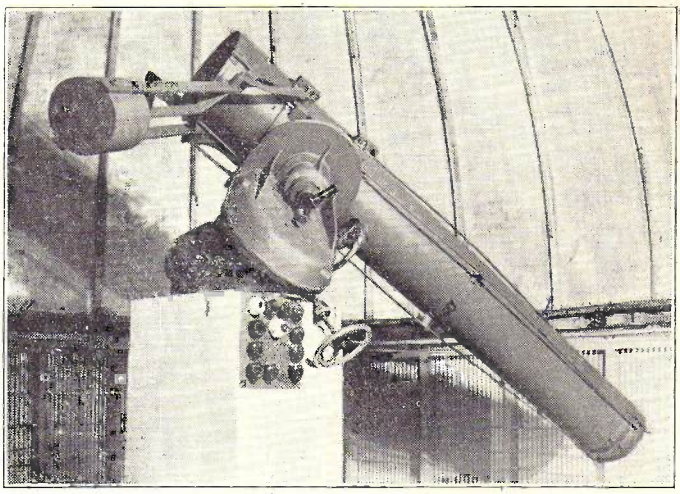
AMATEUR ASTRONOMY

Published monthly by the American Amateur Astronomical Association

Vol. 3, No. 5 MAY, 1937 Ten Cents

WELCOME M-SIO



THE KOKEN 12-INCH REFLECTOR OF THE LOCKSLEY OBSERVATORY

We take pleasure in announcing the affiliation of the Missouri-Southern Illinois Observers with the American Amateur Astronomical Association.

The M-SIO was organized in 1931 by J. Wesley Simpson and J. Fletcher Hickerson of Webster Groves, Missouri. The lack of numbers in those early days was more than compensated for by enthusiasm, diligence, intelligence and the admirable ability of contributing to the science of astronomy through good hard work. At the close of the first year as an organization the two aforementioned had observed 604 meteors and added 237 observations of variable stars to the files of the AAVSO. Through the impetus given by the unexpected appearance of an extremely large and bright fireball which exploded over Tavern, Missouri, shaking the earth and buildings within a radius of fifty miles on January 10, 1932, the membership roster of the growing organization was enlarged by a number of active observers.

In November 1933 appeared the first issue of the now well known Astronomical Discourse as the official publication of the M-SIO. A.D. has faithfully served the beginning and active amateur astronomer alike with pleasing regularity. We are happy to say that A.D. will not be discontinued with the affiliation of the M-SIO with the AAAA but that it will continue to serve astronomy as it has in the past.

During the years 1933, 1934 and 1935, the M-SIO broke all records and attained world-wide recognition for their prolific and valuable contribution to meteoric astronomy. Work was begun on the Locksley observatory in the latter part of 1934 and opened to the public in October, 1935. The Locksley Observatory is one of the largest amateur observatories in the world. Its 18 ft. revolving dome houses the excellent Koken reflector of 12-inches aperture. The latter is mounted on the sturdiest Springfield type mounting so far constructed in the annals of astronomy. The observatory is capably managed by J. Wesley Simpson, director, and Martin E. Friton, assistant director.

Space will not permit a comprehensive review of the many activities of this energetic group but it will suffice to say that the M-SIO is one of the most outstanding amateur groups in the country. The AAAA cordially welcomes the Missouri-Southern Illinois Observers and extends sincere greetings to each and every one of its members. News notes from the M-SIO will appear in future issues of Amateur Astronomy in the pages devoted to the affiliated societies.

We are happy to add also, that the M-SIO will serve as the regional headquarters of the South Mid-Western region of the AAAA.

Table IV.

LONGITUDE OF ORIGIN OF WEST INDIES HURRICANES COMPARED WITH SUNSPOTS

Average Longitude	No. of cases	Ave. sunspot numbers
79 W.	33	39.0
68 W.	32	28.5
78 W.	32	27.1

Regions of terrestrial activity vary in behavior, noticably decreasing in winter. In the East Indies, activity increases wth solar activity while in the North Pacific Ocean it also increases, but to a lesser degree. In the West Indies, as appears from the minus sign in table 3, storms at all seasons, except autumn, are slightly less numerous with higher than with lesser solar activity. In the South Pacific Ocean, this reversal of conditions is complete. This apparent contradiction is directly in line with what is found in close analysis of practically all relations between the activity of solar and terrestrial atmospheres; that is, certain areas are influenced in one way, and others in the opposite. Nevertheless, in certain locations the influence is too regular to be discarded.

The answer may be in locating the spot of birth of hurricanes, reports from some parts being incomplete. An interesting fact is that in the United States at sunspot activity hurricanes increase along the margins of the country, while they decrease in the interiors. If similar conditions prevail in the northern Atlantic, many hurricanes might originate far to the east at times of abundant sunspots, and might swing north, without being recorded as of tropical origin, for lack of reports.

Cyclones

The cyclone has a diameter of a thousand to two thousand miles, the hurricane about one to three hundred, and the tornado only one to ten hundred feet. The hurricane is much more destructive than the cyclone, and the tornado is incomparably greater in velocity of gyration and rending force than the hurricane.

Tornadoes are most numerous in states bordering on the Mississippi and the eastern half of Oklahoma, Kansas and Nebraska. A tornado twists counter clockwise. Four essentials to the formation of tornadoes are as follows:

1. A cyclone, the center of which is to the north or northwest.
2. An isotherm of 70 or over, extending from the southeast well up into the center of the cyclone, and then passing outward toward the southwest, all inside the southeast quadrant of the low.
3. Excessive humidity.
4. Time of year: from March 15 to June 15.

—From *"Earth and Sun"*

Twin Elms Solar Observatory,
Elizabeth, Pa.

Variable Star Section

D. W. ROSEBRUGH, Director

EASY METHODS OF OBSERVING VARIABLE STARS

Last month we gave some hints in locating and estimating the brightness of variable stars. This month we are offering suggestions as to methods of observing and as to the use of the telescope. If these suggestions seem in some cases to apply more to observers using refractors than to those using reflectors, it is because to date more of our members use the former than the latter, so that the writer has picked up more information on the use of refractors. No doubt this condition will gradually change, and it is our hope that when any of our members discovers a new or better way of observing, especially with reflectors, he will let us know so that we can all reap the benefit.

As it is hoped next month to report on the AAVSO convention to be held on May 22 at Syracuse University, this month's hints will be given in as terse a form as possible with a minimum of comments and qualifying phrases

Plan your work every two months for the next two months as follows: When you receive your bi-monthly variable star prediction sheet from Mr. Campbell, make a long straight check mark opposite each star designation for which you have a chart and which is visible at the season. When the night is clear and moonless try, let us say, for the stars which, it is predicted, will be between 12^m and 14^m. If, however, it is full moon, concentrate on the stars between 8^m and 10^m or brighter. As each star is observed, make one cross check on the long straight pencil check already placed opposite the star designation on the list.

Only cross check the star once the first month even though it is observed two or three times. Next month, however, a second cross check should be made opposite each star observed. All stars showing only one cross check are therefore those still to be observed.

A list of those variable stars requiring special attention should be tacked in the wall.

Some of us find it best to file our charts by R.A. with a cardboard spacer and tab at every half hour of R.A. The Milwaukee Astronomical Society group, however, prefer to file the charts by constellations, which are studied one at a time. If this is done there will be less moving of the telescope, though as Mr. Brocchi of Seattle points out in the March Popular Astronomy, some constellations such as Hydra, which covers 108 degrees, are very much spread out.

Charts should be filed loose so that they can be picked out and carried to the telescope eyepiece where they may be consulted with a pocket flashlight with a red or green bulb (the latter is preferred by some observers). A chart in the left hand is useful to shade the eyes from street lights though Miss Louise Ballhaussen uses a large black colored screen 12x24 inches in size surrounding the eyepiece of her refractor for this purpose. A small section above the telescope may be moved away by a string mechanism to permit locating the variable star by the finder.

Glue the finder charts on the back of the "d" charts.

The Rev. T. C. H. Bouton records his observations by stars in a large ledger. Some of us, however, record our observations chronologically on the blanks provided by Mr. Campbell. However, in reporting to him, list your observations by stars in order of R.A.

Observe the stars in the west first, then those east of the zenith, then west of the zenith, and finally those just rising in the east.

Faint stars are best seen by averted vision. Often when looking for a faint comparison star the variable star, hitherto unseen, becomes visible off to the side.

A solid box 9x12x15 inches is useful for sitting or standing on. If covered with carpet it will not be quite so cold to sit on when it is below zero. A step ladder works well as a high seat.

Glue felt on the eye end of your eyepieces. Otherwise your glasses will get scratched of your eyelids chilled in winter, by the metal.

Dew caps lined with dark blotting paper, twice as long as the diameter of the lens they are to protect, should be used in front of every objective lens and may be needed to protect the secondary mirror of reflectors.

The following table of the faintest stars visible with different sized telescopes is of interest.

Diameter, Inches	Mag. Visible
Main Telescopes	
3	11.6
4	12.1
6	13.1
8	13.6
12	14.6
Finder Telescopes	
1	9.1
1.25	9.8
1.5	10.1
1.75	10.4
2	10.6

The table for main telescopes is that usually given by telescope makers for refractors and it applies on good nights. With indifferent seeing or with very low powers one must knock a magnitude off these figures, while, under superlative conditions and the optimum magnifying power, a magnitude fainter can be seen. This main telescope table also applies to reflectors with good coats, but when the coating is dull a half magnitude or more must be subtracted. Finder telescopes are usually equipped with low power, wide field eyepieces, which do not spread out the general light of the sky enough to reveal faint stars. One should, therefore, take a magnitude off the finder column for this reason alone and another magnitude when conditions are poor. A review of this column will indicate the convenience of 1.5 or 2-inch finders magnifying 12 or 16 times on even 3½ to 6-inch telescopes.

Many telescopes fresh from the makers can be improved by installing longidudinal countereights along the barrel.

Serious work can be done with a 3-inch refractor. With a 2″ eyepiece giving a power of 22 such an instrument is the best size for stars from the 7^m to 10^m. Slip in a ¾″ eyepiece magnifying 60 times and you can work down to $12^m.5$ on very good nights. Such a portable telescope equatorially mounted, without circles, made to rotate about a central carriage bolt running down through the wooden tripod head with a wing nut on the under side to clamp it in any azimuth, is the handiest instrument in the world, except binoculars which only reach to 8 or 9^m, for a few quick observations. If looking west, rotate the mounting so the polar axis points north; if looking south point the polar axis west, etc. and the finder

will always be in a handy position for the right eye. A good fork-type alt-azimuth mounting would be nearly as convenient for a refractor and, in fact, Mr. Brocchi prefers an alt-azimuth mounting for his 12" Newtonian reflector as the eyepiece is always level.

Mr. Jones of Goffstown, N. H. uses a 2" eyepiece on his 6-inch Clark refractor for general use. This gives a power of 45 or 7½ per inch of aperture. The writer uses a 1.2" eyepiece with his identical refractor which gives a power of 75 or 12½ per inch of aperture but as Mr. Bouton pointed out in the April issue of Amateur Astronomy the faintest possible stars can be seen with a F15 refractor by using a ¾" eyepiece. This gives a power of 20 per inch of aperture. Mr. Brocchi says that with his 12-inch, F6, Newtonian, he usually uses a ½" hyperplane eyepiece giving a power of 12 per inch of aperture. For the faintest stars he uses either a ¼" orthoscopic eyepiece giving a power of 24 per inch of aperture or a ⅓" single lens ocular which absorbs less light and gives a power of 18 per inch of aperture. From this we may conclude that a power of about 20 per inch of aperture brings out the faintest stars with either type of telescope but that powers of 8 or 12 per inch of aperture are of more general use.

Mr. Brocchi has also furnished the following information: Celestial refractors and Newtonian and Cassegrainian reflectors all give inverted images of the sky. The inversion is complete with refractors and Cassegrainians; that is, the sky seems to be rotated 180 degrees so that north becomes south, and east becomes west. Therefore the AAVSO charts are made inverted to correspond with what one sees. In the Newtonian the inversion may not be a complete 180 degrees; that is the AAVSO chart may have to be twisted somewhat around its center to make it fit the stars one sees. This twist will vary according to the position of one's head and of the eyepiece and of the telescope tube unless it is equatorially mounted. On the other hand, if one uses the ordinary type of zenith prism with a refractor or Cassegrainian, or if the image is brought out to the side of the Cassegrainian, or if one introduces an extra reflection in the Newtonian, as in the Springfield or Pasadena mounting, one has an unhappy state of affairs. Then the image of the sky is not inverted but is reversed and one must either look through the chart from the back or else build a chart reversing box with a mirror as described by Dr. W. L. Holt, Scarboro, Me., at the 1935 spring convention of the AAVSO.

There are only a few observations to report this month because the date for mailing this to the printer has been moved ahead, but please continue to report your observations and still more your comments.

Name	Stars	No. of Obs.
Brocchi	12	20
Callum	23	42
Hartmann	113	262
McNabb	2	11
Rosebrugh	54	104
Halbach	2	2

Mr. Brocchi found the irregular variable star Z Cam and the U Gem type star X Leo at maxima of 104 and 121 respectively, both at the same time, namely J.D. 602. Such coincidences as this add spice to an observer's work.

The AAVSO chart committee including Messrs. Brocchi, Hartmann and Webb and Prof. S. A. Mitchell, University of Virginia, has just issued a new Catalog of Variable Star Charts superseding that in the Instruction Booklet. Among the improvements noted are: it gives the number of the correct finder chart alongside the name of each star, lists the "C" charts issued two years ago and mentions the special red charts. It also shows that the much needed "d" chart on Nova Lacertae, 221255, is ready and that a "b" chart is available in 191201 Nova Aquilae which will be visible again by midnight after May 15. Write Mr. F. Hartmann, Chart Curator, 171-25 144th Ave., Springfield Gardens, L. I., N. Y. for charts.

It is anticipated that 045540 Zeta Aurigae, the well known long period eclipsing variable, will undergo a month's minimum starting about April 22. Perhaps by next month some of the early observations on this star may be available for discussion in this column.

3 Yates Blvd.,
Poughkeepsie, N. Y.

ERRATI

Volume 3 No. 3 (March 1937) Page 68: Please change sentence in line 16 to read: These seven persons contributed approximately 85% of the total observations obtained in the region.

Volume 3 No. 4 (April 1937) Page 75: Please change the word "decreases" in line seven from bottom (not including address) of page; second column to read "increases."

AAVSO Nova Program Report

L. E. ARMFIELD

All participants in the nova search deserve much credit for extending the survey of their fields to the fainter magnitudes as will be noted in the columns below. The reports received are becoming more valuable each month and it gives great satisfaction to know that many of the areas assigned are being observed so carefully and assiduously.

			Mangnitude of faintest star easily visible						Total
Observers	Location	Region	7 or (7	6	5	4	3	2	Nights
Abrahams	Milwaukee	56	6	10	2	—	—	—	18
		65	—	14	2	—	—	—	16
		66	—	14	2	—	—	—	16
		67	—	14	4	—	—	—	18
		68	—	14	4	—	—	—	18
		69	—	14	4	—	—	—	18
		80	—	11	4	3	—	—	18
		81	—	11	4	3	—	—	18
		82	—	11	4	3	—	—	18
		91	—	14	4	—	—	—	18
		92	—	11	5	2	—	—	18
Ballhaussen	Scarsdale, N. Y.	12	2	4	1	1	—	—	8
		33	—	8	2	—	—	—	10
		55	—	3	2	3	—	—	8
		57	—	1	4	—	—	—	5
Cox	New York	62	—	6	—	—	—	—	6
		65	—	12	—	—	—	—	12
Diedrich	Milwaukee	43	—	—	2	—	—	—	2
Friton	St. Louis (Jan.)	9	—	4	2	—	—	—	6
	(Feb.)	9	—	—	6	2	—	—	8
	(Mar.)	9	8	—	2	—	—	—	10
	(Jan.)	10	—	4	2	—	—	—	6
	(Feb.)	10	—	—	6	2	—	—	8
	(Mar.)	10	8	—	2	—	—	—	10
Halbach	Milwaukee	49	—	—	—	2	1	—	3
		50	—	—	—	2	3	—	5
		71	—	2	5	3	—	—	10
		99	—	1	—	—	—	—	1
Kirkpatrick	New York	92	—	1	2	—	—	—	3
McNabb, Jr.	Acton, Canada	8	1	3	—	—	—	—	4
		72	6	10	—	—	—	—	16
		58	—	7	—	—	—	—	7
Moore	Milwaukee	54	—	9	7	—	—	1	17
Olson	Chicago	51	10	1	4	—	—	—	15
Rosebrugh	Poughkeepsie	1	3	9	2	—	2	—	16
		52	9	5	2	—	—	—	16
Thomas	Cambridge	3	—	—	—	5	5	—	10

12 Observers 33 Regions 3300 square degrees of sky reviewed.

Richard Abrahams contributed the fine total of 194 observations of the 11 areas he is reviewing. Even illness did not deter Miss Ballhaussen from observing her regions; she caught them through her window as they marched by. Each of Robert Cox's observations is to the sixth magnitude or fainter. Edwin E.

Friton reached seventh on practically all evenings he observed during March. Neil McNabb submitted a long list of observations with none fainter than sixth. Using binoculars, Darrel Moore reached sixth in the heart of Milwaukee for the majority of his observations. E. H. Olson of Chicago continued his good work with observations to fainter than seventh on ten nights. D. W. Rosebrugh, the first to extend the survey to the seventh magnitude, contributed a fine list of observations as usual.

The following observers reviewed their regions with binoculars or low powered finders: Ballhaussen, Cox, Friton, Kirkpatrick, McNabb, Jr., Moore, Olson and Rosebrugh.

Much impetus is being given to the nova search program by Dr. Helen S. Hogg, former Chart Curator of the AAVSO, located at the David Dunlap Observatory, Richmond Hill, Ontario, Canada, who is assigning search areas to members of the Royal Astronomical Society of Canada. Her efforts are greatly appreciated and we trust that many of our Cnnadian friends will join us in our watch of the sky for new stars and comets.

1410 N. Marshall Street, Milwaukee, Wis.

Calendar of Events

MAY, 1937

Wed. 19 Opposition of Mars and the moon at 11:31 A.M. Mars 0° 33′ north. Chi Herculid meteors.
Tue. 25 Full moon at 9:24 A.M.
Thu. 27 Mars 47,000,000 miles from the earth (closest approach this year).
Sat. 29 Conjunction of Jupiter and the moon at 1:51 P.M. Jupiter 3° 54′ south.
Sun. 30 Iota Pegasid meteors.

JUNE, 1937

Tue. 1 Last quarter at 11:24 P.M.
Fri. 4 Alpha Scorpiid meteors.
Sat. 5 Conjunction of Venus and the moon at 4:00 P.M. Venus 6° 10′ south.
Sun. 6 Mercury 24° west of the sun.
Mon. 7 Conjunction of Mercury and the moon at 12:52 A.M. Mercury 5° 40′ south.
Beta Herculid meteors.
New moon at 10:12 P.M.
Tue. 15 First quarter at 3:36 A.M.

A. M. S. Meteor Notes

WISCONSIN-NORTHERN ILLINOIS REGION

L. E. ARMFIELD

With many apologies to the faithful contributors listed below for the delay incurred in publishing their reports the followng observations of telescopic meteors have been received for the year 1936.

Observer	Location	Number of minutes at eyepiece	Number of Telescopic meteors
Callum	Chicago	3727	5
McNeill	Chicago	No record submitted	8
Rosebrugh	Poughkeepsie	489	1
Armfield	Milwaukee	432	4
4 Observers		4648	18

Messrs. Callum and Rosebrugh as usual contributed excellent subordinating data which is so necessary for a statistical study of telescopic meteors. Mr. McNeill's initial report is excellent likewise and we apppreciate greatly his keen interest in the study.

In an appeal to other variable star observers for their cooperation it might be well at this time to mention briefly the statistical study of telescopic meteors for which your scribe has been slowly gathering data during the last four years. While observing variable stars for the AAVSO and recording incidental telescopic meteors for the AMS during 1933 it occurred to the writer that the value of the data pertaining to telescopic meteors could be much enhanced by simply keeping track of the number of minutes an observer actually spent in looking through the eyepiece of the telescope while observing variables. Adding also the magnitude of the faintest star readily visible through the eyepiece having the power normally used by the observer, the time of observation and the condition of seeing on a scale of five basis during each observation. Before attempting to interest others in the work the writer gathered the additional data for a year to test its practicability. In the beginning a watch was tied to the draw tube of the telescope and the minutes spent looking through the eyepiece were carefully noted and recorded along with the other data aforementioned.

At the end of the year when the data were compiled in summary form its enhanced value was readily apparent and more than jusified the continuation of the program. Data sheets were then designed and printed for use at the telescope which greatly facilitated the recording of the data desired by the AAVSO, the AMS and the statistical telescopic meteor study. During 1935 the additional information was gathered also by Messrs. Callum, Halbach, Diedrich and Knott. After recording his time manually for a few months, Mr. Halbach, that inventive genius of the MAS, constructed an electrical stop watch which records the time actually spent at the eyepiece by the pushing of an on and off switch held in the hand. The electrical stop watch also gave the Milwaukee observers a good check on the time recorded manually. It was rather gratifying to learn that with a given observer, the manual and automatic times were in extremely good accord.

Mr. Rosebrugh joined the small clan in 1936 and after the year's work suggested further improvements in the manner of gathering data by regular variable star observers. The data sheet has been revised recently in accordance with his suggestions and, as it exists today, it appears that the data sheet will be of value to variable star observers even though they do not join us in the meteor business.

It is unfortunate of course, that the aforementioned data could not have been obtained by some variable star observers since the inception of the AAVSO. However, from the experience gained so far it appears that it would be feasible to go over the old records of individual observers in the files of the AAVSO and derive mean factors for eyepiece time, magnitude of faintest star readily visible, etc., thereby gleaning the statistical material needed for the study. It will be a large task to be sure but time means little in astronomy, except in eclipses and occultations, and if it is not finished in this generation it may be in the next.

The outline of the work proposed above is admittedly much too brief but space will not permit further elaboration. It was presented however, in the hopes that other regular variable star observers might become interested to the point of communicating with the writer for further details or to use the data sheets now available for recording their variable star observations at the telescope and adding the few extra items desired for the study. It must be mentioned that the use of the forms is not intended to conflict with the present methods used in reporting their variable star observations to the recorder of the AAVSO, or their observations of incidental telescopic meteor observations to the AMS, but rather as a means of recording the data at the telescope for all purposes on one form. This means that the variable star observations which go to AAVSO headquarters will need to be copied to the regular AAVSO monthly report blank, the incidental telescopic meteors will need to be copied to the forms provided by the AMS and the data sheet just sent to Milwaukee where the data will be compiled at the end of each year for study purposes.

Two way radio communication was again used between Professor Oakley's station in Milton and the Milwaukee station on Phillips Farm in Waukesha County for duplicate meteor observation during the Lyrid and Aquarid maxima. Static, clouds and skip fouled the attempts during the Lyrids. Better success was attained during the Aquarids; the weather was ideal, the reception good but meteors few and far between. Messrs. Halbach and Peck motored to Milton to assist Professor Oakley while Messrs. Schmitz, Albrecht, Cooke and Armfield manned the Phillips Farm station. Four meteors were seen in duplicate between 2:30 and dawn on May 5-6, 1937. R. D. Cooke is computing the beginning and ending heights and further comments will be had from him in the near future.

Milwaukee, Wis.

1410 E. Marshall Street,

The official monthly publication of

American Amateur Astronomical Association

Publication Headquarters

1312 E. Curtis Place, Milwaukee, Wis.

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Astronomical Society of Rutherford, N. J.
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Astronomers Guild of Jamestown, New York.
Chicago Amateur Astronomical Association, Chicago, Ill.
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Ten cents per copy, $1.00 per year.
Membership in AAAA, $1.00 per year. including subscription.

Send all communications to the above address.

Metropolitan Notes

ASTRONOMICAL SOCIETY OF RUTHERFORD, NEW JERSEY

JAMES S. ANDREWS, President
33 Franklin Place, Rutherford, N. J.

The last meeting of February was led by Theodore Treadwell who talked on "Atomic Structure", and by Mr. Fisher on "What Keeps the Stars Shining." The first meeting in March was devoted to observations through Mr. Treadwell's 8-inch telescope, though the weather was not too good. General discussion was in "Stellar Magnitudes."

LONG ISLAND TELESCOPE MAKERS
E. H. CHRISTMAN, Correspondent

Adolph Scholl presented a discussion provoking questionnaire on double stars. The Feb. 19 meeting at the home of Dr. Frost also included a facetious talk by H. Turner on a clock drive to end all clock drives. Seriously, the group now boasts five drives of outstanding performance and two in the course of construction. Let us get out of the cellars now, boys!

Harold Webb showed us his new book, "Observations of the Planet Mars." It is a timely publication as Mars will soon be in opposition. Some members were able to compare drawings which they

April 9 will go down on our calendar as the date of distinction. It was on this date that the first photos of our group in action were taken. Charles Coles, museum photographer, helped us take our first step toward the organization of a rogues gallery of New York's Telescope Nuts.

Carl Grosswendt, our hard-working secretary, has finished a 6-inch pyrex mirror and is starting a 10-inch pyrex.

81st Street and Central Park West
New York City

Tri State News Notes

AMATEUR ASTRONOMICAL ASSOCIATION OF PITTSBURGH

WILLARD A. MacCALLA, Correspondent

Our annual "Argufy and Gabfest" was held on March 12. The meeting was graced by such distinguished fellow fact and fancy fumigators as past Presidents Chester Roe and Warren Donaldson, Troy Russell, hardware expert, and Dave Brown of "North Star Observatory" fame. We were also honored by the presence of Z. Daniel of Allegheny Observatory, who joined in the evening's "Argufication". He explained how to find the new Wilk comet and described its movements, speed, etc.

Because of the unusual sun spot phenomena during the past month, we were particularly interested in hearing Mrs. Wiegel describe her recent solar work. She appealed to the younger members to take up this fascinating study. Will MacCalla has been estimating the size of some large sun spots by projecting the sun's image on a screen. In addition to solar work, he reported observations of Mars and Venus, as well as some assorted variable stars. Leo Scanlon's variable work has been slightly disturbed in recent weeks while his mirrors are being aluminized. Leo has just completed another 6-inch reflector, this time for a furniture store owner. Our president, Sam Weissiger, not to be outdone, has almost completed his own refractor.

The real feature of the evening was the story of recent secrets, discoveries, trials and tribulations in the making of mirrors and lenses as told to us by the "Optical Twins" themselves, Joe Goin and Larry Scanlon. Joe explained some of their new wrinkles in the art of rough grinding, "skinning" mirrors, beveling, template cutting, reaching focal lengths quickly, and avoiding sleeks and scratches. Due to the splendid teamwork which they have developed, making pitch laps holds no terrors for Joe and Larry, to whom the whole job is only 20 minutes' work. Believe it or not, the boys have invented a contraption by means of which they actually grind some mirrors with their feet! With this contraption, round disks are cut from square pieces of glass with the greatest of ease. While Joe didn't have time to tell us all of the secrets which we know the twins possess, he certainly hit the high spots in an instructive and entertaining manner.

An attractive astronomical display, arranged by our group, occupied the Fifth Avenue window of the Farmers National Bank in Pittsburgh, from March 19 to March 26. A number of neatly arranged mirrors, tools, prisms, eyepieces, pictures and books were included in the display. The splendid model of the 200-inch telescope, constructed by C. E. Raible, attracted particular attention.

At our meeting on April 9, Dr. Homer Rutherford, seismologist of the University of Pittsburgh, discussed the increasingly popular subject of "Earthquakes". Further details of the meeting will be reported in the next appearance of this column.

Valley View Observatory,
Pittsburgh, Pa.

Milwaukee News Notes

M. N. FISHER, Correspondent

The Milwaukee Astronomical Society had an academic field day April 9 and 10 when it met with the Wisconsin Academy of Sciences, Arts and Letters, the Wisconsin Archeological Society and the Midwest Museums Conference at the Milwaukee public museum. Papers were read by Edward A. Halbach on coordinating meteor observations by radio; by Lynn Matthias on celestial photographic photometry with small cameras and by M. J. W. Phillips on amateur telescope making by high school students. Many members of the MAS attended the talk by Joel Stebbins and Albert E. Whitford, of the Washburn Observatory, on "Gadgets and Galaxies," the evening of April 9. The photo-electric cell was demonstrated on the platform.

A. C. Tabbatt has donated for the summer his 8-inch f.15 reflector for use by members of the society at the Phillips farm, which will henceforth be the nucleus for observers of the Milwaukee group.

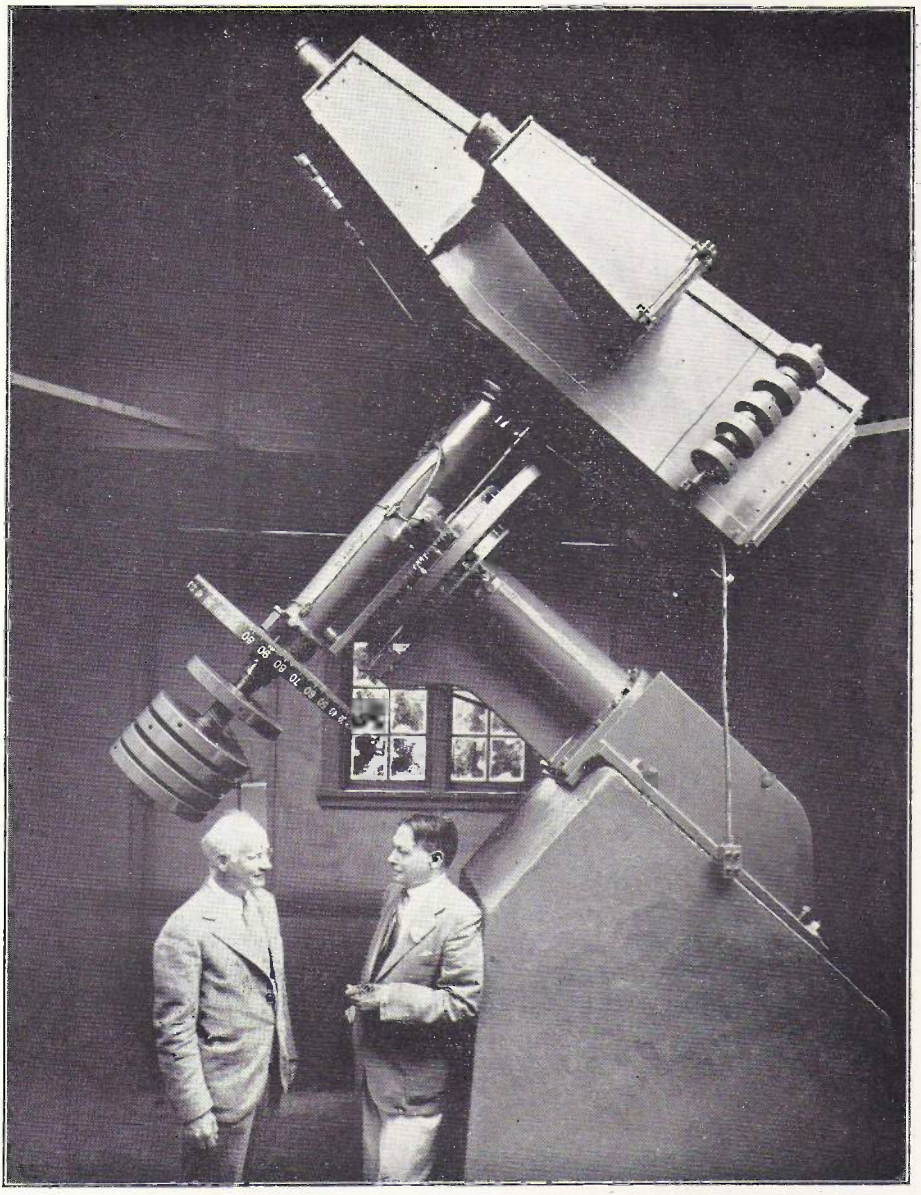
Dr. Ross H. Bardell, of the University of Wisconsin extension division, will speak at the May meeting of the society.

836 N. 14th Street
Milwaukee, Wis.

AMATEUR ASTRONOMY

Published monthly by the American Amateur Astronomical Association

Vol. 3, No. 6 JUNE-JULY, 1937 Ten Cents



THE ASTROGRAPHIC CAMERA of the Cook Observatory, the largest of its type in the world. The large camera is to use a 10-inch lens, on a 20 x24 plate. The smaller one is for a 14x17 plate. The 8x10 camera is on the opposite side. Standing below are seen Dr. Cook (right) and J. W. Fecker, builder of this and most of the other equipment of the Cook Observatory.

The Cook Observatory

A UNIQUE INSTITUTION ESTABLISHED BY A PHILADELPHIA AMATEUR

JAMES T. STOKELY, Director
Fels Planetarium

In a suburb of Philadelphia, among many fine homes, is a unique scientific institution. At Wynnewood, Pa., on the seven acre estate of Gustavus Wynne Cook, banker and manufacturer, is one of the world's outstanding private observatories, one with equipment that any college would be proud to own. Of course, other men of means have erected telescopes, some of sizable dimensions, but too often they are merely playthings. The Cook observatory is distinguished by the fact that its superb instruments are being put to good scientific use by a staff of three regular observers. Important work has already been accomplished.

A group of observatory domes in a residential area, might be considered offensive by the neighbors, and the buildings of the Cook observatory are of cottage type, surrounded by beautiful flower gardens and fine old trees. Most of the instruments are covered by roofs that can slide back to expose the sky to view.

Chief of the telescopes is a reflector, in an open fork mounting, with an aperture of 28.5 inches, a product of the factory of J. W. Fecker, in Pittsburgh. Attached to its framework tube is a 9-inch refractor, the lens by Alvan Clark, and a 6-inch finder. Much of the work done with this instrument has been with a three-prism spectrograph attached.

Next, as one makes a tour of the observatory, is a computing room housing clocks, a chronograph, and a working library. Then comes the transit room with a 3-inch prism transit for time determinations. This was constructed by Dr. Cook himself, and it has received the admiration of many professionals.

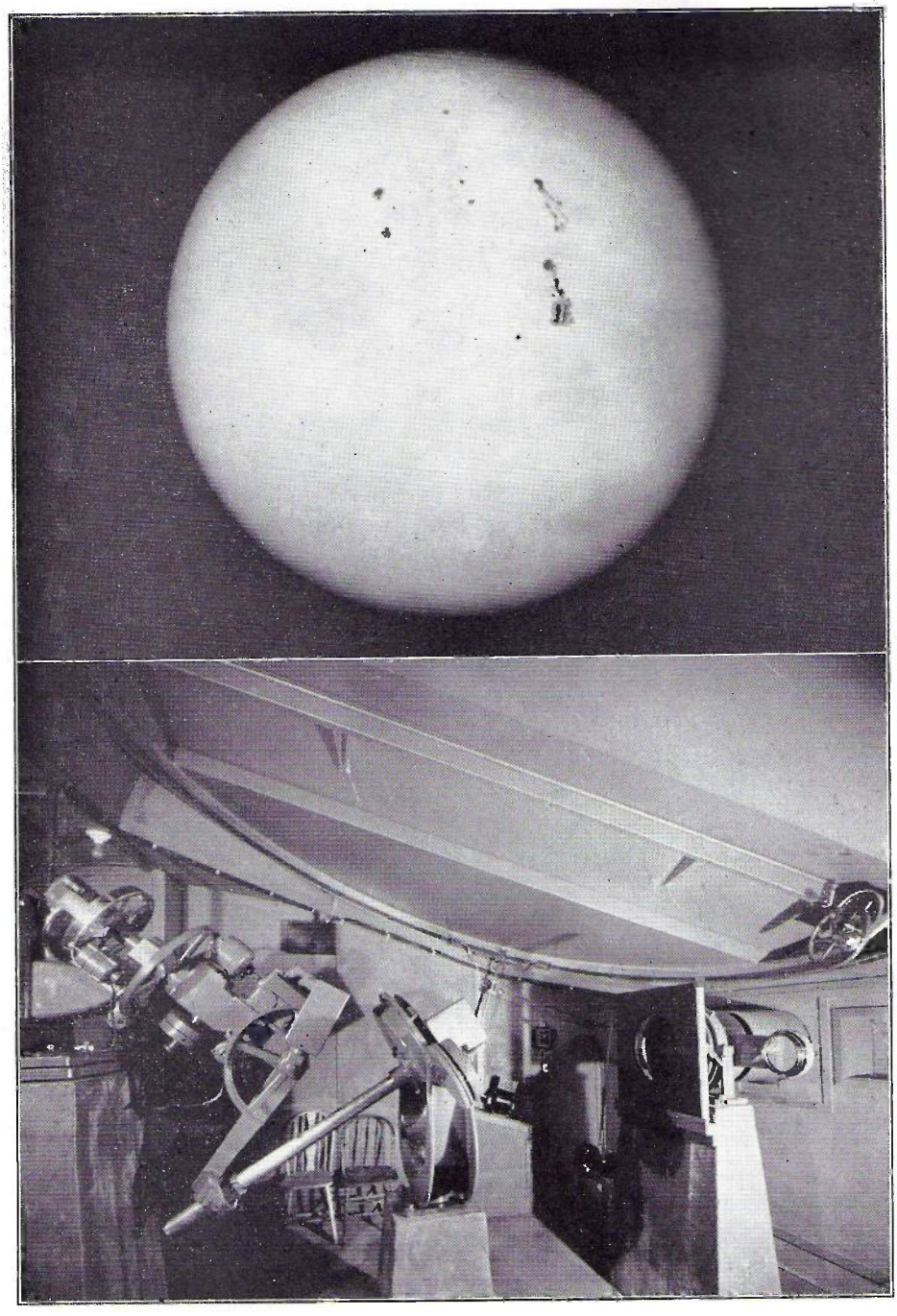
The next room, at first glance, seems as little like an observatory as one could imagine. At first, one has the impression of being in a comfortably furnished room in a home. Then a platform is noticed at one side. On the wall above this platform is a strange assortment of push buttons and dials that seem reminiscent of the controls of a submarine. This is the eye-end of a telescope, one of the most extraordinary ever built.

Going out of doors and investigating the outside of the same wall, a horizontal tube is found, connecting with a smaller building a few yards to the north, inside which the astronomical function is revealed. Here is a siderostat telescope, a kind very rarely built, though it has many advantages. With the ordinary telescope, the temperature in the observing room must be the same as outside. Otherwise, ascending air currents will cause a turbulence that ruins the definition. But with the siderostat telescope, the observing room can be heated in winter, or, for that matter, cooled in summer. The telescope projects through the north wall of the building, and a clock-driven flat mirror reflects the light of the heavenly bodies into the lens.

In the Cook observatory installation, the flat mirror is 25 inches in diameter and mounted on a fork that is moved electrically with great accuracy to follow the motion of the stars across the sky. The lens is 15 inches aperture. There are two front elements which can be interchanged according to whether it is desired to use the telescope for photography or for visual observation. In order to operate the telescope it is only necessary to go to the outer building, open the roof above and uncover the mirror and lens. Then, everything can be controlled through electric motors from the observing room. The dials indicate the setting in right ascension and declination. Mr. Fecker constructed the mechanical parts of this instrument. The lens was made some years ago by his predecessor, John A. Brashear, for the Philadelphia Central high school, but was never mounted.

Attached to the building where the flat and lens are located is another structure. This, also with sliding roof, is the location of the great triple star camera, the largest of its kind yet made, with three lenses of the type devised by Dr. F. E. Ross of the Yerkes observatory. These lenses permit sharp photographs of the sky over a much larger area than was possible with previous types. The largest lens is 10-inches diameter, and takes pictures on a plate 20x24 inches. The second lens of 5-inches aperture covers a 14x17 inch plate, and the smallest, a 4-inch lens, covers an 8x10 inch plate. A visual telescope is also attached to permit the photographer to guide the instrument during long exposures.

PART OF THE CONSTELLATION OF CYGNUS, photographed with the 4-inch Ross-Fecker lens of the Cook Observatory by Louis P. Tabor. The star at the top is Deneb, and to the left of it can be seen the North America nebula. Near the bottom the Network nebula is visible.



THE SUN, photographed on April 24th with the 40-foot phototheliograph of the Cook Observatory by I. M. Devitt, showing an unusually large crop of sunspots which were visible to the naked eye.

SIDEROSTAD AND 15-inch objective of the Cook Observatory horizontal telescope. The shutter in the circular roof opens, and the light of a celestial body shines on the 25-inch mirror supported in the fork in the center of the picture. This reflects it into the lens. The mechanism to the left moves the mirror to follow the diurnal motion of an object.

With this battery of cameras, also the work of Mr. Fecker, Dr. Cook intends to photograph the entire Milky Way on the large plates. These pictures will ultimately form an atlas of the Milky Way that will be presented to observatories throughout the world. Of course, the southern skies cannot be reached from Wynnewood, so after the northern sections have been taken, he expects to move the cameras temporarily to a southern station, perhaps in South Africa. On this account, the mounting was so made that it can be moved with a minimum of trouble for an outfit weighing several tons. When transferred, it will be only necessary, at the other location, to erect a concrete pier with the top slanting at the proper angle. The entire motor drive and polar axis can be bolted to the top in one piece, and then the cameras can be attached.

Adjoining the observing room of the horizontal telescope is a large darkroom where the 20x24-inch plates can be handled conveniently. This, like the observing and computing rooms, is heated by steam from a gas-fired boiler in a small structure about 50 feet away.

In another group of buildings is the solar observatory. On a pier to the north is a lens of 40-feet focal length, fed with sunlight by a flat, unsilvered mirror. The image of the sun is formed in a darkroom where a photographic plate is supported on another pier. A shutter drops in front of this plate. To use it, the plate holder is loaded, the shutter set, and a window opened to let the beam inside. The observer adjusts the mirror until the image is formed on a target of cross lines, painted on the front of the shutter. Then the pressure of a key operates an electromagnet, the shutter is released and the exposure made. The windows closed, the same darkroom is used to develop the exposure.

This building also accommodates the spectrohelioscope. The two-mirror coelostat is to the south, on a pier with the 20-foot focus lens. The light beam enters through another opening and falls on the rotating mirrors and the other equipment used to permit solar observations in the light of a single wave length.

Dr. Orren Mohler was the first member of the Cook observatory staff, other than Dr. Cook himself. He has been using the spectrograph of the reflector in a study of spectroscopic binary stars, radial velocities, and novae. He made a very complete series of spectrograms of nova Herculis and some of his preliminary results were gathered together more than a year ago in the first publication of the Cook observatory. Lately he has applied the Geiger-Müller counter, a device frequently used to detect cosmic rays, to study the brightness of the stars. So far it does not surpass the usual photoelectric cell in sensitivity, but it is theoretically capable of responding to far less light, and this research may lead to important results. Already he has used it to detect for the first time a band of ultraviolet radiation of very short wavelength from the sun. During the spring of 1937 he is visiting the Lowell observatory to continue this work. The 7000 foot altitude of northern Arizona with the clear skies overhead, will be superior to the usual conditions around Philadelphia.

Two other members of the staff are engaged on part time. One is Lewis P. Tabor, a science master of Episcopal Academy, a boys' private school. An expert photographer, with extensive knowledge of its technical and scientific aspects, he is in charge of the stellar photography, with the different instruments. He is making the Milky Way series with the large camera.

I. M. Levitt, a member of the astronomical staff of The Franklin Institute, is the solar observer. Each clear day, from 11 A. M. to 1 P. M., he works with the spectrohelioscope and the sun camera making a record of spots, prominences and other solar disturbances. By means of a camera attachment to the spectrohelioscope, he is able to photograph the sun in the light of a single wavelength, as well as to view it with the eye. A few months ago, he made changes in the instrument in order to make motion pictures as well.

These solar observations are part of an international program, and reports

are regularly sent to the headquarters in Paris. With this program completely in operation, the sun will be under scrutiny of at least one cooperating observatory every moment of every day, and no important, but fleeting, disturbance can be lost.

Desirous of aiding astronomical science as much as possible, Dr. Cook has also made his observatory available several times to visiting astoronomers, who found his apparatus particularly convenient for their work. It certainly seems that this amateur observatory may well become one of the important observatories of the world. Perhaps the authorities of the University of Pennsylvania had something of this sort in mind when they gave its founder an honorary degree of Doctor of Science last June.

Philadelphia, Pa.

AAVSO Meeting in Syracuse N. Y., on May 22, 1937

LOUISE BALLHAUSSEN

Reading from left to right:

Halbach
Jose
Mrs. Hamilton
Miss Schwartz
Mrs. Jose
Arminger
Miss Farnsworth
(Unknown)
Dr. Hogg

Rehnolds
Campbell
A. L. Wallon
Carpenter
Shapley
Mrs. Shapley
Hamilton
Jones
Callum

Miss Ballhaussen
Andrews
Armfield
Doolittle
Scanlon
McNabb, Jr.
Witherell
Van Wyck
Elmer

(Clausing behind the camera)

Many members of the AAVSO enjoyed the annual spring meeting on May 22 in the University of Syracuse, where we received a hearty welcome from Dr. Jose and Vice-Chancellor Graham.

In spite of threatening skies, which seem to be the rule for astoronomical gatherings, some of the members straggled onto the campus on Friday evening. Of these, a few attended to business in the council meeting, while the others inspected the small, though interesting and well-equipped, observatory under the guidance of Lockwood Doolittle.

Next morning, about twenty-five or thirty of us met in the library for the regular business meeting and presentation of papers. The business included mention of new members elected, resignations, etc., tribute to the recently deceased Mr. Yalden, and various committee reports, besides the secretary's report. As usual our alert recorder had many pointed comments to make, especially in regard to the reading of the record by our inimitable secretary, Charles W. Elmer, whose report was accepted by the president, Dr. Harlow Shapley, "as it should have been written" rather than as it was spoken. Dr. Leon Campbell also posted the plotted light curves of several important variable stars, including Nova Lacertae, now near tenth magnitude, and DQ (Nova) Herculis, just below eighth. Later he mentioned the suggestion that T Orionis and similar stars resemble old dying novae sufficiently to deserve a separate classification other than "irregular."

In an attempt to explain the curves of SS Cygni stars, Noel McLeod from the far northwest sent an all-too brief paper suggesting especially that these stars consist of a small, very dense nucleus and large outer atmosphere; in accordance with some theories on stellar structure, the light variations may be due, he says, to sudden, possibly periodic, releases of energy from behind a comparatively opaque layer.

Following this paper, Mr. Doolittle gave a short biography of Mr. Calthrop, a famous Syracusan who predicted the local weather with uncanny accuracy over a period of many years—with never a miss—by means of extensive observations of sunspots. We remained puzzled, however, as to how his rules for prediction would apply also to other parts of the world, such as in the following instance: "A large spot appearing on an otherwise clear sun precedes by 3 days a noticeable terrestrial storm." Does this statement imply that such a storm is felt over the whole earth or only in Syracuse? If the latter, why should the spot affect so small a portion of the earth? His success provides much food for thought and investigation.

The question was next brought up as to the future of the Syracuse observatory, for it has no regular staff or director. Naturally, Dr. Shapley replied, that, since Harvard had already acquired the 6½-inch Roe telescope (now at Oak Ridge)—in other words, Syracuse's only other observatory—Harvard should take this one over also, possibly to be managed by the AAVSO. Nevertheless, the fate of the instruments was left unsettled.

The sad tale of another idle observatory at Colgate was then related by Richard Hamilton. Following him, James S. Andrews, now official astronomer of the Rockefeller Center observation roofs, consumed thirty minutes in pointing out on his slides scenes visible from his telescope on the roofs of the RCA buildings. Though he never observes himself, he hopes to disseminate sufficient interest in astronomy to add some new members to our organization. The morning session was then concluded with the taking of numerous photographs of each other by the members on their way to lunch.

We reconvened about two o'clock for the social part of the meeting. Everyone was very delighted to meet the grand old-timers and shy new additions, some even from Canada. We appreciated especially the great interest shown by the mid-western group in driving 825 miles to this gathering. In fact, the night before, we had noticed a bright meteor moving swiftly toward us, and we learned that it was Armfield, Callum, Clausing, Halbach and Scanlon burning up the road to arrive on time, which they almost did. On the other hand, we were very sorry not to see Mrs. Helen Thomas, Mr. David Pickering, Dr. Brown, Miss Anne Young, and our many other friends, whom we hope to see in mid-October at the Harvard College observatory. We hope, too, that Mrs. Rosebrugh has by now fully recovered from her recent operation. The Association feels especially keenly the loss of our beloved former secretary, Tyler Olcott, and the many-sided "Baron" Yalden.

After introductions, our astronomical caravan of eight automobiles stretched out like a good political funeral procession (simile due to Elmer), played follow the leader and cracked the whip behind Dr. Jose. Although we had anticipated visiting Green Lake, we missed the road and actually stopped at the Chittenango Falls. Before enjoying

the falls, we emtpied several bottles of beer, while Armfield ruined several good negatives by turning the camera the wrong way,—well, he knows how, now. You should have heard the constant buzz of clicking cameras in a feeble attempt to catch and retain the impressive beauty of approximately one-hundred and fifty feet of sheer drop of sparkling water, gleaming in the sun and showing a lovely rainbow as viewed from the top of the falls. Some of the crowd descended to the river bed below, there to get rock specimens and pictures, besides trying to cross the water on a flimsy, one-rail bridge. The spot was indeed very delightful and refreshing.

All too soon, the leader called us away to a long, though pleasant, roundabout drive back to town. There, while Armfield scurried around trying to sell his nova search regions, we refreshed outselves with soap and water, mostly beer, while waiting for the 8 candle-power banquet at one dollar each, which started on time half an hour late. A new precedent was set—for the first time in the 25' years' history of the Association, we were guests of the University at dinner. The charge of one dollar was repealed. The Scotchman, William Callum, on hearing of this, invited Mr. Elmer as his guest. And a very good dinner it was—all thanks to Syracuse. In fact, Mr. Elmer made the motion to pass a resolution of thanks and appreciation for everything, named and unnamed, to Dr. Jose, Vice-Chancellor Graham, and the University of Syracuse. This was passed unanimously by a standing vote.

After dinner, the first vice-president, Verne Armfield, ran the show. Many of the members remarked that, in spite of his inexperience as toastmaster and youth, he did very well, except that his voice did not carry to the furthermost parts of the hall. During the dinner, one could see him scrambling around to get victims to speak. That he succeeded is evident from the following brief excerpts:

Mr. Fredricks, a Syracusan, mentioned that he had only just learned of our work in the AAVSO.

Mr. Leo Scanlon invited us, in speech of only a minute's length, to visit the Pittsburgh planetarium upon its completion about May 1939.

Mrs. Hogg, our former Chart Curator from Toronto, mentioned some facts about Toronto's new David Dunlop Observatory.

Dr. Leon Campbell commented on the T Orionis Group, which includes also RR Tauri and V Sagittae. These stars show some resemblance with Nova Persei No. 2 in that the range is about 2½ magnitudes and the period short, though somewhat irregular. Hence, perhaps this group should receive the designation of "old novae" rather than "irregular."

Mr. Callum, the Scotchman, after living in the flat West, appreciated our New York hills so much that he almost thought he could hear the bagpipes playing. An especially interesting comment was on his introduction to astronomy because of the troubles of the Depression.

Mr. Armfield gave a brief appreciation of Drs. Shapley and Campbell for their ever faithful help and inspiration. Also, he forgot to give his own speech on the work of the Milwaukee group.

Dr. Shapley gave the most unusual and stimulating speech of all, taking as his subject the known senses of man and adding some hypothetical new ones that would enable us more fully to understand such simple phenomena as gravitation, the complete electromagnetic spectrum, telepathy, and allied problems. For instance, with a sense of heat rays, we could learn about dead stars which radiate only in the far infra-red. And in regard to telepathy, much research is necessary on the homing instinct of bees and the mating of butterflies which find each other regardless of great distances. Are brain waves involved? It has been found that electrical impulses in the brain of man occur irregularly when he tries to think but regularly in sleep. Dr. Shapley certainly gave us food for thought.

After the resolution of thanks was carried, the meeting adjourned amid a thunderstorm, until October 16, 1937. We all hope that that meeting will be as successful and stimulating as this one, and we are looking forward to seeing all our friends of the Association at Harvard. May the interval be productive of much good astronomical work to tell about in the fall.

Submitted by Louise E. Ballhaussen, with slight revision by Jonesy and Elmer on the train ride to New York.

1 Gilmore Court,
Scarsdale, N. Y.

Variable Star Section

D. W. ROSEBRUGH, Director

Zeta Aurigae, a Remarkable Eclipsing Variable Star

Before considering the classification of variable stars it appears better to describe a number of typical variable stars.

Because 045540 Zeta Aurigae is now (J. D. 8661) undergoing its first minimum since August 1934 and is the cynosure of all astronomical eyes, it seems best to start the series of descriptions with this remarkable star.

Zeta is a spectroscopic binary; that is, it is a double star the components of which are too close (0.033" apart at most) to be separated by eye with the largest telescope. Nevertheless, it gives indications of the presence of two separate and very different stars when the light is examined with the spectroscope. By a fortunate accident the orbit in which the two component stars revolve about their mutual center of gravity lies edgewise to the earth so that every 972.4 days the smaller of the two stars passes behind the larger and its light is cut off or eclipsed by the larger. Zeta Aurigae is therefore an "eclipsing variable star" similar to Algol, and because of this fortunate circumstance a great deal of information regarding the two stars can be derived. Zeta is not one of the regular AAVSO stars because its variations in visual brightness are comparatively slight so that photographic and spectroscopic analyses are necessary to secure the fullest information about the star. However, the following series of visual observations made during the present eclipse, which is not yet finished, may prove of interest.

Date	Mag.
J. D. 612 to 640 incl.	4.4
644	4.5
648	4.6
653	4.6
654	4.6
655	4.6
656	4.6
661	4.6

Note: Star is now at minimum about $0^m.2$ below its maximum of 4.4 existing prior to J. D. 644.

In the Feb. 1935 issue of *Scientific American*, Dr. Henry Norris Russell sets forth the information derived about Zeta from the observations made at its last eclipse. A summary of this information together with some explanatory comments are as follows:

The eclipse of the smaller star by the larger lasts about 38 days, but the smaller star passes into complete eclipse in 24 hours or less. While the drop in the visual magnitude is only about $0^m.2$ or $0^m.25$ as shown above, the drop in photographic magnitude amounts to $0^m.6$. The two stars revolve in elliptical orbits with an average separation of about 530 million miles. This figure is derived from the radial speeds (i. e. in the line of sight) of the two stars in moving about the center of gravity of the system. These speeds were determined spectroscopically by the French observer Tranblot. The 972.4 day period between eclipses, together with the radial speeds, can be used to determine the size of the orbit. The diameter of the larger star is 175 million miles, an estimate which is derived from the 38 day period during which the smaller star is eclipsed behind the larger super-giant star and the speed at which it is travelling. The diameter of the smaller star is about 3 to 4 million miles, which is derived from its speed and the fact that it is completely eclipsed in 24 hours or less.

The spectrum of the larger star is K6 (according to Mount Wilson plates), which indicates a surface temperature of only 3200 degrees, corresponding to a comparatively red star. Although the star, being comparatively cool, is probably only 2.5% as bright visually as the sun, area for area, yet since the star is very large its estimated light is 1000 times that of the sun.

The spectrum of the smaller star is of an early B class, corresponding to a temperature of at least 15,000 degrees. This means that the smaller star is white in color and possibly 15 or 20 times as bright per square mile as the sun. Since it is considerably larger than the sun, it probably gives out 200 or 300 times as much light.

The total light of Zeta is, therefore, about 1200 suns, and from its apparent brightness of about the fourth magnitude its distance may be estimated as 750 light years.

At this point, one or two questions occur to mind. If the light of Zeta falls off every 972.4 days because the smaller white star is eclipsed by the larger red star, should it not fall off at intermediate times because the smaller star passes in front of the super-giant star and cuts off some of its light? Doubtless this occurs, but since the small white star is only big enough to eclipse perhaps a thousandth of the light of the larger star, these intermediate eclipses are not evident. However, when the smaller star, emitting 200 times the light of the sun passes behind the super-giant,

one sixth of the total light of Zeta is lost to view, which corresponds to a decrease in visual magnitude of 0m.2 as shown in the above series of visual observations. Photographically the light of the star drops 0m.6 at the time of the eclipse. This corresponds to a drop of 43% in photographic brightness. Evidently, therefore, the white star emits 43% of the actinic light of the star although it emits only about 17% of the visual light. This is because the star is so much hotter and whiter than the larger red star.

The mass of the larger star is about 16 times that of the sun, while the mass of the smaller star is about half as great. These masses may be derived by applying Newton's laws to the size of the orbit and the period of revolution.

Harvard College Observatory Announcement Card 413 states that Prof. D. B. McLaughlin found that the eclipse absorption effects in Zeta appeared on J. D. 8635, five or six days earlier than predicted. Apparently the larger star is surrounded by an atmosphere or chromosphere of calcium, hydrogen, titanium and magnesium gases many million of miles thick. The light of the larger star passes out radially through these gases by the shortest path through the chromosphere so that the absorption lines of these elements are not strong enough to be noticed ordinarily. However, just before and just after the eclipse of the smaller star, its light passes through possibly 50 or 100 million miles of the light chromosphere gases of the larger star, which is a sufficiently long path to produce the absorption lines. Thus, the first intimation that the eclipse of 1937 had started was brought us by the spectroscope.

The above description gives some indication of the great importance of eclipsing variable stars. Since most of the information upon such stars must be secured with the spectroscope and camera, the importance of such stars to the visual observer is not great, but it is necessary for all of us to understand what an eclipsing variable star is and what it can teach us.

MONTHLY OBSERVATIONS

Name	Stars seen	No. of obs.
Bouton	.....	84
Hartmann	118	242
Jones	98	308
MacCalla	5	6
Northcott	1	2
Rosebrugh	32	86
F. W. Smith	1	2
Topham	5	8

With this report we welcome Miss Ruth J. Northcott, 71 Joicey Blvd., and Bert Topham, 105 Regent St., both of Toronto, Canada, and W. A. MacCalla, 710 Shady Drive East, Mt. Lebanon, Pa., who are contributing to this column for the first time. Please keep up the good work.

Mr. Bouton says that the two U Geminorum type variable stars 060547 SS Aur and 74922 U Gem (itself) were at minimae of 141 and 140 on J. D.'s 8633 and 8634 respectively. Walter Houston comments that he found the long period variable S Sextans at 10.4 on 8637, evidently on its way up to maximum; on 8566 he noticed an unusually deep minimum of 14.1 of the irregular star RR Tau; he states, too, that the long period variable star U Lyrae has been at 135 for many months now which is fainter than any minima from 1931 to date. These comments of Mr. Bouton and Mr. Houston are of great interest to us all, and more of them are desired.

3 Yates Boulevard,
Poughkeepsie, N. Y.

Planetary Report No. 22

MARS 1937—1

E. P. MARTZ, Jr., Planetary Director

AAAA planetary observers are undertaking the following work: In Nashville, Tenn., Latimer J. Wilson is making regular photographs and drawings of Mars with a 12-inch, F:8 reflector, and as previously mentioned here, at the Mount Union College observatory, Alliance, O., Walter H. Haas is carrying on a visual program of drawings and color observations of *the* planet with the 10-inch refractor there. Through the kindness of Dr. Dinsmore Alter, director of the Griffith observatory and planetarium in Los Angeles, Calif., the writer has been observing and photographing Mars during the present opposition with the 12-inch Zeiss apochromatic refractor of the observatory since Apr. 27. This work is being supplemented by photographs made with the 60-inch reflector at Mount Wilson observatory, near here, one night each week, through the courtesy of the director, Dr. Walter S. Adams. On other nights, if fog prevents observations at Griffith observatory (elevation 1650 feet), further photographs and visual observations are undertaken with the 6-inch Brashear refractor on Mount Wilson.

Comparison of observations early in

AAVSO Nova Program Notes

L. E. ARMFIELD

Through the kindness of Helen S. Hogg and F. Shirley Patterson of the David Dunlap observatory and members of the Royal Astronomical Society of Canada, initial nova program observations were received from the following members of the Toronto Center of the aforementioned society: Miss F. Shirley Patterson, Miss Ruth J. Northcott and Bert Topham. These observers together with Neil McNabb, Jr., who is also a member of the Toronto Center, form a fine nucleus of nova programmers in Canada.

Initial observations were received also from Lawrence Smith of Brooklyn, New York.

At the spring 1937 meeting of the AAVSO, your scribe had the sincere pleasure of meeting and conversing with Dr. Helen S. Hogg, Neil McNabb, Jr., and Frank Van Wyck, all of Canada. Friendships were renewed with such faithful contributors as Jones of Goffstown, New Hampshire, Ballhaussen of Scarsdale, New York, and Doolittle and Hamilton of Norwalk, Conn.

The following observations for the month of April are hereby gratefully acknowledged:

Observer	Location	Region	Magnitude of faintest star seaily visible 7 or (7	6	5	4	3	2	Total Nights
Abrahams	Milwaukee	56	6	6	1	....	....	....	13
		59	....	2	2	....	....	....	4
		65	....	5	4	....	....	....	9
		66	....	5	4	....	....	....	9
		67	....	4	5	....	....	....	9
		68	....	4	5	....	....	....	9
		69	....	11	1	....	....	....	12
		80	....	2	6	....	....	....	8
		81	....	2	6	....	....	....	8
		82	....	2	6	....	....	....	8
		91	....	6	4	....	....	....	10
		92	....	6	4	....	....	....	10
Ballhaussen	Scarsdale, N. Y.	55	....	3	1	1	2	....	7
		12	....	3	....	1	....	....	4
		57	....	5	3	....	1	....	9
Diedrich	Milwaukee (Mar.)	43	....	2	1	....	....	....	3
	(Apr.)	43	....	6	....	....	....	....	6
Friton	St. Louis	9	2	....	....	....	....	....	2
		10	2	....	....	....	....	....	2
Halbach	Milwaukee	71	....	4	3	1	....	....	8
Kirkpatrick	New York	92	....	....	....	1	....	....	1
		61	2	2	....	....	....	....	4
Keuziah	Milwaukee (Mar.)	15	....	1	....	....	....	....	1
	(Apr.)	15	....	....	8	....	....	....	8
Loreta	Bologna, Italy	17	....	3	....	....	....	....	3
		105	....	3	1	....	....	....	4
		112	....	3	3	....	....	....	6
McNabb, Jr.	Acton, Canada	8	....	2	....	....	....	....	2
		58	6	8	....	....	....	....	14
		72	5	7	....	....	....	....	12
Moore	Milwaukee	54	....	9	7	1	....	....	17
Northcott	Toronto, Canada	9	1	1	....	....	....	....	2
		71	4	2	....	....	....	....	6
Patterson	Toronto, Canada	18	....	....	1	1	....	....	2
		70	....	1	1	....	....	....	2
Rosebrugh	Poughkeepsie	1	3	4	3	1	....	....	11
		52	1	2	3	....	....	....	6
Smith	Brooklyn	38	....	....	3	....	....	....	3
Topham	Toronto, Canada	91	....	....	....	1	....	....	1
Treadwell	Arlington, N. J.	47	....	....	2	1	....	....	3
		103	....	....	5	3	....	....	8

16 Observers 38 regions 3800 square degrees of sky reviewed.

The following observers reviewed their regions with binoculars or low powered telescopes: Ballhaussen, Friton, Kirkpatrick, Loreta, McNabb, Jr., Moore, Northcott and Rosebrugh.

1410 N. Marshall Street Milwaukee, Wisconsin

Book Review

The Year Round with the Stars. L. L. Doolittle. The Skaneateles Press. 75c.

M. N. FISHER

Many persons who look at the sky don't want to be bothered with an exhaustive study of astronomy. To become familiar with the important constellations, to know what to expect each month in the heavens, to understand a few of the essential terms—that means keen pleasure in itself. For those persons this handy paper-covered guide will prove most suitable.

The brief introduction contains the rock-bottom essentials; the main section deals with what may be seen in the sky during the various months. The star maps are clear and helpful and they are footnoted by a paragraph listing "interesting sights," such as double stars, clusters and so on, and mentioning a variety of interesting miscellaneous information as well. The principal stars and constellations are treated alphabetically and compactly and the final section—planet notes—winds up with a suggestion for locating the sky wanderers, a bit about the moon and a summary of the important meteor showers.

It is to be hoped that a deserved second edition will correct the typographical oversights.

836 N. 14th Street,
Milwaukee, Wis.

The official monthly publication of

American Amateur Astronomical Association

Publication Headquarters
1312 E. Curtis Place, Milwaukee, Wis.

Affiliated Societies

Amateur Astronomers Association of Pittsburgh, Pennsylvania.
Astronomical Society of Rutherford, N. J.
Astronomers Guild of Jamestown, New York.
Chicago Amateur Astronomical Association, Chicago, Ill.
Eastbay Astronomical Association, Oakland, Calif.
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New Jersey Astrophysical Society, Woodbridge, N. J.
Norwalk Astronomical Society, Norwalk, Conn.
Optical Division of the AAA, New York, N. Y.

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Ten cents per copy, $1.00 per year.
Membership in AAAA, $1.00 per year, including subscription.

Send all communications to the above address.

Calendar of Events

GEORGE DIEDRICH

(All times C. S. T.)

June, 1937

8. Tues.—New moon at 2:43 P. M. Total eclipse of the sun (Invisible north of 40° N. latitude).
15. Tues.—First quarter at 1:03 P. M.
20. Sun.—Conjunction of Mars and the moon at 3:51 A. M. Mars 0° 4′ north.
21. Mon.—Sun enters Cancer. Summer arrives at 2:12 P. M.
23. Wed.—Full moon at 5:00 P. M.
25. Fri.—Conjunction of Jupiter and the moon at 3:10 P. M. Jupiter 3° 47′ south.
26. Sat.—Quadrature of Saturn and the sun. Venus at greatest elongation west (45° 45′). It sets after 10:00 P. M.
27-28. Pens-Winnecke meteor shower. Maximum on the 28th (AMS Shower).

July, 1937

1. Tues.—Last quarter at 7:03 A. M.
7. Mon.—New moon at 8:12 P. M.
15. Tues.—Jupiter in opposition with old Sol. First quarter at 3:36 A. M.
17. Sat.—Conjunction of Venus and the moon at 3:09 P. M. Venus 42′ S.
23. Fri.—Full moon at 9:24 A. M.
26-31. Delta Aquarid meteor shower. Max. 28th. (AMS shower).
30. Fri.—Last quarter at 12:47 P. M.

AUGUST, 1937

3. Tues.—Venus in conjunction with the moon at 2:51 A. M. Venus 48′ S.
6. Fri.—New moon at 6:37 A. M.
8-13. Perseid meteor shower. Max. on the 11th. (AMS shower.)
13. Fri.—First quarter at 8:28 P. M.
14. Conjunction of Mars and the moon at 8:00 P. M. Mars 1° 52′ south.

3331 W. National Ave.,
Milwaukee, Wis.

Tri-State News Notes

AMATEUR ASTRONOMERS ASSOCIATION OF PITTSBURGH

WILLARD A. MacCALLA, Correspondent

The biggest news in many months, for Tri-State astronomers, is the announcement by the Buhl Foundation of the donation of a planetarium to the people of Pittsburgh. The grant of land and funds for this purpose has officially been accepted by the city council. With its Mellon Institute, its great universities and Allegheny Observatory, Pittsburgh is known as a center for scientific interest and knowledge. It is, therefore, very fitting that Pittsburgh will soon have one of the finest planetaria in the world. In recognition of its contribution to the promotion of interest in astronomy, the Amateur Astronomers Association of Pittsburgh has been assured of accommodations in the basement of the proposed building for a shop and research laboratory.

A two day exhibition of amateur work was arranged during the last of April at Allegheny College, Meadville, Pa., by Joe Goin, Leo and Larry Scanlon. Portable telescopes built by Dr. S. A. Godlewski, Fred M. Garland, and W. A. MacCalla were transported to Meadville for this event, and Leo gave an evening lecture on the subject of "Amateur Astronomy."

"Seismology" was the subject of the April ninth meeting of the Amateur Astronomers Association. Dr. Homer Rutherford, seismologist of the University of Pittsburgh, delivered a most interesting talk on this increasingly popular subject. The science of seismology dates from the time when man first noticed ripples on the surface of a lake affected by an earthquake, but the first man-made seismograph was constructed by a Chinese about 1000 B. C. As our speaker explained, there is an analogy between the breaking of a saw blade upon bending, and the formation of an earthquake condition due to the bending of rock strata under the influence of the gradually changing form of the earth's crust. For this reason, earthquakes are prevalent in areas which are relatively new and in the process of comparatively rapid change, as, for instance, the Pacific coastal region and the Japanese archipelago. Volcanic earthquakes are only of local and minor importance compared to those resulting from earth crust shifts.

Through the courtesy of Dr. Rutherford, we were privileged to examine the seismograph charts of the recent Ohio earthquakes, as recorded on the University of Pittsburgh instruments. Examination showed that small waves are continuously being recorded. These movements are not definitely understood, but may be caused by the gravitational effect of the moon. Dr. Rutherford explained the various types of waves and how earthquake centers are located. This interesting lecture was supplemented by movies of scenes of earthquake destruction and by animated drawings showing the formation of quake conditions and the propagation of waves.

So much interest was developed in this subject that at the invitation of Dr. Rutherford, 30 members of our group made an inspection trip to the Cathedral of Learning of the University of Pittsburgh to inspect their equipment and see the seismograph which the doctor constructed using Ford parts at a total cost of $5. Between the time of that visit and the present writing, his seismograph recorded a 90 minute earthquake. As a result of information gained from Dr. Rutherford, a home-made seismograph has been constructed by S. S. Weisiger and George Stephenson. Their instrument is now on display, together with three complete telescopes and a model of the 200-inch telescope in the window of the B. White Furniture Company, North Side, Pittsburgh.

Valley View Observatory,
Pittsburgh, Pa.

Milwaukee News Notes

M. N. FISHER, Correspondent

Scores of Milwaukeeans crowded the Milwaukee University school auditorium May 27 to hear Dr. Otto Struve, the noted director of Yerkes observatory, speak on the structure of our galaxy. He began with the ancients, with the days when astronomy was wrapped in a veneer of astrology, when comets were thought to be human sins that floated up from the earth and then came swooping back to scare mortals, when the stars were thought to be lanterns that were turned on and off.

Galileo, he said, put the first scientific bomb into this comfortable folklore. With the first crude telescope, Galileo was able to learn that the sun, not the earth, was the center of the universe. The civilized world of the day didn't like that notion; it hurt people's pride. Yet patiently, often secretly, the work of exploring the universe went on. At the time of Herschel the telescope came fully into its own; modern astronomy virtually dates from that period.

And today? "Our universe," Dr. Struve told the audience, "is gradually diminishing in importance. Once man hoped that at least the sun would be

important but it seems now that even that idea must be abandoned." Dr. Struve showed schematic drawings of the galaxy and the sun's place was shown not near the center, as it was believed not so many years ago, but toward the end of one gigantic arm.

Speaking of the clouds that on photographic plates partially conceal the stars, Dr. Struve said that a similar effect might be produced if "1.000 million suns were pulverized into dust." When a member of the audience asked about interplanetary rockets, Dr. Struve replied that rockets are theoretically possible but that he'd hate to be in one.

836 N. 14th Street,
Milwaukee, Wis.

Chicago News

CHICAGO AMATEUR ASTRONOMICAL ASSOCIATION
H. C. TORREYSON, Sec'y

The regular meeting of the association was held at the Adler Planetarium and Astronomical Museum on Apr. 18. Gerald E. McCord continued the series of educational lectures with a talk on the "Solar System." This was followed by a talk on "Checks on the Einstein theory," by J. A. Longman. While not claiming to be one of the 12 who know what it is all about, Mr. Longman discussed the famous attempt of Michelson and Morley to detect an effect produced by motion through the ether, Dr. Einstein's disregard of a medium through which light might pass, the conclusions to which such disregard led, together with the attempts that have been made to check on the results of those conclusions. We were convinced that although only a dozen or so of the learned men of the world were able to understand the complicated mathematics necessary to explain completely Dr. Einstein's theories, here was a man who could talk about them in language the layman could understand. Astronomy has something to offer for all types of people.

John Sharp, 1834 W. Jackson Blvd., was unanimously elected treasurer to act until January. We mentioned John in last month's news. He is a live wire and doing things in the club he was instrumental in forming at Crane Technical high school.

George Warner, our president, is back in town again after an absence of about a month on business.

3738 N. Richmond St.,
Chicago, Ill.

Optical Division of the Amateur Astonomers Association

HAYDEN PLANETARIUM, NEW YORK
LEW LOJAS, President

On May 7, Dr. Clyde Fisher, director of the planetarium, sailed for Peru to observe the eclipse of the sun on June 8. The members of the society looked forward to this sailing for two good reasons: first, because Charles H. Coles, staff photographer who sailed with Dr. Fisher, is an honorary member of the optical division; secondly, because Miss Dorothy A. Bennett, assistant curator of the planetarium and assistant executive officer on the trip, is taking the first rich field telescope finished in New York which she will use to observe the southern constellations.

At present there are about five rich field telescopes in construction, their stages ranging from those being mounted for use to those being rough ground. Within a few months New York should bristle with rich field 'scopes.

The optical division has access to an almost unlimited supply of eyepieces suitable for rich field 'scopes. We shall be glad to answer any inquiries on these eyepieces from any other groups.

We have discovered that our group of Telescope Nuts is rapidly becoming a 10-inch club. Almost every member has plans for starting a 10-inch or has finished one. After finishing their 6-inch and receiving their diplomas they order 10-inch blanks. As Caesar would say, "Are our boys ambitious!"

1510 White Plains Road,
Bronx, N. Y.