AMATEUR ASTRONOMY

DEVOTED TO
THE AMATEUR OBSERVER

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AMATEUR ASTRONOMY

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Appreciation

The history of human culture has been a curious, paradoxical story of individual development together with individual concession and sacrifice. Great, enduring movements or institutions have borrowed from their adherents, asking of them their hours and their energies. Organizations have built themselves corporeal bodies of the flesh and spirit of their followers, draining them at times of the last vestiges of life and purpose. The eternal law has been that individuals must bow and lose themselves so that the onward rush of the movement may not be halted. Yet, despite this rather heartless seeming commandment, men everywhere are found giving themselves gladly to their ideals, accepting their sacrifices without complaint, and marvelously learning that this same process of individual subtraction reverses itself so that the powers of the one are raised, his philosophy enriched, and his life brightened.

In much the same fashion the AAAA has grown up and at temporary culmination, as expressed by this first unified issue of Amateur Astronomy, its record thus far is one of large demands and willing sacrifices. This is the inevitable first part; the individual enrichments, the helps to science will follow if the former has been honestly given. As the balance now stands, amateurs from all over the country have relinquished their treasures that the AAAA might start unencumbered. Several societies have suspended publication of their papers, local section leaders have agreed to cooperate with national leaders located in distant cities, many have given up personal advantages to assume unrewarded, onerous obligations, and all the cooperating groups have modified to some degree their local organization.

It is a story of sheer sacrifice the extent of which will not be appreciated for many years to come. Individuals and observing groups, when approached with suggested plans for a national association of observing amateurs, instead of delaying or bargaining (as they had every privilege to) responded eagerly to the enlarged outlines for the AAAA, bent to their jobs, and the rather phenomenal record of the organization can be directly traced to the unselfishness of these men.

In this, the official publication of the associated groups that comprise the AAAA, attempt will be made to stimulate the amateur so that science will be added to, and the amateur himself enriched. This magazine provides him with a means of self expression so essential to true development. His efforts and observations will be acknowledged and recorded, special attention being given to those kinds that are not fully published by the AAVSO and the AMS. The files of the society will preserve these records and make them accessible to future investigaters. This magazine will facilitate the exchange of ideas between various sections of the country, assist in organizing the observing programs to their most efficient peak, and best of all enlarge the amateur's circle of friends. Its beginnings were rooted in amateur sacrifice but its full bloom will reverse the process so that the same amateur will attain interests and pleasures impossible in the past.

The contents of this issue are typical of future numbers—articles of general interest, some of them by leading professionals; careful reporting of the progress and worth of amateur observations; and news notes of the many groups which have joined to make a magazine of this magnitude possible.

The official monthly publication of

American Amateur Astronomical Association

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

Affiliated Societies

Amateur Astronomers Association of Rutherford, New Jersey.
Amateur Telescope Makers of Chicago, Ill.
Amateur Telescope Makers of New York, N. Y.
Madison Astronomical Society, Madison, Wis.
Milwaukee Astronomical Society, Milwaukee, Wis.
Norwalk Astronomical Society, Norwalk, Conn.
Pittsburgh Astronomical Society, Pittsburgh, Pa.

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Mrs. A. K. Fisher — Miss Carolyn Nickels
Edward A. Halbach — H. William Liebscher

Ten cents per copy, $1.00 per year.
Send all communications to the above address.

Occultation Section

R. D. COOKE

The individual charged with the responsibility of predicting occultations for February has had an easy time of it, as there is only one and that some time before sunset making it scarcely worth observing. The circumstances are as follows:

Date	Star	Mag.	Immersion CST	Pos. Angle
Feb. 1	62 Tauri	6.2	4:30 PM	54°

For such an unusually long month this is slender compensation.

In December three more observations were added to our list for the year. One of these was by a new observer, George Knott, who turned in a set of data which when reduced yielded a splendid result. We hope Mr. Knott will be a regular contributor from now on.

Through the courtesy of Dr. Ball of their science department we spent an enjoyable evening at Mount Mary College recently introducing to a group of teachers and students of the astronomy class some of the intricacies of computing occultations. We are counting on them to help us get the 1935 observations ready for publication.

6811 W. Cedar Street,
Wauwatosa, Wisconsin.

Loan Bureau

WALTER HOUSTON

The loan bureau, while at present a very small section of the AAAA, has already some work to its credit and a very active program is planned in the future. As its name implies, its duties are to facilitate and encourage the exchange of instruments between members of the AAAA so that work may be gotten from all observers and no telescopes are left idle. At present, through our efforts, a 6-inch mirror was figured and silvered for Jack English of Madison; an 8-inch reflector was loaned to Mr. Amron Katz at Madison; an 8-inch mirror for Hans Gaebler of Watertown has been ground and polished, and the figuring will be finished shortly; an 8-inch mirror has been accepted from Rev. H. Randel Lookabill of Madison for testing and possible correction; the same Mr. Lookabill has donated the use of a 14-inch disc to the Madison Society which will be ground and figured in the MAS shops; a 7-inch mirror has been donated to the Minikani YMCA camp for summer use; and Mr. Edward Halbach has given Mr. Edward Legel the use of a motor driven mounting for small patrol cameras.

From Mr. Leo Scanlon of Pittsburg, national observatory director, the MAS has received a 6-inch f:5 aluminized mirror with optical parts, an instrument which was much needed in Milwaukee.

Members who have mirrors, telescopes, or other instruments which they care to loan on a temporary basis should write the undersigned. In particular we are looking for a 6-inch portable for a Chicago observer and a 10-inch f:8 or f:10 for a variable star observer of many years experience whose record is among the best in the association. If people who have made their own mirrors would send us the tools, where the tools are 8 or 10 inches in diameter and an inch or more thick, it would greatly help the work of this section.

807 E. Otjen Street,
Milwaukee, Wisconsin.

Schmidt Cameras

(continued from page 3)

The choice of the photographic plate, the manner of making it conform to the focal surface, of focusing, of changing plates, of making exposures are all problems that will confront and should be considered by the potential makers of Schmidt cameras. There is no doubt that the difficulties will act as spurs to a great many. The writer repeats the warning: that a good look should be taken before the task attempted lest the bite be a bit more than is comfortably digestible.

7655 Wabash Avenue,
Chicago, Illinois.

Variable Star Notes

HANS. D. GAEBLER

ZETA AURIGAE MINIMUM—1934

Professor R. Sommer, of the Treptow Observatory, Berlin, Germany, has written an interesting account of Zeta Aurigae in the June, 1935 number of "Das Weltall" published for amateurs by the observatory.

He selects this star for the purpose of showing how much attention may suddenly be attached to an apparently insignificant star of slight variation and difficult for the amateur to observe visually.

Prager's Catalogue lists some 6200 stars as variables and yet how little we know what some future astronomer may find out about them. Our meager data may cause a later study to be made of some or many of the variables now listed and about which little is as yet known. So runs the history of our records of Zeta Aurigae.

As early as 1709 it was observed by Kirch, in 1848 by Argelander, and, in 1902, Schwab concluded that it had a minimum. While Zeta is a fourth magnitude star, its minimum is about one-to two-tenths of a magnitude. An explanation for the drop was offered in 1897 by means of the spectroscope which showed the presense of a companion star and, in 1907, its orbit was determined. In 1924 Harper figured a period of rotation and Bottinger predicted another minimum for 1932. Its circuit of two years eight months brought another eclipse in September, 1934.

Zeta was then carefully studied. It was found to be a large star of low temperature surrounded by an irregular mass of calcium gases somewhat like the corona of our sun and that its companion was a very small star of high temperature which was eclipsed for a period of 36 days.

Guthnick predicted an eclipse to begin August 12th to 26th but it really began August 24th (J. D. 2427673.5) and began to increase in brightness October 1st. These changes seem to differ at each eclipse due, perhaps, to the irregular shape of the calcium gases surrounding Zeta being about 70 to 90 million kilometers thick. Huffer, at Madison, determined 24 hours as a period of ascending brightness and Schueller found that the companion star, Mu Aurigae, was itself a variable.

The next minimum is predicted for April to May, 1937 but will be seen low in the horizon for northern observers. The next favorably situated eclipse will be (according to Harper 973 days) December 21st, 1939 to January 29th, 1940.

Perhaps no other star, except Nova Herculis, has received so much attention this last year. What insignificant star in Prager's list will be next?

VARIABLE STAR OBSERVATIONS FOR NOVEMBER

We welcome two new contributors to this report: Wm. B. Albrecht of Milwaukee, Wis., and S. J. Fairbanks of Waterloo, Iowa.

We wish to call attention to another remarkable record of S S Cygni. Our Chicago observer, Wm. Callum, has found a drop of four magnitudes in 13 days (mag. 8.4 on J. D. 8115 to mag. 12.0 on J. D. 8128).

Following are the number of observations for the last month which included our old friends O Ceti, R Scuti and S S Cygni:

Albrecht, 4; Armfield, 124; Callum, 47; Diedrich, 16; Fairbanks, 22; Halbach, 19; Keuziah, 1; Knott, 10; Loepfe, 4; Luczka, 8; Peck, 62; Total 317 observations.

404 N. 8th Street,
Watertown, Wisconsin.

Planetary Section Notes

(continued from page 4)

duction of light. The color is probably also partially subjective with each individual observer. For this reason it would be especially desirable for the members of the AAAA to give some attention to this crater. I should recommend a rather low power eyepiece, say one magnifying 10X to the inch, though it may be desirable to use a higher power in conjunction with the lower when the area to be examined is small, such as is true of Grimaldi's neighbors, Billy and Cruger. Grimaldi's green is a kind of greenish gray, not very unlike the coler of an olive to my ye. Its brown is similar to the brown of the Palus Somnii. It is of course desirable in making these observations to compare Grimaldi in color with some neighboring dark craters or with the Oceanus Procellarum near it. I think Riccioli may be subject to changes of color. At times in Jamaica its gray seemed to me to be somewhat purplish." . . . We wish to suggest the use of different color filters for more objectively judging the colors present in these cases. Mr. Haas has also been observing and drawing Venus lately with the ten inch refractor of Mount Union College and 200X. His sketches, which will be discussed with others later, show, among other markings, the most predominantly recognized feature, the apparent "polar caps"

(continued on page 8)

Nova Program Notes

L. E. ARMFIELD

The nightly review of nova fields has suffered severely from adverse weather, astronomically speaking. However, the persistence with which the sky is being watched at every opportunity by many of our members is indeed indicative of the value of this program. Peering a bit into the future, one is able to imagine the intrinsic value of being able to say with comfortable assurance that no object brighter than 6th magnitude was seen in such and such areas of the sky during the years 1935, 1936, etc. Comparable in importance, of course, is the early discovery of nova or other objects. While the chances for any single observer to discover a new object are extremely remote, each participant is, nevertheless, a potential discoverer of a nova, comet, or other object. It is to be remembered also, that the major worth of the program as a contribution to astronomy will be measured by the accumulation of data by all participants.

Mr. D. W. Roseburgh, of Poughkeepsie, New York, is reviewing his nova field with low power binoculars, thereby extending his survey to stars of the 7th magnitude. This is a very commendable practice and it is hoped that other members will employ binos or small finders for reviewing their areas. Persons desiring a map of the stars beyond naked eye visibility in their nova fields are invited to inform the writer.

The following observations were received for the month of November:

			Magnitude of faintest star visible.				
Observer	Group	Area No.	6	5	4	Brighter than 4	Total Nights
Abrahams	Milwaukee	24	6	2			8
Bautz, Russell	Milwaukee	17	2	4		1	7
Bautz, Ann	Milwaukee	16	2	4		1	7
Diedrich	Milwaukee	7	4	1	4		9
*Loepfe	Milwaukee		5	11			16
Martz	Oak Park	25		1			1
		26		1			1
		1		6			6
Roseburgh	New York	57	4	1			5
Seely	New York	41	2	1			3
		48	2	1			3
		5(	2	1			3

* Combined report for Aug., Sept., and Oct.

Meteor Report Wisconsin-Northern Illinois Region

L. E. ARMFIELD, AMS Regional Director

Cloudy skies are entirely responsible for this brief, but nevertheless, worthy report of the Wisconsin-Northern Illinois region. Why anyone residing in the great lakes region should be interested in astronomy, is indeed a mystery. Perhaps the tantalizing expectancy of seeing the stars once a month piques the curious.

Observing Location	Observer	Minutes	Meteors
Milwaukee, Wis.	R. Abrahams	395	27
Chicago, Ill.	J. Boehm	141	9
Milwaukee, Wis.	G. Diedrich	120	10
Milwaukee, Wis.	M. Keuziah	122	9
Chicago, Ill.	E. Mittendorf	121	6
Milwaukee, Wis.	J. Schmid	122	12
Milwaukee, Wis.	L. Sidoff	60	3
	7	1081	76
	TELESCOPIC METEORS		
Chicago, Ill.	Wm. Callum	353	1
New York, N. Y.	R. Seely	25	1

As a reminder to the reader, American Meteor Society dues are payable on the first of January, or shortly thereafter. To ensure the continued receipt of AMS publications, reprints, and many other benefits, it is heartily recommended that all members, present and prospective, submit the dollar membership fee to Dr. Charles P. Olivier, President of the AMS, Flower Astronomical Observatory, Upper Darby, Pennsylvania.

2046 S. 59th Street,
Milwaukee, Wisconsin

A T M Club News

AMATEUR TELESCOPE MAKERS OF CHICAGO
WM. CALLUM, Secretary

At the meeting in the Planetarium on December 1st, Mr. Wm. J. Lovejoy gave an exceedingly interesting talk on "Matter, Electromagnetism, and Radiation". Mr. Lovejoy has been a member of our group for over two years and has done a great amount of work on the above subjects. His talk was illustrated with colored diagrams, prepared by himself, which were very helpful in giving his audience a conception of his theory of the fundamental properties of matter. Some of the members have expressed a wish to hear the talk again and we may get Mr. Lovejoy to speak again.

George Olewin, who is one of the members who started the club, has returned from Texas where he has been for two years. He has done some very fine work on instruments and we are very glad to have him with us again.

A few months ago we sent out a form for the purpose of getting a census of the telescopes owned by members of the club. We also asked the members to say which branch of amateur astronomy they were most interested in. So far, we have heard from about half of the group. It is interesting to note that the member who suggested the census has not returned his form. We do not wish to publish the census of the telescopes until the return is more complete. The interests, so far, are as follows:—General Astronomy 16, Solar Observations 2, Planetary Work 6, Mathematical Astronomy 1, Variables 9, Telescope Making 5, Optics 1, Photography 2, Meteors 2, Nova Program 2, Astrophysics 1, Double Stars 3, Reduction of Occultations 1, Celestial Mechanics 1.

With one exception the weather in November was the worst in our experience for observing. The exception is the first half of December.

The mid monthly meetings on the south side are well attended. There are always two or three telescopes on hand, testing apparatus, and general discussion which enables the various nuts to air their individual obsessions to others who are inoculated with the protective serum of their own. We wish to have meetings in some of the other districts. If any member has a place where a meeting can be held, will he please communicate with the secretary, notices will be sent out and another district group will be started.

CHOICE

GERALD E. McCORD

I do not choose the midday bright
With all its glaring of the sun.
Give me the dusk that brings the sight
Of stars agathering, one by one.
I simply ask that heaven's dome
Shall be a clear and cloudless sky,
Whose boundless vastness I may roam—
A worshiper of midnight, I.

For evening hours shine with the light
Of star that calm and steady glows;
Or, if it be a winter night,
That glints with tints of blue and rose.
The flowers of day are all too frail;
They blossom once, then fade from sight.
But each a friend that will not fail,
I count the blossoms of the night.

1319 W. 78th Street,
Chicago, Illinois.

Planetary Section Notes

(continued from page 6)

(bright clouds?) on the crescent cusps; photographed by Ross in the ultra-violet, and often noted by the writer and numerous other observers of Venus.

AURORA BOREALIS, SEPT. 23, 1935: At our request, Mr. O. C. Durham of Waukegan, Illinois, has forwarded us the following description of an auroral display observed by himself at Waukegan on September 23, 1935 from 8:55 to 9:10 P.M., C.S.T., in the north to northeast sky: "When first observed the display consisted of several bands of light each about ½ to 1 degree wide, extending from the horizon to a height of some 50 degrees. The bands were not all the same width but were all parallel to each other (vertical in position), and each for the most part a continuous band rather than a converging or diverging ray. The intensity of the light of each band varied somewhat according to its width. The width of a given band changed rapidly. At one time there was a very narrow shaft of light. At last only two bands remained, one about a degree wide, standing directly north and another about three degrees wide standing northeast. These began to shift to the west and by the time the wide band had reached the north, both had faded. According to Stormer's Classification, this was one of type (6) auroral displays." (See, Scientific American, March 1931, P. 154.) Mr. Durham also sends a novel and intriguing sketch of the display, made with chalk on black cardboard, and indicating that the narrow ray was the brightest (most intense) and the widest extended ray was the faintest and most diffuse. Other similar observations of this and other auroral displays are solicited by us with greatest interest. We particularly wish to recommend the use of chalk and black cardboard or paper for sketching the displays as Mr. Durham has so admirably instituted. As other observations are forthcoming we will discuss possible interpretations of the observed phenomena.

726 N. Elmwood Avenue,
Oak Park, Illinois.

Milwaukee News Notes

MILWAUKEE ASTRONOMICAL SOCIETY

The Milwaukee Astronomical Society greatly appreciates the opportunity to affiliate with the American Amateur Astronomical Association.

The M A S originated in 1932 and was incorporated the following year with 55 charter members. The "M A S Bulletin" was begun in 1934 with a circulation of approximately 100. At the present time, the Society's membership roll includes well over 100 names, and nearly 500 copies of the last issue of "M A S Bulletin" (December, 1935) were distributed.

Although the Society is discontinuing its own publication in favor of "Amateur Astronomy," it is felt that contact and cooperation with other local groups throughout the country, through the A A A A, will be of infinitely greater benefit.

The M A S educational program for 1935-36 is well under way.

Besides the regular monthly meeting, which is usually well attended by members and interested visitors, the following special features were presented during December:

On December 4th, a demonstration of amateur astronomical activities was given at Mount Mary College.

The enthusiasm displayed by the astronomy class, other interested students, and Sisters was very gratifying.

Various celestial objects were observed through the telescopes furnished for the occasion by A. L. Peck and John Luczka. R. D. Cooke, President of M A S, explained the reduction of occultations, and E. A. Halbach and L. E. Armfield took charge of the general discussion.

The refreshments, which followed the outdoor demonstrations, were heartily enjoyed by the members present.

Miss Helen Pillans, who is specializing in juvenile educational activities, talked to a group of fourth and fifth graders at the Pershing School in West Milwaukee on December 6th.

Dr. G. A. Parkinson, our genial past president, gave the weekly lecture at the Milwaukee Public Museum on December 12th. His subject was "The Structure of the Universe" and it was heard by an audience of over 500.

H. R. Stamm showed his motion picture depicting the art of telescope making and L. E. Armfield presented an illustrated lecture entitled "Through the Windows of a Space Ship" to members of the Lincoln Parent-Teachers Association of Wauwatosa on December 10th and to the Business and Professional Women's Club of Milwaukee on December 11th. Approximately 400 persons were present at the two meetings.

2046 S. 59th Street,
Milwaukee, Wisconsin.

SURVEY OF FAINT RED STARS

Resume of talk given by Dr. Oliver J. Lee, Director of Dearborn Observatory, Northwestern University, Evanston, Ill., to the M.A.S. on Thursday evening, December 5, 1935.

Stars are giving off tremendous amounts of energy in the form of heat and light. What becomes of stellar bodies which can no more radiate as stars? No known star has a temperature of less than 1500° absolute. There is some indication that all the universe was at one time—some five billion years ago— concentrated much more than now and began expanding. Will a long period of expanding be followed by a similar period of contracting? Is there a recurring cycle of stellar existence or must the universe end in the "heat-death" of complete enthropy? So many unusual physical conditions exist in the universe—perhaps the Second Law of Thermodynamics may not necessarily hold out there or perhaps it is nullified, or even reversed.

Faint red stars are either nearby dwarfs or distant giants having temperatures between 1500 and 4000 degrees Kelvin. Relatively few red stars have been studied. We know little about their distribution statistically. To observe the spectral type, frequencies in subclasses and to give some idea of the luminosities of these apparently faint stars and so to ultimately fix their positions in the story of stellar evolution, is the present work of the Dearborn Observatory.

The monumental Draper Catalogue and its extensions to fainter stars, especially near the galactic plane, is a veritable mine of information. The blue or photographic end of the spectrum has been used for this work at Harvard. Many stars have only little light in the photographic region and in consequence these red stars have suffered when the comparative attention given to the white and blue stars is considered.

The Dearborn Prismatic Camera, whose 7° prism and Cooke Triplett lens have apertures of 10½ inches and which gives a field of about 100 square degrees at focal length 52 inches, was designed, made and put to use in a survey of the whole sky. Eastman's Wratten and Wainwright and Ilford's Astra Panchromatic plates have been used. The limit in magnitude, with four hour exposures, ranges from 11 to 12.5. We are in general only concerned with stars below magnitude 8.25, the limit of completeness of the Draper Catalogue. However, we also include many brighter red stars in our survey.

(continued on page 10)

Madison News Notes

MADISON ASTRONOMICAL SOCIETY, MADISON, WIS.
W. R. BINNEY, President

The December meeting of the Madison Astronomical Society was again well worth all the effort that has been expended in getting the Club on a going basis. Miss Claudette Stewart, who is taking a post graduate course of study in astronomy at the Washburn Observatory, University of Wisconsin, read a paper on "Eclipses of the Sun." Her paper was outstanding because of its chronological treatment of the subject. Everyone left the lecture with that pleased feeling which only a well-ordered paper can give.

Dr. Huffer told of personal experiences he had had on solar eclipse expeditions and also those expeditions sponsored by Washburn Observatory.

The members of the Madison Astronomical Society are indeed unable to express their deep and heartfelt appreciation to Dr. Huffer and Professor Stebbins for the fine things they have done, and are doing, for us. Our thankfulness is of the quality which just can't be expressed with mere words.

SUN SPOT OBSERVATION

Dec. 2, 1935

Being about two hours late for lunch on the afternoon of December second, I was greeted with some information from my wife that sent me away from the house without lunch or any further thought of it. She informed me that Dr. Huffer of Washburn Observatory had been desperately trying to reach me by phone, and that I should by all means get to a 'scope and look at the sun. I made tracks for the observatory and was well repaid for passing up lunch. It was the first day for more than a week that was clear and the sun turned up with a fine, big spot. It was, apparently, about one-sixth the diameter of the sun, or, roughly, about 150,000 miles across. I did not have time to make a drawing but, after getting back on the job, tried some more experimenting which proved very fruitful.

I first tried looking thru a dense piece of cobalt glass and could make out no marking. Still unsatisfied, I broke a clear 100 watt light bulb and smoked it with a match, the stick of which I had heavily impregnated with motor oil. I saw no more with this than I did with the cobalt glass. Still trying, (an amateur astronomer never did know enough to quit,) I next smoked my thin glass shell in several degrees of density. And what a thrill! That part of the smoked glass which showed the sun's disc as a ball of intense sodium flame quite clearly permitted one to discern the spot. I verified the observation by having Mr. Zenda, who is majoring in geography at the University of Wisconsin ,try his luck. Without telling him where the spot was beforehand, he told me after looking. From now on, I will not take smoked glass for granted but will have it nicely graded from a slight coat to an intense black.

315 N. Franklin Street,
Madison, Wisconsin.

Milwaukee News Notes

(continued from page 9)

Classification of many hundreds of stellar specra by Dr. Lee and two assistants and comparison of the lists showed two points very clearly, (a) the three observers working independently experienced no difficulty with the early K and M stars, (b) the stars classified by Mt. Wilson observers in earlier lists as K6, K7, K8, and K9 did not, in our spectra between Ha and Hb, show distinct criteria and we were confused in classifying. After a long investigation we concluded that there was no room for these types and decided to drop them. A few months later we learned that the Mount Wilson observers, in a review of their stars, also had dropped these types, except for K6 which they retained for a few dwarfs.

As we worked with these short spectra we gradually became aware that they are sensitive to absolute magnitude. This might have been expected from the beginning, but we did not at once discover it because we started in with giants as type stars and our attention was concentrated upon other features of the spectra.

Twenty years ago we had no other method of determining absolute magnitude of a star (the apparent magnitude when the star is placed at a distance of 32.5 light years from us) than that of laboriously measuring its fundamental trigonometric parallax and then computing the absolute magnitude.

In 1914 Adams and Kohlschuetter at Mount Wilson discovered that certain spectral lines are different in giant and in dwarf stars. Adams and other associates have developed a powerful method of finding absolute magnitudes by means of this fact. Many other observers have followed them very profitably.

Our criteria depend not upon line behavior but upon the relative intensity of the blue light (out of focus, in part) in our short spectra as compared to the yellow-orange-red radiations. Just how far we can go in giving the absolute magnitudes of these faint stars is not yet certain. We know that we can easily distinguish a supergiant from an ordinary giant and both from superdwarfs.

Metropolitan Notes

METROPOLITAN NEW YORK AND NEW JERSEY REGION

JAMES S. ANDREWS, Regional Organizer

AMATEUR ASTRONOMERS ASSOCIATION OF RUTHERFORD, NEW JERSEY.

Organized September 1934—Election held the second meeting in May. James S. Andrews, president, 33 Franklin Place, Rutherford, N. J. Paul J. Hagar, vice-president, Mrs. Alfred Bidwell, secy-treasurer. Willard Savary, librarian and historian.

Twenty-six persons residing in Rutherford and adjacent towns are at present on the membership roster of the association. Meetings are held twice a month. Various members present papers, after which the group usually studies constellations or conduct observations with the telescope. Six amateur-made reflectors are within the association, one 4½-inch, two 6-inch, two 8-inch, and one 12-inch, all equatorially mounted with circles. Certain members have factory-made refractors which have apertures as follows: two 2-inch, one 3-inch, and one 3½-inch. A camera, spectroscope, and 12-inch reflector have been made by Irving Meyer. A loaning library, containing more than 100 books is available to members of the association. Sixteen regular and four special meetings were held last year, as well as two field trips and a week end picnic with bathing and sports in the mountains.

AMATEUR TELESCOPE MAKERS OF NEW YORK

LEW LOJAS, President
1510 White Plains Road, Bronx, N. Y.

The membership consists of 14 persons who have either completed one or more telescopes, or have one under construction. This is a group of enthusiastic workers who have many ambitions. Mr. Lojas has polished and figured many mirrors. Within a short time, the club will have a central workshop in Manhattan. Sincerely interested persons who will work to complete a mirror and telescope are invited to join.

An astronomical society is being formed in New York City, which is to be the center for those who desire a definite program of observing and to invite affiliation of groups within the metropolitan area, that is, within 50 to 75 miles of the metropolis. It is planned to have occasional get together meetings and exhibits for the interchange of thoughts and to encourage research programs in cooperation with the large observatories. Many people do not realize that the amateur can do very valuable work in the interests of astronomy without the aid of expensive equipment. In some cases, equipment will be loaned to reliable, interested persons.

Among the astronomy clubs in the metropolitan area, one is planning an observatory to house a 12-inch reflector. The telescope is nearing completion, the location for the observatory has been chosen, and funds are being raised to build the dome and lecture room. It will be within easy reach of Manhattan and will be available to affiliated members of the society.

Those interested in this movement are requested to communicate with M. E. Lange, Hotel McAlpin, 34th Street and Broadway, New York, N. Y.

Occultations—How and Why

(continued from page 2)

That the theory fails to represent the moon's motion exactly must be ascribed to the fact that the earth's rate of rotation is not uniform. This explanation was suspected for over 50 years but the proof was lacking until fairly recently when overwhelming evidence in favor of this explanation was obtainedfrom observations of the Sun, Mercury, Venus, Mars, and Jupiter's satellites.

Knowledge of the deviations from uniformity of the earth's rotation is of obvious importance. Instead of saying that the earth's rate of rotation is not uniform we can say that the length of the day is variable. It has been found that changes in the length of the day take place abruptly. About 1898 a sudden change occured, increasing the length of the day by about one three-hundreth of a second. About 1917 a change in the opposite direction occurred. Since then there has not been any noticeable change. As compared with the mean length of the day during the past three centuries the earth's period of rotation is now too short by about one five-hundredth of a second. Small as this amount may seem, in a year the difference in time builds up to three-fourths of a second of time that the earth's rotation has gained on the uniform or "Newtonian" time. The moon and the other bodies of the solar system whose tables are constructed for the uniform time will fall steadily behind their predicted places if we use the non-uniform Earth-time, or observatory time. This is actually what has been happening during the past 12 years that the moon's motion has been studied so accurately.

At any time the earth may change its period of rotation. The occultation results will show this better than any other series of astronomical observations. With the abundance of data now being accumulated we may expect to be able to study such a change in detail

(continued on page 12)

Variable Star Section

HANS D. GAEBLER

RV Tauri Stars

Digest of an article by Friedrich Lause in "Die Himmelswelt", 1930, S 175.

Less than twenty years ago RV Tauri stars were considered as a separate class of variables. The brightest of these, R Scuti, was discovered by Pigott in 1795 but until 1910 very few stars of this class were known and even today they are not numerous.

What are RV Tauri stars? They are variables with medium length periods in which a deep and less deep minima alternate while the maxima are nearly alike. They differ from the Beta Lyrae stars of alternating minima of unequal depth by several additional peculiarities.

One of the best representatives of the class is AC Herculis which has a uniform succession of main and secondary minima. The drop to minima is more gradual than the rise and the depth of similar minima varies greatly. Furthermore, the interval of time between similar variations is, of itself, somewhat irregular.

The light curve of TT Ophiuchi differs only from the former by the fact that, at times, there is no difference between main and secondary minima. One of the most irregular ones of this class is R Scuti. Lacchini, who observed this star since 1912, showed that there were so many irregularities that the star was a difficult subject for study. R Sagittae is less difficult. From its discovery in 1859 until 1882 it showed a period (double period) of 70.42 days with considerable regularity except that a change took place in its light curve from one epoch to the next. Maxima, as well as minima, differed in magnitude usually. From 1859 to 1860 its light curve was like that of Beta Lyrae. From September 1860 the secondary minimum increased until it finally equalled the main minimum in 1862 and it disappeared entirely in July 1864. During this time the depth of the principal minimum increased and, in 1875, the main and secondary minima again exchanged places. In 1878 peculiar irregularities appeared in the relative intensities of these minima, until 1882 when the star was hardly a variable at all.

R Sagittae then gradually assumed fluctuations again from maximum to minimum and the period had changed in the meantime, until in 1897 the double period was 71.24 days, only to shorten again. Changes such as these have been observed ever since that time.

It is noteworthy that the fluctuations of periods of both R Sagittae and V Vulpeculae occur about the time of transformation of main to secondary minima. This happened to R Sagittae in 1913; its change of period, gradual at first, but then quite sudden. This occurs in other RV Tauri stars such as R Scuti and DF Cygni.

Perhaps the double period is the true period which, if true, would seem to coincide with the changes in radial velocity, and if so, the relation between period and spectrum would also indicate a jump.

We know very little about these stars but the following seems to relate them closely to the Delta Cephei stars.

Both are found near the Milky Way. Certain lines in the spectrum of each are very thin and sharp, indicating that the stars are giants. R Scuti, while not belonging to spectral class M, yet shows titanic oxide bands. Relation of period to spectrum is similar. Temperature increases and decreases alike in both. Curve of radial velocities are similar to their light curves. Small numbers of such stars indicate that their interior condition is very unstable and not of long duration. Causes for these fluctuations are still unknown but the pulsation theory of Gerasimovic is perhaps the most plausible.

Foreign amateur astronomers emphasize some things more than we do, such as the following:

His record book for observations usually provides a column for entering the degrees of altitude of the telescope for each observation and a correction by applying a table for that purpose. Also, the kind of chart used for each observation which may be of value in checking later. Another thing the observer does is to rest his eyes a few minutes each time before looking through the eyepiece. Amateur aids include books on "How to be Prepared to Make Observations while Traveling". In other respects the amateur journals in foreign countries are very much like ours.

The following observations have been reported for the month:—Armfield 49, Callum 17, Dietrich 7, Fairbanks 10, Halbach 9, and Loepfe 2. Total observations reported - 94.

Peck's and Armfield's observations of the star 201437b WX Cygni should prove interesting after a few more months.

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Watertown, Wisconsin.

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Astronomers Guild of Jamestown, New York.
Madison Astronomical Society, Madison, Wis.
Milwaukee Astronomical Society, Milwaukee, Wis.
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AAAA Notes

Hans D. Gaebler visited headquarters on January 22 and became so interested in the discussion of variable star and AAAA work that he didn't leave until the next morning. Come in again, Mr. Gaebler, and stay longer. We enjoy your company.

A new feature has been added to Harold Stamm's lecture on the art of telescope making. He has purchased a 4-inch reflector, made at the West Allis High School by one of his pupils, which he intends to use in a demonstration after showing his motion picture, "Telescope Making at West Allis High School".

An interesting narrative account of the American Association of Variable Star Observers, by Dr. Anne S. Young of Mt. Holyoke College, will be one of the feature articles in the March number of Amateur Astronomy.

R. D. Cooke of Milwaukee has been experimenting with various methods of silvering mirrors. The results of his experiments will also be featured next month.

(Continued on page 20)

AAAA Organization

Organizing Chairman—L. E. Armfield, 2046 S. 59th St., Milwaukee, Wis.

Regional Organizers—

Connecticut and Rhode Island—L. L. Doolittle, P. O. Box 241, South Norwalk, Conn.
Chicago Area—Wm. Callum, 1319 W. 78th St., Chicago, Ill.
Kentucky and Tennessee—Latimer J. Wilson, 1606 Woodland St., Nashville, Tenn.
Maryland, Pennsylvania and West Virginia—Leo J. Scanlon, Valley View Observatory, Pittsburgh, Pa.
Metropolitan New York and New Jersey Area—James S. Andrews, 33 Franklin Place, Rutherford, N. J.
Eastern Wisconsin—L. E. Armfield, 2046 S. 59th St., Milwaukee, Wis.
Western Wisconsin—Wm. R. Binney, 315 N. Franklin St., Madison, Wis.
Other areas are not yet assigned.

Section Leaders—

Double Star—Unassigned.
Loan Bureau—Wm. Callum, 1319 W. 78th St., Chicago, Ill.
Meteors—Unassigned.
Nova Program—L. E. Armfield, 2046 S. 59th St., Milwaukee, Wis.
Observatory—Leo J. Scanlon, Valley View Observatory, Pittsburgh, Pa.
Occultation—R. D. Cooke, 6811 W. Cedar St., Wauwatosa, Wis.
Photoelectric Photometry—Unassigned.
Photographic—Lynn Matthias, 2121 E. Capitol Drive, Milwaukee, Wis.
Planetary—Ed P. Martz, Jr., 726 N. Elmwood Ave., Oak Park, Ill.
Publication—Miss Elizabeth Wight, 1312 E. Curtis Place, Milwaukee, Wis.
Telescope Making—Unassigned.
Translations: German—Hans D. Gaebler, 404 8th St., Watertown, Wis.
Translations: Swedish— T. R. Hedengren, 2561 S. Graham St., Milwaukee, Wis.
Variable Star—Hans D. Gaebler, 404 8th St., Watertown, Wis.

Subsection Leaders—Planetary—

Jupiter, Mars and Saturn—Latimer J. Wilson ,1606 Woodland St., Nashville, Tenn.
Mercury and Venus—Ed P. Martz, Jr., 726 N. Elmwood Ave., Oak Park, Ill.
Moon—Walter H. Haas, Miller Hall, Mt. Union College, Alliance, O.
Asteroids, Comets, Neptune, Pluto, Sun, and Uranus—Unassigned.

Tri - State News

LEO J. SCANLON, Regional Organizer

As a preparation to beginning full co-operation with the AAAA program, at the December meeting of the Astronomical Section of the Academy of Science and Art in Pittsburgh, we were favored by the presence of Dr. Keivin Burns, Assistant Director of Allegheny Observatory, whose subject was of tremendous interest: "A Suggested Program of Work for the Amateur". A summary of this lecture has been forwarded to the editors of this magazine, and appropriate portions will be printed as occasion permits.

Along the same line was the meeting of January when we had the pleasure of attending a lecture by Prof. W. J. Kiefer, one of our members, whose subject "Elementary Optical Principles" was well illustrated by means of an optical disk which showed the refraction and reflection of parallel beams from surfaces of different curvature.

At the beginning of the year a searching questionnaire was sent to all active and passive members, numbering two hundred and fifty, asking whether or not their names should be retained on our list, what telescopic and photographic equipment they had, what shop and laboratory facilities, and what other hobbies they enjoyed. They were asked also to designate which of a dozen branches of astronomy they were most interested in, and at the present time the data are being tabulated and analyzed, so that the active members can be assigned to appropriate sections, and the program for each section outlined. At the present time, a rough tabulation indicates that variable star observing and celestial photography will occupy the most prominent places in the work programs to be developed here, and if this is the ultimate decision, full energy will be concentrated on these programs, without trying to carry along a half-dozen other pretentious schedules.

At the present time several members of our immediate vicinity are constructing or altering instruments for photographic purposes. The sixth amateur observatory is under construction by Roy Hoffman, and will be completed in time for a dedication at the Vernal Equinox. This building, fourteen feet in diameter will house a splendid 10-inch Springfield type telescope, motor driven, the third of its type to be installed here. Since these are the most suitable guide telescopes for photographic work, it is likely that, at all three stations, this work will be carried out simultaneously with variable star observing.

The organization of groups in outlying districts is going on apace. Literature has been sent to some of the widely-known amateurs in the field of variable star and meteor work, with the request that they act as nuclei for amateurs in their vicinity for a more intense organization of the district.

As National Observatory Advisor, the writer is engaged in collaborating with several amateurs on construction of their observatories. The most pretentious outside of Pittsburgh is in West Farmington, Me., under the hand of Alfonso R. Ibarguen, who is housing a 12-inch equatorial reflector. Another is being built in Baltimore, Md., and since this is the home grounds of Woods and Watson, the celestial photographers par excellence, the amateurs in their vicinity have been instructed to make first contact with them for expert advice.

Telescope construction has not suffered with the advent of winter, but the use of all instruments has been sadly curtailed by the general bad weather over this end of the country. The sun shone for a total of five hours over Pittsburgh during the first half of January, which is just about ten percent of normal. Needless to say, the nights, with two exceptions, have been consistently cloudy, and this seriously delayed the beginning of a photographic program outlined for us by Lynn Matthias, National Photographic Director.

Valley View Observatory,
Pittsburgh, Pennsylvania.

AAAA Notes

(Continued from page 19)

A "directory" of regional organizers and section leaders will be found on Page 19 of this issue.

If you are interested in any branch of astronomical activity, the leader of that section will be glad to have you write to him and tell him about it and will co-operate with you in any way he can.

The regional organizers, as the name implies, are interested in the expansion and organization of their respective areas. Amateur astronomers and local groups desiring information concerning the AAAA are requested to communicate with them or with the organizing chairman.

A. T. M. Club News

AMATEUR TELESCOPE MAKERS OF CHICAGO

WM. CALLUM, Secretary

George H. Olewin was the speaker at the monthly meeting in the Adler Planetarium, on Sunday afternoon, January 12th. His subject was "Seismological Instruments". He described the construction and use of such instruments for oil prospecting and the recording of earthquakes. He drew respresentative graphs showing the amplitude of the different earth waves, both reflected and refracted. He suggested that amateur seismology might be taken up as a hobby and said that the construction of a seismograph good enough to do useful work would not be too difficult for the amateur. After questions and discussion the meeting adjourned.

After the meeting a business committee was organized. Clausing, Davis, Kernan, Klapperich, Martz, McCord, Nicholson, Olewin and Warner are the members of the committee. They will have charge of the club business and programs during 1936. Kernan is chairman of the program committee. Klapperich, Martz and McCord will form an educational committee the function of which will be to arrange for short courses of instruction on astronomy, observing, and optics. It is planned to give these courses at the mid-monthly neighborhood meetings.

There was a meeting at Ed Martz's home, 726 N. Elmwood Avenue, Oak Park, on Saturday evening, January 4th. The nigth was cloudy but Mr. Armfield of Milwaukee was there and Ed has a fine collection of astronomical books so we spent a most enjoyable evening. There will be another meeting at Ed's next month of which you will be notified. The South Side meeting was held at 1319 W. 78th Street on Thursday evening, December 19th. The night was cloudy but the usual amount of optical gas was generated.

Prof. Carpenter reports seeing a red glow in the southeastern sky one forenoon this month. He thinks that this may have been the sun which some of the older astronomers have seen.

During 1935 the following telescopes were finished by our members: 10-inch Newtonian by John McNeil, 10-inch F-4.8 portable Newtonian by J. A. Wingard, 8-inch Cassegranian-Newtonian by O. J. Bliss, 6-inch Newtonian by L. Grandl, 6-inch Newtonian by J. L. Adkins, 14-inch Cassegranian-Newtonian by Joe Boehm, and 8½-inch Springfield by S. J. Fairbanks. C. H. Nicholson has the 120 mm. mirror and correcting plate for a Schmidt camera almost finished. There is a 250 mm. mirror to be made yet, but Mr. Nicholson says that the experience gained in making the small mirror will shorten the task of making the larger one. These mirrors are to be use in the Schmidt camera for the McDonald telescope in the Texas Observatory. The club is sponsoring the making of the mirrors and Nicholson is doing the work.

Three members, Fairbanks, Kernan, and McNeil, joined the AAVSO during the latter part of 1935 and are sending their observations to Harvard. Joe Boehm and Mittendorf have been doing meteor work. C. C. Orgo is going to join in that activity until his 8-inch telescope is finished. Joe Boehm has taken some good photographs of the moon with his 14-inch. Ed Martz has been appointed National Planetary Director for the AAAA and is getting others interested in that field.

The foregoing indicates the club has made a start in observational activities. The most of this occured during the last three months of 1935 since we came under the influence of the Milwaukee enthusiasts. This year should be a fruitful one for the Chicago ATM.

Perhaps the most important step the club took last year was the publication of the "Bulletin" and its incorporation with "Amateur Astronomy". This seems to have aroused more interest in observing than anything else we have done. The January issue of "Amateur Astronomy" is the first one in the combined form. It is a "thing of beauty and a joy forever", and we congratulate the editorial staff on the fine job they have turned out. Our club has agreed to take 60 paid subscriptions at $1.00 each. We ought to be able to sell at least 100, but so far only 20 have been taken up. Excepting a few complimentary copies, no more free numbers will be sent out. It is surprising how much more interesting a thing becomes if you have to pay a dollar for it. While we are on the subject of dollars, don't forget that splendid publication "The Telescope" published bi-monthly by the Bond Astronomical Club, Harvard Observatory, Cambridge, Mass. This is also $1.00 per year, and there is over a dollar's worth of astronomical photographs in every issue. The two magazines do not overlap, and they make an excellent combination. They deserve the support of every amateur.

1319 W. 78th Street,
Chicago, Illinois.

Milwaukee News Notes

MILWAUKEE ASTRONOMICAL SOCIETY

Harold R. Stamm returned from a southern trip on January 4. He visited Miami, Fla. but was unable to locate members of the Southern Cross Observatory. He did, however, visit Rev. Tilton C. H. Bouton at St. Petersburg and was quite impressed by the equipment at his observatory.

On the return trip, he attended the convention of the Association for the Advancement of Science at St. Louis, where he met Carl Hellweg of St. Louis, G. E. McCord of Chicago, Leo Scanlon of Pittsburg, and other enthusiastic amateur astronomers. Harold's description of the display of 20 transparencies, of the disks from Corning showing methods of grinding and polishing, and of other exhibits at the convention was very interesting.

Herbert W. Cornell, Scott Houston, and L. E. Armfield shared the honors, as speakers at the January meeting of the Milwaukee Astronomical Society.

Mr. Cornell gave a review of Dr. Forest Ray Moulton's new book, "Consider the Heavens", in so complete and comprehensive a manner that we feel as though we have already read it. He also announced that Dr. Moulton has consented to speak at the next meeting of the society to be held on February 6. The meeting will be held, as usual, at the University Extension Bldg.

Mr. Houston returned from an extended tour of the Southwest and West shortly before Christmas. He visited D. F. Brocchi at Seattle, Oscar E. Monnig at Ft. Worth, Joseph Meek at Tucson, and other amateur astronomers and various observatories including the Dominion Astrophysical Observatory at Victoria, B. C., the Chabot, Lick, Mt. Wilson, and Stewart Observatories, and the Pasadena shops at which the 200-inch disk is to be ground. Scott gave us a very interesting account of what he had seen, illustrating his discourse with pictures that he had taken. While at Tucson, Ariz., he was so impressed by the fact that he could see stars as faint at 14.4 with a 4-inch refractor (here at Milwaukee a 10-inch is required) that he was tempted to stay.

Mr. Armfield's report of his eastern trip and the AAVSO convention at Cambridge, Mass., which had been postponed in order to have the reports of both eastern and western trips at the same time, lost none of its interest because of the delay.

This winter finds Mrs. Harriet O. Smith basking in the well known and widely advertised sunshine of Southern California. Her last letter was sent from Hollywood, but we understand that she has since gone to Santa Monica.

Frank Dieter has gone to Washington, D.C., having received an appointment as an engineer for the Resettlement Administration. He expects to be with us again by spring—or as soon as the Supreme Court declares the R. A. unconstitutional.

Larry Wiffen, President of the Milwaukee Hobby Council, interviewed R. D. Cooke, our president, on astronomical questions during the Hobby Council's broadcast over WTMJ on January 18. Among other things, Larry asked about the relation of celestial stars to Hollywood stars to which Ray replied, "Well, perhaps the Hollywood variety comes under the head of variable stars. However, both kinds have one thing in common - they photograph well".

Max Feinsilber, who has been in the U. S. Forest Service in the Nicolet National Forest for over a year, paid us a surprise visit on January 18. Arthur Boyd of Pewaukee also visited with us on that day. Both Max and Art have been away so long that they were strangers to us. They stayed at headquarters over night, and left the following morning. Max is now staying in Tulsa, Okla., but we wouldn't be surprised to hear that he will come back to Milwaukee soon.

E. A. Halbach spoke at a meeting of the Hi Mount Parent-Teachers Association of Milwaukee on January 20. Ed is the M A S representative in The Milwaukee Hobby Council and his talk on "Astronomy as a Hobby" was given as part of a Hobby Program. Incidentally, he acted as master of ceremonies ,introducing members of the Hobby Council and other speakers.

Mrs. W. W. Wight entertained at a farewell dinner in honor of Miss Helen Pillans on January 24. Miss Pillans left for Escanaba, Mich., on January 25, where she will assume her new duties as teacher in the Escanaba Public Schools. We hope that she will continue her work in juvenile astronomical education and will keep us informed of her progress.

At a meeting of Kenwood Lodge, F. & A. M. on January 24, L. E. Armfield spoke on "The Architecture of the Universe, Old and New". After the meeting, the members were invited to see some of the celestial objects through the 3-inch refractor belonging to Dr. John J. Ball of Mount Mary College.