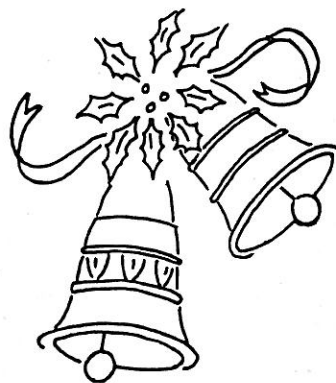


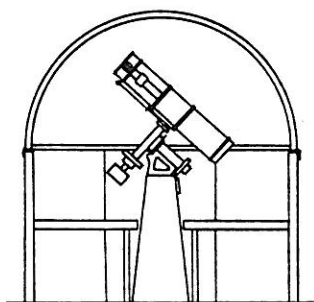
The

Spectrum



 NOVEMBER - DECEMBER
 1983
 ISSUE

BUFFALO ASTRONOMICAL ASSOCIATION, Inc.



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-Methods of Improving Suburban Deep-Sky Observations-

While little can be done to totally eliminate the detrimental effects of large scale metropolitan light pollution, a few simple steps can be taken that often markedly improve ones ability to discern extended objects through moderately brightened skies. Simply simply stated, it all boils down to attaining sufficient contrast between the targeted deep-sky object and the surrounding sky.

I have found that the glare and stray light of local streetlights or a neighbors window can be at least as much of a hinderance as the light pollution. One method of avoiding this, I have found, is to literally paint almost the entire telescope a very dull black. As a true fanatic, even the observing ladder and chart table are similarly darkened. In fact any objects within the eyes field of view should be rendered as unreflective as possible. This is necessary for the human eye can detect light across a field of 150° or so in extent, even with an eyepiece which can take in a 75° apparent fieldm there is still plenty of visual area where stray light can filter into the eye. Cupping ones hands about the eyepiece would seem a simple solution but the resultant fogging of the eyepiece and the additional eye strain would likely prove self defeating. A far better solution would be to don a dark cloth that completely covers the observers head along with the eye end of the telescope. Particularly annoying extraneous light can be blocked from view by the application of a light screen, a 7.5 x 10 ft. one in my case.

Nebular filters, where applicable, are not to be underrated but even here performance can be improved by the proper combination of magnification and field coverage. Especially with large low surface brightness objects, such as M-33 or NGC 7000, the eyepiece field should not be too constricted. If possible, try to employ an eyepiece that takes in a field at least 50% larger than the target objects largest dimension. The objective is to provide the needed object/sky contrast. Also with large diffuse objects, use as low a magnification as is practical for this will help preserve the objects surface brightness. Averted vision has proven to be a most valuable tool. By looking a little to the side of the objects expected position, often an entire magnitude fainter can be detected. At the opposite pole, for compact objects, moderately high powers often much improve detectability. This has the effect of darkening the sky background. I've found 15x - 20x magnification per inch of aperture most useful. When viewing rrally faint objects from the suburbs a good set of setting circles or a detailed star chart are quite helpful. Faint objects are best seen against the background only when their exact positions are known.

I don't know if anyone else has ever noticed this but for very compact, near stellar, planetary nebulae the objects identity seems often to be betrayed by its "abnormal" green, green-grey, or even bluish color. Afterwards if the seeing conditions will bare it the nebula's tiny disk is almost invariably confirmed under high magnification.

For the viewing of the faint central stars of some planetary nebulae as high a magnification as the seeing conditions will withstand can prove advantageous. High magnification dims the nebula's apparent surface brightness and thus boosts the stars contrast with the sky.

With faint compact galaxies and quasars seeing conditions as well as sky transparency are usually the most limiting factors. Digressing a bit, the importance of good seeing conditions in regards to compact deep-sky objects is critical for even the slightest spreading of their feeble light will render them invisible. A recent striking example was the successful observation of the Ring Nebula's (M-57) faint central star. On that singular night fine seeing conditions prevailed, attempts on other equally transparent nights failed, no central star was seen. At 372x during excellent seeing, the star, on this one occasion, amazingly popped into view.

Even the thermal convective turbulence in and around the telescope must be considered. At least for several hours after nightfall, it would seem that the more thermally un-equalibrated metallic mass is present near the optical path the worse the localized seeing will be. Wooden components have proven to be a superior alternative, especially where the tube is concerned.

Lastly a "rock steady" telescope mounting is to be preferred. For mountings I have come to favor bonded wooden box constructions. Such laminates are lighter than most metals, mechanically strong, and fairly inexpensive.

Its sometimes amazing how much can be seen from the suburbs if one first learns what to detect!

Michael Idem

- ASTRONOMICAL HAPPENINGS -

SOLAR- The Sun passes from Scorpio into Sagittarius in November and into Capricornus in December. Winter Solstice this year is on December 22nd. The Sun will have reached its southern most trip to the south and will commence to move northward, making the days longer and nights shorter. Of course that means warmer weather as well as shorter observing time. An Annular Eclipse of the Sun will occur on December 4th. Its path will be through the North Atlantic Ocean to central Africa near the equator.

LUNAR- New Moon - November 4 & December 4
First Quarter Moon - November 12 & December 12
Full Moon - (Beaver) November 20 & (Cold) December 19

Last Quarter Moon - November 27 & December 26

Occultations (As seen from the Buffalo area are conjunctions) - Uranus - November 6 & December 31

Jupiter - November 7
Saturn - December 2 & December 29
Mercury - December 6
Venus - December 30

Conjunctions - Mars - November 1, November 29 & December 28

Venus - November 1 & November 30
Neptune - November 8 & December 5

PLANETARY - planet conjunctions -

Mercury & Uranus - November 20
Mercury & Jupiter - November 26
Mercury & Neptune - December 3
Venus & Saturn - December 17
stellar conjunctions -
Venus & Spica - November 29
Mars & Spica - December 23
Mercury & Antares - November 20

METEOR SHOWERS - ♈Taurids (southern) - November 3
♈Taurids (northern) - November 10
Cepheids - November 9
Mu Pegasus - November 11
Arietids - November 12

• Beilids - November 14
• Leonids - November 16
• Andromedes - November 28

Phoenicids - December 5
Monocerotids - December 10
Chi Orionids (northern) - December 10
Rho Hydrids - December 11
Chi Orionids (southern) - December 11
• Geminids - December 13
• Ursids - December 22
Delta Aretids - December 8 - 14
Coma Berenicids - December 12 - January 23

Darwin Christy

BAA ANNALS

5 YEARS AGO- The Nov. 1978 meeting was hosted by Ernst Both at the Science Museum. He spoke on the Red Planet Mars. The December meeting was the annual Christmas party. Darwin Christy was having his mirrors aluminized in Ithaca and visiting wineries while he waited. Or was he visiting wineries and decided to take his mirrors along. Orrin Christy was just back from a business trip to England and Walt Wyman was showing his slides of covered bridges in New England. The Study Group was in its third month after being newly reorganized.

10 YEARS AGO- At the Nov. 1973 meeting the topic was the June total eclipse. Larry Hazel traveled to Kenya, East Africa and Vern Siegel observed the eclipse from aboard the S.S. Canberra. They both spoke at the meeting. The December meeting was again the annual Christmas party. Comet Kohoutek was the big news then and Ernst Both had an article in the Spectrum which included an observing schedule that ran from Nov. to Jan. 1. Orrin Christy spotted the comet way back in October.

20 YEARS AGO- The Nov. and Dec. meeting in 1963 were both unusual. The Nov. meeting was addressed by a Norman Weiss who spoke on U.F.O.s. The Dec. meeting was about a new electronic observational device developed by Dr. E.P. Tschermok, a Czech physicist. I can't begin to imagine how the thing worked with no additional information so maybe someone who attended that meeting can fill me in. Christmas parties took the form of extended social hours after the regular meeting. There was a two part article in the Spectrum about eyepieces which gave prices of the types discussed. They ranged from \$ 3.50 to \$ 6.00, 20 years ago!

Ken Kimble

"SPECTRUM" DEADLINE

The deadline for the January-February Issue of the "SPECTRUM" is December 28th.

DUES	DUES	DUES	DUES	DUES	DUES	DUES
DUES are due!	FAMILY membership....	\$ 15.00	annually			
	Regular membership...	10.00				
	Student membership...	5.00				
	Senior membership....	5.00				
"SPECTRUM"	subscription only.....	2.00				

This will be the last issue for unpaid memberships.

Spy and Tell

Beverly Bette is an extremely busy person these days. She is painting two space pictures for Betty Wasiluk, who was a grad assistant for the astronomy department at State, and now has a job in Florida at the Bradenton Planetarium as an astronomer educator. Betty is taking Beverly's pictures with her to show them to the folks down there. At Stellarane, Bev sold \$120 worth of 8x10 and 5x7 space paintings.

Next year NASA is putting on a Science Fiction, Science Fact Art Exhibit at NASA Lewis Research Center in Ohio. Bev has sent in slides of her space art and is waiting to hear if her work will be accepted for the exhibit. Next year she will be exhibiting her paintings at the Kenan Center in Lockport. Shaun Hardy will manage the exhibit.

Beverly is taking a course in computer art at U.B., and an adult education course at the Benjamin Franklin Middle School in Kenmore in computer literacy, and one at Sweet Home Senior High in computer programming. She is also working for Lenzart Celer Art in the photographic department as a print retoucher.

Richard Janas is in the graduate school at U.B., working on his Ph.D. in policy studies. He is a graduate assistant in the School of Management.

Al Mehn is going to school at ATC, studying computer programming.

Robert Hughes was the publicity director for the Hydroplane Frestbite Regattas held on the Niagara River August 12-13-14 and October 1-2, for the benefit of Children's Hospital.

Bob is interested in shortwave listening which he has enjoyed since the '60's.

Michael Idem is busy working at an auto dealership. When he can find time he does some black and white general photography and his own developing.

He is interested in the space program, and enjoys helping out at Beaver Meadow Observatory with the ever growing public attendance.

Norm Eckhardt was married in Rochester on June 25 to Desiree Kagi. Norm graduated from the University of Rochester in '76, and is an electrical engineer for Sierra Research. In his spare time he enjoys tinkering with electronic gadgets.

Congratulations to Howard and Bill Kirst for winning the top prize of \$1000 at a photo exhibit sponsored by 93WUF, Delaware Camera Mart, and the Big E, at the Main Place Mall last August. There were 93 prizes offered for 8x10 photos. The Kirsts' entry was a photo of the Erie Basin Marina. Bill also won a \$25 gift certificate from Jasmine Jewelers for his photo of the light house and Coast Guard Base on the Waterfront. Copies are available.

An article on Charles Kewal, noted astronomer and former B.A.A. member (1956), appeared in the Omni magazine, October issue, page 86. Among other things, the article mentions that he was born in Buffalo and attended classes at the Buffalo Museum of Science.

Rowland Rupp will be giving a talk on astrophotography to the Lockport Camera Club in January.

I attended the last public night for the season at Beaver Meadow Observatory where a crowd of enthusiastic individuals filled the observatory to capacity. Special credit for these very successful public nights should be given to Observatory Director, John Riggs, who has given so much of himself in time and energy to bring astronomy to so many people. We can all be proud of his inspiring leadership. He has established a following of eager observers, and enriched the lives of many. We are also indebted to John Yerger and Michael Idem who have assisted with public nights this season.

Happy Holidays!

Edith L. Geiger

?! PUZZLE ?!

A Cryptoquiz is a list of words which are related. They are solved by changing the letters to their proper letter. Thus: if a word were spelled 'hwz' and represented the real word 'dog', each h would be a d, w would be an o and z would be a g....get it? The answers will be in the next issue.

1) Tools for the Astronomer -	2) Solar System-	3) Short names in Astronomy-
abcbdefgb	zyxwv	apef
ecfeh ijkib	uvtswr	asvmp
emnbjmd	tvvgr vh glznwso	spttf
damj eomjad	prwsovnmr	bjsz
pkcabjd	rlq	dmbsl
pkcn	spowk	xfjo
dgbcajdefgb	wnwpq	ibmf
dofq nfakfr efrjfed	qszwlqs	nsllpt
sffhd	tsouloj	ppsu
jbi pcmdo citoa	onqir vh rpwlq	qpqf
- - - - -		

Match-up the 'spectral classifications' -

- O:- 1-hydrogen weaker, neutral & singly ionized metals.
- B:- 2-neutral metals, TiO bands dominant.
- A:- 3-hydrogen dominant, plus singly ionized metals.
- F:- 4-Ca II prominent, hydrogen weaker, neutral metals.
- G:- 5-neutral metals, C₂, CN & CH bands.
- K:- 6-neutral metals, C₂, CN and CH bands.
- M:- 7-neutral helium, ionized metals, hydrogen stronger.
- R:- 8-neutral metals, ZrO & TiO bands.
- N:- 9-neutral metals, some molecular bands.
- S:- 10-ionized & neutral helium, ionized metals, weak hydrogen.

--- FOR SALE ---

Mirror Making Machine - can handle up to 8-inch diameter and produces an excellent spherical surfaces. With miscellaneous grinding supplies. Asking \$20.00 - Call Orrin Christy at 692-8190 after 6:00 P.M.

Also:- The Kuiper Photographic Lunar Atlas - It is in good condition - Make offer. Orrin Christy - 692-8190

For free with either of the above a 4 1/4-inch f:10 telescope of Edmund optics, 1 1/4-inch eyepiece holder. DIRTY - BUT what do you want for FREE!!! Orrin Christy - 692-8190.

"SPECTRUM" deadline is December 28th

LOOKING BACK

The Associated Press recently issued a release by Mark S. Smith headlined "Mammoth Telescope Will Let Scientists Look Back in Time." This telescope will be built in the Canary Islands over a ten-year period by British scientists and will be the world's largest telescope. It is described as a "six-eyed monster", which will probably exceed \$65 million in cost. Professor Alec Boksenberg, Director of the Royal Greenwich Observatory, is coordinating the project and he states that "When one looks with a very big telescope such as this one, one is looking back in time."

Just how big must a telescope be before one can "look back in time"? Can one look back in time with a small telescope? How about with no telescope at all?

A look at the moon with the naked eye is a look back more than a second in time (1.28, to be exact). Granted, that is not very far back. One should not do it, but a look at the sun is a look back approximately 8 1/2 minutes in time. That is still not very far back. How about Alpha Centauri? If we could see our nearest star neighbor from our latitude, we would be looking back approximately 4.3 years in time. How well do you remember things as they were that long ago? Looking that far back might be very interesting--especially if there were more to see than a spot of light.

The human eye can look back a lot further than 4.3 years, however. It is generally agreed that the naked eye with good seeing conditions, can see objects slightly fainter than 6th magnitude. For most people, there is probably some wishful thinking involved in seeing such faint objects, but one does not have to have such keen vision to see the Andromeda Galaxy (M-31), which is 4th magnitude. It appears as a small patch of fuzzy light to the unaided eye; but what is seen is an extra-galactic object as it was 2.2 million years ago. That is certainly looking back.

And how much further back might we be able to look if we had even a modest telescope? Suppose we had a 3-inch. Now, perhaps, we could see objects as faint as 11th magnitude. Again, that is probably too faint for the average observer, especially in Buffalo, so consider the pair of galaxies M-81 and M-82 in Ursa Major. These have magnitudes of around 8 and 9 respectively and are easily seen with a small telescope. Estimates of their distance range from 6 1/2 to 9 million light years. With the BAA's own 12 1/1 inch Beaver Meadow, one could see, ideally, a 14th magnitude object. Well within the Vorgo Cluster, distant some 42 to 70 million light years (estimates vary). And larger telescopes will reveal fainter and more distant objects, as they were even further back in time.

The fact is that we are looking back in time whenever we view an astronomical object--with a telescope or without. But, if all we see is a small patch of fuzzy light, we do get a very good idea of how things looked back then. This is where the "very big" telescopes come in.

All telescopes (including the human eye, which is like a small refractor), large or small, collect and focus electromagnetic radiation at a single point (focus) where it is detected by a human retina, a photographic plate, or other device. Obviously, a large telescope can collect and deposit at the focus more radiation than can a small one. A good quality large optical telescope can see faint and more distant objects that a small one cannot see--and with more detail. With the Hale Telescope, Mt. Palomar's 200-inch, one can see galaxies approximately five billion light years away, as they were five billion years ago.

Five billion years back in time! Isn't that far enough? Not for the proponents of the Big Bang explanation of the creation of the universe. With various measuring techniques, astronomers have found that all the countless galaxies found to date are rushing away from earth, and the farther ones are moving away faster. In other words, the universe is expanding. But, it all had to start from

somewhere and the Big Bang theory is one explanation.

The Big Bang theory postulates that, between 12 and 20 billion years ago, the entire universe was an incredibly dense "primeval atom". This atom exploded, hurling matter and space outward at speeds nearly that of light. Some million years later, enormous clouds of hydrogen and helium began to form, becoming the protogalaxies. Still later, star formation began and within a few billion years after the Big Bang all of the galaxies were formed, as all seem to be about 10 to 13 billion years old. Estimates of the times involved vary. For example, the British scientists developing the Canary Island telescope think the Big Bang occurred only 10 billion years ago.

In any case, some astronomers believe that if they could see far enough back in time, they would see the Big Bang--if it occurred. This curiosity about the creation of the universe is the impetus for the new telescope, which will be ten times as powerful as any existing light telescope--powerful enough so that perhaps some lucky observer peering into it will see the glowing debris of the Big Bang.

That's really looking back! But, remember--on a clear night, everyone can "look back in time"; and without spending a cent.

Anonymous

Stephen E. Kramer III

This scholarly gentleman with a unique occupation, was born in Washington, D.C., but didn't live there very long as the family moved to Pueblo, Colorado. He graduated from Carlyle Elementary School, and then the family moved on to Annapolis, Maryland, where Stephen attended junior high. He won a science award for having the best grades in the science class. His hobby at that time was model cars which he pursued with fervor. The family made another move. This time it was to Milledgeville, Georgia, 30 miles east of Macon. Steve graduated from Baldwin County High School with a National Merit Scholarship.

From high school, Steve went directly into the army. His basic training at Fort Jackson, South Carolina, lasted a half year, after which he spent one and a half years at Fort Ord in California, and a year in Puerto Rico. He served as a clerk typist, and education clerk, and finished his enlistment in 1962.

During Steve's term in the army, he acquired one year of work toward college credit, so he continued his education by enrolling at Ohio State University in linguistic science. After one year, he went to Westinghouse to work as an inspector in quality control. The next year he returned to Ohio State, and by going full time year round, graduated in 1965 with a B.A. degree. In his last year at Ohio State he married Marilyn McMann, a history major.

Steve and Marilyn joined the Peace Corps and went to Turkey where they both taught English for two and a half years. Steve wrote an English text which was mimeographed for local usage. During vacations the Kramers traveled to Iran, Egypt and Lebanon. They found their time spent in Turkey to be a great and exciting experience.

Returning to the United States, Steve and Marilyn went to Indiana University in Bloomington, Indiana, where Steve, on a fellowship, received his Master's in English, and Marilyn received her Master's in library science.

Then came Steve's decision to go into the aircraft field. He went to Bowman Technical

Schoel in Lancaster, Pennsylvania, for a one year program in clockmaking, after which he became employed for a half year at the Hamilton Clock Company. He then rented a space of his own where he ran a clock repair business for one year. He had contact with the Rittenhouse work of a couple centuries ago and designed missing gears and parts for one of his famous clocks. Steve then repaired measuring gauges for five years working between Lancaster and Philadelphia.

The Kramers moved to Philadelphia while Marilyn got her law degree at Temple University. Steve and Stacy D.C. Weed, a former Navy officer and clockmaker, who had also attended Bowman Technical School, started to work with the historical society on the clocks of Lancaster County. Word spread about the project and, as a result, they learned of all kinds of clocks in the area. They co-authored a 224 page book on Clockmakers of Lancaster County and Their Clocks 1750-1850. It is published by Van Nostrand.

Steve was given a faculty appointment as a Senior Fellow at the University of Pennsylvania, where he worked on the "Rittenhouse Orrery" for four months in 1978, disassembling, cleaning and rebuilding this mechanical clockwork planetarium built in 1771 by Philadelphia, David Rittenhouse. The Rittenhouse project was supported by funds from the American Philosophical Society, the University of Pennsylvania, and the Barra Foundation of Philadelphia. Steve gave an illustrated talk on the orrery at our meeting last November.

He and Marilyn moved to Columbus where Marilyn worked at the Ohio State University Law Library as cataloguer. Steve remained for a while in Philadelphia working on the orrery, taking pictures of the orrery and doing photography for the Clock Museum at Columbia, Pennsylvania. He had learned commercial photography in order to take these pictures. He has a traveling photographic studio and a Nikon camera.

Marilyn was offered the position of head of cataloging at the University of Buffalo, so the Kramers came to Buffalo in 1981. Steve continues to carry on research on the "Rittenhouse Orrery," and has branched out. He recently took a trip to Boston to study another famous early American orrery, but has found that the Rittenhouse is still "number one." He hopes for more funding to continue his work on the Rittenhouse project, but cryptically remarks, "This is the U.S. of A., not Denmark."

Earlier while in Columbus doing background reading for the Rittenhouse undertaking, he read an article on the partially reconstructed ancient Greek "Antikythera Mechanism" made in 87 B.C. For many centuries experts were in a quandary as to what this device might be. One of many theories suggested that it might have been used to determine eclipses, but a puzzling collection of gears and rings prevented the solving of this ancient mystery. This 2000-year-old device had been salvaged by sponge divers from a shipwreck in 89 B.C. off the Greek island of Antikythera near Crete. It was broken in pieces and dried out. It has been cleaned, x-rayed, and gears and teeth have been measured and other reconstruction has taken place. Steve became excited as he thought how spectacular the full reconstruction would be. He set to work and, over many months, reconstructed various gear combinations with help from his notes analyzing the Rittenhouse gearing system. Realizing what the gear ratios should be to the suspected

19 year "Metonic cycle" of this instrument, he soon found the correct ratios of the dials and determined that most probably this device was an ancient lunar eclipse calculator. Steve has constructed the first complete model of the "Antikythera Mechanism."

When Steve met Bob Mayer at one of our meetings, the Antikythera device was discussed and they decided to work together to produce a fine replica of this ancient instrument in brass, aluminum, steel, and bronze, in a beautifully finished mahogany frame. They have demonstrated this replica at a couple of our meetings. There is still some engraving to do and painter blades to make. Steve says that it has taken longer to finish than he had thought, but that maybe the work will be completed sometime next year.

An excellent article appeared in the Sunday Buffalo News on June 26 of this year, giving a detailed account of Steve's research and of his and Bob Mayer's work in the reconstruction of this incredible instrument made by ancient men of great intellect.

Astronomy has always held a special appeal for Steve, so working on the "Rittenhouse Orrery" and his knowledge of astronomy went well together. His astronomical interests center around the history of astronomy and celestial mechanics. While in Columbus, Ohio, Steve used a 4" reflector belonging to his father. He likes, when possible, to limit himself to conditions similar to the 1700's. In Lancaster, he volunteered as a planetarium lecturer and technician at the North Museum on weekends for two years. The planetarium had a Spitz projector which was one of the first to have a new mode of running the globe.

Steve joined the B.A.A. in 1981. He has been a member of the Rittenhouse Astronomical Society since 1975. Its members number around 200. His main incentive in keeping his membership in the organization is to keep up with its activities, and to receive Sky & Telescope with his membership.

Steve is giving a lecture on Rittenhouse at a seminar on Pennsylvania Clocks, given by the National Association of Watch and Clock Collectors. The seminar will be held in Lancaster later this year.

One of Steve's pleasures is listening to baroque music and the classics played on WNEB and Canadian stations. He also has tapes of country singer, Jerry Reed, who was his squad leader while in basic training. He periodically reads science fiction and likes Star Trek reruns.

In Steve's projects he has to do some sketching and hand-engraving, but he says, "If you need it, you do it." This succinct statement also applies to his projects at home which consist of roofing, painting, plumbing, and electrical work on the house which they purchased in the Kensington section in 1981.

Steve believes in physical fitness and finds jogging to be a worthwhile exercise. During the summer he runs one or two miles a day around the football field at the University of Buffalo.

He is a most unusual man, blessed with perseverance and purpose in solving the extraordinary. He and Marilyn have had a broad educational experience, and are friendly, warm and gifted human beings. They have been in Buffalo but a short time, but have made many friends who treasure their congeniality and wealth of stimu-

lating conversation.

Edith L. Geiger

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ASTRONOMICAL LEAGUE

Those of you who have attended either our September or October meetings are aware that the Board is considering recommending that the BAA drop its long-time membership in the Astronomical League. Last year our dues to the AL were \$114, just about the amount of our operating deficit. The question is--do we get our money's worth?

The most tangible benefit we receive is individual copies of the Reflector, the quarterly newsletter of the AL. Its publication costs about half the League's budget. Other benefits include a book service, a computer users group, a product quality and safety committee and several more. A listing of these services is given on page 8 of the August 1983 Reflector.

As a strictly editorial comment, I feel the Reflector has improved some during the last few years but is still unexciting. A survey of our members, however, indicates that about half of us read and enjoy the publication. The book service recently fouled up on an order from one of our members and the AL suggested a rather awkward method of making amends. A request for help to the quality committee made another member a couple of years ago

made by another member a couple years ago went unanswered. made by another member a couple of years ago went unanswered.

Yet I think they mean well. President Gerry Sherlin wrote an editorial in the August Reflector explaining the difficulties in administering the organization. Sometimes the BAA presents operating problems too--think how they would magnify if our Board and members were scattered across the country.

I've asked for comments from members about their feelings about continuing membership in the AL. So far, one suggested we retain it, two suggested we drop it. Apparently, for the most part, we don't care. Should we spend \$114 on something we don't care about?

Since the issue may come up in November, you may want to look over some recent issues of the Reflector. An article on the Astronomical League in the "Amateur Astronomers" column on page 345 of the October 1983 issues of Sky & Telescope may also help you decide. If you want to comment on this question, please call me at 839-1842.

Rowland A. Rupp
President

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OBSERVATORY NOTES

ATTENTION

ATTENTION

ATTENTION

The 12½-inch mirror and diagonal of the BeaverMeadow Observatory telescope will be removed for re-aluminization on Sunday, November 13, 1983. The two mirrors will be sent to Evaporated Metal Films, in Ithica, N. Y. Turn-around time is expected to be from two to three weeks. During this period, the only usable telescope available at the Observatory will be the 8-inch reflector. DO NOT go out to the Observatory after the 13th and expect to make use of the 12½-inch telescope!. This time period was chosen to coincide with the unfavorable moonlit portion of the month. In addition, November is so notoriously cloudy here in western New York only a minimum amount of observing time will probably be lost. Hopefully, the mirrors will be back by the first or second week in December. For more information please call John Riggs at 875-7965. Announcements will also be made at the November and December general membership meetings.

The last Public Night of the year was held October 15. Out of a planned number of 19 Public Nights, 13 were favored with clear or partially clear skies. Public Night services brought in a total of \$140.15 to the Observatory fund

-- nearly a 50% increase over last year's receipts. Let's hope a trend like this continues for next year's Public Nights as more and more people become aware of what the Beaver Meadow Observatory has to offer!

John Riggs
Director

* * * * *

*** CONSTELLATIONS ***

ANDROMEDA, the Chained Lady, daughter of Cepheus and Cassiopeia. As the legend goes, her mother, Queen Cassiopeia enraged the sea nymphs so much by boasting of her beauty that Neptune punished her by chaining her daughter, Andromeda to a rock by the seashore. She there was laid prey for the terrible sea monster that was ravaging the coast. The unfortunate maiden was forced to submit to barbarous treatment to that monster. Luckily, as the monster was about to seize her, Perseus the Champion, flew down to rescue her. Perseus cut the hideous head of Medusa off and held it up to the sea monster's eyes and the creature was turned to stone, and he gallantly released Andromeda.

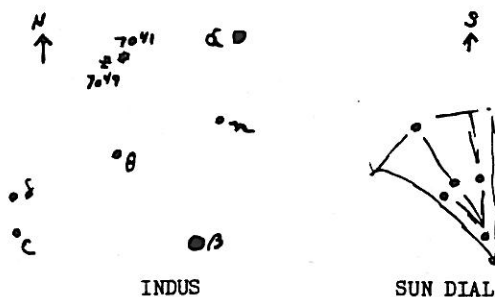
Andromeda lies within the boundaries of Perseus on the east and north; Cassiopeia on the north; Lacerta on the west; Pegasus on the south; Pisces on the south; and Triangulum on the south.

Items of interest include galaxies, open clusters, planetary nebula, variable stars and double stars. The galaxies include the Andromeda Galaxy, M-31 (NGC 224), M-32 (NGC 221) M-110 (NGC 205), NGC's 214, 404, 708, 753, 891 & 7640. Open Clusters NGC 752 & 7686. Planetary Nebula NGC 7662. Variable Stars T, R, TZ, RS, TY, AN, ET, Z, CG, SU, SV, VX, TU, AQ, RW, EG, CC, W, & C. Double Stars Pi, Gamma, Mu, Delta, 56, 59, & Alpha which has a dark companion. Binary Stars are Psi & Gamma. The foregoing objects can be found in the "SkyAtlas 2000.0", one of which is at the Beaver Meadow Observatory.



INDUS which is a southern constellation, was a contribution by Bayer to honor the American Indians. It is not visible from our vantage point as it lies well south of -45°. There is only one star brighter than 4th magnitude which is Alpha. It being 2.1 magnitude. Indus lies within the boundaries of Grus, Microscopium, Telescopium, Pavo, Tucana & Octans.

For the persons visiting far enough south might enjoy to see the many NGC objects. The galaxies include NGC's 6935, 6942, 6970, 6984, 7007, 7014, 7029, 7038, 7041, 7049, 7064, 7083, 7090, 7096, 7124, 7125, 7126, 7155, 7168, 7192, 7196, & 7205; also I.5063, I.5152; as well as New 5. Variable Stars are - Gamma, V, S, AK, W, T & X. The only other star of any significance is the star Epsilon Indi of magnitude 4.7 is one of our near neighbors. It is but 11.4 lightyears distant or one of the stars which is within 15 lightyears from us.



INDUS

SUN DIAL

SOLARIUM, the Sun Dial is one of the ancient constellations from the 'Atlas' of Burritt; also from Miss Bouvier's list. It lies east from Horologium, between the head of Hyrus and the tail of Dorado. The stars which made up Solarium are now part of Reticulum, and the stars of the other two neighboring constellations above. It too, is a southern constellation.

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Meeting notices

**** MEETINGS ****

Our speaker at the NOVEMBER 11, 1983, will be Dr. William E. Harris of McMaster University, Hamilton, Ontario, whose topic is "Globular Cluster Systems in Galaxies." Dr. Harris, a native of Edmonton, Alberta, studied at the University of Edmonton and received his Ph.D. in Astronomy at the University of Toronto. He has spent two years in post-doctoral studies at Yale. His astronomical research has taken him to Cerro Tololo Observatory in Chile, Mauna Kea in Hawaii and the Dominion Astrophysical Observatory in British Columbia. The meeting starts at 7:30 p.m. in the auditorium of the Science Building at Buffalo State.

The December meeting will be held at Buffalo State at 7:30 p.m. on the 9th and is our traditional Christmas Party. Beverly Botto, Darwin Christy and Carl Milazzo will report on this year's meeting at Stellafane. Edith Geiger will expound on her exposures of our activities taken during the past year.

Our wine and cheese party will follow. The wine and cheese is on the club, but we would appreciate any Christmas goodies you would care to share. Doris Koestler has again agreed to organize the party, so if you want to find out how to help or what to bring, please contact her.

- OBSERVATIONS -

On September 19th - what a night - a gibbous moon lighted up the skies as did lightning in the south. The clouds were low lying, quite fluffy, with the underside lighted by the Buffalo man-made lights, helping to prevent sky darkening from my vantage point. I was checking my instruments for light gathering of the moon when I decided to look in the northern sky to see what might be there. I saw clouds there also, but---it turned out to start to shimmer and with a closer look, found it to be a faint aurora. That was the fourth of lighting up the skies. Lastly, I was out looking up when a 2nd magnitude meteor crossed the sky, then a second one crossed the sky in almost the same area. These were within about 2 minutes of each other. One more meteor decided to come from out of the southern circlet of Pisces across through the Summer Triangle of stars, Vega, Deneb and Altair, leaving a slight trail. It was of zero magnitude and I felt there to be a slight shadow cast from it. NOW--one can see why it is not really good observing in the City of Tonawanda; a gibbous moon, lightning, Buffalo City lights, aurora and bright meteors.....

Darwin Christy

The dark nebula, Barnard 143 in Aquila, was seen 3 degrees north of Altair as a $\frac{1}{2}$ degree round dark patch against the Milky-way. It was seen with binoculars and with a 5-inch f4.2 refractor at 21x on September 9th. The skies that night were absolutely perfect, crystal clear, dew free moonless and pitch black.

A 6.0 magnitude open cluster was seen in Perseus that looked like a comet with binoculars on September 10th, but turned out to be NGC-1528. In the richfield refractor it resolved into a group of 75 stars packed within an area of half a degree.

Later that night with a 13-inch Dobsonian telescope the open cluster NGC-1513 was seen in Perseus. It wasn't as easy to resolve as the last cluster but did show about 40 stars packed in half the area, and looked to be 8.5 Mag.

With Tom Dey's 18-inch Dobsonian telescope the next night I saw in Cygnus the Crescent Nebula, also known as the Egg-shell Nebula. It is catalogued as NGC-6888 and is a Wolf-Rayet type nebula ejected from a spectra class 'O' star. It looked like a miniature Veil Nebula which is also in the constellation Cygnus. It is shaped like an archery bow 1 x 15 minutes of arc in extent of very low surface brightness, with a 7 and 10 magnitude double star in the middle separated by about 15 seconds of arc.

Later that night the Cocoon Nebula, I.C.-5146, an H-11 region in Cygnus was located. It looked like a misty patch of low surface brightness covering an area of 10 x 12 arc seconds. It's edges dimmed very gradually and resembled the nearby dwarf galaxy in Sagittarius, NGC-6822.

Thinking that there was a severe thunder storm when the ground trembled on October 7th, I looked out the window at 6:20 A.M.. There wasn't a single cloud in the sky nor a trace of haze, but due east was zero magnitude orange Mercury, 5 degrees above the horizon. Ten minutes later on the radio it was announced that there was an earthquake at Blue Mountain Lake in the Adirondack Mountains that registered 5.2 on the Richter scale.

Back on March 13th at 10:35 P.M. I was observing NGC-3190, a galaxy in Leo, when a very slow moving 8th magnitude satellite past by. It was traveling one degree across the sky every 120 seconds of time. This was recently calculated by Phil Cizdziel to be orbiting 6,400 miles above the surface of the earth.

All past Space Shuttle flight paths were too far south to be seen orbiting over the northern half of the United States. The next mission which is scheduled for late November will be the first visible from our latitude. It will be zero magnitude and cross the sky in about 5 minutes, on board ultraviolet and X-ray stellar astronomy will be done along with solar.

Carl Milazzo

1) July 13-14 Observationally a cross between a variable star and a deep-sky object, BL Lacerta has proven to be a most interesting study. These objects as a class are often considered to be dwarf quasars or distant, stellar appearing, extra galactic sources. As a variable light source BL Lacerta, itself, varies between magnitude 12.0-15.5. When first observed on the night of July 13-14 this object was estimated to be of magnitude 15.4, with reference to in-field comparison stars. Its interesting to monitor this apparent "star" every few weeks to note its brightness and subsequent fadings knowing full well that it possesses the luminosity of millions of stars. To appear this bright at a distance of millions of light-years and still look to be a point source it must be generating an enormous amount of energy and be physically compact. Even so since it varies over a period of only months it must as a consequence be only a matter of, at most, a few "light-months" across since no light impulse can propagate from one end of an object to the other at a velocity greater than that of light.

2) July 25-26 Caught variable star SS Cygni just as it began its rise to maximum. Tonight it was estimated to be

of magnitude 11.1. By July 27-28 this "dwarf nova" had reached its maximum light of magnitude 8.3. Of late, owing to the observation of this star and to some exposure to John Riggs I have become quite interested in variable stars.

3) August 1-2 Observed the numerous dark nebulae which almost surround the bright open cluster M-11. To my sight the most obvious of these dark nebula is B 143. Looks to be about $0.5^\circ \times 0.4^\circ$ in extent. Only a relative few faint foreground stars are seen upon its surface. Considering that the nebula is located within the rich Scutum star cloud this is quite remarkable.

4) August 13-14 While out at Beaver Meadows, Observed a rare deep green colored 1st magnitude perseid meteor. Incidentally, has anyone else noted how active the lesser meteor shower of the Upsilon Pegasids have been this year? Both these showers are active concurrently.

5) September 10-11 Observed the rich galaxy cluster Abell 194. Amazingly it proved to be an easy grouping. Nineteen of its member galaxies were detected ranging visually from magnitude 13.0-14.5. (estimated)

6) September 14-15 Variable star Chi Cygni now is approaching minimum light. Tonight it looks to be of magnitude 12.2 and shines with a dull red hue. When first observed on the night of August 13-14 I placed it at magnitude 10.7 and it was fiery red in color.

Michael Idem

"JANUARY - FEBRUARY"

"SPECTRUM deadline is December 28th"

The "SPECTRUM"

Buffalo Astronomical Association 'Newsletter'

Darwin Christy, Editor
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From the PAST ISSUES

From the April 1971 issue of the "SPECTRUM" - "Measuring a Mirror's Radius of Curvature" by Robert Burdick.

To the mirror maker who is looking for a simple method to measure the radius of curvature of his mirror during grinding, a steel ball whose radius is accurately known and a stop watch which will measure to 1/10th second is needed. The procedure is as follows: level the mirror, face up, using the ball which will roll to the mirror's center, if level. The mirror must be solidly supported, and both ball and mirror surface should be completely clean of dust, and dirt particles. The ball is brought to the edge of the mirror and released. The ball will roll to the other edge of the mirror, then back to the release point; when it reaches the release point the stop watch is started. If P = period in seconds/cycle, and F = frequency, in cycles/second, then: $p = \frac{1}{F}$; this value is placed in the formula $R = r^2 P^2$, where r = radius of ball, and R = radius of the mirror.

I have a 2-inch diameter ball, and for a 12.5-inch, f:4 mirror the number of oscillation cycles of the ball is 40 in $150.4 \pm .1$ seconds. This is accurate to within 0.14 inches for a 100 inch focal length. A table of seconds and mirror radii can be calculated for your particular mirror and converted into a graph. All that is needed each time the radius is measured is to look up the seconds in the graph and read off the corresponding radius.

In the above formula $R = r^2 P^2$, according to Dr. Fred West, it should read $R = r + r^2 P^2$ which was found after the above article was written. ed.

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