

# The Spectrum



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BUFFALO ASTRONOMICAL ASSOCIATION, Inc.

MARCH - 1995 - APRIL



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## BEAVER MEADOW TELEPHONE

The telephone at Beaver Meadow (716) 457 3104, is for emergency use only at no cost. There is however, a box placed near the phone for which we ask that you deposit 50 cents for the first three minutes and 10 cents per minute thereafter for domestic calls. Please abide by this ruling.

## IN CASE OF EMERGENCY

If, for any reason, there might be cause for cancellation of the meetings of the B.A.A., tune your radios to either WHEW (930) or WGR (550). Also, if Buffalo State College has been closed because of inclement weather, so will the meeting of the B.A.A. be cancelled.

## Taxacom Computer Bulletin Board

phone (716) 896 7581

for more information, call Jack Eapson at (716) 745 3138.

## "knights of Discovery" Computer Bulletin Board

phone (716) 837 2901

for more information call Jerry Silverschatz at (716) 838 8336.



## \*\*\* MEETING NOTICE \*\*\*

March 10: Annual dinner meeting - featuring Dr. Jack Mack speaking on the updates and improvements to the Hubble Space Telescope.

April 14: "Astronomical sites in and around Tuscon, Arizona." (see meeting description below)

Meetings: 2nd Fridays @ 7:30pm Jan-June & Sep-Dec.  
Location: New Science Building Auditorium at Buffalo State College on Elmwood Ave.

We hope to see you at these meetings.

As usual refreshments will follow.

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The March meeting will be the annual dinner meeting which will be held at Ilio DiPalo's Restaurant in Blasdell, NY - see separate notice concerning dinner meeting information. The guest speaker is the club's own Dr. Jack Mack who has an extensive background in cosmology, astrophysics, and astronomy. The HST has now been repaired and Jack will update us on the improvements.

The April meeting will feature a presentation by a new club member, Richard Jones. Richard has recently moved to the Buffalo area from Tuscon, Arizona. He has had the opportunity to visit Kitt Peak, The Multiple Mirror Telescope, the Stuart Mirror Lab and The Very-Long Array Radio Telescope in New Mexico. So, if a trip to Tuscon is in your future his talk will highlight astronomical sites to visit.

Bring a friend and your ideas!



## \*\*\* 1995 DINNER MEETING \*\*\*

This year's dinner meeting will be held on Friday March 10, 1994 at Ilio DiPalo's Restaurant in Blasdell. Ticket price is \$15.00 per person and all tickets must be purchased by February 24, 1994 from Steve Kramer. There will also be a cash bar available starting at 6:30 pm. This will be a family style dinner featuring pork loin, roast beef, & chicken breast to be served starting at 7:30 pm. If you are a vegetarian, please contact Terry Farrell by February 24, 1994 for an alternate menu selection. The service and food are excellent. Our guest speaker will be Dr. Jack Mack who will speak on the improvements made to the Hubble Space Telescope. For more information please contact Terry Farrell (826-3738) or Steve Kramer (634-7694).



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## \*\*\* NEWSLETTER EDITOR POSITION FILLED \*\*\*

Effective September 1995, Darwin Christy will be retiring from serving as newsletter editor. Bill Smith, & Bev Orzechowski have volunteered to serve as co-editors. Remember, that the Spectrum is your club's newsletter and your input is important. In addition, when you see Darwin, please extend your appreciation and thanks to him for his years of valuable club service as editor.

### \*\*\* MEMBERSHIP SURVEY \*\*\*

The membership survey committee has prepared the survey which will be available very shortly either at a club meeting or by mail. All members are asked to complete this questionnaire and return ASAP. Your responses are extremely important and will be used in planning future events. If you have any questions contact Terry Farrell at a club function or by phone: (826-3738). Thank you.

### \*\*\* NATIONAL ASTRONOMY DAY CELEBRATION \*\*\*

The BAA is having a celebration of national astronomy day on Saturday, May 6, 1994 at Beaver Meadows. Bob Hughes is coordinating this event which is open to the public and is looking for assistance in making this event a success. If you are interested in helping please call Bob at 833-2407.

### \*\*\* FUNDRAISER - SWAP TABLE \*\*\*

The board has decided that at the June meeting there will be a table available for those members wishing to contribute astronomical items which they no longer use for sale to club members at down to earth prices. All monies raised will be used for future needs. If interested, please contact any board member.

### \*\*\* AUDIT OF FINANCIAL RECORDS \*\*\*

Bob Hughes has recently completed an audit of all the BAA's financial records and has informed the board that everything is in order and that Steve Kramer has done an excellent job as treasurer. Keep up the good work, Steve.

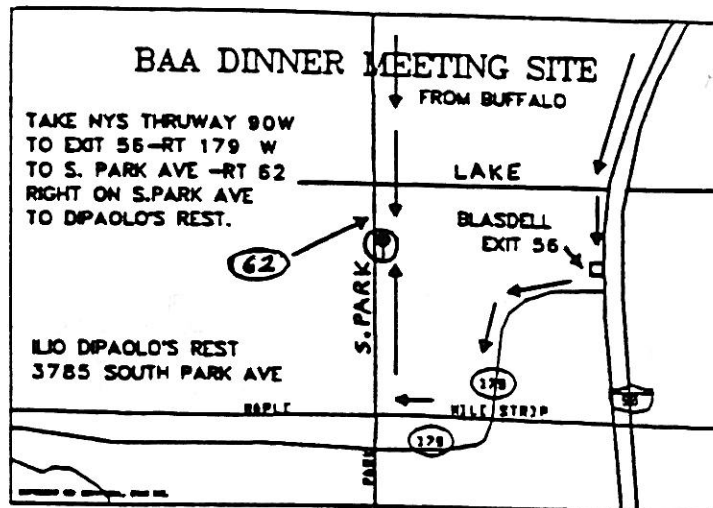


### \*\*\* PRESIDENT'S MESSAGE \*\*\*

#### "YOUR PARTICIPATION IS IMPORTANT"

When you joined the BAA you had expectations as to what being a member truly meant. Probably, for the bulk of the membership the idea of sharing the enjoyment of studying astronomy with fellow amateurs was a deciding factor. For others, it may have been more of a social reason. Now, that you are a member it is extremely important to avail yourself of the opportunities which the club provides. If you have been a member for several years you have developed friendships, learned some new things, and have become aware of what the club has to offer. If you have recently joined you are still formulating your opinions about the club. One area that offers a great chance to participate is the exchange of ideas between our veteran members and newest members. If you are a veteran member please take the chance to welcome our new members, and if you are a new member please make yourself known. Remember, that it is the members who form the cohesive bond to keep the club spirit alive. In addition, please take advantage of the many member benefits which are available such as the observatory, astronomy classes, meetings and presentations to just name a few.

Very shortly, a membership survey will be distributed to all members. The purpose of this survey is to find out what the club members want. I feel this is the best way to solicit opinions and ideas from all members which will allow the Board and Officers to plan upcoming events. So, when you receive your copy please give a lot of thought to the questions and provide sincere answers. I would like to have 100% participation from all the members in completing the survey.



In conclusion, participation is a powerful tool which can prove very beneficial in any situation by providing an exchange of ideas. So, let's form a BAA Galaxy with the club leaders as the central core, and all other members forming the spiral arms contributing to future growth.



### Beaver Meadow Observatory Report # 457-3104

The 12" will be out of service till further notice. Martin Price is in the process replacing the polar clutch assembly, the polar worm gear bearing assembly, replacing the tangent arm assembly and replacing the tangent arm screw. This will take till at least the middle of March, as he has to do some extensive machining. Preliminary report from Marty indicate that the Polar gear and worm are in excellent condition. The attachment of the declination bearing housing to the polar shaft was loose, one of the worm gear bearings for the polar drive was rough and will have to be replaced. When all the work has been done I will need assistance in assembling and polar aligning the mount. If you have never had the pleasure of aligning a mount come on out and enjoy the fun!

CCD classes will be on Feb 18, and March 25 at the Observatory starting 6:00pm. We will be using the camera to image anything that we can. If clear we will use a scope, if cloudy, we will use a simulated sky! You will have to attend several of the classes before you can use the camera! What! you are afraid of computers? Don't worry, we will show you how. We have several computers at the observatory, so you can practice with the program while others are using the camera.

Star Parties: Bill Smith is having a Messier Marathon on March 4 at his house in Jamestown starting at 4pm, with a cloud date set for March 25 at Beaver Meadow Observatory. In both cases these are a bring a dish to pass occasions. What is a Messier Marathon? It is when you try to find all 105 Messier objects in one night!! It happens that you can do this around the spring equinox with out freezing various parts of your anatomy off. What to bring; binoculars, telescopes of all sizes and shapes (short focal lengths are very useful in locating objects, large apertures give great views) nebula filters, CCD cameras, and food. (what kind of event is it with our pigging out on junk food). Summer star parties are being booked now for this summer. If you would like to host one at your house or at Beaver Meadow, please let me know. I usually suggest that the parties be held rain or shine to avoid confusion on when to come. I also insist that they be held on a night that does NOT conflict with an observatory event, ie public night.

After all is said, what a star party? It is an event held by a club member where every one is invited to bring a friend, food, telescope, binoculars, astronomical toys, computers, and video cameras! We meet at a park, the Observatory, or a person's home, and enjoy astronomy together. Some even hold them in the daytime, when you can check out the Sun, the Moon, Venus, Mercury, Jupiter and have sporting events like volleyball, horse shoes (Rowland's favorite). When it rains, we have discussions on weather, talk about what we have seen, and could see if it was clear, and in general, out on food (not really). These are great places to learn astronomy, try someone else's wiggles on your scope, or better yet try yours on someone else's equipment. This year I am recommending that we hold them out at Beaver Meadow. The CCD camera will be there, along with a refurbished 12 mount, and the 20". We have been having bring a dish to pass dinners on public weekends, and will continue the tradition this year. Beaver Meadow is really a delightful place to spend the evening for a picnic, and natural walk. See you soon!



★Daniel Marcus

Greetings,

Allow me to introduce myself. I am Richard Jones and have recently moved to the Buffalo area from the astronomy capitol of the world - Tucson, Arizona. The usual question I have gotten when I tell people this is "Why?". Let's just say that after forty some years there, I was tired of the heat, the brown color and the lack of four seasons.

I spend most of my time during the week working with computers for a health maintenance organization here in Buffalo. When I'm not doing that, I gaze up to the skies and wonder what is on the other side of the clouds you seem to have a lot of!! But seriously, I have been an amateur astronomer since the late 60's. I will always remember the first time I saw the rings of Saturn or the Great Nebula in Orion.

I decided to try to marry my work and my hobby in the form of a space/astronomy/rocketry forum on the excellent Free-Net community computer information system you have here in Buffalo. I completed the application for a Special Interest Group (SIG) and submitted it to the Free-Net organization. I also asked for and received permission from the BAA Board of Directors to be the sponsoring organization for the SIG. In early February the Development Committee for the Free-Net met and approved the SIG proposal. So, there will soon be the WNY Space Forum on the Buffalo Free-Net!

What will the forum offer us? The forum will be a place for the public to ask questions about any topic dealing with space, astronomy or rocketry. Users of the Free-Net may leave questions on an electronic bulletin-board system for all to see and respond to. In addition, they will have access to news groups on the Internet dealing with such topics as space policy, amateur astronomy, model rocketry, and lots more. Also, since the BAA is the sponsoring organization of the forum, there will be information to the general public on the BAA, where we meet, how to join, and so on.

A major feature of the forum will allow a user to access database information from all over the world through the World Wide Web (WWW) on Internet. For example, users may browse through the Shuttle Technical Manual for details on how the aft thrusters work, they may want to check out what is going on at the Ames Research Center or JPL, they could look up the procedures for submitting an observing run on the Hubble Space Telescope, and with the correct software, they could browse through the thousands of high detail photos available from NASA or any of the hundreds of other space and astronomy related organizations. They could also post questions about any space related topic and receive answers directly from people inside the field who are on the leading edge of their technology.

Anyone may access the Buffalo Free-Net. The cost is very minimal - nothing!! There are some procedures in place for obtaining a membership on the Free-Net, but they are simple and anyone with a simple computer terminal, a modem and a telephone line can sign-on with the Free-Net.

If you would like more information about the Free-Net, please contact me directly by calling 836-8261 and I'll be glad to mail you information and the enrollment agreement for access.

Here's looking for you on the WNY Space Forum!!

— Richard Jones



#### SPY and TELL

Congratulations to Patty Rupp, who on October 22, 1994, was inducted into the University of Rochester Sports and Recreation Hall of Fame. The following account of her outstanding accomplishments appeared on the program:

At Rochester: One of the finest swimmers in Rochester history...Won 13 New York State Championships...All-America honors in 11 individual events and four relay events...Dean's List every semester...Rochester Press-Radio Club Local College Athlete of the Year as a senior...Two-time CoSIDA College Division At-Large Academic All-American and one-time CSCAA Academic All-American...Held 15 Rochester records, six pool marks, and five New York State records...Phi Beta Kappa...Won the Merle Spurrier Award as a senior as well as the Ayman Amin-Salem Award...NCAA Post-Graduate Scholarship Winner...NYSWCAA Scholar-Athlete...Graduated Summa Cum Laude with a degree in Molecular Genetics in 1987 with High Distinction in research. Post-Graduate: Graduated from the University's Medical School with an M.D. in 1991...Completed residency and holds a fellowship in Infectious Diseases at the Dartmouth-Hitchcock Medical Center in Lebanon, NH.

Larry Carlino's 28" telescope was finished after the mirror finally arrived in July 1994. The focal length collimated just right, and his new scope performs beyond all expectations. It actually picks up colors. Larry has seen yellow and orange in M13, and blues, greens, pink and purple in the Orion Nebula, and many more awesome sights. The Horsehead Nebula is really visible in this spectacular scope, and Larry is reobserving, with enthusiasm, everything he has ever seen in the heavens. A great star party is in store this summer at Larry's. Sketches of his observations of the Jupiter impact will appear in the upcoming Strolling Astronomer.

Dave and Cathy Sepulveda are the proud parents of Evan Isaac, born on December 3rd, weighing 6 lb. 12 oz. Along with Adam and Brianna, the Sepulvedas are a very happy family. Dave is still working at UB and is now Superintendent of the Computer and Media Equipment Repair.

Gerry Rising, who writes the "Nature Watch" column in The Buffalo News is very busy writing species accounts for a new state book, Birds of New York State. His column in The News helps his many readers to appreciate the wonders of nature.

Paul Cole is a tool designer at Cole Automatic in Buffalo. He owns a 12" computerized telescope, and has just purchased a solar filter. Roseann teaches 5th grade at St. Gregory the Great, and she has shared with her students the astronomy she has learned from Paul. She plans to have a star gazing party at their home for her students.

Ed Ratajczak has been interested in bird watching since he was 11 years old. On New Years day 1995, he participated in the Chestnut Ridge Christmas Count (National Audubon Christmas Count) with a team in the West Seneca Leidecker Road area. He was fortunate to see both a sharp-shinned hawk and the similar but larger Cooper's hawk, a flock of sleek Cedar Waxwings flying overhead, and tiny, perky kinglets. He went with the Buffalo Ornithological Society to the Iroquois National Wildlife Refuge in January to see waterfowl. There are few to see in winter, but they did see some Canada Geese and mallard ducks. Ed is a volunteer at Tift Nature Preserve, and on Friday, January 13th, he saw the largest falcon, the gyrfalcon from the Arctic regions. A rare treat.

The Orzechowskis spent February 5-10 cross-country skiing at Allegany. They stayed in the new pine cabin area. The heated shower cabin was a bit away from their cabin, so they had to take a brisk walk to stay clean.



Edith L. Geiger

#### BAA ANNALS

5 YEARS AGO - A planetarium show at Buffalo State was the main event at our March 1990 meeting. Before the show David Quiqliana spoke briefly on the analemma (the figure eight shown in the middle of the Pacific Ocean on old world globes). For the March meeting Fred Price spoke on "The History of the World Greenwich Observatory".

The NFAA scheduled a meeting for May 5th at St. John Fisher College in Rochester. Other SPECTRUM items announced



that BAA dues were being increased to \$15 for an individual and \$20 for a family, and that the May dinner meeting (which will be held in March this year) would at the Lord Amherst. Ernst Both was scheduled to speak.

Ken Biggie concluded his article on the construction of the original observatory a Beaver Meadow. Ed Lindberg wrote amusingly about his experiences teaching mirror grinding. He taught this art at the Buffalo Museum of Science for many years until he lost access to the facility used for the grinding. It probably got swallowed up in one of their numerous remodelings.

**10 YEARS AGO** - Dan Marcus was our speaker for March 1990. His topic was "Astrophotography Geared Simply Towards Halley's Comet". Rochester's Richard Carlson spoke in April on "All About Eyepieces".

Plans were afoot for an NFCAA meeting to be hosted by the BAA in May. Ed Lindberg coordinated the event which was to be held at Buffalo State. John Riggs had just resigned as Observatory Director and we were searching for his replacement. President Ken Biggie noted that the board was considering replacing the 12-inch telescope at Beaver Meadow with a 16 to 17.5-inch. This project may have been delayed a bit, but I think the overall result justifies it. This SPECTRUM contained two items of sad news: the obituary for Bob Burdick and a note about Walt Whyman suffering a stroke.

Edith Geiger's Profile was on Evan (Jerry) and Adrienne Morris. Apparently they first met at the BAA! - an unpublished benefit of membership. SPECTRUM articles were submitted by the Morrises on "Telescope Size and Magnitude Limit" and by Ken Biggie on SS-433, an X-ray binary that is a black hole candidate. Carl Milazzo and Michael Idem submitted observation reports.

**15 YEARS AGO** - BAA member Phil Cizdziel, an astronomy student at the time, talked about "Arizona Astronomical Observatories" at our March meeting. In April, David Atkins from Rochester spoke on his visit to Arecibo observatory in Puerto Rico. There was a notice that the BAA was planning to celebrate Astronomy Day by hosting an exhibit at Eastern Hills Mall. Al Kolodziejczak was in charge.

The SPECTRUM had one article on Mercury, anonymously written, and another on telescope making by Ed Lindberg. Edith's profile highlighted Ken Kimble. Also included was an observation report on the variable star Mira written by Shigeru Morikubo, the Japanese astronomer friend and meteoric colleague of Darwin Christy. We also had two astronomical poems from the pen of BAA member Esther Goetz.

**25 YEARS AGO** - Our speaker for March 1970 was an astronomer from the Munich Observatory, Dr. W. D. Heintz, who spoke on "Visual Binary Stars and Stellar Evolution Effects". He was visiting astronomer at Sproul Observatory in Swartmore, PA. His trip to Buffalo was sponsored by Buffalo State College, the Museum and the BAA. For April, BAA members Dale Hankin, Larry Hazel, Walter Semerau, Walter Whyman and unidentified "others" reported on their observations of the recent solar eclipse.

The BAA had just held its first astrophotography exhibit. Unfortunately most of the color prints disappeared. Walter Whyman was one of the victims. He stoically rationalized that stealing one of his photographs should be regarded as a compliment. BAA member Fred West wrote an article on "Transits of Mercury". Dr. West taught astronomy at Buffalo State at the time.

**40 YEARS AGO** - In March 1955 Harry Olsen spoke on "The Nature of Light". Kurt Stehling, a club member working at Bell Aircraft, showed movies of the Bell X-1A aircraft (the one that broke the sound barrier) and rockets at the April meeting. (Extracted from the "BAA Annals" for March-April 1980.)



Rowland A. Rupp

## FISH THAT GOT AWAY FROM MESSIER

Most amateur astronomers believe that all 110, or at least 103 of the "M-" objects were discovered by Charles Messier. In actual fact, he discovered just 38 of those deep-sky objects. Many of those discoveries were made while comet hunting, not by systematically sweeping the entire sky as visible from France. Being a comet hunter, the "M-List" he compiled was to help other comet hunters avoid mistaking these fuzzy blobs for comets.

During the period of 1758 to 1781, Messier discovered 38 deep-sky objects with a 3.5-inch telescope, but missed about two or three hundred that were within reach of his scope from his latitude in France.

It is difficult to imagine any comet hunter mistaking the Pleiades for a comet; it along with eight other M-objects have been known from antiquity. The Double Cluster in Perseus has been known long before the invention of the telescope, yet Messier did not add it to his list.

Thirty-one of the Messier objects can be seen with the naked eye, a twenty-seven others can be seen with the naked eye from France, but we not added to his list - this yields a grand total of fifty-eight naked eye, deep-sky objects. This total breaks down to forty-nine open clusters, four emission nebulae, three globular clusters and three galaxies. But when it comes down to what is beyond the naked eye, yet within reach of a 3.5-inch scope, about 75% of them are galaxies with most of the remaining objects being open clusters.

Today, many of the Messier objects have been resolved into fine detail with much hidden beauty. Messier could not resolve a globular cluster into stars, and appeared to him as galaxies or even comets. Many of the M-objects have become show-pieces at star parties, but not all of them. Some terrible objects include M-73 and M-29 which have the appearance of comets in small, low-power scopes. Many amateur astronomers assume that all non-Messier deep-sky objects are faint and boring.

The smallest and faintest objects in the Messier catalogue are the planetary nebulae which are about 1 arc minute in size and 11.5 magnitude brightness. All are of medium surface brightness and inamenable to telescopes no colour is detectable, but with NGC (New General Catalogue) planetaries of high surface brightness and less than 1 arc minute in size, blue-green, luminous emissions can be seen vividly. They can be seen easily, even on full moon nights or from heavily light polluted locations. In these conditions, Messier planetaries either disappear or are barely detectable. An easy to see planetary that Messier missed is the 6.5 magnitude Helix Nebula (NGC 7293) in Aquarius. It is a big nebula - about 15 times larger than M-57, but exhibits a low surface brightness like M-33. It can also be seen with binoculars.

M-103, the faintest open cluster in his list of objects, shines at 7.4 magnitude. The following objects are just a few examples of the biggest fish that got away from him. Rich, naked eye NGC objects such as NGC 2264 (The Christmas cluster in Monoceros), and NGC 752 in Andromeda; cluster on the verge of being naked eye such as NGC 7789 in Cassiopeia with 300 stars and the nearby cluster NGC 457. Other goodies include NGC's 2362, 2232, 2422, 6940, 6819 and 1528. Some loose naked eye clusters include NGC 6633 and IC 4665, both in Ophiuchus. 7 cluster Ca 399 (Brocchi's cluster) in Vulpecula, better known as The Coat Hanger, is an easily seen object. The faintest globular cluster Messier's list is 9.4 magnitude, M-72, located in Aquarius. Some of the brightest globulars he didn't catch include 8.2 magnitude NGC 6712 in Scutum and 9.1 magnitude NGC 5466 in Bootes.

Messier missed an ocean of galaxies numbering in the hundreds. The faintest galaxy he observed was 10.2 magnitude M-91 in Coma Berenices. But some of the biggest and brightest ones which eluded him include 7 magnitude NGC 253 which is 25 arc minutes in length, 8.4 magnitude NGC 2403, 8.7 magnitude NGC 3521, 8.9 magnitude 2903 and 9.2 magnitude NGC 3115 and 4725.

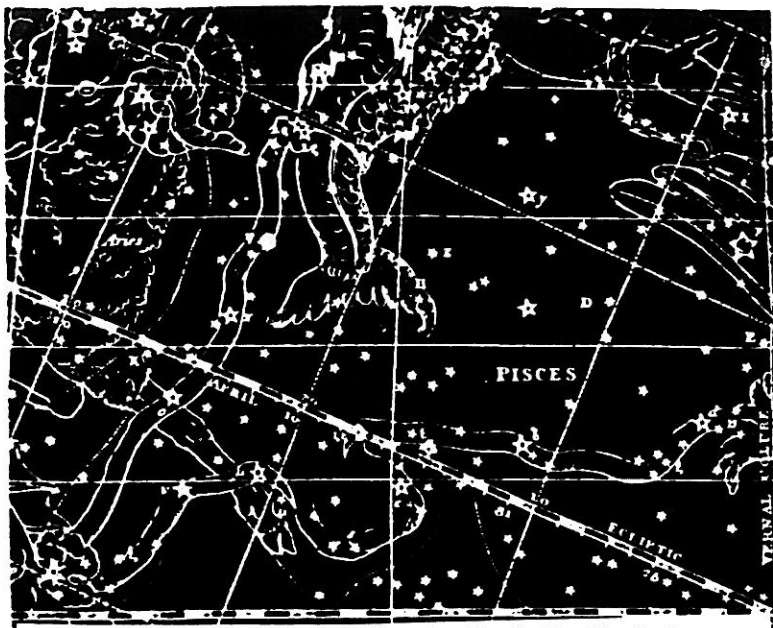


Carl Milazzo

## ANTARAH

Antarah, the Cord or Flaxen thread which ties the two fishes (Pisces) together was first introduced by Al Asma' about the year 800 A.D. It was later separated into two constellations, Linum Boreum & Linum Austrinum, by the Arabs. They originally called it Al Rescha, as described from Al Risha - The Cord. In reality it had reference to the star which was the know, Alpha Piscis, tying the two threads together. Another mention of this tie by the Arab in ancient times was the cord being a part of a well, the cord being attached to a bucket at the bottom.

This cord or knot has been described by many: Aratos and Geminos referred to it as the "Knot of the Fishes" or "Threah". Even Hipparchus and Ptolemy had given its name: much before. It was described by Cicero as 'Vinsa' the bonds. But as time went on, it was finally divided into two parts as before mentioned (Linum Boreum and Linum Austrinum), being created by Hevelius.



The ancient Chinese had thought the butterfly had woven 'Silk Threads' to help them catch fish in their nets by pulling on the 'knotted' end, tightening the net about their catch. Similarly, the Egyptians thought along the same lines, but they used a thread made of flax. When throwing their nets over the waters, they would draw the flaxen lines closing the nets with many fish trapped in the net.

The two cords being connected by Alpha Piscis, stretch northward through Omicron, Pi, Eta to Rho and reach to the west through Xi, Upsilon, Mu, Epsilon, Zeta and Delta to Omega. Alpha is a 3.94 magnitude double star whose components are 4.9 and 5.2 magnitudes respectively.

Today, this (these) constellations are known only as the two fishes, PISCES.



Darwin Christy

## ASTRONOMICAL HAPPENINGS

### MARCH

- 1 - Mercury at greatest elongation (27° west)  
NEW MOON
- 2 - Conjunction - Venus & Uranus
- 5 - Conjunction - Saturn & Sun
- 6 - Pluto stationary
- 8 - Moon at apogee (404,305 km)
- 9 - FIRST QUARTER MOON
- 10 - Virginid meteor shower (see below)  
Mercury at aphelion  
**B.A.A. MEETING (7:30 P.M.) DINNER MEETING**
- 11 - Zeta Bootid meteor shower
- 13 - Conjunction - Mars & Moon  
Mars at aphelion
- 16 - FULL (SAP) MOON  
Corona Australid meteor shower
- 19 - Conjunction - Spica & Moon (An occultation will be visible throughout the Middle East and Central Russia.)
- 20 - Moon at perigee (368,972 km)  
VERNAL EQUINOX - Did you ever try the EGG trick? It works!!!  
Camelopardalid meteor shower
- 22 - Conjunction - Jupiter & Moon
- 23 - LAST QUARTER MOON  
Ceres stationary
- 25 - Conjunction - Neptune & Moon  
Mars stationary  
Conjunction - Uranus & Moon  
Conjunction - Mercury & Saturn
- 26 - Virginid meteor shower \*\*\*\*\*
- 27 - Conjunction - Venus & Moon
- 29 - Conjunction - Saturn & Moon  
Conjunction - Mercury & Moon
- 30 - NEW MOON

### APRIL

- 1 - Jupiter stationary
- 4 - Kappa Serpentid meteor shower
- 5 - Moon at apogee (404,974 km)
- 7 - Delta Draconid meteor shower
- 8 - FIRST QUARTER MOON
- 9 - Alpha Virginid meteor shower
- 10 - Conjunction - Mars & Moon
- 13 - Conjunction - Venus & Saturn
- 14 - Mercury at superior conjunction  
**B.A.A. MEETING (7:30 P.M.)**
- 15 - FULL (PINK) MOON (A lunar eclipse will begin and become visible in the western part of North America. The end will become visible in the western United States and Canada. Unfortunately, we will not see it here in eastern United States or Canada.)
- 17 - Moon at perigee (361,701 km)  
Rho Leonid meteor shower
- 18 - Conjunction - Jupiter & Moon
- 21 - LAST QUARTER MOON  
Conjunction - Neptune & Moon  
Conjunction - Uranus & Moon  
Lyrid meteor shower \*\*\*\*\*
- 23 - Mercury at perihelion
- 24 - Juno stationary
- 25 - Conjunction - Saturn & Moon  
Mu Virginid meteor shower
- 26 - Martian Summer Solstice (Northern hemisphere of Mars)
- 27 - Conjunction - Venus & Moon  
Neptune stationary
- 28 - Alpha Bootid meteor shower  
Solar eclipse (This annular eclipse will only be a partial phase visible in Florida. Again we are left out)

### METEOR SHOWER

On March 10th, the lesser known Virginid meteor shower will appear from 08h 32m right ascension and 00° declination. It does, according to some records, last as long as 71 days, which is really unconfirmed. Near peak, there may be as many as 15 observed in an hours time, consisting of 4th magnitude, yellowish streaks trailing 2 to 4 seconds. This could prove to be a challenge to the avid meteor observer, to compile more data.



### THREE LEAPS OF THE GAZELLE

Quick - what's between Ursa Major and Leo? It probably stopped you for a minute, well me too. I know Leo Minor is north of Leo but I didn't know where else, if anything, was between Leo Minor and the Dipper. If you're in the same boat of constellation confusion as I am then perhaps a little tale will be of help. Stories of the constellations and mythology do help in tying the sky together. It's not at all good at remembering grand fables nor do I want to be; but often partial tales provide all one needs. Also a little story or lore is enjoyable to share.

#### IT DOESN'T LOOK LIKE A BEAR!

Many constellations don't look like their namesakes, so forget what they are "supposed" to look like. Much more valuable to remembering what is where is to identify constellations or parts of them (asterisms) as patterns you can remember. The Big Dipper is a star pattern or asterism and is only a part of the official constellation Ursa Major, the Great Bear. It is fun to try to trace the constellation patterns of what they traditionally represent. I occasionally use an atlas that shows what they depict or use Darwin's many reproductions in *Spectrum*. But dam if I can remember them the next time it's clear out! For the most part, many of these patterns are just not memorable.

You'll probably find, as I did, that your made up asterisms are different for observing where the magnitude limit is perhaps 3.5 to 4 and Beaver Meadow viewing where the limit is closer to 5.5. The same applies to a sky awash with moonlight. Made up asterisms exist for all levels of sky darkness and transparency. Star pattern discovery can be done anytime and anywhere - more excuses for not viewing!

#### WHAT ABOUT THAT GAZELLE

If you look at the sky, star map or planetarium program between Leo and Ursa Major you won't see much. It's a pretty blank void. High overhead on Spring evenings this 25-30° circular area of almost starless sky is known as the P.



according to some ancient legend (Allen's *Star Names, Their Lore and Meaning*, p444). If you can see magnitude 4.5 stars you'll see three pairs of close, 1.5° stars (mags 3.1 to 3.9) with each pair 15° apart from the other pair going in a line across the pond. A gazelle was near the hindquarters of Leo the lion and leaped into the pond to escape from Leo before Leo had a chance to turn around and get him. The legend doesn't say what happened to the gazelle once it got to the other side. Hopefully it didn't meet up with the Great Bear! That's it for this short tale! Why, even I can remember something that short. Do try to observe it in the real sky (star pairs along the southern Ursa Major border:  $\{v, \xi\}$ ,  $\{\mu, \lambda\}$ ,  $\{\chi, \iota\}$ ). PC planetarium programs can simulate different conditions of light pollution by selecting the magnitude limit of the stars you want to see, but their varying stellar "dots" are not the same as the "dazzlingness" of true chiseled stellar points. The shareware program Skyglobe shows it well while EZCosmos and Distant Suns show it pretty good compared to the real sky.

Note in many old constellation drawings those same three pairs of stars make the feet of the Bear. However I don't see the Bear as much as the leaps of the gazelle. This works for me and I hope it works for you. If it doesn't then follow my earlier advice and forget it, and devise your own aid to help sort out all those stars.

#### APOLOGY (SORT OF)

Some of you know I'm a fan of H.A. Rey's books. One entitled "The Stars" does a great job in depicting the constellations as they were traditionally composed. I'm particularly fond of his pictorial representations. Constellations are not "stick figures" but diagrams with filled in portions (triangles, squares, pentagons...) that give them body. His images of Cetus the Whale, Leo the Lion and Hercules are terrific. Others as Draco the Dragon, Ursa Major the Great Bear, Cepheus the King, Aries the Ram and Pegasus the Winged Horse (full upright horse!) are stretching things a bit and are almost unusable under bright conditions. Also Rey strays, as I recommend as well, from restricting his images to official constellations. A very fun book I wouldn't do without but again no matter how obvious the image is in Rey's book, it just isn't that memorable, for me, in the sky. The emphasis is on "for me". Use what works for you.

#### BONUS: SQUARE PEG IN A ROUND HOLE

I mentioned how to remember the placement of Pisces and Pegasus in a previous article. If you don't know nor remember the article it's really quite easy. Two asterisms are involved here: The great square of Pegasus and the Circlet of Pisces. The Circlet is directly south of the Square. Once you recognize them as asterisms instead of trying to find "an upside down head and front quarters of a horse" and "two fish" and just associate the asterism (Square and Circlet) with the constellation names. I think you'll have an easier time of sorting out the pieces of our sky puzzle.

Knowing patterns you can recognize will increase your familiarity of the heavens. Whether they are official constellations, well known asterisms or your own "discovered" patterns they will stay with you longer than trying to force someone else's ideas in your mind. Try it and pass on your experiences in the *Spectrum*!



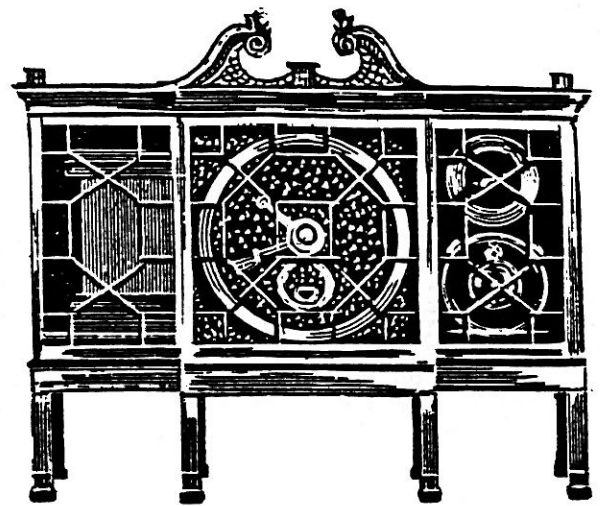
- Bill Smith

David Rittenhouse,  
Colonial America's Astronomer  
Part III -- The Orreries

As in Part II - The Transit of Venus - we start again in 1767, when Rittenhouse was 35. The orrery project, already in planning for a couple years, continued to beckon.

The term "orrery" is generally applied to any mechanical astronomical model with planet or moon arms revolving about a center sun or planet. The original one giving us the term was made in the late 1600's for the Earl of Orrery and was a Sun-Earth model.

You can easily make one of your own. Take an (old) electric wall clock. Place a 360° grid or an ecliptic ring over the dial. Take three large beads, or similar items. If the clock has a seconds hand, pull it off and put a bead in its place. Cut the minute hand shorter than the hour hand: slower arms are longer and placed lower. Bend up the ends of the two hands and put beads on them. Et viola: an orrery of 1:12 ratio, similar to the Earth and Jupiter going around the Sun (1:11.86), or the Sun and Moon going around the Earth (1:12.37).



courtesy Van Pelt Library

This is the second of the two large orreries that Rittenhouse made. It is at the University of Pennsylvania in the Van Pelt Library - well worth going to see if you are in Philadelphia; sign in and ask directions at the door. You won't miss it - the case is about eight feet tall and wide. The right panel shows the moon's motion; the center shows the six planets, Mercury thru Saturn; the left was to have shown the moons of Jupiter and of Saturn, but there is no evidence I was ever made. (The first one went to Princeton but is now only the planet panel mounted in a wall in Peyton Hall.)

Orreries were popular in Europe, though their representations were perhaps exaggerated: no really accurate planetary and lunar one appeared to exist. In addition, this was a good time in history to make an orrery. Astronomy had been relatively stable for almost a century. The legacy of Issac Newton was gradually forming our modern astronomical theory. And the solar system was stable for now, no new planets or moons having been discovered.

This work would obviously be a major project, and we already know that Rittenhouse himself was quite active. He apparently had help with the tedium of the necessary calculations. And much of the work was probably done by his shop with, I speculate, about a half dozen workers - foreman Henry Voight. It was likely that money from the farm helped pay the workers, as well as purchase the (expensive) brass from England. No ordinary shop could afford an uncontracted enterprise like this. As the project progressed, interest grew. Then the college at Princeton in New Jersey bought it. After outcries from the Philadelphia community, Rittenhouse agreed to make this second one.

Each panel is driven by turning a crank; the are not connected. Each has 10,000 year calendar going from 4000 B.C. to 6000 A.D. The Moon Panel works beautifully - if you spin the crank it will "coast." The Planet Panel is more laborious.

The Moon Panel was done first. It has 106 gears and is a quite complex system inter-related gear sets. There are fifteen features that have to be set during assembly. It incorporated the only recently explained (but long recognized) major influences on the Moon in its orbit by the Earth, by the Sun, and by the Earth and Sun together. Thus it could show the position of the moon during its entire orbit. (At the time of the Antikythera Mechanism, around 100 B.C., only the

time and position of the New and Full Moons could be reasonably calculated. This is possible since at these times the variables in the major influences cancel each other out.)

The Planet Panel has 171 gears. It accurately shows the orbital periods; planets spinning and moons revolving on inclined axes; orbital inclination, eccentricity, and equal-area motion; precession; and lastly, proportional distance from the Sun. But as you can recognize from Jack Mack's Solar System model on Astronomy Days, a four foot panel could not show relative planet sizes as well. In fact, we cannot know what sizes were used for the Sun, planet, and Moon parts, since it is obvious that they are more modern replacements. The original ones were perhaps vandalized.

While the second orrery was still under construction, Rittenhouse was tempted to the city from his farm location by his frequent trips and contacts, and by a yet to be created position of a resident astronomer for the colony. The family - David, pregnant Eleanor, and the two girls - moved to Philadelphia during the cold December of 1770. Unfortunately things did not go well. The baby was stillborn, and Eleanor died a couple days later. Then the astronomer position did not materialize.

I think the orrery project soured. The Planet arms, which would be likely to be done last, are crudely finished in areas. But the two panels were finished. And things went on. Rittenhouse had relocated his shop to the city. He gave lectures on the orrery and astronomy at the College of Philadelphia (later the University of Pennsylvania). And the political scene started getting active.

To be concluded.



Steve Kramer

## A CRUISE DOWN THE MILKY WAY

There have been some very clear nights in late August and early September - I hope you had a chance to enjoy the sky. On one of these very clear nights when the Milky Way was straight up I spent about 2½ hours observing the Milky Way from one horizon to the other with large 16x80mm binoculars. Actually I restricted myself to a path 5 degrees on either side of the galactic equator. This was a pretty serious perusal as the binoculars were mounted on a tripod and I used Tiron's 10 map Bright Star Atlas that comes with Binocular Astronomy by Crossen & Tiron for object identification and to keep me near the galactic equator.

### USE DEM BINOS

Binoculars are special instruments. Think of them as parallel wide field refractors to be used slowly rather than just something to catch a quick glance at a bird at the feeder! Advantages are many: comfortable 2 eyes open viewing; upright, unique wide-field images; and you can be out and viewing fast. Significantly more detail can be seen if they are held steady - bracing your arms against something is okay but mounted on a tripod is far superior. They should be your first instrument and are still essentials even when one graduates to a larger aperture telescope.

Even restricting oneself to the galactic equator one finds a smorgasbord of heavenly delights from asterisms, clusters and nebulae all strewn across beautiful star field after star field. Regardless of what size binoculars you have there are objects of interest for everyone.

### LET'S START CRUISING

The cruise started with the huge open clusters M6 and M7 in the (then) setting tail of Scorpio. Binoculars are the only instrument that does M7 justice - bursting it into a swarm of stars. A Messier sampler awaits in Sagittarius: nebulae as M8 and 20, 17 and 16; open clusters as M21, 25, 23, 18 and 17; even a globular - M28. Okay I couldn't resist a peek at the monster globular M22 just a few extra degrees off the path. The sprawling star mass that makes up M24 is a pure pleasure. Further north M's 2, 26 and 11 were spotted in Scutum. The Scutum star cloud in northeast Scutum is a place to pause and gawk at the endless

variety of stars and patterns. Here we are looking down a spiral arm rather than across one so the foreshortening effect makes this star cloud appear particularly bright. Around the M11 area are several dark patches of obscuring dust noticeable due to the lacking of stars - a reward for persistent observers. Picturesque star fields abound all over the Milky Way but are especially appealing in the Scorpio to Scutum region.

Crossing into the northern declinations comes an IC object, IC4756! Normally ICs are obscure and difficult, however IC 4756 is nearly a degree across and gets lost in a telescopic view but is a dramatic cluster in binoculars!

For the next 50° of sky to Deneb we are traveling along the most obvious part of the "Great Rift" of the Milky Way. I say 'most obvious' as the rift can be traced all the way to Alpha Centauri (although the west branch is missing in Ophiuchus). This is a region where obscuring dust and gas between us and the Milky Way limits our view. The nature of the Great Rift is readily seen in binoculars by sweeping slowly from Albireo to γ Sagittae. Ten plums are here for the picking: open clusters NGCs 6709, Cr 399 (the Coathanger), 6882, 6885, 6871 and M29 and 6910 are balanced with the globular cluster M71 and the colossal planetary nebula M27. I need to handhold the binos for some of these overhead objects - bracing on a car top helps a lot. Off route, the 2 arcs of the Veil nebula show well - both fitting nicely in the bino's view with a very starry background. While the objects seen in binos do not show the detail as the would in a scope, it is a treat to see them with background - rather like seeing a lion in the distance while on safari versus seeing one close-up in a zoo.

### HALFWAY POINT

Deneb marks the halfway point on this cruise down the Milky Way. This means it gets easier to view through the tripod mounted binos again. Deneb through Cassiopeiae covers 50° and is decorated with a swarm of objects, mainly open clusters and more delightful star fields. The trip from Deneb starts in a big way with the North American nebula overspilling the 3.5° field of my binos. The "Gull Coast" is especially easy to spot. Star-hop from Deneb and, for first-time viewers, watch those field stars - don't just pan around and expect to see it. Some hints of the Pelican nebula's outline could be detected again: surrounding dark nebula.

M39 strikes an obvious pose - this bright, loose grouping showing up better in binos than in most scopes. Entering Cepheus, near the north edge of my 5° alley on both sides of the galactic plane lies IC1396 a faintly seen nebula with a few associated stars. Directly past the southern edge of the galactic alley is an open cluster, NGC 7243, in Lacerta. While I only saw a few (~6) stars, there is haze from other unresolved members making a diameter half that of the Moon. There are not a lot of objects in Lacerta but this cluster is a fine one.

Perhaps 4 of my binocular fields pass by until I bump into M52 in Cassiopeia. There are a bunch of open clusters to see and compare in Cassiopeia. Seeing these makes one curious about their histories and placement in the galaxy. In order along the galactic plane are: M52; NGCs 7789, 129, 225 & 457 (nice cloudy haze); M103; NGCs 864, 859, 863; Stock 2; NGCs 869 & 884 (the Perseus double cluster); IC 1805; Tr2; NGC 1027; IC 1848 and Stock 23. All that in a 27° stretch of sky plus some mighty fine star fields! Notable clusters which usually appear as tiny fog clouds in binos are M52 which appears as bright fog billow with a few stars poking through; 129 shows some resolved stars; 457 is a super cluster with many resolved stars - note its structure; M103 is a nice field and well resolved; St 2 is in the same field as the "double cluster", we resolved this is the famous "Muscle Man" cluster; 869 and 884 form the "double cluster" with stars galore; Tr2 shows a dozen stars in a nice pattern; 1027 is well resolved and St 23 shows as a readily seen small knot of stars. After Stock 2 there is another 4 bino field break until NGCs 1528 and 1545 were swept up getting down low in the northern sky. Auriga beckons from the northern horizon I had to wait 20 minutes for Auriga to rise enough to pick up the open cluster M's 38, 36 and 37 and NGC 1893 (faint elongated cluster) to round out the grand tour. Of these, M37 is the easiest to spot and its richness adds a 'fog' to the resolved stars.

### SKY ATLAS 2000.0

Jumping up to this atlas reveals many, many more objects. Those not plotted on the 10-page Bright Star Atlas 2000.0 generally require more horsepower than the 16x80mm binos I used. While waiting for Auriga, I spent some extra time in the Cepheus to western Cassiopeia region (galactic longitudes 95°-125°) to see what I could find as it was well placed for viewing. While scanning there were still clumpings and itty-bits clouds not shown on the Bright Star atlas. Within 5° of the equator, Bright Star atlas shows 7 objects while Sky Atlas 2000.0 shows 3. Can any of those added to Sky Atlas 2000.0 be seen in binos? The answer is yes; but very few and not too well. NGC 7261 in Cepheus appeared as a very small and dim puff while 7235 and 7510 could only be described as "sort of there"; in Cassiopeia 7790, 133 and 136 were similarly detected. Some others may be seen with very dedicated viewing and precise locating - all too much work for this evening of fun!



#### DO YOURSELF A FAVOR

The variety of stellar patterns and concentrations; object shapes, sizes and placements; and the ability to see something of the makeup of our galaxy's construction together with 50 highlighted objects covering 185° along the galactic equator and perhaps 2000 square degrees of sky — all in 2½ hours set this tour as the highlight of all the observing I've done this year. Do yourself a favor and take the time for a trip of discovery on a galactic scale!

- Bill Smith



## FOR SALE

**Celestron Ultima C-8 Telescope.** Operated by re-chargable batteries. Includes dew shield, flashing Telrad, 1 1/4" 45mm. Pl., heavy duty tripod, regular & 45 degree image correcting diagonals, focal reducer/image corrector, glass solar filter, fully padded travel case, battery charger, hand controller and dec motor. It has 2-way 8x50 finder with lighted reticle. Extra batteries for finder & scope Included. \$1600. Will give BAA member setup and operational lessons and deluxe star atlas.



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## TOPICS IN ASTRONOMY

A CLASS IN "TOPICS IN ASTRONOMY" WILL BE GIVEN AT THE MUSEUM OF SCIENCE BY AL KOLODZIEJCZAK, EDITH GEIGER & ROWLAND RUPP. ANYONE INTERESTED SHOULD CALL THE MUSEUM AT 896 5200 FOR MORE INFORMATION.



### "SPECTRUM" DEADLINE

The deadline for the **May/June** issue of the "SPECTRUM" is **April 14th 1995**. In the next issue will occur and ancient constellation, "TUBUS HERSCHELII MAJOR & MINOR"; a past astronomer, "Lord William Rosse"; an article, "Astronomy 1879"; a profile, "Terry Farrell" and other articles I have received from our members as well as articles from other club newsletters. My final edition of the "SPECTRUM" will include an editorial, that being the July/August issue.



THE SPECTRUM



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