

BUFFALO ASTRONOMICAL ASSOCIATION, Inc.  
SEPTEMBER - 1994 - OCTOBER

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IN CASE OF EMERGENCY

If for any reason there might be cause for cancellation of the meetings of the B.A.A., tune your radio to WBN (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.

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CORRECTION

IN THE LAST ISSUE OF THE "SPECTRUM" A MISTAKE OCCURED IN THE DATE. EVEN THOUGH THE DATE WAS WRONG, BEING THE SEPTEMBER/OCTOBER ISSUE, STILL IT DID REFER TO IT AS THE "SUMMER ISSUE".

>> MEETING NOTICE <<

Sept. 9th: Cepheid variable stars: milestones of the universe (main talk) and an overview of the astronomy program at University of Toronto (short talk).

Oct. 14th: The BAA's CCD camera system: building it from a kit and early results including comet Shoemaker-Levy 9's impacts on Jupiter.

Meetings: 2nd Fridays @ 7:30pm Jan-June and Sep-Dec.

Location: New Science Building Auditorium at Buffalo State College on Elmwood Ave.

We hope to see you all there at these meetings.

As usual refreshments will follow.

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The September meeting will feature Dr. Don Fernie from the Dunlap Observatory at the University of Toronto. Dr. Fernie will clarify what Cepheid variables are and their place in the universe. Dr. Fernie has spoken on astronomy on CBC radio's Quirks and Quarks and is adept at presenting technical topics in an understandable manner.

Our October meeting will feature our own Joel Stuckey on selection, construction (he did it!) and use of our new CCD camera. It's easy to use and available for any member upon checkout at the observatory. Watch for our CCD class.

Bring a friend and start the fall with an astronomy talk!



>>> BOARD AT-LARGE POSITION ELECTION <<<

Rowland Rupp moved to the College of Fellows board member position this past Spring so he had to vacate his former member-at-large board seat. An election to fill this spot will take place in September. There is 1 year remaining in this term. Call Edith Geiger (649-7965) if you would like a place on the ballot. Edith has two candidates and is looking to add your name.



Beaver Meadow Observatory

Well, has it been a great summer or what!!!! Jupiter performed, Joel Stuckey completed the club's CCD camera, the Observatory is finished, and the weather has been excellent!

**Notice:** The September 17/18 public weekend has been canceled! In it's place on September 17 we will be hosting the members of the Audubon's 100 club for public night (these members are financial supporters of Beaver Meadow Audubon Center). Since this is also a public night, I would appreciate having plenty of people and telescopes on hand to give these people as much individual attention as we can!

**Attention:** We will be having an Observatory Clean up, sort out and garbage day starting at 12:00 noon on September 17! I would like to get the place ship shape for the winter! There will be a bring a dish to pass picnic dinner while we wait for public night to start.

**CCD Imaging Classes:** will be held once a month at the

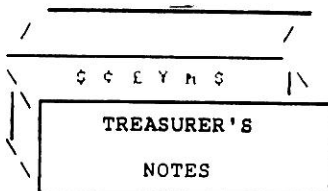
observatory. You must be trained on the camera before you can use it. The dates are to be announced at meetings, or you can contact Joel Stuckey or Dan Marcus.

**Observatory Users:** The combination will be changed on October 15 after public night. At that time the combination will be given out to those who have paid 94/95 dues! If you don't hear from me before then and you are checked out on the scopes, Please give me a call at 773-5015, and I will give you the combination as soon as I verify your membership is current!

**Jupiter gets BASHED!** On July 16, and 17 we did not see any indications of the comet's impact sites. Monday the 18th after the larger pieces had already impacted, Lary Carlino reported he could see an impact plume in his 6". On the 19th people at the observatory were treated to 2 large **BLACK** impact plumes on the front of the planet! Reports from Bill Smith and Tom Bemus indicate you could see it in a 50mm refractor!!!! The plumes are still visible, albeit not nearly as dark and defined, as of August 5. Joel Stuckey has been using the new CCD camera to image Jupiter on as many clear night as possible. The results from our new clubs CCD camera are really exciting! Gene Witkowski has been bringing his surveillance camera to public nights, the public and members alike have really enjoyed the Jupiter and lunar tours Gene has been giving. The public was very appreciative of seeing Jupiter in TV first and then seeing it in the 20". Now they knew what the heck we are talking about, and where to look for it.

**Observatory Needs:** I am looking for help to rehabilitate the 12" mount to make it easier to use. It is starting to feel the wear and tear of 20 years of use, and needs a little attention. The CCD camera needs a rolling cart to move around the computer and store the camera. We could use more hard drive space, faster CPU, or a math coprocessor for the CCD Computer. Other ideas: -Raising money for a Dob driver would be nice (would allow the 20" to track the stars for public night). -Raising money for a better refractor that we could use for CCD work as well as visual. -Figuring out a safer way to raise and lower the back wall. -Someone to organize public nights to include constellation programs. -How about a constellation slide show? -Organizing our shareware, and show it off to the public. -Assembling our spare computer parts into another computer! I'm sure the list is longer, but if you wish to help, or have any ideas you wish to implement please give me a call at 773-5015.

Daniel Marcus



SKY & TELESCOPE MAGAZINE

ASTRONOMY MAGAZINE

RASC OBSERVER'S HANDBOOK

Astronomy club discounts are available for subscriptions to the two popular magazines, SKY & TELESCOPE and ASTRONOMY, and for annual copies of the RASC OBSERVER'S HANDBOOK.

Make checks out to Buffalo Astronomical Assn. Mailing labels are not necessary for renewals of the magazines.

SKY & TELESCOPE is \$20 a year. It renews individually around January for most of us. When S&T sends you the renewal notice, give or send this with payment to me. If your renewal month is not January or February, please check with me first. I will have another reminder in the next Spectrum. However,:

NOTICE > > > > > FIRST & LAST CALL < < < < < < NOTICE

Deadlines for ASTRONOMY and the RASC book have been moved earlier this year, so there will not be time for notice in the next Spectrum.

ASTRONOMY is \$18 a year or \$36 for two years. It renews annually by group list, which has already arrived and I need to return at the beginning of October. All subscribers except B.Newman please bring payment to the September meeting or mail to me by the end of September. E.Czapla, H.Goller, and T.Loncto please add \$1.50 to your payments.

OBSERVER'S HANDBOOK of The Royal Astronomical Society of Canada for 1995 is US \$ 10.50 as last year (regularly \$ 15.89). In order to make first shipment in mid-November, I need like to send the order by the beginning of October.

Stephen Kramer  
80 Donna Lea Blvd.  
Williamsville, NY 14221



### BAA HISTORICAL BOOKLET

Due to the cost of mailing, an additional cost of \$.50 will be added to make it \$9.00 should you wish to have it mailed to you.



### >> PRESIDENT'S MESSAGE <<

#### REMINISCING

Over the past 2 years I tried to use this column to act as a catalyst to start a reaction - that between people and the terrific hobby of astronomy. I covered topics as: don't take a hobby too seriously; how to know what one really wants; innovation and club resources; help yourself by helping others; overcoming new member apprehensions; show and share a bit of yourself; making astronomical resolutions; reacquaint yourself with the sky; how to increase satisfaction and enrich your hobby; the hidden benefits of volunteering; and ways to take advantage of what the club offers. Those columns helped me, for sure.

Amateur astronomy is supposed to be fun and a break from daily routine. Whether it takes the form of lying in a chaise lounge just watching the sky; observing a meteor shower with family; observing with binos or scope; or curling up with a good book - this hobby represent serious stress relief! Several recent articles in Sky & Telescope and Astronomy magazines bemoan astronomy as an expensive hobby. Your \$15 membership opens the door to a \$20,000 observatory and the priceless value of fellow members. Looks like most of those authors missed the club advantage. How about you?

If I got anyone to take up an astronomy initiative, to try new things or even to try old things again then that is what I wanted all along! Relax, slow down, share the sky with others and delight in astronomy.

#### PASSING ON THE TORCH

The September meeting marks the start of a new slate of officers. Terry Farrell, Bob Hughes, Lynn Sigurdson and the continuing Steve Kramer will take the baton to lead us in the future. They can't do it alone; they need your suggestions and support. Give them a call on what you'd like to see in the way of club activities and meeting topics.

I would like to thank the outgoing roster of officers (Bruce Newman, Luann Szucs, Steve Kramer); past board members (Edith Geiger, Tom Nigrelli); current board members (Joe Drabek, Jack Mack, Dan Marcus, Rowland Rupp, Joel Stuckey); and all the volunteers on club projects and public events who helped make my term as President a very rewarding experience. Sure there were some bumps along the way but the big projects of the past two years: new 20" scope, observatory expansion and CCD camera possibly may not have happened without their take charge attitude and forward thinking. At all times we tried to do things to legitimize each member's reasons for belonging to the BAA.

Bill Smith



## MEMBERSHIP CORNER

It's hard to believe that summer is almost over. It seems as though it was just last week that it got warm enough to remove the electric socks and thermal underwear from the observing wardrobe. On the up side, the nights are more likely to be bug-free at the Observatory or anywhere else in the area from which you choose to observe.

Bugs or not, we hope that everyone had a great summer. We certainly had a wonderful time at our star party on the 23rd of July and we thank everyone who attended for helping us consume the copious amounts of food. Somewhere between the eating, the merrymaking, and the intense discussions about the automatic toll collection system used on the Grand Island bridges, we even managed to put in some time at the eyepiece.

I'm sure most of you know what's coming next. It is once again our unpleasant duty to remind everyone that, in addition to the colder nights, the end of summer also means that it is time to renew your membership in the BAA. Your dues may be paid in person at one of the monthly membership meetings (which begin again on September 9th) or you may mail your dues to us at 125 Roycroft Blvd., Amherst, NY 14226. How can you tell that your dues have been received and properly credited rather than used to fund our trip to the Texas Star Party? Well, keep your eye on the mailing label on your copy of the *Spectrum*. If your name is followed by "(95)" it means that your membership is paid until August, 1995.

Finally, we would like to take this opportunity to present the following new members:

Derek Bill  
49 S. Main St.  
Batavia, NY  
344-5733

Don Lewis, DVM  
7345 Chestnut Ridge Rd.  
Lockport, NY  
433-7062

Adrian Raymer  
2075 Centerline Rd.  
Varysburg, NY  
535-9994

Ted & Audrey Molkiewicz  
64 Samantha Way  
Cheektowaga, NY  
668-6902

Please join us in welcoming them to the BAA.



Joe and Bev Orzechowski

### "SPECTRUM" DEADLINE

The **deadline** for the November/December issue of **The SPECTRUM** is NO later than October 17th which is the MONDAY following the meeting.



### >> USE THAT 20" <<

#### PRIME VIEWING IN SAGITTARIUS

From star clouds to dark lanes, the rich Milky Way strides overhead and heads south through Sagittarius. Here lies a treasure trove of objects for viewing. There are charming objects for every instrument from the eye alone to binoculars, small scopes and the BAA's 20".

The 20" can give some awesome views of the well known Messier objects. It can also bring out details that are hidden in smaller scopes. Some of these details will be glossed over by observers due the sheer grandeur of the general view.

Spend some extra time when viewing objects and try to see some details that lie below the level you normally see. I try to view each object at low, medium and high powers not only to see more but by changing eyepieces the eyes get a rest from constant concentration.

As an example, M22 (a magnificent globular on par with M13 in Hercules) is well resolved in a 6". My 10" suggests a yellowish hue to the stars of the globulars core. The 20" makes these old star's color much more obvious -- but only if one scrutinizes! Hints of color to the Trifid nebula also show up in the 20". Treat yourself to some extraordinary views this fall by planning a trip to your observatory at Beaver Meadow.



- Bill Smith

## >> OBSERVING REPORT <<

### COMET SHOEMAKER-LEVY 9 IMPACTS ON JUPITER

Slam bam! I hope everyone got to see the impact features through a telescope. Hubble images presented on TV and in magazines were no doubt clearer but lacked the emotional impact of live viewing.

The impacts had to be the second easiest to see feature on the planet after the main equatorial belt. They were plainly seen in a 60mm Meade refractor and could be detected with that scope stopped down to 40mm. You should've seen the grin on that scope's owner!

Persistent effort paid off. In times of good seeing the impact sites showed a sharp contour that wasn't circular. Some of the noncircularity is due to the viewing perspective. The spots were jet black and BIG - much larger than I think most estimates expected. I used a 6" f/7 refractor as it usually outperforms my 10" reflector for detail at high power and provides steadier images in the early evening.

On one of the early impacts I suspected I saw a partial arc similar to the expanding ring one sees when a rock is tossed in water. I viewed that impact a bit late as it had almost rotated out of view; had I viewed a couple of hours earlier perhaps that arc might have showed a more complete ring. On the 11 o'clock news a Hubble image showed that arc was part of a "splash" ring. That was the only professional image I saw for the next 10 days as I didn't want Hubble or large observatory images to color my viewing.



- Bill Smith

## ASTRONOMICAL HAPPENINGS

### SEPTEMBER 1994

- 1 - Saturn at opposition  
Beta Lacertid meteor shower  
Aurigid meteor shower
- 5 - NEW MOON
- 7 - Conjunction - Mercury & Moon
- 8 - Moon at perigee (365,148 km)  
Conjunction - Venus & Moon  
Venus at aphelion
- 9 - B.A.A. MEETING at 7:30PM  
Conjunction - Jupiter & Moon
- 11 - Epsilon Perseid meteor shower
- 12 - The Sun leaves Leo and enters Virgo  
FIRST QUARTER MOON
- 14 - Conjunction - Neptune & Moon  
Conjunction - Uranus & Moon
- 15 - Mercury at aphelion
- 18 - Conjunction - Saturn & Moon
- 19 - FULL (HARVEST) MOON
- 20 - Southern Piscid meteor shower
- 21 - Ember Day  
Conjunction - Mercury & Spica  
Kappa Aquarid meteor shower
- 22 - Kappa Aurigid meteor shower
- 23 - Autumnal Equinox  
Ember Day
- 24 - Moon at apogee (405,245 km)  
Conjunction - Mars & Pollux
- 26 - Mercury at greatest elongation (26° east)
- 27 - LAST QUARTER MOON
- 28 - Venus at greatest brilliancy (-4.6)  
Conjunction - (occultation) Vesta & Moon
- 29 - Conjunction - Mars & Moon  
Sextantid meteor shower (daytime) see below

### OCTOBER 1994

- 1 - Uranus stationary
- 2 - Neptune stationary  
Quadrantid meteor shower
- 3 - Andromedes meteor shower
- 4 - NEW MOON

- 6 - Moon at perigee (360,244 km)
- Conjunction - Mercury & Moon
- 7 - Conjunction - Venus & Moon
- Conjunction - Jupiter & Moon (An occultation will be visible from the west coast of South America through the South Atlantic Ocean and Antarctica).
- 8 - Meteor shower from the Giacobini-Zinner Comet of 1985 - Does anyone have any information on this occurrence nine years ago? I have looked for data in regards to this possible meteor shower but to no avail. Any information, I would be glad to hear from you on the subject. (dpc Ed.)
- 9 - Mercury stationary
- Draconid meteor shower
- 11 - Conjunction - Neptune & Moon
- Conjunction - Uranus & Moon
- FIRST QUARTER MOON
- 12 - Venus stationary
- Northern Piscid meteor shower
- 14 - B.A.A. MEETING at 7:30PM
- 15 - Conjunction - Saturn & Moon
- 17 - Epsilon Arietid meteor shower
- 19 - FULL(HUNTER'S) MOON
- Epsilon Geminid meteor shower
- 21 - Mercury at inferior conjunction
- Moon at apogee (406,098 km)
- Orionid meteor shower - see below
- 24 - The Sun leaves Virgo and enters Libra
- Leo Minorid meteor shower
- 28 - Conjunction - Mars & Moon
- 29 - Mercury stationary
- Mercury at perihelion
- 30 - Daylight savings time ENDS and we are now back to proper time!!!

#### METEOR SHOWERS

##### SEXTANTIDS

This daytime shower which occurs on the 29th of September, is perhaps an illusive shower as it seems to be seen only during the daytime hours. It comes out of 10h 08m R.A. on the Equator. It is irregular, producing about 10 hourly for about eleven days. These -5th magnitude meteors are white only that they are seen in the daytime, at night, should they appear, would probably be of a greenish hue. Observation data is no picnic to obtain unless there should be a high sky of deep blue and no clouds.

##### ORIONIDS

On the 21st of October we are to expect a great shower of yellowish, 3rd magnitude meteors. They are short and swift coming out of 06h 08m R.A., at +15° declination for 5 or 6 days. It is supposed to be from Comet Halley 1910 II, and could be related to the Eta Aquarid meteors of May 4th, where the plane of the Earth's orbit occurs on the opposite side of the Sun. This annual shower is one of the most noted of all the meteor showers throughout the year.

##### Next issue

For November the Leonid meteor shower and for December, the Geminid meteor shower.



#### A BIT ABOUT THE HISTORY OF ASTRONOMY IN GEORGIA (Former Soviet Union)

Unfortunately, at present very little is known in the West about the history of Georgian astronomy, even though this branch of science has long and interesting traditions in Georgia. Celestial phenomena have been especially interesting to Georgians since old times. Representatives from all layers of the Georgian society, from peasants to kings, often observed such rare phenomena as solar and lunar eclipses, the visitation of comets, and other celestial events.

The Sun, the Moon, the planets and the constellations - each had its own Georgian name. In the XI-XII centuries, the Georgian academies Ikalto and Gelati taught astronomy along with other subjects. The academy of Gelati even had a functioning observatory for a time. A functioning observatory also existed in the XII century in Tbilisi, the capital of Georgia. Here, systematic astronomical observations were carried out by means of azimuth disks. Since Georgian astronomers were known to be skilled observers and calculators, they were often invited to the observatories of neighboring countries, for example, the observatory of Mukhamed Naciredin Tusi in Maraga.

Quite a few old Georgian manuscripts are preserved in the Tbilisi Institute of Manuscripts of the Georgian Academy of Sciences, Archives and Museums. These manuscripts include various fields of astronomical science, beginning with chronology and the calendar and ending with a description of the positions and motions of heavenly bodies. Most of the manuscripts and original works of the Georgian authors and are written in old Georgian. The rest are made up of translations from various Arabid and Greek sources. The French scholar Marie Brosse (1802-1880) was one investigator of the old Georgian astronomical manuscripts.

Astronomical theses appear frequently in Georgian literary works, particularly in the poem "Vepkhuis Tkaosani" ("The Knight in the Panther's Skin") by Shota Rustaveli, a Georgian poet of the classical period (XII century). (See figure 1, a reproduction of the cover of the poem in book form, for example of old Georgian script) A description of heavenly bodies and various elements may frequently be found in the poem. It would seem that the author of the poem was familiar with the basics of astronomy and probably received an education which included astronomical topics.

As a further example of astronomical interests in old Georgia, one may view the walls of old temples and cloisters which are decorated with astronomical inscriptions and drawings. Ancient sundials which are preserved in Georgian temples may be considered as examples of architectural monuments. Finally, an astrolabe, an example of precise metal work, may be seen in figure 2.



Handwritten text in old Georgian script, likely a reproduction of the poem's content.



- Figure 1 -

#### "Vepkhuis Tkaosani"

The XIX century in Tbilisi marked the beginning of a physical-astronomical observatory. The director of this observatory, an astronomer from Derpt, was Paul Morits (1821-1902). At the beginning of the XX century, Georgian astronomers founded an astro-physical observatory on Mount Kanobili in Abastumani, which functions to this day, Figure



- Figure 2 -  
An Astrolabe,  
an example of precise  
metal work.



3 shows a photograph of the Abastumani Astrophysical observatory in the Republic of Georgia.

Dr. Irakli Simonia

About the author: Dr. Irakli Simonia is an astronomer from the Abastumani Observatory in the Republic of Georgia (the former Soviet Union). He has conducted research on the history of Georgian astronomy and is interested in sharing this information with the Western friends and colleagues. Dr. Simonia recently visited the "state" of Georgia (yes, the one in the United States), where he conducted lectures on his Georgian favorite historical topics. Should you wish to write to Dr. Simonia, his address is:

Dr. Irakli Simonia  
Vazha-Pshavela av,  
14-4  
Tbilisi 380060,  
Republic of Georgia



Mitzi Adams

#### BAA ANNALS

**5 YEARS AGO** - Our fall 1989 program opened with Mike Jefferson of the Hamilton RASC speaking on "Selecting the Ideal Telescope". Another RASC member, Eric Clinton from London, spoke in October on "Observatories of California and Arizona".

President Doris Koestler announced that Bell Aerospace Textron had donated a 10-inch, motor-driven equatorial mount to the BAA. Bill Smith is presently putting the finishing touches on it and on the 6-inch telescope donated by Conrad Stolarski that it will carry. The intention is to make it into a photographic and CCD assembly for use at Beaver Meadow Observatory. Doris also announced that the first meeting of members interested in a new telescope would be held on September 12th. Her chairmanship, with help from Dan Marcus, Jack Mack and many others, ultimately led to the expanded facility we can now enjoy.

Edith Geiger's profile was on current Vice-President elect Bob Hughes. An article on Neptune and its satellites appeared in the SPECTRUM in anticipation of the Voyager II flyby that was about to take place - no author was given, but I'm pretty sure I know who wrote it!

**10 YEARS AGO** - Our own Jack Mack spoke on "How Far Is a Star" at the September 1984 meeting. In October, Dr. James Houck, Professor of Astronomy at Cornell University, spoke on "Results from the Infrared Astronomy Satellite (IRAS)". Edith's profile featured Shaun Hardy, who was active in the Lockport Astronomy Society as well as in the BAA.

Michael Idem contributed a SPECTRUM article, including sketches, on observing Mars. Anonymous wrote on "What's Wrong with Astrology", listing thirteen specific complaints. Subsequent articles took issue with various aspects of this polemic. Ernst Both wrote a review of Ken Fulton's "The Light-Hearted Astronomer". Without realizing the duplication, I wrote one on the same book a couple of issues later. I think neither of us was particularly pleased with Fulton's effort, but Ernst expressed himself more diplomatically. Carl Milazzo received a complimentary letter from a non-member reader. Donald Magor, who was impressed with Carl's compilation of double star colors that appeared in a previous issue.

**15 YEARS AGO** - Ed and Olga Lindberg started the 1979-1980 season speaking on "The Story of Time". In October Emil Pallos of the Broome County Astronomical Society was our guest speaker. The subject of his talk was not given.

President Fred Price congratulated Bob Mayer, Darwin Christy and Al Kolodziejczak on having been elected to the Board. Speaking of Darwin, this September-October 1979 issue was the first SPECTRUM he edited. Joe Provato was the subject of the Edith's profile, and Al Kolodziejczak reported on a twelve member BAA excursion to the Dunlap Observatory near Toronto.

**25 YEARS AGO** - Richard Karlson from Rochester was our September 1969 speaker. His topic was Stonehenge. In October we heard about "Amateur Radio Astronomy" from Orrin Christy, who was then Vice-President of the BAA. Orrin, with Darwin's help, had built his own radio telescope.

Appearing in the SPECTRUM were articles from the elusive Kurt Eriand on how to build up an astronomy library, and from Fred Price on "Observations of the Lunar Crater Atlas". The latter article included one of Fred's fine lunar sketches. Dues were due - \$5 for an individual, \$8 for a family!

**40 YEARS AGO** - The first meeting of the new year was held in October in those early days. According to our editor, James Clements, the opening meeting would feature Ed and Olga Lindberg who would speak on the observatories they visited during the summer. Ed and Olga frequently led off the year, and also were featured at our Christmas meetings. World travelers, they visited many interesting astronomical sites and returned with pictures and anecdotes.



Rowland A. Rupp

#### SPY and TELL

The Astronomy Book Club selected the recently published, The Planet Observer's Handbook by Fred Price, as the main selection for the month of October 1994. Congratulations to Fred, and also to Gene Witkowski who has a number of his fine astrophotos included in the book.

I received a call from Mary Chapman, widow of former BAA member, Sev Chapman, informing me that their son, well-known astronomer Clark R. Chapman, would man the Galileo cameras for the Jupiter crash. He has been on the imaging team for the Galileo mission for several years. He said that as the main antenna on the craft was stuck at half mast, the first pictures of the crash would arrive, at the earliest, on August 14, and from then on through December. Congratulations to Clark for his outstanding accomplishments in the field of astronomy.

Tom Bemus, Bud Abate, and Carl Milazzo attended the Astroblast Convention hosted by the Oil City Astronomy Association in Pennsylvania, where Carl gave a talk. The weather was not the best, with rain, hail and thunder. The observatory was struck, knocking out the modem. There was a break in the clouds, but observing was very poor. Carl said that the speakers were very good. Tim Spuck, a high school teacher in Berkeley, California, told of using a computer operated telescope with his class. He spoke of his two students, Heather Tartara and Melodie Spency, both juniors, who received quite an amount of recognition for having the earliest pre-discovery images in the world of Supernova M51. Their images were discovered four days before the discovery by other astronomers. Their images were shot on CCD, March 28. Other discoveries were made on April 2. The students recorded the image at 16th magnitude, those recorded four days later were at 11th magnitude.

Once again our members made the Buffalo News: A picture of Dan Marcus and Bob Hughes at Beaver Meadow appeared in the Sunday, July 17 issue with an article on the then not spectacular view of the Jupiter-comet impact. In the July 10 magazine section, the News had carried a comment by Dan on the event, and mentioned two lectures to be given by Ernst Both at the museum concerning the collision. As the impacts on Jupiter became more spectacular, further articles appeared with comments by Ernst, and a photo by Joel Stuckey taken with the camera he had made and attached to an IBM computer. The photo was taken at the Beaver Meadow Observatory.

Ken Biggie has been doing his internship as vice principal at West Seneca East during the summer as part of the requirement for his degree, his second Masters. Check Nov.-Dec. '93 Spy and Tell for further information.

Melissa Marcus has completed course No. 4 in gardening study. She also completed course No. 3 in environmental studies given by the Federated Garden Clubs of New York State. She took a course in Introduction to IKEBANA International, Buffalo Chapter 50. IKEBANA is a Japanese Flower Arranging Club, with 300 organizations throughout the world.

The Macks visited numerous campuses this summer looking into a possible college in which daughter, Alice, would like to be enrolled after graduating from high school next June.

Bill Smith exhibited his fine photographs at the following shows this summer: Syracuse, Allentown, Cornhill in Rochester, and East Aurora. He has six more shows coming up through November.

The Smiths have a new little filly named Billy's Holiday. She was born on July 4th to their sire and mare full Arabian horses. And who delivered this beauty? Why Bill, of course!

Marilou Bebak spent the month of July on a grant from the Cornell Institute for Biology Teachers. Everything was paid for, including tuition, room, board, and books. She studied molecular genetics, with a stipend of \$4000 worth of scientific material, and a computer. She was also paid a salary. Only 20 teachers in the state received a grant for this summer program. While she was there, she naturally wanted to see the Jupiter crash, so she banged on the door of the observatory, and they let her in, and also let her work with the telescope. She did get to see the holes made in Jupiter's atmosphere by the comet. The observatory has a 24" Cassegrain with a fork mount and an infrared camera. Three student interns were at work doing infrared observations. The observatory also houses a 12" refractor with a windup clock drive. Marilou had a great three weeks working with observatory equipment from high tech to windup.



Edith L. Geiger

David Rittenhouse,  
Colonial America's Astronomer

Astronomy of the mid-1700's was comparable to our period of the mid-1900's: a gradual improvement in the optical resolution and the understanding of our known universes. In the background of both times, however, was quietly developing the work of a recent genius, Newton then and Einstein now.

On this side of the Atlantic there was of course not the developed technology and scholarship. On the other hand the lack of established traditions and institutions contributed to the growth of the independent "Yankee tradition." In the "natural philosophy" of the time, we are familiar with Benjamin Franklin, as well as Thomas Jefferson to some extent. Those we are lesser familiar with are John Winthrop, William Smith, John Ewing, Owen Biddle, John Witherspoon, and: David Rittenhouse.

David Rittenhouse was born in 1732 - the same year as George Washington, as well as the other astronomers Lelande and Maskelyne - in Germantown, Pennsylvania. This was then a few miles north of Philadelphia; now it is part of the city, and fortunately the houses of the enclave of the extended Mennonite Rittenhouse family is still preserved in Fairmont Park. They are currently being refurbished and reopened to the public. The theme of the area is the family's business of papermaking.

David's father bought a farm about twenty miles north in the Norriton area and moved there when David was two. The site became a private hospital, and little remains of the original structures. David already had an older sister. Later there were four more sisters and a brother,

Benjamin, in 1740. Since he was the eldest son, it was expected that he would inherit the farm and was so raised. But when he was twelve, a carpenter uncle, on his mother's side, of Lancaster County died, leaving him a box of tools and books, including some on mathematics and geometry, and some math calculations. In addition, an aunt on his father's side had married into a Gorgas family - the most prolific clockmakers of Lancaster County. Math calculations in chalk started appearing on farm implements and fence posts. He made miniature models including a water mill and later a wooden and then metal clock.

Except for schooling at home and perhaps a few years at the local church, the real influence rounding out his education was the appearance of a local teacher, Thomas Barton, in 1751. Barton extended David's knowledge of the classics and of the latest scientific developments in Europe. Barton was also from Lancaster county, educated in England, and moved in the intellectual circles of Philadelphia. He introduced David to these people. Later he married one of David's sisters and his son wrote an extensive biography of David in 1813.

With the help of his mother, his father was persuaded to set him up with a shop by the side of the road to make clocks and mathematical (surveying) instruments. This was quite unusual. The usual course for such a profession was to serve a long apprenticeship, journeymanhood, then becoming a craftsman, and slowly acquiring the equipment over the years.

All were impressed by Rittenhouse's mostly self-taught accomplishments. He apparently had derived his own version of calculus ("fluxions") in order to understand Newton's work (which few did). He made ordinary clocks of good quality, but more important he could make the highly accurate type of clock necessary for astronomical observations and thus surveying. He made other surveying equipment - transit scopes and compasses, which included a vernier scale. Such a compass was referred to into the next century as a Rittenhouse compass.

It was only natural with his skill and contacts that he was commissioned in 1763 to settle the boundary dispute between the colonies of the later Pennsylvania and Maryland; this boundary was later confirmed and named for the British Mason and Dixon. Such a field surveying project required a party of people to be off in the wilderness for weeks at a time, carefully transporting the delicate equipment, and always dependent on the weather. More surveying contracts followed, taking more time from his preferred pursuits and taxing his weak disposition.

Now more things started happening. In 1764 his father moved to another farm, leaving the first to David. I believe the idea of incorporating astronomical indications on a clock, as was being done in Europe, had long intrigued him, and in 1765 he made such a clock now at the Pennsylvania Hospital in Philadelphia. It had some unrefined design and construction in it, but it also had the budding of further sophisticated lunar indications to come in later work. Unfortunately some recent repair and restoration to this clock has been somewhat farcical.

In 1766 he married the Quaker Eleanor Coulston,

born in 1741, and they had two daughters in 1767 and 1768. He was writing articles [some astronomical ones in previous Spectrums], working on temperature compensation for pendulums (important in clocks used for astronomy), devised a pocket thermometer using a fused brass and steel strip of metal (still found in household thermostats) but the credit went to Breguet in the 1800's, and wrote up a description of an elaborate orrery - a mechanical model of the earth and the solar system. In 1767 he was awarded an honorary Master of Arts degree by the University of Pennsylvania.

He had now begun the serious design and preliminary fashioning of the work which was to bring fame to both him and to the colonies: the large orrery project ...

Also, general preparation was underway both in Europe and America for the most important astronomical event of the time: the June 1769 transit of Venus across the Sun ...

[to be continued]



Steve Kramer

#### ANCIENT CONSTELLATIONS

TARANDUS, the Reindeer is a small, faint asterism located between Cassiopeia and Camelopardalis. It was formed by Pierre Charles LeMonnier as a memento of his stay in Lapland when he was engaged in Geodetic work in 1736 under the title of 'Renne'.

The Germans knew it as Rennthier. Bode placed it on his map, 'Die Gerstirne' as such in the 18th century.

Today it is seldom recognized or figured as a constellation by the astronomers. At least on Burritt's atlas, it was shown as a sort of deer or as you wish, a reindeer, NOT one of Santa's.



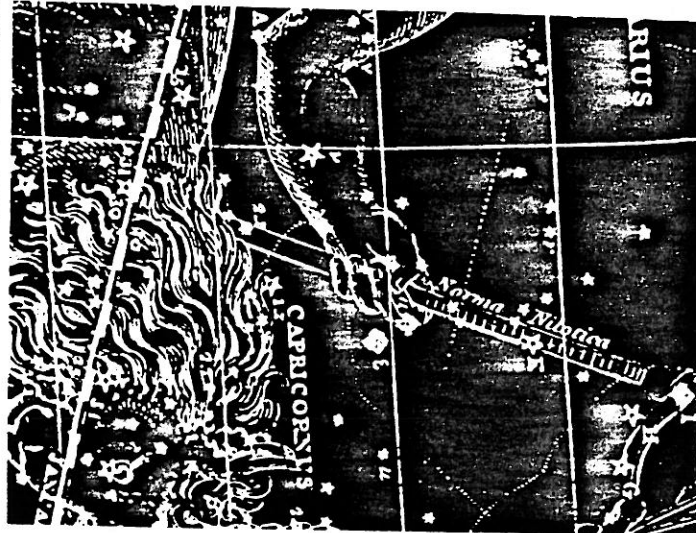
NORMA NILOTICA, a Ruler or Measuring Stick of the River Nile, is an ancient constellation as described in Burritt's atlas as being that instrument which was held in the hand of Aquarius. This means, therefore, that Aquarius must have been wading in the River Nile, taking measurements of the water in depth

Norma Nilotica, or as it is called today, "The Nilometer" is an instrument used for the purpose of measuring the depths of large bodies of water such as our lakes and reservoirs.

The Nilometer, as described in hydraulics, was used to measure the rise and fall of the River Nile during its periodic flooding. The instrument was stood in a well which communicated with the River Nile, and the markings being measures in "cubits". One cubit measuring about 18 inches in length, that distance from the elbow to the wrist of one's forearm.

In the time of Pliny, 12 cubits meant famine, 13 cubits was scarcity of water and 15 cubits, safety. There was plenty at 16 cubits and at 18 cubits. Even today, canals are cut for distribution to the surrounding farmer's fields. When it reached 19 cubits, it was still tolerable. At 20 to 22 cubits, the water rose to the almost flood level and precautions were being made for flooding. At the level of 24 cubits and more, ruination was created by the severe flood waters.

Norma Nilotica is no longer in existence, found not on maps or charts anymore, and has since been disregarded by astronomers today. Even though it is an instrument which is still in use throughout the world in rivers, lakes and reservoirs to keep records of their fill.



SCEPTUM BRANDENBURGIUM, the Brandenburg Sceptre, was invented or charted by Gottfried Kirch in 1688. He was the first astronomer of the Prussian Royal Society of Sciences. Over a century later, Bode published it, rescuing it for a time oblivion. However, as time ran out, it disappeared from any map or chart it may have been drawn upon. It contains but four stars which were shown in a straight line with one another. This ancient constellation is not to be confused with another 'Sceptre' held by the Hand of Justice. The latter was introduced by Royer in 1679 to honor King Louis XIV and placed near Lacerta.





## ANCIENT ASTRONOMERS

### ARZACHEL

This Jewish astronomer, born in Spain about 1500, discovered the obliquity of the ecliptic and compiled certain astronomical tables known as the "Toledo Tables", on which two centuries later were based the famous "Alphonse Tables".

### ABRAHAM IBN DAUD (DAVID) HALEVI

Haveli was a Jewish astronomer, historian and philosopher in the 12th century. He was born in Toledo, Spain about 1110 and died a martyr around 1180. Having been born in Spain, his identity with Avendauth, who translated Avicenna works to Latin, was a precursor of Maimonides. He waged a vigorous battle against Jewish Neo-Platonism and was the first to formulate a systematic synthesis of Jewish faith among medieval Aristotelian lines. He was the first to have introduced into Judaism the phase of philosophy which is derived from Aristotelian sources. To his 'Emunah Ramah (Sublime Faith)' Maimonides, he was largely indebted for many valuable suggestions. His most valued historical work was 'Sefer ha-Kabbalah (Book of Tradition)' which was translated into Latin by Gênerad about 1510. This book traces Rabb'nic authority from earliest times to his day.

### ALBUMAZAR

Albumazar, or Aboumaschar, Djafar Ibn-Mohammed was an Arabic astronomer, born in Balkh on August 10, 787 A.D. and died March 9, 886 A.D. in Wasid. While living in Bagdad, he wrote over 50 books, some of which have been translated into Latin. The theory on 'De Magnis Conjunctionibus' (Augsburg 1489) is advanced that the world was created when the seven planets were in conjunction in the first degree of Aries. This prediction was made that it will come to an end when the same conjunction occurs in the last degree of Pisces. He may have been plagiarized some. He explained the movements of tides in terms of the rising and setting of the moon. One of his other thoughts or beliefs was that the stars determined all aspects of life, including birth and death. Other notable works of his were: 'Flores Astrologici' (Augsburg 1488) and 'Introductorium in Astronomiam' (Venice 1506).



♦♦ The SPECTRUM ♦♦

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"Interesting use of space."

The next issue of "The SPECTRUM" will include "What is a Julian Date?"; Fish that Go\* Away from Messier"; the ancient constellation, Machina Electrica and others. In a future issue will be seen "Observing Meteorites Through a Microscope"; the ancient constellations, Tubus Herschelii Major & Minor; Antarah; and a few astronomers from the past and what they have accomplished in their time. Please feel free to write articles and submit them for publication, as they are needed to fill the pages of this newsletter. Remember, October 14th, as it is the deadline for the November/December issue.

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