NEWSLETTER OF THE BUFFALO ASTRONOMICAL ASSOCIATION INC.

# THE SPECTRUM

Volume 3 Issue 3 | Late Spring Edition | May/June 2001

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## President's Column

Did anyone get to view Venus when it was passing North of the Sun? Bob Titran, Fred Gordon, Alan Friedman and I tried to no avail due to clouds on the 28 of March. Bob and I tried to chase a hole in the clouds, but never got far enough East to see low on the horizon. I did catch Venus in a pair of 6x25 binoculars from the Boulevard Mall parking lot on the evening of March 24, it showed as a easily seen very thin crescent. Oh well maybe we will have clear skies next time. Are you ready for the summer??? Do you want to learn how to CCD? image process? Use a Go To telescope? Play with a video camera to image Mars? Then come on out to Public Nights at the Observatory! Or come join in the hunt with Bill Aquino, Frank Chalupka, for GRB's and Super Novas when they occur. It is amazing what the CookBook CCD camera can do. Bill Aquino has done several modifications to the camera and has greatly improved it's imaging abilities. He has perfected the technique of using the astrovid camera as his guider and is installing an extension for the controls for the 12" so he can guide the 12" from inside the warming room. When we perfect operating the CookBook camera from the warming room computer, imaging in the winter will never be easier. Bill and Neil Dennis are working on installing the new digital setting circles on the 12". I was helping Bill image SN2001AI in NGC52768 ( a 13.6$^{th}$ magnitude galaxy) on April 8, while it was 45 degrees from the FULL Moon. How Bill found the darn thing I'll never know, but we had it in the camera after 10 minutes of searching. I would never have believed that you could get even a glimmer of the galaxy. Bill's final goal will be to have the astrovid autoguide the 12" while we go out and view with the 20"!

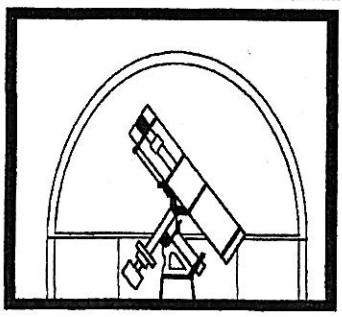
Summer Star parties. Are you a new member?, and don't know anyone in the club? can't find your way around the sky? still wondering what end of the scope you are supposed to look through? Well come join us at a star party or a public night and join in on the fun. We all come to these to share what we know, and learn to use what we have. Speaking of star parties, if anyone is going to StarFest on August 16-19 or any of the other major star parties in the area let me know and I will help coordinate the car pooling.

Anyone need Kodak Carousel Slide trays? Neil Dennis found some at the Springville Auction. I will be bringing them to the May, and the June meetings while they last.

I am looking for someone to organize and run the November Telescope Clinic at the Buffalo Museum of Science. Please contact me if you are interested in helping. We are trying to get our events organized well into the future, as it makes getting them advertised much easier!

——— Daniel Marcus ———

## BAA COMING ATTRACTIONS



Be sure to check out the activities at this year's Astronomy Day event being held on May 5, 2001 at the Beaver Meadow Nature Center, North Java NY. The event will take place rain or shine and features a full schedule of kids' activities, planetarium shows, presentations by BAA members and, weather permitting, sunspot viewing. If the skies remain clear, the BAA's 12" and 20" telescopes will be used for night time viewing of the Moon, stars, galaxies, etc. The fun begins at 12 noon.

The May meeting of the BAA will be held on Friday May 11, 2001 in the New Science Bldg. on the Buffalo State College campus. The featured speaker will be Peter Jedicke who will discuss Kepler's great work, New Astronomy (1609). In this book, generally acknowledged as one of the greatest astronomical works ever written, Johannes Kepler's de-

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**SPECTRUM SUBMISSIONS**

**Submissions wanted for publication in the Spectrum!!!!**
**Send to:**
**Tim McIntyre**
**135 Fairvale Dr.**
**Cheektowaga, NY 14225**
**Email-TMcint9320@aol.com**
**astrotim_2000@yahoo.com**
**MS Word or Wordperfect ok**
**scanning available**

**DEADLINE FOR July/August ISSUE IS June 15**

scribes his first two laws of planetary motion. Mr. Jedicke is a faculty member at Fanshawe College in London Ontario and is Honorary President of the London Centre of the Royal Astronomical Society of Canada (RASC).

"People who live on asteroids shouldn't throw stones!" So says our resident professor, Dr. Jack Mack, who will be speaking at our June 8th meeting. The topic of his presentation will be asteroids and meteors. Dr. Mack will be showing a number of asteroid & meteor images and will describe how a meteor's orbit can be determined from the images of its flaming demise.

# THE UNIVERSE – GRAVITY – AND THE PHOTON .....A GRAND UNIFIED THEORY OF MASS ENERGY SPACE TIME MECHANICS

THE GRAVITY MECHANICS EQUATION simply says that the total energy of the universe is a constant. See REFERENCES below. See Abstracts Amer. Math. Soc. Aug. 1986 Issue 45. Newton's Laws of Motion work very well, and certainly there is a Galileo acceleration effect of gravity, but, we must understand why these effects exist if we,like Newton and Galileo, want to discover new worlds of knowledge and progress.

WHY a grand unified theory of the universe? Einstein's General Relativity equation does not include relative mass-energy (kinetic energy). Gravity relative volumetric acceleration, is a function of relative mass-energy density! THE LAW OF MOTION, THE BERNOULLI PRINCIPLE , THE EQUATION OF STATE AND TORRICELLI THEOREM can all be derived directly from the FUNDAMENTAL EQUATION OF THE UNIVERSE.

A General Theory of Relativity can only exist if a Fundamental Equation of the Universe relates all things. Current physics theories do not properly explain the ocean tides, the photon (particle or wave), gravity, time, mass, or the electromagnetic field. The low tide, not the high tide, is observed in the deep ocean directly under the full moon.( U.S. Coast and Geodetic Survey Tables ). This observed fact, contradicts physics texts, the dictionary and encyclopedia definition of tide, which shows a picture of the earth with a bulge of water on the side facing the full moon, and states that the high tide tends to occur directly under the full moon. This is an error! The tidal wave would be 12000 miles long. It is not conceivable that the moon could pull several feet of ocean water around the earth at better than 1000 mph to generate this wave. This would wash away the continents and humanity in a day. A Grand Unified Theory, a General Theory of Relativity, a single Fundamental Equation of the Universe, is required .

The copyrighted text (theory) 1988 A.C.Goodrich; explains tides as a decrease of kinetic energy and volume of the ocean water with the increase of potential energy as the moon direction changes and distance decreases relative to a particular side of the earth's ocean, to maintain a constant total energy of the effective universe.

THE FUNDAMENTAL EQUATION AND PRINCIPLE of the universe is one of constant total energy expressed by the (modified Galileo pendulum-Kepler-Newton-equation by Goodrich) equation: $L^3 / T^2 = K(M-m)$ ,relative volumetric acceleration, GRAVITY, is a function of M-m, where M is the total energy of the universe, m is the mass-energy in question and T and L are time and distance. The quantities M and m are the sums of the kinetic energies of their parts that lead to the relative volumetric acceleration and are consistent with the fundamental equation for a constant total

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MEETINGS CANCELLATION POLICY

If, for any reason, (most likely snow or ice storms), there might be cause for cancellation of the meetings of the B.A.A., tune your radio to either WBEN (930) or WGR (550). Also if Buffalo State College has been closed due to inclement weather, so will the meeting of the B.A.A. be cancelled.

BEAVER MEADOW TELEPHONE

The telephone at Beaver Meadow, 716-457-3104, is for emergency use only at no cost. Local calls may be placed for a small charge - see the collection box by the phone. This phone cannot make long distance calls.

energy of the universe. They can be considered to be fixed units and can be treated as constants because of their relatively low volumetric acceleration and relatively high mass energy densities. This equation is derived from the FUNDAMENTAL EQUATION AND PRINCIPLE of the universe (by Goodrich) mL ^2 / T ^2 + K(M-m)m/L = a constant M. The total of kinetic and potential energy of the universe is a constant M. Kinetic and potential energy are strictly relative and directional. This grand unified theory defines time, mass, energy, gravity, the photon, other forces, and the electromagnetic field as geometric properties of the universe. If the kinetic energy of a mass m, relative to the rest of the effective universe, is equal to the negative potential energy of m, relative to the rest of the effective universe, any positive change of kinetic energy must equal a negative change of potential energy. All of the planets around the sun and the moon around the earth, the electron about the proton (Hydrogen atom spectrum was verified) in orbital motion, were found to obey this fundamental law: The total orbital energy is a constant.

m(2pi L)^2/T^2 = -G (M-m) m/L ,where m is the planet ,(M) is the effective universe, G is the gravitational constant 6.67 x10^-8 dynes cms^2/gms^2, L is the radial distance in centimeters and T is the orbital time in seconds. ^ means to the power of. The planetary orbits are stable because it takes an energy change to change the orbit. Orbital motion is a state of equilibrium, where the kinetic energy of a mass m relative to M-m increases at the same rate that the potential energy of m, relative to M-m, decreases as the universe expands. The FUNDAMENTAL EQUATION OF THE UNIVERSE controls. Mass-energy, kinetic energy, is created as the universe expands and relative potential energy decreases, to maintain a constant total energy of the universe.

THE PHOTON is the change of the potential energy of the rest of the universe relative to the atom which occurs when the electron of the atom changes its kinetic energy relative to the rest of the universe in a manner which conserves the constant total energy of the universe. This concept explains the Thomas Young two slit experiment very nicely. The photon is neither a particle nor a wave. A light photon does not travel through space as a particle. It is everywhere in space as a potential energy change of the rest of the universe relative to the atomic electron. At the proper mass energy space time density and direction, the photon potential energy can be converted to kinetic energy of the electron and discontinue expanding with the rest of the universe. The photon is therefore a characteristic of the entire universe which may contain one or more slits. Only at the high mass energy space time density and direction of a particular atomic nucleus, will a high energy gamma ray photon, potential energy, be converted to a stable, mass, electron and positron, kinetic energy, because the relative volumetric acceleration is nearly zero at this mass energy density. MASS is energy at roughly zero relative volumetric acceleration and the energy density of the atomic nucleus. At lower energy densities the relative volumetric acceleration will be that of the rest of the universe and the velocity of light. Fundamental entities, such as the electron and positron, are all identical because they are all produced by the identical relative change of the potential energy of the same entire universe.

Just as it is the potential energy of the rest of the universe, including the rest of the planets of the solar system, relative to the sun, that help to establish the earth's orbit about the sun, it is the photon's potential energy relative to the proton of the hydrogen atom that helps to establish the specific orbit of the planetary electron of the hydrogen atom and the spectrum of the atom. In the expanding universe, the frequency of the photon's directional increase and decrease of the rate of decrease of the potential energy relative to kinetic energy is a function of the energy of the photon. This determines the atomic spectrum according to mass energy space time mechanics. All physical and mental processes ,all kinetic energy changes, are accompanied by potential energy changes of the entire universe, a communion with the universe.

LIFE is the genetically guided reaction of kinetic and potential energies. This Grand Unified Theory of Mass Energy Space Time Mechanics is a new method that future students can use to better understand the universe of which we are a part.

——— by Allen Goodrich ———

REFERENCES
See Library of Congress Card Catalog No. 94-90554 THE UNIVERSE- A UNIFIED THEORY-GOODRICH
Copyright 1984 to 2000 Allen C. Goodrich
and ISBN 0-9644267. ALLEN C. GOODRICH 1620 GROVER RD. EAST AURORA, N.Y. 14052-9721

# COLLEGE OF FELLOWS AWARDS FOUR

**The BAA's College of Fellows awarded four members for making outstanding contributions to astronomy. The requirement for this recognition is that the achievement must extend beyond the normal activities of club members. Publications, education, equipment fabrication or outstanding observing accomplishments have qualified in the past.**

**Honored for their observation of the afterglow of a Gamma Ray Burster were: Bill Aquino, Tom Bakowski, Frank Chalupka and Dennis Hohman. This is the first time in the fifteen years that these awards have been made that more than one member was the recipient. In some years the award is not made. The four were professionally recognized for their accomplishment at an AAVSO/NASA meeting last year.**

**The 12.5-inch telescope and CCD camera at BMO and lots of perseverance were used to capture the dim image of this GRB. Forty years ago this 19th magnitude object was near the limit of the 200-inch telescope at Mount Palomar, now it's in range of the BAA's equipment. Observing the decline of GRB after-glows aids professional astronomers in determining the properties of these intensely powerful sources of energy.**

# OBSERVATION REPORT

I was able to take advantage of some of the recent clear evenings and get some observing in with my 8" SCT. On the evening of March 11 I concentrated on Jupiter and Saturn. The seeing was above average and, despite the planets' being well past the meridian, I had some fine views at powers up to 222X. Jupiter, in particular, showed a great deal of detail, with knots and festoons clearly visible along the north equitorial belt. There was a strikingly dark part of the belt which I may have thought was the shadow of a Jovian moon on a more "normal" blurrier evening. A check of the recent issue of Sky and Telescope indicated that there were no shadows on the planet's face that evening. Alas, the same issue said that if I had observed a half hour later I would have seen a moon emerge from eclipse behind the planet. Here's where a little planning would have paid off. There was a deep, light colored indentation in the south equitorial belt. The color of this indentation was not noticeably different from the adjacent zones, but as it turns out it was indeed the Great Red Spot. On this evening I also turned my 'scope towards the meridian, where I was able to easily resolve Rigel and its companion. I then made a stop at the Orion Nebula, where I was able to detect Theta-1 E Orionis, an 11.1-magnitude star in the Trapezium. I don't recall being able to see this one previously with my 'scope. I looked for Theta-1 F but didn't see it. At magnitude 11.5, it must have been just beyond my grasp on that evening.

On March 17th I had another chance to do some viewing. Armed with a copy of *The Night Sky Observer's Guide* by Kepple and Sanner, I went after some targets in Canis Major. I started off with a few easy double stars. Nu-1 was my first, mag 5.8 and 8.5 stars separated by about 18". A nice pair, but I saw no sign of the colors described as "subtle yellowish and dark bluish." Next, I took a look at Sirius. I didn't resolve its components (nor did I expect to), but I was treated to a wide variety of colors as the star twinkled in the evening air. It looked nice, but it also told me that tonight was not nearly as steady as it had been a few nights ago. I then tracked down 17 CMa and 19 CMa, a triple star and a double star in the same field, both a little east of M41. 17 CMa is a white primary with two companions that looked yellowish to me. 19 CMa is supposedly a whitish primary with a bluish companion. While the companion was definitely dimmer, I didn't see much blue color to it. I then decided to go after a few star clusters. The *Observer's Guide* pointed me to NCG 2360 and 2374 easily hopped-to just east of Sirius. These were loose clusters of fairly bright stars easily picked up in the 8" and nice sights at 105X. Finally, I decide to track some some "easy" Messier objects. M41 was easy to pick out in the finderscope just south of Sirius. A big, showy object much brighter than the NGC clusters I just looked at, I got the feeling that there was almost too much to look at after studying the subtleties of the smaller clusters. Next, I hunted down and identified a gorgeous cluster I "accidentally" stumbled across while chasing down the dimmer clusters. It turns out that the cluster was M50 in Monoceros (yes, I had gotten quite lost). What a great cluster! It's a bright, rich collection of stars with a neat orange star off to the side. Oddly, some of the viewing guides I checked stated that this star was "not conspicuous." Unless the star varies some how, I can't see how you'd miss it. Finally, I took a quick trip to Leo to see if I could see M65 and M66. Galaxies are always tough to find from my house and years ago I tried to find these items repeatedly with a 4" reflector (with no success) when I was first starting out in the hobby. Quite frustrating. Tonight, however, they were easily visible. No detail, not very bright, but they were there.

On April 13th I spent some time viewing with my Astroscan, a 4" f/4 reflector good for low power viewing. I tried to track down some of the double stars described in the May 2000 issue of Sky and Telescope. My 28mm eyepiece gave me a power of 16X, so I wasn't going to see any stars that weren't widely separated. I tried Struve 1695 first. The two stars are separated by only 3.8", and I saw no hint of a double here. I went on to easier targets, Kappa and Iota Boo. These were, indeed, easier. White stars, widely separated, I had trouble getting excited over them as they resembled any other moderately crowded star field. I then hopped over to Omicron Sigma 123AB in Draco, a "striking object" according to the article. Frankly, I didn't see it as so striking – a pair of off-white 7th magnitude stars. Perhaps this is an object that needs a little more study, different magnification, or more aperture to bring out its character. I'll have to try it again some time, since tonight's view didn't "strike" me as anything special. As a finale for the evening, I turned the Astroscan toward Leo to once again check on M65 and M66. To my surprise I saw them both in the little scope. It took averted vision, wiggling the scope and a little bit of knowing where to look and what to look for, but sure enough they were there!

On April 14th it was clear throughout the day and I decided to do a little solar observing. There's been a good deal of solar activity lately, so I though I might see something interesting with the hydrogen alpha filter. A number of active regions were visible, so I decided to set up the Astrovid camera to view the image from the monitor. Everything was working and Laurie and I were enjoying the view from the living room, so I decided to set up the VCR and try to record what I saw. About the same time I noted a bright area near the limb of the sun accompanied by a grayish blur resembling a puff of smoke. Over the course of several minutes it became obvious that the "smoke puff" was moving, and it soon moved beyond the limb of the sun. Over about 30 minutes the ejecta covered about 6" on the monitor screen, equivalent to about 1/8 of the sun's diameter or about 100,000 miles! At the same time the active region again brightened substantially. Quite a show! According the NOAA website, what we had seen was a an eruptive prominence and a bright surge on the limb associated with a Class M (pretty big) X-ray flare, followed by a subflare (pretty small) with multiple eruptive centers. Alas, as it turns out the VCR was connected improperly, so I didn't record any of it. But we enjoyed the solar show while it lasted, and labeled the all the proper connections so the next time we'll be ready!

——— By Bob Titran ———

# ASTRONOMY DAY IS HERE !!!

**Where:** **The Beaver Meadow Observatory, 1610 Welch Rd. in North Java, NY**

**When:** **12:00 Noon until 11:00 PM Saturday, May 5, 2001**

**The Buffalo Astronomical Association invites you to join us for a day of fun under the stars as we celebrate Astronomy Day.**

**From noon until 5:00 PM, planetarium shows will be presented throughout the afternoon. A variety of kids' activities will include face painting, telescope treasure hunts, and building your own constellation projector. There will be a walking tour of a scale model of the solar system, where each step measures 6 million miles. A specially equipped telescope will allow us to scan the surface of the sun and look for sunspots. We'll also have demonstrations of our automated telescope, presentations highlighting visual astronomy, astro-photography, the problems of light pollution, and the contributions made by local astronomers to professional astronomical research.**

**At 7:30 PM evening activities begin, including talks and presentations by local amateur astronomers and viewing of the night skies through our 12" and 20" telescopes, some of the largest public telescopes in Western New York. This is a great opportunity to visit the Niagara Frontier's largest working astronomical observatory.**

**As most activities will be indoors, this is a rain-or-shine event. Lunch will be sold on-site, visitors are encouraged to bring a picnic basket and have dinner under the pavilion.**

## CIRCLE THURSDAY OCTOBER 4th ON YOUR CALENDAR

The BAA will have a combined meeting with the local chapter of the Institute for Electrical and Electronic Engineers , IEEE, to hear Dr. George Swenson speak. George Swenson is professor emeritus of electrical engineering and astronomy at the University of Illinois and a former member of the team for project Cyclops, the original SETI study conducted in 197 1. Professor Swenson also helped design the array of radio antennas in New Mexico, the Very Large Array, and travels to consult on other radio telescope projects. Dr. Swenson will talk about Radio Astronomy as a tool to listen to faint signals from the stars and perhaps to signals sent out by a civilization on a planet near one of those stars. This will be a dinner meeting; cocktails, dinner, followed by the guest speaker including questions and hopefully answers, with prior reservations required. The final site hasn't been selected yet, but is usually a local restaurant.

You might remember Dr. Swenson as the author of the article in Scientific American that paralleled the article published in the Spectrum by Rowland Rupp and Carl Klingenschmitt on SETI and the technical challenges involved in interstellar communications. It was through communications by Rowland and Carl that Dr. Swenson is coming to the Buffalo area as a guest of the IEEE. Being a recognized world leader in the field of radio astronomy Dr Swenson should be an exciting speaker and the combined meeting will be an excellent opportunity to look at another facet of astronomy. Stay tuned for final details as they develop.

## BOARD NOMINATIONS

**The election of three Board Members-At-Large will be held at the BAA's annual business meeting in June. The terms of Gene Belstraz, Alan Friedman and Bill Smith are expiring; some of them have expressed the intention of not seeking re-election. The newly elected members will take office September 1, 2001 and will serve a two year term. Bev Orzechowski and I have been appointed to be the Nominating Committee at the Board meeting of April 6. Anyone interested in running for this office should contact Bev (632-7091) or myself (839-1842). This is your chance to make a meaningful contribution to the continued success of the BAA.**

**—— Rowland A. Rupp ——**

## BAA ANNALS

by Rowland A. Rupp

**5 YEARS AGO** - "Origin of the Universe" was the topic given by Dan Hatton, a member of Jamestown's Martz Club, at our May 1996 meeting. In June we saw Carl Milazzo's wide angle astrophotos with landscape foregrounds, some of which have appeared in Sky & Telescope. Speaking of photographs, a picture of Comet Hyakutake by Dan Marcus and John Marino appeared in this SPECTRUM. Bob Titran reported on a highly successful two-day astronomy workshop held for the public at BMO in the preceding November. Several of our members participated with instructive lectures. Joe Orzechowski, Membership Chairman then, noted that the BAA had increased its membership by 18 during the period from 1991 through 1995. SPECTRUM editor Bill Smith wrote an article on comets - what they are - what to observe. He also had a brief note on aircraft designer Alfred William Lawson, a "part nut" who had some mighty peculiar ideas about the respiration of the Earth (yes - respiration).

**10 YEARS AGO** - At our May dinner meeting at the Lord Amherst we heard from Jack Mack on the Hubble Space Telescope. Ken Biggie presented the Dow Collection slides at the June 1991 meeting. The Dow Collection was donated to the BAA by Mrs. Jane Dow many years ago. They are largely superseded by our recent slide acquisitions, thanks to our grant. The May-June 1991 SPECTRUM was fairly packed with observation reports. It must have been pre-spring fever. Bill Smith reported on his Messier marathon held on March 17. Approximately ten members braved the 17 degree temperature to see 95 objects. Dave Fliss reported on several observations made from various locations in February and March. Frank Plennert observed eclipses and shadows caused by Jupiter's moons. Someone figured out that the origin of *Spy and Tell* was in the September 1966 SPECTRUM. No author was given for that first *Spy and Tell,* but Edith Geiger is almost certainly the culprit.

**15 YEARS AGO** - In May 1986 we held our dinner meeting at Moot Hall on the Buffalo State campus. Dr. Mark Shure was the speaker, but what was his topic? The first College of Fellows award was presented to Dan Marcus that night for his photography of Comet Halley from Australia. The June business meeting featured some short topics "to insure we have a good attendance". We had SPECTRUM articles on the comet by Ed Lindberg and a brief biography of Albert Einstein by Dina Adimey. Edith Geiger wrote a profile on Paul R. Noye, a highly talented member of the BAA until his death not long after the profile was written. Observation reports from Bob Hughes (sunspots), Michael Idem (Halley's Comet) and Carl Milazzo (BMO activities - Carl was Observatory Director). Ken Kimble was still heading up the Study Group and proposed having an introductory astronomy course as a program. It didn't work out then - would it now? An NFCAAA meeting was scheduled at the McLaughlin Planetarium in Toronto.

**25 YEARS AGO** - In May 1976 we met at the Fred T. Hall building at Beaver Meadow where Fred Price spoke on "The Norman Lockyer Observatory". In June we just had a business meeting without having a speaker to insure good attendance. A report in THE SPECTRUM on the newly opened BMO noted that it took about six months and $6000 to build. Observatory Director Tom Dessert was ready to check out prospective users, and BAA member Carl Kalweit had already begun a ten-week course on beginning astronomy at the nature center. Tom was planning a six-week course on astrophotography to follow.

**35 YEARS AGO** - Alan Gee spoke at our May 1966 meeting, held at the Museum of Science. His topic was the solar telescope and heliostat that were then being installed at the museum. The June meeting was business only. Up for election were: President - Ron Clippinger, Vice-President - Edith Geiger, Secretary - Richard Zygmunt and Treasurer - Paul Redding.

Rev. George Walker (a past BAA President) left as a bequest to the BAA his refractor telescope, a complete collection of Sky & Telescope magazines and an electrically operated constellation simulator, invented by him. A profile of Ed Lindberg was a highlight of the May SPECTRUM, but no author was credited. Sounds like Edith at work to me. Here's a note - Larry Hazel joined the Navy! The death of Grover Clippinger, Ron's father and a BAA member, was reported in the June SPECTRUM.

## SPY and TELL

by Edith Geiger

**Mark Swiderski** and **Neil Dennis** are looking forward to a great Public Night Season at Beaver Meadow Observatory, where they hope to have large turnouts. They will appreciate all the help they can get from our members.

**Roger and Michelle Whitfield** and their two children, Rachel 15, and Roger I 1, went on a winter weekend to an area a 1/2 hour ride above Toronto, and rented snowmobiles for a wonderful time together. Near the end of February they were at Maskoko Lake in Huntsville near Torrance Barrens Conservation & Dark Sky Reserve. They didn't go in, but were fortunate to see an aurora mixed with a few clouds in that very dark sky from outside the Reserve. Nearby is Echo Valley Observatory in a woods with a 3 story dome on a tower. Roger has brochures on this region that may be of great interest to our members. In April, son Roger, who is in 6th grade, invited his class and teacher to his home for a wonderous evening with Dad at the telescope.

**Hector Velasco** has been working at the Earthquake Center at UB for 14 years. He also does computer graphics at the university, and programs computers into making movies and animation for the Web.

**Martin Palys** is a pipe fitter who is employed at Joseph Davis, Inc. Heating and Refrigeration. He works wherever he is needed. At present he has been working at Roswell Park. Martin, his wife, Bridget, and two children Sarah 13, and Rachel 11, enjoy a happy family life. On February 9th, they went cross country skiing in Allegheny State Park. The temperature was a rare 63 degrees, but the snow was still there providing fun for all. The family also goes roller-blading and bicycling. Sarah, who is in 7th grade at Alden, is on the merit list. Bridget volunteered as a crossing guard for St. John's Religious Instruction.

During Easter break, **Tom Bakowski** and his parents went to Arizona for a great vacation, during which Tom checked out some amateur and professional observatories. They re-

**Continued top of next page**

turned April 19th.

**Tristan DiLapo** is enjoying his new SP-7 CCD, and is pleased with the fine results.

Congratulations to **Carl Milazzo** who, in February, received a blue ribbon in photography at a regional Astronomy Convention in Niagara Falls, Ontario, which involved clubs within a 50 mile radius of the area.

Though **Bob and Laurie Titran** have been enthusiastic cross country skiers near their home on Grand Island this winter, they are now looking ahead to the pleasures of this summer.

# STAR PARTIES !

Spring is finally here and it's time to think about getting out and observing. Star parties are a great opportunity to get out and meet other club members while sharing the fun astronomy has to offer. All club members are welcome to host their own star party. Star parties can be anything from a serious dark site observing get together, or the opposite extreme of a full moon barbecue. Club members can have them at Beaver Meadow, their homes, cottages, parks, campgrounds or any place they desire. Club rules indicate star parties must be held only on Earth. If anybody is interested, there are still many open dates this summer. Check your BAA calendar for the moon phases and any public night conflicts.
Contact Janice and Jeff Gardner at 639-0866 or MMDAWG@AOL.COM
Current star party schedule:

**April 21-22:** Last Chance Messier Marathon @ Cherry Springs, PA. *

**May 18-20:** MMMAA/BAA/ORAS Campout Weekend @ Cherry Springs, PA. *

**May 25-28:** No-Frills Star Party @ Cherry Springs, PA. *

**June 23:** Rowland & Irene Rupp Star Party Cottage # 316 Martin Lots @ Lime Lake, N.Y. (H) 839-1842 Party starts at 1:00pm. See map

**July 14:** Jack & Jayne Mack; 1 Hunter's Lane, Williamsville, N.Y. 14221 (H) 632-6210 Sheridan Dr. to the Village Green (between Hopkins Rd. & North Forest Rd.) left on Bridle Path, left into circle, house on left. Star party begins at 8:00pm.

**July 20-21:** Interclub Stargaze @ Cherry Springs, PA. *

**August 17-18:** MMMAA/BAA/ORAS Campout Weekend @ Cherry Springs PA. *

**September 14-16**:Black Forest Star Party *

* Contact: Tom Bemus (H) 386-7150 (W) 483-0343 e-mail: BEMUSABORD@ AOL.COM

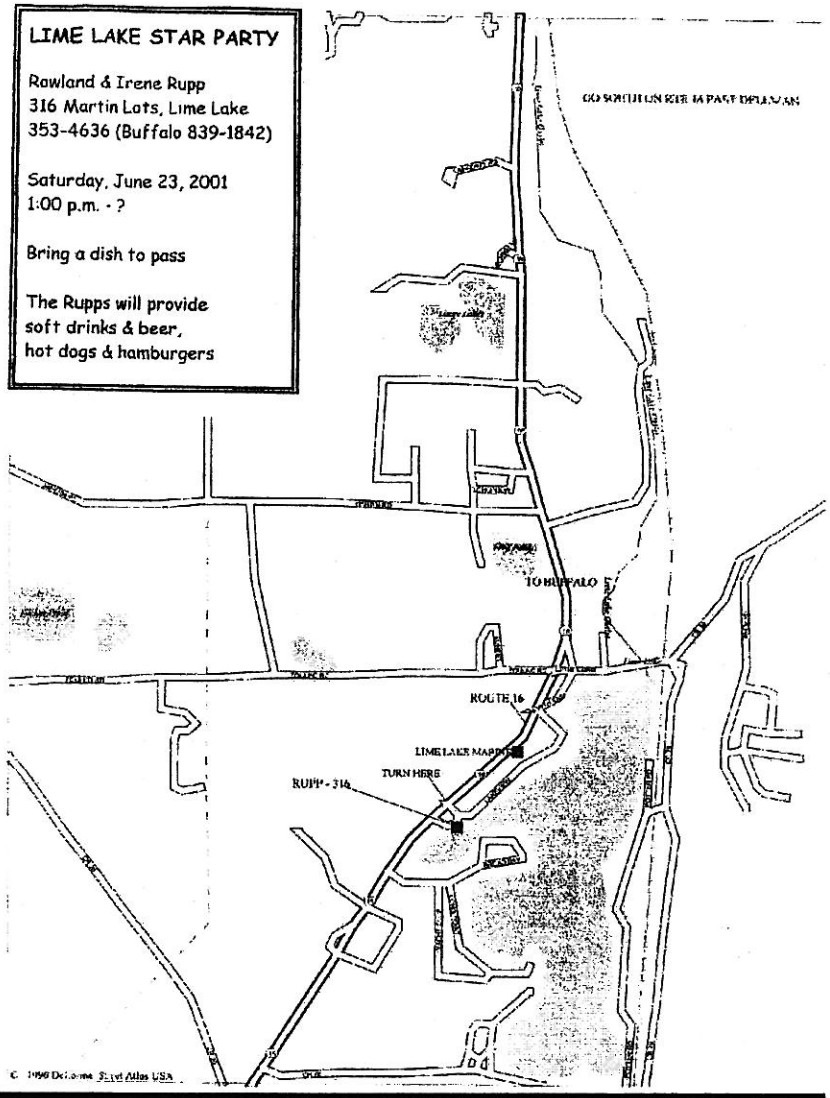
LIME LAKE STAR PARTY

Rowland & Irene Rupp
316 Martin Lots, Lime Lake
353-4636 (Buffalo 839-1842)

Saturday, June 23, 2001
1:00 p.m. - ?

Bring a dish to pass

The Rupps will provide soft drinks & beer, hot dogs & hamburgers




## OBSERVATORY NEEDS YOUR HELP!

**With two public night events scheduled every month from now through October , now is a great time to step up to the plate and give us a helping hand at these events. This is the perfect time of the year for any new club member to learn the "ropes " and gain the status of observatory user .Contact Mark or Neil or better yet just show up and introduce yourself. The experience you will gain is priceless.**

## BEAVER MEADOW OBSERVATORY

The observatory is open to " checked out" members any time. Call Neil Dennis (322-7596 ) or Mark Swiderski (535-0006) to get checked out. Public nights are held on the 1st and 3rd Saturday nights April through October. There is " members only" viewing after every public night. Help is always needed and appreciated for our public events. You don't need a lot of experience to help out. Stop by and be an "observer" and see just how easy it is. The "vets" will show you how.

# IF YOU WERE A GREEK- -

by Leslie Martin

Did you ever stop to think what you would know about astronomy if you lived in the past? We know so much about our subject today that it's not easy to realize how difficult it was for ancient astronomers to acquire just a fraction of that body of knowledge from the feeble lights seen in the night sky. In other articles we have imagined what it was like to be an Egyptian *(The Spectrum:* January-February 1998) or a Babylonian *(The Spectrum:* July-August 1998) astronomer; now suppose you were a Greek. What would you know then?

Greek astronomy, like Egyptian and Babylonian, had a long history. Thales, sometimes regarded as the father of Greek astronomy, is believed to have been born about 624 BC. Ptolemy, the final sage of Greek astronomy, died around 180 AD, nearly 800 years later. If we count back 800 years from our time, we arrive at the Dark Ages and the Crusades, long before the wealth of astronomical information we have today was even dreamed of. our recent burst of knowledge occurred incredibly more rapidly than it did for our predecessors.

Since the history of Greek astronomy is long, it will be divided into two parts, with the first part ending with the work of the great authority on all matters scientific, Aristotle. Maybe the title of this article should be If You Were a Greek - Part 1!

The record of Greek astronomy is fairly well known, although much of the work is either only a fragment of the original, or is a summary written long after the original by another author. It shows a progression of thought (with occasional reversals), which suggests that a chronological approach should be taken. Although the Greeks borrowed astronomical lore from the Egyptians and Babylonians they advanced the study markedly by introducing geometrical concepts in an effort to explain their observations or, as they put it, to save the appearances - that is, the appearances of the behavior of the objects of their study.

The shape and size of the Earth, was very unclear in the sixth century BC. Thales held that the Earth was shaped like a disk that floated on water. In that case the sun never passed under the Earth, it somehow found its way to the east each morning after traversing the surrounding sea. Living at about the same time as Thales, Anaximander asserted that the Earth was supported by air and was located at the center of the universe. Being equally distant from all the other objects, it was immobile. He imagined the Earth was shaped like a hockey puck and that we inhabited one of its faces. Although he concluded the stars were nearer to Earth than the sun, he at least believed that the sun could pass under the Earth at night, a conceptual improvement. Anaximenes, possibly a pupil of Anaximander, believed the stars were attached to a crystal sphere, and he clearly distinguished between the east to west daily motion of the stars and the slower general motion of the planets eastward through the stars.

Pythagoras of theorem fame, born around 572 BC, is credited with being the first to declare the Earth was spherical, a deduction he may have based on the observation that sails of ships are seen before their hulls as they come over the horizon, or from the observations that different stars are visible and others become circumpolar as one changes one's latitude.

The nature of the sun, moon and stars was utterly unknown. Some philosophers (in those days there were no scientists in the sense we know the word) concluded they were bodies composed of compressed air, clouds set on fire, or glowing stones. Their light emanated from vents shaped like pipes, while their shapes ranged from wheels to bowls. The turning of the bowl-like shape of the sun and moon explained eclipses. Parminides, early in the fifth century BC, is credited with possibly being the first to realize that the morning and the evening star (Venus) were one
and the same. Some also think he, not Pythagoras, was the first to conclude Earth was a sphere.

The real explanation of eclipses was probably first put forward by Anaxagoras, a slightly younger contemporary of Parminides. He is also believed to be the first to conclude that the moon shines by reflected sunlight. His conclusion that the sun was a red-hot stone and that the moon was made of earth got him into trouble. He was charged with impiety because the Greeks perceived that the heavens and everything in them were made of an ideal substance, the aether, that was unchanging and, unlike our world, incorruptible. Although he had the idea of eclipses more or less right, he was unable to explain the phases of the moon because since he believed the Earth was flat, he almost certainly concluded the same about the moon. You need a spherical moon to have phases.

Ideas about the location sequence of the objects seen were being formed during the fourth century. Plato describes the celestial bodies in terms of "whorls". Just what whorls are is debated among scholars: were they spheres, hemispheres, bands, rings, or what? Whatever Plato meant, they carried the heavenly bodies in the following order. outermost were the stars, then Saturn, Jupiter, Mars, Mercury, Venus, Sun, Moon, and finally, at the center of everything, the spherical, stationary Earth. With Plato the order of things are a bit scrambled from our perspective some twenty-four centuries later, but at least he had the stars farthest from the Earth, unlike Anaximander, a couple of hundred years before, who reckoned the stars were nearer than the sun. These whorls apparently had breadth. The celestial bodies traveled on the outer rim; the inner rim coincided with the outer rim of the next nearer whorl. The whorl of the stars had the greatest speed, turning once in 24 hours. Each interior whorl traveled more slowly, thereby accounting for the various eastward motions of the bodies of the solar system against the backdrop of the stars. No mention of retrograde motion is evident.

The Pythagoreans, later followers of Pythagoras's teachings, developed a more ingenious model - one in which the Earth was obliged to move in a spherical and finite universe. They conceived a "central fire" about which the Earth and a "counter-Earth" revolved. This central fire was not the sun, it was a fire that was always below our horizon, as was the counter-Earth, so neither could ever be seen. Above the Earth was the moon, then the sun, followed in some order (probably the same as Plato's) by the five planets and then the fixed stars. outside these fixed stars is yet another fire surrounding the universe which, apparently, also could not be seen by us. Why the counter-Earth? Most researchers think it was invented to explain why lunar eclipses occurred more often than solar eclipses. Not only did the Earth cast its shadow on the moon, sometimes the counter-Earth did so

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too.

Eudoxus was born around 408 BC. His development of a system of theoretical nested spheres was designed to provide a mathematical model that would describe the complex motion observed in the planets. Later, in the hands of Aristotle, it led to a physical description of the universe that would persist for nearly two thousand years.

An example of his nested spheres for the case of the moon is indicative of his methodology. The moon resides on the equator of its innermost sphere. This sphere turns at a uniform rate on an axis perpendicular to the equator. The poles of this axis are fixed to the equator of the next sphere outward. Similarly the poles of the second sphere are attached to the equator of the final sphere. All three spheres, rotating in different directions and at different rates, provide six variables, enabling a gifted mathematician to account for daily rotation, rotation backward through the ecliptic and finally to account for the inclination of the moon's orbit with respect to the ecliptic. Eudoxus also had three spheres for the sun, but required four for each of the planets to account for their synodic period (period from one orientation of the planet, the Earth and the sun to the next identical one) and their retrograde motion. In all, Eudoxus required 26 spheres, all centered on the Earth, to obtain a mathematical approximation of these motions, plus one more to describe the diurnal motion of the stars.

The system worked fairly well for Jupiter and Saturn, but was otherwise inadequate. Callipus is credited with adding seven more spheres to correct some of the problems, but one glaring one never went away. It was clear to any observer that the planets changed in brightness, evidence that sometimes they were closer than at other times. Also, some solar eclipses were total while others were annular implying that either the sun, the moon or both change size and, hence, have different distances at different times. Since all these spheres were concentric with the Earth no reconciliation for changes in distance was possible.

With Aristotle the mathematical model of Eudoxus and Callipus was transformed into a system of real, concentric, transparent spheres that transported the planets in their complex motions. For Aristotle the entire system was one big machine, where each sphere interacted mechanically with the others. This was no math model; this was the real thing. Aristotle concluded that each planet had to 'unroll' the motion of the spheres of the next more distant object. For example: the three motions unique to Saturn had to be unrolled so that the spheres for Jupiter could be defined. Saturn's diurnal motion was common to all the objects, so it didn't need unrolling. Adding up the spheres of Callipus and those needed for unrolling gave Aristotle a system of 55 spheres with which he approximated the motions of the heavens. Fifty-five crystal spheres of sublime material made up the Greek universe.

So, what would a Greek astronomer of the fourth century BC know? First of all, if he were to use Aristotle's mechanical universe, he had better have a flair for mathematics. (I used the "he" instead of "he/she" or "person" because I don't think political correctness of this kind was known in the fourth century BC.)

Much else had been determined, some by Aristotle, some by others, some right, some wrong. The motion of all these perfect and immutable crystal spheres was circular because that motion is also perfect. The Earth is spherical, so is the moon, so are the stars, so is the whole universe, because the sphere is the perfect solid. Since the moon only reflects sunlight, one could explain its phases and the causes of eclipses. Stars shine because of air friction as the motion of the outer-most sphere carries them on their daily course. (No one knew the atmosphere was confined to the Earth's surface in those days.) Meteors and some comets are exhalations of the Earth that somehow ignite. They must be below the moon, that is, near the corruptible Earth, otherwise they would have to cross the crystal spheres - a clear impossibility. The Milky Way is an exhalation of the stars (so are some comets, surprisingly) that is set on fire because of the revolution of the sphere of the stars. The Milky Way does not appear among the zodiacal constellations because the sun and planets move in this path (the ecliptic) and sweep it clean of exhalations.

Not bad progress for about two centuries of thought. Thought was the Greek way. One reflected on how appearances could be explained. The idea of testing hypotheses lay far in the future. They did discover the shape of the Earth and the moon, could correctly explain some mysteries like phases of the moon and eclipses, and crudely made predictions of planetary positions with Aristotle's spheres, even if their changes in brightness remained a mystery. The centuries that were to follow led the Greeks to make preliminary determinations of sizes and distances, and to refine further Aristotle's construction. But that's another story.

## African Solar Eclipse Viewer Project

At the annual Banquet the BAA took up a fundraiser for solar eclipse viewers for several mission stations in Zambia, the safest nation to view from with typically 90 - 95 % clear sky conditions. After several contacts and e-mails I located a missionary who will be returning to Zambia in early May who has agreed to carry over a quantity for the school and mission stations in Chitokoloki, Chavuma, and Kopombo, all villages within the totality path spelled out in Fred Espenaks excellent eclipse prediction booklet from Washington.

The region is farthest west in Zambia, south of the eastern extension of the mid-Angolan border. Childrens and medical work have been going on there for scores of years, perhaps over 100 in Chavuma and nearly as long in the other two villages. We will hope to get some photos and comments from the Africans and missionaries from the approach, duration and exit of totality, both in terms of astronomy, meteorology, (temperature changes, that is, not clouds), and animal monitering if possible.

Bill Aquino and I presented the idea to the Directors in winter. Id like to thank those who approved this project, and the great support of all those who gave towards the viewers themselves. We purchased 500 from American Paper Optics in Bartlet Tenn. I'm hoping we can get all taken over on that May flight. I ran a similar observation at Frontier High during the Annular eclipse of the 90s, and sent some to Colombia S.A. for the most recent total eclipse there, (Jan or Feb 2000 ?) and that met with great response so I m looking forward to the results from this project too with great anticipation.

The same day and week this occurs, June 21, 2001 there is a solar boat derby sponsored in part by UB and the

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Mus. Of Science, at Hoyt Lake, Delaware Park. They have boats over 20', up to 30 mph. It s a National competition of solar powered boats fought by engineering students. Hope for clear skies in BOTH places !

—— Jim Lehmann ——

## BAA WEB SIGHT

**Tom Bemus and Bill Smith put together a new club web sight at : http://members.aol.com/BuffAstro/**

## MEETINGS

**Baa Meetings are held on the 2nd Friday of the month from September to June in the New Science Building on the Buffalo State College Campus . Meetings start at 7:30 pm and all members and guests are encouraged to attend.**

## INTER – CLUB COMMUNICATION

An email group for communications within the BAA membership and friends. This was developed by Dennis Hohman and is restriction by invitation only (ie. BAA members). Available services include e-mail to the whole group or any member; review the history of messages (900+ in 5 months); view/post items to the calendar of events; and view/post items to our own storage area of files. You can be alerted for spur of the moment viewing, auroras or just take part in lively discussions of any astronomical nature.

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You can even query the 39 group members (at once!) to see if anyone is going to the observatory or to get a question answered. There are options when you sign up whether you get every e-mail message in its entirety; just a summary once a day or you can review the messages right from the e-group site by book marking: buffalo_astro_assoc@egroups.com which I prefer to do.

Bill Smith

NEWSLETTER OF THE BUFFALO ASTRONOMICAL ASSOCIATION INC.

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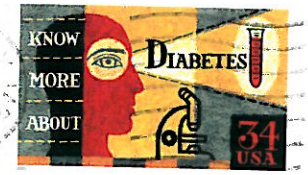


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