

THE SPECTRUM

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Observing Occultations from Beaver Meadow Observatory

To occult means to hide from view. Astronomical occultations occur when an intervening object, as seen from Earth, blocks the view of a celestial body. The occultation of distant stars by bodies within the solar system is the most common occultation event. Three types of stellar occultations which are typically observed by amateur astronomers include planetary (which are rare), asteroid (difficult to observe), and lunar (relatively common). Stellar occultations demonstrate the motions of solar system bodies and are a joy to observe, especially when a bright star is involved. These observations can also be an important scientific tool for learning about the occulting bodies as well as the stars that are occulted.

A great deal has been learned about planets in our solar system by carefully observing their occultation of distant stars. A planet's atmosphere causes the stars disappearance and reappearance to occur gradually. The rate of change in the star's brightness is related to the atmosphere's temperature and composition. Also, if a planet has rings or other nearby debris, their extent and transparency can be determined. The rings of Uranus, the ring-arcs of Neptune, and the atmosphere of Pluto were all discovered by occultation observations.

Stellar occultations by asteroids are an important means of determining the asteroid's size and shape. This is a far more accurate measurement method than any other earth-based technique. Observing asteroid occultations requires a team of amateur astronomers spread out in a line perpendicular to the asteroid's expected shadow path. As the asteroid passes through the line of sight from the observers to the distant star, the times of the star's disappearance and reappearance are recorded. This information can then be used to determine the profile of the asteroid, with the profile's resolution limited only by the number of amateurs participating in the observation. However, because of an asteroid's small size and great distance from Earth, its occultation is visible from only a narrow (few tens of miles wide) strip on the Earth's surface. To complicate matters, the exact location of the shadow path is difficult to determine because of uncertainties in the star's exact position as well as the asteroid's orbit. Asteroid shadow paths are sometimes found to be shifted several "path widths" from their expected locations.

Because of the lack of a lunar atmosphere, the more common lunar occultations are seen as almost instantaneous phenomenon. They help to refine our estimate of the moon's orbit and the shape of its profile. Improved knowledge of the lunar profile is useful in determining the sun's diameter from solar eclipse records. Measuring variability in the solar diameter may shed new light on Earth's global weather patterns. Lunar occultation observations are also useful for detecting double stars and measuring their separations, in some cases to within 0.02 arc-seconds. Measurements of binary stars with separations in this range are useful because they "fill in the gap" between separations that can be observed visually and those which require spectroscopic observation.

Stellar occultations have also played an important role in helping to discover some of the basic principles of astronomy. One such example is the discovery of proper motion, which is best described in the following excerpt from Burnham's *Celestial Handbook*, Vol. III, p. 1810:

One of the "classic" occultation's of Aldebaran was that seen at Athens in March of 509 AD; in studying the records of this event more than a thousand years later, Edmund Halley concluded that the phenomenon could not have occurred unless the position of Aldebaran had been several minutes of arc further north at the time. From a comparison of his positions with those reported in ancient records, Halley found that Sirius, Arcturus, and Aldebaran had measurably changed their positions since ancient times. Halley, in 1718, announced the discovery of what we now call proper motion.

Observing the lunar occultation of celestial radio sources has been useful in determining the accurate position

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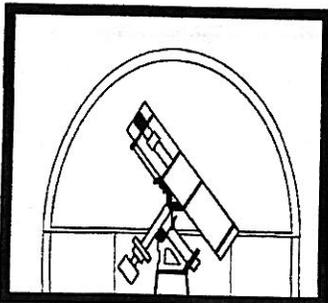
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BAA OFFICERS

President — Daniel Marcus
phone 773-5015

Vice President — Dr Jack Mack
phone 632-6210

Secretary — Joe Orzechowski
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Treasurer — Bev Orzechowski
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Bill Smith , phone 664-0841

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OBSERVATORY**DIRECTORS**

Neil Dennis — phone 322-7596

Mark Swiderski, phone 535-0006

MEMBERSHIP**DIRECTORS**

Tristan Dilapo —phone 941-5613

Alan Friedman—phone 881-4310

SPECTRUM STAFF

Tim McIntyre - Editor/circulation

Cheryl McIntyre - Co Editor

Phone -632-3172

Ella Abate Circulation 773-2398

**SPECTRUM
SUBMISSIONS**

Submissions wanted for publica-
tion 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 May/ June
ISSUE IS April 15**

Occultations cont.

as well as the angular size of these objects. An important breakthrough occurred in the study of quasars (quasi-stellar radio sources) during the early Sixties when the optical counterpart to radio source 3C-273 was located during an occultation observation. As the Moon occulted the mysterious radio source on August 5th 1962, its exact position was determined. An unusual 13th magnitude star-like object was then found at this position, thus permitting the detailed study of 3C-273 at wavelengths other than radio and allowing astronomers to gain a much deeper understanding of the true nature of quasars.

Occultations are fascinating astronomical observations, but to be of scientific value an observation needs to be timed as precisely as possible and the observer's latitude, longitude, and altitude need to be known exactly. The International Occultation Timing Association (IOTA) is the clearing-house for amateur occultation observations and analysis. Their standards for "scientific grade" observations are a timing accuracy of one-tenth of a second for planetary and asteroid occultations and just several hundredths of a second for lunar occultations. In addition, an accuracy of 30 feet in geographical position as well as elevation is required for all types of observations. Accurate timings are easy enough to acquire using time signals from a short-wave radio tuned to one of the many "time" stations. Accurate geographical positions, however, are an entirely different matter. It is not an easy task to learn one's exact geographical position to within 30 feet of accuracy — Earth is a "big" planet.

Amateur observers currently use two primary methods for determining their geographical position: (1) consulting a USGS (United States Geological Survey) topographical map and measuring the coordinates of the observing site on the map, or (2) by using a Global Positioning Satellite Receiver (GPS) to determine their position directly. Both of these methods have their own advantages and disadvantages, which are discussed below.

Topographical maps can be obtained at a reasonable cost from the USGS for any area in the country. Measurements of longitude and latitude made on the maps, however, can be very difficult. Using the smallest scale maps available will require sub-millimeter measurements in order to meet the IOTA standard. Such measurement accuracy is technically possible on a printed map but is difficult to make and thus prone to error. Any coordinates based on this method would at best be an estimate. On the brighter side, the USGS topographical maps do in most cases provide an accurate enough altitude value.

The second method for determining one's geographical position involves the use of a GPS receiver. In addition to their small size, portability and high degree of precision, GPS receivers have dropped dramatically in price over the past several years. With entry level models selling for under \$100, they are now truly affordable for the amateur astronomer. An excellent overview of determining one's geographical position using a GPS receiver is discussed in an article titled "For a More Precise Position" in the September 2000 issue of Sky & Telescope magazine and was the inspiration for this article. As it turns out, a single, short-term GPS reading taken at an observing site would only have longitude and latitude accuracy of about 60 feet, which is short of the desired IOTA standard. However, by averaging multiple readings over a longer period of time an accuracy of approximately 6 feet (an improvement of one magnitude) can be obtained. Unfortunately, GPS altitude measurements are less precise and can vary by as much as 75 feet.

As a service to the club, the authors decided to try and determine the exact coordinates of several observing sites at the Beaver Meadow Observatory using a Magellan Model 315 GPS receiver. Three "observing sites" were chosen at the observatory including the 12" Newtonian, the 10" LX200 pier, and the center of the concrete pad as shown in Figure 1. In addition, a fourth site was added at a later time (some distance from the observatory building) to serve as a comparison measurement. Figure 1 also shows the actual measured distance in feet between each of the four sites. A tape measure was used for these measurements to help insure accuracy.

Following the suggestions listed in the Sky & Telescope article we made a total of 39 measurements with each measurement consisting of 5 minutes worth of short-term readings averaged together. Fortunately the Magellan model 315 has an "averaging" mode so we could simply place the receiver on the site and walk away. After 5 minutes passed the averaged value from the GPS was recorded in a log and the receiver was rotated to the next site. This process continued for 3 hours and 15 minutes. The results of the 39 measurements are listed in Table 1.

At this time we have no way to verify the absolute accuracy of any of these measurements because no accurate reference exists in the area of Beaver Meadows to compare against. We can, however, judge

Continued next page

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.

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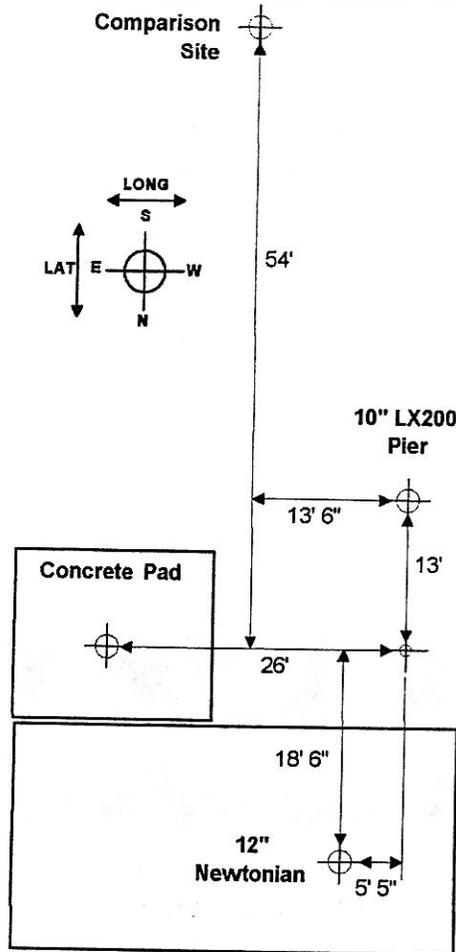


Figure 1

Position	Latitude (degrees)	Longitude (degrees)	Altitude (feet)	Number of Measures
12" Newtonian	42 40 22.1	78 23 2.7	1512	12
Concrete Pad	42 40 22.0	78 23 2.4	1510	13
10" LX200	42 40 21.9	78 23 2.7	1515	14
Comparison Site	42 40 21.4	78 23 2.6	1469	3*

Table 1: Observing site averages as read from the GPS.

Note: One tenth (0.1) of a degree in latitude or longitude equals 10 feet.

* Each measurement consisted of 60 minutes of short-term averaging.

Source	Latitude (degrees)	Longitude (degrees)	Altitude (feet)
Posted at Observatory	42 40 20.0	78 23 7.5	Not Available
Topographical Map	42 40 25.9	78 23 4.9	1508
From Internet Website	42 40 22.0	78 23 2.0	Not Available

Table 2: Other sources for BMO coordinates.

Note: One tenth (0.1) of a degree in latitude or longitude equals 10 feet.

the relative accuracy of these measurements by several means, and in so doing we can build a level of confidence in the data.

Comparing our GPS measured values against values from other sources verified we are in the right "ballpark". Three other sources are available including the value already posted at the observatory, one from an Internet website, and finally a measurement made on a topographical map. The values gathered from these sources are listed in Table 2.

The value posted at the observatory is from a tag located on the door between the computer room and the telescope room. It is our understanding that this measurement was done some years ago with a GPS receiver. Although we do not know any of the specifics regarding the measurement procedures used, we assume the measurements were done in a careful manner and that the values are reasonably accurate. The topographical map values were measured as carefully as possible with an accurate millimeter ruler. Values from the Internet website are remarkably close to the GPS measured values. However, IOTA claims that Internet website's are NOT capable of producing accurate results reliably. Therefore, either the Internet data was accurate and reliable in our particular case, or the GPS data is somewhat "off" and happens to coincide with the Internet values by coincidence. In either case, the data shown in Table 2 verifies that the GPS measurements are indeed in the right "ballpark".

The second way we evaluated the GPS data was to compare it against itself and the physical measurements between the observing sites. Figure 1 shows that the distances between the three sites in latitude are large enough to show up in our data. Likewise, in the longitude direction the measured distance between the concrete pad and the 10" LX200 is also large. The 12" Newtonian and 10" LX200 sites are too close to-

gether (55") in longitude to be resolved by the Magellan GPS receiver. Careful scrutiny of the values listed in Table 1 shows that the "trends" are there. The latitude values increase between the three sites in a south to north direction as expected. Also, the longitude values increase (east to west) between the concrete pad site and the 10" LX200 site. This is an important result and boosted our confidence in the GPS values.

As a final test of the GPS data we decided to make an additional trip out to BMO for a "comparison" measurement. The position we chose is shown in Figure 1 and the results of the measurements are listed in Table 1. As with the observing sites, we have no way to determine the absolute accuracy of the comparison measurements, but instead were trying to see if this measurement would also fit the "trend". The comparison measurements were done as carefully as possible. They took place a week later when the ambient temperature was considerably different. They were taken some distance from any large metal objects or buildings. Each measurement was a 60-minute average of short-term readings and the GPS receiver was moved as little as possible between measurements. An unobstructed view of the horizon was achieved and at least 8 individual satellites could be "locked-on to". We also used fresh batteries just in case. The results came out as expected, with the comparison site matching the trends demonstrated by the observing site data. With this additional check completed our confidence in the GPS measurements of the three observing sites is now quite high.

The values listed in Table 1 for the three observing sites are about as good as we can reasonably get them. We recommend that any club members observing occultations at Beaver Meadow Observatory use these values for their geographical position, at least until such time as someone can come up with values having a higher level of confidence.

As mentioned previously, it is not easy to know one's position to within 30 feet of accuracy.

In addition to the latitude and longitude values, an observer must also know the altitude of the observing site to within 30 feet. The only source providing a reliable value was the topographical map, which listed BMO at 1508 feet above sea level. It should be noted, that although altitude values for the three observing sites listed in Table 1 are very close to the value from the topographical map, the altitude value for the comparison site differs markedly, and thus calls into question all of the GPS altitude measurements. Further investigation of GPS altitude measurements is therefore warranted. We will be conducting further testing in the future and will report the results at a later time. In the interim, and because all three of the observing sites are within several feet of each other in altitude, we recommend that the value of 1508 feet be used for all three observing sites.

There will be many noteworthy occultation events visible from Beaver Meadow Observatory during the next year, including lunar occultations of fairly bright stars, several planets, and some open star clusters. An article that summarizes these opportunities appears in the January 2001 issue of *Sky & Telescope* magazine beginning on page 117. In addition, there are always at least a half dozen lunar occultations of lesser magnitude stars visible from the observatory each month throughout the year.

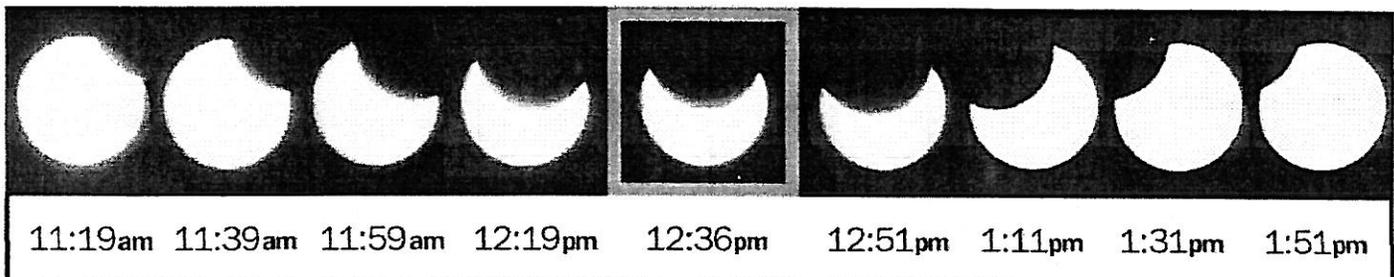
The authors encourage all members to come out to Beaver Meadow Observatory and join in our efforts to observe these fascinating astronomical events. With our geographical position now pinpointed, and with accurate timings, we hope to be making regular submissions to IOTA and further contribute to the "science" associated with amateur astronomy.

Mike O'Connor and Bill Aquino

Dec. 25, 2000 **eclipse**

D=3.8, 1/2000s on 100sp B&W

Photo sequence by Tom Bakowski



11:19am 11:39am 11:59am 12:19pm 12:36pm 12:51pm 1:11pm 1:31pm 1:51pm

CHRISTMAS ECLIPSE

by Rowland Rupp

I don't know how well the solar eclipse of December 25, 2000 was seen in Buffalo, but Irene and I managed to see it from our vantage point near Portsmouth, New Hampshire while we were visiting our daughter, Patty. The skies were pretty bad, being partly covered by thin clouds that sometimes blocked the sunlight altogether. Fortunately at other times the sun was seen relatively clearly. We used a small two-inch homemade refractor with a homemade filter to make the observations. We also had hand-held filters for naked eye observing.

Observations were pretty brief. The temperature was in the single digits, and a strong breeze added to the discomfort. The eclipse started sometime after eleven in the morning when a small nip was taken out of the sun. A couple of poorly seen sunspots were evident in the telescope.

Irene and I both observed around 12:30 PM. She concluded that the moon covered 45 to 50% of the solar diameter; I estimated between 40 and 45%, but nearer

the larger number. At 12:45 I braved the cold again and estimated that the coverage was a little greater than earlier, somewhere between 45 and 50%, but closer to the former. According to the December 2000 *Sky & Tel*, maximum was scheduled at 12:52 in Boston, (12:36 in Buffalo). Boston and Portsmouth are nearby and at nearly the same

longitude, so they should have had about the same timing and degree of coverage. We may have missed maximum by a couple of minutes. That evening a Boston TV station reported 46% coverage, so our estimates were pretty good - assuming 46% coverage meant 46% of the diameter was covered. According to my calculation, about 35% of the sun's disk was obscured by the moon.

I took a couple of 200mm photos on a tripod - no candidates for *Sky & Tel*'s "Gallery" there. All in all, this eclipse was somewhat less satisfying than the total eclipse seen from a cruise ship in the Caribbean in February 1998.

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.

AS THE WORLDS TURN

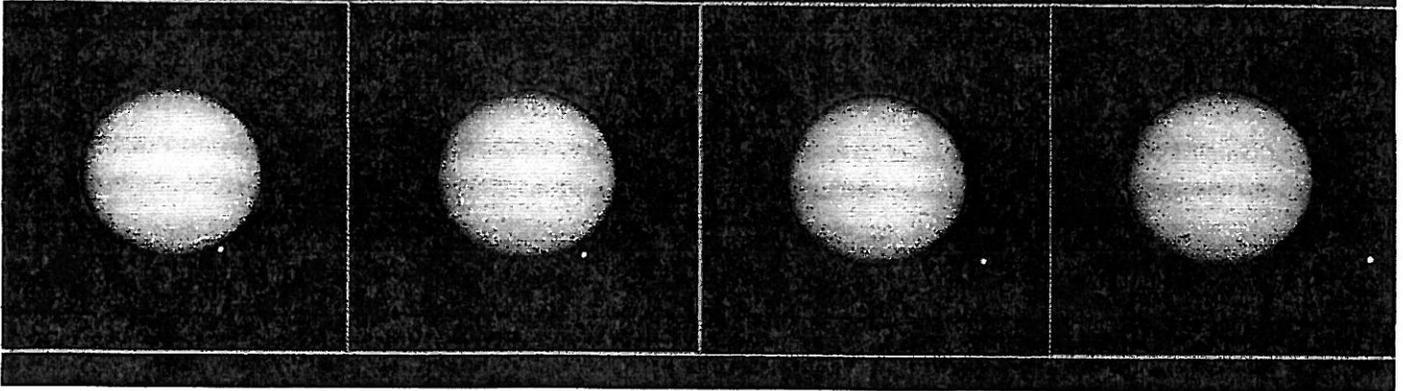
by Alan Friedman

12:20 am

12:33 am

1:24 am

2:17 am



In these days where glorious images of the universe from the Hubble Space Telescope are available for a casual glance on the World Wide Web from the comfort of our warm homes - what is it that keeps the dedicated observer up late at night, out in the freezing cold, looking at (or searching for) dim views of the same objects in our small amateur telescopes? My answer would be that this direct view - whether through telescope, binoculars or the naked eye - is a live, real time view - and, like the theatre compared to A&E, nothing beats seeing it live.

So what can be experienced in this live view that can't in a spectacular photo. Numerous things, not the least of which is the beauty of the outdoors - but among my favorites is the ability to see stuff move. But although nothing we view through the telescope is still and motionless, much of this motion is so distant that changes in structure and position happen too slowly to observe in a lifetime, much less in an evening. Imagine trying to observe the orbits in a binary star system - fast moving pairs have orbital periods measured in years, slower ones in thousands of years. Variable stars might get some votes. We can easily experience the rotation of our earth - but I will pass on this since we spend astronomical amounts of time lubricating our dobsonians and fine tuning our equatorial mounts just to cancel out the effects of movement in our home base. We can watch the movement of sunlight and shadow on lunar crater walls and mountain tops as the terminator progresses across the surface of the moon. Occultations of bright stars by the moon or other solar system satellites are another opportunity - but these are events that happen infrequently. My top choice would be Jupiter and its Galilean moons. When Jupiter is visible in the night sky, the rotation of its disk with the many features visible within its cloud belts and the orbit of its four brightest moons is nightly theatre of the highest order. The photo shown above records the activities of two hours of observation this past Halloween night. The moon emerging from behind the planet is Ganymede - largest of our solar system's planetary satellites with a girth of 5262 km - one and a half times as large as our moon. And does it move! Traveling in an ordinary path almost three times as far from it's planet's center as the moon, it completes an orbit in just seven days. It zips along at almost 40,000 km/hr compared to our moon's turtle's pace of 3700 km/hr. (lo - the closets of the four visible moons and more than halfway closer to the planet's center orbits in less than two days at 61,000 km/hr!)

The movement of this moon as it emerged from behind the planet on the morning of November 1 was discernible to my eye in much the same quality as the movement of a minute hand on a standing hall clock. The most dramatic moment occurred as the moon first peeked out - first a pimple, then a bud, then the thinnest line of space separating the two disks. This experience is quite different from a stellar occultation, because the moon presents us with a disk (albeit a tiny one at a little more than an arc second) rather than a point source of light. It doesn't blink in and out like a star. The movement of Ganymede through the sky on this night was at the rate of an arc second every 4.8 minutes. The rotation of the planet presents to the eye at approximately the same speed. Once the red spot becomes visible, it moves across almost half of the Jovian disk (48 arc secs in diameter) in two hours. (Imagine having a summer home beneath this Jovian storm which has been raging nonstop for at least 300 years.) The astro-photography technique of stacking multiple high resolution CCD shots to increase the quality of image is very difficult to achieve with Jupiter - sequential images show noticeable movement in just a few minutes.

Show times of the daily performances of Jupiter and its moons are superbly recorded in Sky and Telescope. Remember to subtract 5 hours from Universal Time to get to Eastern Standard Time. You will find an interesting happening almost every night - eclipses, transits, satellite shadow transits, conjunctions, the Great Red Spot... The movement of the satellites against the dark of space can be traced in binoculars and telescopes of all sizes. I can observe the red spot on a good night with my 4" refractor - though it shows more noticeably in my 6" reflector. Pull up a comfortable chair and enjoy the show from the cheap seats - you're less than 400 millions miles from the stage!

EDUCATION PROGRAM

by Rowland Rupp

The BAA is still plugging away at its in-school lectures program. Since its inception in 1997 we have given 43 talks to more than 2100 students. We are still looking for other BAA members to join in this program with their own topics. Our program is aimed at students from 5th grade up through 12th. If you're interested in participating, contact me at 839-1842.

Those of us who do it find it's great fun to interact with the kids. The BAA benefits directly because the grants we have won and those we seek often depend on our ability to provide service to the community, and everybody is impressed when you outreach to kids. Also, if you have children in school, please let the schools know of our program, and ask them to contact me for more information.

On February 1st I spoke to about 24 Earth Science students at West Seneca East High School on one of my favorite subjects - Extraterrestrial Life. I covered topics including UFOs, SETI and the Martian meteorite purported to contain fossils. Before I gave the talk I

ook a written survey of the kids to assess their pre-conceived notions about these subjects. I thought you might find the questions and the results informative. Here they are:

Do you believe that Unidentified Flying Objects (UFOs) spacecraft piloted by alien beings? Yes - 8 No - 12

Have you ever seen a UFO? Yes - 0 No - 20

Do you believe that intelligent beings live on other planets in our solar system? Yes - 6 No - 12

Do you believe that intelligent beings live on planets orbiting other stars? Yes - 10 No - 7

Do you believe that we will detect the presence of alien beings in your lifetime? Yes - 9 No - 10

Do you believe that we will be able to communicate with alien beings in your lifetime? Yes - 6 No - 14

If you're wondering why the results add up to only twenty re-

Continued page 10

BAA ANNALS

by Rowland A. Rupp

5 YEARS AGO - The coming of Comet Hyakutake in March 1996 made headlines in THE SPECTRUM. Not much information, other than a sketch of its daily position, was reported; it came on pretty suddenly. It was predicted to be the best comet since Comet West in 1975. April's meeting was to be "Astronomy on the Internet" by new member Richard Jones. THE SPECTRUM doesn't tell about the March meeting, but I know what it was. It was !! I spoke on astronomical hoaxes at our annual dinner meeting held at Ilio DiPaolo's restaurant in Blasdell.

Citing work and family commitments, Terry Farrell resigned as BAA President. Vice-President Bob Hughes served out the remainder of Terry's term. Carl Milazzo wrote an article for THE SPECTRUM giving advice on how to find isolated, dark, wind free sites for observing. I wrote a book review on Edwin Hubble, and after re-reading my report remembered how thoroughly I enjoyed *Edwin Hubble, Mariner of the Nebulae*, by Gale E. Christianson. Edith Geiger wrote a profile of Beverly Orzechowski. Joe Orzechowski gave some tips on how to write SPECTRUM articles relatively painlessly. The observation of a "glory", seen during a flight to Indianapolis, was reported by Laurie and Bob Titran.

10 YEARS AGO - Computers was also the topic at our March 1991 meeting, when members were asked to bring in their computers and explain how they used them. At the April meeting Joe Cardin spoke on his work at Moog on NASA's Observatories Program. Ed Lindberg's *Instrument Notes* reported on the activities of the Instrument Section, and recalled some past accomplishments of that long-running group. Darwin Christy contributed his *ASTRONOMER from the PAST* and a couple of *Ancient Constellations*. The death of honorary member, Jane Dow, was reported.

15 YEARS AGO - Comet Hyakutake may have caused a stir in 1996, but Comet Halley created more excitement for its 1985-1986 apparition. Hyakutake was more spectacular, but Halley was a lot more famous. observation reports of Halley were made by Michael Idem and Carl Milazzo.

In March, Philip Hronberg from the University of Toronto spoke on galaxy M82. Details of Voyager's encounter with Uranus was presented jointly by Marilou Bebak and Ernst Both at our April 1986 meeting.

Michael Idem, a dedicated and knowledgeable observer, wrote

an article for THE SPECTRUM on "The Effect of Atmospheric Turbulence on Telescopic Magnitude Limits". He concluded a 16"-18" aperture for 80% of the time its magnitude reach would fall only 0.4 magnitude short of a 19 inch!" (sic) President Ken Biggie reported that we had two shopping mall shows scheduled for Spring: one at McKinley Park with John Yerger in charge, the other at Eastern Hills, headed by Doris Koestler. Rowland Rupp wrote an article on Comet Kahoutek, whose 1973 apparition was very disappointing after all the hype that preceded its arrival. The coming of Halley's Comet inspired the comparison, although Halley's showing was expected to be poor well in advance.

25 YEARS AGO - Fred Price was our speaker in March 1976. He spoke on "The Bright Ray Systems of the Moon". Fred subsequently wrote a book on lunar observing. For April we headed to Rochester's Strasenburgh Planetarium, where we paid the munificent admission charge of \$1.75.

Most of THE SPECTRUM was devoted to Bill Deazley's article on projects to pursue at the newly completed Beaver Meadow Observatory. His suggestions included obtaining a blink comparator, an image intensifier, a photoelectric photometer, a photoelectric guiding system, an offset guiding system and, back in 1976, even a microprocessor. For those of you who don't know, or haven't guessed, Bill was an accomplished electronics engineer. He worked at Calspan and was one of the guiding lights in designing BMO. Bill died a couple of years ago.

35 YEARS AGO - Leslie Stoklosa and Paul Redding were our speakers in March 1966. Leslie spoke on mirror grinding, while Paul's topic was the search for Dr. Van Duzee's 13-inch refractor, the largest in the world at the time, that had been located in Buffalo. There were multiple speakers in April too: Ernst Both on "Activities on the Sun", Walter Semerau on "Completion of my Rich Field Telescope", Rudolph Buecking on "Construction of Eyepieces" and Ed Lindberg on "Observatories of the Northeastern United States". All four were the first members of the BAA's College of Fellows. They were inducted in 1964, and were the only members at the time of these talks.

Darwin Christy started an article in the March SPECTRUM on eyepieces, and concluded it in the April issue. THE SPECTRUM was published monthly by Dick Zygmunt in those days. Bruce Cook was editor.

SPY and TELL

by Edith Geiger

On Christmas Day several of our members saw the partial eclipse of the Sun : **Gene Witkowski** used binoculars with solar filters to view the event from his back yard. **Alan Friedman** hooked up a video camera to a solar-lensed telescope and watched the images on a television screen from inside his home. He was very impressed by the silhouette of the lunar mountains on the the moon's edge.

On January 9th, **Marilou Bebak** and **Ernst Both** appeared on Channel 4, discussing the closing of the Museum's Kellogg Observatory on January 12th because of the dangerous condition of the dome, and the needed repairs to the telescope. A photo of Ernst with the telescope was published in the Buffalo News along with comments by Ernst and museum president, David Chesebrough. Another article on the observatory closing was in the Museum's *Collections & Events*, January February 2001. Ernst has been invited to go to California in April to give three lectures on boletes, All expenses paid.

Jayne Mack, who has been a teacher in Williamsville East High School since 1978 is planning to retire in June. She had teacher certification in both English and history.

On January 27th, **Dan Marcus** and **Rowland Rupp** gave talks on astrophotography to the Park-way Photography Guild at the School of Horticulture outside of Queenston, Ontario.

Former BAA president, **Ken Biggie**, is a permanent sub at Orchard Park High School. Ken and Diane enjoy being grandparents to son, Kevin and Nicole's three children.

On February 8th, **Rowland and Irene Rupp** arrived in the Caribbean, and enjoyed visits to Aruba, Columbia, Antiqua, and Costa Rica.

Marilou Bebak has received a grant from Cornell to write a high school biology lab book on the West Nile Virus.

On page 95 in the March issue of *Sky & Telescope*, you will find three of **Carl Milazzo's** astrophotos: Fort Niagara, Amateur Dome Observatory at Queenston, Ontario, and a cemetery in Medina with the Big Dipper in the background.

The **Astronomy Book Club's** main selection for March is the second edition of The **Planet Observer's Handbook** by **Fred Price**. A picture from the book is on the cover of the leaflet, accompanied on the inside with a write-up of the book.

Larry Carlino retired recently from Williamsville South after many years of teaching English, along with a course in astronomy with interesting projects for his very appreciative students. Retirement will give him more time to enjoy Shakespeare, one of his special interests; plus writing poetry and novels. He is now working on a novel which he hopes to finish in the next two years. He has also written some short stories which he will continue to do. Larry will be able to work on his astronomical pursuits late at night without having to worry about getting up early the next morning. Music plays a very important part in his life, with his great love of classical music, especially orchestral, concerti and opera, and in addition, his vast record library. Besides academic teaching, he was a soccer coach, and was involved in indoor and outdoor track. He has been a running enthusiast for many years and continues to be. He also enjoys golf. What a wonderful, exciting future ahead!

The **Sigurdsons** are involved in many activities. Lynn is competing in the Niagara Invitational Figure Skating Competition held at Buff State in late March. Daughter, Hannah (7), is a budding figure skater. Son, Ryan (10 in May), is a hockey player, enjoying his travels with the team. Lynn is on the Parent Auxiliary Board for hockey. Wade is busy on the

Board of Directors for hockey (NBHA), and is Ryan's team co-manager. Wade is also director of UB's confocal microscopy 3D imaging facility. Lynn is still working in research at Roswell Park.

In talking with a member from Jack Mack's astronomy class at Buff State, this young lady sang his praises to the sky as a great teacher with a wonderful sense of humor. Congratulations Jack! I'm sure this is the sentiment of all your students.

It's a very lively place at the Rupp's these days. There's Barkley, the resident Airedale, and a kitty-cat from a neighborhood litter that arrived one day on the doorstep wanting a handout. After a sip of milk, it decided this would be a great place to live. Being accepted, it moved in, and life hasn't been the same at the Rupp's since then. Between Barkley and the kitty-cat, keeping track of what each is into, is quite a job. Take note! Frank Chalupka is taking karate lessons, so watch your step!

President's Column

Daniel Marcus

Now that Venus has reached greatest brilliance on February 21, and is starting to pass between the Earth and the Sun, have you tried looking for it in the daytime? Keep track of it in the telescope and watching its crescent shrink as the planet gets larger. Should be lots of fun. S&T claims you may be able to see it during the day time on March 28, when Venus passes 8.9 degrees North of the Sun. The best part is you don't need dark skies and a big scope to watch this event, another feature to watch for is the extension of the cusps beyond 180 degrees as the crescent gets thinner. If you would like to try to image this event, contact me at 773-5015 as I intend to image during the day on March 26/27/28.

Star Parties:

We have a Star Party Coordinator!! Janice and Jeff Gardner have volunteered to help get Star Parties coordinated if you wish to hold a star party please give them a call. Star parties can be held anywhere you wish, they can be in your back yard, at a friends (so long as they know about it of course!), or at a park like Cherry Springs. Do you need to be an astronomy expert to have a star party? heck no! schedule one out at Beaver Meadow, and entice the "experts" out with food to show you how to use the place. Keep in mind on almost all clear Friday and Saturday nights, you can expect people will be out there having fun. If you are on the internet you can check out the E-groups board to see

what is happening that night.

March 24, Bill Smith's Messier Marathon 2001, cloud date March 31. See article elsewhere in newsletter listed as "Messier Marathon 2001"

Adventures Wanted:

Does anyone have any Astronomy event(s) they want to watch? It would be fun to get an occultation group going, since we have the Astrovid and the LX200 available! Lunar and Asteroid occultation timings would have scientific value, and could prove to be lots of fun. We need to get these activities listed in the Spectrum. Would love to see a video of the crescent of Venus shrinking and how it affects the size of the image. We have the equipment to chase most events in case we need to get to clear skies, but it will take someone to help organize. Better yet organize a Star Party for one of these events! and let the fun begin.

T-shirt/Sweatshirt salesman wanted: The club is looking for someone to take over the T-shirt/Sweatshirt concession. "Alls you got to do is" bring them to meetings and public events to sell them, and to reorder when necessary.

BAA FUNDRAISER

This is an opportunity for members of the BAA to reach out and share our love for astronomy in a unique and special way with those less fortunate. The goal of the fund-drive is to raise enough donations to purchase at least 300 pairs of eclipse viewing glasses. These glasses will be sent to children and adults living in areas of Angola and Zambia in order that they may safely view the total solar eclipse expected in this area of Africa on June 21, 2001.

There are several missionary stations in this region staffed by English speaking volunteers helping thousands of native Africans. These are established missions, some of which have been operating for the past 90 years. Several of the missionaries have visited BAA member (Jim Lehmann's) church here in the Buffalo area over the years and provided reports on their work with the Africans. This has given Jim the opportunity to gain an insight into the local situation and also to develop contacts within the missionary service. These contacts will be used to distribute the glasses among the local population. Because it will require between 6 and 8 weeks to purchase the glasses and deliver them to the missions, the fund-

raising effort will end on April 21, 2001.

Totality in this area of Africa is expected to last from 3 to 4 minutes depending on exact geographical location. NASA estimates the probability of clear skies for this region to be between 90 and 95 percent for this time of the year, which is just about the best odds for anywhere along the path of totality.

Accompanying each pair of glasses will be an instruction sheet which explains how to view the eclipse safely, what causes an eclipse, and also describing some simple projection experiments that the kids can perform while observing the eclipse. If you would like to help out with the instructions contact Bill Aquino at (731-9366). Once again Beverly Orzechowski has graciously volunteered to handle the donations. Please forward your donations, payable to the "Buffalo Astronomical Association" to:

BAA Eclipse Fund Drive
c/o Beverly Orzechowski
125 Roycroft Blvd.
Snyder, NY 14226-4557

THE FORMATION AND GROWTH OF STARFEST

by Carl Milazzo

In 1980, twelve amateur astronomers from the Toronto club, wanted to observe the Perseid Meteor Shower. They decided to try group camping over the weekend from a campground with dark skies and open horizons. Everyone enjoyed that experience so much that they got together the very next month around new moon. They did deep sky observing from the camp ground each new moon weekend through out the Summer and fall.

A year later word spread of their activity and how satisfied the amateurs were that the attendance had doubled. Three years later, they needed to rent a large tent for its first talks and workshops

dealing with observing and astrophotography. The leaders of the Toronto club were mainly armchair astronomers and did not support their outdoor astronomy activities, so this group formed the North York club.

In 1988 I attended my first Starfest along with 250 other amateurs. Every year it has grown and with last years turnout of 1,200 amateurs, it was the largest outdoor gathering of amateur astronomers in Canada and the third largest in North America. Officially the next Starfest is from August 16-19, but many stay at the campground for an entire week. The past few years have brought about a dozen BAA members gathering up at Starfest each year.

DIGITAL CAMERA CLASS

The club is starting up a new working group called the Digital Camera Class. Its purpose is to explore the methods and techniques of computer imaging processing. Regardless of whether you image with a film or CCD camera we all want to squeeze as much detail and beauty out of the images as possible. The most popular way to do this is at the computer using tools like Photo-shop, Picture Window, Maxim DL, or numerous others. Everyone

seems to know a trick or two which they learned the hard way. This working group will give us an opportunity to share those tricks and techniques with each other. The working group is VERY informal and geared towards fun and learning. We will meet at the observatory on the first Saturday of each month between April and October, two hours before sunset. See you there!

ANCIENT CONSTELLATIONS

by Darwin Christy

BOOTES

Bootes only seem'd to roll
His Arctic change around the Pole.
from Byron's 3rd Ode in Hours of Idleness

Bootes, the Herdsman, was transliterated from the Greek letters (Bootes) which appeared in the Odyssey. This means that the title has been around since 1,000 B.C. or even much longer. Doubtful at first, it was only applied to the first magnitude star Arcturus. Degenerate forms of the name have been called Bootis and Bootres.

Many derivations have kindled: for instance, Bootes has been referred to as the Waggoner, or Driver of the Wain; and as of a Claudian writing, we read:- "Bootes with the wain the north unfolds; or the Ploughman of the Tritones."

In more recent times the figure has been imagined to be the Driver of Asterion and Chara in their pursuit of the Bear around the Pole, thus alluding to a thought of the Hunting Dogs, written by Carlyle in Sartor Resartus:-

What thinks Bootes of them,
As he leads his Hunting Dogs
Over the zenith in their leash
Of sidereal fire?

The star Arcturus, at the beginning of the 1933 Century of Progress exposition in Chicago, played a 'high-tech' role. The light from it was collected by the 40" refractor in Yerkes Observatory and focused on a photoelectric cell which in turn, closed the circuit, triggering the main light control, thus lighting the exposition. At that time, it was thought that Arcturus was 40 light-years away (although we now know it to be but 36 light-years out) and Chicago, 40 years earlier had another blowout, the Columbian Exposition. So- why not utilize the light source from Arcturus (40 ly distant) to trigger the beginning of the Century of Progress Exposition?

Many more stories can be picked up on this ancient and modern constellation. More than I can deliver here in this small newsletter. This constellation is bound by Corona Borealis, Canes Venatici, Virgo and Coma Berenices.

MEETINGS NOTICE

The annual BAA dinner meeting will be held on Friday March 9 at Warrens on Main St. N Tonawanda. Tom Dey will be our special guest speaker talking about his big dobsonian telescopes and home made observatory. Looking forward to seeing you all there. Warren's is an excellent place and the food is terrific.

April 13th - Monthly meeting will resume back at Buffalo State College New Science Building at 7:30pm.

PUBLIC NIGHTS BEGIN AT BMO

Saturday April 7th will mark the beginning of public nights at Beaver Meadow Observatory. Public nights are held on the 1st and 3rd Saturdays of the month beginning in April and ending in October. They are held rain or shine. Hopefully the weather will cooperate a little better than last year which was the cloudiest year I can remember in a long time. All members are encouraged to come out and help out. If any member would like to give a presentation on public night give Mark Swiderski or Neil Dennis a call. Any new member who would like access to the Observatory should come and help out on these nights. This is where you can learn the operation of the building and get to know every one. If you are new to astronomy this is the place to come and learn the night sky.

MESSIER MARATHON 2001

When: Saturday, Mar 24th starting at 3pm - ??
Cloud date: Sat. Mar 31st

Where: Bill Smith's & Carol Lorenc's farmette (map in e-group files area)
1880 Thornton Rd, Cherry Creek NY 14723
(physically in Town of Charlotte)
(716) 962-3412

Who: All members of the BAA, Marshall Martz Club & families

Dark skies -- Low horizons -- Big scopes -- Super-experienced observers
140° of southern sky from SSE to WNW has a 4° horizon or less!
Guaranteed telescope exercise program

New to observing? No problem!

Get started on the right foot with: Constellation finding, Binocular use and Observing hints

Also

- ❖ Pot luck dinner (Chili & drinks provided)
- ❖ Overnight free at the Foxe Farmhouse (our next door B&B)
- ❖ Lots of floor space too (bring sleeping bag) or tent camp outside for the hardy
- ❖ Pancake & maple syrup breakfast for the overnights
- ❖ On-site petting zoo (4 Horses, 1 burro, 1 dog, 12 cats (some indoors))
- ❖ On 13 acre farmette bordered by State Forest: X-country skiing, hiking
- ❖ Cockaigne downhill ski area 1.6 miles away

Got a scope, bring your scope ...

- ❖ Got scope questions / problems – get them answered / solved here
- ❖ Full telescope repair facility; mirror cleaning and alignment a specialty
- ❖ Try out & compare all sorts of different gear: eyepieces, reflectors, refractors, dobsonian & equatorial mounts, filters, finder scopes, star charts, observing guides
- ❖ Try out some astrophotography on the piggyback photographic mount
- ❖ Full B/W darkroom available

What's to see

Gas Nebulae, Planetary Nebulae, Globular & Open Clusters, Galaxies
Milky Way, Constellations, Asterisms, Double Stars, Red Stars

In previous marathons 100 Messiers have been seen as well as many other objects:

You've heard of them; if you haven't seen them, now's the time:

- ❖ Veil, Helix, North American, California & Horsehead nebulae; Stephen's Quintet, the big NGCs such as 55 & 253; Kremble's & Christmas tree clusters; even an obscure Palomar cluster

Even if you don't have all night

- ❖ 35 Messiers normally seen by 10 pm
- ❖ 60-65 Messiers normally seen by midnight
- ❖ 1½ hour rest break due to a 'gap' in rising Messiers
- ❖ 85-90 Messiers normally seen by 3 am

Please call ahead if possible: 716-962-3412

See ya there!

Education continued

sponses, it's because only twenty questionnaires were printed. A couple of questions have fewer than twenty answers because the students either didn't respond to it or they added a "maybe" column.

The answer to the first question is interesting. A couple of years ago I read in the newspaper that a survey revealed that 58% of Americans believe UFOs are controlled by aliens. Maybe belief that UFOs are extraterrestrial visitors is fading, or maybe surveys just yield the results you seek. That may apply to mine as well!

FOR SALE!!

APOGEE 5.5 MM SUPER EASY VIEW AND ORION 20 MM ULTRA SCOPIC EYEPIECES FOR SALE. EXCELLENT CONDITION \$100.00
CALL MARK MORGIS AT 821-1802 OR 824-7379

LUMICON CASSEGRAIN EASY GUIDER FOR 8 INCH SCT. EXCELLENT CONDITION \$ 150.00
CALL TIM MCINTYRE AT 632-3172

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.

ARTICLES , FOR SALE ADDS, ETC. WANTED FOR PRINT IN THE SPECTRUM ! MY STOCK PILE OF ARTICLES IS NOW DOWN TO NOTHING ! IF YOU HAVE AN OBSERVATION REPORT OR ARTICLE CONTACT OR SUBMIT IT TO THE SPECTRUM PLEASE .

NEWSLETTER OF THE BUFFALO ASTRONOMICAL ASSOCIATION INC.

Tim McIntyre
135 Fairvale Drive
Cheektowaga, NY 14225

Phone: 716-632-3172
Email: TMcint9320@aol.com or astrotim_2000@yahoo.com



ROWLAND RUPP
c/o ARCHIVES
132 BURROUGHS DR
SNYDER NY 14226

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