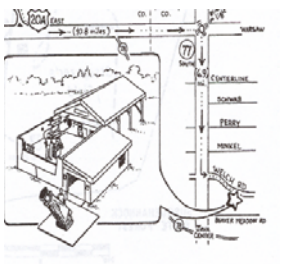
Newsletter of the Buffalo Astronomical Association

The Spectrum

Volume 9 Issue 2 **Almost Spring Edition** **March/April 2007**

In this Issue:



Directions to BMO

From the Editor's Desk

Hi folks! I just want you all to know that I am honored to be your new editor. This edition of The Spectrum looks a lot like the last one, but I am considering making a few changes (for the better, I hope). I want to bring in a little color and maybe a new layout. I'd like to thank Gus Cenkner for carrying on this tradition and for doing a great job the last two years. I hope my efforts will be as good as my predecessors. This edition features articles from Alan Friedman, Mike Israel, and Rowland Rupp, along with the usual observation reports, the BAA Annals and a word from our president, Peter Proulx. There is even a poem by Larry Carlino. I've included some astrophotos from our members. They look better in the electronic version of The Spectrum, but I included them in the paper version so everyone can enjoy them. It's been another long winter, but Spring is about to arrive and you know what that means! Our first public night at BMO is only about a month away. Hope to see you there.

Rich Fusani

Capturing the Lord of the Rings

Alan Friedman

Have you found the bright wandering star in Leo?

Riding the ecliptic near Regulus, Saturn is now prominent in the eastern evening sky as it heads to opposition February 10th. It will move slowly eastward, remaining the brightest star in Leo for the next two years. My first glimpse of the ringed planet through a friend's telescope many years ago got me hooked on this hobby. Decades later, an encounter with Saturn on a steady night still takes my breath away.

For the astro-photographer, a sharp and detailed image of Saturn is a prized and elusive catch. The ringed planet is a tough subject, revealing its treasures only in good conditions. The delicate disk bands and concentric minima in the B and C rings demand smooth, well-collimated optics and steady seeing. You also need to shoot at high magnification (a long effective focal length.) Saturn is small, spanning 45 arcseconds across the rings with a disk only 20 arcseconds in diameter. The Cassini division, a gap large enough for our moon to pass through, measures a scant arcsecond at best.

(continued on page 3)

The Frugal Webcam Imager

Mike Israel

One of the most enjoyable and rewarding things I find to do in astronomy is imaging planets and the moon with a webcam and telescope. Compared to imaging with a CCD camera or a digital SLR, astrophotography with a webcam can be done relatively inexpensively. Best of all, you can image with a webcam from the convenience of your backyard, largely unaffected by light pollution.

I use a Philips ToUcam Pro (aka 740) webcam. This model was replaced several years ago by the Pro II (840), and more recently, by the Philips SPC900NC. The Philips SPC900NC, while not available locally, can be purchased for less than $65 over the internet from one of the large chain stores.

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BAA Website
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BAA Voice Mail Box
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Location/Time of Meetings:

BAA meetings are held on the ***2nd Friday of the month*** from ***September to June*** in the ***Science Building on Buffalo State College Campus***. Meetings start at ***7:30 P.M.,*** in the first floor auditorium near the entrance. See above web site for a map of the location. **Non-members are encouraged to attend**.

Spectrum Deadline
Articles for the next Spectrum are due by: April 20th

BAA Webmaster
Mike O'Connor

BAA Yahoo E Group Coordinators
Dennis Hohman
Mike O'Connor

President's Message

Peter Proulx

Happy March! Hopefully by the time you read this the temps will be a few degrees above freezing. As I write this, it's the 15th of February and about 10 degrees outside after starting the day at 0. No astronomy in Sanborn today. Even if the skies were clear my observatory is froze shut! Seriously; I ventured out shortly before dinner to grab some software from the observatory and the door wouldn't budge. The prediction is for 34 degrees by Tuesday I will see if I can get it open then.

Hope you made it to the meeting this past month, Marko Krco from Cornell gave an excellent talk explaining how he discovered a method for Hydrogen Dating Stellar Nurseries. Although it was a pretty heady topic I found it extremely interesting. From the numerous questions from our members it looks like everyone else enjoyed it too. Marko mentioned how impressed he was with our questions and the high level of knowledge by our club members. This was his first time with Amateur Astronomers and he was blown away with the Alan's pictures on Space Weather and APOD. Marko was our first speaker from Cornell, he was contacted through their speakers bureau.

The speakers bureau is also responsible for supplying our dinner speaker Dr. Jim Bell. Dr. Bell is the Chief Scientist for the panoramic cameras on the Spirit and Opportunity rovers. Dr. Bell will also be speaking at the Buffalo Museum of Science at 2:00pm the same day as our dinner meeting. The talk will be similar to the talk that he will be giving at the dinner. If you can't make the dinner you may want to consider seeing Dr. Bell in the afternoon at the museum. Speaking of the dinner you should have received your invitation for dinner by now, please get them back as early as possible. Janice Gardner has put together a terrific menu and a great venue for this event. I would also like to send out a thank you to Alan Friedman for designing and printing this years invitations.

I wanted to note here that we another great speaker for April; Dr. Kevin Williams he was originally going to be our dinner meeting speaker. Dr. Williams graciously moved his talk when DR. Bell became available. This will be part of our Mars "Double Header"!

"Mars-Once an Enigma, Now a Mysterious Puzzle!"

Dr. Williams is the most recent member of the Earth Science Department at Buffalo State College. His Geology specialty is Geomorphology, the study of the processes that shape planetary surfaces. His undergraduate degree is in Astronomy & Physics, and he is an accomplished planetologist with publications to his credit on the coronae land-forms on Venus and on the surface of Mercury. He is an active member of the NASA Site Selection Committee for future Mars Landers.

Sounds like a great presentation!

Stay warm and think CLEAR SKIES!

Peter

(continued from page 1)

This represents a speck about half the width of a red blood cell at the focal plane of a 4" f6 telescope! And the holy grail of Saturn imaging, the razor thin Encke gap, is much smaller. Though beyond the theoretical resolution of amateur scopes at a twentieth of an arcsecond, the very best images will show its location in the outer region of the A ring.

You might want to start by getting to know the seeing patterns from your observing location. Although Saturn will be at its brightest and largest around opposition, my backyard often yields the best images closer to the beginning or end of an apparition, when the planets reach the meridian just before dawn or shortly after dusk. This transitional time can offer brief periods of very steady air. Pre-dawn imaging is my favorite, quiet and peaceful, with plenty of time for the telescope to adapt to ambient temperature. An optical tube shedding heat in falling temperatures will not reach its potential, even if seeing conditions are great.

Practice and experience will help you determine the best set-up and settings. I use a B&W streaming camera (an industrial webcam) for planetary imaging. A barlow extends the focal length of my 10" f 14.6 scope to 11 meters, placing a large Saturn on the 640x480 chip but still leaving some wiggle room for drift during the exposure. Sky transparency will determine the shutter and frame rate (between 15 and 30 frames per second). Camera settings are a juggling act, balancing image brightness with electronic amplification (more commonly called gain) – increasing the image brightness with a high gain setting will create a noisy image.

These B&W video streams provide the detail (luminance) for my final LRGB image. Color data is captured with the same camera using RGB filters. The filters consume light (hence the lower sensitivity of color cameras). I often reduce the focal ratio to f30 for the filtered capture. The image will be smaller, but I can scale the color data to match the luminance data later on, combining both in Adobe Photoshop to construct a full color image.

Experimentation will determine the right Barlow and image scale for your telescope, mount and camera. If the image is too dim, focusing too difficult, or if tracking makes it hard to keep the image on the chip, move to a lower magnification. Saturn will become brighter and more stable on the monitor. The moons might also become visible. A wide field image of Saturn showing five or six pinpoint moons is a beautiful alternative to a high resolution close-up.

Sensitive image processing will reveal the detail in your recorded data. Using software programs like Registax, or the Mac based application Astro IIDC, you can select and stack just the sharpest frames from your video streams. This magical process will increase the signal, average out the noise, and display features not visible in the individual frames. Both programs allow you to select an alignment position for the frames in your stack. This can be a powerful advantage. On most nights, even the best frames in your stream will not be uniformly sharp throughout the image. One side of the rings might be sharper than the other. By processing the image multiple times using different alignment positions and then combining these optimized regions with mosaic techniques in Photoshop, you can create a seamless composite that records maximum detail from your session.

As a final step, image processing with software tools such as wavelets and unsharp mask can be used to increase contrast in the image. Your personal taste and end purpose will guide you here. I prefer a natural feel and so I use a restrained hand with these tools. Overdoing it will introduce artifacts in high contrast areas of the image - along the edge of the disk and in the rings and ring gaps.

It will take practice, but a detailed image of Saturn with its glorious ring system etched against the velvet blackness of space is a prize worth the effort.

Alan Friedman
January 15, 2007

Links:

Registax/
http://www.astronomie.be/registax/

Astro IIDC/
http://www.outcastsoft.com/ASCASTROIIDC.html

Alan's saturn images to use:

http://www.avertedimagination.com/img_pages/saturn032505.html
http://www.avertedimagination.com/img_pages/saturn012106.html
http://www.avertedimagination.com/img_pages/saturn_withmoons_041805.html
http://www.avertedimagination.com/img_pages/saturn_04_06.html

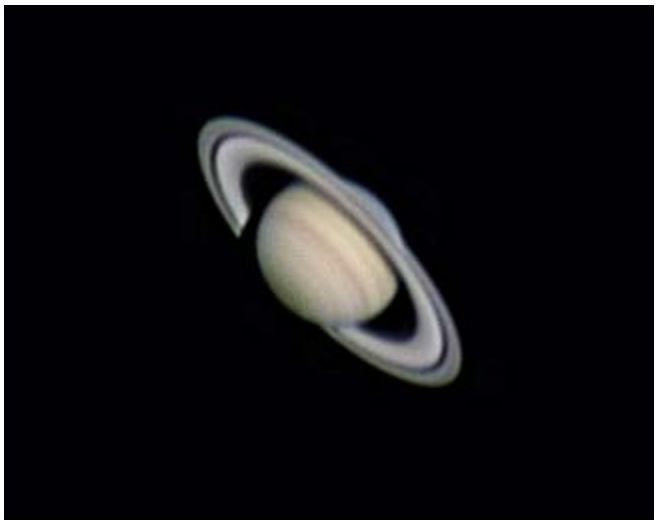
(continued from page 1)

The older ToUcam models frequently show up on Astromart. All of these cameras are small and light-weight USB devices intended for non-astronomical use. They produce low resolution color video for transmission over the internet when connected to a computer. While similar webcams are available from Meade and Celestron, the Philips cameras produce better images and are less noisy. However, the Meade and Celestron cameras come ready for astronomical imaging, while the Philips cameras require the purchase of a 1.25-inch eyepiece adapter. The webcam adapters are inexpensive and readily available on the internet. The lens housings on the Philips cameras are easily removed and the eyepiece adapter substituted in place of the camera lens.

The webcam is inserted into a 1.25" telescope focuser or diagonal for astronomical imaging use, and is connected to a personal computer via USB cable, enabling the transfer of video from the webcam to the computer. The Philips webcams are powered by the USB cable and do not require a separate power supply. Whether you use a PC or laptop computer, it is important to have adequate hard disk storage space and a high-rpm disk drive, as the video streams from the webcam are large and transfer at typical frame rates of 5 or 10 frames per second. At 10 frames a second, you can easily end up with a 130 mb file shooting a two minute video sequence. Camera control is performed by software on the computer. The Philips cameras come with software that allows you to set frame rate, exposure, gain, brightness, white balance, etc. There are also several freeware or shareware programs available that facilitate camera control and shooting the video sequences. For this purpose, I use K3CCD Tools, which also has great image-processing features.

I use an 8-inch SCT when imaging with a webcam. With a 2x barlow lens, I can shoot at f/20 to increase image scale. Imaging at or near this focal ratio also comports with the typical seeing here in Western NY. Because of the tiny CCD chip in the webcam, it sometimes is difficult to keep the target object centered in the imaging field. A hand-paddle motor control on the telescope is a big help in this regard. I find focusing to be the biggest challenge, especially when imaging planets. The video image on the computer screen is grainy and dim. It helps to concentrate on high contrast areas, such as the edge of Saturn's rings to help achieve good focus. Focusing when imaging the moon is much easier, as it is brighter and the craters provide good contrast areas for focusing. Because the Philips cameras use video compression at higher frame rates, I stick to shooting video sequences of 5 or 10 frames per second, which produces 600 or 1200 frames, respectively, in each two-minute sequence. The length of the video sequence is limited by my laptop computer's ability to handle the data flow and by planetary rotation. Typical individual frame exposures with my setup are 1/25 to 1/33 of a second when imaging planets.

After obtaining a number of video sequences, I pick the best sequence or sequences and process using K3CCD Tools and Registax, another freeware program specifically created for processing webcam images. These programs take the individual frames of the video sequence, rank them in terms of image quality, and align and stack whatever number of the best frames that you specify to create a final image. Don't be discouraged by how bad the individual frames look. Generally speaking, the more frames you stack, the better the final image will be because of the resulting decrease in noise. Once aligned and stacked, I use the wavelet filters and other tools in Registax to adjust and sharpen the image.



Here is a webcam image of Saturn that I shot last Spring from my suburban backyard. I used a fork-mounted 8-inch SCT, together with a 2x barlow and the ToUcam. I shot a two-minute video sequence of 1200 frames with a shutter speed of 1/33 of a second. I selected the best 900 frames to stack using the planetary wizard feature in K3CCD Tools. Sharpening and final image adjustment were done using Registax and Photoshop.

With Saturn just past opposition, now is a great time to get a webcam and start imaging! If you have any questions, don't hesitate to contact me to help get you started.

What's in a name?

By Rowland Rupp

There's been a lot of controversy about Pluto's demotion from planet to dwarf planet (whatever that term implies). Editorials and letters to the editor denouncing the revision have an appeared in *Sky and Telescope*, unfavorable comments are seen in newspapers and other magazines, and we've also heard complaints at BAA meetings. So I thought I might as well toss in my two cents.

First of all, I'm in favor of reclassifying Pluto, although the term "dwarf planet" doesn't much appeal to me. When I taught astronomy, well before this issue arose, I only spoke about the terrestrial planets, the Jovian planets, and reserved the talk of a Pluto for the minor bodies of the solar system -- comets, meteors and asteroids. I placed Pluto in the category of icy objects in the Kuiper belt; albeit at the largest of those bodies, though it isn't even that anymore.

Second, I think the definition adopted by the International Astronomical Union about a planet sweeping out debris in its orbital region, though on the awkward side, was adopted as an ad hoc description specifically designed to avoid a future plethora of "planets" being discovered in the Kuiper belt, and perhaps elsewhere. Having a couple of dozen planets someday might mitigate the significance of the concept of "planet".

The term "planet" stems from the Greek word for "wanderer". The planets wandered through the stars, causing untold agony for early astronomers who tried to explain and predict their movements. Originally there were seven of them: the Moon, Mercury, Venus, the Sun, Mars, Jupiter and Saturn. These were the wandering objects easily visible to the naked eye. In time, Copernicus provided us with a better understanding of how the solar system worked, causing the Moon and the Sun to be reclassified, and the earth to join the other planets.

When Uranus was discovered in 1781, it was added to the list. Although not an object easily seen without optical aid, its size, midway between Jupiter and the terrestrial planets, surely qualified it as a planet. In fact, it can be seen with the naked eye, rather readily in my experience. When Neptune was found in 1848, it matched Uranus in size, mass and composition. While there is no hope of seeing it wandering around the sky unless you have a telescope, it undeniably is a planet.

So what about Pluto? History gives the answer. Neptune was discovered by observing the perturbations it caused in Uranus's orbit. When some residuals were thought to persist in Uranus's motion, Percival Lowell set about discovering planet X mathematically, as Leverrier and Adams had done leading to the discovery of Neptune. For these supposed perturbations to be caused by the yet undiscovered planet, it would have to be fairly massive, several times the mass of the earth.

When Clyde Tombaugh found Pluto in 1930, not far from where Lowell thought it might be, it was exceedingly dim, implying it was very small -- no larger than the Earth. Even so, if it was as large as the Earth and much more massive, it must be a planet. One problem plaguing astronomers of that time was how to account for the enormous density its small size and large mass suggested. What in the world could be made of?

As observations of Pluto were refined, its size was reduced continuously until its density became absurdly high if was still to account for the behavior of Uranus. Its moon Charon was discovered nearly 50 years after Pluto itself was first seen. Now, an accurate assessment of its mass could at last be made; it is less than a quarter of a percent of the mass of Earth. In fact, it's only about a fifth the mass of the Moon and around two thirds its diameter. With these data, Pluto's mysterious density could finally be nailed down. It's in the order of 35% the density of Earth and much less than the Moon's density as well -- it's a rocky ice ball just as we suspect the rest of the denizens of the Kuiper belt to be. All in all, that's not much of a planet, especially when we've already found something bigger, but not much bigger, out there.

Evidently, the IAU sought to avoid having to designate still more Pluto size ice balls as planets and use their improvised definition about sweeping out material to weed them out. I said I'm not fond of their definition, so I'll offer one I like better, though I know by doing so, I place myself in the same unenviable class of probably thousands of other amateurs who also imagine they can do better than the IAU. Anyway, here it is: "A planet has an orbit that is unique from the orbits of objects similar in size and composition." I think that pretty much excludes asteroids, Kuiper Belt objects and maybe eventually Oort cloud objects from being classified as planets. By the way, this definition, like the IAU's, only applies to our solar system. A future generation of astronomers can wrangle over the designations of bodies, large and small, found orbiting other stars. I'll note in concluding that I share the regret expressed by many that Tombaugh's famous discovery no longer holds quite the status that it did for three quarters of a century. But the same can be said for Piazzi's discovery of Ceres in 1801, though he didn't enjoy the prestige of discovering a planet for nearly as long. Nonetheless, Tombaugh's dedicated search and the significance of his discovery remained undiminished.

Observatory News

We are getting ready for another season at the BMO and Remick. Hopefully we will have the clear skies we need. Every year we are getting more people to attend public nights at Remick. We still have some issues to address, such as lighting and the soccer problems. We hope to get the painting done this year. We should have the assistance of an assistant principle to get this done. In any case things are looking up. Below are the sun and Moon data for the upcoming months to help us with scheduling.

DATE	SUNRISE	SUNSET	MOON RISE	MOONSET
7 April	6:48 a.m.	7:49 p.m.	12:16 a.m.	8:50 a.m.
Phase of the Moon on 7 April: waning gibbous with 79% of the Moon's visible disk illuminated				
21 April	6;25 a.m.	8:05 p.m.	8:09 a.m. on preceding day.	12:44 a.m.
Phase of the Moon on 21 April: waxing crescent with 23% of the Moon's visible disk illuminated				
5 May	6:05 a.m.	8:21 p.m.	11:11 p.m. on preceding day	7:33 a.m.
Phase of the Moon on 5 May: waning gibbous with 90% of the Moon's visible disk illuminated				
12 May	5:56 a.m.	8:29 p.m.	3:30 a.m.	3:35 p.m.
Phase of the Moon on May 12: waning crescent with 23% of the Moon's visible disk illuminated				
19 May	5:49 a.m.	8:36 p.m.	7:53 a.m.	12:22 a.m.
Moon set in on following day				
Phase of the Moon on 19 May: waxing crescent with 11% of the Moon's visible disk illuminated				
26 May	5:43 a.m.	8:43 p.m.	3:43 p.m.	2:56 a.m.
Phase of the Moon on 26 May: waxing gibbous with 76% of the Moon's visible disk illuminated				
2 June	5:39 a.m.	8:49 p.m.	10:57 p.m.	7:22 a.m.
Moon set is on following day				
Phase of the Moon on 2 June: waning gibbous with 97% of the Moon's visible disk illuminated				
9 June	5:37 a.m.	8:53 p.m.	1:55 a.m.	2:35 p.m.
Phase of the Moon on 9 June: waning crescent with 37% of the Moon's visible disk illuminated.				
16 June	5:36 a.m.	8:57 p.m.	6:41 a.m.	10:56 p.m.
Phase of the Moon on 16 June: waxing crescent with 3% of the Moon's visible disk illuminated				
23 June	5:37 a.m.	8:59 p.m.	2:34 p.m.	1:36 a.m.
Moon set is on following day				
Phase of the Moon on June 22: waxing gibbous with 61% of the Moon's visible disk illuminated				

Observation Report: Comet McNaught

Despite knee-deep snow drifts and a bitter wind chill, I managed to get a good look at Comet McNaught (C/2006P1) on January 10 - the one clear night among many cloudy ones. Twenty to thirty minutes after sunset, the comet appeared north of the brilliant Venus and closer to the horizon, with an altitude of only five or six degrees. The bright nucleus of McNaught was instantly visible to the naked eye, as was a broad, fan-shaped dust tail some two degrees long. Atmospheric extinction and blue scattering gave the nucleus a strong yellow-orange hue, and the tail appeared a golden yellow. I would estimate the comet's magnitude at –2 – about as bright as Jupiter with the bonus of a spectacular tail. 9x63 binoculars accentuated the coloration and afforded a magnificent sight that I won't soon forget. I would not be surprised if the comet reaches naked-eye visibility as it swings into the southern hemisphere.

Larry Carlino

BAA Annals

5 YEARS AGO - Bill Aquino wrote a detailed Spectrum article about type Ia Supernovae. He explained the spectral characteristics of these exploding stars, their origins, and his own work, at BMO in observing supernova SN2001V. Leslie Martin had an article entitled, "If you were Geek (SIC) (Part 2)". Glancing through the article, which dealt with the later period of ancient Greek astronomy, suggested to me that "Geek" was supposed to be "Greek". That's all right -- these days close is good enough. Carl Milazzo wrote on various nearby locations where dark skies prevail and sixth magnitude objects can be seen.

We planned to hold Astronomy Day, on April 27th at the Buffalo Museum of Science. Bob Titran was in charge of the event. Nowhere in the Spectrum did I find any mention of club meetings. I searched the January-February issue for a clue, but didn't find anything there either. That's odd, since we usually publicize our March dinner meeting. I wonder who spoke. Does anyone recall who it was?

10 YEARS AGO - Things worked out better in 1997. I found that Ivan Semeniuk from the Ontario Science Center was to speak on Comet Hale-Bopp at our dinner meeting, which was to be held at JP Bullfeathers on Elmwood Avenue. In April. We heard from BAA member Gene Witkowski on "Lunar Videography". Membership chairman Joe Orzechowski reported we had 99 members as of 1997.

Tom Bemus wrote about "The Right First Scope". Tom made several good points, emphasizing quality, simplicity and portability. He mentioned the problem of excessive technology created by complex scopes. If scopes were complex in 1997, what are they now? Barnard's Star was the topic of Leslie Martin's spectrum contribution. Bill Smith discussed techniques for finding Messier objects with binoculars, while Paul Carroll elucidated some points of physics made by Alan Goodrich in earlier articles.

15 YEARS AGO - Our March 1992 meeting was held at Buffalo State College. Back then the dinner meeting occurred in May, and BAA member Fred Price was scheduled to speak on "Astronomy On Cigarette Cards". Apparently, once upon a time in Fred's native England, having astronomy cards in a cigarette package was a ploy to reward people for buying cigarettes. Interesting! "Volcanism in the Solar System", was the subject of Paul Mazierski's talk at our April gathering. The NFCAAA scheduled a meeting of several area clubs and Hamilton Ontario in May.

Vern Siegel, an accomplished engineer, was the subject of Edith Geiger's long running series of profiles of prominent BAA members. Bill Smith and Carol Lorenc extended an invitation for members to join them at their annual Messier Marathon star party. Bill also wrote on low power eyepieces including some straight-forward mathematics on magnification and angle of view. Astronomy Day was scheduled once again at Buffalo State where we participated the before in an event that won a national award.

25 YEARS AGO – We didn't know whom we would have as speaker at our meeting in March 1982, but Larry Carlino was scheduled to talk about "New Dimensions In Visual Astronomy" the following month. A change to our bylaws that eliminated student membership as a distinct class was to be voted on. Ken Kimble's informal Study Group was still meeting then. Observatory director John Riggs reported that Bob Mayer's rework of the mount for the 12.5 inch scope also improved the clutch drive.

There were observation reports by Carl Milazzo, Darwin Christy, Steve Desmond, Rowland Rupp, Doris Koestler and Shaun Hardy. Edith Geiger's profile was on BAA member Bob Dietrich. "Anonymous" sent in an article pointing out that if you could see through Venus's clouds, the Earth-Moon system would be a truly fascinating system to watch. Carl Milazzo wrote on Pluto, giving some statistics about it as they were then known. There have been plenty of updates in the twenty-five years since. Saturn was also the subject of and article, this one written by James Machowski.

35 YEARS AGO – Ray Manners was to be our 1972 speaker. His topic was "Astrology: Your Life in the Stars." I wonder what he had to say. Fred Price was the April speaker. His subject was "New Light on Some Lunar Features." Fred was an ardent student and observer of the Moon. Members were busy realigning the club's 12.5 inch telescope which was then at Newstead Observatory. They were also working on the dome drive.

Warren Steinberg reported that at the last meeting of the Instrument Section members experimented with finding the radius of curvature of a mirror by rolling a one inch steel ball across its surface. I think the method involved timing the excursions of the ball. John Riggs wrote on deep sky observing, and Darwin Christy described various polishing laps for mirror making.

Rowland Rupp

Buffalo Astronomical Association Members Astronomy Websites

Compiled by Tom Bakowski

Tom Bakowski -- www.tomseyeonthesky.com
-- Wide Angle images of the sky thru the seasons, from dark skies of PA, using a dslr camera and lens.

Thom Bemus -- www.upstateastro.org/stars/index.html
-- Astronomy resource site.

Anthony Davoli -- www.astro.premcom.com/ADM/index.htm -- www.admaccessories.com
-- Images of deep sky objects using a Takahashi FSQ-106 and a dslr camera.

Tristan Dilapo and Mike O'Connor -- www.orbitjetobservatory.com
-- Images of deep sky objects and transient events.
-- Tristan uses a fully robotic Meade 12" LX200 and CCD.
-- Mike uses a fully robotic Celestron 9.25", Takahashi TOA-130 and CCD.

Alan Friedman -- www.avertedimagination.com
-- Highest resolution images of the solar system using a Astro-Physics10"- 6,5,4" refractors.

Mike Israel -- http://users.adelphia.net/-armis/
-- Images of deep sky objects using a TeleVue101 and dslr camera.

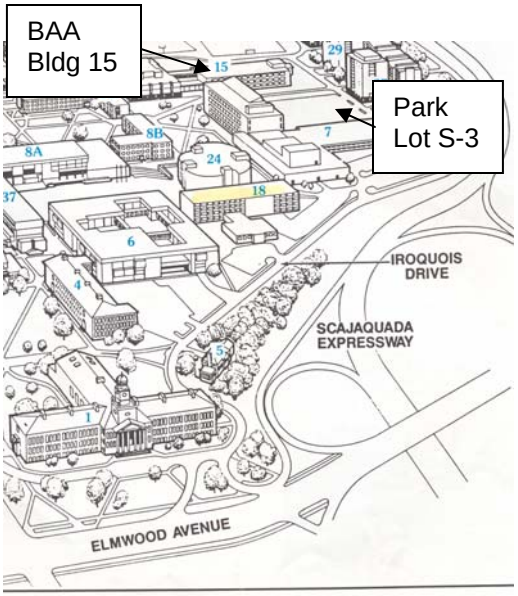
Dr. Jack Mack -- http://facstaff.buffalostate.edu/mackje/
-- Astronomy resource page.

Mark Percy -- www.williamsvillek12.org/planetarium
-- Williamsville Planetarium schedule.

Peter Proulx -- www.gotastronomy.com -- www.ip4ap.com
-- Images of deep sky objects using a Meade 10" RCX and CCD camera.

If you're a BAA member, and not on the club's message board, then you're missing out on communication and current events. This message archive, started in 1999, has 134 members and had over 12,130 messages!
-- http://*groups*.yahoo.com/group/buffalo_astro_assoc/

The Spectrum
Buffalo Astronomical Association Newsletter
Richard L. Fusani, Editor
(716) 432-3819



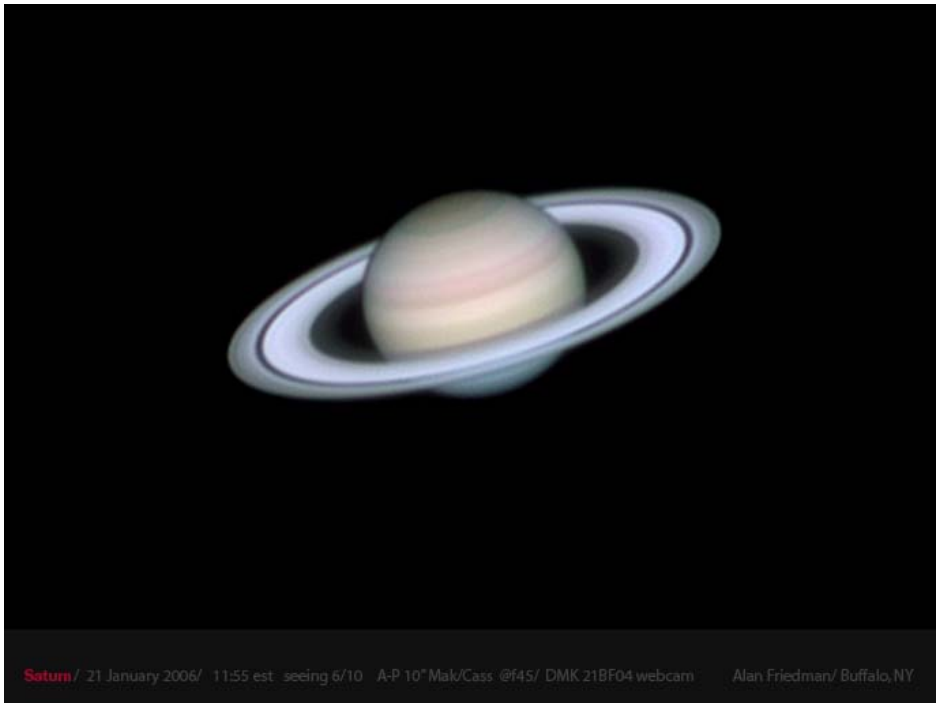
CASSIOPEIA

A queen of tumbled throne
bejeweled athwart the silken tapestries.
The goddess vanity of beauteous
supremacy.
Perfection in the milky mirrors
in endless circles about the kingdom.
Her king effete, the dumb and pointless
lap-dog.
She preens with triplet crowns and
jaded and diamond clusters
ubiquitous…
Beauty insulting and cold.
A price…
the virtuous daughter
rock-chained and affrighted
sacrificial.

… and still, her eyes hold
tight the mirrored image to
Enjoy.

Lawrence Carlino

Picture Pages



Another great planetary shot from Alan Friedman.

A nice ice halo shot by Pat Lannon.