*The Newsletter of the Buffalo Astronomical Association*

# The Spectrum

**Volume 9 Issue 4** **Dog Days Edition** **July/August 2007**

**In This Issue:**



## *From the Editor's Desk…*

Welcome to the dog days of summer! Enjoy the weather while it lasts.

The editorial staff would like to thank Peter Proulx and Tom Bakowski for their service as officers and board members of the BAA. Due to personal reasons, Peter has resigned as president of the BAA and Tom has also decided to resign his position as an at-large member. Both have dedicated lots of time and effort in making our club the best it can be. They both deserve a great deal of gratitude for the hard work and time they have given to the BAA. Peter was instrumental in getting us some tremendous speakers like Dr. Jim Bell from Cornell University, the speaker at our March dinner and Jack Newton, last year's dinner speaker. Tom has spent endless hours helping us enjoy astronomy by sharing his vast knowledge of the night sky. Both have also helped us to better appreciate the night sky with their astrophotography. Thank you both for your dedication to the BAA and for your friendship.

Have you ever gone to a BAA event and wondered who you were talking to? I know I have. Now I've been a member for almost six years (where does the time go?) and I still don't know a lot of names. I'll bet I know three times as many faces as names. How about we make it a habit of wearing our name badges at BAA events and meetings? Alan Friedman puts a lot of effort to make them for every member and they really would help everyone, especially newcomers. On the same token, don't be afraid to introduce yourself to people you meet. Show a friendly smile and say: "Hi, my name is …" Your friendly demeanor may just go a long way to increasing our membership and that means more money for the club and more cool stuff that the club can provide.

Take care and have a safe summer!

Rich Fusani,
Editor

## Taking Good Pictures from Bad Places

By Alan Friedman

Like many of us, I live in a pretty tough place to do astronomy. Buffalo is famous for snow and chicken wings and for being a wonderful American city in many ways. A haven for clear skies and steady seeing it is not. I can expect perhaps sixty clear nights a year in Buffalo. And as an astronomer who is also a father, I know that a dance recital or school conference night will coincide with most of these.

*(continued on page 3)*

## BAA Officials

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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: August 22nd

**BAA Webmaster**
Mike O'Connor

**BAA Yahoo E Group Coordinators**
Dennis Hohman
Mike O'Connor

## *Important Announcement!*

A special election will be held at our October 12th business meeting. Nominations are being accepted for the positions of club president and one at-large seat. These are the seats recently vacated. If you are interested in running or want to nominate someone else, contact the chairman of the election committee, Rowland Rupp. Nominations will close at the September 14th business meeting.

### *Great Party at the Mack's!*

A big thank you to Dr. Jack and Jayne Mack for a wonderful evening on Friday, July 13th. The Mack's entertained about seven or eight fellow BAA members. Gary Flagg brought some "astro-music" and Dan Marcus showed us time-lapse footage of the eclipsing variable star, SZ Her. Jack also gave us the grand tour of his wonderful garden. There was very little observing, but a good time was had by all.

### *For Sale!*

Celestron 10-inch, f/4.7 Newtonian reflector on very smooth and sturdy home-built Dobsonian mount. Scope is complete with 50mm finder, 2-inch/1.25 inch focuser, 25mm eyepiece, and tube rings for alternative mounting as an equatorial. $300.
Larry Carlino
433-3432

## Taking Good Pictures from Bad Places

*(continued from page 1)*

My focus – taking detailed images of our solar system neighbors – has been shaped both from my interest in observing the moon and planets and from the need to adapt my hobby to the realities of my life and location. It is a rare night that I can steal away to a rural location with hundreds of pounds of gear in tow. Fortunately, the sun, moon and planets look just fine from my city backyard. When the forecast looks promising for a brief window of atmospheric steadiness I am ready and if the conditions are good I can record a lot of data fast – enough to fill the remaining 300 cloudy nights with images to process. High resolution imaging is a good fit for the urban astronomer.

It is often said and very true that seeing is the key ingredient in good lunar and planetary images. Capturing detailed pictures of our solar system neighbors is a cat and mouse game with air turbulence. The grand prizes, Plato bespeckled by a throng of tiny craterlets, or glorious Saturn revealing a trace of the Encke division, these are achieved only in moments of very steady air. But while perfect seeing is the stuff of dreams, most of us don't extract the potential from the average to good conditions available on many nights within fifty feet of the back door. The "prizes" mentioned above are within reach of a good 10" scope in 6/10 seeing, if it is well collimated, thermally stable and the data is worked with care. With a little planning, the right equipment and careful processing of the collected data, high resolution imaging does not demand a tropical vacation. It can be tackled from your backyard or apartment terrace.

The Phillips ToUcam deserves much credit for the revolution in planetary imaging that has occurred over the past ten years. Though it is still available and in use by many, new cameras have become the choice of those looking to advance the quality and resolution of their images. Most are monochrome industrial and scientific cameras sold by The Imaging Source, Lumenera, Point Gray Research and others. Based on a B&W CCD chip and beginning at $300 for a 640x480 model, these cameras offer enhanced sensitivity and better noise reduction than consumer webcams and are available in a variety of sensor sizes and configurations. Unlike the ToUcam, (limited to capturing 5 uncompressed frames a second) these cameras connect to a laptop computer using the high speed Firewire or USB 2.0 bus, allowing a massive stream of data to be captured at 60 frames per second or even faster, without the need for compression and the artifacts that result. Good seeing at mid-northern latitudes is a fleeting phenomenon. The ability to capture as many frames as possible during these brief moments of image stability is well worth the higher price these cameras command.

When combined with a filter wheel, a monochrome camera offers a distinct advantage in average seeing conditions. Data recorded in narrow slices of the visible spectrum will show significantly better sharpness compared to streams captured in unfiltered white light. This improvement is most dramatic in the longer wavelengths of red and near infrared light, where the seeing might appear 1 to 2 points higher Pickering than without a filter on the same night. When the seeing is very good, using the longer wavelengths will compromise resolution. On these nights, the moon will reveal finer detail recorded through a green filter than through red. A rotating filter wheel will allow you to evaluate these effects visually and in real time during the capture process.

Our moon is obviously well suited for the benefits of a monochrome camera. For the planets, it may seem that color imaging with a filter wheel and B&W sensor would be much more complicated than shooting with a color camera. But accurate color is easier to achieve in a composite of filtered RGB images and the stability benefits mentioned earlier apply here as well. On a night of average seeing the atmospheric tremors at short visible wavelengths are readily apparent. The red and green filtered images will show finer detail than the blue. To achieve a sharper final image, this R and G data can be combined and processed independently of the RGB composite. By re-applying this blend of R and G to the color image as a luminance layer, detail can be enhanced while an accurate portrait of the planet's features and color is preserved.

The full potential of your images will be revealed with the tools you use to process your data. I work on a Macintosh computer and my software will probably be different than yours but most of the concepts remain the same across platforms. The captured video is reviewed and the sharpest frames are selected for further processing. The set of best frames is aligned to negate any drift in the image over time and then stacked (averaged) together. The selection process has the effect of steadying the atmosphere while stacking improves the tonal range, increasing signal and averaging out random noise at the same time - creating room for further enhancement through image processing. Frame selection can be done automatically within software, though I often opt to select the frames by eye. A dim, noisy signal can confuse the quality evaluation routines in software. I usually test both methods and choose the one that delivers the best result.

A night of 6/10 on Pickering's scale qualifies as good seeing from my backyard. In these conditions I will use my 10" telescope at a focal ratio between f/30 and f/45 depending on the object size and brightness. I focus manually, viewing the image on the laptop screen, setting the exposure with an eye on the histogram provided by my capture software, Astro IIDC. After filling a hard drive with video of the lunar surface, it should be a snap to find the best frames and stack them to create a stunning image. But it's not quite that simple. A scan through the captured video shows that even the best frames are not uniformly sharp from edge to edge.

The region of sharpest focus will drift around from frame to frame, showing an undulation much like rippling waves on the surface of a pond disturbed by a pebble. This effect causes the shape of lunar craters to morph slightly from frame to frame.

Using a single position to align and stack will average these undulations, producing an image that appears well focused at the alignment region and gently softening outward. Using multiple alignment points (MAP) for stacking is a powerful technique to better the results. With MAP I can align the same selection of frames several times using different positions in the image, creating a stack from each and saving it as a separate file. The sharp sections will be selected and merged into a final mosaic of optimized regions. In this way I can tune the total image sharpness for the best result the data can deliver.

The useful number of alignment points is determined by the quality of seeing (the better the conditions, the fewer MAPs needed), the size of the field and your patience. For Saturn, four alignment points (one at each ring ansae and one each at a point where the rings meet the planet's disk) work well. For the moon, six to nine alignment points will provide a dramatic improvement. But I will often choose more (as many as 30 in a 640x480 pixel image), though there are diminishing returns as the points get close to each other.

To avoid getting lost I will create a reference sketch noting the location of each alignment region, saving each stack with a unique file name. I perform a mild sharpening of each stack, working with a small pixel radius to avoid artifacts and leaving room for further processing after the composite is assembled. Any processing done at this point should employ the same settings for each stack so that they can be assembled seamlessly later on.

I use Adobe Photoshop to prepare the final image. Photoshop's powerful and varied selection tools permit you to apply enhancements only to the areas in your image that need them, retaining a natural appearance and reducing the chance for over-processing and artifacts.

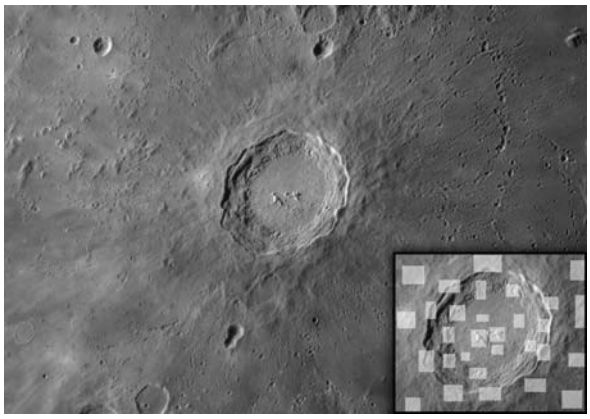
To begin, I open one of the MAP stacks as a master image and save it as a working file. Each MAP file is then opened and the region surrounding the alignment point selected with a marquee tool, feathered, copied and pasted into the master image on a new layer. Often I will up-sample from 72ppi to 144 or 288ppi to allow sub pixel control when nudging the pieces into alignment. The MAP piece is generally applied at 100% opacity, but transparency can also be used. Once all MAP regions have been pasted, aligned, and merged into the master, the image is saved and further processing can be done. Since my lunar work is done using a small CCD sensor; I often mosaic several images to create a wide, high resolution panorama.

Image processing is a very personal art – informed by your intentions and taste. Strong contrast enhancements can bring out subtle detail, a faint lunar rille for instance, that might remain hidden in a more restrained representation. In my work I favor a depiction of the moon and planets that reflect their visual or "natural" appearance. The main intention of planetary image processing is to boost the sharpness and contrast of the picture – applying a "fountain of youth" to counteract the softening effects of the atmospheric and optical trauma that lies in the path between the subject and the camera. As with any fountain of youth, the magic of image processing can be a mixed blessing. Applying unsharp mask globally to an image at levels perfect for low contrast areas such as the lunar maria will prove too strong for the rims of deeply shadowed craters where contrast was high to start.

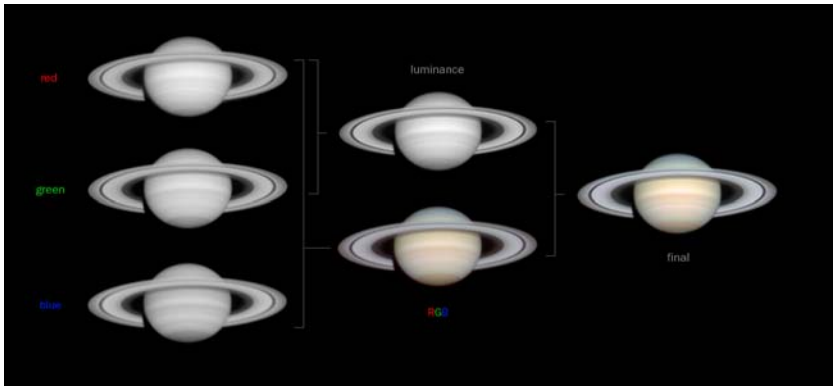
Selection tools in Photoshop permit you to avoid processing certain areas at the expense of others. With >>Select>>Color Range you can isolate the extreme highlights and shadows in a lunar panorama and then, by inverting the selection, exclude them, shielding theses areas from over-processing as you tease tiny craterlets from the surface with iterations of unsharp mask and gaussian blur filters. The Magic Wand and selection marquees are also excellent, allowing you to exclude the edge of a planetary disk as you work to reveal definition within and between cloud bands. Remember to make duplicate layers to test your enhancements and to hide the distracting "marching ants" that Photoshop uses to display your selection area. This will allow you to better evaluate the results in preview.

Used with sensitivity and faithfulness to the data, these tools will enable you to liberate every ounce of detail from your imaging session and help avoid the artifacts that come from overdoing it. Practice will improve the results achievable in average seeing and prepare you for perfection when you meet up with that magical 9/10 night.

[See next page for some examples.]



A resolution view of the lunar crater Copernicus with inset to show the MAP regions used for a section of this region. More than 250 regions were used for alignment overall.




A chart showing the components that go to make an L(r+g)RGB image of saturn.

## On Mounting a 4 ½ inch dob:

By William Halbert

As I had previously written, the mounting for the 4 ½ inch newt that I had owned for quite a few years had fallen heavily into a state of disrepair and needed replacing. I was no longer in need of a lightweight equatorial mount and my observing habits also did not necessitate a motor drive to track the stars. If I was to make this mount myself, I would also need it to be simple to make out of wood. Given all this, the decision to make a dobsonian was inevitable.

As I had made 'dobbies' previously in 60mm, 4" and 8" sizes I figured on putting together the same thing with this little beast. I then remembered an article in the July 2001 issue of Sky and Telescope (pg 120). In this article, Francis Milton built a dobsonian in which one of the standard half-circle side bearings was replaced with a simple 3/8" bolt serving as a pivot. The reason for this was that this pivot increased stability but not at the expense of maneuverability. Intrigued, I decided to give this design a go.

First came the cradle for the telescope. It was a simple 4-sided box with a handle on top to facilitate transportation. I also added one large side-bearing of the traditional dobsonian design, namely an 8-inch PVC end cap which rides on small nylon gliders attached to the rocker box. The other side bearing is 3/8ths-inch bolt which acts as a pivot as described by Mr. Milton.

This pivot was a little different. First of all, I wanted a pivot that would lend about the same amount of friction as the

traditional side bearing but without sacrificing stability. The pivot is a simple 10mm carriage bolt with a spring washer and a wing nut acting as a kind of friction regulator. Inside the rocker side I attached 3 of the same kind of small nylon glides as I used to play on the PVC bearing. This bears against a piece of Formica which is attached to the cradle box side. The arrangement that I have described for the altitude axis has functioned wonderfully, very smoothly in both warm and cold weather without sticking. In addition, it possesses the quality of variability should the amount of friction need changing. This combination of the two different altitude bearings maintains just the right amount of friction without backlash, as well as providing the extra stability Mr. Milton mentioned.

The rocker box is also somewhat unusual: I am 6' 1" and prefer to observe standing up on my own two feet. Needless to say, the usual dobsonian rocker would leave me very uncomfortable, the height of the eyepiece being a bit over 3 feet at the zenith. The simple fix? I made the rocker box sides approximately 1 meter long with ¾" birch plywood. I used such a thick piece of wood to work against the inherent twisting force of such a long cradle. In practice, this thickness was more than ample against twisting when the azimuth axis is rotated.

This fix did cause one difficulty and that was with the ground board: the center of gravity being rather high meant the distance between the feet needed to be increased past the 12 inch diameter of the ground board. To remedy this, I simply extended the base of the board's feet with three 16 inch pieces of 2x2 lumber. This added distance is more than enough to prevent the telescope from unwanted side-to-side motion.

Am I happy with the result? Absolutely. This design has greatly increased my enjoyment with this telescope many-fold. I can enjoy the inherent stability of a dobsonian while standing on my own two feet, a great aid whether observing overhead or on the horizon. And all in a package that can be picked up in one hand!


## BAA Annals

**5 YEARS AGO** -- BAA projects were underway during the summer of 2002. We were planning to establish high speed Internet access at BMO in conjunction with UB, who would supply the equipment. The BAA, UB and the Audubon Center would share the monthly costs. Also, a fundraiser was started for the 10 inch robotic telescope project. Spectrum editor Jamie Siebert was putting together an electronic version of our newsletter. Membership stood at 138.

Carl Milazzo continued his reminiscences about some of his many observing adventures. Edith Geiger was still writing her *Spy and Tell* articles in 2002. Star parties were held by Dennis Hohman, Jack and Jayne Mack and Anthony Divoli. Alan Friedman posted a sun party at BMO where we viewed through his new hydrogen-alpha filter and feasted on bagels and lox.

**10 YEARS AGO**-- Star parties dominated the July-August 1997 calendar: hosts were Irene and Rowland Rupp, Larry Carlino, and Jack and Jayne Mack. Lynn and Wade Sigurdson hosted a party at BMO as did Bob Hughes. Bob was also trying to organize a field trip to the Ontario Science Center and the Dunlop Observatory. A lone article by Bill Aquino dealt with "Cloudy Nights". He advocated watching astronomy related television programs when one runs out of "tinkering" projects with telescopes.

**15 YEARS AGO** -- Ed Lindberg wrote an *Instrument Note* on the two primary methods amateurs use to judge the quality of a mirror. One is the Foucault method or knife edge test. The other is the Ronchi test that uses a grating. Ed noted that the number of high-quality telescopes now available commercially curtails the need to grind one's own mirror, and makes these tests somewhat anachronisms. Bill Smith wrote about star hopping using articles in S*ky and Telescope* as a guide. He gave observing hints that improve viewing galaxies and noting star colors. Bill also wrote about observing the Coat Hanger asterism where he viewed the nearby open cluster NGC 6802 for the first time.

Larry Carlino, Bill Halbert, Bill Smith and Carol Lorenc, Irene and Rowland Rupp, and Dan and Melissa Marcus all hosted star parties. Obituaries for Leonard Milks and Carol Geiger appeared in this spectrum.

**25 YEARS AGO** -- Ernst Both concluded his article on "Sun Grazing Comets" and Ed Lindberg wrote about aligning the polar axis of a telescope by determining when the sun is at "true noon" at your location and aligning the axis to the shadow of the pier. Sounds a bit iffy to me! Carl Milazzo had an observation report.

Star parties were held by Miro Catipovik, Jerry Morris and his bride to be Adienne Kaczmarke, Steve Desmond, Tristan DiLapo and Darwin Christie. Ernst Both hosted another at Kellogg Observatory on the roof of the museum. Tristan's was interesting because it was held on his roof in downtown Buffalo were a better view of city activities was afforded than of the stars.

**35 YEARS AGO**-- Here is the list of summer star parties for 1972: two at Camp Sprucelands, Les Stoklosa, Edith Geiger, and two at our Observatory at Newstead. Speaking of Newstead, the agreement between the BAA and Cornell Aeronautical Laboratory, the owner of the land on which the Observatory was located, was provided in this spectrum.

John Riggs wrote about the deep sky objects to observe in July and August, and Ed Lindberg reported on the Second Summer Seminar at the Syracuse club's Observatory in Vesper, NY. They held an astrophoto competition, a series of talks by local astronomy experts and a demonstration of how to melt aluminum and pour castings.

Rowland Rupp

## *MOVING SALE!*

Meade 12.4 Plossl - $50, Meade 24.5 Super Wide - $115, Meade 8.8 Ultra Wide - $155, Meade 18mm Super Wide - $95, TeleVue 10.5 Plossl - $50, TeleVue 4.8 Nagler - $100, Meade 2x barlow - $50, Celestron #96 (moon) filter - $8, Orion set of 4 filters - $30, Telrad - $25. Also a Mead DS8 with mnt. - needs tlc - make offer and Meade 323 80mm f11 on eqt. mnt. - make offer.

Details call Kathy @ 634-7138

## Double-double's Double Sorta Double

By Bill Smith

Double stars are fun to observe with their who-knows-what-color-they-will-be characteristic. Double-doubles are 2 sets of double stars close together that look similar to each other (hence a double-double) – otherwise they'd be just two doubles in the field of view; nice yes, but not as nice as a true double-double.

Seeing double doubles can double your pleasure and double your fun, so why not! Now a neat double-double is the famous double-double in Lyra, Epsilon Lyra, the Double-Double (capitalized out of respect). This double at low power transforms itself into a double-double as each star of the low power double is itself a double. The doubles of this double-double are (mags 5.4 & 6.5 at 2.6" sep) and (mags 5.1 & 5.3 at 2.3" sep). The pairs of doubles are about 3.5' of arc apart. Keen eyed observers may see a double with their naked-eyes but little do your double (pair) of eyes know that each point is itself made up of a double; these 2 doubles becoming a telescopic double-double – Lyra's famous Double-Double!

Wouldn't it be neat if the Double-Double had a double itself, why it could be the Double-Double's double! Such a double-double exists and not too far from the famous Double-Double, thus making Lyra a constellation with not only 1 double-double (the Double-Double) but another double-double ( the Double-Double's double) – that's 2 double-doubles!

This Double-Double's double is a pair of doubles going by the names Struve 2470 & 2474. The two doubles are 10' apart and the doubles themselves are (mags 6.6 & 8.4 at 13.4" sep) and (mags 6.7 & 8.8 at 16.2" sep). This double-double is a bit fainter than the Double-Double but is very easy to split at 50x. It is easily found using a flattened equilateral triangle with Gamma & Delta Lyra as the long base. The Double-Double's double is located at 19h09m +34 40' and has been the subject of news notes in both Deep Sky and Sky & Telescope magazines over the years.

Now wouldn't it be double-neat if not only the Double-Double had a double but the Double-Double's double also had a double! Now darn if the Double-Double's double doesn't have a double and it is also in Lyra. What a double-double delight. Man double-sakes alive if we aren't double lucky to have all these double-doubles within just a double low-power telescope field of view from each other.

Keeping with the natural progression of going from the Double-Double to the slightly cruder Double-Double's double this Double-Double's double double is again a grade cruder with the stars a little less mismatched in brightness and separation and the doubles themselves a bit farther apart from each other. So perhaps we shouldn't call this the Double-Double's double double but the Double-Double's double sorta double as that is what this Double-Double's double double really looks like to me. This Double-Double's double sorta double is made up of Otto Struve doubles 366 & 367 (mags 7.7 & 10.3 at 21.3" sep) & (mags 7.1 & 9.6 at 34.4" sep) and is located at 19h 14m +34 23' just a degree away from the Double-Double's double.

So do yourself a double favor and double up your observing, double fast, by checking out these 3 double-doubles: the famous Double-Double, the Double-Double's double and the Double-Double's double sorta double. No doubt you'll be glad you did; although maybe not as glad as knowing that this is the end of this story.

## 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**
**The Newsletter of the Buffalo Astronomical Association**
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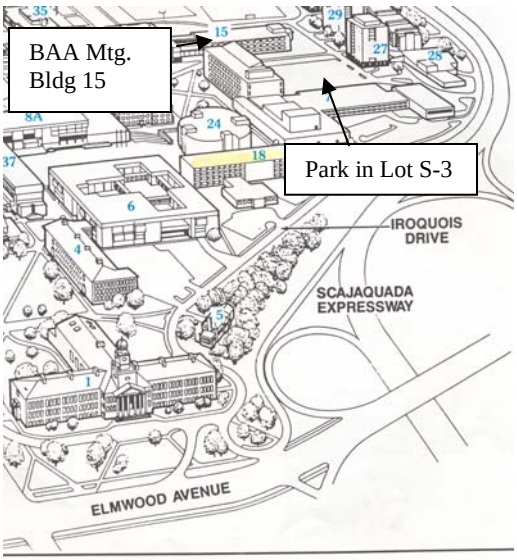


Observatory Parking

Here is a re-print from the 1994 Summer *Spectrum*, that I believe is still in force. It should serve as a reminder of our responsibilities and those of our host, the Audubon Center.

Two parking areas are now available at Beaver Meadow Observatory. One is to the west of the observatory where we have always parked in the past. The other is the small lot to the southeast of the building. The Audubon Center will keep the grass cut between this lot and the observatory to provide us with a path.

We have been asked not to park in this lot when the Audubon Center is having a special event. We can still use it for unloading equipment, but we should park in the large lot to the west.

Also, we have been asked not to leave cars on the grass leading from the small lot – it is intended as a foot-path, not as an access for vehicles or a parking place. Under special circumstances, where very heavy or awkward equipment is being unloaded, the path can be used to drive closer to the observatory, but the vehicle should then be moved to the lot. In general, we should carry our telescopes from the lot to the observatory.

Rowland A. Rupp