REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers

September, 2013

Volume 37, Issue 9

The Milky Way Over Bryce Canyon

By Brian Ottum

This was taken on Father's Day (June 16) of this year. I loaded up all my stuff and hiked down into Bryce Canyon at sunset. This is a time when most folks are leaving the canyon, so I received a lot of quizzical looks (huge backpack with tripod legs sticking out, carrying lounge chair). The Navajo Trail is the most popular one in the park, enabling visitors to get views of the amazing "hoodoos" rock spires. This shot looks straight south near midnight. The "Sentinel" is the thin spire that points almost exactly to the center of the Milky Way. I love sitting quietly in the canyon, with the only sounds coming from the shutter and the occasional scurrying rodent. One time last year, I was taking an all-night time lapse video and was convinced that I was being stalked by the mountain lion that had recently been spotted in the park. But this night was quiet, except for the occasional photographer stopping by. We help each other out, offering advice on composition, exposure times, ISO settings, processing. I think it was this night that I spoke to a gentleman from California who was on a landscape photography tour of the western national parks. He said he had 5 Nikon camera bodies, and about 13 lenses. I asked him about his business website and he said he was just an amateur. Holy cow, he's like us astronomers and our telescopes!

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Milky Way Over Brice Canyon (continued)

This image is a composite of just 2 different individual images. I used my tripod, Losmandy StarLapse motor drive, 12V power supply, intervalometer, Canon 5D mark III (mod), and the kit Canon zoom lens at 24mm f/4. The sky was captured with a single 7 minute exposure with the motor drive obviously running. Then I turned the motor drive off and took another 7 minute exposure to get the rocks. ISO1600. I used Photoshop to blend the two together. A simple but very tedious task because you have to carefully trace the edge of the rocks with a mouse. (Since then, I bought a refurbished pen tablet to make the tracing much easier). Photoshop Curves was used to bring out the darker areas of the Milky Way. Note the "kicking horse" dark nebula. I had never seen that until I went to Bryce Canyon, which has some of the darkest skies in the world (due to distance from lights, high altitude, and dry air). With the naked eye, you can easily see the "kicking horse," the North American nebula and M33. I urge Lowbrows to get out West to experience the amazing views – no special equipment needed other than your eyes.

Photo by the author. If you attended the August meeting you saw Brian's 16"x20" print of this amazing image. ***Reflections*** *can only give you a small idea of what you missed. Next month: Rho Ophiuchus!*

Lowbrow Calendar

Saturday, August 31--***Open House on Peach Mountain.*** Begins at sunset. May be cancelled if cloudy

Friday, September 6--***Dark Sky Park Dedication.*** *Port Crescent State Park, Port Austin, MI.* 9:00 PM

Saturday, September 7--***Open House on Peach Mountain.*** Begins at sunset. May be cancelled if cloudy.

Friday, September 20--***Monthly Club Meeting.*** 7:30 P.M. Room 130 Dennison. Jeff Heinline, Great Red Spot Astronomy. Equipment Show and Tell. The latest and greatest from this local supplier.

Saturday, September 21--***Chinese Moon Festival.*** 8:00 P.M. 6500 Bethel Church Road, Saline. Public observing celebrating Earth's moon.

Friday, September 27 & Saturday, September 28--

Astronomy at the Beach--6:00 P.M. both days. Maple Beach, Kensington MetroPark. Speakers and Public Observing. Scores of area astronomers bring their telescopes for mass public education. Likely the most important event on the yearly Lowbrow Calendar and certainly the largest. Hundreds (and sometimes thousands) attend annually. Early set up is encouraged.

Saturday, October 5--***Open House on Peach Mountain.*** Begins at sunset. May be cancelled if cloudy.

Sherzer Observatory Gets a New Deck

By Norbert Vance

Photos by the author

View north and west including the astrophotography dome.

It has been 23 years since the major fire that struck the original Sherzer Observatory at EMU. The replacement roof from the rebuild had finally been showing its age so replacement this summer was in order. The new dormer shingles were straightforward enough but the large observation deck had different issues, primarily replacing the old ballast tiles with a level cement tile deck that met code. The result was a leveling system with 6-inch PVC stands that separate the new tiles from the rubber membrane below. This LOOKS nice but also presented problems with vibration for telescopes sitting atop the deck while folks walked about. Solution- gravel pits. A dozen locations scattered across the deck were mapped out to replace a 2x2 tile with a box filled with gravel to isolate any of our Dobsonian telescopes from any immediate tile. While never absolutely ideal to have a telescope on the deck even before, at least we can mitigate most of the vibrations with this method. It works to an acceptable degree. Two Nexstar C8 SCT's are mounted on pedestals on the SE and SW corners of the deck isolated in a similar fashion as semi-permanent goto scopes. They have the added bonus of sitting on steel plates surrounded by a metal curb and yet more gravel. The pedestals are actually remnants of the old KMS Fusion laser system now filled with sand to add mass and fitted with wedges so the scopes remain equatorially aligned. They are covered when not in use by all-weather wraps. Students can readily uncover the scope and have at the sky.

View southeast

The secondary Sirius dome which houses the Celestron Edge HD 9.25" imaging scope has a 6-inch steel pier that is anchored through the roof into steel beam understructure below. Again, while not absolutely ideal it does isolate from the tile system. The dome itself rests atop the deck, held down by a tightly fitted custom wood deck. The wood is isolated from the central pier by a 2 inch gap. The hollow pier serves as a conduit for control cables to a room below where the CGEM DX telescope mount, cameras, ancillary equipment, and dome are controlled remotely by a PC desktop computer. Low light TV cameras are eyes to action in the dome above. The main dome, home to the 10-inch Astrophysics apo refractor, was unaffected by the

construction. It did get its annual bath and room organization, even a waxed floor to make it look spiffy, too!

While the skies over Ypsilanti are not the best, the convenience of a campus observatory cannot be understated. The deck is above many of the shielded lights below and gives a commanding view of the complete horizon. It gives students and visitors the opportunity to learn what an observatory is all about first hand. Each semester we offer 15 full sections of astronomy lab with a total of 270 students that are required to make treks to the deck for observations, plus a dozen lecture sections at our planetarium which encourage visits. An observational course that makes direct use of the facility and its various instruments is offered each fall, filled to capacity once again. New Daystar H-alpha filters and Coronado scopes give the facility a daytime presence as well. Views of the sun are terrific, especially in the long focal length refractor. A large south facing wall sundial finishes the appearance on the deck. The place gets a workout! The deck and observatory will face their first test on August 16-17 when the Ypsilanti Heritage Festival sponsors a “Star Party” featuring a NASA trailered exhibit with actual Apollo 17 moon rock, displays, free shows in the planetarium, kids workshops, and evening observations at Sherzer [www.spaceypsi.com]. This should tell us if all our efforts paid off.

View south from the southeast pier.

View north and east including the main some of Sherzer Observatory

Adding Eyepieces Without Emptying your Wallet?

Decisions, Decisions...

By Doug Scobel

Amateur astronomy is often fraught with decisions. What kind of telescope should I buy? Refractor, reflector, or catadioptric? Once you decide on the scope, then how big? After you decide how big, then how do you want it mounted? Portable or permanent? Equatorial or alt-azimuth? Answer those and now you have even more decisions to make. For visual use or for imaging? Buy or build? Commercial optics or homemade optics? How much money should I spend? It seems that answering one question just leads to the next.

So let's say that you've finally decided on a scope. Or like many of us, yours truly included, a few scopes. As in plural. So what eyepieces do you need? Now there's a can a worms!

Author self-photographed in pondering mode.

It seems like there are as many eyepieces from which to choose as there are stars in the sky. Ok, that may be a stretch, but you get the idea. You can choose apparent fields of view from 30 to over 100 degrees. Focal lengths from just a couple millimeters to forty or even more. Some of these monsters have more glass in them than the telescope you're planning on using it with, accompanied by equally monstrous price tags. The bewildering breadth of eyepiece offerings can make the decision downright scary. With the amount of money you can end up spending you definitely want to make a good decision.

The bad news here is that I'm not going to make recommendations regarding what brand or type of eyepieces you should get. There are too many variables, both in what's available and your particular needs, desires, and budget. But I do want to talk about eyepiece focal lengths. Here I can make recommendations, regardless of design or price.

Because with any given telescope eyepiece focal length determines the magnification of the image, you'll need more than one. But how many? Two? Four? Ten? Again, I cannot answer that for you – only you know your budget. But regardless of how many you acquire, my recommendation is to think in terms of focal length ratios.

But first, I'll illustrate what you don't want to do. You don't want to keep a constant difference between eyepiece focal lengths. For example (based on a telescope with a 1500mm focal length): ⇢

Focal Length	Magnification	F.L. Difference	Mag. Increase
40	38	n/a	n/a
35	43	5	14%
30	50	5	17%
25	60	5	20%
20	75	5	25%
15	100	5	33%
10	150	5	50%
5	300	5	100%

As you can see, at shorter focal lengths/higher magnifications, you have a good range of magnifications, but at long focal lengths/low magnifications things are a little more crowded. There's not much difference between for example eyepieces of 40 and 35 millimeters. There isn't even a huge difference between 40 and 30 millimeters.

Now look what happens when you keep each successive focal length a constant proportion of the previous. That is, keep the ratio constant, instead of the difference. Here is the simplest way of doing that, where each eyepiece's focal length is half that of the previous: ⇢

Focal Length	Magnification	F.L. Difference	Mag. Increase
40	38	n/a	n/a
20	75	20	100%
10	150	10	100%
5	300	5	100%

Here each eyepiece provides double the magnification of the next longest. Under the stars you'll have a nice range of magnifications, low, medium, and high. This would be a good way to go if you are on a budget and can only afford a small number of eyepieces. You could even use a 2x Barlow lens to get 20mm out of the 40 and 5mm out of the 10 and save more money. Of course you'd still have to spend money on the Barlow, but they're typically less expensive than high quality eyepieces.

If you can afford it, you might want to make the focal length reduction from eyepiece to eyepiece a little smaller, say by 2/3 instead of one half, as shown here:

Focal Length	Magnification	F.L. Difference	Mag. Increase
40	38	n/a	n/a
26.7	56	13.3	50%
17.8	84	8.9	50%
11.9	127	5.9	50%
7.9	190	4.0	50%
5.3	285	2.6	50%
3.5	427	1.8	50%

Here each eyepiece provides 50% more magnification than the next longest. You might even want to add another shorter focal length for really high magnifications, so I've added a 3.5mm at the bottom. Now you can see that you have a good range of magnifications, from low to high, and the magnification increases are evenly spaced. But look at the difference in focal lengths column. The top two eyepieces are more than13 millimeters apart, but the bottom two differ by less than two millimeters. By using this method you'll end up with more short focal length eyepieces than you do long.

Now in reality you usually can't find eyepieces with fractional focal lengths. So rounding to the nearest integral focal length we have this:

Focal Length	Magnification	F.L. Difference	Mag. Increase
40	38	n/a	n/a
27	56	13	48%
18	83	9	50%
12	125	6	50%
8	188	4	50%
5	300	3	60%
4	375	1	25%

The spacing isn't ideal but it's close. The 4 millimeter is a bit close to the 5, but if you go to a 3mm then you'll be at 500x, an increase of 200x. Here a better solution might be to skip the 4mm altogether and use a 2x Barlow to take the 8 millimeter to 4mm and the 5 to 2.5. You could also use the Barlow with the 12 millimeter to get to 6mm. There's really no "right" answer – just be aware that experimentation with real eyepieces rather than a spreadsheet can get expensive!

Also be aware that depending on the eyepiece lines you choose you may not find the "ideal" focal length that fits perfectly in your desired progression. Simply choose one that's close. Most of the time you can find something within a millimeter of what you're looking for, in particular in the shorter focal lengths. Notice that I said eyepiece "lines", not "line". You'll have a difficult time finding a single, quality line of eyepieces that cover a focal length range from say 3 to 30 millimeters. You'll probably end up mixing and matching, which really is not a bad thing. Most folks have quite a variety of makes and models in their eyepiece case. The important thing is to keep the focal length ratios more or less consistent.

One more item before we wrap up. Don't take the focal lengths listed in this article's tables too literally. They're here for illustrative purposes only. For example, if you have a fast (say f/4.0) scope, then you probably have little need for a 40mm eyepiece. Conversely, if your scope is a slow f/10 then a 3mm eyepiece is probably overkill, unless of course you're looking to bust the Tasco® limit!

Hopefully I've cleared up one aspect of choosing eyepieces. Of course, what focal length progression to choose is up to you. And, oh yeah, there's all those other things to decide on too. 50, 60, 70, 80, 100, or 100+ degree apparent field of view? Long eye relief or short? Two inch barrel or 1.25"? Complex optical design or simple? New or used?

Decisions, decisions…

[Editorial comment and legal disclaimer from the author: Dabbling in the acquisition, divestiture, and re-acquisition of eyepieces can become addictive and damaging to your financial health. The author shall not be liable for any losses, financial or otherwise, as a direct or consequential result of reading this article. In other words, read at your own risk!]

Astronomy at the Beach: 2013

By Paul Walkowski

Lowbrows Mike Radwick and Dave Snyder talk with visitors at the 2011 event. *Photo: John Causland*

Our annual 2 night, 7-club star party happens at Maple Beach in Kensington Metropark on September 27 and 28, 2013. Events start with Solar observing at 6:00 pm both evenings and wrap up as attendance dwindles, typically around 11:30 pm. There are short talks and demonstrations in the "big tent" from 6:30 to 9pm, and an inflatable planetarium set up and staffed by the Michigan Science Center. This year's keynote speaker is "Star Gazers" host, Dean Regas, from the Cincinnati Observatory. "Star Gazers" is the Miami Planetarium's public outreach on PBS and commercial TV stations originally made famous by Jack Horkheimer under the name "Star Hustler". Dean is known as an astronomy popularizer for his many contributions to Sky and Telescope, Astronomy, NPR's Science Friday, and myth busting interviews on TV. The Cincinnati school system recognized him as an outstanding educator for his innovative astronomy observing and planetarium programs. He is regionally known as a first rate amateur astronomer as well, and the special technical presentation for astronomers and their families at 1:00 pm Saturday at the Kensington Nature Center will dwell on his armature astronomer experiences.

AATB is usually the largest event that most Lowbrows participate in, with a typical crowd turnout of around 2,000 people for the two evenings. Then there was the year of Mars' opposition where we had 10,000, but that is a story for another day. This is billed as a family event, and as such has kids from ages 5 to 16 come along with their parents to hear the talks, see the video presentations, and win prizes by completing an astronomy scavenger hunt. Scouting and home school groups also seem to attend with fair regularity. While we do have families who come back every year, for many kids this is the first time they have ever looked through a telescope, and it's exciting for astronomers and kids alike. Many Lowbrows enjoy showing off the heavens to large, appreciative crowds and come away with quotes and stories which they will retell for a lifetime. The scavenger hunt will typically involve signing off a small half sheet of paper with a blank for initials next to items like: Planet/moon; galaxy, nebula, colored star, double star, and star cluster. Some forward planning is required in case your favorite double star or galaxy is hidden behind a cloud; plan alternatives in the North,

South, West and East and overhead just in case. I usually stay with the same object most of the night and then switch around to whatever is needed for most kids to complete their scavenger hunt around 10 pm. Twice in the past we were inundated with college kids who were taking astronomy courses carrying long lists of deep space objects that they need to describe for course credit. This is the area of expertise for the pros among us, my 10" dob was not made for picking out clusters of galaxies from the Hubble deep field or revealing the "Pillars for Creation" in full color.

I appreciate that kids and parents have oohs and aahs when they first see the rings of Saturn or the cloud bands of Jupiter, but expect the unexpected. I've had to show adults the inside of my scope tube with a flashlight to prove to them that they weren't looking at cut out pictures of planets and galaxies. And heard little kids say "no way, noway" as they looked for the first time. One kid took a poke at his younger sibling because he wanted a longer turn and the little one was pushing him aside. A three year old was standing atop my tripod platform holding a half filled baby bottle while his mom held him, and wouldn't let her take him away from the eyepiece for a full 5 minutes. We repeatedly explained to him that he was looking at the moon. Finally he broke his gaze from the eyepiece and stated emphatically, "The moon has bubbles". That is a future scientist for you—making observations and then relating them back to things he has seen before.

The Lowbrows typically set up on the grassy area between the beach and the paved bike path directly in front of the stairs leading down from the pavilion. The crowds are best in this area, even if there is some stray light from the vendor tables. Clustering in this area also allows Lowbrows to watch each others equipment while we grab a snack or listen to a talk. The canteen food bears little mention; i.e. bring your own. They open the snack bar for the crowds at AATB, but the menu is limited to hot dogs, chips, pop and coffee.

Maple Beach is most quickly reached from Ann Arbor by entering the park through the Kensington Road side off of I-96 and following the park road along the lake until you see the AATB sign with the arrow at Maple Beach. Astronomers will be able to drive their own vehicles to drop off equipment for 15 minutes early in the evening—follow the curb cut road to the East side (Left) of the bath house for 100 feet, and then cut across the grass to the paved bicycle/ pedestrian path and follow that to the set up area. Park on the grass to unload: pedestrians, bikers, and skaters have right of way. Alternatively, flag down a ranger with a golf cart and they will take you and your equipment from the curb to a setup area on the lake side of the bath house.

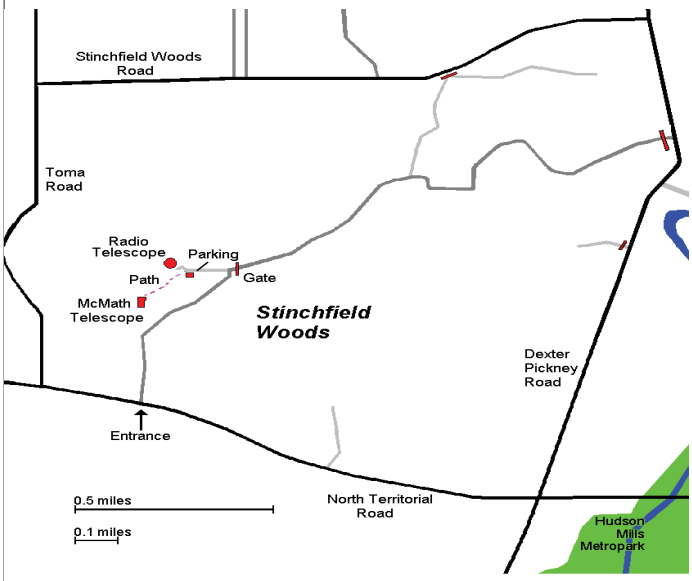
So what does a GLAAC organizer do? We hope to inspire youth to explore careers in the science and math fields. We meet monthly for 10 months of the year at the Kensington Nature center and email in between to put on the GLAAC program every year. We draw up a theme, hopefully related to the astronomy object(s) visible that night, gather a list of potential speakers, screen speaker candidates, and make their travel arrangements. The park arrangements need to be made every year. We try to update talks and demonstrations every few years. Finally we help raise money for the tent, sound systems, scavenger hunt prizes, astronomer door prizes, and speaker honorarium and travel expenses. I mention these items because GLAAC is in short supply of organizers and the kids need new, younger folks with new ideas to freshen GLAAC's AATB next year. The same dozen organizers have done it for 17 years and more than a few cannot continue for health reasons. This year John Schroer of Detroit Science Center fame had an extended hospital stay and is still undergoing rehabilitation in a nursing home in Cincinnati following a nearly fatal brush with diabetes.

So what are the closing arguments that will make you want to come to GLAAC this year? Thousands of children and adults looking through telescopes? Memorable first moments with budding young scientists? Or will it be the door prizes for astronomers who remember to register with George at the astronomy club tables in the Pavilion (if you don't get a ticket, you can't win)? This year's door prize contributors include Televue, Orion, Abrams Planetarium, the Great Red Spot, The Michigan Science Center, and many others.

Places & Times

Dennison Hall, also known as The University of Michigan's Physics & Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. Dennison Hall can be found on Church Street about one block north of South University Avenue in Ann Arbor, MI. The meetings are usually held in room 130, and on the 3rd Friday of each month at 7:30 pm. During the summer months and when weather permits, a club observing session at the Peach Mountain Observatory will follow the meeting.

Peach Mountain Observatory is the home of the University of Michigan's 25 meter radio telescope as well as the University's McMath 24" telescope which is maintained and operated by the Lowbrows. The observatory is located northwest of Dexter, MI; the entrance is on North Territorial Rd. 1.1 miles west of Dexter-Pinckney Rd. A small maize & blue sign on the north side of the road marks the gate. Follow the gravel road to the top of the hill and a parking area near the radio telescopes, then walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mountain observatory, but are usually cancelled if the sky is cloudy at sunset or the temperature is below 10 degrees F. For the most up to date info on the Open House / Star Party status call: (734)332-9132. Many members bring their telescope to share with the public and visitors are welcome to do the same. Peach Mountain is home to millions of hungry mosquitoes, so apply bug repellent, and it can get rather cold at night, please dress accordingly.

Membership

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, $12 per year for students and seniors (age 55+) and $5 if you live outside of the Lower Peninsula of Michigan.

This entitles you to the access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).

A hard copy of the Newsletter can be obtained with an additional $12 annual fee to cover printing and postage. Dues can be paid at the monthly meetings or by check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomers

P.O. 131446

Ann Arbor, MI 48113

Membership in the Lowbrows can also get you a discount on these magazine subscriptions:

Sky & Telescope - $32.95 / year $62.95/2 years

Astronomy - $34.00 / year or $60.00 for 2 years

For more information contact the club Treasurer at:

lowbrowdoug@gmail.com

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest.

Call or Email the Newsletter Editor: **Jim Forrester (734) 663-1638 or** jim_forrester@hotmail.com to discuss length and format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

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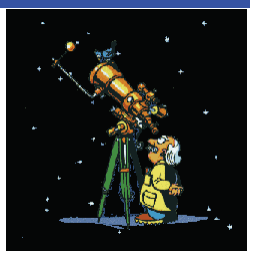
Reflections & Refractions



Website
www.umich.edu/~lowbrows/

MOON SHOT

Here's the just-past-full-moon by Brian Ottum. It was taken on Wednesday, August 21st, with a Canon 5D Mark III camera. The telescope was a 10" f/5 reflector from Taiwan. These modern DSLR's are super sensitive to light: this is merely a 1/1000 second exposure taken at ISO 100 (the lowest setting!). Paramount MX mount operated remotely from the basement. Brian is in the final stages of getting this remote control imaging rig ready for installation in New Mexico. He has many trials, tribulations and triumphs to report in a later article.

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