University Lowbrow Astronomers
Ann Arbor, Michigan

REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers

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"We Stayed Up All Night!"

A Messier *Photo* Marathon

By Brian Ottum

I've been observing the Messier objects for over 40 years. My trusty orange tube Celestron 8 helped me track down dozens of them. Then aperture fever struck, and I got the revolutionary Coulter Odyssey 13.1" dobsonian (at an unheard of $500 price in 1982). The bigger scope enabled me to see even the faintest galaxies on that Messier list. When I became aware of the "Messier Marathon" phenomenon back in the 1990's, I participated. However, cloudy skies, cold temperatures and exhaustion held me back.

The best observing marathon ever was when Doug Scobel, Mike Radwick, John Kirchhoff, Bob Gruszinski and many others gathered at Lake Hudson on perfect March night several years ago. I cheated, using digital setting circles. So I was able to get about half by 12:30pm, then sleep until 4:30 to get as many more as I could. I think I was able to observe about 95 of the 110. What a blast!

I started to take [crappy] pictures of the sky way back when I got my first Pentax SLR. Looking back at the old negatives, I chuckle to remember how excited I was to get a blurry picture of Saturn, a hint of the Milky Way, or an Andromeda Galaxy smudge. As the years went by, the more I read about the cost & complexity of CCD cameras, the less I was interested in diving into that area of the hobby.

I guess two events spurred me into astrophotography. First, the prison several miles from my house "upgraded" their outdoor lighting to produce a monstrous light dome to my south (which was previously very good). Secondly, digital SLR cameras came onto the market at a reasonable price. So I sold my 20" dob to Mike Kurylo and got a solid german "go to" equatorial mount. After doing some research, I bought a 10" f/5 reflector that started out its life as a Taiwanese-made dobsonian. Dale Penkala of Auburn, Michigan took this modest scope and "pimped it out" for astrophotography: Swayze refigured the mirror, flocking added, cooling fan added, a bigger secondary mirror and a motorized focuser. Now I was ready to climb that imaging mountain!

For me, astrophotography has bigger highs and lower lows than visual observing. (I still do visual, by the way). It was very exciting to have my M13 image appear on the cover of the Astronomical League's "Reflector" magazine. On the other hand, I have had many astrophotography mishaps. A few years ago, I set up the camera to take 2 hours of images of the fantastic edge-on NGC 4565. Once the focus and tracking were tweaked and everything was working fine, I was chilled so I put on a coat that I store out in the observatory. Soon I was being repeatedly stung around the neck and shoulders! I jumped around like a madman, trying to get that coat off as fast as possible. After inspecting the wasp stings and recuperating in the house for the 2 hours, I returned to see that my camera had only taken about 10 minutes of images because I had unplugged something in my jumping frenzy!

Another time, I drove 1 hr in my RV to the Pioneer Scout Reservation (observatory for the Toledo Astronomical Association). It was a rare clear, moonless night for the mighty Geminid meteor shower. I set up my camera for all night timelapse operation. I heard it the shutter click as normal, so I went to the RV to sleep. In the morning, I saw that a partially-disconnected cable stopped my camera after that first exposure!

A MARATHON MESSIER MARATHON

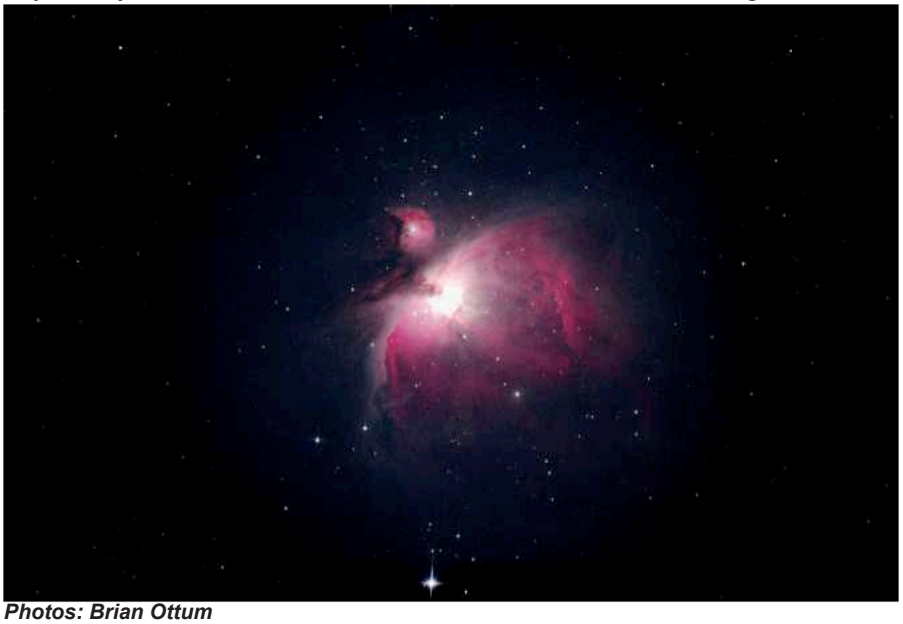
Once I got everything working in my backyard observatory (good polar alignment, good tracking, collimated optics, focusing, camera operation), I started to take lots of images. It seemed like 1-2 hours of total exposure was all I could easily do, yet still provided a good final image (under my moderately light polluted sky). Of course, the best images are the bright objects, the Messier objects. So I decided to get images of all 110. This had been done by others for years,

and Sky & Telescope even sold a nice poster. It took me about 4 years to get all of them. When it came time to do my poster, I wanted something better than the typical grid layout. So I downloaded a Hubble image of NGC 1300, a great barred spiral galaxy. I laid out the even-numbered Messiers on one spiral arm, and the odd-numbered objects on the other arm. I got a huge 72" wide poster mounted on thick foam core for hanging in my basement. That was in 2013.

GOING ALL IN

Also in 2013 I got serious about investigating owning my own little patch of super dark sky. I had previously visited the friendly Chiefland Astronomy village (FL) and had a great time. People had great reports from the Deerlick site in Georgia. When Tom and Jeannie Clark moved from Chiefland to start something similar in New Mexico, I decided to visit them there. I had a great time and the skies were inky black. But I started to gravitate towards something that technology has only enabled very recently: a remotely-controlled telescope. Just before I was about to visit the Rancho Hidalgo site in New Mexico, I found out that Lowbrow member Stan Watson was about to break ground there on his remote-control observatory. It was a great visit to Rancho Hidalgo, which is located in the "bootheel" of New Mexico, 40 miles north of the Mexico border and 8 miles east of the AZ border. Gene Turner has a growing collection of roll-off roof observatories in the desert in front of his house. Stan offered to partner with me on his observatory, and the plans were expanded slightly to accommodate my scope.

I got a robotic Paramount MX and set it up in my back yard, with the 10" reflector and Canon camera. During this "shakedown" period, I ran power and Internet cables out of my basement window so I could emulate remote operation. It took me about 5 months to assemble all the technologies, learn everything and get it working independently (so I did not have to go outside and fiddle with something).



Photos: Brian Ottum

In February of 2014, I installed everything. Luckily, whatever issues that popped up I was able to handle. You gotta be that way with "bleeding edge" technology. Lots of Googling and trolling forums to find solutions. Here's the first picture I took with the scope: just a single 3 minute exposure of the Orion Nebula. It seemed like that was equivalent to 30 minutes of exposure back in Michigan!

The first year of remote operation has gone better than I could ever have hoped. Yes, there were setbacks (like when lightning fried my PC and the mount) but I've used the scope just about any night I wanted.

PLANNING AN IMAGING MARATHON

This March, I decided to try to do another Messier Marathon. But this time the goal would be to take a picture of all 110 objects in a single night. My first step was to download the Arizona Messier Marathon list from the Phoenix club. It was a nice checklist (and customized to my latitude). As I was doing my last-minute planning, I came across Alex McConahay's excellent account of his imaging marathon in the April 2013 S&T. His article stressed the problems inherent in german equatorial mounts: "meridian flips," or changing from the western to the eastern sky, need to be minimized because they eat up lots of slewing time. So I carefully laid out a sequence that would average one image every six minutes throughout the night. Some images are "twofers" (as Mark Deprest would say) so I could fit in two Messiers in a single frame (or three as in M31, M32 and M110). A total of 96 frames could capture the 110. Hours playing with TheSkyX program showed me that I might even be able to get all 110, if the

beginning and end of the marathon went flawlessly AND there were no clouds.

The night before the actual event, I practiced. The M77 galaxy in Cetus was only 21 degrees up in the still-significant western twilight. But I was able to take a [crappy] image for 60 seconds. Then M74, a galaxy in Pisces, was only 14 degrees off the horizon (still at about nautical twilight). The rest seemed quite doable: the Andromeda trio, M33, etc. I set my alarm and got up the next morning at the start of astronomical twilight. Horror of Horrors, the north wall of the observatory blocked the spot where M30 was to rise! This is the final and most difficult object (even without a blocking wall). One cannot wait for M30 to rise far above the horizon, because twilight brightens rapidly. I was able to get an image of what I thought was M30.

WE STAYED UP ALL NIGHT

The day of the event, I readied my finished basement for the event. The refrigerator was stocked with snacks and Red Bull. Tony Licata arrived first and helped set up the laptop with Photoshop, and recommended a process for pasting in each image as it was finished. Stan Watson arrived to offer his support, having previously helped to get an FTP site set up for quick file transfers between the observatory and my Photoshop laptop.

As it darkened in Michigan (while NM was still in evening sunlight), Lowbrows Doug Scobel and Nathan Murphy arrived. I trained them on telescope operation, so they could tag-team the taking of images. They used my main work PC so there was a good-sized screen to use, and room for two chairs.

We watched and heard the observatory roof open via the webcams. The sun had set in NM, but the sky was still bright. We turned on the camera cooler and mirror fan a half hour before the first shot. At 10:19 EDT (Nautical Twilight in NM), I took the first couple images while Doug and Nathan watched (M77 and M74). Each was only about 2 minutes long, but enough for us to see that they were galaxies. Then I let Doug and Nathan do the controlling while I watched over their shoulders. They got the Andromeda trio and M33. Then a technology glitch hit. TheSkyX program, which controls the telescope, froze up. Totally unresponsive. I started to sweat. We restarted the program, and then had to send the scope back to its “home” position to calibrate. Worked fine. I did not start breathing again until we took a 10 second test image to confirm that the telescope was properly pointing at the next object (M76, the little dumbbell). Whew! Luckily, that was the only problem we encountered.

Here was the procedure Nathan and Doug replicated 94 times

- Consult the list to identify the next object
- Enter that number in the “find” box
- Tell the telescope to slew to that object
- Take a 10 second test exposure to ensure the object is centered in the frame
- Move the telescope slightly to center object
- Turn on the autoguider
- Take a 2 to 5 minute exposure of the object
- During the exposure, take a break, go to the bathroom, get a snack/drink, and most importantly check how we are doing relative to the schedule
- Turn off the autoguider
- On to next object

We used 2 minute exposures for bright objects like star clusters. We went as long as 7 minutes on the great objects like Orion Nebula, Lagoon, Trifid, etc.

Aaron Liepman, an astrophotographer who lives near me in Saline, arrived after we started to help me do the Photoshop processing of images.

Here is the process that we Photoshoppers replicated 110 times

- Use the FTP program to download the most recent bunch of images from NM to the laptop’s desktop
- Open the Canon .raw image using Photoshop
- Crop to show just the object
- Several iterations of “Curves” adjustments to bring out the object against the dark sky background
- Sometimes color correction, vibrance, saturation
- Sometimes noise reduction
- Save as a smaller .jpg image
- Copy and paste into the master poster image
- Place image in a good spot

Doug, Nathan, Aaron and I stayed very busy and alert until about 1am. Then Aaron had to leave. We all took a break. It was going well, even better than anticipated.

Of course, the toughest part was staying alert as we marched through 2am-6am. There really isn't any time to relax, as the schedule has imaging happening almost continuously. The Photoshopping load never abated, in fact I found that I was getting further and further behind as the night wore on. It takes only 6 minutes to take an image, but sometimes more than 6 minutes for me to do the Photoshopping work. I found it tough to stop "tweaking" the image to get it better. Sometimes I just had to day "good enough" and move on.

Nathan left about 6am in order to catch an airplane home to Wisconsin. So it was down to just Doug and I. Actually, we were mostly alone because Doug was in one room and I was in another. He was able to take quick breaks when the shutter was open, and came to visit me. We kept each other going.

Stress increased as we hit the start of astronomical twilight. There were many Sagittarius globular clusters that are just rising and we had wanted to let them get as high as possible (about 15 degrees) before imaging them. So the pace quickened.

After quick exposures of the five Sagittarius globulars (M69, M70, M54, M55, M75), there was M2. Then the fantastic M15 in Pegasus, with a longer exposure to do it justice. But we started to fall behind schedule, and got worried. Then Doug realized that we had skipped M54! I was watching over his shoulder, and keeping an eye on the clock as he went back and nabbed M54. Then we fit two objects in the same frame to save time: M72, the globular in Aquarius and M73 (the asterism of 4 stars that Charles thought was a cluster with nebulosity).

Finally, Doug relinquished his telescope operator chair and had me get the final and most difficult object. M30, the globular cluster in Capricorn, rises with the brightening dawn, at the spot where the observatory's wall ends. So I slewed to where it should be rising and we took repeated 30 second exposures. Nothing. Nothing. Nothing. Either we were taking pictures of the wall, or the distant mountains that extend about 2 degrees above the horizon. Then still nothing, nothing. The frames started to get brighter as the sky brightened. We started to make out a star. But half the frame seemed dark, probably from wall blocking half of the 10" mirror's view. Finally there was a smudge in the center. We were only able to get four more 30 second exposures that barely showed the M30 smudge before it was totally washed out by the dawn. But we did it! All 110 objects.

By this time the sun was up in Michigan. Doug went home. I had so much caffeine in me that I found it difficult to get to sleep. So I got a small glass of wine, drew the drapes in my bedroom, and slept for 4 hours.
I had family responsibilities that next day, and did not get back to Photoshopping until late afternoon. It was 10pm when I finally finished the poster. The full sized version is a monstrous 72" wide x 41" tall. The small version is 41" wide x 23" tall. Aaron and I got them printed at EMU and they look great. Many Lowbrows have one, and I need to do a second printing.

After this exciting all-nighter, Doug said, "Next, we do the Herschel 400!" I'll have to think about that. Tough, but maybe there is a way. But we're gonna need a bigger team and more than one scope.

Uncle Jim's:

Summer Nebula Sampler

By Jim Forrester

The **Bubble**, the **Bug**, the **Box**, the **Cocoon**, the **Crescent**, the infuriating **Egg**, the **Pacman**, the **Skull** and not to be out done in outrageous nicknames, the **Flaming Skull** are all nebulae of different types that are visible from high summer to early fall from southern Canada and latitudes south into the Tropics.

A few can be seen in most backyard telescopes but most will require a dark site to see well. Many have been seen, though some barely, from Peach Mountain. Let's start with the more easily observed.

Sparkling at m 9.6 is the **Bug Nebula**, NGC 6302, located bit north and 3.25° west of the Scorpion's stinger. Some of the hottest gasses (36K°F) known in a planetary rush at an insane 600,000 mph from either side of the dust obscured central star. Having done this for about 2000 years, the bug is nearly 2 light years across, but at 4000 light years from us occupies only 50 arc seconds of sky.

Bright as it is, though, the Bug is a belly scraper for dob owners to observe, transiting at only 10.5° altitude when seen from Peach Mountain (about 01:30 EDT in June). The views are diminished by a magnitude or more by the increase in atmosphere to peer through when the target is so close to the horizon.

The **Box Nebula**, NGC 6309 (m11.5), can also be found with modest telescopes about 3° north east of Sabik in Ophiuchus, and transiting at 34.7° altitude (again, at about 01:30 EDT), a bit easier for dob owners to observe. The odd rectangular geometry of the nebula is likely due to our point of view of an essentially bipolar object. The bright part of the nebula is about ½ light year in diameter, covering 0.3 x 0.2 arc minutes of the sky.

Most scopes will show a dark lane in the southern third of the nebula but smaller scopes might not show the box like shape at all. And some observers have reported seeing the outer "box frame" brighter than the inner core. The central star at m13.7 will be tough, but able to be seen on nights with good seeing and transparency with a 10 inch or larger instrument.

The other objects in this selection aren't easy to see from anywhere in southeast Michigan with any size scope. You'll need to keep your UHC or OIII filters handy to see anything at all. And as we'll soon see, they won't always help either.

4000 light years away in northern Cygnus, framed by a lobe of dark nebula Bernard 168, is the star forming emission nebula IC 5146, the **Cocoon**. Cruising near the zenith in late summer, and supposedly among brightest of our targets at m7.6, the nebula contains the open cluster Collinder 470. The nebula appears dim in the eyepiece as the 7.6 magnitude light is spread over a 12'x12' area. UHC and OIII filters don't seem to help the view, but some speculate an H-beta filter might work.

The Cocoon Nebula *Photo: Brian Ottum*

A young m9.5 main sequence star near the center of the complex seems to provide most of the energy to light up the nebula and has cleared out some of the dust and gas of the molecular cloud that otherwise would have blocked our view.

A tough pair of challenges (as if seeing the nebula wasn't challenge enough) are two double stars in the cluster: V1578 Cygni with a m10.14 primary and a 13.9 secondary 4.5" apart. The other is Coutreau 2320 with brighter m9.71 and m12 stars at 0.9" separation. A very clear and transparent night will be needed to successfully observe the nebula and the stars within it.

The Cocoon is far from any bright stars in northern Cygnus. But most clear summer nights on Peach Mountain will display the fourth magnitude stars Rho and Pi^2 Cygni. IC 5146 is a bit north and 3.5° east of the first and a bit east and 2.3° north of the second. A Telrad will help immensely.

The **Crescent Nebula** is an emission nebula powered by the Wolf-Rayet star HD 192163. The glow we detect is the high-powered radiation of the star blasting into the shell thrown off when it became a red giant. HD192163 is another near term super nova candidate, assuming the "near term" to be the next million years, give or take a few millennia.

The position of NGC 6888 is easy to find, just 2°southwest of Sadr, the central star of the Northern Cross, along its direct line to Alberio. Scopes as small as eight inches have detected a faint crescent under dark skies, but Peach Mountain observers will likely need a larger instrument. If you see something akin to the euro symbol, you'll have gotten most of what there is to get.

Magnitude(m)	Sep.(")	PA
AB	8.6,10.1	1.6	79
AC	9.2	3.9	134
AD	9.8	8.9	193
AE	12.5	16.6	336

NGC 7635, the **Bubble Nebula**, has been classified by different sources as both an emission and planetary nebula, with the very dim "bubble" part about 10 light years across. Most likely seen are the emissions from the surrounding molecular cloud that is lit by m8.7 SAO 20575, the nebula's 11th magnitude light spread over an area 8x15 arc minutes.

The Bubble is a toughie from the Hill that you'll not likely see any of with a scope smaller than 12 inches, despite being less than a degree east of M 52. Even then you may need every trick, including filters and averted vision to sort any nebulosity from the glow of nearby 7th and 8th magnitude stars. For the "Bubble" itself, you may need an 18 inch scope (or larger) and very dark site.

The **Pacman Nebula**, NGC 281, 10,000 light years away in the constellation Cassiopeia, is a large HII star-forming region. The young stars of tiny (4') and dim open cluster IC 1590 light up the over 40 light year in diameter cloud of gas and dust. Notable in the nebula is quintuple star HD 5005, a "Summer Trapezium." The gas and dust of the nebula make the D and E stars a challenge for amateur instruments.

Bok globules—dense, dark areas of gas and dust are scattered through the nebula. The easiest to find is about 3 arc seconds NE of HD 5005.

"Easiest" is probably not quite the right description of anything to do with the Pacman. Nominally bright at m7.1, its light is scattered over an area larger than the full moon, making even the signature shape very difficult to see. A 15' section, though, is much brighter than the rest and should be able to be seen in scopes as small as 6 inches. Late summer and fall are the best times to hunt for this target as it wheels overhead in the hours after midnight. In September, you'll find it 1.7° southeast of Shedar aka Alpha Cas. And as with the Bubble, keep your filters handy.

The **Egg Nebula** (PK 080-06.1) has baffled many a search, some to the point where the frustrated observer doubted its existence. Lowbrow Doug Scobel put that myth to rest with a lavishly illustrated article in the June 2012 ***Reflections***. For those wishing to star hop through northwest Cygnus, follow Doug's detailed directions. Several Lowbrows have observed the Egg from the Hill.The latest edition of Sky Safari, though, now contains the PK Catalog and those with digital setting circles can now easily go to the right spot.

This still doesn't guarantee you'll see the nebula and its two tiny lobes. Even though all its light is packed into a 0.5"x0.2' area, m14 objects are hard to see. Doug estimates it is at least 2 magnitudes brighter, so it is worth a few minutes on a clear, transparent Peach Mountain night.

The Egg is classified as a "proto-planetary nebula." Its star has just ended its red giant phase, hurling off its outer shell and barely begun to light it up with much more intense radiation.

The **Skull Nebula** (NGC 246) in Cetus, however, is reaching the end of its life. Its now white dwarf star is noticeably fading, going from mag 9 to mag 12 since 1930. HIP 3678 is a double—The two stars are only 3.8" apart. The primary is m11.77 and the secondary a hard to see 14.3. HIP 3678 is a bit off center in the nebula, brightening one side as the other dims. The aging of the nebula combined with foreground stars creates the unusual appearance of the nebula.

Observers at dark sites have glimpsed the Skull in 4 inch scopes. The nebula is reasonably bright at m10,39 and a decent 4'x3.5' in size. Most of us though will need more aperture to see NGC 246 as the Skull.

Star hopping to it is a chore as the area has few bright stars. The nebula is about 6°north of Beta Ceti. The Skull makes an equilateral triangle with Phi1 and Phi2 Ceti which lie about 1.5°northwest and northeast, respectively.

The preceeding objects have been seen by Lowbrows through amateur instruments, some from Peach Mountain and some from remote dark sites. I've either found the objects myself or looked through the scopes of members who have.

Sharpless 2-68, the **"Flaming Skull"**, is distant at approximately 30,000 light years and dim. Large at maybe 14' with the best visual magnitude estimates being around 16.5. The nebula has been successfully observed in a 22" scope at 100x with an OIII filter.

This planetary is also fading away as its star dims. WD 1822+008 shines (barely) at m16.6, but its extraordinary proper motion of about 53 milli-arc seconds/year has given the nebula the appearance of a cartoon comet as this part of Serpens has more gas and dust in the interstellar medium than usual. The "skull" part of the nebula is ionized oxygen while the trailing "flame" is excited hydrogen. If you can see anything in your scope, it will be the brightest part of the skull and the bustling central star will be in its eye socket.

All of these objects are a challenge for most any amateur telescope, but most of them can be seen with most any amateur instrument, at least from a dark site. Many have a low surface brightness and will require time, patience and all the tricks of the trade to be seen. And even from Peach Mountain, you'll see some of them well. So good luck and have fun and take some time to share with the rest of us what you see.

The Flaming Skull Nebula--Sharpless 2-68
Photo: T.A. Rector (University of Alaska Anchorage) and H. Schweiker (WIYN and NOAO/AURA/NSF)

Object	Type	Visual Magnitude (m)	Dimensions (arc minutes)	R.A.	Declination	Notes
NGC 6303 Bug Nebula	Planetary	9.6	1.4x0.4	17h 13m 48s	-37° 07'	Center dark lane carbon rich
IC 5146 Cr 470 Cocoon Nebula	Emission nebula and open cluster	7.6	12.0'x12.0'	21h 54m 7s	47° 20' 29"	7.6 mag spread over 144 sq arc minutes= a dim view
NGC 6309 Box Nebula	Planetary	11.5	0.3x0.2	17h 14m 56s	-12° 55' 28"	Central Star Mag 13.7
NGC 6888 Crescent Neb.	Emission	7.4	20.0x10.0	20h 13m 04s	38° 27' 58"	Wolf-Rayet Central Star Mag 7.5
NGC 7635 Bubble Neb.	Emission	7.1	15.0x8.0	23h 21' 24"	61° 17' 24"	Less than 1° E M52 A "Twofer"
NGC 281 Pacman	Emission/ Star Nursery	7.4	35.0x30.0	00h 53' 44"	56° 41'	Central Star 5 star system "Winter Trapezium"
PK 080-06.1 Egg Nebula	Proto-Planetary	14.0	0.5x0.2	21h 02m 56s	36° 45' 35"	Two tiny lobes Hard to find
NGC 246 Skull Nebula	Planetary	10.39	4.0x3.5	00h 47m 50s	-11° 47' 20"	Mag14.3 "B" of central star hard to see
Sh 2-68 Flaming Skull	Planetary	16.5?	14.0x14.0	18h 25m 20s	00° 52' 25"	Large scope & dark site a must!

Sources

NGC/IC Project
Sky Safari
Wikipedia
Jim Kaler's Stars
The National Optical Astronomy Observatory
SAO/NASA ADS Astronomy Abstract Service:
Proper Motion of the Central Star of the Planetary Nebula Sh 2-68, Kruger, F., et.al.
NASA
Deep Sky Forum
Deep Sky Companions: The Caldwell Objects, S. J. O'Meara
SIMBAD Astronomical Data Base
The Large Planetary Observing Guide, Reiner Vogel
Celestial Atlas of NGC, IC, and PGC Objects, Courtney Seligman

All sources excepting S. J. O'Meara's Caldwell Objects can be found on the web.

Lowbrow Monthly Meeting Minutes

May 15, 2015

Meeting Minutes – May 15, 2015

President Charlie Nielsen opened the meeting at 7:34PM

Charlie introduced Emily Rauscher, a post doc fellow in the UofM Dept of Astronomy. She spoke to us about the techniques that have been used to find exoplanets: 1. Doppler shift of a star's spectrum due to the changes in gravitational pull during the orbital motion of an exoplanet, 2. Direct observation, and 3. Changes in the observed star light brightness due to blockage by a traversing exoplanet. The focus of her work is to gain an understanding of the composition and physical conditions of atmospheres of exoplanets. Audience questions were addressed by her.

Matt Linke, UofM planetarium director, then gave us a presentation of the development and status of the new planetarium to be built in the new Biological Science and Museum of Natural History building.

Charlie Nielsen reported on the visit, along with Jack Brisbin and Amy Cantu to MSU Abrams Planetarium. He then reported on the Camp Hazelwoods event: 40-50 young students attended. And we received a "Thank you" note from them and a $100 contribution to our club. He also told us that we have no June speaker and asked for help.

Newsletter Editor, Jim Forrester, reported that the May newsletter had been published and that he needs more articles for June. The May 16 Open house is in question due to weather. The May 23 Open house will feature Saturn in opposition.

Member, John Causland, mentioned that the color of Jupiter's Great Red Spot had an unusual color recently, just prior to the sky being fully dark.

Observatory Director, Jack Brisbin, reminded us of the upcoming Leslie Science Center event on June 27.

VP, David Jorgensen, had nothing to report.

VP, Dave Snyder, reported that the exoplanet naming contest submission deadline has been extended to June 15 and asked for someone to take over this task.

VP, Ken Ruble, reported that he is continuing to pursue a field trip to PlaneWave Instruments.

VP, Don Fohey, mentioned that he will be attending the Black Forest Sky Party and estimated that the number from our club would be 4 to 10 people. Registration begins is Monday, May18. He also mentioned his enjoyment at Camp Hazelwood.
VP, Jack Brisbin, showed us the western cleanup near the observatory that he and others had done by taking down more trees.

Treasurer, Doug Scobel, reported that we are now at 125 members and that there is $5K+ in the club's account. Doug suggested that we might consider obtaining caps with the Lowbrow logo for members. At next meeting he will have a more formal proposal and costs.

Member, Brian Ottum, reported that the requests for posters of the recent 110 Messier objects that he and others have put together have exceeded his expectations. He also mentioned that a You-Tube presentation of their activity would be available on You-Tube at "Astro Imaging Channel" on Sunday, May 17 at 9:30PM.

Member, John Causland, mentioned that Hubbard Lake might be a substitute for the Atlanta dark sky location.

Minutes submitted by David Jorgensen, May 19, 2015

Michigan Planetarium News ...By Norbert Vance

Friday afternoon, May 29, I was invited to the grand reopening of Flint's Robert T. Longway Planetarium which included short intros from Sloan-Longway Director Todd Slisher, Flint Mayor Dayne Walling, and other representatives and donors. The Mott Foundation has generously supported the planetarium over the years, in part, and did so again, this being Michigan's largest planetarium dome. It was a full gut restoration including the interior dome, seats, and system. We were treated to hors d'oeuvres, special fulldome previews using their latest brilliant, ultra high res, Digistar 5 fulldome system, night domesky tours, and behind the scene walk through of another Michigan jewel. The seats are awesome! Specially made in Spain at $1000 a pop, all 129 of them, you'll find superb comfort, plenty of leg room, and recliner head backs and headrests. Todd and his staff did a wonderful job of getting everything just right. So impressed was I that I had to share this with the Lowbrows. Find the planetarium in the Sloan Longway museum campus conveniently located just off I-475, first exit north of I-69, E of US-23/I-75. It's well worth putting into any travel plans.

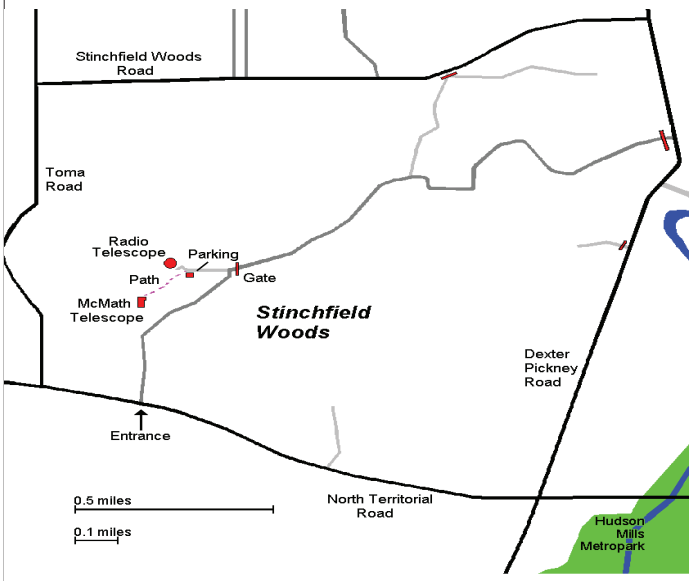
http://www.longway.org/Longway-Planetarium

If it's not on your flight path then take in any of the other local planetariums this summer. Several in our area have also had recent upgrades. Shameless plug for us- Saturndays are coming to EMU June 27 and July 25 which include the full dome feature "Saturn: Jewel of the Heavens" and views of Saturn, weather permitting, through the Sherzer Obs 10-inch apo. But then you'll get a dose of this at the July Lowbrow meeting at EMU with pizza, pop, and cookies to boot! See, aren't planetaria and observatories cool??

Places & Times

Monthly meetings of the University Lowbrow Astronomers are held the third Friday of each month at 7:30 PM. The location is usually Angell Hall, ground floor, Room G115. Angell Hall is located on State Street on the University of Michigan Central Campus, between North University and South University Streets. The building entrance nearest Room G115 is the east facing door at the south end of Angell Hall. A club observing session at the Peach Mountain Observatory, weather permitting, often follows 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, maintained and operated by the Lowbrows. Located northwest of Dexter, MI; the entrance is off North Territorial Road, 1.1 miles west of Dexter-Pinckney Rd. A maize and blue sign marks the gate. Follow the gravel road to the top of the hill to a parking area south of the radio telescope, then walk About 100 yards along the path west of the fence to reach the McMath Observatory.



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 $30 per year for individuals or families, $20 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 $18 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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Lowbrow's Home Page

http://www.umich.edu/~lowbrows/

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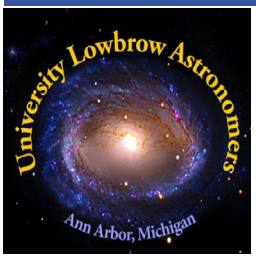
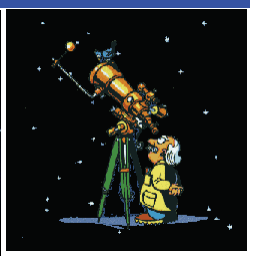
Reflections & Refractions





Website
www.umich.edu/~lowbrows/

Lowbrow Calendar

***Saturday, June 13 and Saturday, June 20*--Open Houses at Peach Mountain**--Start at sunset, may be cancelled if cloudy.

***Friday, June 19, 7:30 PM*--Monthly Club Meeting**--Room G115 Angell Hall, University of Michigan, 435 South State Street, Ann Arbor, Michigan--Kurt Hillig (University Lowbrow Astronomers): “A trip to Astrozona.”

***Saturday, June 27, 8:30 PM*--Observing at the “Great American National Backyard Campout”**--Leslie Science Center, 1831 Traver Road Ann Arbor, Michigan--May be cancelled if cloudy.

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