



REFLECTIONS / REFRACTIONS

REFLECTIONS \ REFRACTIONS

University Lowbrow  
Astronomers

JANUARY 2015

VOLUME 39, ISSUE 1

# C/2014 Q2 (Lovejoy)



Photo: Nathan Murphy

What will likely prove the best visual comet of the year comes, of course, at the coldest time of the year. Observing it has been a bone chilling experience for almost all of us. Lowbrow Nathan Murphy, though, made other arrangements and sent the above photo he shot from Vieques, Puerto Rico on January 7 at 8:04 PM Atlantic Standard Time. He used a Canon EOS 6D with a Canon 24-70 f/2.8L lens at 54mm 6s @ f/2.8 Tripod only (no tracking). The Vieques night time low was in the mid 70's that night. Orion is on the left and the comet is the small blue ball on in Eridanus, in the lower right quadrant of the image. Nathan points out, "really red W Orionus in the middle is way cool!" (On a line directly right of Mintaka)

After warming up, other members sent in their observations: John Causland reported on an observing session in his driveway December 28 (with temps in the balmy mid 20 degrees F), "It was all about Comet Lovejoy last night. Heading towards M79, half degree away in the EP. We came back to it over and over for hours, hi - low power, bino-viewed." Available that night was John's 24" Starmaster, Mike Radwick's 14.5" Starmaster and the Lowbrow 17.5", which is living in John's garage for the winter. Your editor was also able to view the comet later that night from his yard in light polluted Ann Arbor in the club's 10x42 Lecia binos.

The insane cold has not prevented members from making further observations: John Manney, 1/7--"was a bit startled to see that the sky is clear, so I ran out and got a look at the comet with binoculars. It was very clear, even in the Ann Arbor haze. It is in the Southeast, above and to the right of Orion's feet". Doug Scobel, later that night--"Hey John thanks for the heads up. I just got a look at it thru my 10 x 50s minutes before some hazy clouds started to move through. Very nice despite the bright moon. Caught a bit of the tail, the coma looked to be pretty big, maybe 20 arc minutes? Just a guess. Very nice." Chris Sarnecki, 1/8-"This comet is reported at 5th mag right now. I thought to try seeing it naked eye after looking the my 42 mm birding binos. Maybe my imaginary seeing picked it up during an early evening viewing from my Xmas lit front yard, then again later around 10ish when it was higher in the sky. I think with a darker site, this one is easy to spot naked eye...and with some warmer weather (say, in the teens?). Anyone wanting to see an easy comet with your binocs should try this one on the next clear night."

## Over 40 Years in the Making

# A Mirror Tale: 1963-2014

by Don Fohey

This is the tale of mirror project begun so long ago. This is not a how to make a mirror article, but it does pass on lessons learned.

The mirror began when I was but a lad of 16 years back in 1963. I bought everything I needed, an eight inch pyrex mirror blank, a plate glass tool, grits, polish, pitch, pitch mat (used to form groves in the pitch), a knife edge tester kit, and a booklet 9006 titled "Homebuilt Telescopes" from Edmund Scientific Co. I no longer remember why I choose to make an f8 mirror, it was probably because it would be easier, less glass to remove. I followed all the instructions in the booklet. I remember that working with the pitch and rouge was messy. I soon had a mirror polished and ready for figuring. I looked at the mirror with my knife edge tester and couldn't figure out how to interpret what I was seeing. So I gave up and put the mirror away for 40 years.

## Failed to Figure 2002/2003

During the winter of 2002/2003 I decided that it would be fun to finish the mirror. This should be quick and easy. I only had to figure the mirror to a parabola, which could be done in a 15 minute figuring session, how hard could this be? I had polished the mirror into a nearly perfect sphere. When you look at a sphere with a knife-edge tester no shapes appear and the knife-edge readings for all the zones are the same. I was trying to see shapes and make measurement where none where to be seen or made. It also became clear that I needed a better knife-edge tester. I added a micrometer, replaced the incandescent lamp with a LED, modifying it so that I could use it either as stationary or moving source and added an alignment LED.



*Knife-edge Tester, it's not pretty but it works*

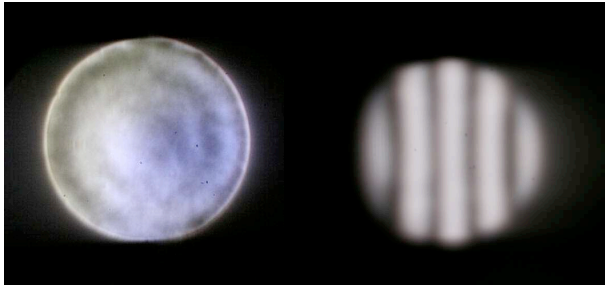
shadow images and zone shadows are not as distinct as they would be with say an F/5 mirror. The stationary source has twice the knife-edge travel from center to edge zone as the moving source. My setup, sticktion and hysteresis errors were therefore less significant. The moving source setup does make knife edge/slit alignment unnecessary and provides for a brighter image. I had no difficulty aligning the slit or with image brightness.

The alignment LED was wonderful especially for my tabletop setup. A piece of paper is attached to the front of the tester. You then align the mirror so that the slit image is at the knife. You then turn on the alignment LED and the mirror forms it's image somewhere on the paper. You circle the image with a pencil and then the next time you test the mirror, you simply move the mirror until the alignment LED image is in the circle and in sharp focus. This saves much time searching all over the room in the dark for the slit image.

I preferred the stationary source over the moveable source knife-edge setup as the zone shadows were easier for me to see. Since an F/8 spherical mirror is about 1/2 wave from a parabola the

Did I tell you how much I hate working with pitch? It stinks and spatters as you heat and pour it. **Wear goggles, a long sleeve shirt, gloves and work in the garage.** Pitch is really the most amazing stuff, if you pick up the pitch-covered tool and are touching the edges with your fingers, the pitch will deform and leave your finger impression. If you try trimming it with a knife or chisel it will shatter into tiny glass like shards. The pitch matt was supposed to make it easier, but edge squares fell off and needed reattaching, trimming the edge made a mess with shards going everywhere. Doug Scobel would come to my rescue later.

So I poured a new pitch matt and began figuring. After three sessions I actually had a very good mirror, the best mirror I was every going to have. I didn't recognize in the data how good it was and I thought I could get it a little better and each successive session introduced more error and zone defects. A mottled appearance developed. I quit in frustration after 23 figuring sessions and put the mirror away for three more years.



**Stage 23**

polishing sessions, which resulted in a mirror that was actually a pretty good sphere confirmed with knife-edge readings. However it was mottled, and had an edge problem. It seemed to have a major defect seen in the lower right. I put the mirror away for seven more years.

## Finished Mirror 2014

Motivated by the progress of the club 17-inch telescope I decided to revisit my mirror. The major defect was actually an artifact of a black pitch spot on the back of the mirror. The knife-edge test can see very small defects and the amplitude of the mottling was actual very small. Tom Ryan explained that the mottling was probably due to the polishing agent being too thick and also suggested a thinner lap. Russ Vente suggested Synthetic Optical Pitch.

## Return to Sphere 2006/2007

I met Doug Scobel who loaned me his pitch hardness tester, and pitch grooving/edging tool and suggested a sub-diameter polishing tool to figure the mirror. I confirmed that my pitch was too hard and ordered a softer pitch appropriate for my 65 degree basement. **The heated pitch grooving and edging tool was amazing, I will never use any other technique again.** My plan was to use the full size tool to return the mirror to a sphere and then use a 4 inch tool to figure the parabola. I had two



**Stage 25**

I poured a new 4 inch diameter thin matt tool using synthetic pitch and the pitch-grooving tool. **I love the synthetic pitch!** It doesn't have the volatile elements of traditional pitch so it doesn't smell when heated, bubbles are not a problem and in many small ways it is easier to work with. I kept the polishing agent thin assuming my figuring would reduce the mottling. After 5 more figuring sessions and after 51 years I decided I was done. My figuring stroke wasn't making any more progress on the edge zone and Figure XP reported a 1/7.7 mirror. The edge zone is not great but it is likely that any more work I do will make it worse. Now for a star test! But first I need to design and build a telescope for the mirror.

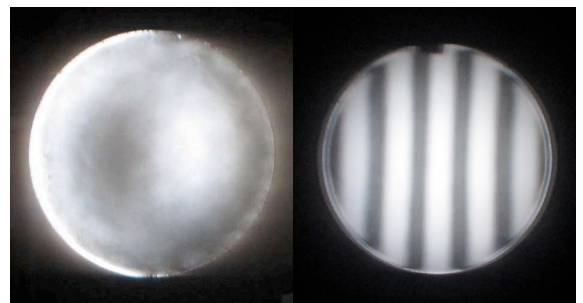
***The stage 30 Ronchi test was a double pass ( lines are straight for parabola) made with Russ Vente's optical flat, the stage 23 and 25 Ronchi are single pass ( lines are straight for sphere).***

## Other Lessons Learned

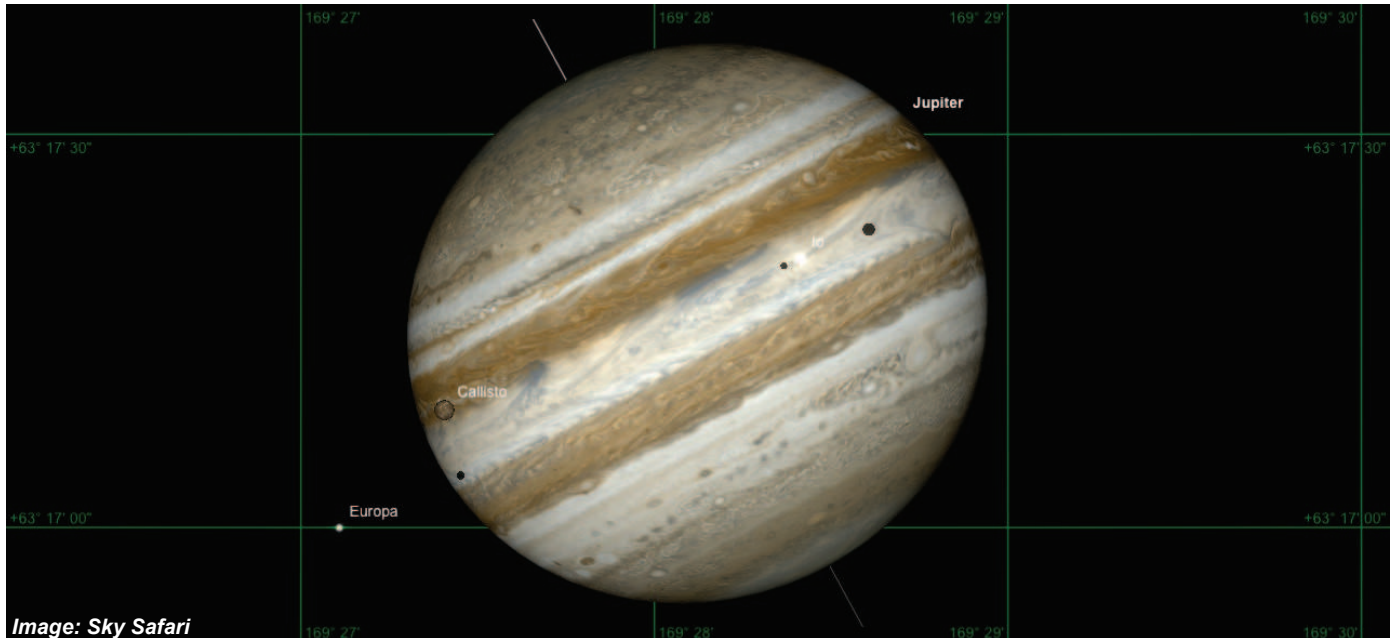
Over the years I have used several analysis methods. I like Figure XP it is simple and gives you back the information you need in a form that you can use.

I liked cerium oxide as a polishing agent. It's less messy than rouge and seems to work fine.

I regret not chamfering the edge of the mirror before I started. I ended up with a knife sharp edge that chipped easily. The chips are evident in the stage 30 photo. I have since chamfered the edge.



**Stage 30**



## Triple Shadow Transit of the moons of Jupiter! Saturday, January 24, 01:26 EST

**Be prepared!!**

*This event lasts only 25 minutes!*

You can set up anywhere you can see Jupiter and fortunately, that should not be difficult. The solar system's largest planet will be over 60 degrees above the horizon at 166 degrees azimuth, nearly due south. You will need a telescope to see this event. A good 80mm refractor will probably be sufficient but you'll be happiest with 6 inches or more of aperture and 100x or more of magnification. Cold, possibly very cold, is the part of the weather forecast that is certain. Wear all your layers.--ED.

## Observatory Roof In Need of Insulation



December 23, myself and Charlie Nielsen moved the 17.5 dob and accessories to John Causland's garage.

The dehumidifiers were running but the building's inside temp was 34 degrees and the humidity was 88 degrees. This means it was dripping water from the inside roof ceiling. (Some of you may have to enlarge the image to see the dripping water.)

We had a discussion at the December meeting on using the non-flaking type ceiling foam that was used on the one of the Angel Hall observatory domes. (I think it was Angel Hall). We need to review this further and develop a time table for installing the right type foam.

Jack Brisbin  
Observatory Director

# **A Survey of Peach Mountain Observatory Weather -1991 through 2014-**

by Christopher Sarnecki

I've always had a passing interest in the weather. Lately I have been reading up and exploring weather in a more academic way, but that's another story. In this brief article, I'll present my survey of when we actually opened the Peach Mountain Observatory for our scheduled Open Houses during the last two and one half decades.

This is my first REFLECTIONS newsletter article that's based on actual data. OK, it's lowbrow data, but data is data. So how did I come by this data? For most of my professional work-a-day existence I had a calendar (used the RASC Observer's Calendar purchased from the club for the last decade) in my work station to record when meetings, project due dates, and other time contingent obligations would occur. Like many cube dwellers, my mind would wonder off to think about more interesting things other than work. You guessed it. I was thinking about the next scheduled Open House at Peach Mountain. So I started penciling in the Open House dates on the calendars. After the weekend, I'd come in on Monday morning and record if we actually opened up or we cancelled the event due to poor weather.

Now don't think that I judiciously recorded our Open House status for the 24 years listed at the top of this article. There were years (1992, 1994, 2002, 2004, and 2006 through 2012) when I recorded nothing. That's right 11 years without data! That leaves 13 years with data. But don't think that the remaining 13 years were completely and accurately recorded either. There were some gaps in that data. Think vacations, family obligations, or out-of-state star parties were I couldn't attend our open houses even if I wanted. Also there were four years (1991, 1993, 2003, 2005) where I had very limited data. I did have a run of 7 years from 1995 through 2001 where I had pretty good data. Also during 2013 and 2014 I've returned to more consistent recordings. That means I have 9 years of good data and four years of marginal data. See, I told you this was lowbrow data.

I thought I'd compile this weather data to see what I might find (and support our Newsletter Editor's wish for us to write more articles). The tables below indicate the percent of 'open' Open Houses. When looking at this information, think about how you might interpret the information, then I'll give you my interpretations below.

### **PERCENT OF 'OPEN' OPEN HOUSES AT PEACH MOUNTAIN OBSERVATORY**

<u>Month</u>	<u>Years 1995 - 2001</u>	<u>Years 1991 - 2014</u>
January	0%	No additional data
February	45%	No additional data
March	60%	50%
April	44%	46%
May	57%	75%
June	71%	60%
July	100%	67%
August	78%	69%
September	60%	60%
October	45%	61%
November	45%	35%
December	55%	45%

So what does this limited weather survey tell us? Looking for better than even odds (>50%) on having an actual open house, you'll want to observe from May to September. But wait, the month of March and December show some better than 50% chance of clear open houses occurring. If you're like me, your recollection might suggest that neither of these months are ideal for some nights under the stars with cooperative weather. The best odds for clear open houses seem to peak in July and August. Overall the data does have a definite bell shaped curve to it following the January to December yearly calendar. No surprises there. I compared my results with an alternate weather survey to see how close the data comes to records from national weather stations. In the back of Guy Ottewell's *The Astronomical Companion* are some nice monthly graphic maps representing cloudiness in the continental United States. The information on the maps follows the same big picture view, except it's not as optimistic for clear skies during the November to March 'cloudy season' as my data suggest.

# INTERMISSION

**Stockyard Oatmeal Stout**--JosephsBrau Brewing Co., San Jose, CA - *Roasted notes in the nose + black as motor oil + full bodied mouthfeel = satisfaction in a glass.*

**Heller Bock**--JosephsBrau Brewing Co., San Jose, CA - *Golden color with crisp dark malted flavor and a slightly bitter ending makes this a refreshing drink.*

**Pere Jacques 2013**--Goose Island Beer Co., Chicago, IL - *Sweeet Belgian sours greet the nose. At \$3 per bottle this full bodied Belgian Style Abbey Ale is defiantly under priced.*

Noted here is some additional information gleaned for the data that's worth mentioning. To our newer Lowbrow members the data showing up in January and February is not made up. Up to a few years ago we actually did observe during these cold winter months. Never mind that I recorded 0% open houses in January, but I did record 45% clear open houses in February. I can recall on some winter nights were we had to shovel some snow to clear a place for our scopes. Lately the month of December seems to be going the way of January and February with little to no observing in the last few years. I suspect it is due to many of our members becoming a 'little long in the tooth' and have an aversion to observing in the winter months. One observation made has to do with Astronomy Day which typically occurs on a Saturday in early April or May. I found only one clear Astronomy Day on my calendars. All the rest were, you guessed it, cloudy! If I had my way, we should delegate Astronomy Day to a Monday or a Tuesday. That way we wouldn't waste a good Saturday to the clouds. Yea I know that's not logical, but hey sometimes you have got to appeal to the weather gods.

Now don't think the worst of our local weather when it comes to observing opportunities. I always say you've got to use what you have. It just might surprise you. To prove a point from January 17 to May 12, 1997, I observed Comet Hale Bopp no less than 34 times. They say you get (maybe) one great comet in a lifetime. For me, Comet Hale-Bopp was that comet. So get out there and observe. Persistence really does pay off, but of course he weather needs to cooperate.



## When Day Becomes Night

Lowbrow eclipse chaser Mike Meade took this view of the November 14, 2012 total solar eclipse as seen from Four Mile Beach, Port Douglas, Queensland, Australia.

"For just over 2 minutes, we were in the shadow of the Moon. With the Moon covering the Sun's photosphere, we looked at the glowing corona with naked eye as the Sun and Moon danced with the clouds."

Mike travels north to the Faroe Islands for the March 20, 2015 total solar eclipse. Mike will be reporting on his adventure to the club at the April 17 Monthly Meeting of the Lowbrows. **Technical Information:** Shot with a Sony DSC-HX10V. @f/5.9, 68.5 mm, 1/6 second, ISO 800 (if viewing electronically, enlarge for detail.)

# Lowbrow Meeting Minutes and Notes

*Each monthly meeting of the University Lowbrow Astronomers is comprised of a presentation on a topic of interest followed by a business meeting of the club. These business discussions are vital to the continuing health and operation of the club and should be attended by all members when able. What follows are reports of the November Officers' Meeting and the November and December membership meetings. Reflections publishes meeting minutes occasionally as space permits--ED*

## University Lowbrow Astronomers (ULA) Officers Meeting--November 21, 2014

Present for Meeting were Charlie Nielsen, Ken Ruble, Don Fohey, Dave Snyder, Dave Jorgensen, Jim Forrester, Jack Brisbin, Krishna Rao and for part of the meeting Doug Scobel.

### SCHEDULING SPEAKERS FOR FUTURE MEETINGS WAS DISCUSSED:

Dave Snyder had an exchange with Matt Linke who may give us a Planetarium presentation. Dave will continue to follow up with him. Dave Jorgensen offered Dr. Glaude Pruneau of Wayne State for the Jan 16th meeting to discuss his current research. Dave J. has also contacted David Cinabro who is considering the November 2015 meeting. Dave will work to schedule him for another month. Dave also explained that there is a third Wayne State possibility for a presenter that he will work to schedule. Charlie Nielsen has a confirmation that Brother Guy Consolmagno, the Vatican Astronomer, will be our speaker for November 2015. The exact date, time and location will be worked out. Norb Vance of Eastern has offered their facilities for the meeting which can accommodate the large number of people expected to attend his presentation. Other possibilities for speakers are Pat Seitzer, Tim McKay and Eric Bell. Dave Snyder will contact Tim McKay.

PROGRESS WITH FACEBOOK AND TWITTER: Krishna explained that there is now a simple procedure to update both Facebook and Twitter with Open House announcements. He explained that anyone can post pictures, text, or links to the Lowbrow Facebook page. It is a moderated page, so it will not appear until he or Dave Snyder approve it. Jack Brisbin asked that the Young Astronomers Web site have a link on the Lowbrow Facebook page. Krishna explained the workings of twitter and how twitter subscribers can follow posts made to a hash tags.

### GENERAL DISCUSSIONS:

The International Astronomical Union (IAU) is expanding its public outreach program. Part of the program is to have members propose names for newly discovered exo-planets. Discussion on the filing requirements concluded that we had the necessary paper work and that joining the IAU should be voted on by the membership.

Briefly recapped the officers email exchange on the merits of the SLOOH Community Observatory. ULA would not provide a web page link to SLOOH. Individual members may join SLOOH and a newsletter article would be a good way to explain SLOOH to the ULA membership.

There was also email discussions on the merits of the Astronomical League (AL). ULA will not join the AL. Members may wish to join as individuals.

There was discussion on our public event notices. The Observer Newspaper continues to be a good resource for us, the paper requires speaker name and title of the presentation in order to print a meeting notice.

Jim Forrester explained the U of M Transplant Center Charity Event. The Evening at Peach Mt. with the ULA for 12 guests had a winning bid of \$2000. ULA will host the event on a date to be determined this spring. We will pick 3 dates, if the weather is bad, we will then pick another 3 dates until the event is held. ULA volunteers will be needed to host, set up tents, tables, serve food and operate the McMath telescope. Jim and Ginia will prepare the food.

Jack Brisbin asked that the names of non current members be removed from the observatory committee list. Dave and Krishna will make the changes. Jack also reviewed various options for a ramp to use when transporting the club 17" telescope. He judged that \$350 would cover purchase and shipping costs. He will bring this up for a vote at the club meeting.

## University Lowbrow Astronomers (ULA) Members Meeting--November 21, 2014

ULA member Brian Ottum gave a well received presentation on the remote control of the observatory he and his friend Dr. Stan Watson constructed at a location near the SW corner of New Mexico (NM). We observed the site from cameras both inside and outside the observatory. He used computer software to power on devices and watched via the cameras as the roof rolled off the observatory. We could see the telescope slew as he pointed it at Vega and then were able to see the image from the camera attached to the telescope. Clouds in NM hampered the view. Stan and Brian's tales and pictures of developing the site, installing the mounts and telescopes was followed by an enjoyable discussion. We hope to have Brian back for a view thru the telescope when it is not cloudy in New Mexico.

### BUSINESS MEETING

Charlie Nielsen has a confirmation that Brother Guy Consolmagno, the Vatican Astronomer, will be our speaker for November 2015. The exact date, time and location will be worked out. Norbert Vance of EMU has offered facilities for the meeting which can accommodate the large number of people expected to attend the presentation.

Dave Snyder reported that the International Astronomical Union (IAU) is expanding its public outreach program. Part of the program is to have members propose names for newly discovered exo-planets. Charlie Nielsen made a motion that ULA should join the IAU. Kurt Hillig seconded the motion and a show of hands approved it.

Jim Forrester reported that newsletter articles are needed. He has nothing for the next newsletter. Jim also explained the U of M Transplant Center Charity Event. The "Evening at Peach Mt with the ULA" for 12 guests had a winning bid of \$2000. ULA will host the event on a date to be determined this spring. We will pick 3 dates, if the weather is bad, we will then pick another 3 dates until the event is held. ULA volunteers will be needed to host, set up tents, tables, serve food and operate the McMath telescope. Jim and Ginia Forrester will prepare the food.

Charlie Nielsen reported that the Leslie Science Center event on Nov. 7th was well attended and was well received. The center donated a check in the amount of \$50 to the ULA.

Krishna Rao reported that anyone can post pictures, text, or links to the Lowbrow Facebook page. It is a moderated page, so it will not appear until he or Dave Snyder approve it.

Don Fohey reported that the open house for Saturday Nov. 22nd was cancelled because of the cloudy and rainy weather forecast.

Norbert Vance reported that EMU received a new Orion 12 inch telescope. It assembled easily and works very well.

Jack Brisbin reported that a ramp is required to transport the club 17" telescope. He recommended an eight foot foldable ramp. He made a motion that the club authorize \$350 to purchase a ramp similar to the personal ramp that he has experience with. **Discussion followed:** Doug Scobel proposed that the ATM group look at building a ramp. Much discussion ensued as to the features of many styles and designs. It was suggested that a used one may be available for sale on the internet. Dave Jorgensen volunteered to research various designs that could be fabricated. A motion was made, supported and passed to have Dave research designs to build a ramp and report back to the club at the December meeting.

Doug Scobel reported that the club has about 120 members and approximately \$4000 in the treasury.

Meeting Adjourned at 9:55pm

University Lowbrow Astronomers (ULA)  
Members Meeting--December 19, 2014

President Charlie Nielsen gavelled the meeting to order. Our scheduled speaker, James Cutler, was unable to make his presentation due to the flu.

Dr. John Monnier, Associate Professor of Astronomy at U-M, and associated with the "Hands on Museum" was introduced to the club by V.P. Dave Snyder. John went through the steps, as he knew, regarding rules and process for naming exo-planets by the IAU (International Astronomical Union). Several members offered suggestions about a name we might submit and if it might be coordinated with "Hands on Museum".

Charlie Nielsen introduced Tom Ryan who spoke about the work he has done regarding multiple coordinated laser beams (1064 nm wavelength) for military application against incoming missiles. The project involves adjusting the individual beams using fast (5KHz) piezo electric actuators to concentrate/coordinate the individual beams (about 35mm diameter) that would otherwise be miss-aligned due to atmospheric turbulence. 32,000 watts are now achievable in a small area at a distance of 5 km, sufficient to quickly melt heavy gauge aluminum sheeting. The talk was well received, with many audience questions and comments fielded excellently by Tom.

Charlie Nielsen mentioned that the Leslie Science Center potentially would like to schedule an activity on August 13 at Peach Mountain.

Newsletter Editor, Jim Forrester, presented a proposed open house schedule for 2015. Jim said the schedule would be emailed to members for their comments. It was suggested that on Astronomy Day, April 25, that the club might want to do a public telescope activity in Ann Arbor. Then Jim made a pitch for articles for the upcoming newsletter, since he has very little material for the next one.

Webmaster, Krishna Rao, reported that the club website size has been increased to accommodate the club's website needs.

Treasurer, Doug Scobel, reported that the membership is at 118 members, a slight decrease from the high point of 120 members and that the treasury is at about \$4000. D.C. Moons suggested that we contact former members for soliciting them as members again.

V.P. Dave Jorgensen reported that the majority of email notes regarding a loading ramp for the 17.5 inch scope seemed to indicate that a purchased, ready-made aluminum ramp, was preferable to designing and building one from wood. Jack Brisbin has been looking for new and used ramps that vary in cost from about \$200 to \$350. No final decision made. Dave J. also reminded the club that in January, Dr. Claude Pruneau, from WSU, will be talking about his research in Switzerland at the CERN LHC and how it relates to our understanding of the "Big Bang".

V.P. Dave Snyder reported that he had submitted an application to the IAU so the Lowbrows would become a "society of amateur astronomers".

Observatory Director, Jack Brisbin, did a slide/video presentation of the latest activity at the observatory. He said that retracting of the roof all the way to the rail stops likely would damage the rail/roof weather stripping he recently installed. Some discussion of methods to prevent this damage ensued. Jack installed 2 dehumidifiers, tying them into the humidistat controller set to 60% humidity. He covered the 24" McMath mirror area with a large plastic bag to reduce the problem of roof drips on the scope. He also discussed adding a heated blanket on the 24" to prevent dew accumulation. Jack showed us pictures of the work he has done to increase our view of the horizon by cutting down many of the trees close to the observatory. He will continue to monitor the conditions inside the observatory with his data logger. It seems to tell us when "wet" conditions occur.

Jim Forrester reported that he and V.P. Don Fohey visited the Northfield library at their request to help them with their telescope program. After evaluating the scopes, they decided to wait until spring to decide what and if improvements could be made.

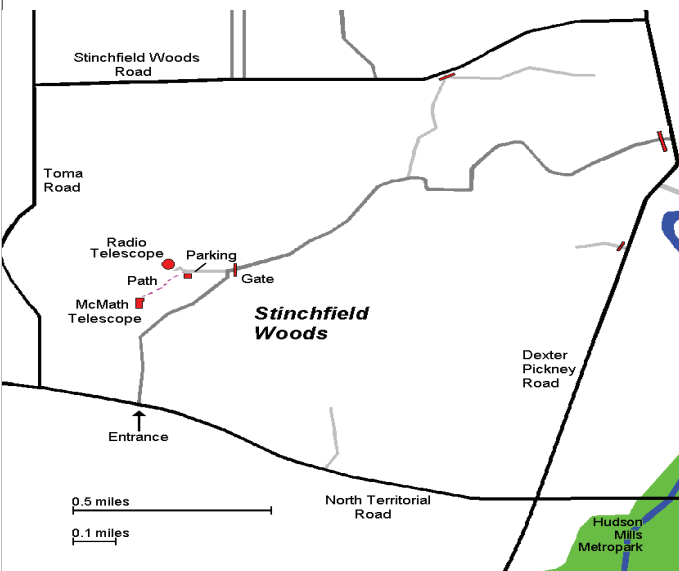
--David Jorgensen



**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 1<sup>st</sup> day of the month as publication is the 7<sup>th</sup>.

**Telephone Numbers**

- President: Charlie Nielsen (734) 747-6585
- Vice Presidents: Dave Snyder (734) 747-6537
- Dave Jorgenson
- Don Fohey
- Ken Ruble
- Treasurer: Doug Scobel (734)277-7908
- Observatory Director: Jack Brisbin
- Newsletter Editor: Jim Forrester (734) 663-1638
- Key-holders: Jim Forrester (734) 663-1638
- Fred Schebor (734) 426-2363
- Charlie Nielsen (734) 747-6585
- Webmaster: Krishna Rao

**Lowbrow's Home Page**

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

**Email at:**

[Lowbrow-members@umich.edu](mailto:Lowbrow-members@umich.edu)

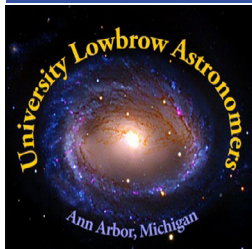




## University Lowbrow Astronomers

University Lowbrow Astronomers  
P.O. Box 131446  
Ann Arbor, MI 48113  
[lowbrowdoug@gmail.com](mailto:lowbrowdoug@gmail.com)

### Reflections & Refractions



### Website

[www.umich.edu/~lowbrows/](http://www.umich.edu/~lowbrows/)



University Lowbrow Astronomers  
P.O. Box 131446  
Ann Arbor, MI 48113

# Lowbrow Calendar

**Friday, January 16--Monthly Club Meeting, 7:30 PM, Room G115, Angell Hall, Ann Arbor--Claude Pruneau (Professor of Physics, Wayne State University):** "The mini-bang: How studies at the CERN Large Hadron Collider inform us about the Big Bang!" Meetings of the University Lowbrow Astronomers are free and open to the public.

**Saturday, January 24, 01:26 EST--Triple Shadow Transit of the moons of Jupiter!** Set up anywhere you can see Jupiter. The solar system giant will be 63 degrees above the horizon in the south-southeast. This unusual event lasts only 25 minutes. Don't be late!

**Comet c/2014 Q2 (Lovejoy)--**Currently (January 11) bright at Mag 4.9 and transiting around 9:00 PM about 16.5 degrees due south of the Pleiades. The comet fades to mag 6 in February, so get out the next clear night!

**Friday, February 20--Monthly Club Meeting, 7:30 PM, Room G115, Angell Hall, Ann Arbor--Carl Akerlof (Professor of Physics, University of Michigan).** "Radio Astronomy on the Roof – Two Undergrad Experiments in Astrophysics & Cosmology."