



Tiny Telescope: A Step into the Past

Norbert Vance

The April meeting of the Lowbrows was a quiet night with elections and equipment swap shop on the agenda... plus it was a clear, moonless night outside. What to do? A few opted to head directly to Peach Mountain instead. I went to the meeting with checkbook in hand not knowing what I'd find. John Kirchhoff would bring a number of temptations over from Rider's. So there I am buying a spare 2-inch diagonal on the cheap. A few days before he had sold Bob Justin and me his last two in-stock Celestron "First Scope" Newtonians so he asked that day if I would bring my new toy over to Dennison for show and tell. I gladly complied and set it up front for all to see.

This little table top Newt on a rugged Dob mount pretty much mimics the scale of Newton's original reflector (which had a speculum mirror of course and even smaller in aperture). It also sits on a contemporary mount, but, you get the idea. Firstscope is Celestron's concurrent answer to the Galileo refractor scope fad marking the 400th anniversary of the telescope. The tube is adorned with famous names in astronomical history. We're talking \$59 for a 3-inch reflector on a

decent little mount with no finder and two cheesy Huygenian 1.25-inch eyepieces (25mm and 4mm). Magnification minimal, expectation factor- low. It does sport a respectable focuser so it was no wonder folks chuckled at my use of this mini-me scope the night before with a Televue Ethos 13mm eyepiece while at Sherzer. Never mind that the Ethos costs more than 10 times as much as the telescope and weighs as much as the scope itself, there was more concern the whole contraption would fall over. It didn't and better yet, it worked. I was surprised how nice the Orion Nebula looked, with more detail than expected. A 5mm Radian brought out the rings of Saturn, albeit tiny even with that muscle. It even managed a couple moons beyond Titan. I had fun looking at things as though I were rediscovering them through my 4.5-inch Tasco (granted my Tasco never had eyepieces like these!). I am, however, not quite ready to trade in the 10-inch apo. Not yet.

After the meeting, off I go from Ann Arbor to... hey, why not... Peach Mountain. I am armed with a telescope after all. I arrived to find Mark, Jim, and Mike with their mega Dobs aimed high. Yasu and Yumi were also stationed nearby while Jason wandered in between. Here I am with a 3-inch Dob under reasonably dark skies. Ooooh, stand aside everyone! I apologized to Mark as I set up nearby hoping not to block his view, ha! All I had was the small box to set the scope on and a cloth bag upon which to kneel. The scope soon caught the attention of Yasu who seemed impressed at the sight of Saturn via the underachiever. Before you know it he's off to the races. He grabs some of his best eyepieces to enhance the views. I gladly step back and let him at it since I'm sure his back is healthier than mine and... he's giggling. Somebody's really having fun with this thing! You know, it's nice to watch an adept observer at work. If only we paid folks with such skills Tiger Woods-like salaries. They've certainly honed this talent with the same time and dedication over as many years. The Pleiades and Beehive are gathered up quickly. Nice bright stars. Yasu manages M81 and M82 directly overhead in seconds. What a nice wide field! Off to the Leo Trio. Yup, there's NGC 3628 next to M65 and 66. Who would have guessed it could be seen with such a marginal scope? OK, nothing beats the views from Mark's 18-inch next door but it's the idea of looking through a 3-inch to see them anew. Ah, then M51, the Whirlpool. Could it be... structure? Maybe our senses are tainted with experience from larger scopes? It is certainly brighter than I would have expected. It also helps that the galaxy is pretty much at zenith. But the view brought out yet more chuckles and disbelief.

Perhaps this is best testament to the quality of today's eyepieces and the need for such. Yasu would then trounce on more galaxies in the Virgo Cloud and Mizar/Alcor. My turn; we marvel at the splitting of Gamma Leonis. Not bad. Over in the east was old friend M13. I stoop down with all the indignity of Dr. Smith from Lost in Space to hunt for it. My back you see, my back... oh the pain. My hefty C11 proved too much to lift one night a few years ago, ouch. Was it worth yet another look in so small a scope? There she is, a bright smudge with her two stellar guardians either side. Am I seeing stars resolved? Well... yes! It's not my imagination. Just on the edge we pick a few off. OK, so Mark pulls in a hoard of stars along with NGC 6207, the small galaxy just north of M13 moments later with the giant cousin. Color me jealous. But it precisely this that makes one speculate just how Newton, Galileo, Cassini and the others viewed the night sky and pondered the discoveries they made. Imagine the awe they would have felt at the eyepiece of the 18-inch. This more than anything makes having the 3-inch scope worthwhile.

Pluto and the Three-Zoned Solar System

By Douglas Warshow

No, this isn't the author's attempt to try his take on the "Harry Potter" series. Rather, this is the first of three articles covering Dr. Alan Stern lecture on how the discovery of Pluto changed astronomers' view of the Solar System. (The author has added some background material where necessary.) He gave this lecture on Friday, February 6 of this year.

Before 1930, the Solar System appeared to consist of two types of major worlds: the terrestrial planets (hold that thought, folks – I'll get to it in the third article) and the gas giants. The terrestrial worlds (Mercury, Venus, Earth and Mars) are relatively small, having diameters ranging from 4,880 km (Mercury) to 12,760 km (Earth). Their compositions are mostly of metals and silicates, which tend to make them dense (from 3.9 to 5.5 times the density of water).

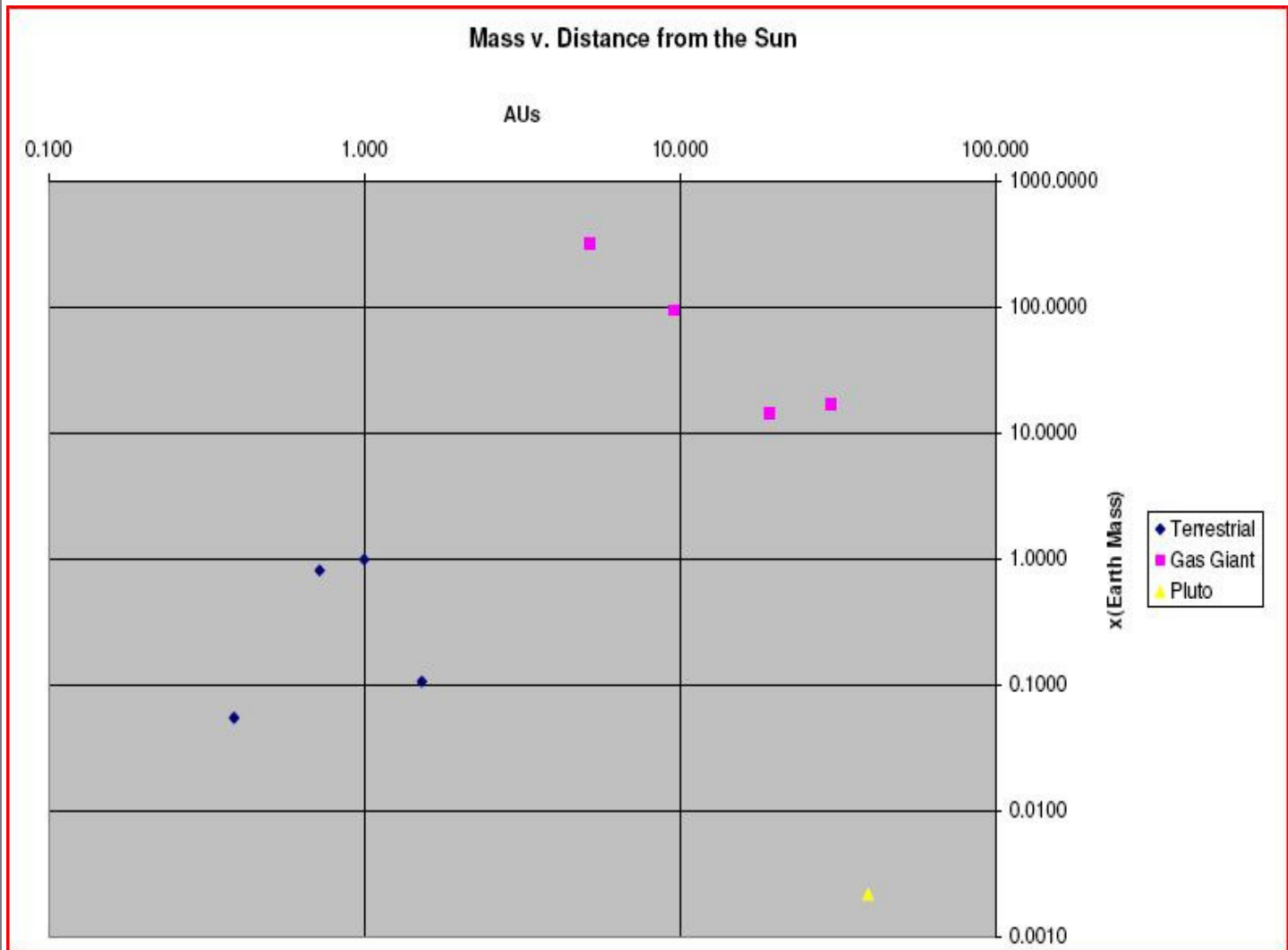
The gas giants (Jupiter, Saturn, Uranus and Neptune), on the other hand, are enormous; the smallest one (Neptune) is four times the size of Earth, while the largest (Jupiter) has a diameter about eleven times that of Earth's. In spite of their enormous girths, three of these worlds have densities barely greater than that of water. The fourth (Saturn) could actually float if there were a cosmic-scale ocean in which to place it. The reason for the "lightness" of the gas giants is that their primary components are the gases hydrogen and helium (hence, the collective name).

Astronomers considered the Solar System to be "tidy" in that each planet was isolated from the other worlds by empty space. Additionally, the planets revolved around the Sun in the same direction in nearly circular orbits.

Recalling whatever mnemonic you used to remember the order of the planets from nearest-to-the-Sun outward, you can see that all the terrestrials are near the Sun while the gas giants inhabit the colder regions of the Solar System. Thus it became natural for scientists to divide the planetary region into two zones.

There were many known comets and asteroids as well, but the largest one (1 Ceres) has a diameter of ~950 km – only about a fifth that of Mercury's. These weren't really considered significant on the planetary scale, so they were regarded as "minor bodies."

The two-zone model began its demise in 1930; that is when Clyde Tombaugh discovered Pluto. As further observations of this distant world accumulated, it became clear that Pluto was a "misfit." (See Figure 1.) It was smaller than Mercury and larger than 1 Ceres, yet thermal observations confirmed that it was more like a comet than a terrestrial planet. If it was a comet, however, it was by far the largest one ever seen. (In 1978 James Christy added more fuel to the fire by discovering Charon, a moon of Pluto that has half the diameter of its primary. No comet was known to have any satellites at all. Two more Plutonian moons, Nix and Hydra, were discovered by the Hubble Space Telescope in 2005.)



Pluto's orbit was also odd. For one thing, its eccentricity (how far from being circular it is) was greater than any of the other planets. Most of the planets have an eccentricity (e) value that is less than 0.100 (with $e = 0.000$ representing a perfect circle). Mercury's eccentricity is above 0.200, but Pluto's over 0.250. For further comparison, a parabola has $e = 1.000$.

The tilt of Pluto's orbit with respect to the ecliptic (i. e., the plane of Earth's orbit) is also greater than any of its larger brethren. Mercury, again, had the greatest value with an inclination of 7° . Pluto easily beats that out with an orbital tilt of more than 17° .

These orbital characteristics are more common with those of comets than planets, so could Pluto just be an enormous comet? Was Pluto just the first discovery of a new class of world? In 1936 Frederick C. Leonard went as far as to suggest that they might be more such objects beyond Pluto's orbit. Or, maybe, this body was merely the proverbial exception that proved the rule.

Pluto's status as a planetary oddity might have been considered as final if it were not for the work of astronomers Kenneth Edgeworth and Gerard Kuiper. In 1951 Kuiper published a paper describing the formation of the Solar System. (Edgeworth had published a similar paper a few years earlier, but relatively few people – Kuiper included – knew about it.) In this paper, Kuiper showed how the giant planets would tend to fling less-massive bodies (like comets) into orbits beyond that of Neptune. These comets would tend to remain in a thick disk located between Neptune's orbit (30 AU from the Sun) and the Oort Cloud, a spherical region of about some 100 billion comets that has an inner "edge" that may be as close as 2000 AU from the Sun. (An astronomical unit, or AU, is the average Earth-Sun distance – about 150 million kilometers.) Julio Fernandez bolstered this argument in 1980 by predicting that a belt of comets and planetesimals (very small celestial bodies) in the outer Solar System was the source of short-period comets. Further more, in 1987 the team of Martin Duncan, Thomas Quinn and Scott Tremaine showed via numerical analysis that low-inclination, short-period comets must come from the region proposed by Edgeworth and Kuiper.

But did this "Kuiper Belt" or "Edgeworth-Kuiper Belt" actually exist? In 1992 David Jewitt and Jane Luu of the University of Hawaii discovered 1992QB1, an object located 40 AU from the Sun. Not only was this body have the proper distance for a Kuiper Belt Object (KBO), but the inclination of its orbit was only about two degrees from the ecliptic.

The discovery of more KBOs followed; four more were found in 1993 and an additional ten the year afterward. By 2009 over thirteen hundred KBOs had been discovered in less than one percent of the sky. This implies that there about *four hundred and seventy thousand* of these bodies residing in the Kuiper Belt with more than one hundred and forty thousand of them having diameters over 100 kilometers. So far, five KBOs appear to be at least 1,000 kilometers wide. The largest known KBO, Eris, is even larger than Pluto. Figure 3 shows the masses and distances of the larger known KBOs along with their sister worlds. As you can see, there is definitely a third region

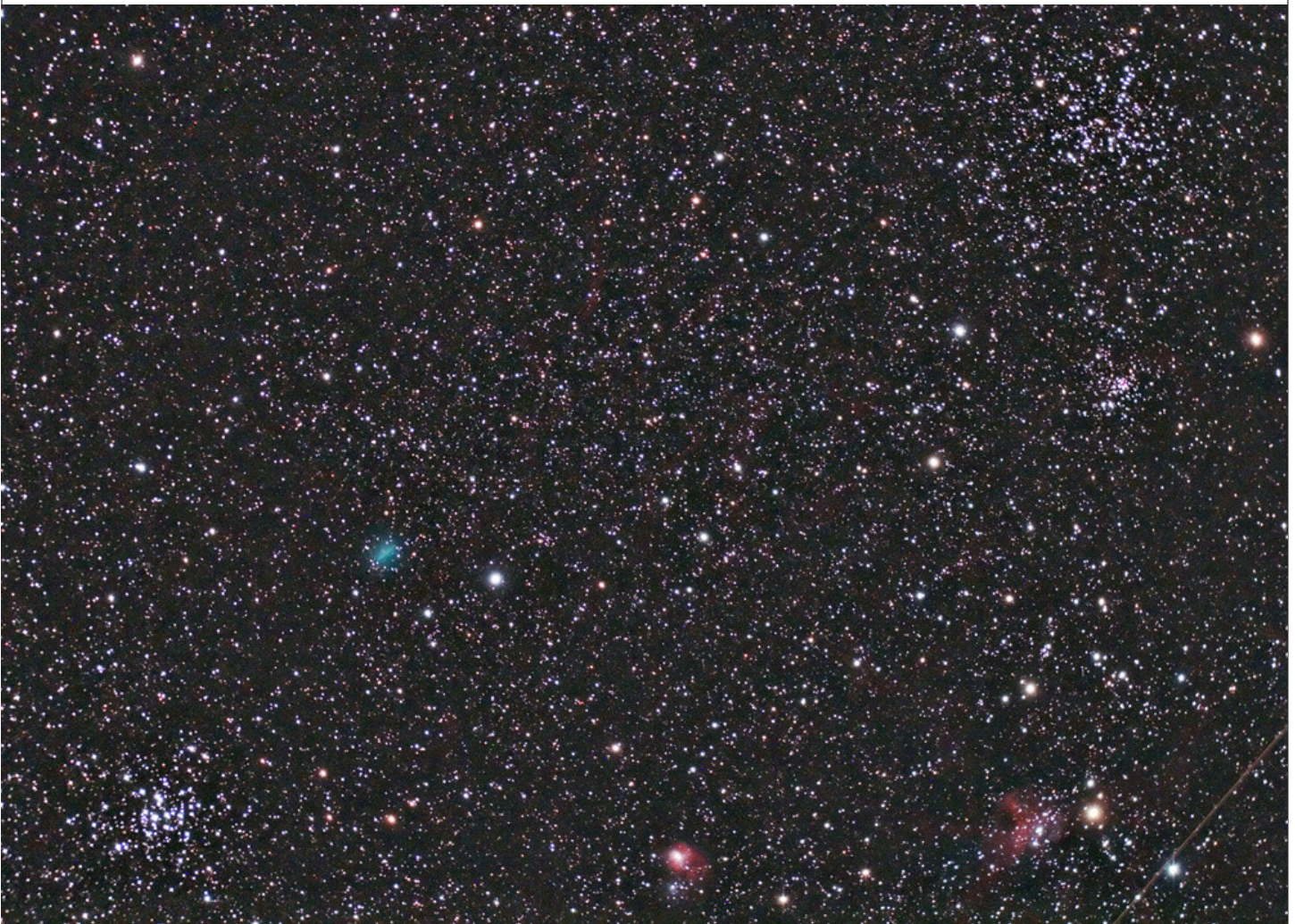
Sterns said that the Kuiper belt is the largest physical structure in the Solar System. This author infers from this statement that the Oort cloud, which is certainly larger than the Kuiper belt, must merely surround the planetary neighborhood instead of being one of its regions. This regarded separation of territories is most likely because the Oort cloud was not part of the nebula that collapsed into the proto-planetary disk that eventually became the Solar System. (Note: the author has not been able to confirm this, yet.)

The Kuiper belt does not appear be unique to our system; astronomers have found many other such structures associated with other stars, such as Fomalhaut in the constellation Piscis Austrinus. KBOs, therefore, should be considered bodies that regularly occur in planetary systems and vastly outnumber a system's terrestrial and gas giant worlds.

So, who are the misfits now?

End of Part I

Note: Many thanks to John Causland for providing me with a DVD of Dr. Sterns' lecture. I also used The Planetary Scientist's Companion as a reference for all three articles.

**M36**

Open Cluster

Comet C/2008 T2

Cardinal

NGC1931

Nebula

IC417

Nebula

NGC 1907

Open Cluster

M38

Open Cluster

Image by Clayton Kessler from SSO in Manchester, MI on the night of April 16, 2009.

And as it turns out some of the ACNO group were out at Peach Mt observatory doing that astronomy thing. Here is a email report from the following day:

WOW!!! It was a wonderful night of Comets (3 to be exact), Galaxies (some of which were Arps) and clear skies. Don Fohey, Mike Radwick, Krishna Rao and I were there until mid-night and if we didn't have to work in the morning we would have all stayed until sunrise! Comets C/2009 F6 (Yi-Swan), C/2008 T2 (Cardinal), and C/2007 N3 (Lulin) were picked off early in the evening and then it was on to our own targets. I heard Don say, that he had seen a number of objects for the first time ... way to go! Don!

Mike and I spent the evening hunting down fainter fuzzies and bouncing back and forth between each other's scopes to see what had the other saying "Cool" or "Sweet"!

Krishna was grabbing some brighter, chunkier stuff with his 80mm Meade ETX espresso machine, which he was testing out for a travel-scope for when he goes abroad this summer. And by the sound of those Meade drives whirling away and his "oos" and "ahhhs" it sounded like a successful test! If the skies stay nice I will probably be out there again tonight!

Thanks guys for sharing the evening with me!

Clear Skies, Mark S Deprest

Saline Star Party

by Brian Ottum

The Lowbrows turned out in force for the Saline Star Party May 2nd and 3rd. Brian Ottum hosted this party for his community, commemorating IYA and the 400th anniversary of Galileo's Telescope.

Saturday May 2nd

Thick high clouds thinned out as Jim Forrester, Mark Deprest, Yasu Inugi and Doug Scobel set up their telescopes on the grass near the dome. Liz Calhoun brought her roommate to help point out constellations. Charlie Nielson fought off a head cold to take control of the 14.5" Starmaster. Before the sun set, Brian cranked up the grill (hot dogs & fixins) plus the astro-themed tunes. Mike LoPresto and Steve Murrell, Henry Ford Community College astronomy professors who both happen to live in Saline, set up their scopes nearby.

Brian's wife Mona lit up the tiki torches and set up the hot chocolate, cookies and display of astronomical pictures. There was even a porta-potty! But where were the attendees?

Luckily they started trickling in at 9pm, as the first quarter moon emerged from the high cirrus. An enthusiastic 25 attendees were able to see craters on the moon (especially Plato), lunar Apennine mountains, Saturn with its nearly edge-on rings, plus three moons. Castor was split, as was Mizar. Visitors to the dome were shown how digital astrophotography was done, taking an image of the Whirlpool Galaxy. Mark wowed the group by pointing out an Iridium flare.

Mark also discovered a new feature on the moon that does not appear on any chart. It is the mysterious "white spot" located near the Alpine Valley. Closer inspection revealed two craters inside the suspected volcano. The Lowbrows enjoyed finding it and speculating on its nature.

After viewing some close doubles (like Porrima) and clusters (an M13 slightly diminished by the bright moon) everyone packed up and left by 1pm. A good time was had by all.

Sunday May 3rd

The next night had the same weather –thick high clouds that thinned out after the sunset. Belinda and Robert came with their retinue of scopes of all sizes. Mike LoPresto was back, but this time with son Sam. We had about 20 appreciative attendees who got to see the moon, Saturn, several binaries, and digital images of galaxies. Peter Cunningham from the Saline Reporter newspaper was there, interviewing folks for an upcoming article.

Brian wishes to express his gratitude to all Lowbrows that came out. We need to do it again in the Fall, when there's no moon!





Images by Brian Ottum's daughter & Mark Deprest

*Saline Star Party
Hosted by Brian Ottum*

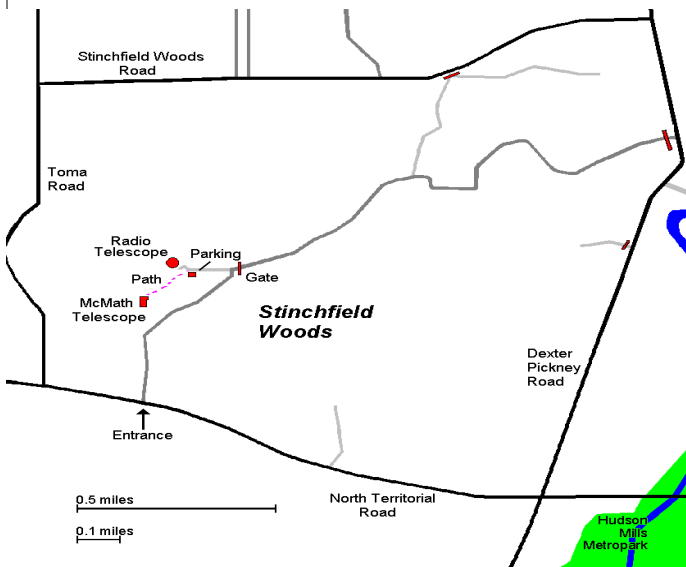
University Lowbrow Astronomer's Schedule

- **Friday, May 15, 2009.** (7:30PM). Monthly Club Meeting.
- **Saturday, May 16, 2009.** *May be cancelled if it's cloudy.*(Starting at Sunset). Open House at Peach Mountain.
- **Saturday, May 23, 2009.** *May be cancelled if it's cloudy.*(Starting at Sunset). Open House at Peach Mountain.
- **Friday, June 19, 2009.** (7:30PM). Monthly Club Meeting.
- **Saturday, June 20, 2009.** *May be cancelled if it's cloudy.*(Starting at Sunset). Open House at Peach Mountain.
- **Saturday, June 27, 2009.** *May be cancelled if it's cloudy.*(Starting at Sunset). Open House at Peach Mountain.
- **Friday, July 17, 2009.** (7:30PM). Monthly Club Meeting.
- **Friday, August 21, 2009.** (7:30PM). Monthly Club Meeting.
- **Friday, September 18, 2009.** (7:30PM). Monthly Club Meeting.
- **Friday, September 25 & Saturday, September 26, 2009.** (6:00 PM to Midnight). The 13th Annual "Astronomy at the Beach" at Kensington Metropark. Hosted by GLAAC (the Great Lakes Association of Astronomy Clubs).
- **Sunday, October 11, 2009.** (time to be determined). Special Club Meeting with Brother Guy Consolmagno (Vatican Astronomer).
- **Friday, October 16, 2009.** (7:30PM). Monthly Club Meeting.
- **Friday, November 20, 2009.** (7:30PM). Monthly Club Meeting.
- **Friday, December 18, 2009.** (7:30PM). Monthly Club Meeting.

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 Astronomer c/o Yasuharu Inugi

**2918 W Clark Rd #203
Ypsilanti, MI 48197**

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

Sky & Telescope - \$32.95 / year

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

For more information contact the club Treasurer. Members renewing their subscriptions are reminded to provide the renewal notice along with your check to the club Treasurer. Please make your check out to: "University Lowbrow Astronomers"

Newsletter Contributions

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

Call or Email the Newsletter Editor: **Mark S Deprest (734)223-0262 or msdeprest@comcast.net** 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

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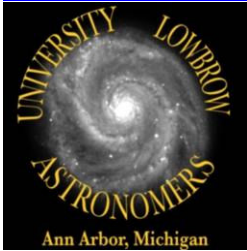


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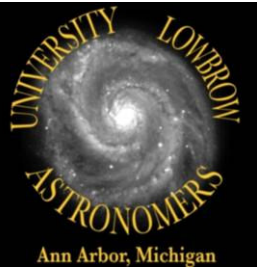
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Reflections & Refractions



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University Lowbrow Astronomers
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*The Moon
The Pleiades
And Mercury
Taken April 26, 2009
By William Stegath
D70 Nikon*

