REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers

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Doug's Deep Sky Challenge -

Will the Real NGC 6526 Please Stand Up?

by Doug Scobel

In my travels through the Herschel 400 and now the Herschel II observing lists, I have come across some rather obscure but nonetheless interesting deep-sky objects to observe. Most of them are not terribly difficult targets to see, given good enough viewing conditions, but some can be a challenge to positively identify. And with a couple of them, it can be downright impossible to know what exactly you're looking at.

A prime example is Herschel II list member NGC 6526, which lies in Sagittarius. Depending on your reference source, it's either Messier 8 (also known as The Lagoon Nebula), a bright knot within M8, or another nebula altogether.

It is most likely that NGC 6526 is at one of two positions – 18h04m06.1s -24d26m31.0s, or 18h02m36.0s -23d35m00.0s. The former puts it just southeast of the dark "lagoon" running through M8; the latter puts it a little northeast of an imaginary line drawn between M8 and M20.

The former position is where you'll find it if you check it in Guide 8.0, in the Saguaro Astronomy Club's database (http://www.saguaroastro.org/), or on the NGC-IC Project's web site (http://www.ngcic.org/dss/dss_ngc.asp). The latter is where you'll find it if you look in Uranometria 2000, Millennium Star Atlas, Pocket Sky Atlas, or The STScI Digitized Sky Survey web site (http://archive.stsci.edu/cgi-bin/dss_form). It does not appear in Sky Atlas 2000.

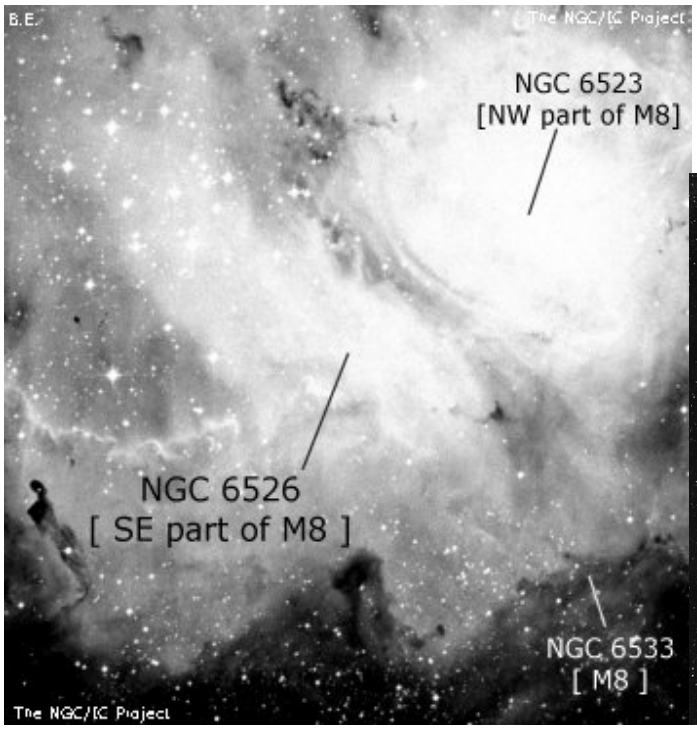


Fig. 1 - left—Here's an image from The NGC-IC Project's data page for NGC 6526, showing it as part of The Lagoon Nebula (M8). Image used with permission.

Fig. 2 - right, above —Here's an image from a web site by David M. Jurasevich (http://www.starimager.com/Image%20Gallery%20Pages/Hydrogen%20Alpha%20Images/m%208%20and%20m%2020.htm). NGC 6526 is described as being the large, faint nebula between M8 (on the left) and M20 (on the right). This is also where most recent star charts put it. Image used with permission.

I also Googled "NGC 6526" to see what else I could find out, but most hits looked like personal web pages that I would not call authoritative. But at least one such site, namely www.answers.com, indicated that NGC 6526 is the designation for the entire Lagoon Nebula, when most sources list M8 as NGC 6523. The NGC-IC Project web page presents a plausible case for NGC 6526 being part of M8 (something about Sir William having a bad night at the eyepiece – I'll let you read about that yourself), but apparently not convincing enough of a case to sway recent sky cartographers. So the jury is still out as far as I can tell.

The good news for me is that the Astronomical League, which sponsors the Herschel II observing club, publishes a nice little booklet to guide you with the observations. This booklet lists NGC 6526 as the separate nebula between M8 and M20. So for purposes of completing the Herschel II observing program, the point is moot – I'll defer to the Astronomical League's opinion. But which one is the *real* NGC 6526? I haven't the foggiest idea!

August's moonless window should be opening just as you read this, and Sagittarius should be perfectly placed in the sky at the end of twilight. So if you get a chance take a look yourself. Seeing details in portions of M8 should be relatively easy, but to see the nebula depicted in figure 2, you'll need a wide field of view, a really dark sky, and either an OIII or UHC filter. Regardless of which one you try, I'd like to know – what do *you* see?

Diagonals

By Tom Ryan

I once made a video of my efforts to make a 4" minor axis diagonal. It is both funny and heartbreaking to watch. The video consists of short time-stamped segments that show the diagonal in an interferometer, which plainly shows its surface figure. The time stamps show I started figuring at about 9:00 PM, with the diagonal about 1.5 waves out of flatness, which is about what you can expect when you come out of machine polishing. After the glass is fully polished, hand polishing is needed to get it flatter, and that's what I was doing.

As I said, the first video segment shows the diagonal about 1.5 waves out of flatness. The next segment, taken about ten minutes later (Karl Mueller, my mentor in this endeavor, emphasizes quick turnaround between testing and polishing), shows the diagonal is about 1/3 wave out.

Now, a diagonal is not round. The minor axis was 4", but the major axis was 1.4 times this, or almost 6" long. The action of an elliptical piece of glass on a round lap is not talked about much in the literature. As it happens, it is surprisingly easy to make a diagonal perfectly flat, and I mean perfectly flat, in one direction, and have it be ½ wave out in the other. And that's what the third video segment shows.

The fourth segment shows the two axis' are more equal, but they are equally out of flatness, at ¾ wave.

The fifth segment shows the second axis flat, but the first has not moved.

And on it went, segment after segment, hour after hour, with the diagonal repeatedly approaching flatness, and repeated retreating from it.

Finally, about 4:30 AM, the video shows that Karl got tired of watching me emulate Sisyphus. He took over the polishing; he went once around the lap in one direction, once around the lap in the other, put the diagonal in the interferometer, and it was flatter than we could measure.

Which just goes to show that you can walk across the water if you know where the rocks are.

I recently needed to get some manufacturing quotations for some tank prisms, and one of the companies I called was Ariel Optics. They have machines called continuous polishers, which basically just make glass flat (which is what you need in a prism). While talking to the owner about other flats I was interested in, he mentioned that one of his employees had a side business called Antares Optics.

Antares Optics, as you may know, advertises extremely flat diagonals on Astromart. The diagonals have phe-

nomenal specifications; 1/100 wave is not unusual. Their prices don't reflect an investment of seven and a half hours in their individual manufacture, either. I asked the owner how he could produce diagonals to that flatness.

A continuous polishing machine is a very large (about 48") ring of pitch on a rotating granite base. Sub-carrier rings containing the optics to be polished are placed on the pitch, and the whole thing is set in motion. Peripheral gears or keepers are used to keep the sub-carriers from flying off the lap, and the whole operation runs continuously (hence its name).

Anyone who has polished anything knows that pitch flows under polishing action. It is constantly trying to become non-flat. The thing that keeps the pitch flat on a continuous polisher is a large round "blocker" that is also set upon the pitch. Moving the blocker closer or farther from the center of the ring turns the lap more concave or convex. The blockers are usually made of pieces of scrap glass, which eventually wear away and have to be replaced.

The employee's thought was that he could substitute diagonal blanks for the scraps of glass on the blocker. Every once in a while, the blocker's action on the pitch will produce a really flat surface across the blocker's 30" or so diameter. At that point, the diagonals, which previously would have been just scrap glass and been thrown away, become saleable items for the employee. If the blocker measures to be 1/3 wave across 30", it will be 1/30 wave over 3", and 1/90 wave over 1".

Would that everyone could turn their by-products into something useful.

I'm now working on a method of heating my house by Global Warming.

New Procedure for Sky&Telescope Subscription

Some of you are already enjoying the club discount rate for Sky & Telescope Magazine for only $32.95 per year as a Lowbrow member (normally $42.95 US).

Some of you are not subscribing yet but may be thinking about doing so. If you are one of them, please read on. There is a new procedure for Sky&Telescope subscription. Here is the summary:

1) If you are already subscribing Sky&Telescope magazine, YOU CAN NOW RENEW DIRECTLY via mail or phone. You will not be required to validate club memberships at the time of renewal. You may mail in the renewal notices with payment or renew via phone at 1-800-253-0245. (Outside US 386-597-4277). Payment at the time of renewal is required. You can send in the payment to:

Sky&Telescope

PO Box 421988

Palm Coast, FL 32142-7818

2) If you don't want to renew directly with Sky&Tel, you can give me a check, along with your renewal notice from Sky&Tel, so that I can send in the payments for your subscription renewal.

3) If you are not subscribing yet and want to start a new subscription, you will need to tell me and give me a check so that I can add your name to the subscriber list and send in the payment to Sky&Tel. New member subscription may be sent at any time during the year.

4) I will be asked to annually review a list of the current Sky&Tel subscribers to validate the membership. The club must remain at least 5 member subscriptions to be eligible for the club discount rate.

5) This new procedure applies to Sky&Telescope magazines only.

If you have any questions about the subscription procedure, please feel free to contact me.

Clear and precious dark skies,

Yasuharu Inugi

Treasurer, University Lowbrow Astronomers

No Matter What John Says …

By Mark S Deprest

I do not have *"perverted imaginary vision"*! I do push my scopes and eyes to the theoretical limits, but I have been doing this since my very first observing session. My eyes and scopes are not the same today as they were back then, but whose are? So, I take exception with those who doubt and voice their doubt of my visual acuity!

Here is a little story of just what I'm talking about. On Friday, July 13th a few of us ACNO (Any Clear Night Observers) went up to Peach Mt. to do a little "observaytin"! Among other things I wanted to do a high power detailed observation of C/2006 VZ13 (LINEAR) to see if there was any hint of new jet activity that I had thought I had seen the week before. This is not unusual for me to do, I often go back and re-examine an object that I have any suspicions about, sometimes just to confirm that I did not see what I thought I saw. As was the case in this observation, I did not see any evidence of a new jet or type of increased activity in the comet.

Now, when I was preparing my charts for this observation, I noticed that relatively nearby to comet was a trio of galaxies from an obscure catalog compiled by Miles Paul. This catalog is one of my favorites, particularly on very clear, transparent & steady nights as the objects can really test your skills and optics. The catalog contains over 300 trios of compact galaxies using all the same parameters as the Hickson's Compact Galaxy Groups Catalog except that Miles Paul only wanted "Trios" of galaxies as oppose to Hickson who only wanted groups of 4 or more for his catalog. For anyone who would like an excel file of the Catalog of Compact Galaxy Trios, please send me an email and I'll forward you a copy.

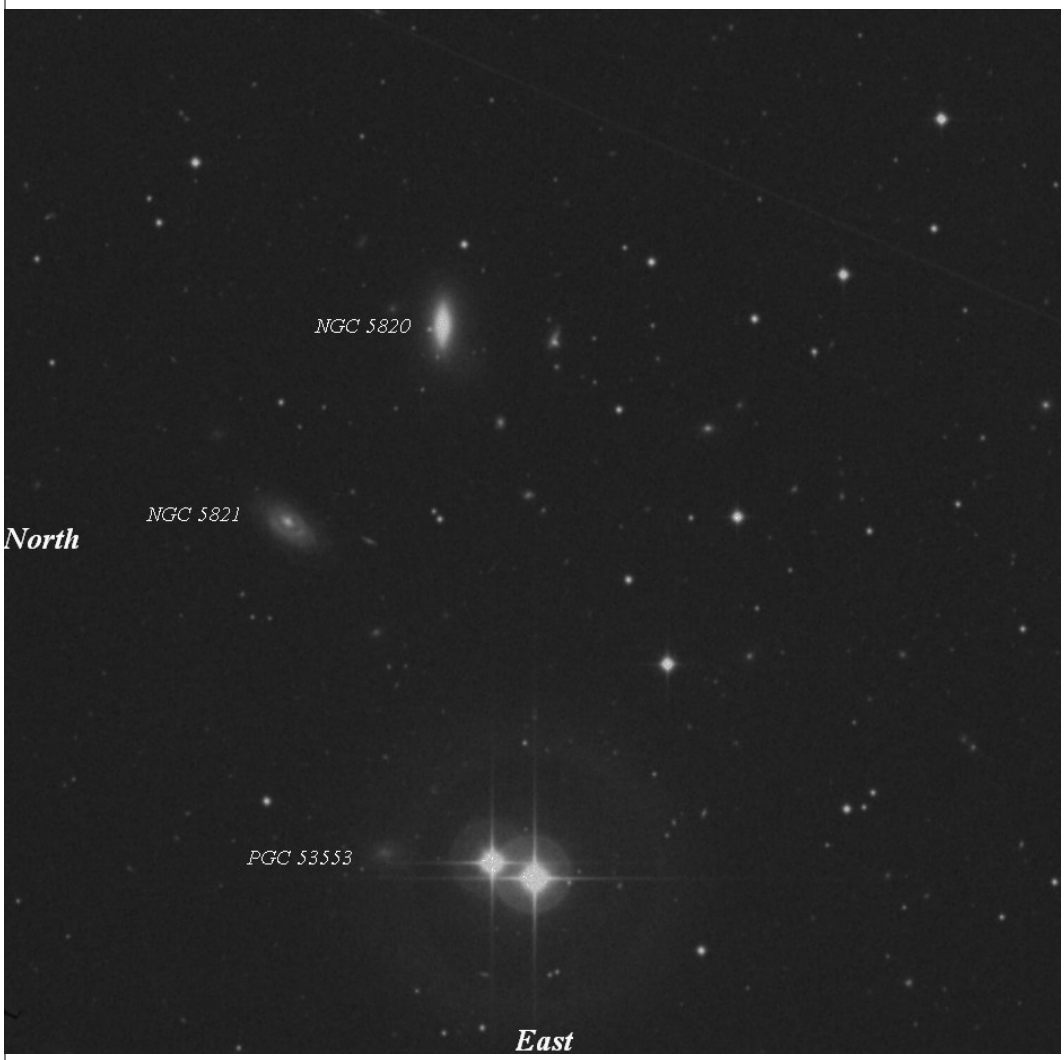
Getting back to this galaxy trio nearby the comet, this trio's components are rather faint and one is quite small. However, if I could see two of the components I would be happy after all as "Meatloaf" so eloquently put it "two out of three ain't bad!" So, after my thorough examination of the comet I pushed my 12.5" f/5.6 over to the field of view containing my quarry and I was pleasantly surprised to see the brightest component at 13.3 magnitude was fairly easy to see even in my low power eyepiece that I use to find my "hunting grounds". However, there is a slight problem with this initial observation and I'll come back to that in a minute. After moving to higher powers I had convinced myself and a couple of my fellow ACNO that we were seeing all three of the components, with the other two galaxies being on opposite sides of the "bright" component and being considerably fainter, somewhere in the 14.5 to 14.8 magnitude range. The faintest and smallest being to the north about 3 to 4 times the distance of the separation between the bright double star in the eastern edge of my FOV. Here's the problem, the other two galaxies are not on opposite sides of the "bright" component, they are in reality both on the eastern side of it and we were not seeing them! I was able to figure this out the next day when I did a much more careful analysis of my finder chart. The power of suggestion can be a double-edged sword cutting both ways. Without knowing what and where to look for something you could be completely lost, but by misinterpreting the FOV and projecting what we think we are suppose to see we can be equally lost and see things that aren't there.

So, the next observing chance I got, I would need to go back to this group and re-examine it. This time knowing exactly where all three components were in relation to the field stars and exactly what they should look like. Fast forward a week and now it's Saturday, July 21st and clear, steady and transparent awaited us. I would have to wait until the first quarter moon to set before trying to see these objects which are right at the edge of the envelope in brightness for my scope. But this would not be a problem as the Trio is located in northern Bootes near the border of Draco and therefore circumpolar.

At this point in this story I need to bring up the question that is probably on everyone's mind by now, just what are the

magnitudes of these galaxies and what are their catalog designations. The brightest component NGC 5820 is listed as 13.3 mag. in the NGC-IC project, NGC 5821 is listed as 14.6 mag. in the NGC-IC project, and the PGC 53553 is listed as 14.5 mag. in the Principal Galaxy Catalog. Armed with this info only your first thought would be that the third galaxy listed should be slightly brighter than the second galaxy and you would be wrong! Because when it comes to extended objects, SURFACE BRIGHTNESS is the key! A perfect example is the Globular Cluster NGC 5053 at 9.5 mag. but with a very low surface brightness, take at look at this globular the next time you're out; it is less than a degree to the east of the 7.6 magnitude Globular Cluster M53.

Surface Brightness is a rather complex formula of "Total Magnitude" and "Size" or magnitude per square arcsecond; that is, if you took an average region of the galaxy and somehow blocked out all but an area one arcsecond (or one arcminute) on a side, this is the magnitude of the surface brightness of the resulting object. Another description of surface brightness is: the apparent magnitude of an astronomical object which is generally given as an integrated value. If a galaxy is listed as having a magnitude of 12.5, it means that we see the same amount of light from the galaxy as we would from a 12.5 magnitude star. However, while the star is so small it is effectively a point source, the galaxy may extend over several arcseconds or arcminutes. Therefore, the galaxy will be harder to see than the star against the sky-glow background light. Surface brightness is usually expressed in magnitudes per square arcsecond. Because the magnitude is logarithmic, calculating surface brightness cannot be done by simply dividing the magnitude by the area. For those of you who like math: ***S=m+2.5*logA*** Surface brightness(***S***) is equal to the magnitude (***m***) extended over an area of (***A***) square arcseconds. Confused? Good, I don't feel so alone. Doug Scobel tells me that the surface brightness of an object is most of the time more important than the listed magnitude of an extended object.



With all that said let's go back to our trio of galaxies and look at their surface brightness and one of my favorite source for this is Uranometria 2000.0's Field Guide, and the numbers here are quite a bit different than the numbers listed in Guide 8.0 (my favorite astronomy software) mainly because they are visual magnitudes and not determine off of photographic plates.

Uranometria 2000.0 lists the same galaxies as:

NGC 5820 Visual magnitude: 12.4, Surface brightness: 13.0, Size: 1.7' x 1.1'

NGC 5821 Visual magnitude: 13.6, Surface brightness: 13.6, Size: 1.4' x 0.8'

PGC 53553 Visual magnitude: 13.8, Surface brightness: 13.3, Size: 1.0' x 0.7'

Okay that's a lot of information, but what exactly does all of this mean at the eyepiece and will I be able to see all three in a 12.5" f/5.6 reflector?

The answer is yes! But not without pushing my scope and eyes **almost** to the limit … I say **almost** because once I think I've reached my limit I seem to be able to go beyond it.

But how does one actually see objects as faint as these? That's really what this article is all about, how do you learn to see, that which most people would consider as "unseeable"? I want to give you some tips and tell you about some of the things that work for me.

First, and arguably the most important is EXPERIENCE! You can not expect to see or for that matter to even find these types of faint objects without a good deal of time at the eyepiece. And I think one of the biggest reasons for this is; one needs to know what certain objects look like in ones scope takes and this takes many hours of observing. I have always said that knowing how things appear to you in your scope can make all the difference in seeing it or not.

Second, and a very close second it is, is ACCURATE INFORMATION! I'm talking about charts, magnitudes, surface brightness', sizes, shapes, etc. A good wide field finder chart & a highly detailed FOV chart (preferably eyepiece oriented) is what I use. I print at least two charts for every comet or new object I go after, and in the margin I write down as much information as I possibly can find. How can you even hope to find your quarry if you don't know where it is? Or what the field of view should look like? Remember, if your target is a moving one (comet, asteroid, planet's moon), make sure that your charts are printed for the time you are going to be searching for it. Case in point: I was planning an observing session for one summer night and I had a rather faint comet listed as one of the things I wanted to see. My observing session started on Friday night and would last until early Saturday morning. I pulled my comet charts for midnight or 00:00:00 Friday, guess what? I couldn't find the comet. Why, because my chart was 24 hours off and the comet had moved almost 3.5 degrees from where I was looking.

The third thing that helps me see those "extra-deep" deep sky objects is RELAXED CONFIDENCE. I always believe that I can! I have a relaxed confident feeling about it and I carry that relaxed feeling with me to the eyepiece. If you put your eye to the eyepiece and think that you probably can't or won't see that faint fuzzy, then you guessed it … you won't! And that's all I'm going to say about this.

Some of the other things that have contributed to my successes and these are in no particular order but all of them make a significant difference.

CLEAN OPTICS, say what you want about over cleaning and sleeks and scratches but I keep my optics clean and regularly use canned air to blow off the dust. This applies to eyepieces as well as mirrors and lenses.

OPTIMAL CONDITIONS, give yourself a fighting chance, don't go looking for a 13^{th} or 14^{th} magnitude galaxy while its sitting a couple of degrees from a first quarter moon, or with hazy, poor transparency skies, duh! Wait for the best conditions, try and get the darkest background possible. Contrast is the key, and sometimes there is very little difference between the brightness of the object and darkness of the sky. (Maybe that should be the other way around for our skies.) My telescopes have been optimized to help produce the highest contrast as possible. They have been flocked to reduce or eliminate stay light, they have the smallest possible secondary mirrors I could put in them without compromising the telescope's performance. I always try and wait until my quarry is near or at its highest point in the sky.

HIGHER POWERS can make a difference between seeing or not. So, first find the correct FOV then start bumping up the powering steps, use as much power as the sky conditions and the object will allow. This reduces the size of your FOV and magnifies the size of the object. Yes, I know that it also equally dims the object and the background, but the object and background still have the same contrast. By increasing the power in steps you will find that there is an optimal high power and that going beyond this point will reduce your ability to see your target.

BREATHING is very important, so keep on doing it or you might pass out and hit your head on the scope! Or even worse you might pass out and drop that expensive eyepiece! But for finding really faint fuzzies, DEEP breathing is equally important. The additionally oxygenated blood going to both your brain and eyes can sometimes produce as much as a half of a magnitude increase in visual acuity. I like to take long deep breaths, in through my nose and out through my mouth. This method seems to produce the best results as well as keep me relaxed.

SCOPE WIGGLE can bring those really low contrasting objects out of the background. I usually have my scopes set up on a tracking platform and the centering buttons are great for this, but a very gentle nudge will accomplish the same. The reason this works is simple, in low light situations the human eye is much more sensitive to movement. So, a slight wiggle of the FOV may be all you need to see the object. This is very similar to averted vision.

AVERTED VISION and not *perverted imaginary vision* is another technique that I use to see some of these types of objects. Anyone who has been observing for any length of time knows or has heard about this method of picking out those hard to see objects. A really good object to see how this method works is NGC 6826 a. k. a. "The Blinking Planetary" nebula in Cygnus. With average size scopes and powers of about 150x to 200x looking directly at the 10.4 magnitude central star, the nebula disappears, but look at the 11th magnitude star just to the south and boom, the nebula pops back out!

Like all of the techniques I describe in this article they take practice to master and I guess that's my real point of this article. Just like learning to play an instrument if you want to be good you must practice, practice, and more practice! So, the next time you're out with your eye at the eyepiece try to push your envelope just a little bit further. Pick a couple of objects that you think are just beyond your reach and reach for them, you might even surprise yourself!

***Left* Image by David Tucker**

Image of a portion of the Eastern Veil Nebula in Cygnus, taken from a friends cottage near three rivers. Taken at relatively low resolution, hence small size. Constructed from about 30 two minute white-light ("L") frames, and about 5 two minute frames each through Red, Green and Blue filters to allow me to build color composite image. TV Genesis refractor with focal reducer, Starlight Express MX716 camera.

***Right* Image by Mark S Deprest**

Image of Comet C/2006 VZ13 (LINEAR) taken with Meade DSI thru "Gilda" (8" f/6 Dobsonian Reflector on a tracking platform) on 07/14/2007

4 auto-stacked 5 second exposures (monochromatic) & 8 auto-stacked 10 second exposures (full-color) then combined using Thumbs Plus 7.0. Meade's "Drizzle" program used to eliminate field rotation. Image is cropped to 75% of its original size.

***Left* Image by Mike Radwick**

M57 the 'Ring Nebula' Taken at the 'Causland-Causeway' on 07/06/2007. 8 x 30 seconds exposures using a Canon 30D and 14.5" StarMaster Telescope

***Left* Image by Doug Scobel**

Venus and Saturn as they pass each other in the sky (at least from our point of view). This one was taken on 07/01/2007 by Nikon Coolpix 800 "Hand-Held" to Doug's 6" f/4.5 'Smurfette' and 24mm TeleVue Panoptic eyepiece.

Lowbrow Open House and Meeting Schedule

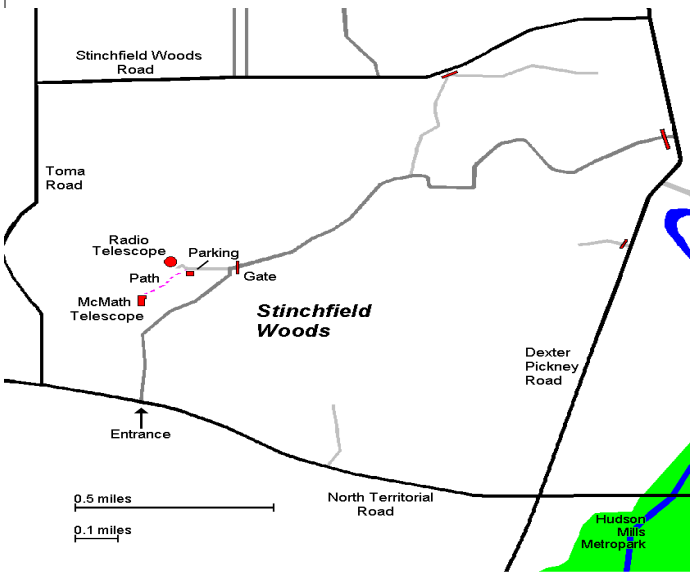
- **Saturday, August 11, 2007.** *May be cancelled if it's cloudy.* (Starting at Sunset). Open House at Peach Mountain.
- **Friday, August 17, 2007.** (7:30PM). Monthly Club Meeting.
- **Saturday, August 18, 2007.** *May be cancelled if it's cloudy.* (Starting at Sunset). Open House at Peach Mountain.
- **Saturday, September 8, 2007.** *May be cancelled if it's cloudy.* (Starting at Sunset). Open House at Peach Mountain.
- **Saturday, September 15, 2007.** *May be cancelled if it's cloudy.* (Starting at Sunset). Open House at Peach Mountain.
- **Friday, September 21, 2007 and Saturday, September 22, 2007.** (5:00 PM to Midnight). The 11th Annual "Astronomy at the Beach" at Kensington Metropark. Hosted by GLAAC (the Great Lakes Association of Astronomy Clubs).
- **Friday, September 28, 2007.** (7:30PM). Monthly Club Meeting. *[Note, the date of this meeting has changed]*.

Also don't forget to watch your Email for those impromptu observing sessions organized by your friends in ACNO!

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

1515 Natalie Lane #205
Ann Arbor, MI 48105

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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Image by Clayton Kessler

Comet C/2006 VZ13 (LINEAR) taken on 07/04/2007 from Clayton's Seven Sisters Observatory .

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