



## The Owl Nebula, aka, M97

*Don Surlles*

The Owl Nebula, M97, is known to most amateur astronomers as a faint fuzzy sharing the outer corner of the bottom of the bowl of the Big Dipper with the edge on galaxy M108. It was "discovered" by Pierre Méchain in 1781. The Owl Nebula, Messier 97 (M97, NGC 3587) is one of the fainter objects in Charles Messier's catalog. It is one of the four planetary nebulae in that catalog. It is about a 10<sup>th</sup> mag object and is about 3.5 by 3.5 arc minutes. The object is an "easy" target for Delmarva scopes 8" and larger...and larger scopes show the object better than smaller scopes. The nebula will take quite a bit of magnification before it disappears into the background.

The name "Owl" is based on the two darker spots that seem to create the dimly lit face of an owl. Use your imaginary perverted di-vision when viewing it and just maybe you can become convinced you are actually seeing an owl's face.

Here is a quote you can process while using your imaginary perverted di-vision on the Owl nebula...and you may want to contemplate what Mr. Hynes was smoking as he penned the quote:

"M97 is one of the more complex planetary nebulae. Its appearance has been interpreted as that of a cylindrical torus shell (or globe without poles), viewed oblique, so that the projected matter-poor ends of the cylinder correspond to the owl's eyes. This shell is enveloped by a fainter nebula of lower ionization. The mass of the nebula has been estimated to amount 0.15 solar masses, while the 16 mag central star is believed to be of about 0.7 solar masses. Its dynamical age is about 6,000 years. (from Stephen J. Hynes, *Planetary Nebulae*)."

For your reading enjoyment here are some other comments about the Owl Nebula's appearance by noted astronomers of yesteryear:

**Charles Messier:** March 24, 1781. 97. 11h 01m 15s (161d 18' 40") +56d 13' 30"

"Nebula in the great Bear [Ursa Major], near Beta: It is difficult to see, reports M. Méchain, especially when one illuminates the micrometer wires: its light is faint, without a star. M. Méchain saw it the first time on Feb 16, 1781, & the position is that given by him. Near this nebula he has seen another one, [the position of] which has not yet been determined [[M108](#)], and also a third which is near Gamma of the Great Bear [[M109](#) near Gamma Ursae Majoris]. (diam. 2") "

**William Herschel:** "The arguments that the nebulous matter is in some degree opaque which is given in the 25th article, will receive considerable support from the appearance of the following nebulae; for they are not only round, that is to say the nebulous matter of which they are composed is collected into a globular compass, but they are also of a light which is nearly of an uniform intensity except just on the borders. I give these nebulae in two assortments.

A very bright, round nebula of about 3' in diameter; it is nearly of equal light throughout, with an ill defined margin of no great extent."

[Papers, Vol. 2, p. 601] *The 97th of the Connoissance*.

"1799, 7 feet finder. The object is not visible in it."

"1789, 20 feet telescope; considerably bright, globular, of equal light throughout, with a diminishing border of no great extent. About 3 minutes in diameter."

"1805, large 10 feet telescope. The constellation being too low it had the appearance of a faint nebula."

From the observation with the 20 feet telescope, it appears that the profundity of this object is beyond the gauging power of that instrument; and as it must be sufficiently distant to be ambiguous, it cannot be less than of the 980th order.

(See [Owl](#) on page 5)

### The Delmarva Stargazers Announces a Writing Contest.

The DMSG will raffle away astronomy gifts to members who submit articles to the Star Gazer News.

How to enter:

1 Open to DMSG members.

2 Members may submit original articles at least 500 words (1/2 page) for publication in the Star Gazer News.

3 Articles **must** be authored by the member.

4 Pictures can be included, but they do not count towards word count (1 picture = 1000 words).

5 Must be astronomy related. Each article = one chance in the raffle. The drawing will be made at the star parties based on the previous 6 issues – need not attend to win (but it would be nice to see you there). *The editor of the Star Gazer News qualifies articles submitted.*

**How to Join the Delmarva Stargazers:** Anyone with an interest in any aspect of astronomy is welcome

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE & ZIP \_\_\_\_\_

E-MAIL ADDRESS (If any) \_\_\_\_\_

Do you need the newsletter snail mailed to you (Y/N)? \_\_\_\_\_

Please attach a check for \$15 made payable to Delmarva Stargazers and mail to Kathy Sheldon, 20985 Fleatown Rd, Lincoln, DE 19960. Call club President Tom Pomponio at 302-736-0157 for more information.

## Shallow Sky Sorties – December 2007

Jim Tomney

This fall has certainly been bountiful in its observing opportunities. First was a great No Frills event – nice company and good skies (although the evenings did dew up pretty heavily by midnight on Friday and Saturday). I managed to rescue the 10" from the back of the garage and take it to the party, and it rewarded me with some fine views once again. We're fortunate to have club members who will offer their time and talent in coordinating these semi-annual events, and I certain thank them for their efforts! And then of course we had the unexpected treat of Comet Holmes "exploding" from an object fainter than Pluto to a naked eye comet, a rare and fascinating event.

Ever suffer from occasional insomnia? I do, and I've found that sometimes the best solution is to get up and do something – like a simple observing session – rather than tossing and turning. The skies from my house tend to be at their best an hour or so before twilight begins. Businesses have shut their doors for the night and neighbors doused their lights as well, so unless you've had the good fortune to have suffered a power outage it's probably at maximum darkness. On a recent Monday morning when I found myself unable to return to sleep after nature's calling (you younger guys will understand later) I elected to grab the 60mm and see what was up in the winter constellations. I have really come to enjoy the fact that the scope is handy and ready at a moment's notice, trading power for convenience.

Gemini is riding near zenith with Mars beginning to assert his presence more boldly each passing week. I take a few minutes to let my eyes dark adapt and conclude that we've got pretty good skies as I'm seeing to at least 4<sup>th</sup> magnitude. Below Gemini lies Monoceros the Unicorn, one of the more modern constellations that is blessed with a handful of great objects from the winter Milky Way, some of which have made their way onto the [Urban List](#). I warm up by aligning the red dot finder on Beta Monoceros, a 4<sup>th</sup> magnitude star that technically is the brightest star of this obscure constellation. As soon as the target enters the low power field of view it's apparent why it has been nominated as an urban gem. It is a fine double of nearly equal brightness – a pair of crisp, glittering white diamonds set close together. While this scope does not have great optics this double really does display well in a small refractor, the wide field bringing in a handful of neighboring stars for added enjoyment. I increase the magnification using the 10mm eyepiece, and although the gap widens between the two suns I have to admit I prefer the lower power view on this one. Beta is actually a fine triple star but that discovery would require better aperture and power than what I have at hand for the moment. It doesn't dissuade me from agreeing that even as just a double this is a fine object for observers with modest instruments.

Turning to more subtle quarry I check the chart for the location of open cluster NGC 2244. Phil Harrington lists this as a binocular object so I begin by sweeping the area with the 7 x 50s between Procyon and the Hunter's right shoulder for any evidence of the cluster – and soon find a little patch that is a likely candidate. Once I manage to get it into the refractor for inspection a group of about a dozen stars forming a loose cluster with a few bright members pops into view. Bumping up the magnification helps this cluster, making the marginal members more definitive in appearance. These stars are white and represent newcomers to the neighborhood, having formed a scant 6-10 million years ago from the attending yet invisible Rosetta Nebula. The Rosetta is a gorgeous object on [film](#), its folds of warm red clouds indeed reminiscent of a rose – or perhaps in this season one might be forgiven if it looks a bit like a Christmas wreath!

Of an even stronger holiday theme is yet another open cluster of the Urban List, NGC 2264 – aka the Christmas Tree cluster. Panning for this one with the binoculars is less fruitful so I set off moving on a little dogleg east and south of Pollux's flat foot. It does not take too much effort before a rather loose yet bright collection of stars that seems like it could qualify as an open cluster is located. It takes about another 30 seconds of interpretation to recognize the arrow-head pattern. It fits nicely within the 25mm field – the base of the tree and its apex are the brightest stars with over a dozen other stars fleshing out the outline. The 10mm view truncates part of the tree but compensates by making the fainter stars of the outline steadier compared to their flickering in and out with averted vision at lower power.

In NGC 2264 we have yet another cluster graced by nebulosity beyond the reach of this modest 60mm scope. First, at a [wide view](#), the nebula seems to flesh out our holiday fir, its wispy clouds like full branches of the tree. The apex of the tree can not help but catch your eye, a dark wedge sliced from it. This is the famous [Cone Nebula](#), a column of dark dust running some six light years long. The base of the tree is anchored by S Monoceros, a massive star some 8,000 times larger than our sun. Like the apex there is complex nebulosity surrounding it, and through the miracle of our

(See *Sorties* on page 4)

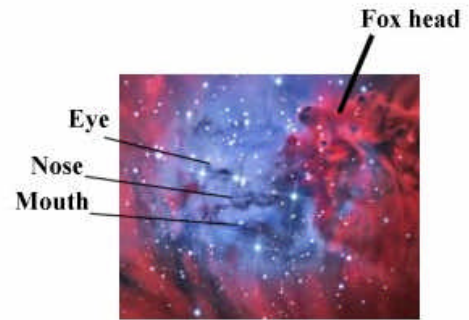
### Your 2007-2008 Officers

Office	Officer	Phone	e-mail
President	Tom Pomponio	302-736-0157	pomponio@lycos.com
Vice President	Tim Milligan	410-841-9853	milligan@integ.com
Secretary	Tony Codella	302-559-0297	tonytowels@yahoo.com
Treasurer	Kathy Sheldon	302-422-4695	f.a.sheldon@att.net
Editor	Pj Riley	302-738-5366	pjr127@yahoo.com
Past President	Jerry Truitt	410-885-3327	truittjs@atlanticbb.net

(Sorties from page 3)

brain and eye to imagine patterns one can make out the head of a canine – and hence the moniker “the Fox Fur Nebula”. (Surprisingly the name has not been abbreviated to a more politically correct “Fox Nebula”).

A [photo of this nebula](#) taken by the legendary Tony & Daphne Hallas graced *Astronomy* magazine’s calendar for the month of September. One afternoon while contemplating this magnificent image in a bit of a reverie I was startled to suddenly perceive yet another pattern emerge from this cosmic dust and gas. To the immediate left of the fox’s head is a section of blue-gray nebulosity, and to my mind I can fashion a face that looks remarkably like St. Nicholas smiling at us. His hat is draped over his left eye and obscuring it, but the right eye, nose, mouth, and chubby cheeks seem clear!



At this point my neighbor’s black lab bayed, startled by seeing me in the yard with my scope and signaling an end to my early morning session. I popped the lens cap back on, covered the scope and dropped it back on the porch, ready for my next opportunistic observing session. Hopefully I’ll have time to continue admiring more winter gems and perhaps get in some views of Mars this December.

Best holiday wishes to all the Delmarva Stargazers – keep looking up!

## Power

*Jerry Truitt*

**Coal** Over 50% of our power generation is from coal. China, India, Mexico and Africa are all fueling their growth boom on the back of coal. In China 2/3 of its power comes from coal. Coal fired plants produce more than two thirds of the sulfur dioxide and about one fifth of nitrogen oxide emissions in the U.S. Sulfur dioxide reacts in the atmosphere to form sulfate particles, which in addition to causing acid rain, contribute to fine particulate pollution, a contaminant linked to thousands of premature deaths from lung disease nationwide. Nitrogen oxides combine with hydrocarbons to form smog-causing ground-level ozone. Coal-burning plants also emit approximately 48 metric tons of mercury a year in America. This highly toxic element persists in the ecosystem. After transforming into methyl mercury, it accumulates in the tissues of fishes. Now for you global warming fans, coal produces more CO<sub>2</sub> per unit of electric generated than oil or gas. Burning coal sends nearly 10 billion metric tons of carbon dioxide into the atmosphere every year. Like I said I’m not going to bang the coal is causing global warming drum, we have enough reasons to limit our use of it with out adding that one.

**Coal Plants** Let me give you some volumes. Coal is delivered by truck, train, barge or a special ship known as a collier. A train called a “unit train” is over a mile long pulling 100 cars, each car is a 100 tons of coal. Under full load a coal fired plant needs one per day , during peak season they may take up to 5 “unit trains” a day. Railroad locomotives, which rely on diesel fuel, emit nearly 1 million tons of nitrogen oxide (NOx) and 52,000 tons of coarse and small particles in the United States. Coal dust blowing from coal trains contributes particulate matter to the air. Many coal plants may store several million tons of coal on site. The coal from a 400 ton silo is conveyed to be pulverized to less than 2 inches before being ground to a fine powder to be blown into the furnace for burning. A 500 MW plant will have six such pulverizers, five of which can supply coal to the furnace at 250 tons per hour under full load. Much of the heat produced from burning coal is wasted. A typical coal power plant uses only 33-35% of the coal’s heat to produce electricity. The majority of the heat is released into the atmosphere or absorbed by the cooling water.

**China** The pollution from coal fired plants from China takes 5 to 10 day to travel the Pacific and reaching the United States. It shows itself as mercury in our fish, streams, rivers and lakes. It increases both cloud cover and ozone on the west coast. It doesn’t just hit us; Korea, Japan and China itself also feel the effects.

**How is Jerry going to connect this with astronomy?** University of Maryland scientists reported that the skies became dramatically cleaner when power plants had to shut down during the August 2003 blackout that hit the Northeast. Measurements found a 90 percent reduction in sulfur dioxide, a gas that leads to haze and acid rain, and a 50 percent reduction in smog, or ground-level ozone. The amount of light-scattering particles in the air dropped by 70 percent and visibility increased by some 20 miles. "In addition, skies cleared up far from some power plants."The improvement in air quality provides evidence that transported emission from power plants hundreds of kilometers upwind play a dominant role in regional haze" and smog, the scientists write in a paper appearing in *Geophysical Research Letters*. "What surprised us was not so much the observation of improved air quality during the blackout, but the magnitude of the observed improvement, the improvement in air quality was so great that you could not only measure it, but could actually see it as a much clearer, less hazy sky."

I hope more than ever you don’t find coal in your Christmas stocking. I will report more facts on coal at our December meeting.

**The Solar System in Decembr-** Mercury ☿ is at superior conjunction, so no viewing this month. Venus ♀ shines bright in the early mornin’ sky. Mars ♂ is at opposition on the 24th. Luna will only be 0.9 deg. away from Mars on the same night. Jupiter ♃ slowly disappears into the glare of Sol this month. Saturn ♄ is at quadrature<sup>1</sup> on Dec 1. Uranus ♅ is still in Aquarius , and can be seen naked eye if you know where to look. Neptune ♆ is in Capricornus. You can find the minor planet Pluto ♇ to the right of Scutum, but it is in the sunlight. If you’re looking for Terra ☁ , check under your feet.  
Note 1: Quadrature: When the outer planet is at a 90° angle to Sol when viewed from Terra.

## Going My Way?

Diane K. Fisher

Not many endeavors require that you plan the mode of transportation before you even know what it is you are transporting. But weighing the physics and economics of getting any sort of cargo to space is a major part of designing a space mission.



It's one of the first issues that NASA's New Millennium Program (NMP) considers when planning a new mission. NMP has the forward-looking job to identify promising new technologies for space exploration. It then helps to mature the technology so it will be available to space missions of the future. If the technology cannot be tested adequately on Earth, the last part of this process is to actually send the technology into space. With carefully documented test results, future mission planners can confidently incorporate the new technology into their designs.

But where to begin? On call from the start, Linda Herrell is the New Millennium Program Architect. Given a list of proposed technologies, she has the job of figuring out the feasibility of wrapping a mission around them.

"We might be considering six or more technologies, anything from solar panels to imagers to masts for solar sails to more intelligent software. Of those, we may choose four. My job is to answer the question—can the selected technology be transported to and operated in space within the constraints of a low-cost technology validation project?"

Along with the list of possible mission payloads (the technologies), Linda also has a list of spacecraft to put them on, as well as a list of launch vehicle parameters. All she has to do is try them out in every possible combination (of which there are thousands) and see what might work.

"Fortunately, we have a software tool to help with this analysis," says Linda. When it comes down to it, her job is primarily to figure out how to get the technologies into space.

"Sometimes, it's like figuring out how to get across town when you don't have your own car. You have to get creative."

She keeps a database of all possible options, including riding piggyback on another spacecraft, hitching a ride on a launch vehicle as a secondary payload, or sharing a launch vehicle with other NASA, Department of Defense, or even commercial payloads.

Her assessment is but one of a gazillion factors to be considered in planning a mission, but it is indeed one of the very first "details" that forms the foundation for the rest of the mission.

Find out some of the technologies that NMP has already validated or is considering at [nmp.nasa.gov/TECHNOLOGY/innovative-tech.html](http://nmp.nasa.gov/TECHNOLOGY/innovative-tech.html). Kids will enjoy watching Linda's cartoon alter-ego talk about her job at [space-place.nasa.gov/en/kids/live](http://space-place.nasa.gov/en/kids/live).

*This article was written by Diane K. Fisher and provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

*(Owl from page 2)*

### **John Herschel (1833):**

A large uniform nebulous disc, diameter 19.0s of time in AR [RA]. Quite round, v B; not sharply defined, but yet very suddenly fading away to darkness. A most extraordinary object. See fig. 32.

So, the next time you are out observing and the bowl of the big dipper is high above the horizon move your scope to the lower and outer corner of the "pot" and search for a uniform nebulous disc with two darker spots...You have seen the OWL Nebula just like Mechain, Messier, the Herschels and Mr. Hynes. Did you notice the different descriptions and the different sizes in the observing notes above? Have you seen the central star?

See you at the next meeting. Don...

**Even a fool knows you can't touch the stars, but it doesn't stop a wise man from trying.**

Harry Anderson

**Astronomy compels the soul to look upwards and leads us from this world to another.**

Plato

**If the stars should appear but one night every thousand years how man would marvel and stare.**

Ralph Waldo Emerson

## Magazine Subscriptions

As a paid member of DMSG, you can sign up -or- renew your S&T or Astronomy magazines through the club for a discount over private rate. S&T, reg. \$42.95, is \$32.95 thru DMSG, Astronomy, reg. \$44, is \$34 thru DMSG. See Tony Codella for details.

## NGC 281

*Pj Riley*

You're out in the dark, with clear skies above. You've just got your big telescope set up. You start observing the stars. But tonight, you decide to do what others don't, that's to look North. You put the following coordinates in you GOTO: RA 00h 52m 59.3s | Dec +56° 37' 18.8". This moves the telescope to the region of space near the constellation Cassiopeia. Adjusting the focuser, a nebula region comes into focus.

What are you looking at? Instead of looking at your charts, you cheat and press a button on the GOTO and it lights up with a NGC number: 281. NGC 281 is impressive. A star nursery just 10,000 ly away is glowing with energy. These 'baby' stars are newborns, just 3 million years old. But are you seeing EVERYTHING? Probably not.

That's why neat little instruments like the CHANDRA X-Ray Observatory were made. Armed with the Advanced CCD Imaging Spectrometer (ACIS), A very special CCD camera that not only

records images in the x-ray spectrum, but can also record the energy of the incoming x-rays.

CHANDRA has recorded NGC 281 and the image is totally different than what you saw.

The energy levels in the x-ray emissions indicate the gas is a few million degrees and contains significant amounts of magnesium, sulfur and silicon.

*Image credit :*

*X-ray: NASA/CXC/CfA/S.Wolk et al;*

*Optical: NSF/AURA/WIYN/Univ. of Alaska/T.A.Rector*



X-Ray image of NGC 281



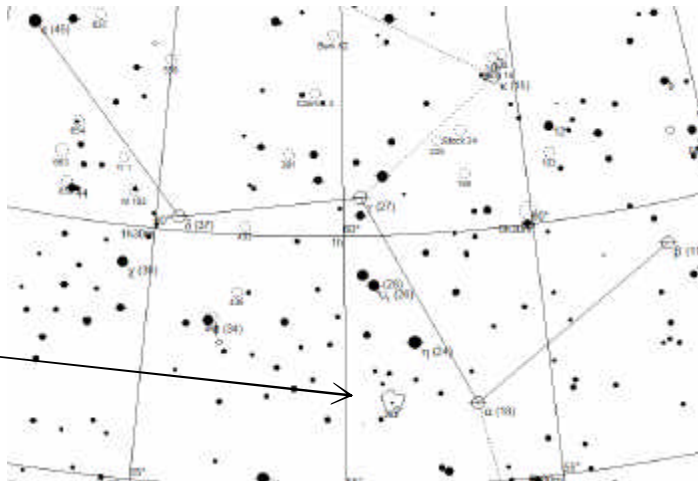
Composite visible and X-ray image of NGC 281  
Image is 29 arcmin wide

If you really want to look for yourself, you can use the chart of Cassiopeia to the right.

Use of filters will probably help.

Have fun !

NGC 281



## Comet 17P/Holmes

*Kent Blackwell*

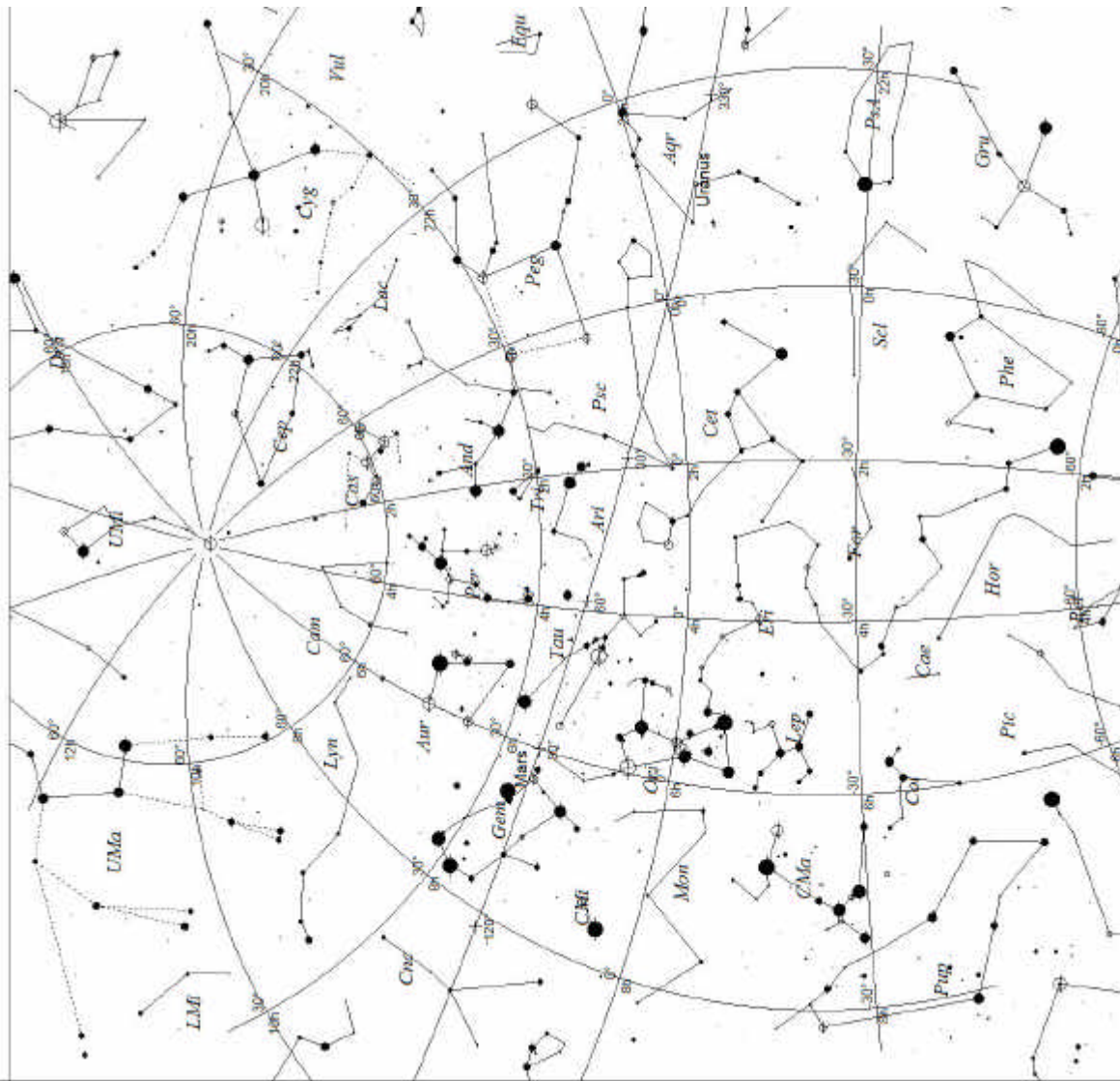
I shot this Monday night (11/12) from Coinjock with a 100mm f/7.5 refractor. Yea, I went home from hosting the East Coast Star Party, then returned that night; a complete zombie!! Note the pretty stars shining through.

Single exposure with Canon 20Da DSLR 100mm f/7.5 with 0.8x reducer 89-second exposure ISO 800.

<http://tinyurl.com/32j84>



Skymap 7 Dec 2007 10PM



Tuckahoe State Park, MD

**STARS**

- <1
- 1.5
- 2
- 2.5
- >5
- 3.5
- 4
- 4.5
- >5

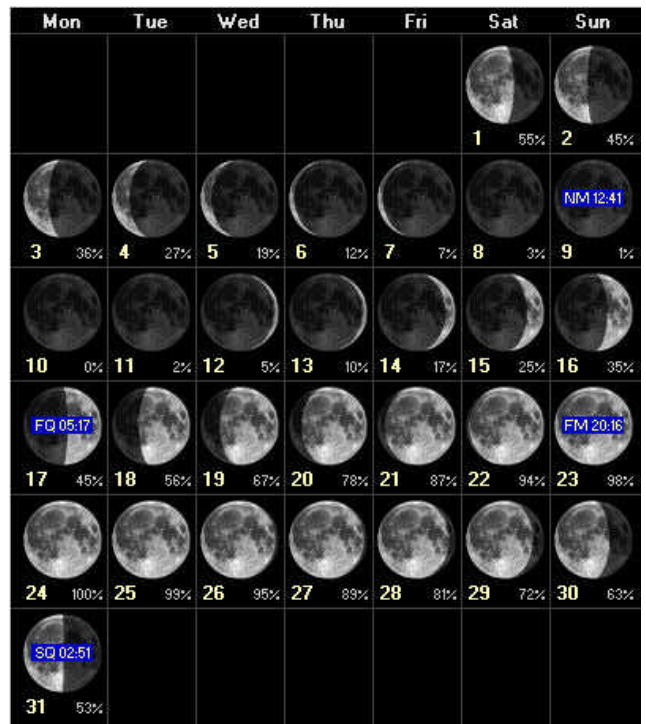
**SYMBOLS**

- ◻ Multiple star
- ◻ Dark nebula
- ◻ Globular cluster
- ◻ Open cluster
- ◻ Planetary nebula
- ◻ Quasar
- △ Radio source
- × X-ray source
- Other object

Local Time: 22:00:00 7-Dec-2007  
 Sideral Time: 03:02:15  
 Location: 38° 58' 0" N 75° 56' 0" W  
 RA: 3h02m16s Dec: +23° 57' Field: 180.0°  
 Julian Day: 2454442.6250

Sun and Moon Data for December 2007  
 Tuckahoe MD  
 38.97°N 75.93°W 5hrW  
 Standard Time Civil Twilight

Date	Twilight	Rise	Sun Transit	Set	Twilight	Rise	Moon Transit	Set	%
12/1/2007	6:34a	7:03a	11:53a	4:42p	5:11p	*****	6:02a	12:34p	48
12/2/2007	6:35a	7:04a	11:53a	4:42p	5:11p	12:22a	6:43a	12:55p	39
12/3/2007	6:36a	7:05a	11:53a	4:42p	5:11p	1:22a	7:24a	1:16p	29
12/4/2007	6:36a	7:06a	11:54a	4:41p	5:11p	2:21a	8:03a	1:38p	21
12/5/2007	6:37a	7:07a	11:54a	4:41p	5:11p	3:20a	8:44a	2:01p	14
12/6/2007	6:38a	7:08a	11:55a	4:41p	5:11p	4:21a	9:27a	2:27p	8
12/7/2007	6:39a	7:09a	11:55a	4:41p	5:11p	5:22a	10:13a	2:58p	4
12/8/2007	6:40a	7:10a	11:56a	4:41p	5:11p	6:23a	11:01a	3:36p	1
12/9/2007	6:41a	7:11a	11:56a	4:41p	5:11p	7:22a	11:52a	4:20p	0
12/10/2007	6:42a	7:11a	11:56a	4:41p	5:11p	8:17a	12:45p	5:13p	1
12/11/2007	6:42a	7:12a	11:57a	4:42p	5:11p	9:08a	1:38p	6:13p	4
12/12/2007	6:43a	7:13a	11:57a	4:42p	5:12p	9:47a	2:29p	7:17p	8
12/13/2007	6:44a	7:14a	11:58a	4:42p	5:12p	10:22a	3:19p	8:23p	15
12/14/2007	6:44a	7:14a	11:58a	4:42p	5:12p	10:52a	4:07p	9:30p	23
12/15/2007	6:45a	7:15a	11:59a	4:42p	5:12p	11:19a	4:53p	10:37p	32
12/16/2007	6:46a	7:16a	11:59a	4:43p	5:13p	11:43a	5:39p	11:44p	42
12/17/2007	6:46a	7:16a	12:00p	4:43p	5:13p	12:07p	6:24p	*****	53
12/18/2007	6:47a	7:17a	12:00p	4:43p	5:13p	12:32p	7:12p	12:53a	64
12/19/2007	6:48a	7:18a	12:01p	4:44p	5:14p	1:01p	8:04p	2:05a	75
12/20/2007	6:48a	7:18a	12:01p	4:44p	5:14p	1:34p	9:00p	3:20a	84
12/21/2007	6:49a	7:19a	12:02p	4:45p	5:15p	2:16p	10:02p	4:39a	92
12/22/2007	6:49a	7:19a	12:02p	4:45p	5:15p	3:09p	11:08p	5:57a	97
12/23/2007	6:50a	7:20a	12:03p	4:46p	5:16p	4:12p	*****	7:09a	100
12/24/2007	6:50a	7:20a	12:03p	4:46p	5:16p	5:25p	12:13a	8:10a	99
12/25/2007	6:51a	7:21a	12:04p	4:47p	5:17p	6:40p	1:17a	8:59a	96
12/26/2007	6:51a	7:21a	12:04p	4:48p	5:18p	7:53p	2:15a	9:38a	91
12/27/2007	6:51a	7:21a	12:05p	4:48p	5:18p	9:03p	3:07a	10:09a	83
12/28/2007	6:52a	7:22a	12:05p	4:49p	5:19p	10:08p	3:55a	10:35a	75
12/29/2007	6:52a	7:22a	12:06p	4:50p	5:20p	11:10p	4:39a	10:58a	66
12/30/2007	6:52a	7:22a	12:06p	4:50p	5:20p	*****	5:20a	11:19a	56
12/31/2007	6:52a	7:22a	12:07p	4:51p	5:21p	12:11a	6:00a	11:41a	46



## Moondark for December: Astro 2.0

Doug Miller

Not so long ago, [astronomy](#) was much slower. Events were communicated by word of mouth or snail mail. The [1987 supernova](#) was briefly mentioned on the evening news, but details followed only much later when I got through to [Skyline's recorded phone message](#). Around the same time, I subscribed to postcard updates from the [Comet Rapid Announcement Service](#). [John Bortle's monthly Comet Digest](#) column in [Sky&Telescope](#) was usually out-of-date by the time it arrived in my mailbox.

[Email](#), [newsgroups](#), [Gopher](#), [browsers](#) and the [web](#) have changed all that. Last month, amateurs learned of [Comet Holmes' tremendous outburst](#) and went out to observe it that very evening. Hundreds, if not thousands, of sites are dedicated to [astronomy news](#), planning observing, and selling products and equipment. And more changes are on the way.

You'll be hearing plenty about [Web 2.0](#). Most of the web at present consists of static pages or web-as-information services, provided by a limited number of tech-savvy or commercial sources. In contrast, Web 2.0 content is user-generated, organized online and retrievable for an indefinite time. It has developed beyond bulletin boards, newsgroups and [discussion groups like Yahoo!](#) with a much stronger emphasis on collaboration and social networking. Software advances have enhanced the accessibility and longevity of this user generated content, enhancing its value. Beyond that, Web 2.0 is hard to define, but it includes services you've surely used as well as some you probably haven't.

[Star gazers blog](#) about their [observing](#) and [hobby experiences](#), and this is a perfect example of Web 2.0 support of user-generated content. [Astro-photo](#) sharing on [Flickr](#) is another. Interactive web applications for producing custom charts or [analyzing astrophotos](#) qualify as well. [Podcasts](#) and [mashups](#) can likewise. [Social bookmarking](#) sites like [del.icio.us](#) don't appear to have been used much for [astronomical purposes](#), but it seems there is great potential there.

[Wikis are very Web 2.0](#). A wiki (from Hawaiian, *wiki wiki*, for quick or rapid) is an easily editable and searchable document consisting of hierarchically organized and tagged pages containing text-based information, graphics and links to sites, multimedia and other electronic resources. [Wikipedia](#) is the most well-known example, and despite the hand-wringing over reliability, it is a great resource for many technical matters. Most anyone can [edit Wikipedia entries](#), and many [ISP's](#) allow you to host your own wiki using [MediaWiki](#), the same software that powers Wikipedia. Alternatively, you can use a free web-based version for online collaboration, or even re-purpose the wiki into [a personal notebook](#). Oddly named, [TiddlyWiki](#) is a wiki in a single web page that is editable and customizable all from a web browser [and requiring no installation](#). Although navigation is somewhat different, accomplished by opening and closing [tiddlers](#) rather than linking pages, [it is very efficient for locating information in a nonlinear fashion](#).

To what uses could star gazers put wikis? They could replace an observer's notebook: the observations would be [tiddlers](#), which would be tagged by object, instrument, and constellation or just about anything else. They could be used to collaboratively develop [meeting agenda](#) or even coordinate [star party tasks](#). A wiki would be ideal for preparing a group presentation: capturing ideas, useful links, images and graphics, and ultimately linking to the final presentation and speaker's notes, all in one place. There are many other educational applications, organizing classes in [telescope making](#), keeping notes on astrophoto projects, even behind the scenes management of a [conventional club web site](#).

Today, [astronomy advances](#) almost too quickly to stay informed, despite dedicated web sites, [Google](#) searches, [RSS feeds](#) and [blog aggregating "planets"](#). [Web 2.0](#) tools like wikis, social bookmarking and photo sharing are sure to contribute to amateur and professional astronomy over many years to come.

Many thanks to Ryan Dale for introducing me to TiddlyWikis. [Moondark](#) is written by Doug Miller, published at the [Moondark web site](#), and printed in the [Delmarva Star Gazers' Star Gazer News](#). This document was last revised on 25 November 2007. Text and images on this web page are free for non-commercial use with attribution under a [Creative Commons Attribution-Non-commercial 3.0 License](#). Ask Doug about other uses.

2001 2001: 2002  
al ago... Algebra A  
d Animated animal  
rocomputing  
tography Astroj  
a autumn Autumn  
a Big Birthday Bir  
/ Bye-bye Calend  
D ccd CCD-10 C  
ts conjunctions Co  
smic Crash Crumb  
deepsky Delay d  
rop Dschubba DSC  
stein Environmental  
ting Eye Fall far Fa  
riend Frills from F  
Time globulars God  
dle Happy hawaii H  
nl Hullabaloo I if  
aw internet iridiumf  
g leo Leo's Light I  
' M87 m96 Magic  
l mashups matarik  
essier messiermarat  
oon? Moondark  
Wilson My my nativ  
ealand Night r  
vations observa  
orion Orion Other  
ons, photosharing  
s pluto Pluto podc  
ainbows RAW Real  
rford sagan saturn  
September Serpent  
es Sky skycolor

This [tag cloud](#) represents visually the contents of the Moondark web site. Know of any useful astro-blog, photo-sharing, social book marking or wiki sites? Please send links to Doug Miller.