MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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&

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May 2011

M-97 (NGC-3587) The Owl Nebula in Ursa Major

Introduction

The purpose of the observer's challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, we will be happy to include them in our monthly summary. Observing is not only a pleasure, but an art. With the main focus of amateur astronomy on astrophotography, many times people tend to forget how it was in the days before cameras, clock drives, and GOTO. Astronomy depended on what was seen through the eyepiece. Not only did it satisfy an innate curiosity, but it allowed the first astronomers to discover the beauty and the wonderment of the night sky.

Before photography, all observations depended on what the astronomer saw in the eyepiece, and how they recorded their observations. This was done through notes and drawings and that is the tradition we are stressing in the observers challenge. By combining our visual observations with our drawings, and sometimes, astrophotography (from those with the equipment and talent to do so), we get a unique understanding of what it is like to look through an eyepiece, and to see what is really there. The hope is that you will read through these notes and become inspired to take more time at the eyepiece studying each object, and looking for those subtle details that you might never have noticed before. Each new discovery increases one's appreciation of the skies above us. It is our firm belief that careful observing can improve your visual acuity to a much higher level that just might allow you to add inches to your telescope. Please consider this at your next observing session, as you can learn to make details jump out. It is also a thrill to point out details a new observer wouldn't even know to look for in that very faint galaxy, star cluster, nebula, or planet.

M-97 (NGC-3587) The Owl Nebula in Ursa Major

The Owl Nebula, known by the New General Catalogue number as NGC-3587 is also known by the more popular designation as Messier or M-97. A planetary nebula in the constellation of Ursa Major, it was discovered by Pierre Méchain in 1781.

The Owl gets its' name because of the two dark areas within it that resemble two eyes. Apparently, it reminded the astronomer that named it of an owl's face. These dark areas are quite subtle and present the observer with the main challenge. The central star has been listed under various magnitudes but the general consensus seems to be around mag. 16, which takes it out of the range of most backyard telescopes except maybe the largest. The reason for that is not only the limiting magnitude of the telescope. The illumination of the nebula tends to block out the tiny feeble dot of the star except on exceptional evenings at extremely high power.

The nebula formed approximately 6,000 years ago and shines at a dim and ghostly mag. 9.9, so it's not exactly a showpiece in the sky. However, it's still within reach of even a 60mm (2.4-inch) refractor, though the eyes will not be visible.

The challenge for smaller scopes is just to see it. For the larger scopes, it's to see the eyes. Some observers will be able to see just one eye, while others will be able to see both and maybe some mottling and other details within the nebulosity. The Owl is one of the dimmer of the Messier objects. It can provide quite a challenge for the observer to eke out all of its secrets.

Observations/Drawings/Photos

Roger Ivester: Observer from North Carolina

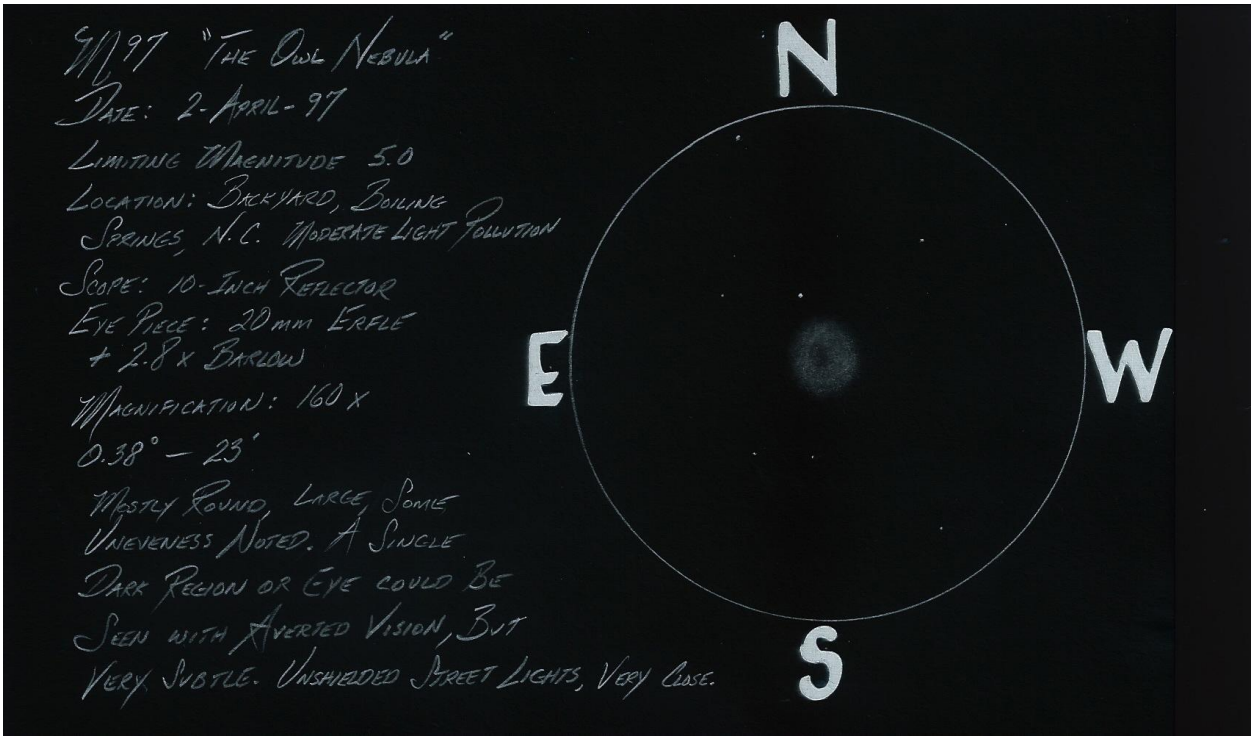
The "Owl Nebula" is best observed from a dark sight. The two eyes have proved to be difficult from my backyard, and I've only noted one eye on my many visual attempts using a 10-inch f/4.5 reflector. However, the nebula is very easy to locate and see with low magnification, appearing as a mostly even gray disc, without much detail. With careful observing and higher magnification, the disc becomes more of an oval.

On May 11, 1997, I observed it at 134X. Conditions were good with calm wind and temperature in the 50s. Unshielded streetlights were in close proximity to my observing site, and I used a building as a light block.

The nebula was a mostly round, soft gray color, with uneven texture. I couldn't see the "eyes."

On April 2, 1997, I observed it at 160X. Conditions were good with limiting mag. 5.5.

The nebula was large, bright and mostly round with a soft fluffy texture. I noted one eye with averted vision, but with difficulty. When I used a nebula filter, contrast improved and the texture became uneven. The dark region, or eye, was still very subtle.



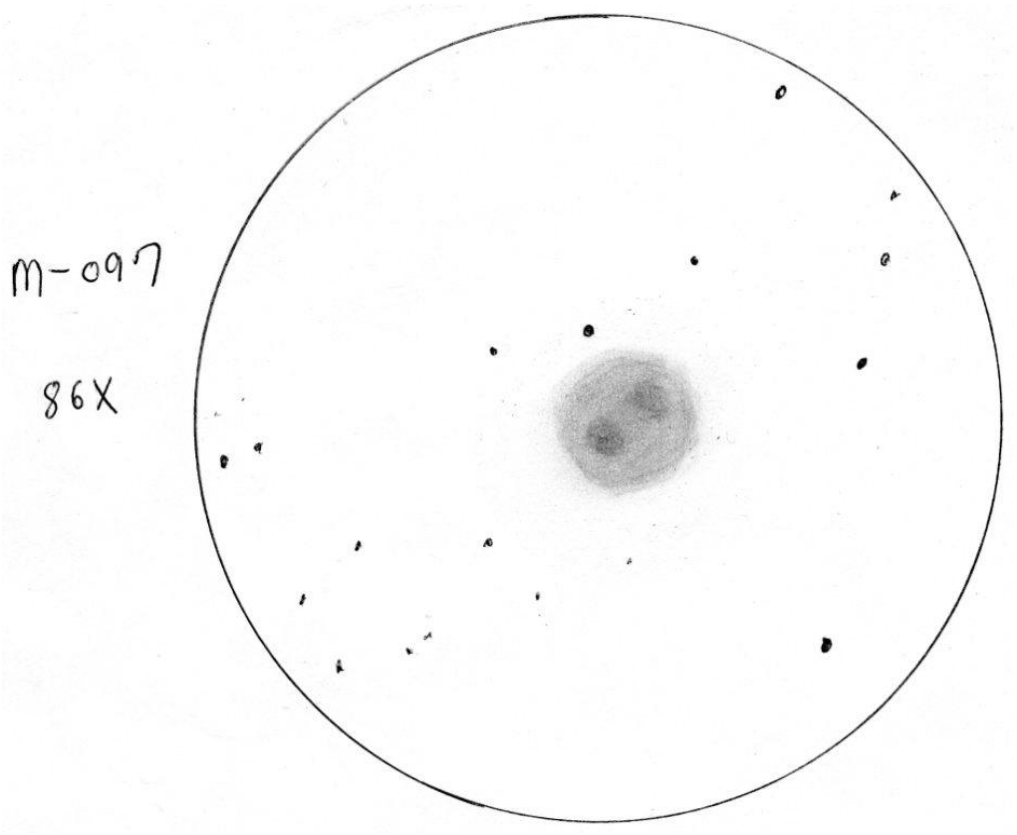
On March 16, 1999, I observed it again at 160X. Conditions were good.

The nebula was bright, large, with uneven texture. I couldn't see the eyes. The edges were fairly ill-defined, with a mostly round shape.

Other observations occurred on March 24, 2003, March 12, 2004, March 02, 2005 and March 17, 2007, all with my 10-inch reflector from my backyard in Boiling Springs, North Carolina. The observing conditions averaged good with moderate light pollution. On none of those dates could I see both eyes.

Fred Rayworth: Observer from Nevada

I've had a rather lousy 2011 for observing, yet I managed to get three peeks at M-97 this year. My official observation for the challenge took place at the Corn Creek Station just north of Las Vegas on May 7, 2011 with my 16-inch f/4.5 Dobsonian. The sky was clear with all of the stars in the little dipper visible, yet the clarity was suspect with the nearby mountains lost in a haze. Without a filter at 86X, M-97 was easily visible as a round glow with something going on in the center. The O-III made it more distinct and the eyes flashed in and out from two to just one. I tried 229X and the nebula disappeared. Later, I tried again at 229X and could see the nebula, but the eyes faded in and out. I tried 131X with the O-III and it looked nice but the eyes were quite difficult to make out, though still visible. The best overall view was at 86X with the O-III.



On January 28, 2011, I had my 16-inch f/4.5 out at Furnace Creek in Death Valley and at 86X, I saw a nice round shape with the two eyes just barely visible. They flashed in and out of focus. I never tried a filter. The next night, I tried again as the clouds moved in and saw only a solid ball, but no eyes.

On August 12, 2010, I dragged my 16-inch f/4.5 up Lee Canyon Road to a Borrow Pit (gravel pit) in the Toyabe National Forest near Las Vegas and with cool and clear skies and a slight breeze, I caught the Owl as a very prominent gray ball but filled in with no eyes at 70X, even with an O-III filter.

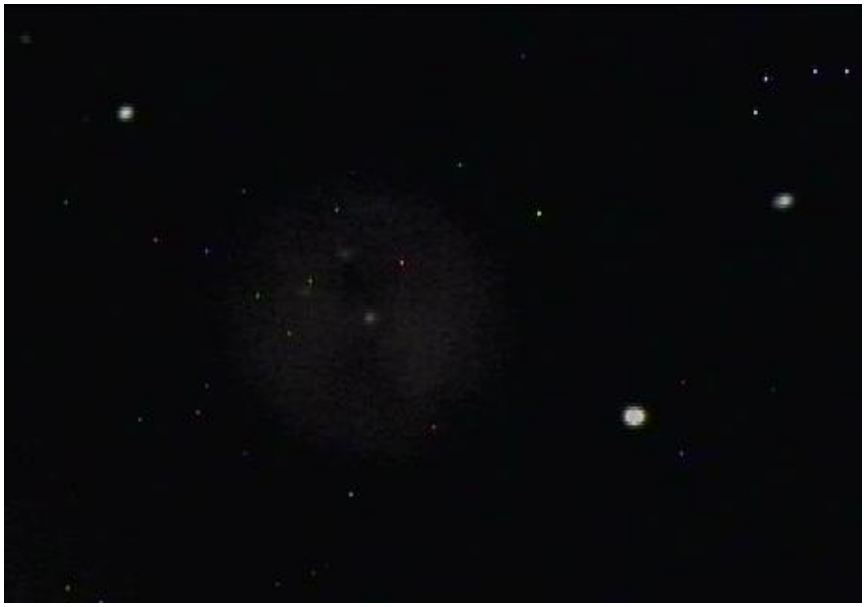
On February 17, 2007, with my homemade 16-inch f/6.4 Dobsonian, I went to the 21 mile marker on the North Shore Road above Lake Mead and observed M-97. At 70X, I saw a gray milky ball, but no eyes. The O-III filter brought out the nebula more but didn't help with the eyes.

On February 5, 2005, with my homemade 16-inch f/6.4, I observed M-97 from Sunset Overview on the western shore of Lake Mead. At 70X, the nebula was a gray featureless ball. An LPR filter just muddied things up and made the nebula look worse. However, the O-III filter worked its magic and brought out the eyes, though just barely. I could see both eyes as ghostly shadows against the gray background.

Rob Lambert: Observer from Nevada

It has been a difficult spring, as far as my participation in the Observers Challenge. Even though I had two decent nights at Cathedral Gorge on the 27th and 28th of this month, I was disappointed in the images I captured. In the first image, captured through a 120mm (4.7-inch) refractor at 50 seconds of integration, I could see the eyes of the Owl and there was even a hint of the central star at approximately 35X. The thing that surprised me was the green color of the nebulosity. The first image is a single frame untouched image. I expected to see a hint of green in the nebulosity, but nothing quite like what I saw on this occasion. What was disappointing was that the captured image was nowhere near the quality of the image I saw on my CRT monitor. I want to find a better capture device that will produce an image closer to what I see on the monitor. Not visible in the image are the distant galaxies that were visible on the monitor.

The image captured in my 10-inch f/10 SCT at 38 seconds of integration, with a magnification of about 150X, again shows both eyes of the Owl and even better definition of the central star. However, the image has more noise and even less quality than the CRT image. This image lost the color of the nebulosity and is probably more like what you would see through the eyepiece of a 10-inch SCT. And again, distant galaxies are not visible in the captured image.



The third image is one of my first captured images from November, 2008 using the 10-inch SCT at f/6.3 and 28 seconds of integration. Except for the brighter reddish light-polluted sky over Albuquerque, NM, this image is more pleasing to the eye than the one above. Again, the eyes and the central star along with the slight greenish tint of the nebulosity are visible at 95X. There isn't enough detail to distinguish which of the other star-like objects might be galaxies.

I'm looking forward to going out again soon and re-sharpening my capture skills. This winter and spring have just not afforded me the opportunity to take my time and improve the quality of the captured images I'm getting. Hopefully, better skies will afford me that opportunity this summer.

Buddy L. Barbee: Observer from North Carolina

This observation was made Wednesday, April 27, 2011 from my families' beach house on Oak Island, NC. I used my 4-inch refractor with a 24mm eyepiece for a magnification of 37X. I also used an O-III filter for this observation.

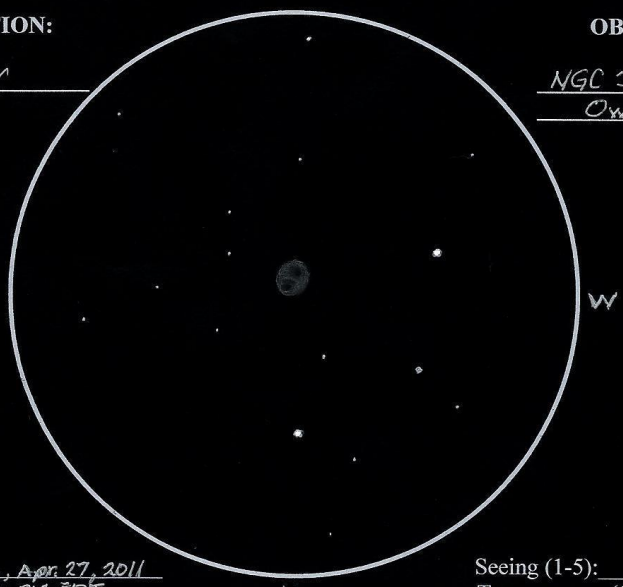
Once the sky became as dark as it was going to get, I was excited to see so many stars out. Before making this trip, it had been almost two months since the last time I had a telescope out observing. The evening was a very comfortable 72° but with a high 80% humidity. Because of light pollution combined with high coastal humidity, the transparency was below normal for this site. Seeing and transparency were much more like the typical summer haze that we normally have here.

It was an easy star hop from Merak, beta Ursa Major, to the Owl Nebula. Moving the telescope approximately one and a half fields-of-view to the southeast of beta placed M-97 almost in the center of a low power eyepiece's field-of-view. Using a 24mm eyepiece without a filter for a magnification of 37X, the Owl Nebula was a small circular hazy spot. Using a 13mm eyepiece without a filter for a magnification 67X, M-97 was fairly easy to see. But at 88X, using a 10mm eyepiece without a filter, the nebula almost disappeared. My best view was at 37X while using an O-III filter with the 24mm eyepiece. With the filter, it was fairly bright and approximately 3 arc minutes in diameter with a circular shape. What was amazing to me was that at moments of good seeing, the eyes in the nebula would seem to pop open. The eyes were visible only for a second or two every thirty to forty seconds. When they were open, I understood why Lord Rosse saw the fanciful face that he drew in 1848. I also thought the nebula looked funny when those eyes were open. I had a good laugh when they would pop into view.

DEEP-SKY OBSERVATION FORM

CONSTELLATION: Ursa Major

OBJECT: NGC 3587 (M97) Owl Nebula



Day & Date: Wed., Apr 27, 2011
Time (local): 10:30 PM EDT
Time (UT):
Observer: BLB
Location: Beach house at Oak Island, NC

Seeing (1-5): 3
Transparency (1-7): 4
NELM: 5,3
Temp: 72°F Wind: 10-15mph
Humidity: 80% ±

INSTRUMENT
Telescope: TV 102
Aperture: 4"
Focal Length/Ratio: 880mm f/8.6
Eyepiece: 24mm Panoptic
Magnification: 37x
Field-of-View: 01° 50'
Filter: TV OIII

OBJECT
RA: 11 hr. 14.8 min.
Dec: +55 d. 01.1 min.
Type: Planetary Nebula
Listed Magnitude: 9.9 visual
Listed Size: 3.4' x 3.3'
Altitude of object: on Z

NOTES

I star hopped to it with 24mm eyepiece @ 37x and saw it faintly; I could see it fairly well with 13mm eyepiece @ 67x without a filter; It almost disappeared with 10mm eyepiece @ 88x without a filter; The best view was with the 24mm eyepiece and an OIII filter, then it is fairly bright and at times of steady seeing the eye's would pop into view.

Although the sky is beautiful the transparency isn't all that good. All galaxies are soft and faint.

Jim Gianoulakis: Observer from Nevada

This is my first attempt at imaging using a monochrome camera. Up to this point, I've used a one-shot color camera. In order to capture color with a monochrome camera, exposures are taken through red, green and blue filters. This complicates things in both acquiring the image and processing the final result. The tradeoff for this added complexity is a more sensitive camera that in theory should provide better images. The image of the Owl Nebula consisted of the following subframes:

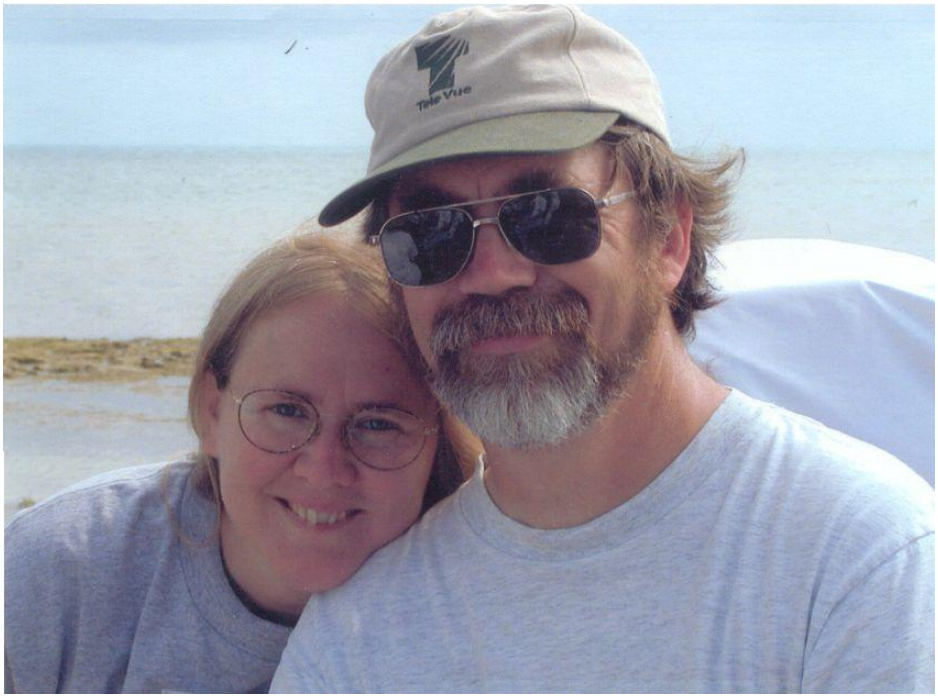
10 X 10 minute exposures through red, blue, green filters. 15 X 10 minute exposures through an I/R cut luminosity filter. Calibrated with darks, flats, and bias frames. Stacked with Deep Sky Stacker and processed in PhotoShop.

Gus Johnson: Observer from Maryland

I first saw M-97 (Owl Nebula) from Centre County, PA with a 6-inch at 59X, in 1967.

Easily seen in a 4 ¼-inch f/4 Newtonian at 22X. In my 8-inch at 96X using averted vision, I suspected seeing one of "the eyes." Another time my 6-inch at 98X did the same. My short 2.4-inch refractor at 25X saw M-97 and M-108, then in a 40mm (1.5-inch) finder at 12X, saw both, but M-108 was harder to see. With 12 X 50 binoculars, I again saw both, but not M-109 near Gamma UMa. I had the 2.4-inch refractor at 21X nearby to confirm if I was seeing them, in April 1992.

Sue French: Observer from New York



My best 10-inch observation (166X) says: "The Owl's 'eyes' are subtle and aligned NW-SE, with the nebula seeming slightly longer in the same direction." So, they aren't obvious.

I did make note of them with the 105mm (4-inch) at 127X: "Very slightly oval NW-SE. Careful study vaguely shows the darker eyes. The area between the eyes is brighter as are the sides aligned with it."

My guess is that one just needs the right conditions to see them once. That nearly always makes an object easier during subsequent visits. Note also that I didn't see the eyes until I got to a medium/high power. The best magnification varies from person to person, but as a rule, the rods in one's eyes are dumb. They don't believe subtle features seen through only one eye unless the feature appears large enough to be detected by a lot of them.

Of course, all the standard advice applies. Patch the non-observing eye. Shield the observing eye from stray light. Breathe. Relax. Observe sitting if possible.

April 25, 2003, 12:15 am EDT: 254/1494mm Newtonian (10-inch f/6), seeing: fair and transparency good.

35mm eyepiece (42X): Very pretty in same field of view with M-108 northwest. M-97 is circular and even in brightness.

9mm eyepiece (166X): Mag. 12 star close NNE. The Owl's "eyes" are subtle and aligned NW-SE, with the nebula seemingly longer in the same direction. A few superimposed, extremely faint stars pop into view now and then.

May 7, 2004, 9:45 pm EDT: 105/610mm apochromat (4-inch f/5.8), seeing: poor, transparency fair.

35mm eyepiece (17X): Visible with M-108 in the same field of view. M-97 is brighter and noticed first.

13mm eyepiece (47X): About 3{1/2}' across with mag. 12 star close NNE.

7mm eyepiece (87X): I occasionally saw a bright spot near the center, but the central star was too faint for this scope, so it must've been a brightness pip.

4.8mm eyepiece (127X): Very slightly oval ~NW-SE. Careful study vaguely showed the darker eyes. The area between the eyes was brighter as were the sides aligned with it.

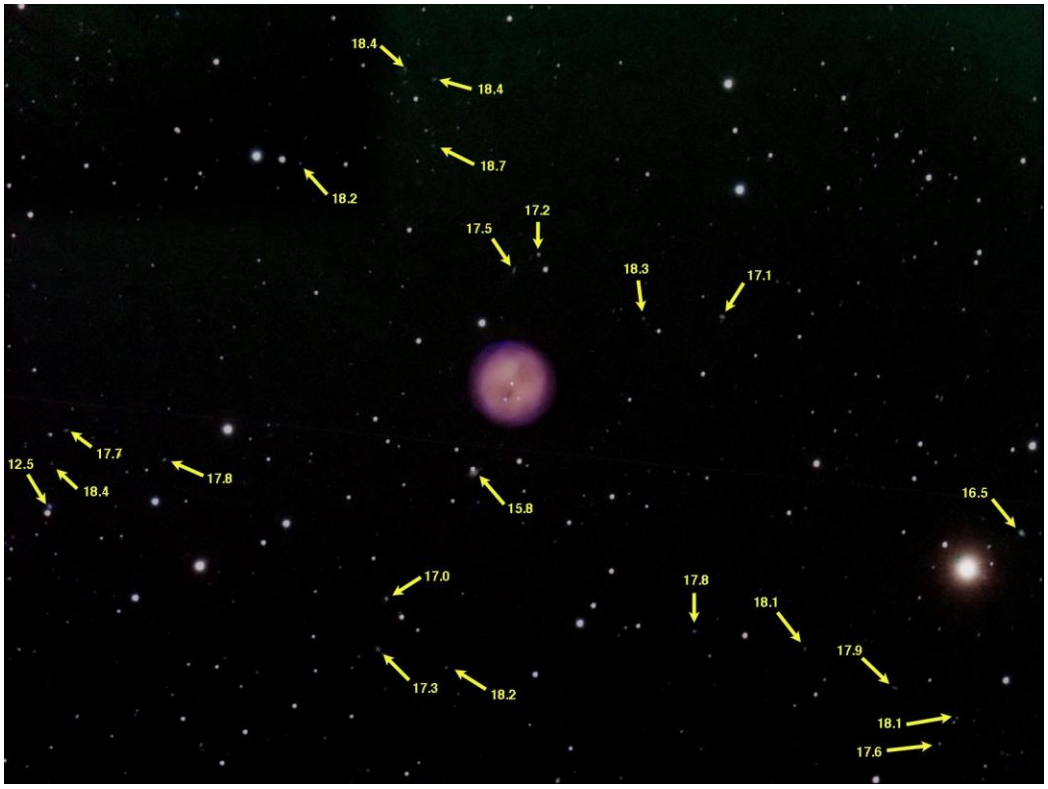
I have seven other logged observations, nothing more recent than 2006. Perhaps it's time for another serious visit. Of course, it's been raining here for nearly a week.

Dr. James Dire: Observer from Hawaii

M-97 – The Owl Nebula was discovered in 1881 by Pierre Machain and added to Messier's catalog later the same year. M-97 lies in Ursa Major just over two degrees away from Merak. It is a planetary nebula formed when the outer layers of a star were thrown off after it left the Main Sequence. This star, seen in the middle of the nebula, is now a mag. 16 white dwarf.

M-97 is roughly 3.4 arcminutes in diameter and shines at mag. 9.8. Two other mag. 16.5 stars form an equilateral triangle with the central star in the nebula. These two stars are most likely line-of-sight foreground stars. Two darker oval regions in the nebula give it the owl-like eyes it was named after.

My image of M-97 was taken with an SBIG ST-2000XCm CCD Camera on a 190mm (7.5-inch) f/5.3 Maksutov-Newtonian telescope. The exposure was 90 minutes. There are numerous faint galaxies, most mag. 17 and mag. 18, scattered throughout the image. The second image has arrows pointing to these galaxies. Their magnitudes are listed next to the arrows.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