MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

Compiled by:

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&

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July 2012

M-17 (NGC-6618) (The Swan Nebula/Omega Nebula) - Emission Nebula In Sagittarius

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-17 (NGC-6618) (The Swan Nebula/Omega Nebula) - Emission Nebula In Sagittarius

M-17 is a really exciting H-II region in Sagittarius that was discovered by Philippe Loys de Chéseaux in 1745. Charles Messier added it to his catalog in 1764. It's between 5,000 and 6,000 light years away and about fifteen light years in diameter. As spectacular as it appears from Earth, it's actually seen edge-in. Just imagine what it might look like face-on. It's considered one of the richest known star forming regions in our galaxy.

It's lit up by an open cluster that consists of approximately 35 stars though the actual number of stars in the cluster could be closer to 800.

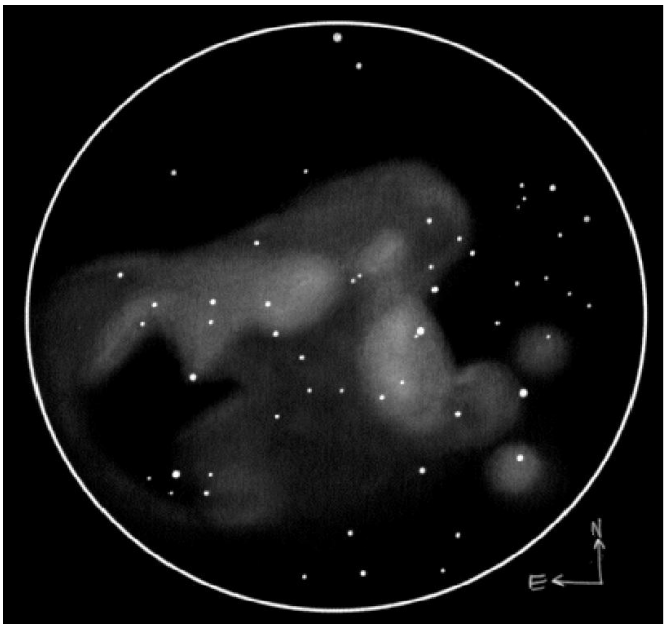
This is a great challenge object for scopes of all sizes. The larger the scope, of course, the more details come out, but even a small scope can bring out at least a bit of the nebulosity with good sky conditions and a sharp eye. It's well worth a trip to this part of the sky to take a crack at it.

Observations/Drawings/Photos

Jaakko Saloranta: Observer from Finland

My sketch shown here is made from the outskirts of Mosaic Canyon in Death Valley at an altitude of 935 feet. I have to admit, I vividly remember nearly every sketch I made out there during that night, in the scorching desert heat. For a start, the temperature never dropped below 90°F during the night – a temperature that never happens in Finland even during the day! I have never experienced such heat in my life and even the humidity was below 10% according my portable weather station. The sky conditions were quite excellent on that night as well. My SQM-L showed measurements as high as 21.70 from zenith and I measured NELM to be 7.7 in Delphinus.

I used my newly purchased 4.5-inch Dobsonian with a high magnification of 160X (15') and an UHC filter to capture the main part of the nebula with all the possible detail. The nebula has a very complex structure with several brighter parts and dark patches as well as many stars within it. The “swan”-shape is fairly obvious with brighter patches visible in the "neck", "chest" and "wing". I also noted a slightly star-shaped dark bay in the E part of the object. Be sure to scan the area with low magnification as well. The fainter wisps run far from the main part.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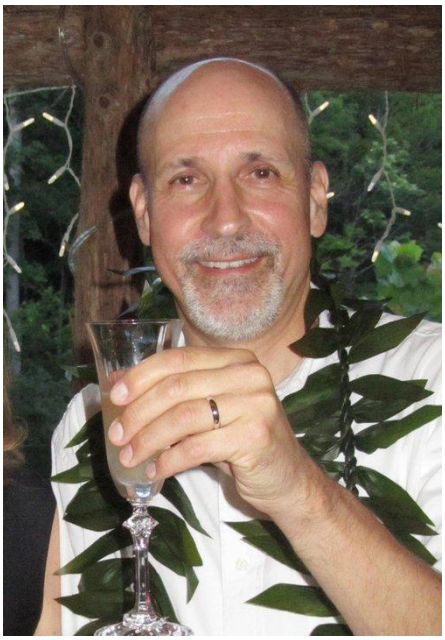
Dr. James Dire: Observer from Hawaii



M-17 is a very bright diffuse nebula located in the Sagittarius Milky Way. The nebula is known by many names: the Swan Nebula, the Omega Nebula, the Horseshoe Nebula, and the Lobster Nebula. In dark skies, the nebula is visible to the unaided eye. The swan shape is part of a larger nebulous complex which glows red due to hot ionized hydrogen gas. Embedded within but hidden from view are approximately 35 stars 20-30 times more massive than the sun, whose radiation heats the gas within the nebula. The visible nebula is 15 light years across with a total gas mass around 800 solar masses. Star formation is still occurring within the nebula.

M-17 was first catalog by both Philippe Loys de Cheseaux and then Charles Messier, both in the year 1746. The nebula lies somewhere between 5000 and 6000 light years away in the Sagittarius-Carina spiral arm of the Milky Way Galaxy. That's the spiral arm immediately inward from our location in the galactic plane.

I imaged M-17 from North Carolina in 2010. But the seeing was poor, the atmosphere too hazy due to summer humidity and the transit altitude was too low to lower the amount of atmosphere I was shooting through. So I imaged it again the night of June 29-30, 2012 from Kauai when it transited and was 51º above the horizon. The seeing was 2 arc sec and the skies were so transparent that besides the nebula, I could see the Great Rift in the Milky Way despite a 9 day old waxing gibbous moon in the west. The image was taken through a 102 mm (4-inch) f7.9 apochromatic refractor with an SBIG ST-2000XCM CCD camera. The exposure was one hour.

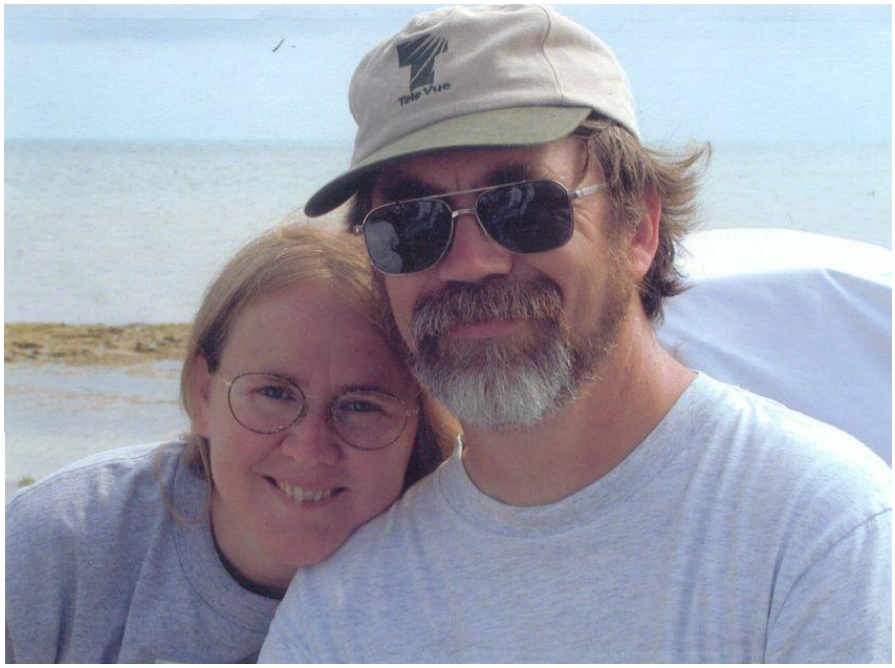
Rob Lambert: Observer from Nevada

M-17 is one of my favorite celestial objects and typically the favorite of the public when they see it through one of my telescopes using the Mallincam. Without any filters, other than a light pollution filter I use when observing in the vicinity of Las Vegas, M-17 proves to be an expansive nebula. The brighter, Swan-shaped, region of the nebula is approximately 11 to 16 arcminutes in length, while the entire nebula is probably closer to being almost a half-degree in diameter. Most of the times when I've viewed M-17 through an eyepiece, I've only seen what would be the body and head of the Swan, but with the aid of the Mallincam, a thin hazy veil of nebulosity surrounds it. Additionally, since M-17 sits almost astride the Milky Way approximately 9º above the lid of the Sagittarius Teapot, you would expect it to be surrounded by a rich star field, and it didn't disappoint in this regard. There were numerous bright pinpoints of light in and around the nebula, many being associated with the cluster of stars born out of this cloud of gas and dust. A number of bright stars are obscured in the brighter regions of the nebula.

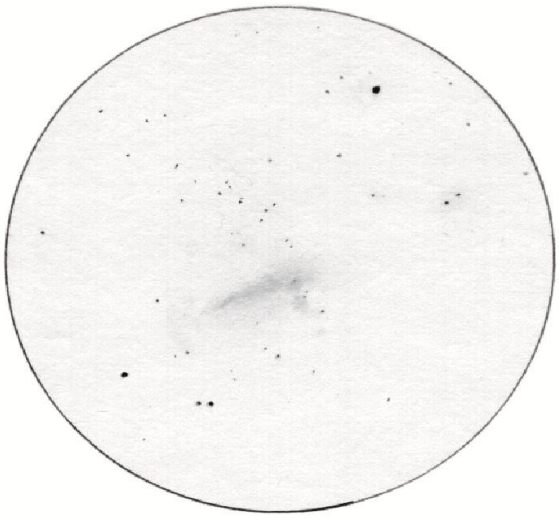
In the 14-second integration through my 10-inch SCT (see just below), the pink color of the ionized hydrogen, being excited by the bright stars within the nebula, is readily apparent.

Sue French: Observer from New York

Sue French is a contributing editor and columnist to *Sky & Telescope's Deep Sky Wonders* column and is the author of several outstanding books including *Celestial Sampler* and *Deep Sky Wonders*.



On August 9, 1999 at 10:30 pm EDT, I observed the Swan with a 105mm (4-inch) 610mm (f/6) apochromat, using a 7mm (87X) eyepiece. Seeing was fair and transparency was fair.

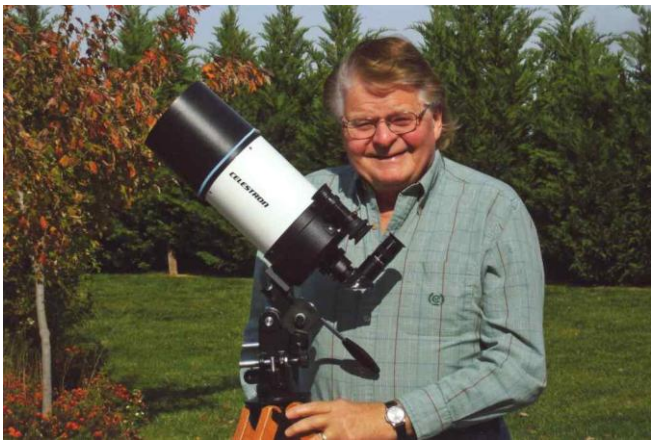


Gus Johnson: Observer from Maryland. **NOTE:** On April 19, 1979, Gus Johnson, visually discovered Supernova 1979C in spiral galaxy M-100. NASA announced on November 15, 2010, there was evidence of a black hole as a result of this supernova explosion.

On June 18, 1982, using an 8-inch reflector at 94X, M-17 appeared bright, with some faint star clusters noted north of the main bar. Scattered nebulosity could be seen in and around the bar and hook. While observing on July 25, 1982, and using the same 8-inch reflector, but with the employ of a UHC filter, the field around M-17 became filled with nebulosity.

James Mullaney: Observer from Deleware

James Mullaney is an astronomy writer, lecturer and consultant who has published more than 700 articles and eight books on observing the wonders of the heavens, and logged over 20,000 hours of stargazing time with the unaided eye, binoculars and telescopes. Formerly Curator of the Buhl Planetarium & Institute of Popular Science in Pittsburgh and Director of the DuPont Planetarium at USCA, he served as staff astronomer at the University of Pittsburgh's Allegheny Observatory and as an editor for Sky & Telescope magazine. One of the contributors to Carl Sagan's award-winning Cosmos PBS-Television series, his work has received recognition over the years from such notables (and fellow stargazers) as Sir Arthur Clarke, Johnny Carson, Ray Bradbury, Dr. Wernher von Braun, and former student NASA scientist/astronaut Dr. Jay Apt. His 50 year mission as a "celestial evangelist" has been to "Celebrate the Universe!" - to get others to look up at the majesty of the night sky and to personally experience the joys of stargazing. It's estimated that more than a million people of all ages, faiths and backgrounds have heard his inspiring message. In recognition of his work he has been elected a Fellow of the prestigious Royal Astronomical Society of London.



M-17, the Horseshoe or Omega Nebula, can be well seen in a 3-inch at 45X. A 10-inch presents a long ray, hooked at one end, and crossed by dark lanes. The sky inside of the hook

looks particularly dark. Look carefully for the faint associated star cluster which is NNE of the main bar, seemingly seldom noted by many amateurs.

Some quotes by famous observers from "*Celestial Harvest*: "

“Small telescopes show an elongated smudge, appears arched-shaped in larger instruments.” “Looks more like a long checkmark than a horseshoe" and is sometimes called the “Checkmark Nebula.” However, “in ordinary scopes, more in the shape of a swan.” “With increasing aperture, the Swan slowly disappears into a huge, glowing, semicircular arc of light...an interstellar spectacle whose magic cannot possibly be conveyed in words or pictures.” "Rivals M-42 for detail.” “Stunning region of bright nebulosity...a spectacular sight.”

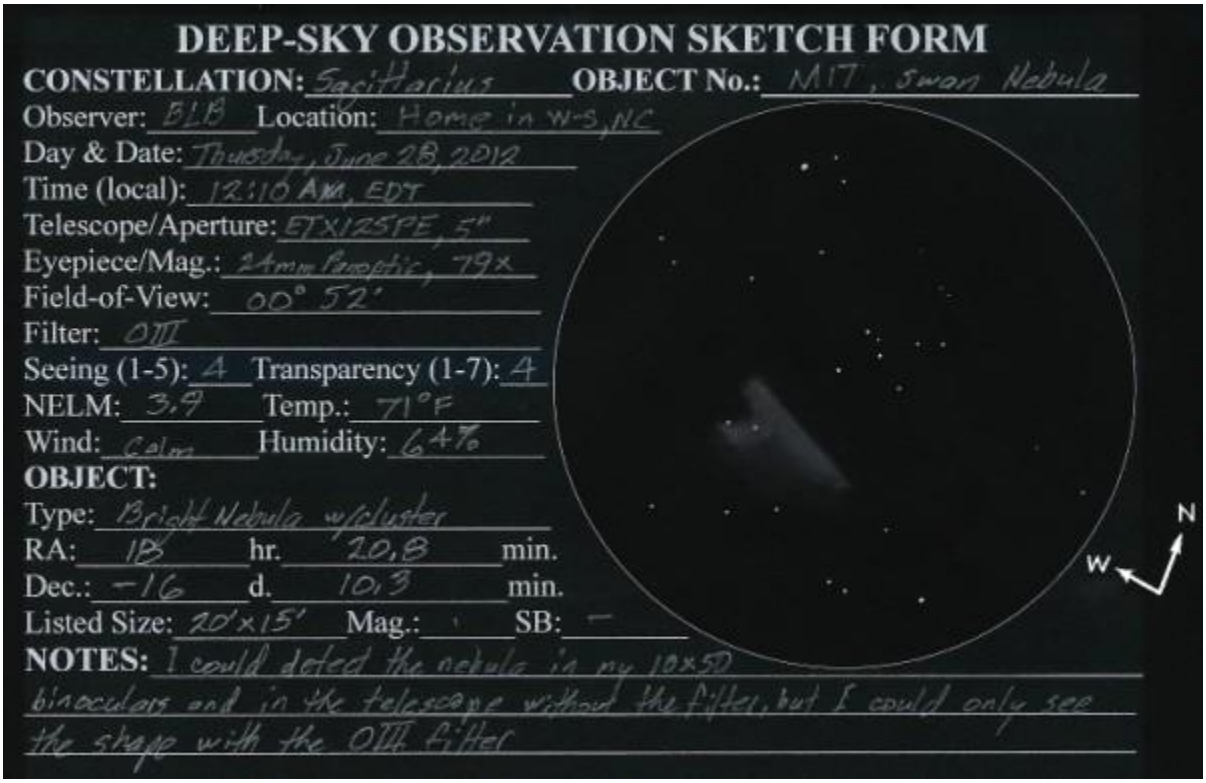
Buddy Barbee: Observer from North Carolina

For the first time since mid April, I was able to take a telescope out for some observing. I set up my 5-inch Mak-Cass, in my heavily light polluted backyard in Winston-Salem, NC, for a night of observing. It had finally cleared off late Tuesday night, and I took out my 10X50 binoculars to observe then. The sky was bright in town as it always is here, but I was still able to see the Swan Nebula with the binoculars. I would not have expected to see the nebula with such heavy light pollution so low in the sky. So, Wednesday evening, June 28, 2012, you know I would be set up to view this nebula while it was still clear.

Having set up the telescope at sunset, I went out to observe about 11:00pm after it was fully dark to try and sketch M-17. I spent about an hour looking at globular clusters while the nebula rose high enough to observe well. It was an easy target for my 10X50 binoculars once again, even though the naked eye limiting magnitude in the area was only 3.9. My southern horizon is the worst for light pollution. Using a 24mm eyepiece in the ETX at 79X, the nebula was visible even without a filter. Without using a filter, the nebula was pretty much a formless haze about twice as long as wide in a northwest to southeast direction. Adding an O-III filter to the 24mm eyepiece brought out the classic shape of the upside down Swan swimming on water. The nebula, with all the light pollution appeared much smaller than its listed size. It was only approximately 13'x7' in size.

My best view of this nebula was last year from a dark sky site in the mountains of western NC, when I could see nebulosity running from M-17 all the way to M-16, the Eagle Nebula, in my 10-inch Dobsonian. That night, the Swan was large and bright and appeared to be swimming across a lake that was filled with fog or mist. Oh to have more nights like that. Still

it's very impressive to see this nebula in a mag. 3.9 sky from town. I know I was happy to see it from my home.



Jim Gianoulakis: Observer from Las Vegas

M-17, also known as the Swan and Omega nebula as well as an NGC-6618 designation is an emission nebula in the Sagittarius constellation. Like many other emission nebula, M-17 shows red light emitted from Hydrogen gas clouds excited by the high energy of young stars. Unlike other emission nebula in its class, the bright stars that are energizing the Swan nebula are concealed by dense dust. Some of this dust in the center of the Swan both obscures and reflects the light from these bright stars. White and blue light reflected by dust, combined with red light emitted by hydrogen, create a mix of pink and magenta tones in the center of the Swan.

This nebula lies 5,500 light years away in the Sagittarius arm of our Milky Way galaxy.

About the image:

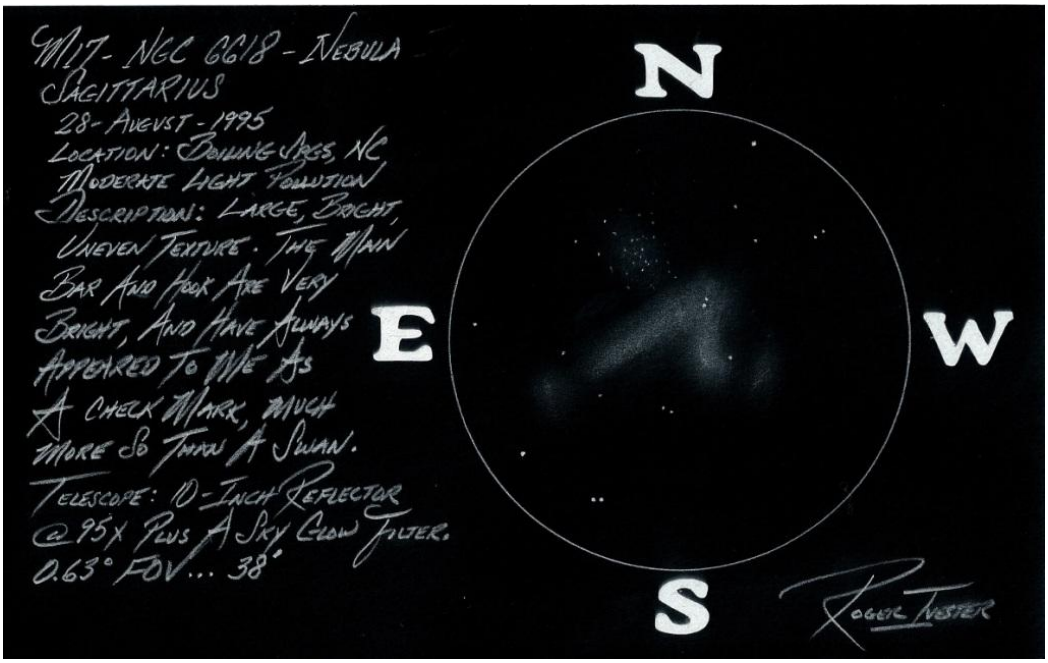
Mount: Paramount MX / Camera: QSI 583 WSG / Exposures: 10 X 300 seconds RGB calibrated with 20 darks, flats and dark flat frames.

Processing: Stacked with Deep Sky Stacker Aligned with MaximDL and combined in PhotoShop. Additional processing in PhotoShop – levels and curves additional noise reduction.

Roger Ivester: Observer from North Carolina

M-17, also known as the Omega Nebula is a magnificent object when observed through my 10-inch reflector. I have always referred to the parts of the nebula as the main bar, and hook. The surface brightness is very high, and the main bar has an uneven texture, with two faint stars being noted where the bar meets the hook. During my observation, a sky glow filter was used which seemed to enhance the nebula and brought out other faint nebulosity in close proximity. There was a definite dark area on the NW edge. A cluster of faint stars could be seen NNE of the main bar, which seems to be seldom mentioned by many amateurs.

When using a 3.5-inch Maksutov-Cassegrain scope, the basic checkmark shape could be seen, however, the faint surrounding nebulosity was absent. On nights of fair to poor transparency, which can be the normal for August in the foothills of western North Carolina, only the main bar can be seen when using the small Maksutov. As all deep-sky objects, M-17 is best observed from a very dark location with an inky black sky.


M17 - NGC 6618 - Nebula
Sagittarius
28 - August - 1995
Location: Boiling Springs, NC
Moderate Light Pollution
Description: Large, Bright,
Uneven Texture. The Main
Bar And Hook Are Very
Bright, And Have Always
Appeared To Me As
A Check Mark, Much
More So Than A Swan.
Telescope: 10-Inch Reflector
@ 95x Plus A Sky Glow Filter.
0.63° FOV ... 38'
N
E
W
S
Roger Tester

Fred Rayworth: Observer from Nevada

I've observed it many times over the years since 1983 when I found it a big surprise as I scanned the Milky Way star cloud north of Sagittarius. The first time I saw it was with my home-built 8-inch f/9.44 Newtonian. My detailed notes were scant but I observed it again later that year and described it as looking like a discus.

When I first used my home-built 16-inch f/6.4 on it on June 10, 1988, from Eurovillas, Spain, I described it as slightly greenish and arrow-shaped. I used no filter at that time. From then on, I mostly described it as fan shaped. It wasn't until September 11, 2010 at Cathedral Gorge State Park in Nevada that I was over at John Heller's 25-inch and he called it the Swan instead of the Omega Nebula and I took a look at it again and that's when it clicked for me. It sure did look like a swan!

I went back to my 16-inch f/6.4 and sure enough, though a bit dimmer than the 25-inch, it looked almost the same and there was the swan shape, clear as could be! From that point on, I've called it the Swan Nebula instead of the Omega. Though I instantly spot the comet flare I so easily see right off, I now notice the arched neck and head of the swan which was there all along, just a bit more subtle than the body.

Buried in there off to the side is also a modest open star cluster that I never paid much attention to because of the nebula. It isn't mentioned much and I just considered it all part of the rich Milky Way background and never knew it was an actual cluster until reading up about the object. I understand that the open associated with the nebula is actually invisible and buried

within the nebulosity so I'm not sure what this cluster next to it actually is and if it a real cluster or just a bunch of unassociated stars. It doesn't show on Megastar.

My drawing I was hoping to get during July, but I held out until August 11, 2012 when I had my final opportunity to observe it before putting this Challenge together. Alas, thunderstorms moved in and I never got out. The sketch is compiled from a multitude of observations over the past several years. It looks best with an O-III filter though through a 16-inch, it doesn't look bad even unfiltered. I never fail to catch it during the summer as it's a spectacular object, especially in telescopes of modest to larger apertures. I'm still waiting for that chance this year!