

MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

March 2022

Report #158

The Medusa Nebula, (Abell 21, PK 205+14 1, PN G205.1+14.2)

Planetary Nebula in Gemini

Sharing Observations and Bringing Amateur Astronomers Together

Introduction

The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It's open to everyone who's interested, and if you're able to contribute notes and/or drawings, we'll be happy to include them in our monthly summary. Visual astronomy depends on what's seen through the eyepiece. Not only does it satisfy an innate curiosity, but it allows the visual observer to discover the beauty and the wonderment of the night sky. Before photography, all observations depended on what astronomers saw in the eyepiece, and how they recorded their observations. This was done through notes and drawings, and that's the tradition we're stressing in the Observer's Challenge. And for folks with an interest in astrophotography, your digital images and notes are just as welcome. The hope is that you'll read through these reports and become inspired to take more time at the eyepiece, study each object, and look for those subtle details that you might never have noticed before.

This month's target:

Abell 21 was discovered during the course of the Yerkes-McDonald survey of symmetric galactic nebulae. The ensuing catalog was published by Hugh M. Johnson in the May 1955 issue of the *Astrophysical Journal*, in which it was given the designation YM 29.

<https://ui.adsabs.harvard.edu/#abs/1955ApJ...121..604J/abstract>

The nebula was independently discovered by George O. Abell among globular clusters and planetary nebulae newly found on the National Geographic Society-Palomar Observatory Sky Survey. His paper was published in the August 1955 issue of the *Publications of the Astronomical Society of the Pacific*, which listed 13 globular clusters and 37 planetary nebulae.

<https://ui.adsabs.harvard.edu/#abs/1955PASP...67..258A/abstract>

Although the nebula is number 16 in Abell's list of planetaries, it's now commonly known as Abell 21. His well-known, updated list of 86 planetary nebulae was published in the *Astrophysical Journal* in 1966, and since the nebulae are given in order of right ascension their numbers were changed accordingly.

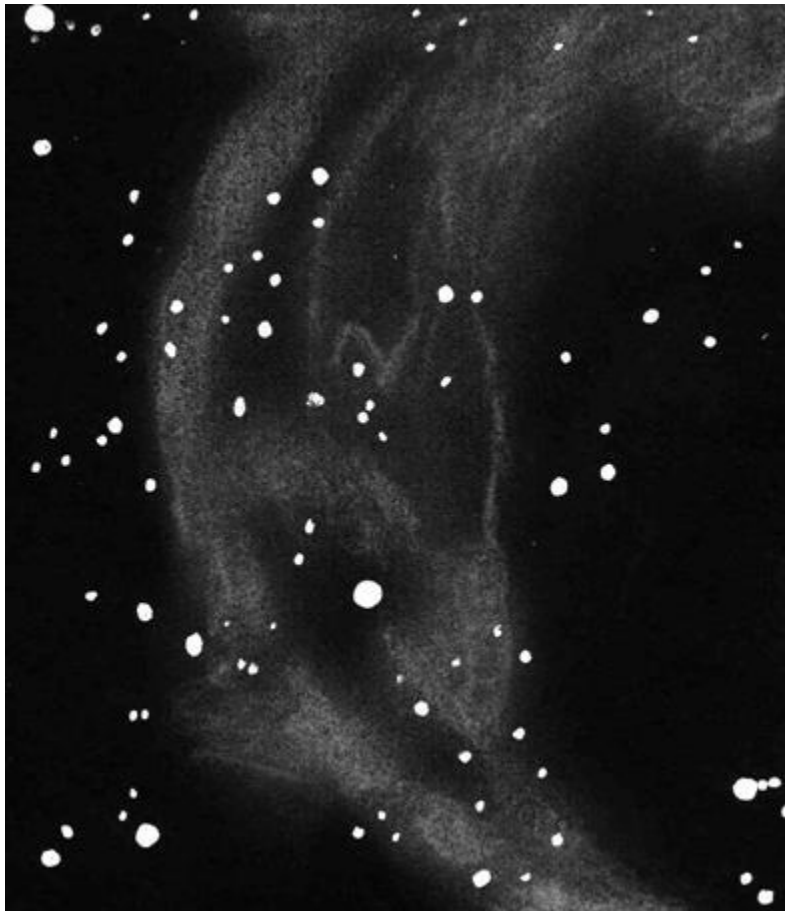
<https://ui.adsabs.harvard.edu/#abs/1966ApJ...144..259A/abstract>

B. A. Vorontsov-Vel'Yaminov coined the name Medusa Nebula in *Astronomicheskij Tsirkulyar* No.221 (1960).



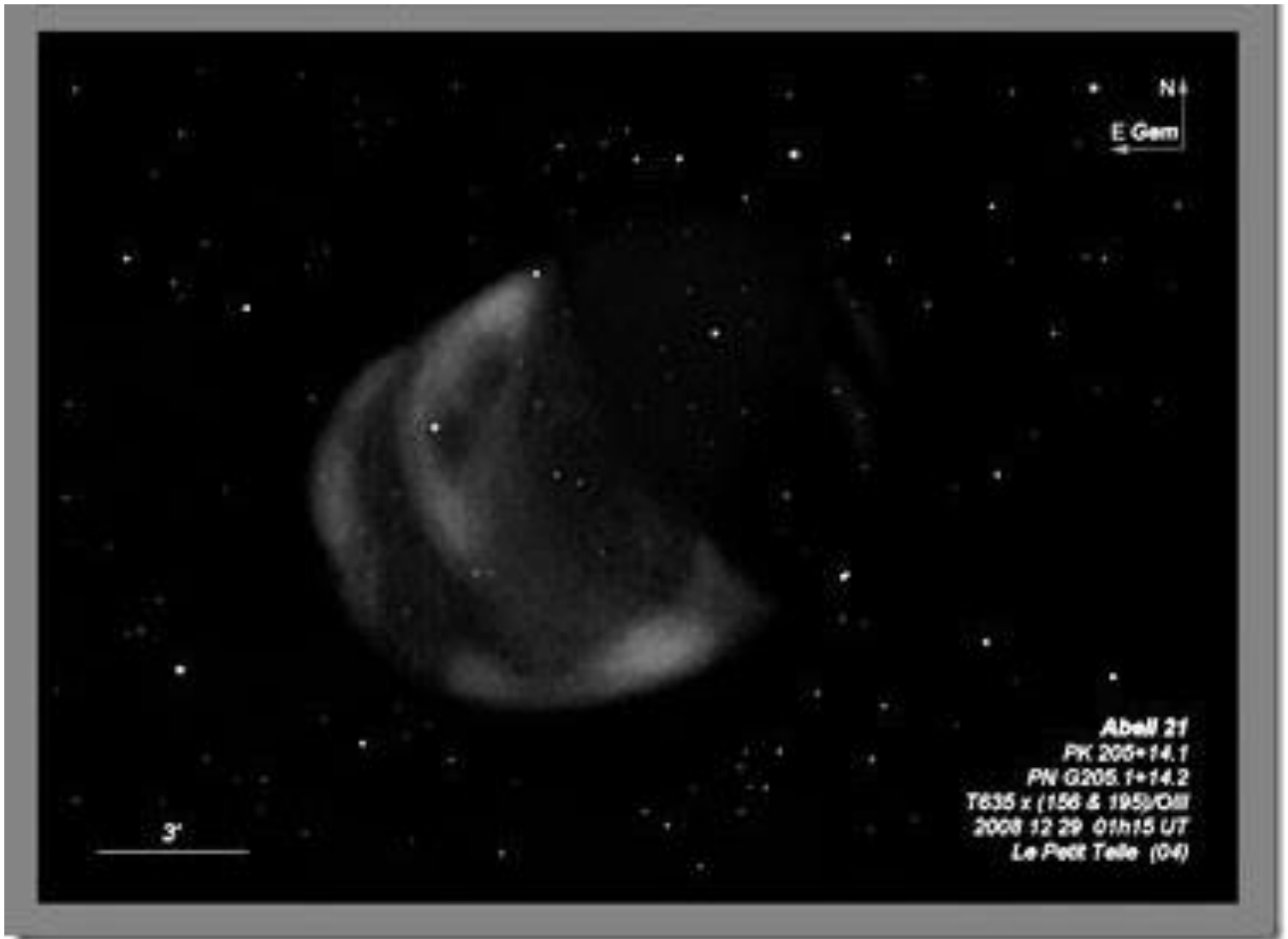
Credit: ESO (European Southern Observatory)

Dale Holt: Observer from England, 30 miles north of London



505mm f/3.74 Newtonian on a fork mount and an old analogue Watec 120N+ deep sky video camera with custom cooling. The camera is B&W and delivers its image in near real time, typically 15 sec exposure to a CRT monitor in my observatory office where I sketch from the screen. Most commonly I used graphite pencil on sketch paper although sometimes I use white on black hard pastels where the object is nebulous. Post drawing I scan the image and invert using paint. Limiting magnitude of my set up is around 19-20th mag. Sadly my camera cannot be fitted with the simple focal reducer as I don't have enough focus travel in its prime focus location, this meant that I was only able to get around 2/3 of the wonderful Medusa nebula into my fov, still it was a very interesting observation and a first time sketch, my notes say that last observed at Field View astronomy centre with my 20" Dob, that is an age ago!!

Bertrand Laville: Observer from France



<i>Date of sighting:</i>	Dec 28 2008 01:45 UT
<i>Duration of observation:</i>	65 mins
<i>Object position:</i>	Alt: 56.1°, Az: 210.5°
<i>Viewing location:</i>	Puimoisson le PetitTelle
<i>Tool:</i>	TN 635 Dobsonian Obsession
<i>Main eyepiece:</i>	Tele Vue Nagler 16mm Type 5
<i>Barlow:</i>	(None)
<i>Magnification:</i>	195x

×195 Nagler 16mm/OIII

It's the best magnification, because you have to magnify enough to analyze the cloudiness. And OIII is better than UHC because it darkens the field more.

The Medusa is undeniably a big thing, with a lot of structure, but little, or very little contrast, apart from the two "ears". The limit between half S and half N of the PN, i.e. the line that joins the two ears, is quite precise in distant averted vision.

It takes careful observation, even at the T635, to analyze and individualize the different areas. No filamentary structure perceived. On the other hand, the two dark zones were perceived, but with the help of Guide8/DSS, to locate them precisely in relation to the stars.

×101 Nagler 31mm/OIII

I resumed the observation at this magnification to refine my perception of half N, which I seemed to perceive at the beginning of the observation, where I used N31/OIII for a few moments.

With careful observation, I was able to perceive half N, as a weak limiting nebulosity on its 2/3 W, and which is lost on the 1/3 E. On the other hand, the two "wrinkles", at the NE limit of this N half, were seen to be difficult, but safe, thanks to Guide8/DSS.

I did not position the stars, far too many, even with the filter.

December 29, 2008, Puimoisson le Petit Telle, Haute Provence, SQM 21.61

×101 Nagler 31mm/OIII-12nm

I resume the observation of the Medusa, because after my observation of the day before, I know perfectly all the luminous and dark zones. This allows me to be more precise, and I see that all the developments are in the direction of improvements, and that I really see what I know and what I'm looking for.

The main modification is that the entire NW half is seen, borderline, L1, but real, in distant VI.

×156 Nagler 20mm/OIII-12nm

The N horn of the S ear is well seen. The W limit of the collar is well seen, almost linear, N/S, and well cut. Two dark areas in the triangle of the collar, with a bulge on the E border, on the S tip side. The continuation towards the E of the S ear is more precise. The continuation towards the SE of the N ear is more precise.

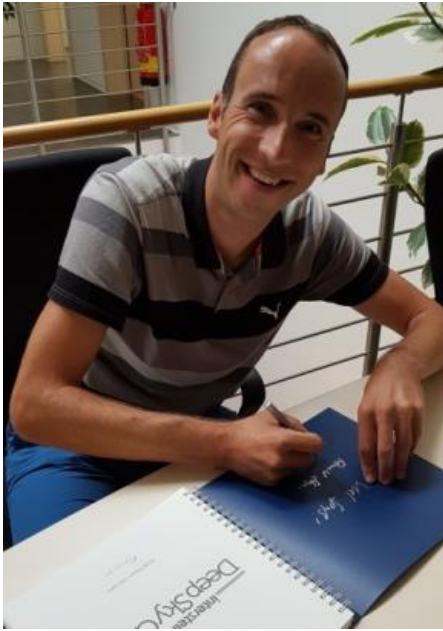
In fact, the whole planetary nebula is more precise, and almost every detail is sharpened.

×240 Ethos 13mm/OIII

I tried increasing the G to 240×, but it's too much. The nebulosities become less clear, and the contours of the different areas also more blurred.

You can see more of Bertrand's sketches at: <http://www.deepsky-drawings.com/>

Uwe Glahn: Observer from Germany



Object: Abell 21 - "Medusanebel"

Telescope: 16" f/4.5 Newton

Magnification: 100×

Filter: O III

NELM: fst 6m7

You can see more of Uwe's sketches at:
<http://www.deepsky-drawings.com/>



Rony De Laet: Observer from Belgium



Rony De Laet

From my backyard, the nebula is large but extremely weak. I can hardly see its presence without a filter. The view at 100x with an OIII filter gives the best result. But it takes time to see any structure in this object. The first impression reveals only the northeast and southwest ends of this 'would be' crescent shaped nebula. The center of this object is not visible at first. Sweeping an object through the field of view helps detecting subtle structures. I kept sweeping the Medusa Nebula for several minutes until I was certain that the two weaker bridges between the brighter tapering horns were really there.

Site : Bekkevoort, Belgium (51° N)

Date : February 27, 2022

Time : around 22:30 UT

Telescope : Taurus 16"

EP: Morpheus 17.5mm 76°, 100x

Filter : OIII

Seeing : 3-4/5

Sky brightness : 20.0 magnitudes per square arc second near zenith (SQM reading).

Sketch Orientation: N up, W right.

Digital sketch made with Corel Paint Shop Pro X2, based on a raw pencil sketch.

Jaakko Saloranta: Observer from Finland



4.5" Orion SkyQuest

Object: Abell 21 / PK 205+14.1

Obs. place: Rajasuo, Hyvinkää, Finland (108 m / 354 ft.)

Date: 26./27.3.2014

NE Lim.mag: 6.0 (zenith)

SQM-L: 20.20 (zenith)

Background sky: 4 (fair)

Seeing: 4 (fair)

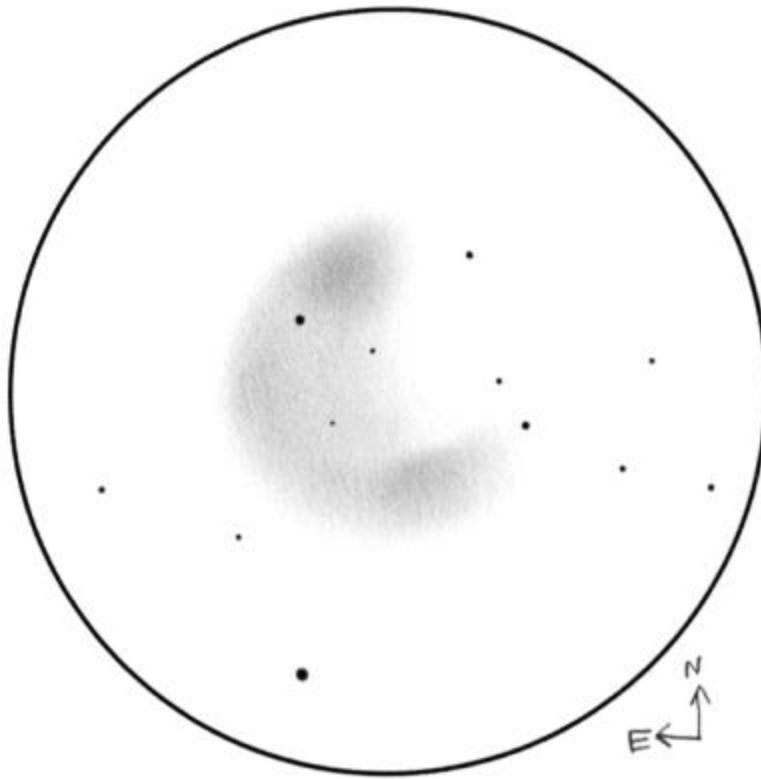
Transparency: 5 (average)

Weather: -4.2°C, humidity ~80%, 1032 hPa, faint gusts of wind.

Altitude: 35°

Description: Very faint, 8' crescent-shaped planetary nebula visible only with a Lumicon O III filter. Slightly brighter at both ends. Best seen @ 76x (46').

Sketch follows.



Abell 21 with 4.5" Orion SkyQuest @ 101× (24')

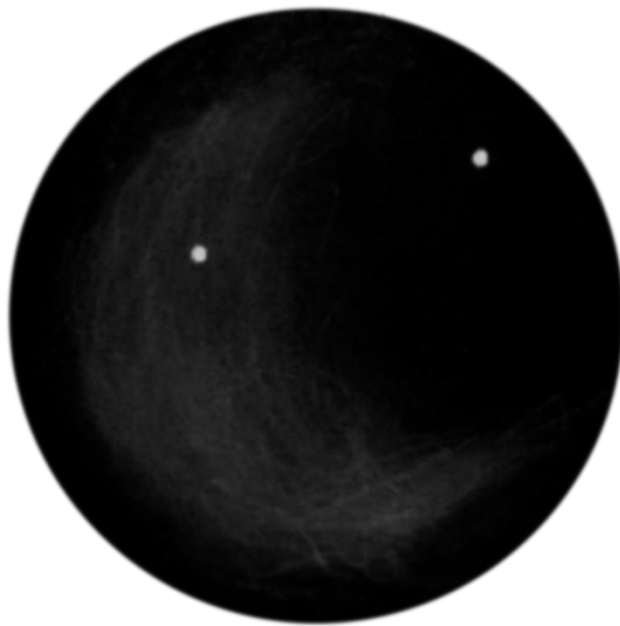
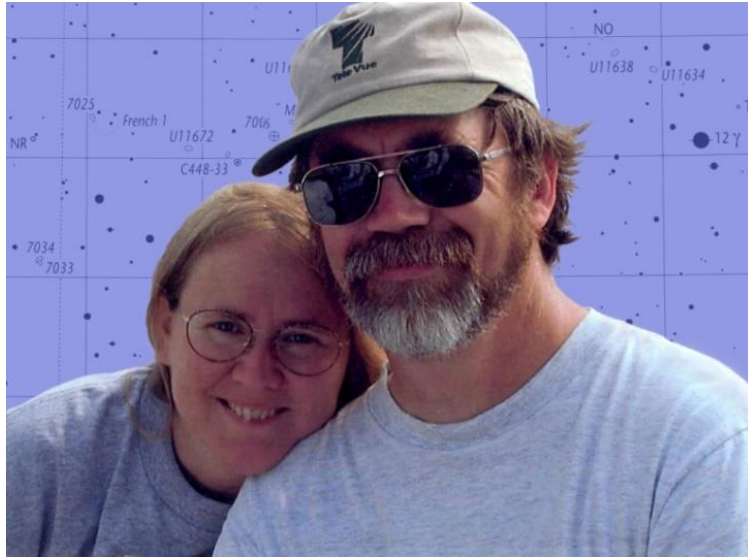
Chris Elledge: Observer from Massachusetts



I visited the clubhouse with my son on Friday night. We were only there for an hour, but Steve Clougherty, Joe Henry, and Phil Rounsville showed us many visual treats during that time. Thanks! I think this group of observers can find just about anything that's visible visually. My son and I both were able to see the Medusa Nebula in two different telescopes. I mostly focused on making sure my son got to see it, so I didn't take any notes. It was certainly a faint and diffuse object, and I think my son had an easier time seeing it than I did despite having me holding him up to the eyepiece on one of the big Dobs.

On the topic of the fun to be had being a club member, I'm attaching an image of the Medusa Nebula taken with the club's Mittelman ATMoB Observatory. It's 12x300s SHO exposures in Hubble palette. I was surprised by how much of the outer faint nebulosity was visible just above the noise floor.

Sue French: Observer from New York



Through my 105mm refractor at 28 \times , the Medusa Nebula shares the field of view with the open cluster NGC 2395, but the nebula was not seen. With an O III filter: Wow! I was amazed. The nebula became visible and was not particularly difficult. It could even be seen with direct vision, although it showed better with averted vision. I estimated its size at about 7½ arcminutes. I could vaguely tell that it's not round, but rather dented inward in the northwest. The nebula appeared brightest in the northeast and southwest.

On a later observation with my 130mm refractor at 48 \times , I was no longer surprised to see the nebula materialize with an O III filter. It appeared as a fat arc of nebulosity, concave northwest, and I judged its size to be about 7 arcminutes. The nebula actually stood out better with the filter at 23 \times , but the shape was more difficult to discern.

The Medusa nebula was easily visible through my 10-inch reflector at 43× with an O III filter. It showed a 7½ arcminute fat arc open north through west and fattest in the northeast. At 68× with a UHC filter the nebula looked very nice, showing much unevenness in brightness. It also looked good with an O III filter, but I liked the UHC better here because it seemed to accentuate the patchiness better, even though the O III gave better contrast against the background sky.

The Medusa is very nice through my 15-inch reflector at 79×. Its fat arc is bright in the northeast, which hosts a superimposed star, dims in the southeast, and is bright and narrower in the southwest. A star, faint through the filter, would sit on the nebula's northwest edge - if there was a northwest edge. The wide areas of the arc appear vaguely filamentary.

The quick-and-dirty sketch of the Medusa Nebula was made on a recent night with the 15-inch scope, using an O III filter and a magnification of 79×. Unfortunately the object was well past the meridian, and slowly sinking by the time I started, so the drawing just gives my general impression.

Joseph Rothchild: Observer from Massachusetts



I observed the Medusa Nebula on March 21, 2022. I had not previously seen this planetary in Gemini. I observed with my 10" reflector under fairly dark skies on Cape Cod.

The planetary was located near 6 Canis Minor. It was halfway between 2 small asterisms - a pair of stars (pointing toward the nebula) and 3 stars in a small arc.

The object was initially not seen, even with a 24 mm eyepiece and NBP filter. Finally, as my eyes fully dark adapted I could see it clearly, but still only with the filter. It appeared as an ill-defined semicircular haze. I could not detect any other structure.

Mike McCabe: Observer from Massachusetts



Friday, March 4th 2022;

Early Afternoon: A message comes in from a friend – would I care to meet at the field tonight and wield some high powers on the Trapezium with his 18" scope? Wow! My fortunes just took a turn for the better in my battle with the Medusa Nebula! With Louis in my corner my chances of slaying the beast just improved by at least three-fold. So yes...I'll see you there at 7, I said!

With the scope set up, collimated, cooled and putting up sharp images we started out with Sirius and the Pup. In all the years of owning the big scope Louis had never seen the Pup in it, but he did on this night. Truth be told, that big mirror is almost too much glass to be wielding on that brightest of all stars. There is a lot of sparkle to be had, and I found it actually more difficult to pull out the Pup than it is in my 8" or 10" scopes. But see it we did and so now that box can be checked with the old Obsession.

Next we dropped in on the Trapezium, but things weren't going as well over there. I surmised that we were looking over the row of houses going down the street, and surely every one of them had their furnaces running and spewing heat up the chimneys. It was 25° out, so I think it was a safe bet. Even the E and F stars weren't showing steadily in the views. I put away my chart showing the locations of the G, H and I stars as was vowed, but not this night, however, we'll go back at another time. Louis has a saying that fits those scenarios very well, that being: "The stars will always be there".

The Medusa Nebula: Now that we were warmed up it was time for Round 3 with the Medusa Nebula in Gemini. Louis, acting as my trainer now, handed me the secret weapon that we would wield to begin the round. I installed the 35mm Panoptic with UltraBlock filter into the eyepiece holder.

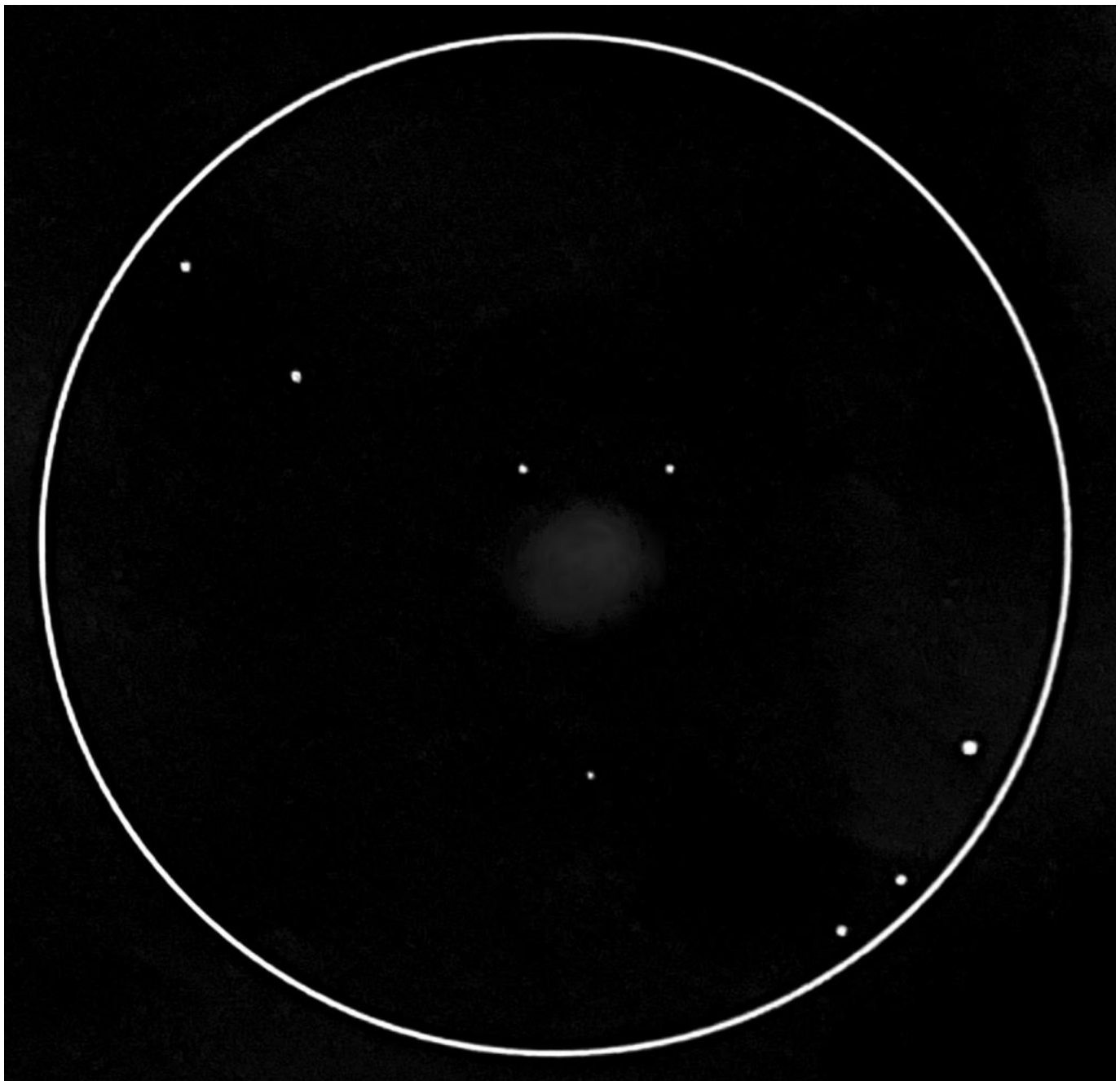
Louis and I both use the same finder system on our scopes, so working at the controls of his is just as comfortable for me as sitting in my chair in front of the TV. I put Lambda Gem in the Telrad target, then hopped down to the location of the Medusa with the RACI. The round was less than a minute old, and we were about to get some clue as to my fate with this battle.

I put my eye to the eyepiece, focused the bright stars in the field to sharp points, then looked in the exact spot where I knew the beast was hiding. And there it was! Battle over! The Medusa had been slayed, and just like Perseus did in the ancient mythological tale, it was a mirror that was used to achieve the conquest.

But rather than collapse from euphoria at finally having succeeded with this beast, I had a rather subdued reaction to it. As I stared into the eyepiece, grateful for not having been turned to stone, another of Louis' famous sayings came to mind..."well, that ain't much".

The view of the Medusa Nebula was nothing more than a hazy apparition in a pretty sparse star field. The UltraBlock pulled it out, definitely, as it was entirely invisible with no filter at all, but it was best seen with an O III filter in place. Those O IIIs have a propensity for changing the look of the stars for sure, but as we stared at the field and got used to it the Medusa became slightly more apparent over time. It eventually got to the point where we would see it instantaneously upon looking in, and with that we concluded the observation a definite success.

Medusa Nebula sketch: The Medusa Nebula as seen through the eyepiece of a friend's 18-inch f/4.5 telescope on Friday, March 4th 2022. The eyepiece of choice was an excellent selection, being a 35mm Panoptic eyepiece @ 58 \times , with a 1.2 $^\circ$ TFOV, and with the employ of an UltraBlock and O III filters.



Larry McHenry: Observer from Pittsburgh, Pennsylvania



Abell 21 is a planetary nebula located in the winter constellation of Gemini, The Twins, and is also known as the Medusa Nebula. It is about 1500 light-years distant, 8,800 years old, and 4 light-years in size.

Abell Planetary Nebula are named after American astrophysicist George Abell, (1927 – 1983). Using the Palomar 48-inch Schmidt telescope, Abell compiled a catalog of very old, faint planetary nebula, which was first published in 1955 titled *Properties of Some Old Planetary Nebula* and expanded several times with the final version in 1966. Abell's catalog is recognized as an excellent compilation of faint, challenging planetaries for both the visual observer with access to large telescopes and dark skies, and EAA/imagers. For the most part, due to being very old, large, and having a very low surface brightness, they can be difficult to observe. O III filters can be a big help visually, allowing the nebula to pop from the dimmed field. For the EAA/imager, narrowband filters will help bring out detailed subtle features in these type of nebulae.

Video-Capture/EAA 10/05/2018: from dark-sky location at Calhoun County Park, WV. Using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, using an analog B/W video-camera & IR filter @ 180 seconds, guided single exposure.

Image follows.



01/21/2021: from Big Woodchuck Observatory backyard in Pittsburgh, PA. Using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, with a CMOS color camera and narrowband filter @ 60-second guided exposure, live stacked for 30 minutes.



Mario Motta: Observer from Massachusetts



This image was taken in December 2022, from Gloucester with the 32-inch scope, and ZWO 6200 camera, 2 hours Ha, 1 hour each S2 and O3.



James Dire: Observer from Illinois

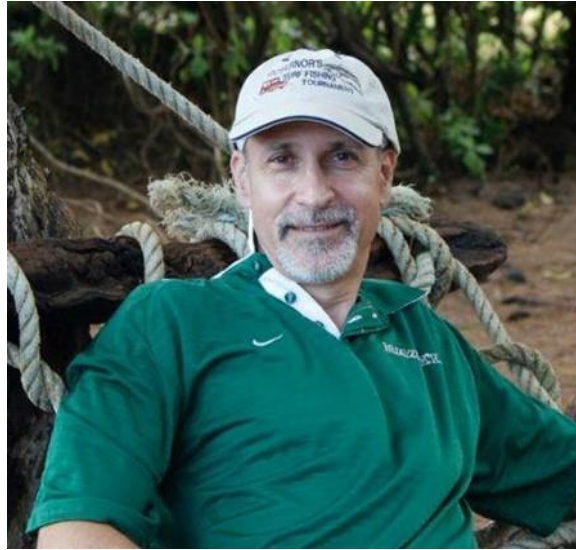


Image made from Earl, North Carolina on January 14 & 18 2010
190mm Mak-Newtonian f/5.3 and SBIG ST-2000XCM CCD camera -20° C



The Medusa Nebula, also known as Abell 21, is located along the southern edge of the constellation Gemini, near the border with Canis Minor. The nebula is found 5 degrees north of the star Gamma Canis Minoris.

UCLA astronomer George Abell independently discovered the Medusa Nebula in 1955. Abell correctly classified it as an ancient planetary nebula and made it the 21st of 86 entries in his 1966 Catalog of Planetary Nebulae. Many other astronomers in the 1970s and early 1980s thought Abell 21 was a supernova remnant. They were wrong!

The brightest regions of Abell 21 measure 12.5 by 8.5 arcminutes. This is huge compared to most planetary nebulae we are used to seeing. The nebula is spread out so much that it has an extremely low surface brightness. It is best seen with 10-inch or larger telescopes in very dark skies. I have only seen it unfiltered with my old 14-inch f/6 DOB from a dark site on Kauai.

The large size of the Medusa Nebula is due to age and proximity. Most planetary nebulae last about 20,000 years. Abell 21 is getting close to that age! Abell 21 is 1500 light years away from us; a relative galactic neighbor.

Because of its asymmetric shape, finding the star that created the Medusa Nebula is very difficult. There is not an obvious center to the nebula. Astronomer identified the star responsible for creating the nebula by searching the region for a star at the same distance as Abell 21 with a spectral signature of a typical planetary nebula central star. I could find no information of the coordinates of the central star, nor its magnitude.

My image of Abell 21 was taken in January 2010 from Earl, North Carolina using a 190mm f/5.3 Maksutov-Newtonian with an SBIG ST-2000XCM CCD camera. The integrated exposure was 180 minutes. In the image, north is up and east to the left.

The nebula appears as a crescent because one side of the nebula is considerably brighter than the other side. Longer exposure images of the object show both sides of the nebula with many layers of expanding gases.

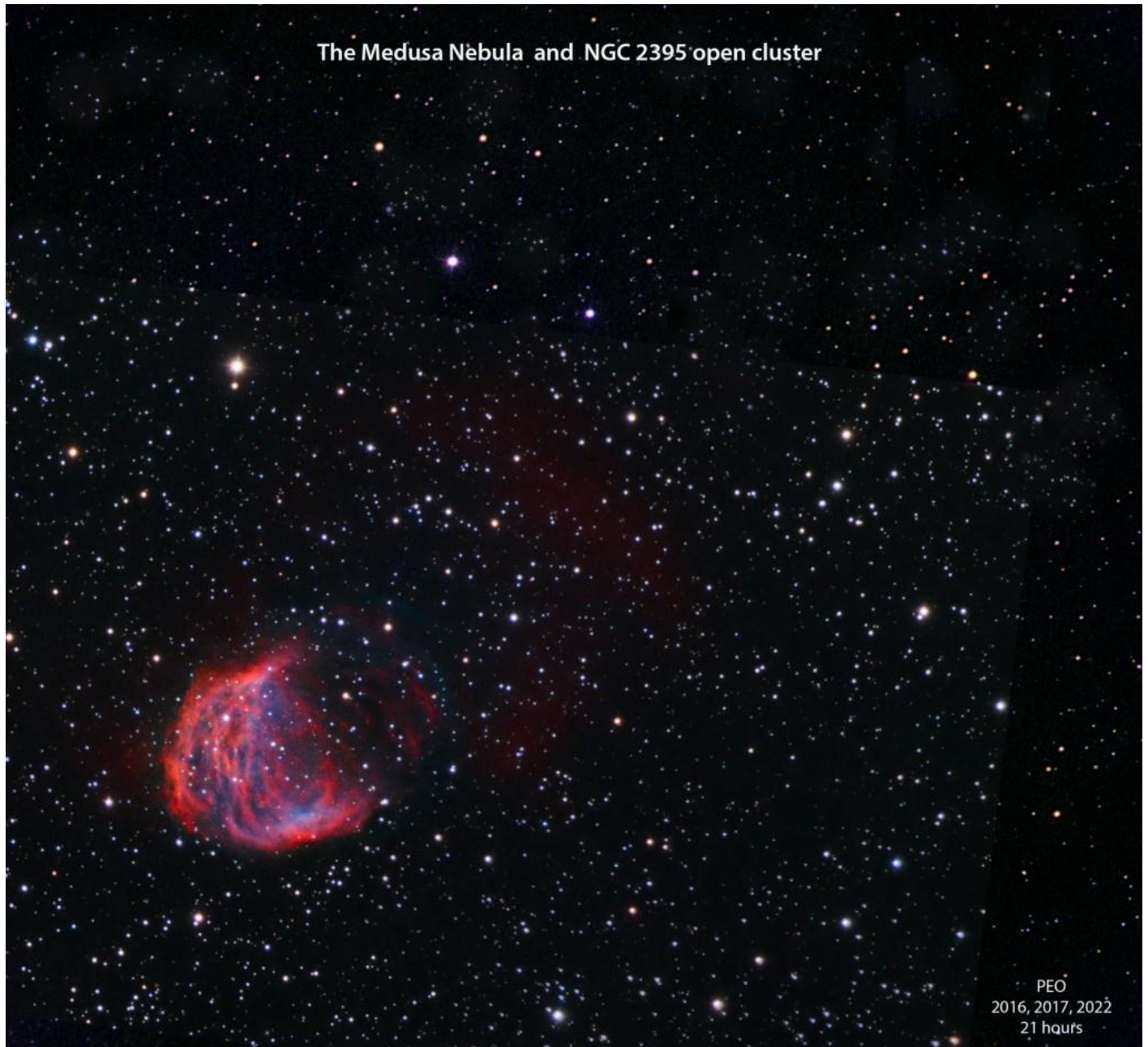
Just north west of the nebula (outside the field of my image) is a galactic star cluster about the same diameter as the nebula. Known as NGC 2395, this sparse star cluster contains 45 stars.

Phil Orbanes: Observer from Massachusetts

Here is my photo of the Medusa, which also includes nearby open cluster NGC 2395.

It includes 27 hours of imaging taken in 2016, 2017 and 2022, through my 14-inch PlaneWave reflector and FLI 16803 CCD camera.

The exposure time was divided evenly between R, G and B, Ha filters.



James Gianoulakis: Observer from Las Vegas



The Medusa Nebula is a planetary nebula in the constellation of Gemini. It is also known as Abell 21 and Sharpless 2-274. It was independently discovered in 1955 by University of California, Los Angeles was Angeles astronomer George O. Abell, who classified it as an old planetary nebula. Until the early 1970s, the thought to be a supernova remnant. With the computation of expansion velocities and the thermal character of the radio emission, Soviet astronomers in 1971 concluded that it was most likely a planetary nebula.

Image information:

Equipment used: PlaneWave 17-inch CDK, Paramount ME, STX 16803 ccd, Astrodon 50mm color filters.

Location: Arizona Sky Village

The photo is an integration of several subframes through red, green, blue and luminance filters. The subframes break down like this: 20×600s R, 18×600s G, 17×600s B and 19×600s Lum. Darks, flats and bias applied. Total integration time 12.3 hours. Average seeing is around 2 arcsec/pixel

Pix-insight Workflow:

Weighted Batch Processing script
Normalized Scale Gradient script
Muir Denoise
Deconvolution (luminance image)
Dynamic Crop
Channel Combination
Photometric Color Calibration
LRGB Blending

Images follow.

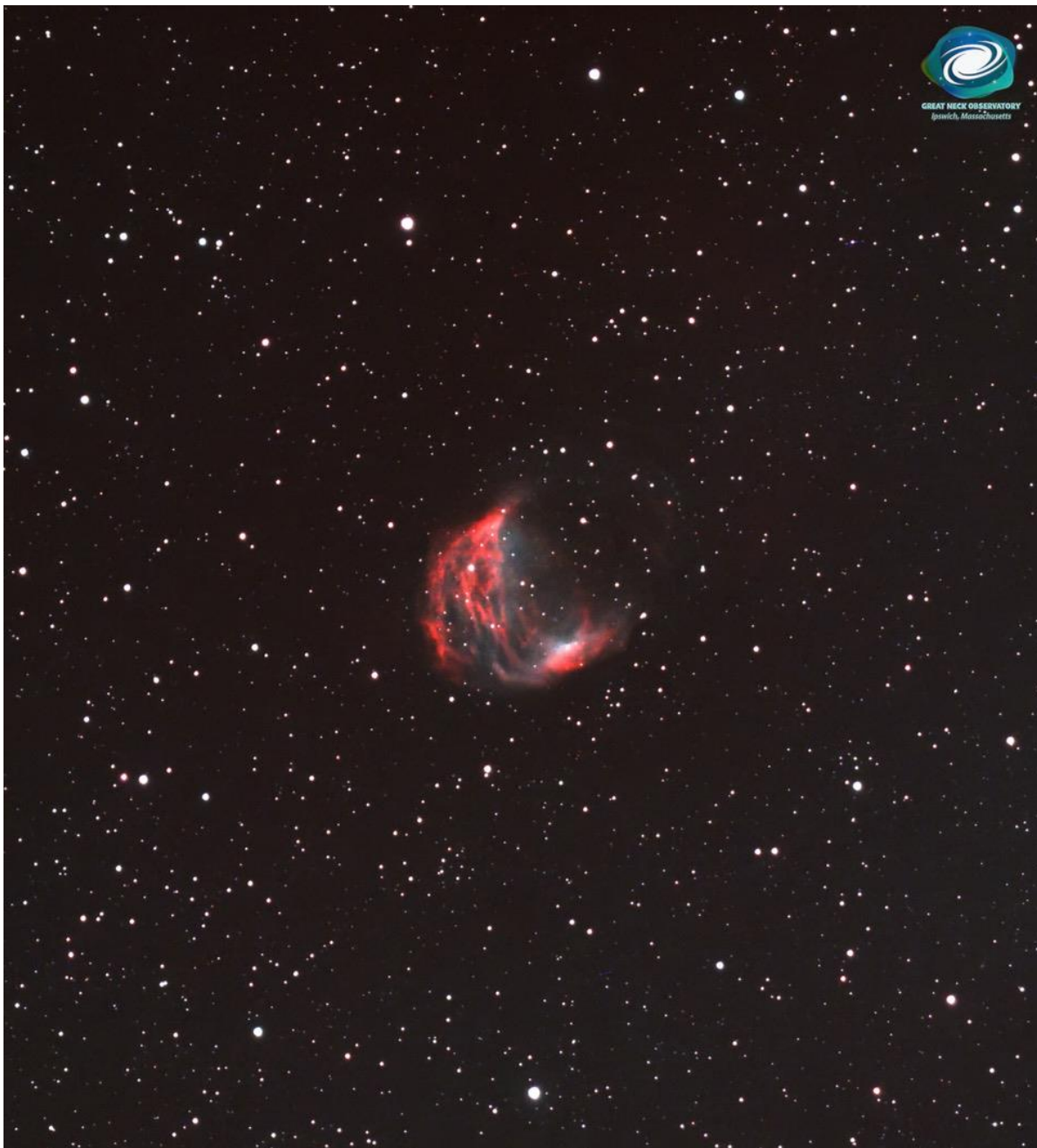




Mark Helton: Observer from Massachusetts

Hello fellow time travelers!

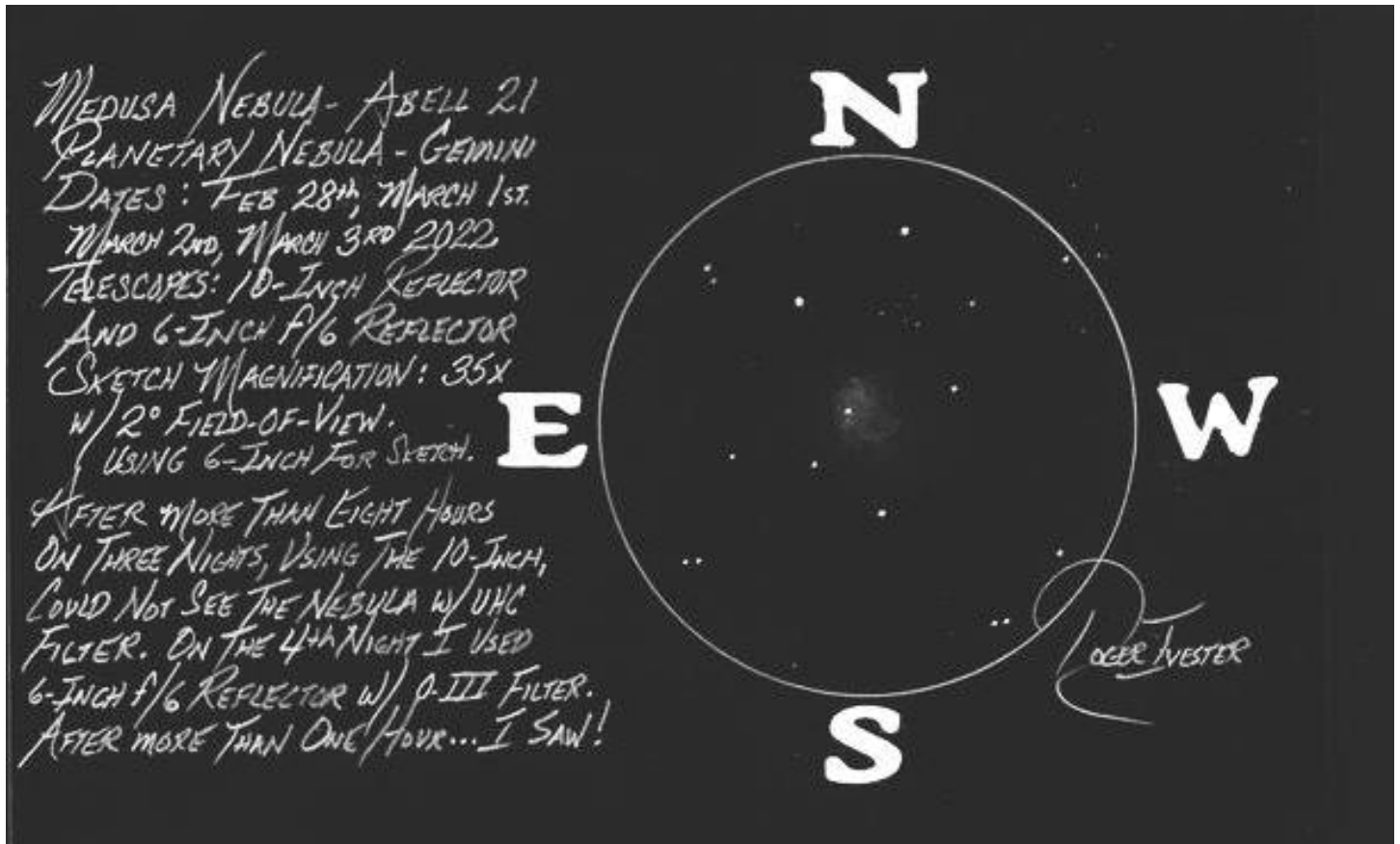
I found it very interesting that Abell 21, the Medusa Nebula was chosen as this month's Observer's Challenge. I had never of it before, as is the case with many of the beautiful, hard to find objects in space, until I saw an image of it posted by an astrophotographer who I follow on Instagram. I was like, that is beautiful, I must go try to find it. Like many of the more beautiful nebulae like the Dolphin Nebula, it is very, very dim. It took a few tries but I finally got it! I used my Stellarvue 102T Raptor, ZWOASI533MCPRO camera with a OPT Triad filter to capture it. Stacked in Nebulosity4 and processed in Adobe Photoshop, with Topaz Labs DeNoise noise reduction program. The outer shell of this nebula reminds me of the Veil Nebula, with a similar structure, just not as far along in its evolution and expansion. This was imaged in February so not sure whether it can be included in this month's challenge. I do plan on going back to image it again, just need a very clear dark night! Clear Skies and keep looking up!!



Roger Ivester: Observer from North Carolina



Pencil sketch using a 10-inch f/4.5 equatorially mounted reflector



After spending four nights and ten hours, with two different telescopes, and multiple eyepieces and filters: I was finally able to “visually” see the Medusa Nebula. For me...the euphoria of seeing an extremely faint deep-sky object after many nights and hours, can “or might be similar” to something physical, such as running a marathon, which I’ve never done, but I have competed in bicycle races.

To be able to locate and “visually” see the Medusa Nebula, a very dark sky is most desirable, but which is something I don’t have from my suburban backyard. My best NELM seldom exceeds 5.0-5.2 on a superb winter night. But I’ve always tried to make-do, and thus far, been successful in seeing all of the challenge objects for the past almost 14 years, and now exceeds more than 200 deep-sky objects.

The Medusa Nebula is the most difficult (visual) object featured to-date in the Observer’s Challenge report for the past almost fourteen years. This might be proof that a dark site with a 6.0-7.0 NELM is not necessary to enjoy the wonders of the night sky.

The Medusa Nebula:

Easy for the imager, but extremely difficult for the “purist” back yard amateur astronomer, using an eyepiece, an O III or UHC filters, a pencil, note and sketch pad.

Amateur astronomy can be anything the amateur wants it to be. But for me, I want it be “not too distant” from the nights, taking out a 60mm refractor, in what I called the “weedy-field” beside my childhood home. I wanted to see some of those fabulous spiral galaxies (and in color) that I’d seen in my 6th grade science book. Of course I never did, but without any support or guidance, I learned what was possible.

I’ve never been disappointed in those very faint objects that are barely visible in the eyepiece, and requires hours or nights to finally see, but somehow “for me” those are my favorite. Where in the solitude of the night, I might whisper to myself: THAT’S IT !

For those few that choose to carefully, and with patience, observe and sketch a deep-sky object, also supplementing with copious notes, they will never forget what that object looks like, and with instant recall.

After 50 years of observing, I’m so glad I never lost my EP, my pencil, or my sketchpad, as I never had any desire to become an imager. I also have a library with hundreds and hundreds of “one of a kind” pencil sketches, to review, and for future reference.

If you’ve never attempted to make a pencil sketch, with supporting notes, you should consider. We need to keep the ancient art of visual observing and “pencil sketching” alive. A skill or facet of amateur astronomy that fewer and fewer seem to be interested in these days. Becoming less and less popular each and every year.

After all, this was the original reason or concept for the founding of the Observer’s Challenge back in 2009.

The following is the complete listing of all Observer’s Challenge reports to-date.

<https://rogerivester.com/category/observers-challenge-reports-complete/>