MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

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August 2021

Report #151

M57(The Ring Nebula), Planetary Nebula in Lyra

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; some early observers:

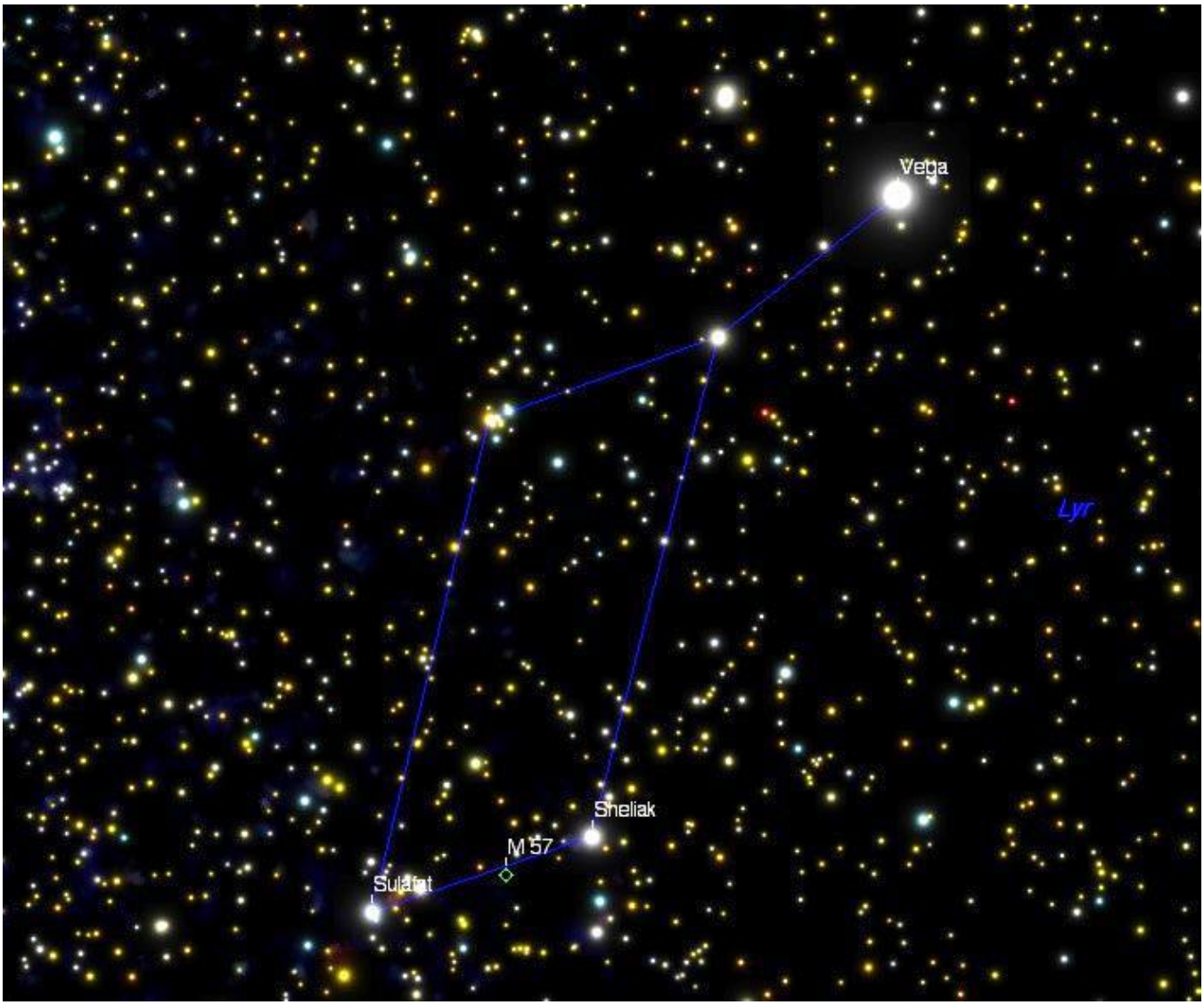
Antoine Darquier 1779: "It is very dim, but perfectly outlined…and looks like a fading Planet.

William Herschel 1785: "Among the curiosities of the heavens should be placed a nebula, that has a regular, concentric, dark spot in the middle, and is probably a Ring of stars. It is of an oval shape, the shorter axis being to the longer as about 83 to 100; so that, if the stars form a circle, its inclination to a line drawn from the sun to the center of this nebula must be about 56 degrees. The light is of the resolvable kind, and in the northern side three very faint stars may be seen, as also one or two in the southern part. The vertices of the longer axis seem less bright and not so well defined as the rest. There are several small stars very near, but none seems to belong to it."

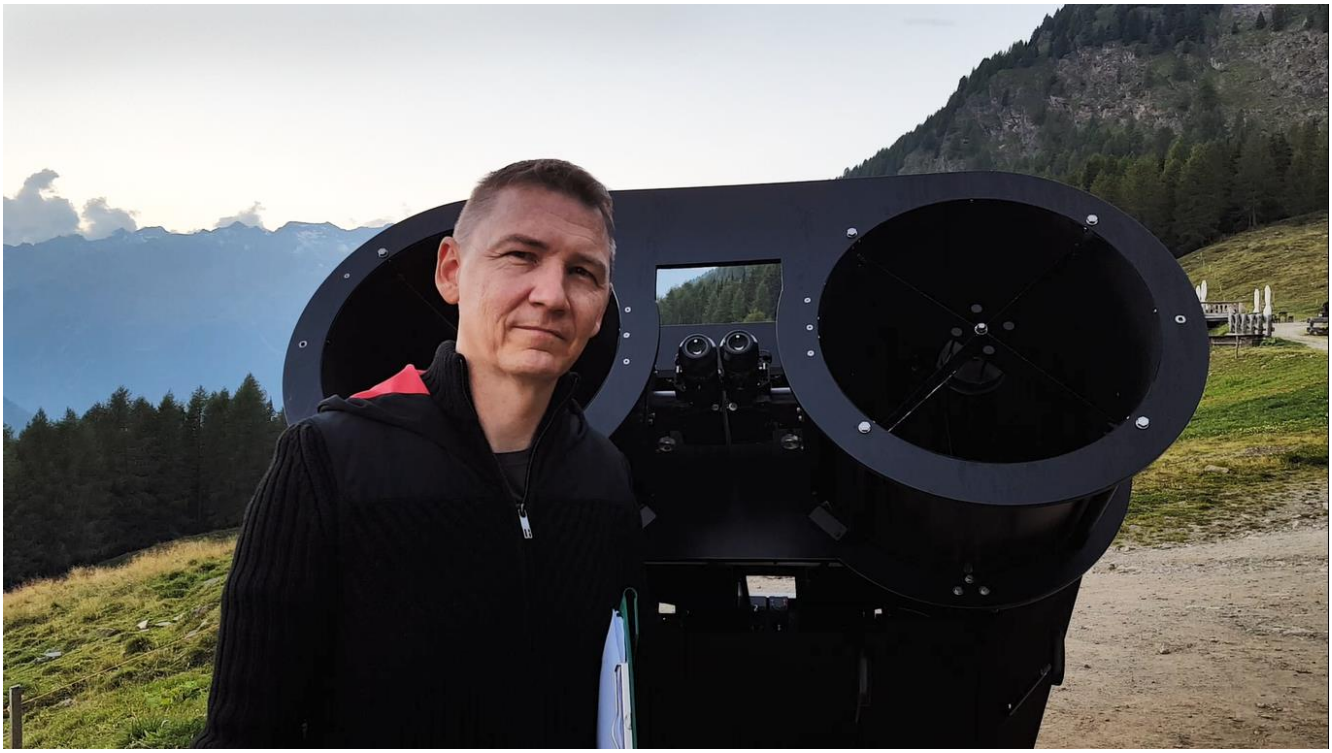
John Herschel 1833: "The axes of the ellipse are to each other in the proportion of about 4 to 5, and the opening occupies about half its diameter: its light is not quite uniform, but has something of a curdled appearance, particularly at the exterior edge; the central opening is not entirely dark, but is filled up with a faint hazy light, uniformly spread over it, like a fine gauze stretched over a hoop.

Ormsby Mitchel 1869: Appears as a ring of misty light hung in the heavens.

Finder image by James Dire



Peter Vercauteren: Observer from Italy



M57, the Ring Nebula, is one of the most famous planetaries. But few people know that very close to it you can find a faint and distant galaxy (IC1296 - top-right) in the sketch.

Pejo, Italy

25 August 2016 – 25:35 UTC

18″ f/5 Otte BinoDobson

4.5mm Delos - 507×

Sketch follows.


M57 + IC1296
Pejo (Italy)
25 Aug 2016 - 23:35 UTC
18" f/5 Otte BinoDobson
4,5mm Delos - 507x
Peter Vercauteren
www.astronomydrawings.com

Uwe Glahn: Observer from Germany

Object: Messier 57

Telescope: 48" f/4 Newtonian

Filter: ZS

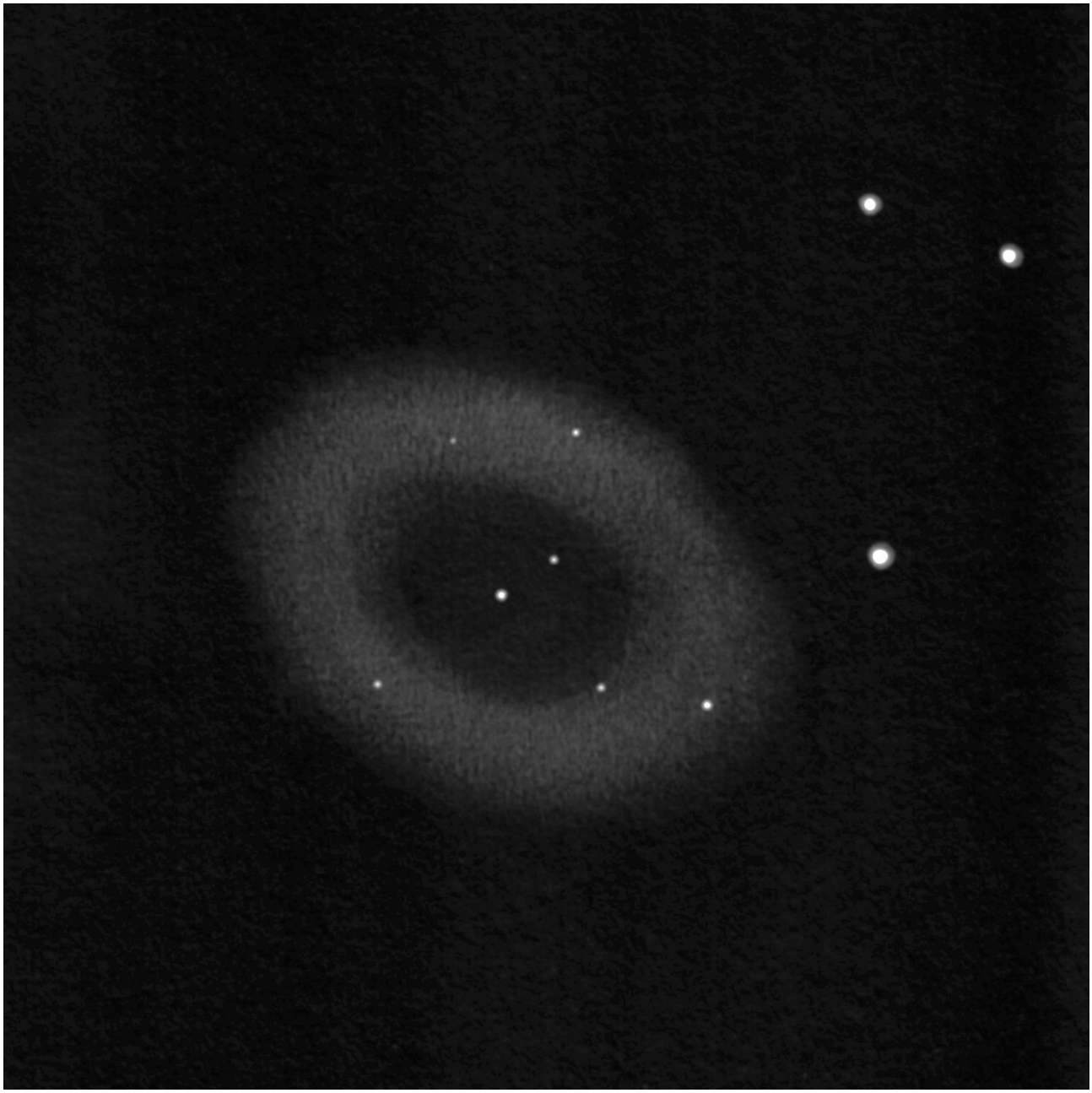
Magnification: 814×

NELM: 7+

Seeing: III

Location: Fort Davis

Sketch follows.

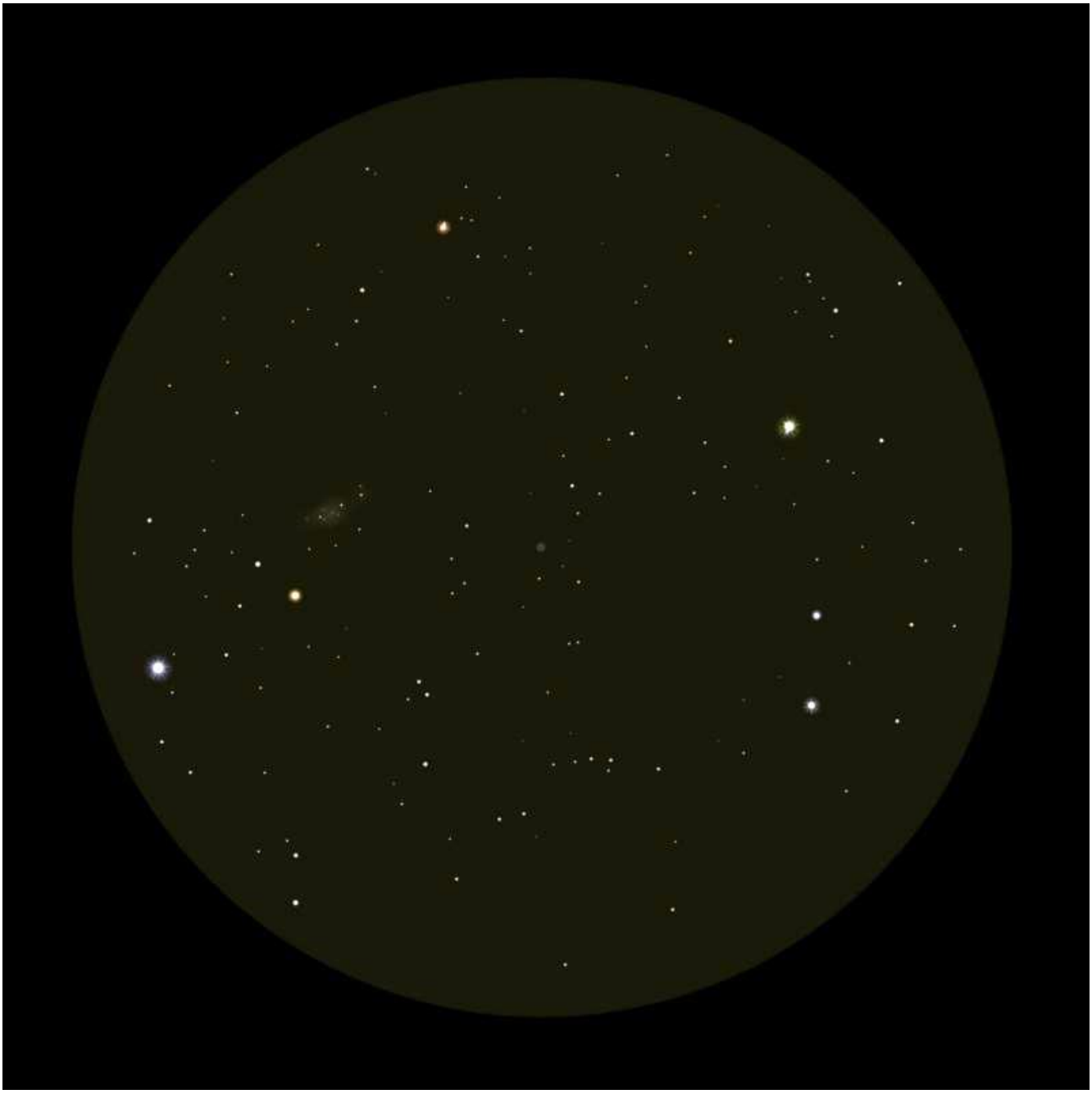


Rony De Laet: Observer from Belgium

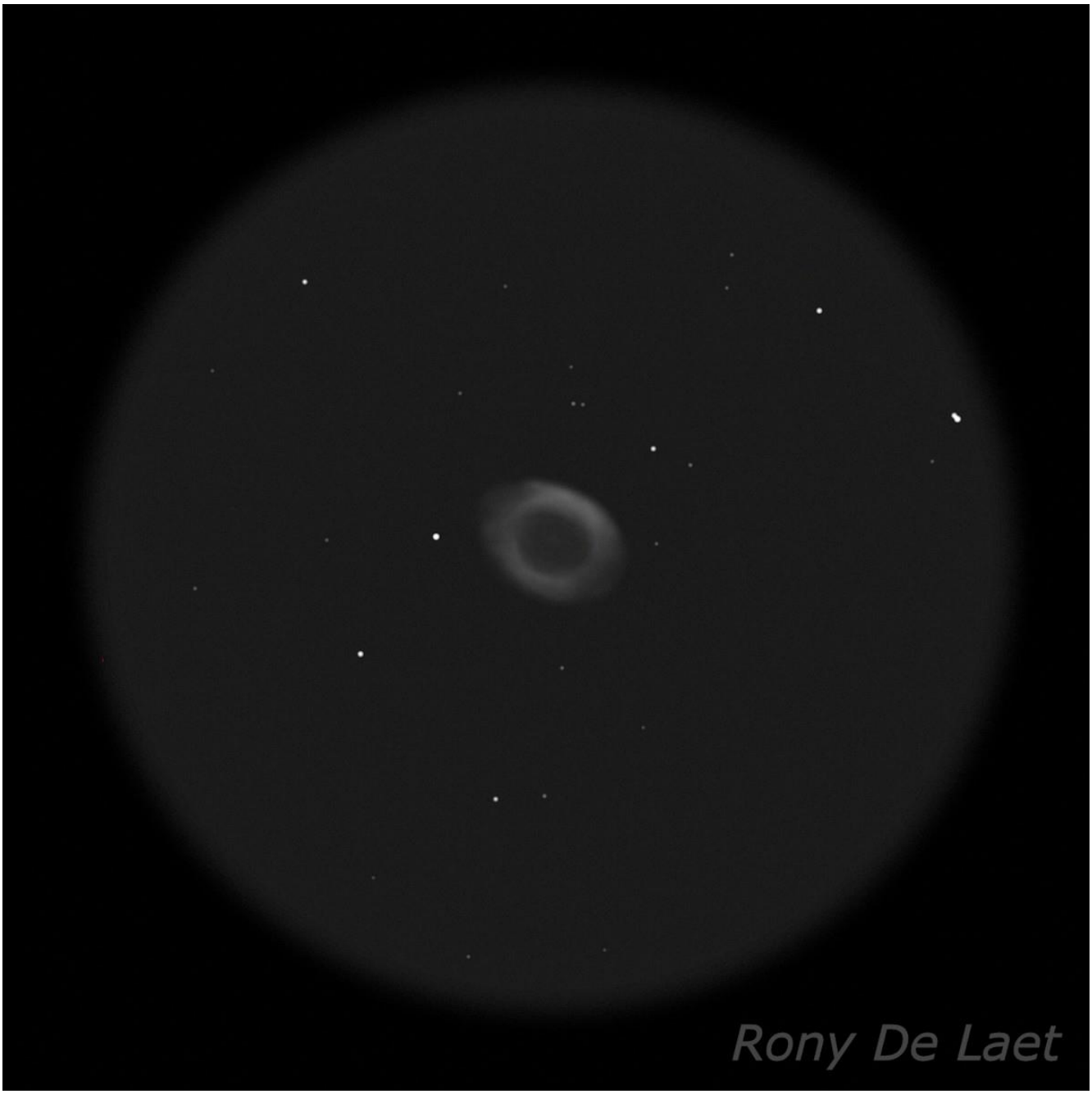
Here are my little reports for M57:

Date : September 13, 2007
Time : 20.00UT
Scope : Sky-Watcher 102/500mm
Meade 4000 SP 26mm
Power : ×20
FOV: 150′
Filter : none
Seeing : 3.5/5
Transp. : 3/5
Nelm : 5.2
Sketch Orientation : N up, W right.
Digital sketch made with PhotoPaint, based on a raw pencil sketch.

It is an all-time favorite. But when I slewed my low-power scope in the right direction, I was pleasantly surprised by the view. Not because it is a detailed view, on the contrary. It's a 2.5° wide-angle view with the Sky-Watcher. There isn't much to see, but it's my favorite composition. It contains the two baseline stars Sheliak and Sulafat. These are the two stars we all use to search for the Ring Nebula. If you look carefully you will see M57 in the middle of the sketch. It will probably be an illusion, but I could not get rid of the idea that the middle of the nebula appeared darker. So sorry for that. Maybe I know the object too well 😟? I also noticed a faint smudge to the left half (of) and a little higher than the baseline. Probably the combined glow of the small grouping of stars at that location. I'm glad that I could bring the impression down to paper as a souvenir brought back from an lovely place.



Site: Bekkevoort, Belgium (51° N)
Date: August 10, 2021
Time: around 22:30 UT
Date: August 14, 2021
Time: around 22:30 UT
Telescope: Taurus 16″
EP: Morpheus 9mm 76°, 200 ×/ 6.5mm 76°, 280× / 4.5mm 76°, 400× / Omegon 3mm 55°, 600×
Filter: none
Seeing: 3-4/5
Sky brightness: 20.2 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.



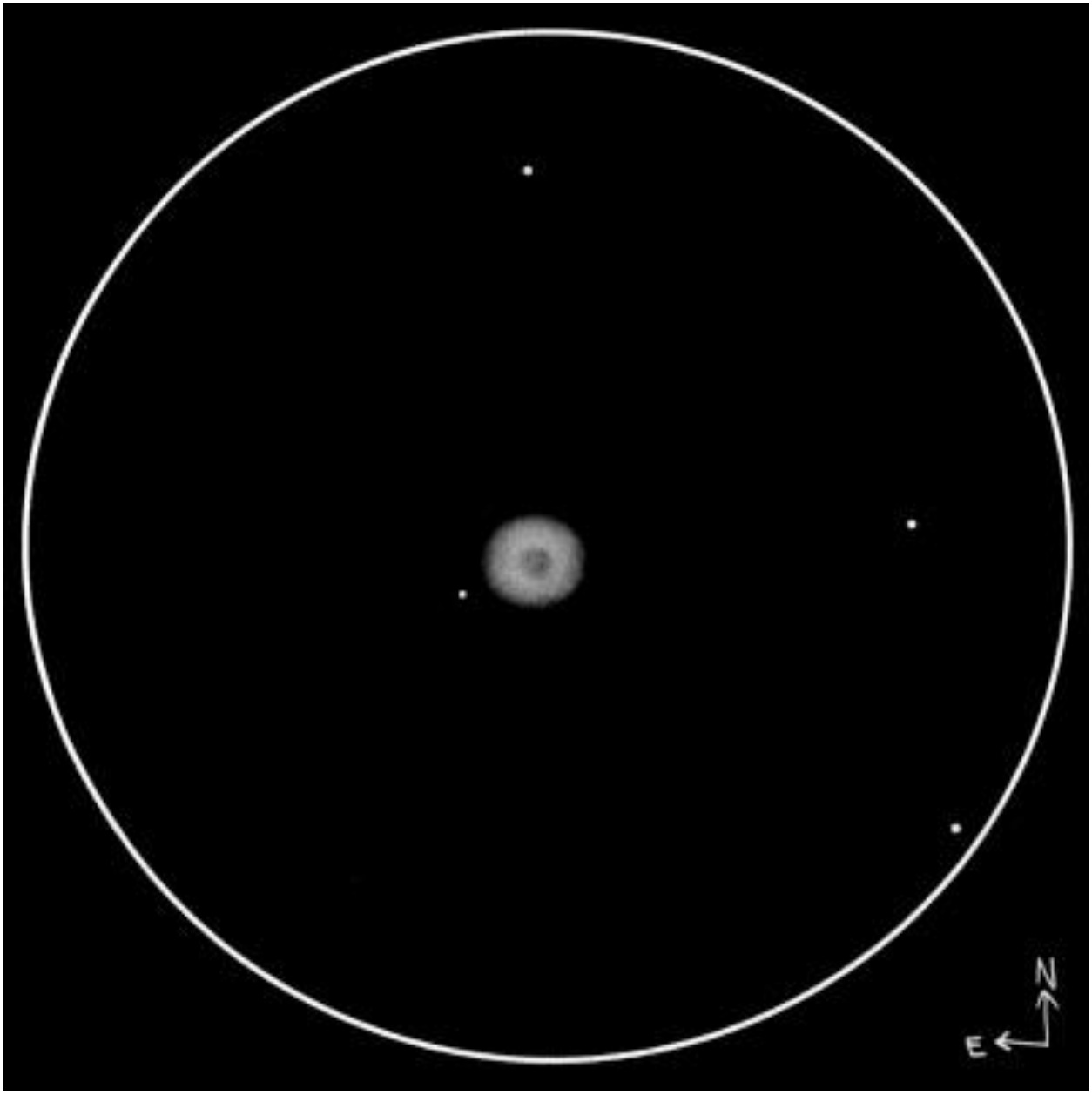
Messier 57 is one the highlights of the summer Milky Way. This planetary nebula is so bright that it doesn't need any filter to be seen in detail. The sketch is a composition of observations at 400× and 600× over two nights.

The torus-shaped nebula appears slightly elongated. Its obtuse sides are brighter than the acute ends. The NW side is brighter than the SE side. The acute parts have ill-defined outer edges. The central hole is not dark. It seems veiled. The E part of the central hole seems a tad brighter than the W part. I tried to discern the central star but I couldn't detect it at 600×. The best I could make out of it was a slight central brightening in the centre of the planetary. The faintest stars that I could see in that part of the sky are of mag 15.7.

Jaakko Saloranta: Observer from Finland

The smallest aperture I've recorded the Ring nebula with is a pair of 8×21 binoculars. In a rich star field, a single stellar object was easily confirmed by using a Lumicon O III filter. With a 4.7-inch telescope @ 240×, M57 appears as "a nebula with a ring structure and 13th-magnitude star to the SE. The disk of the nebula is more round than elliptical – a feature that is more commonly prominent with larger apertures. North and south edges of the nebula appear slightly brighter than the rest of the nebula." No more could be seen from the object under somewhat mediocre conditions (SMQ-L reading 20.06 and naked-eye limiting magnitude of 6.2).

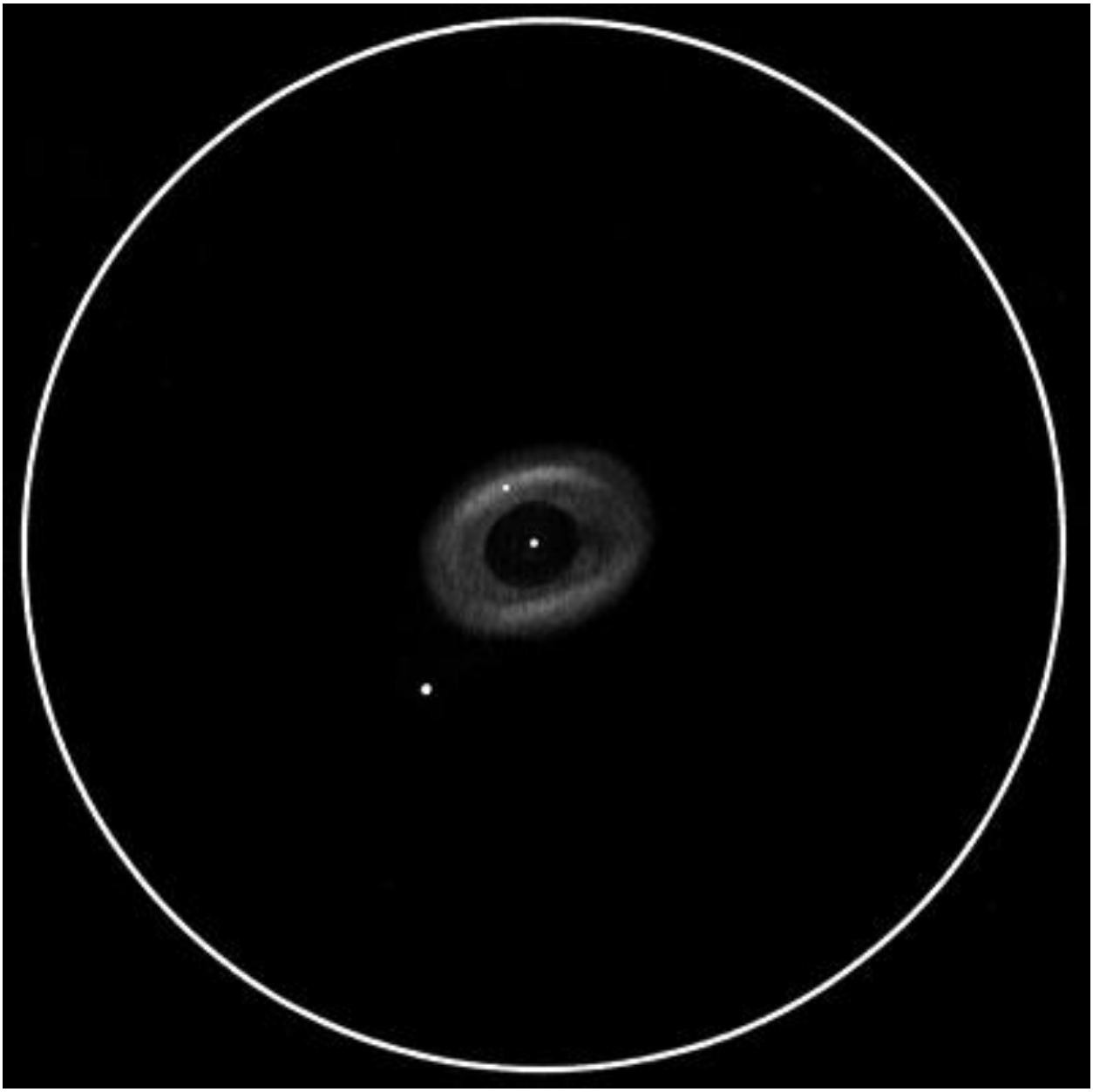
Sketch follows.


N
E

With a larger 10-inch telescope there is a lot more detail visible. The disk of the nebula appears more elliptical and is somewhat unevenly lit throughout. W and E edges of the nebula have brighter regions visible. There is also a stellar brightening visible in NE corner of the nebula. The central star is visible roughly 10% of the time with averted vision and only with magnifications of 357× and above. I have not been able to see the central star with a telescope smaller than 10 inches.

Spiral galaxy IC 1296 close to M57 offers a fine challenge for larger apertures. During autumn I often use the star field around the Ring Nebula to determine the limiting magnitude of my telescope.

Sketch follows.



Chris Elledge: Observer from Massachusetts

On July 10th @11:50pm EDT, I used a 10-inch f/5 reflector to observe M57 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6; NELM 4.5 near M57; Transparency: Fair; Seeing: Good.

The Ring Nebula is pretty easy to find. Starting at Vega, just head towards Altair until hitting the two mag. 3 stars Sheliak and Sulafat. M57 is right between them.

At 36× (35mm, 1.9° FoV) the nebula is easily visible as a circular object with a slightly hollowed out center. The most notable stars in the field are mag. 3 Sheliak to the far WNW of the view, mag. 5 HR 7162 (HD 176051) to the far ESE of the view, and mag. 5 Nu^2 Lyrae sitting right on the SW edge of the view.

At 115× (11mm, 0.7° FoV) the round nebula appears slightly elongated into an oval in the East to West axis. The inner part of the nebula is clearly darker than the surrounding area. With direct vision the obvious separation between the inner and outer nebula fades into just a circular object. The ring shape is only clear with averted vision.

At 270× (4.7mm) it becomes difficult to see the ring shape, as it is hard to detect the difference in brightness between the outer edge and the inside even with averted vision. We also used the 25-inch f/3.5 ATMoB telescope to look at M57. With a power of over 600×, we were able to visually spot the 16th-magnitude central star with averted vision.

Joseph Rothchild: Observer from Massachusetts

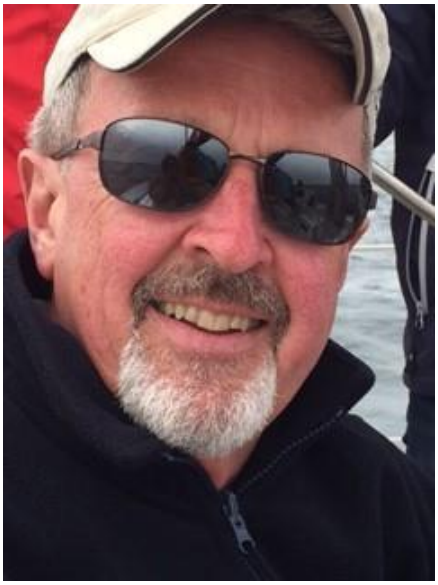
I observed the planetary nebula M57 most recently on August 15th from dark skies and fair transparency on Cape Cod. I have observed the Ring Nebula hundreds of times. It was actually my first observed deep-sky object using a borrowed Edmund Scientific 3-inch reflector at age 13.

I have observed M57 through multiple scopes over the years. I recently was able to see it with my 16×70 binoculars. This time I again used my 10-inch reflector. The object was easily found 40% of the way from Beta to Gamma Lyrae. I initially used 27mm, 14mm, and 8mm eyepieces. With the 8mm (179×) M57 appeared as an oval ring with a 4:5 aspect ratio. The rim was approximately 25% of the diameter. The central star was not visible.

I also tried a 22mm eyepiece with NBP nebula filter, however, I was not able to see any of the outer structure.

Again, one of my old favorites!

John Bishop: Observer from Massachusetts



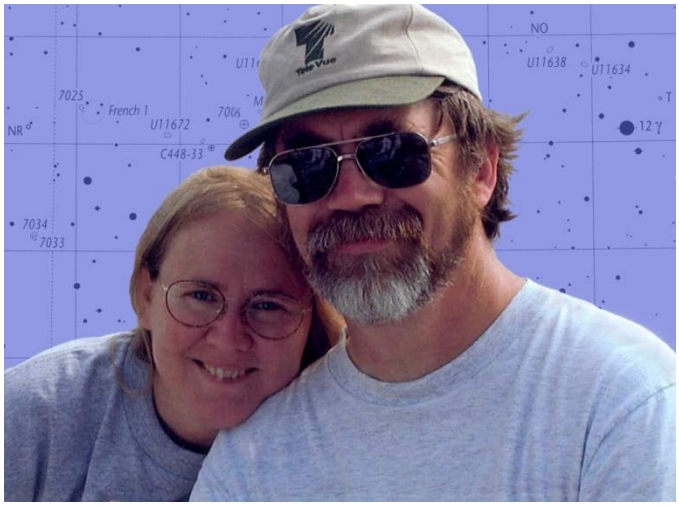
On 9/4/21, I observed M57, the Ring Nebula, a planetary nebula in Lyra. It is one of the classic summer observing objects. I observed from the ATMoB Clubhouse in Westford, MA. I observed with an 8.25 inch f/11.5 Dall-Kirkham reflector, at magnification varying from 48× to 268×.

Temperature was 60º F at 7:00 pm. The sky was clear. Transparency varied from fair to poor. Bands of moist air swept through the area during the evening, bringing intermittent haze and leaving noticeable dew on observing instruments. My dew heater strips drained my battery nearly to empty.

M57 is a familiar object, and fairly easy to locate. It lies about mid-way along the southern side of a parallelogram formed by Delta, Zeta, Beta, and Gamma Lyrae, just south of Vega. The most difficult part of locating the object for me was working the telescope while it was aimed so close to the zenith.

At 48×, M57 was a more or less round, pale blue-gray disc. The disc initially looked solid, but averted vision “opened” the dark central area, giving the ring appearance. This effect reminded me of the Blinking Planetary. With increased power, the object was larger, brighter, more oval-shaped, “whiter” in color, and the central dark area more consistently evident. Also, the ring component was not uniformly bright.

Sue French: Observer from New York

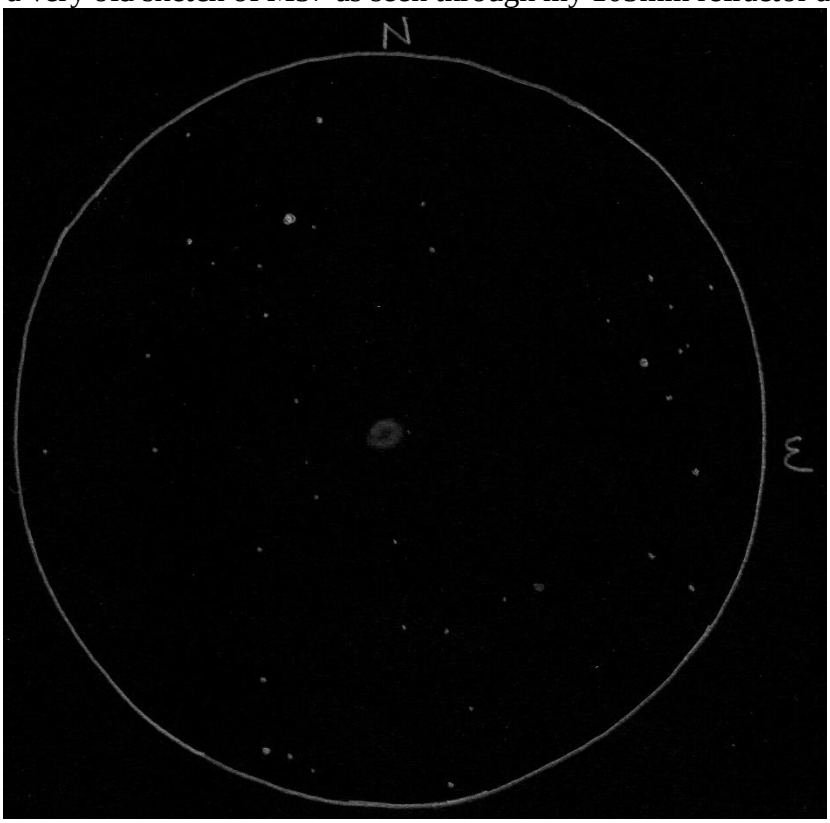


I've logged observations of the Ring Nebula many times, in apertures from 36mm to 36 inches. It's always a pleasure. Here are a few of my notes. Not all of the equipment was mine.

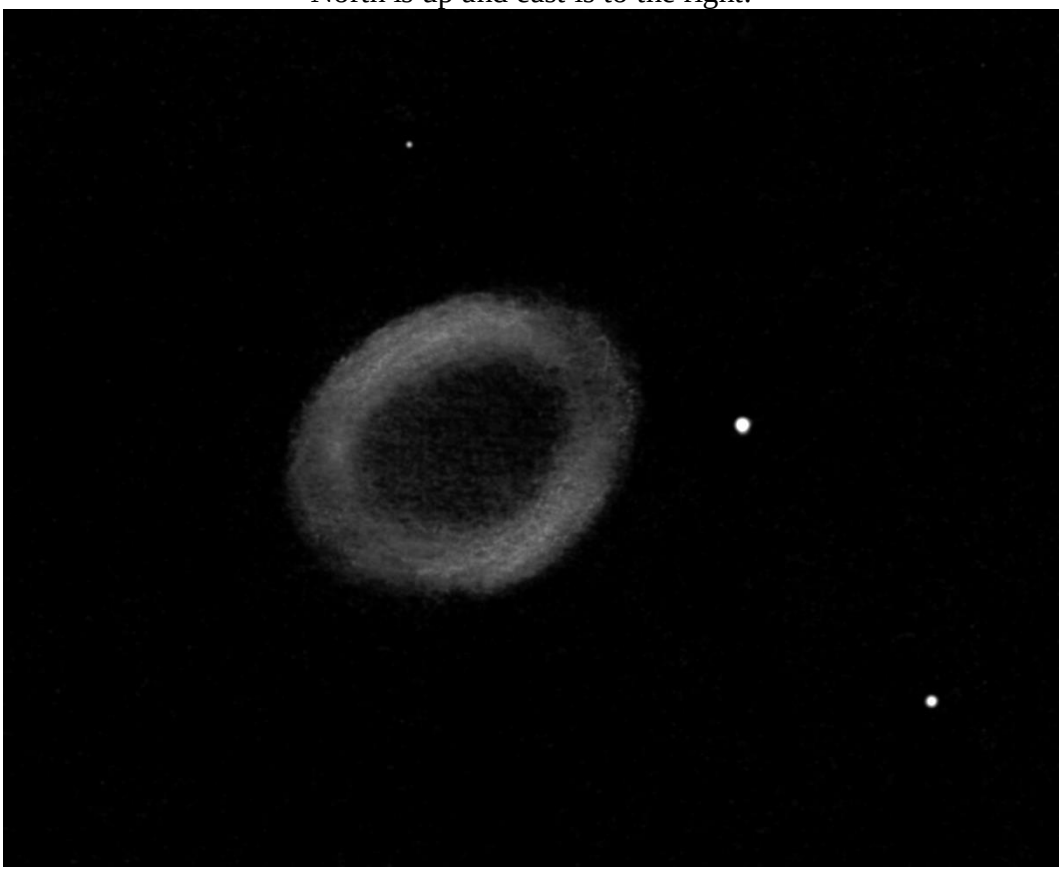
Through 12×36 image-stabilized (IS) binoculars, M57 looks barely non-stellar, while 15×45 IS binoculars reveal a more obvious, albeit tiny, disk, and 18×50 IS binoculars reveal an oval shape.

A 92mm refractor at 94× shows a lovely little donut of light, with its central area brighter that the background sky.

Here is a very old sketch of M57 as seen through my 105mm refractor at 127×.



This sketch was made during two nights with the 130mm refractor at 234×.
North is up and east is to the right.



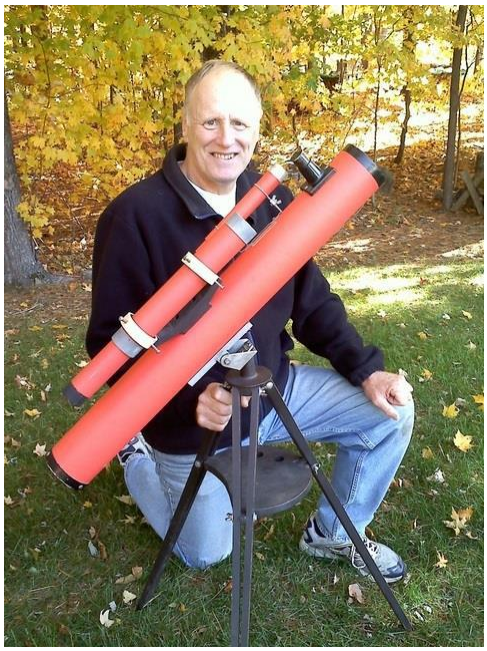
Although the interior was clearly seen to be brighter than the background sky, I couldn't tease that into showing up very well on the above scan of the sketch.

Through a 14.5-inch Newtonian reflector at 552×, M57's outer rim appeared to have a different hue than the rest of the annulus, but I couldn't really say what those colors were. The center of the ring seemed to have a small brighter patch, and I thought I caught sight of the central star a couple times. The seeing was quite good that night.

The first scope I ever saw the central star in was a 36-inch Classical Cassegrain at 229×, way back in 1985. Even then it required averted vision. The interior of nebula appeared so bright that the ring looked nearly filled in. The sky transparency was very good, but the seeing was only fair.

As for the nearby galaxy IC 1296, I was only catch it about 20% of the time through a 15-inch Newtonian reflector at 173×, but it was easier to spot at 216×. It resides in a ring of six stars, magnitudes 11 to 14, with one of the stars being double. A 13½-magnitude star resides with the ring, and the galaxy rests about ⅓ of the way along an imaginary between it and the first ring star that's counter-clockwise from the double in a non-mirrored view. The galaxy looked very small, so I must not have seen its entire extent.

Glenn Chaple: Observer from Massachusetts



OBSERVER'S CHALLENGE* - AUGUST, 2021

by Glenn Chaple

M57, the "Ring Nebula" – Planetary Nebula in Lyra (Mag: 8.8, Size: 86″ × 62″)

Our August Observer's Challenge is M57, the "Ring Nebula," in Lyra. On the surface, this large and bright planetary nebula may not seem like much of a challenge. It's easily found midway between beta (β) and gamma (γ) Lyrae and is readily visible even in a common 60mm (2.4-inch) refractor. That said, there are two challenges offered by M57.

First is its annular aspect. In small-aperture scopes, M57 appears as an oval blob with no dark center. Larger instruments will reveal the dark inner region, hence the Ring itself. What is the smallest aperture that will show the "ring-ness" of M57?

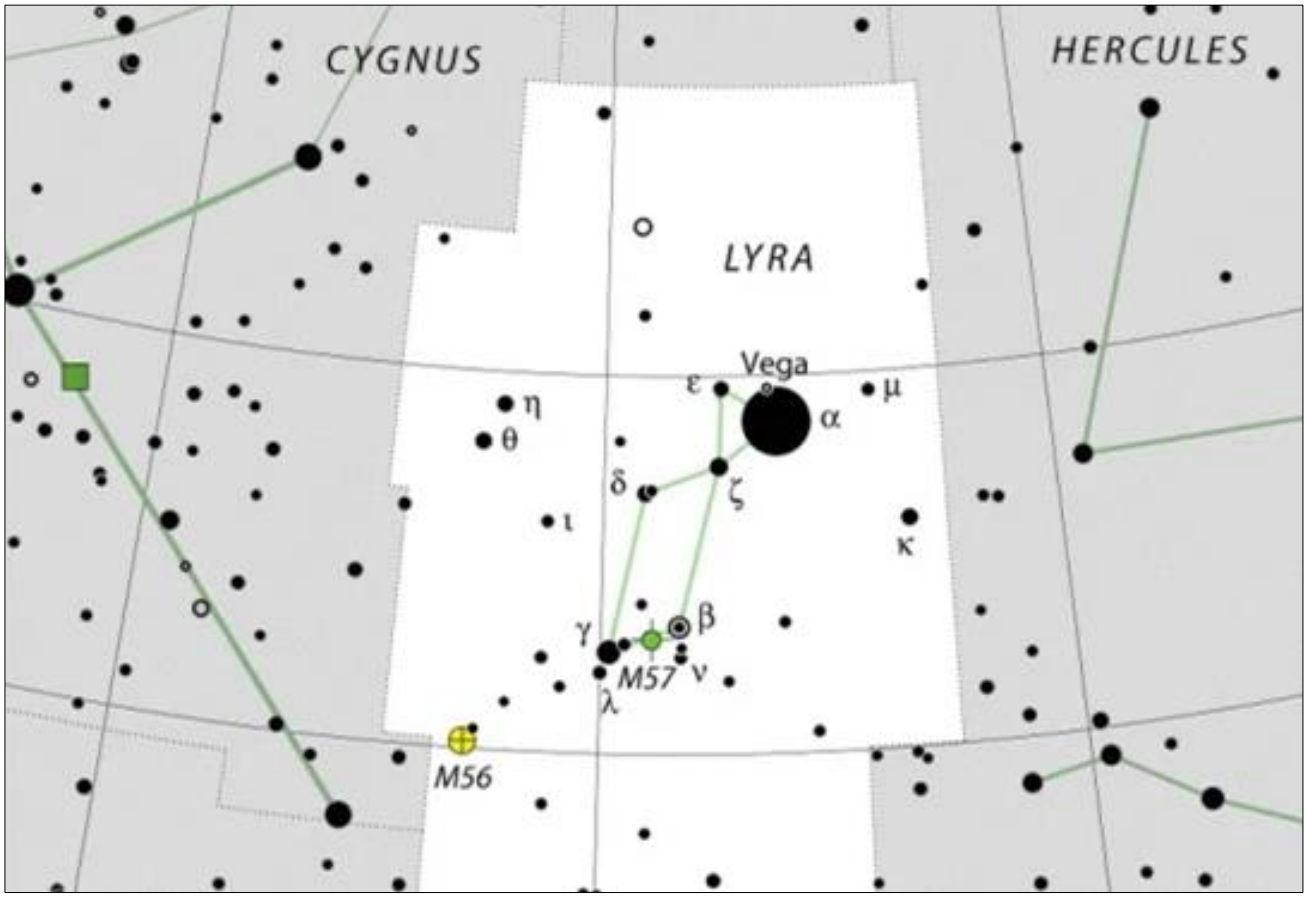
The second challenge involves the visibility of M57's central star, which is said to shine at 15th-magnitude but may be slightly variable. This is definitely a big scope target, although Sue French, in her book *Deep-Sky Wonders*, notes that it has been glimpsed in a 9-inch. Her recommendation is to wait for an evening of exceptional seeing and to use high magnification.

Because M57 is so easily located, I view it many times each summer – often at the onset of an observing session. I begin by centering my finderscope on a point midway between beta and gamma and then giving a slight nudge towards beta. A search with low-medium magnification (45-60×) will reveal an out-of-focus star. I then switch to high magnification (100-300×, depending on scope aperture and seeing conditions) for a close-up view.

There has been some confusion as to whether M57 was discovered by Charles Messier or his French contemporary Antoine Darquier de Pellepoix. A historical study in 2013 and published in 2017 indicated that M57 was found by Messier on January 31, 1779, and observed by Darquier days later.

Distances to planetary nebulae are iffy at best. A recent measurement of the distance to the nebula's central star yielded a value of 2300 light years, The bright visual part of the Ring Nebula spans nearly a light-year, while a faint surrounding halo, visible in an image taken by Mario Motta, more than doubles the nebula's size.

Finder Chart for M57



Larry McHenry: Observer from Pittsburgh, Pennsylvania

August: M57 – Planetary Nebula – **Lyra**; Mag. V=8.8; Size 86″ × 62″
RA: 18h 54m Dec. +33º 02′
Located in the summer constellation of Lyra, 'The Lyre (Harp),' and known as the 'Ring Nebula.'

It was the second planetary nebula discovered by Charles Messier in 1779, about 15 years after M27. It's easy to locate and can be observed with small telescopes, even in suburban skies. M57 is about 2300 light-years distant and 6000 years old. It's estimated to have a diameter of about a half light-year and an expansion rate of about 12 miles per second. With its high surface brightness, the Ring is one of the best celestial showpieces of the summer sky! While the nebula itself is easy to observe, the central star at 15.4+ magnitude, can be quite difficult to glimpse.

Visually in the telescope, the Ring Nebula has a smooth oval shape, with the outer edge of the brighter ring fading toward the center.

Sketch and images follow:

Mike McCabe: Observer from Massachusetts

When I first saw that the challenge object for the month of August 2021 was Messier 57, aka the Ring Nebula, I was reminded of a conversation with a fellow observer one night long ago as we stood under the night sky wondering what to look at next. In that conversation we were discussing observing, planning, and the benefit of having a predetermined target list for any given night. I remember him saying "yuh, I mean how many times have I seen the Ring, 700?"

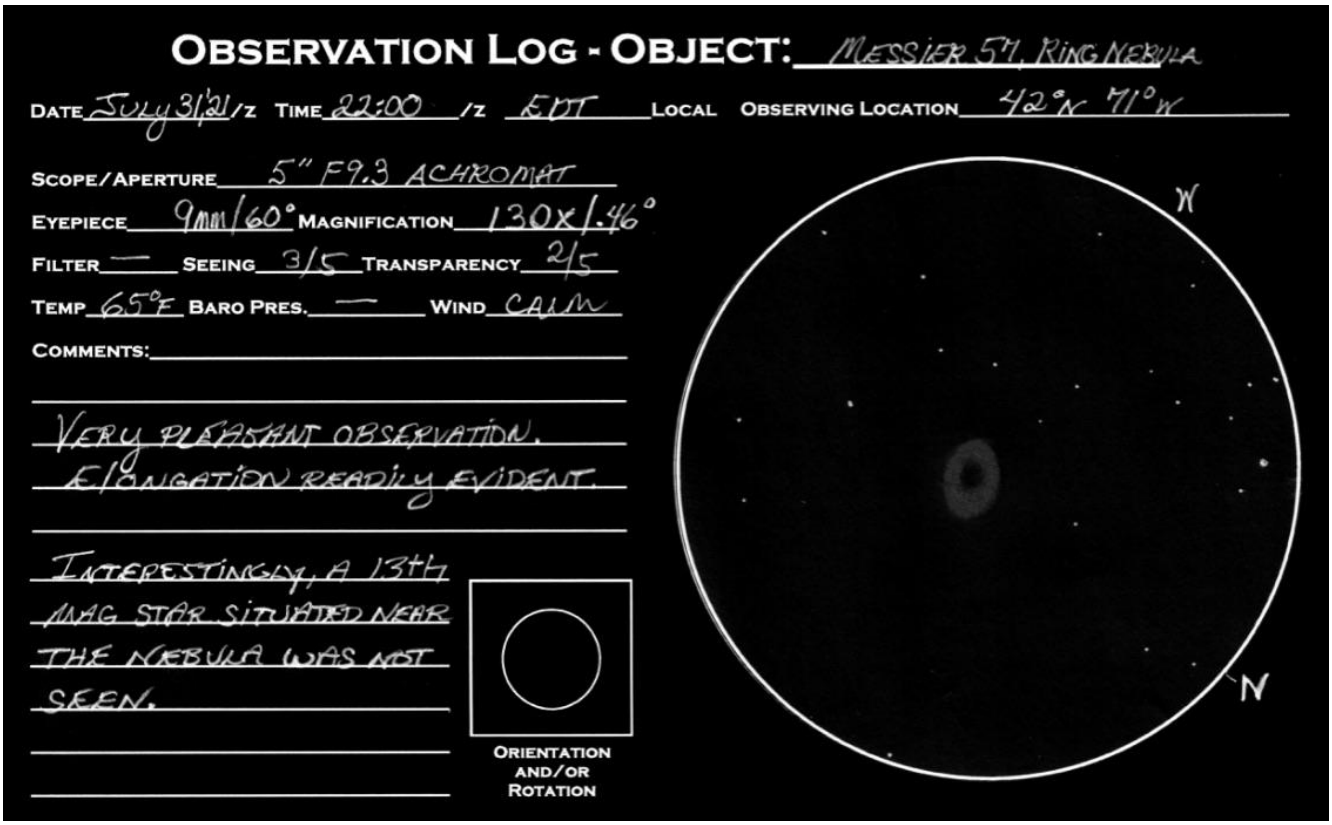
Indeed, the Ring Nebula is one of those targets that's fairly spectacular in nature, easily found, and has a tendency to look very different depending on the equipment you happen to be using. I've seen it in instruments ranging from 80mm binoculars to a 20-inch Newtonian and virtually everything in between. It's one of those things that even when you do have a plan, it tends to get added to it on the fly just because. I call it raiding the candy dish, because it often comes after the meat and potatoes observing for the night has been done, and now you're just touring the tasty morsels on the desert tray. Easily found, easy on the eyes, and goes down quick. That's the Ring.

So I had some thinking to do when it came time to observe the Ring Nebula for the challenge report. I own telescopes ranging from 50mm up to 12.5-inch. Which one should I use? My very best sighting of the Ring came on a night about ten years ago, through the eyepiece of a fellow observer's 15-inch Newtonian. We were under a Bortle 4 sky on a good night, and to this day I will swear that I saw color in that observation.

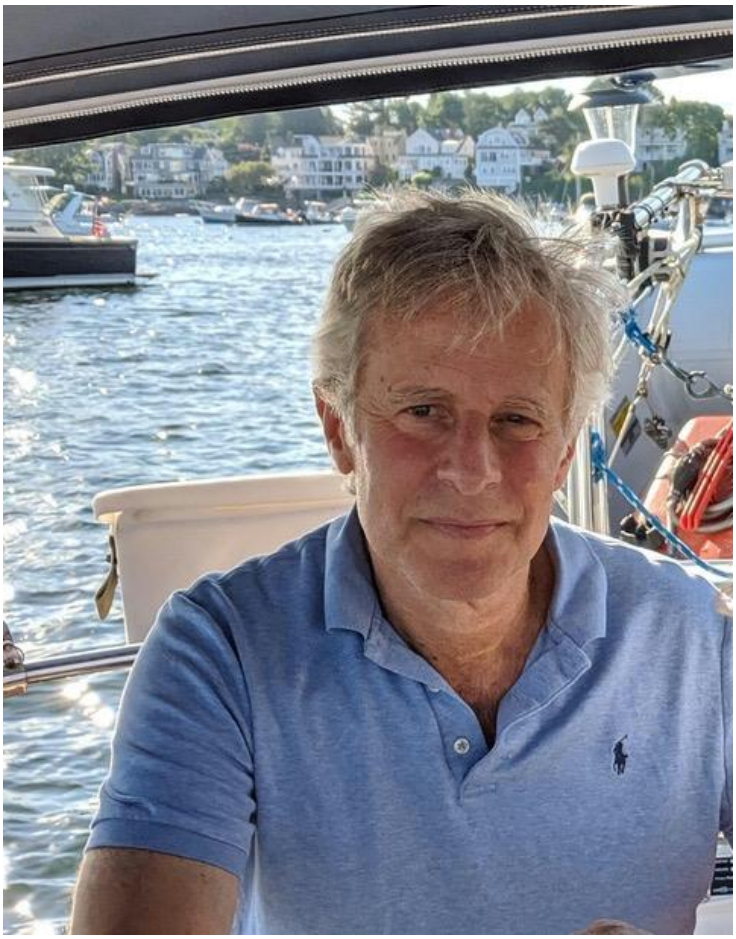
I've also seen it through a 60mm f/15 classical refractor. To describe that observation I'll paraphrase another fellow observer's common refrain when we're observing dim stuff together, when he can often be heard saying "well, that ain't much."

In the end I decided on my 5-inch f/9.3 refractor, which is one of my favorite telescopes, and so it would be. It turned out to be good choice. I had a wonderful observation of one of the most iconic planetary nebulae in the night sky. The venerable refractor contrast highlighted the nebulosity against the background sky, and the oval nature of the object was readily discerned in the view. No, there

wasn't any color and definitely no central star to be seen, but it was a good look just the same, and one which now falls into the 'one of my best' category.



Barry Yomtov: Observer from Massachusetts



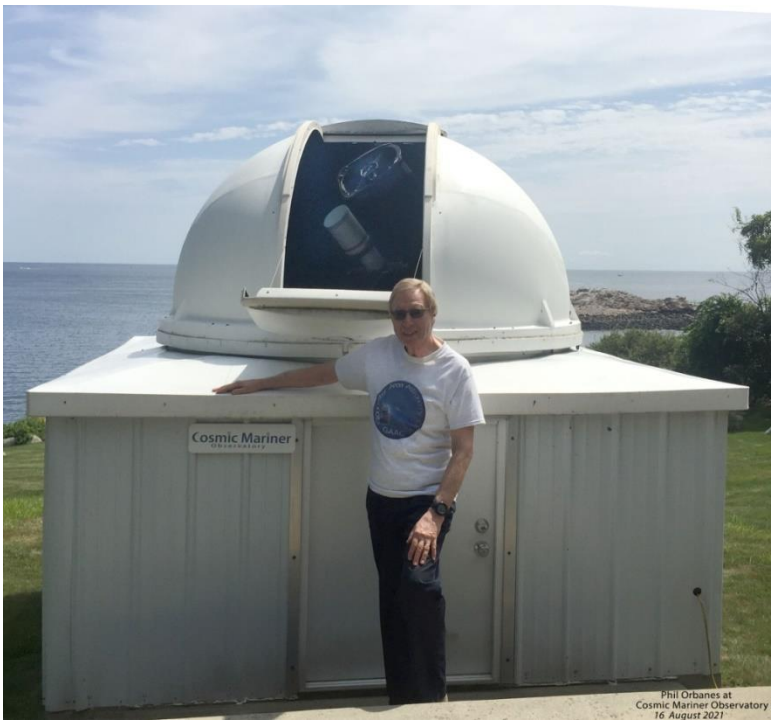
Here in the Northeast US, we have had an awful summer for observing and astro-imaging. The weather has not cooperated at all. SO the question is what do astrophotographers do on cloudy nights? They reprocess their images, so that's what I did for the August observer's challenge, M57, the Ring Nebula.

With its brightness, I usually have to be careful not to over-expose the image with too long exposure durations. This time it was a combination or 20 and 25 second exposures with the fast f/2.2 RASA 11 optics and the ZWO 183 mc pro OSC CMOS camera.

70 images were acquired on May 23, 2019, stacked in DeepSkyStacker. The image was reprocessed with PixInsight and Photoshop on May 23, 2021. With the image processing of PixInsight I was able to bring out more of the red emission region of this planetary nebula.

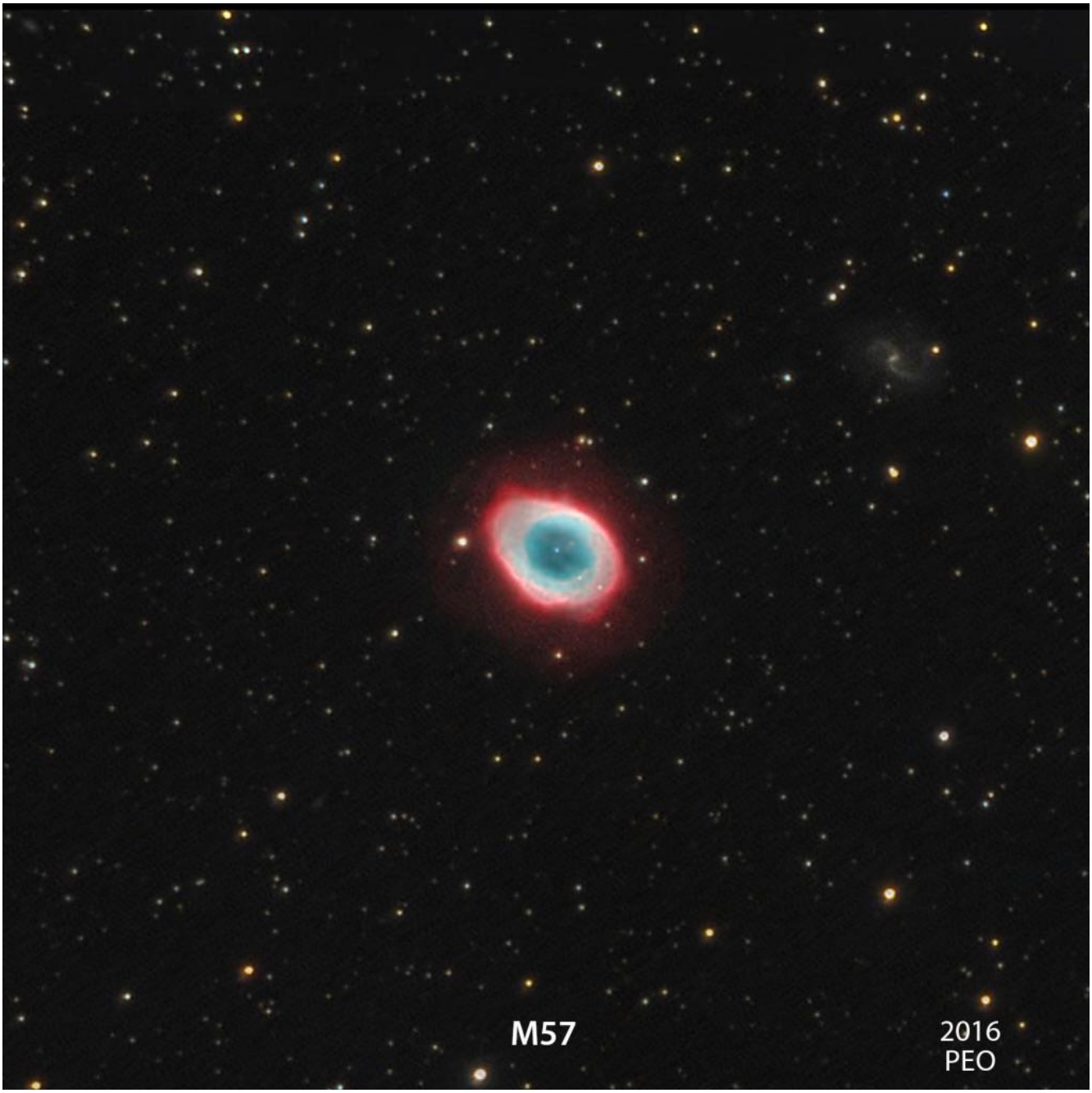
Image follows.

Phil Orbanes: Observer from Massachusetts



M57, as taken in 2016 through my 14-inch reflector, using an FLI 16803 CCD camera with narrowband filters. Ten hours total (4 hours Ha, 3 hours S2, 3 hours O3). The time was sufficient to bring out good detail in the planetary nebula itself, and gently reveal its outer deep red halo. (Also dimly visible in the upper right of the image is galaxy IC 1296, 200 million light-years in distance).

Image follows.


M57
2016
PEO

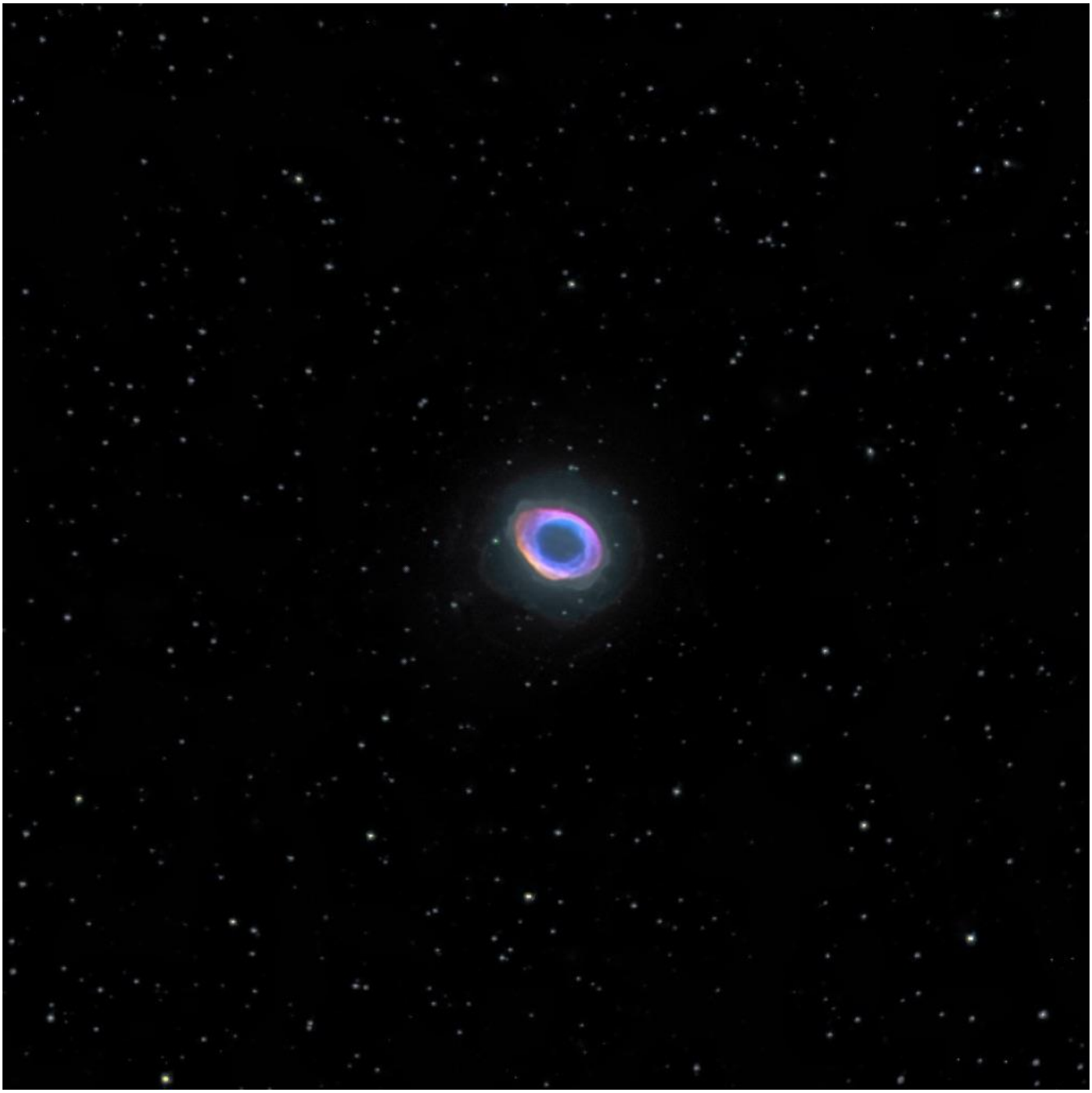
Mario Motta: Observer from Massachusetts

Here are two images of M57, taken a few years back…maybe eight years ago, through my 32-inch scope with a SBIG 1001E CCD camera.

They are good examples of the difference between filters with the same object, the same telescope, and the same camera.

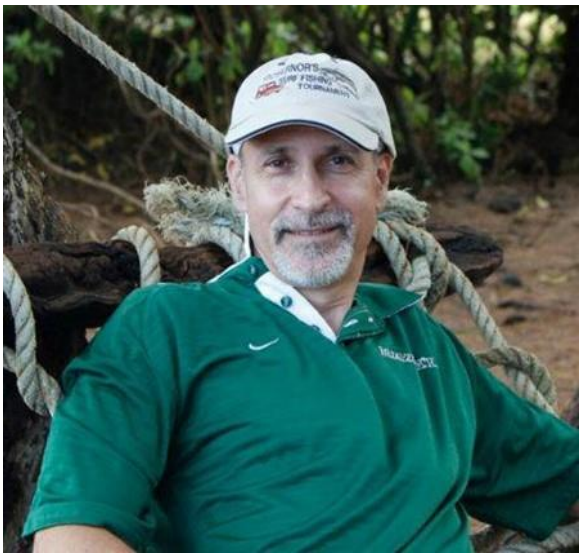
Images follow.

This image shows M57 with NB imaging (Ha,S2,O3), each one hour for a total of three hours. This highlights fine detail and especially the outer gas/dust cocoon surrounding the ring itself which is not visible visually, but suppresses the central star.



Here you see M57 with standard RGB filters, each for about an hour, giving three hours total. This gives you true color and shows the central star and surrounding environs including the nearby galaxy to the upper right [IC 1296].

James Dire: Observer from Illinois



The 57th entry in Charles Messier's famous catalog is commonly called the Ring Nebula. The Ring Nebula is a planetary nebula, the outer layers of a dying star ejected into a shell around the star, which appears ring-like from our vantage point. M57 is not the largest or brightest of these ring-shaped nebulae. But its compact size for a magnitude-8.8 object gives it the optimum surface brightness to be discernable in any size telescope.

Messier spied the Ring Nebula for the first time in January 1779. Freidrich von Hahn discovered the central star inside the ring in the year 1800. The central star is magnitude 15, difficult for most amateur telescopes even today. The star is a white dwarf the size of a terrestrial planet, but has 1.2 solar masses.

The distance to the Ring Nebula has been hard to determine, not unusual for these types of objects. Hubble Space Telescope parallax measurements of the central star place it 2283 light-years away with a 40% uncertainty.

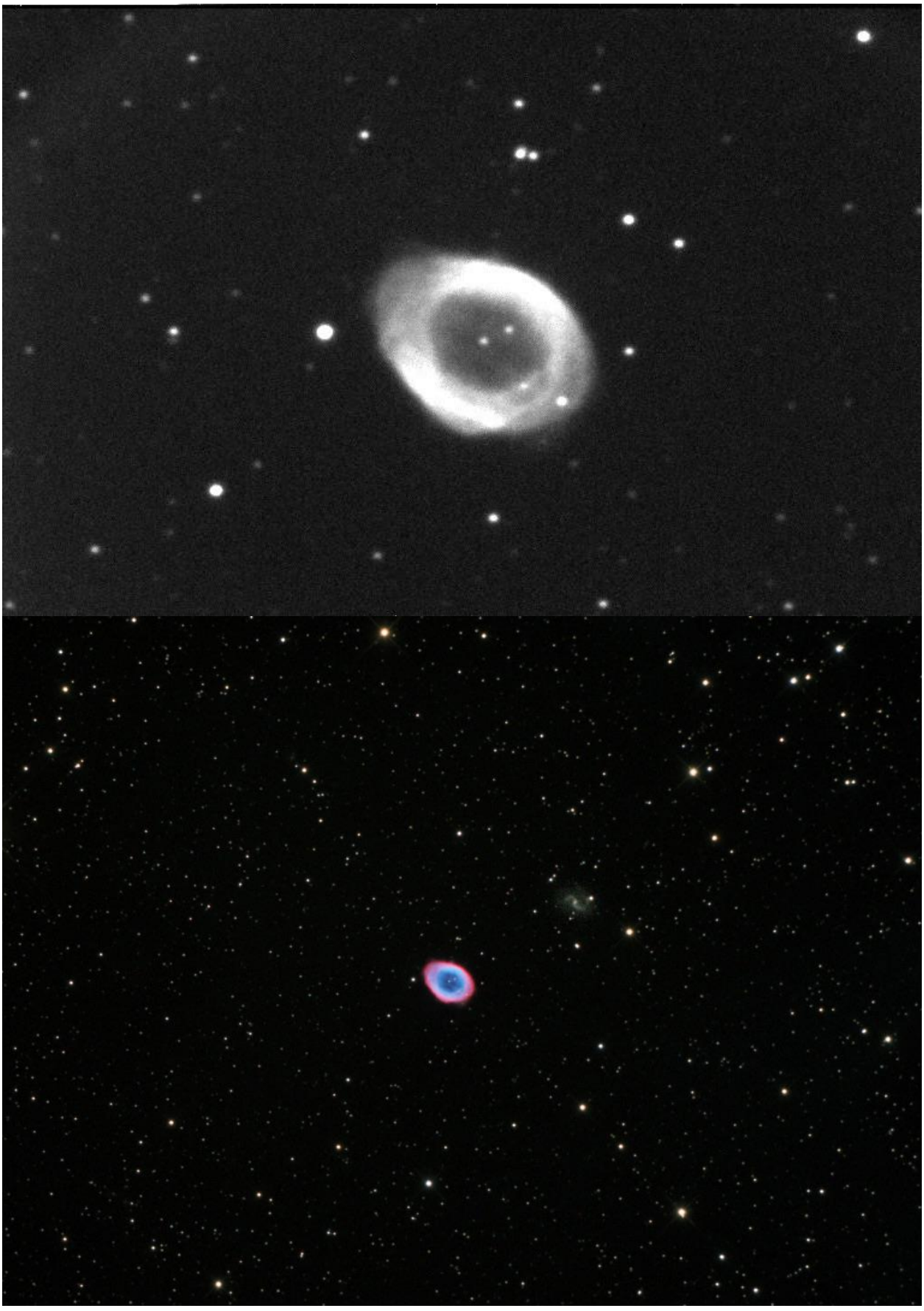
The gases making up the Ring Nebula are estimated to contain 0.2 solar masses and glow from absorbing ultraviolet light from the central star. Current research concludes M57 is actually a torus of gas, not a spherical or elliptical shell as originally thought. Assuming its distance is accurate, the 1.4× 1.1 arc minutes nebula spans 0.9 × 0.7 light years. By its rate of expansion, the nebula is estimated to be between 6000 and 8000 years old.

M57 is easy to find in the sky. It lies 40% of the way along the line from the star Sheliak (Beta Lyrae) to Sulafat (Gamma Lyrae). Although visible in binoculars and small telescopes, it appears too star-like to be resolved into a ring. Six- to eight-inch telescopes with 100× magnification splendidly resolve the ring structure.

M57 was the first object I ever imaged with a CCD camera (Image 1). The image was taken with a 20-inch f/8 Ritchey-Chrétien telescope with an SBIG ST-7 CCD camera. The unguided exposure was 5 minutes. No filter was used with this monochromatic camera. The central star is in the middle of the ring. The other stars inside the ring and nebula are foreground and background stars.

My second image of M57 (Image 2) was taken with and 8-inch f/8 Ritchey-Chrétien telescope with an SBIG ST-2000XCM CCD camera. The exposure was 30 minutes. To the upper right of the nebula shining at magnitude 15.4 is galaxy IC1296. IC1296 is a nearly face-on, two-armed spiral galaxy!

The last image I submit of M57 (Image 3) was taken with a 10-inch f/6 Newtonian using a Paracorr II coma corrector. Again, I deployed my SBIG ST-2000XCM color camera with a 30-minute exposure.



Anas Sawallha: Observer from Jordan

This month's challenge object, M57, the Ring Nebula is probably one of the most observed and photographed deep-sky objects.

A planetary nebula in the constellation of Lyra, located approximately between β Lyrae (Sheliak = Lyre) and γ Lyrae (Sulafat = Tortoise).

It is about 2000 light-years from Earth. Despite its small angular size it's very easy to find and to observe even with my 5-inch reflector from my home with much light pollution.

I have observed it many times with both 5- and 10-inch telescopes. This time I was able to photograph it using an 80 mm ED refractor, mounted on an alt-az mount. This is actually my first attempt to photograph a deep-sky object, maybe not so good, but it's a start.

I photographed it from Irbid, Jordan in 23/5/2021.

80mm ED refractor and an iOptron MiniTower mount.

Image follows.

Roger Ivester: Observer from North Carolina

M57 – Planetary Nebula in Lyra

Telescope: 10-inch f/4.5 reflector

Eyepiece: 16mm + 2× Barlow

Sketch magnification: 143×

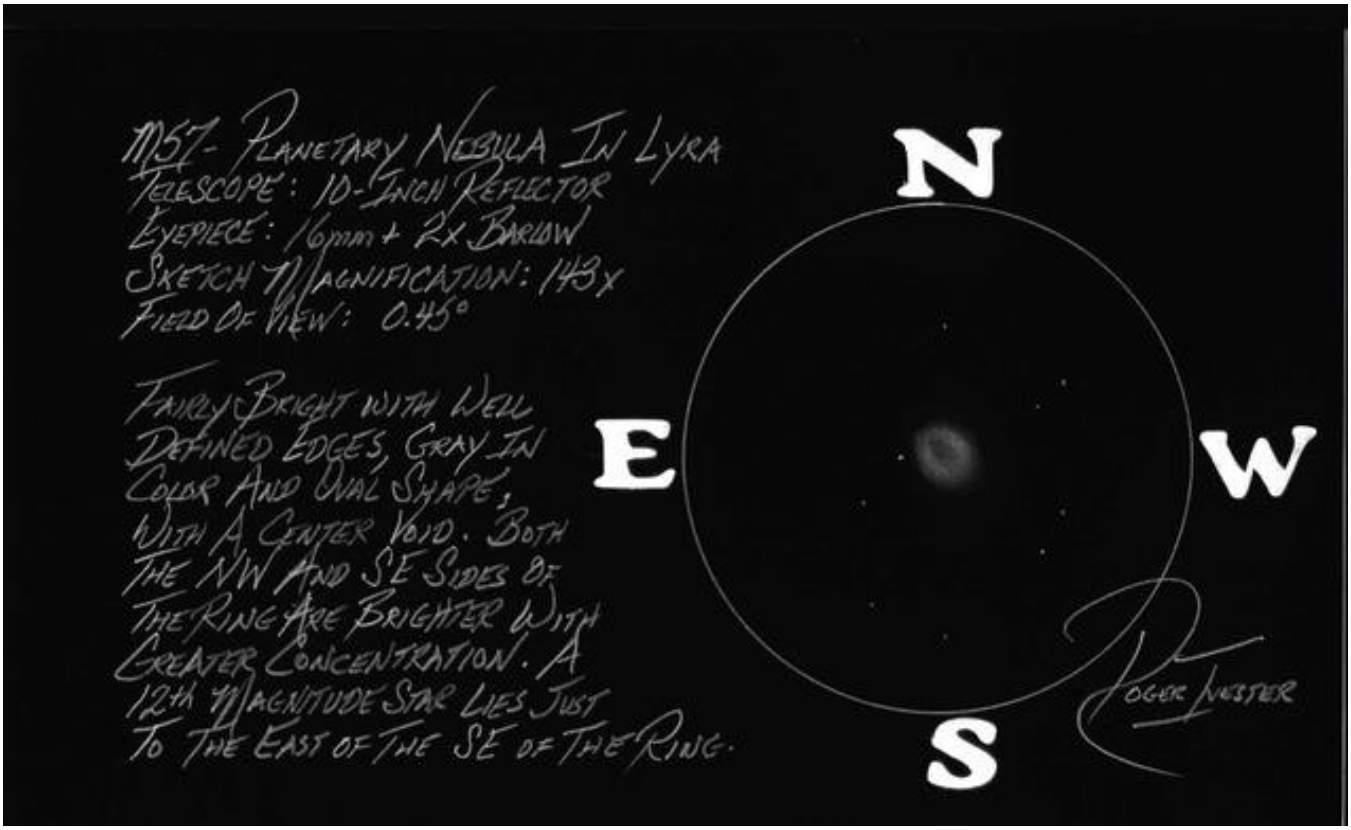
Field of View: 0.45º

Fairly bright with well-defined edges, gray in color, oval shape with a center void. Both the NW and SW sides are brighter with greater concentration. The ring is much lighter, or thinner on the NW, and also on the SE, but more subtle. A 12th-magnitude star lies so very close to the east of the ring.

3.5-inch Maksutov-Cassegrain telescope at a magnification of 146×, the ring nebula is presented as very dim, round but mostly featureless. The central void can be seen, but fairly difficult.

102mm refractor at 175×, shows the ring as surprisingly bright on this night of exceptional viewing with sharp and well defined edges. The center void can be seen, but only as a lighter round gray spot, within the ring. Bright star just to the east.

Pencil sketch below:



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

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