

# MONTHLY OBSERVER'S CHALLENGE

## *Las Vegas Astronomical Society*

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*&*

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**MARCH 2018**

### **NGC-2371/72 Double Planetary 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 that's interested, and if you're able to contribute notes, and/or drawings, we'll be happy to include them in our monthly summary. We also accept digital imaging. 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 the astronomer 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 Observers Challenge. We're not excluding those with an interest in astrophotography, either. Your 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.

#### **NGC-2371/72 Double Planetary In Gemini**

NGC-2371 and NGC-2372 are actually part of the same object, a dual-lobed planetary nebula in Gemini. Discovered by William Herschel on March 12, 1785, he saw it as two close objects and gave it his original designations, H-316-2 & H-317-2 respectively. They were later converted to the more well-known NGC (New General Catalog) numbers. The objects are also known by the singular PK 189+10.1 and also PNG 189.1+19.8.

It shines at a rather dim, but still attainable mag. 13 according to several sources, while others list it at mag. 11.2 to 11.4. In any case, it's within the limits of modest telescopes. The nebula lies approximately 4,400 light-years distant.

The central star is a real challenge at a very dim mag. 14.4 to 15.5 or fainter, depending on the source. Picking it out in contrast with the brightness of the surrounding nebula has been compared to spotting the central star of the Ring Nebula (M57).

## Observations/Drawings/Photos

(Contributors are listed in Alphabetical Order.)



**John Bishop:** LVAS Friend from Massachusetts

On March 17, 2018, I observed NGC-2371-72 from the ATMoB Clubhouse in Westford, Massachusetts. I used an 8.25-inch reflector at 48X, 100X, 196X, and 320X. I did not use any filters.

The sky was clear. Transparency and seeing were only fair when the observing session began. Contrast at the eyepiece was fair, at best. A heavy blanket of snow from a recent storm covered the ground. It seemed to observers that the snow pack was reflecting light (and possibly generating moisture?) that degraded transparency.

The result for me was that the object was somewhat difficult to locate, even though I had previously observed it briefly several years ago. I ultimately located it with averted vision as I swept the area.

At 48X, the object was a barely visible hazy patch. Averted vision gave a hint of an oblong shape. At 100X, the oblong shape became more evident, with just a hint of the separation into two lobes. In one end of the object I saw a small bright nucleus. This “star-like spot” seemed small for a core of stars, but rather big and bright for a single star.

196X produced the most pleasing view. I saw the object brighter, more easily, and it showed more structure. The dual aspect was more obvious.

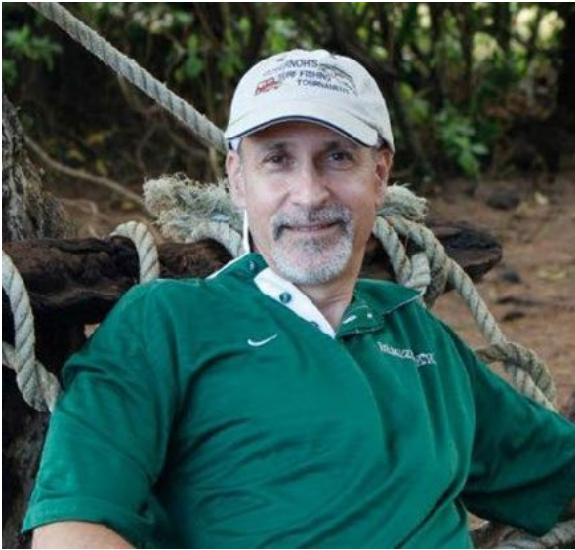
320X produced a distorted, unsteady image. This was too much power for the conditions.

An interesting, somewhat elusive and enigmatic object.



**Glenn Chaple:** LVAS Friend and Author from Massachusetts

I viewed NGC-2371-2 on the evening of March 19, 2018, using a 10-inch f/5 Dobsonian-mounted reflector and magnifying power of 208X. The limiting mag. was 4.5, and the seeing was poor. The nebula was very faint and visible as 2 separate parts. The more westerly part seemed brighter, and the easterly part appeared stellar. When I used averted vision, it was reminiscent of the planetary nebula M76 in Perseus.



**Dr. James Dire:** LVAS Friend From Hawaii

NGC-2371/72 is a planetary nebula in the constellation Gemini. The nebula is  $1.75^\circ$  due north of the star Propus. For reference, Propus is a mag. 4 star  $4.5^\circ$  west of Pollux and forms an equilateral triangle with the much brighter twins, Castor and Pollux. The planetary shines at mag. 11.2 and is  $1.2 \times 0.9$  arcminutes in size. The central star is mag. 14.8. The nebula is approximately 4,000 light years away.

William Herschel discovered the nebula in the year 1785. He cataloged the brighter central portion as NGC-2371 and the extended outer portion as NGC-2372.

I viewed it with a 190mm (7.5-inch) f/5.3 Maksutov-Newtonian reflector. The object was faint and colorless, but the double-lobed structure was apparent even with this small telescope. An OIII filter will bring out more detail and contrast when viewing the nebula.

My image was taken with an 8-inch f/8 Ritchey–Chrétien Cassegrain with an 0.8X focal reducer/field flattener yielding f/6.4. It was captured with an SBIG ST-2000XCM CCD camera and the exposure was 2.5 hours.

The planetary nebula has what appears to be a regular elliptical shell, divided into two main segments by a dark major-axis lane. The bright lobes are thought to be from bipolar flow from the central star. The cyan colored emissions come from OIII atoms. My image picked up two outer blue arcs, most likely from a previous layer of gas ejected from the star in a similar bipolar manner.



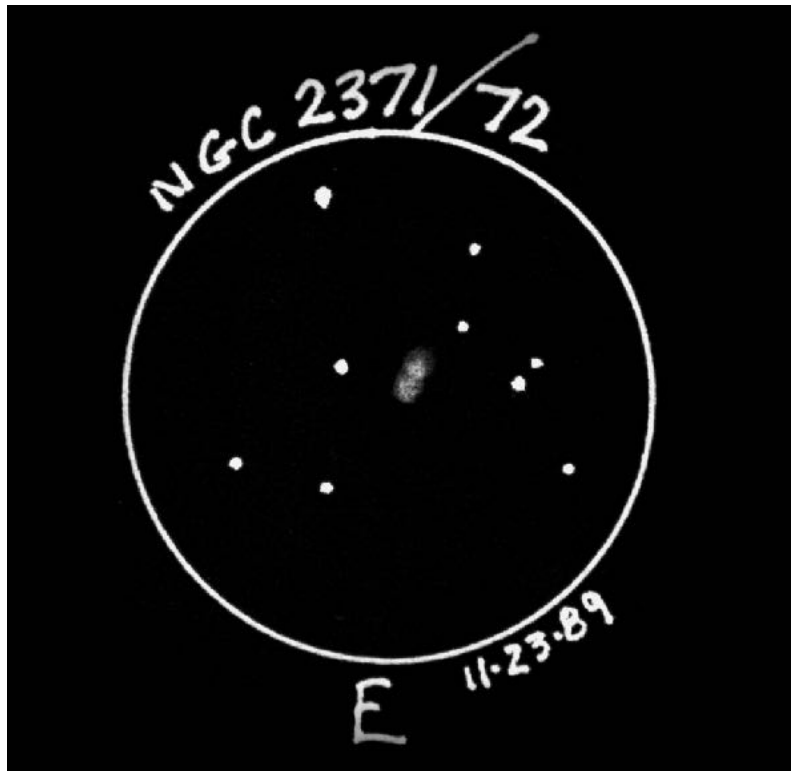


**Kenneth Drake:** New LVAS Friend from Texas

**Editor's Note:** We'd like to welcome new member Kenneth Drake. When Kenneth was 10 years old (1962), he spent time on his grandfather's farm, twenty miles from Crockett, TX, watching the sky. In January, 1983, he decided to look at the sky again and bought an *Edmond Mag 6 Star Atlas*. He then got involved with the *Houston Astronomical Society* at the time of Comet IRAS-Iraki-Alcock and bought a Comet Catcher telescope. He then built a 10-inch Dob and became a dedicated visual observer. Under the guidance of Paul Maley, he helped with the Pallas Occultation in 1983. Until 1999, he was heavily into deep-sky visual observing along with grazing occultations and comet observing. He still maintains a serious interest in observing very thin (young or old) moons. He's constructed a number of Dobsonian scopes from 8 to 24-inches using commercial mirrors. He now mostly observes Iridium flares and meteor showers, but still spends time drawing deep sky objects from his observing site 55 miles north of Houston, using a 13-inch home-brew Dobsonian.

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On November 23, 1989, I observed NGC-2371/72 from my yard between Conroe & Spring, Texas. It was a pristine morning and the observation was made from 4:30-5am. I was doing scale drawings of the Herschel-400 at that time, and could observe most that were north of 0° declination from home. Back then, I had fairly dark skies. The nebula was one of the smaller of the H-400, being less than 1' in size. The FOV was 15' in my 10-inch Dob at 195X (7.4mm EP). My visual impression of the planetary nebula was of a double-lobed fuzz that appeared in contact. The lobe to the SW was brighter and had a more intense core about 15" in size, with a faint halo extending out a bit. The other lobe was evenly lit, but dimmer and round. I saw no central star. I had both a UHC and OIII filter, but did not try them because I was looking for the view that William Herschel may have had.



**Chris Elledge:** LVAS Friend from Massachusetts

I observed NGC-2371/72 from the ATMoB Clubhouse (Bortle Scale 6, NELM 5.0) on two separate occasions with different telescopes.

On February 18, 2018, at 11:00 P.M., I observed it with a 10-inch reflector. The sky transparency was good as was the seeing. I found it by placing Iota Geminorum in the Southern-most part of my 35mm (1.9° FOV) eyepiece. Unfortunately, the planetary didn't show up at 36X. Centering where it should be and stepping up to 50X, I started to see hints of the nebulosity. At 127X, I saw what I thought was a star in the nebulosity, but it was actually a

brighter spot in the nebula. I was unable to see any separation between the parts of the nebula. I planned to attempt it again with this telescope and filters, but I was unable to do so.

On March 17th, 2018, at 10:00 P.M., I observed it again with two telescopes. The first was a 16-inch and the second was a 25-inch reflector, both are ATMob telescopes. The sky transparency was excellent and the seeing was fair. At 160X without a filter, the nebulosity was easily visible across the whole object, but the contrast was still too low to bring out the separation of the two lobes. Adding an O-III filter made it clear that there were two lobes with one to the SW and one to the NE. The SW lobe was brighter with a small bright spot, which was the spot that I confused for a star in my 10-inch previously. The nebulosity faded out toward the SE on the SW lobe, and to the NW on the NE lobe, while the edges were more defined in the other direction. This made it look like a pair of single quotation marks, nested. Upping the power to 400X without a filter greatly dimmed the nebulosity, but I could sometimes detect the central star blinking in and out of the view. I couldn't use the O-III filter at 400X because everything was too dim.

In the 25-inch reflector at 370X and unfiltered, I easily saw the quotation mark shape of both lobes, and even the central star, once spotted, stayed unblinking in the view.



**Ed Fraini:** New LVAS Friend from Texas

**Editor's Note:** We'd like to welcome new member Ed Fraini. Ed began observing in 2005, and is now planning his 11th trip to the *Texas Star Party*, this year. His first real accomplishment as an amateur was the completion of the *Astronomical League Messier List*, and receiving his certificate in 2007. That eventually led to his achieving the *Astronomical League Master Observing Certificate* in 2017. He's an active member of the *Houston Astronomical League*.

Ed and his wife, Anita, currently reside in Magnolia, Texas, which is north of Houston, and they've recently become associated with the *North Houston Astronomy Club*. \* \* \*

I was fortunate to have notes from an observation of the March Observer's Challenge object, planetary nebula NGC-2371-72, on two nights in February of 2015, even though the weather in southeast Texas has been poor as of late, and not conducive for deep-sky observing.

The following observation notes are from those two nights at a location in Leakey, Texas.

The sky condition rating was above average in seeing and transparency. The NELM was 5.2 near azimuth, with the nebula being nearly overhead.

I used a 20-inch Dobsonian with a 13mm eyepiece @152X. The telescopic field of view contained numerous small stars with a pair of mag. 9+ stars just to the south of the planetary. One much brighter star was located just outside the field toward the NW.

NGC-2371-72 appeared as one object with an elongated core, however, when using an OIII filter, I noted much greater contrast, but without additional detail or color.

Observations on the following night, allowed for a greater magnification of up to 330X, but I didn't note any substantial detail. I saw two distinct lobes, but they were still very oblong and joined.



**Roger Ivester:** LVAS Member from North Carolina

NGC-2371/72, planetary in Gemini – nebula mag. 11.3; central star mag. 14.8.

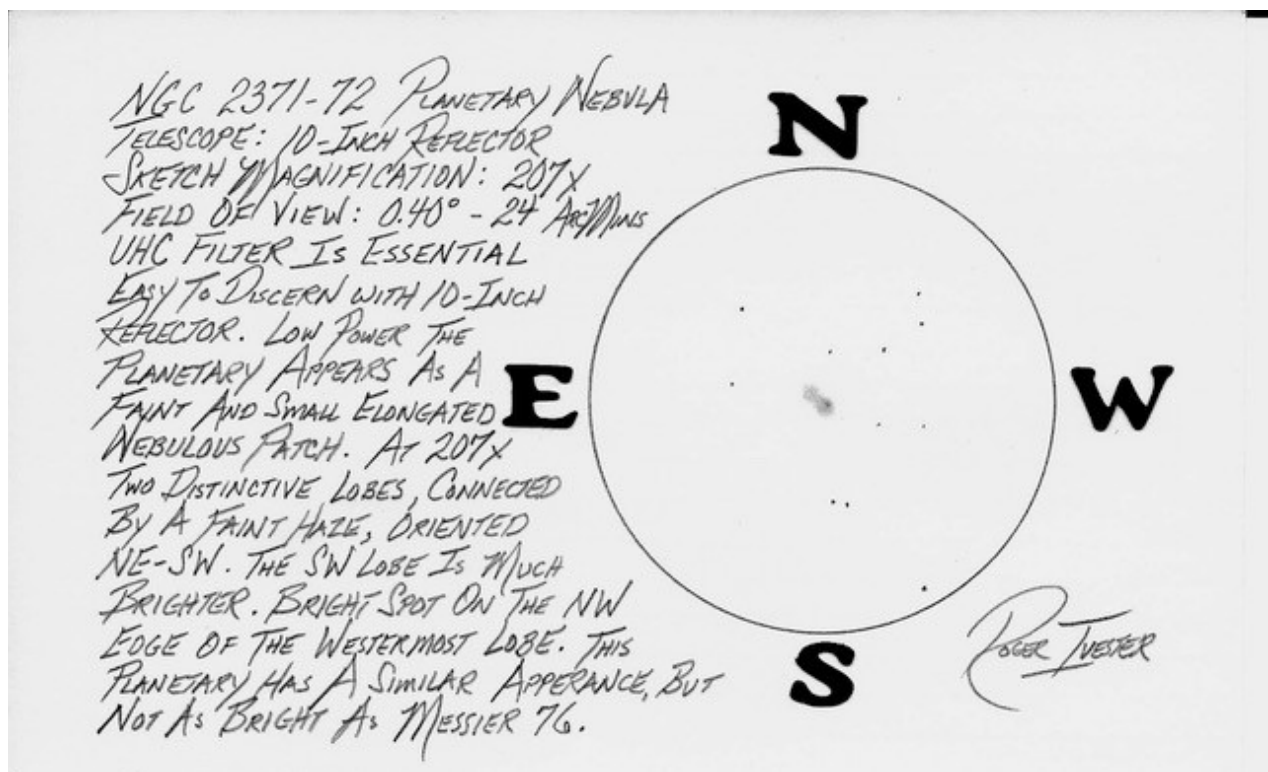
This object was easy to discern with a 10-inch reflector from my moderately light polluted backyard. At low power (57X), the planetary appeared as a faint and small elongated nebulous patch.

When increasing the magnification to 207X, and with a UHC narrowband nebula filter, two distinctive lobes became visible, connected by a faint haze. The nebula was oriented NE-SW, with the SW lobe being brighter and having greater concentration. The

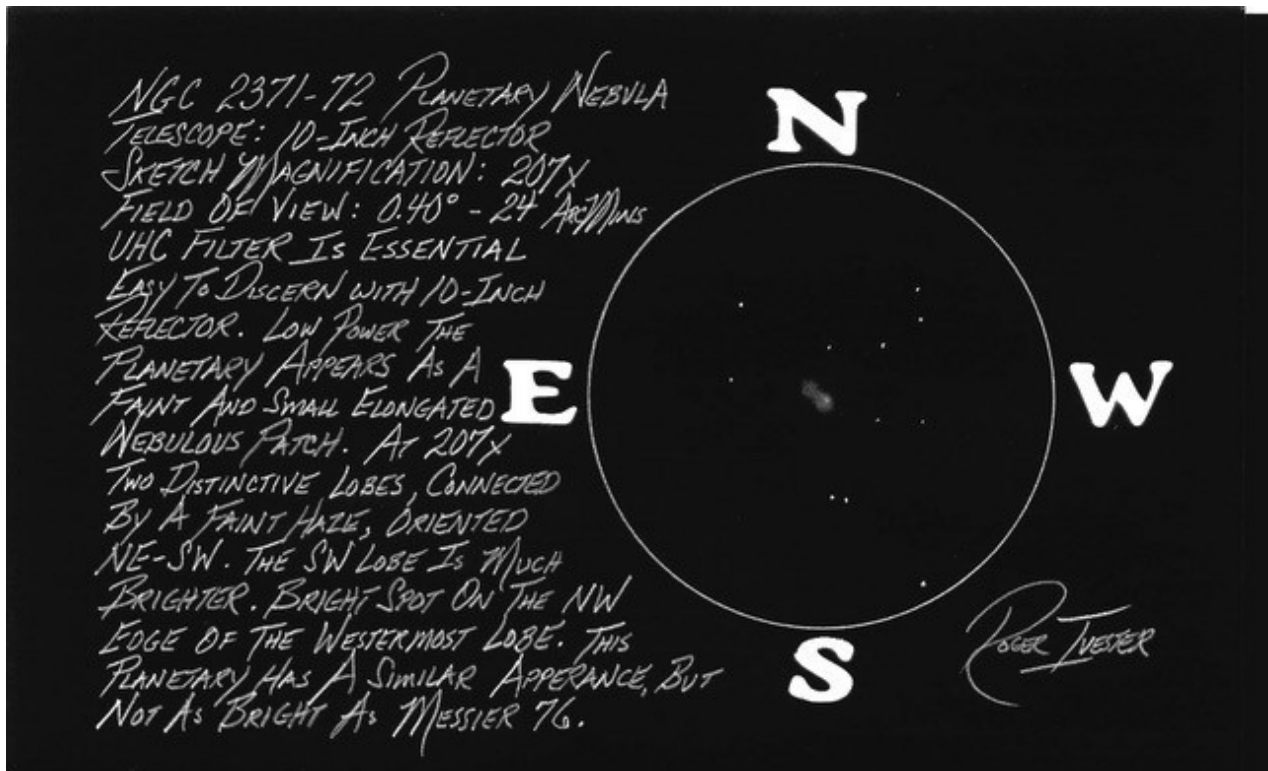
bright spot became visible using averted vision, located on the NW side of the westernmost lobe.

When first observing this planetary almost twenty five years ago, I mistakenly thought this bright spot to be the mag. 14.5 central star. It was, however, during a later observing session in 1998 that I realized the bright spot was not centrally located and far too bright to be the extremely faint central star. Another observation the following year confirmed this.

NGC-2371/72 has a similar appearance, but not nearly as bright as M76 (NGC 650-1), planetary nebula in Perseus.







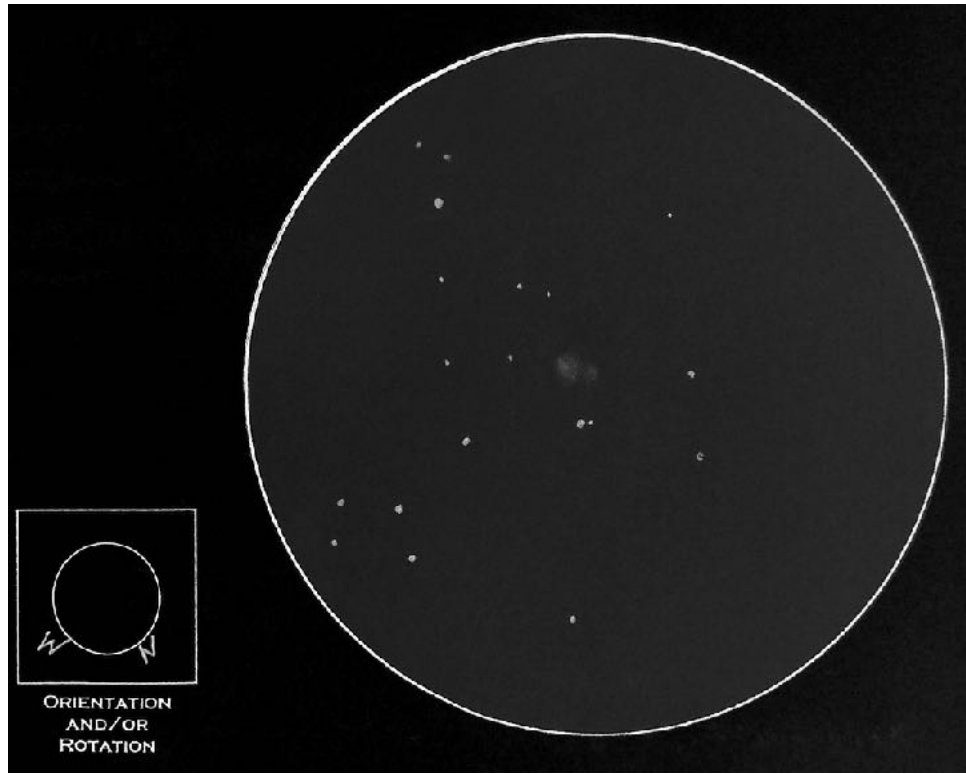
**Mike McCabe:** LVAS Friend from Massachusetts

The LVAS Observer's Challenge object for March 2018 was NGC-2371/72, a double-lobe planetary nebula system also known as the Gemini Nebula. Perhaps, the greater part of this particular challenge was overcoming the weather conditions, where in March, we here in the Northeast endured storm after storm after storm, rendering the sky virtually unobservable for deep sky objects. Over the course of a two month period, between February and March, I only got to observe it one time, with that observation coming on the evening of February 12, 2018.

As indicated by the formal name of the object, NGC-2371/72 is located in the constellation Gemini, and finding it was a snap. Located about 3° WSW of the bright star Castor, it was an easy star hop over to the planetary nebula. Even though this object was listed at mag. 13, the light that it emitted appeared to be concentrated because it was visible as a non-stellar object in a low power field of view. This was a pleasant surprise given the preconceptions that any object listed at mag. 13 conjured up in the mind of an astronomical observer.

For the task of producing a sketch for the challenge, I used my 12.5-inch f/4.8 Newtonian reflector, and pushed the power to extract more detail from the object, which had an interesting effect on the view. First of all, the entire field got very dim. The brightest thing in the 170X/.35° TFOV was a single mag. 10 star toward the south edge of the image, and everything else was significantly dimmer. The nebula itself showed as two fuzzy patches – presumably the lobes – with the western side being somewhat larger than the eastern side. I saw no central star, or even a hint of one, for that matter. The conditions during this observation were about average for my location, with a transparency rating of 2-3/5 and a seeing rating of 2/5. Because I only got that one

opportunity, I can't say for sure how much effect the conditions had on the overall observation. I look forward to returning to it again to assess it under, hopefully, better conditions, and perhaps in a variety of instruments.



**Mario Motta:** LVAS Friend from Massachusetts



Done with a 32-inch reflector.





**Richard Nugent:** LVAS Friend from Massachusetts

All roads lead to NGC-2371/72! You just need to pick an easy one. Pollux, Castor, and mag. 3.8 Iota Gem form a nice triangle. I started at Iota and star hopped from there. If you're going to star hop, you must "know thy finder." I used an 80mm RACI finder that gives a true field of view of around  $3.5^\circ$  and allows me to routinely see mag. 8 stars with ease...mag. 9 stars on exceptional nights. With Iota near the center of my view, I looked just to the northeast to see a pair of mag. 5 stars, 64 and 65 Gem. Next, I shifted my view in a line from these stars to the northwest to find mag. 7.7 HD58746, which was attended by a pair of mag. 9 stars (HD58597 and HD58498). Just to the west of this group was the mag. 7.7 star, HD57470 which was also attended by a pair of mag. 8.13 and 7.22 stars (HD57362 and HD57069, respectively). The planetary was nearly centered between these two trios of stars.

Now, that may sound like a very complicated star hop, but it's not...all of those stars were visible in my finder's field of view! (The magnitude estimates are from *Sky Safari Plus*.)

Now, the nebula was small— $55''$  across. That was only a little larger than the apparent size of Jupiter near opposition so, in order to be prepared for what you'd see, think about how small the planet looks in your scope. You'd need some magnification. The nebula was also pretty faint. My skies in Framingham, MA almost never exceed a NELM of 4.8 and from the ATMob observing site, the NELM was likely around 5.2. (Actually at the ATMob site, the light pollution varies with direction. It's worse in the southeast — toward Lowell, MA. The skies are darker as you look westward and to the north.) If you own an UHC or OIII filter, this planetary will stand out with the improved contrast but, IMHO, an OIII filter is sometimes too much filter for a small scope. These filters are designed to have a very narrow bandpass and squelch most of the light being delivered to the eyepiece. Try different eyepiece/filter combinations to give the most pleasing view.

Despite the snowy March we've had this year, I had a several opportunities to view this object. For most of my observations, I used my 10-inch f/4.7 reflector as well as my 20-inch f/5 Dob. Each scope sits on an equatorial platform making it easier to use high magnifications. I was also able to make some observations using the 25-inch f/3.5 Dob at the ATMob's Westford site.

During my session with the 10-inch scope, I had a NELM of 4.8 with humidity levels at 83%, seeing was 5/10, and clouds were slowly drifting in from the east. When you're 20 miles from the Atlantic Ocean, that's not a good wind direction! Using a 22mm (54X,  $1.25^\circ$  true field) EP with no filter, the planetary was not visible. The UHC filter made it stand out, but its small size would have made it easy to miss had I been sweeping the telescope along. My first impression was that it looked like a smaller version of M76...a bit boxy. As expected, there was no hint of the mag. 14.8 central star. The double lobed-nature of the object was hard to discern, but at higher powers, it was easier to see.

Using a 4.8mm (250X,  $0.33^\circ$  true field) EP, I could see both lobes with no filter. The SW lobe was the brighter of the two, with a brighter spot near that lobe's edge. The spot looked star-like and at first I thought it was a faint field star. However, the spot responded well to the UHC filter, so I knew it wasn't a star. The OIII was too much filter for the telescope/sky conditions. My best view came with a 7mm (170X,  $0.48^\circ$  true field) EP and a UHC filter. The two lobes were clearly visible and the spot on the SW lobe was quite prominent.

Through the 20-inch, the nebula was more prominent but the double-lobe was actually a little harder to detect. I suspect the scope allowed me to see the faint haze between the two lobes. Using the 4.8mm (525X,  $0.16^\circ$  true

field) EP with no filter, I could see the central star some of the time, but it was very difficult. Slight averted vision helped. Using a 3.7mm (600X, 0.18° true field) EP with the ATMob 25-inch, I saw the central star with direct vision. Neither scope showed the faint NW/SE extensions seen in Mario Motta's image.

The nature of the bright spot intrigued me so a Google search of the object led me to <https://www.spacetelescope.org/images/opo0813a/> which describes the bright spot as relatively cool, dense gas that appears to represent one of the two diametrically opposite jets emanating from the central star. I think it remarkable that we can observe this phenomenon through backyard telescopes!

Although this object is overlooked by most amateurs, it's a fine object that's easy to find, responds well to magnification, and is enhanced by filters. This little gem should be a stop on every tour of Gemini.

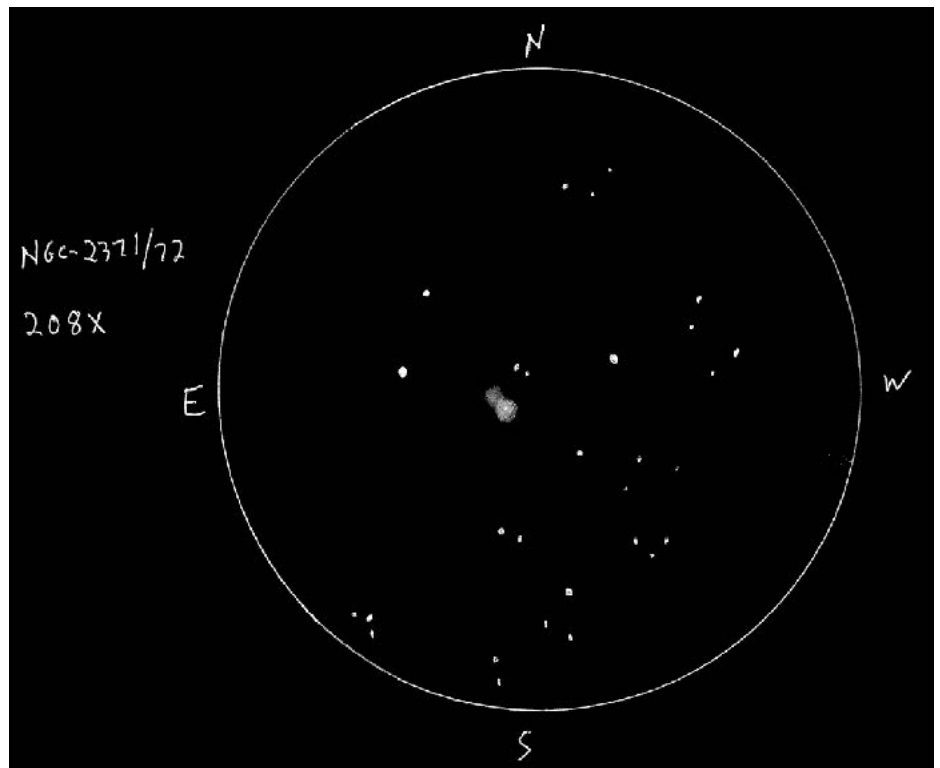


**Fred Rayworth:** LVAS Member and AL Coordinator from Nevada

I've observed and logged NGC-2371/72 six times over the years, starting in October of 1994 from Spain with my home-built 16-inch f/6.4, at a magnification of around 200X. I saw the two distinct lobes and most of my observations since, which included a few more with that scope and some with my current 16-inch f/4.5, and all gave similar results. For the Challenge, I made a concentrated effort to take my time and observe it in more detail.

On February 17, 2018, from the "undisclosed location" at Lake Mead, Nevada, at an altitude of 2,100 feet, it was clear, cool and calm. It pretty much stayed that way, except right around 22:00, gusty breezes picked up a bit. They weren't consistent, but enough to knock everything around for a moment, then die off for a few minutes, then pick up again. Seeing was nothing to write home about, but the transparency was pretty good. There was a band of clouds to the SSE, but they never crept up into view above the ridge to the south. I saw them on the way to the site, so that's how I knew they were there, lingering. It got immediately cold as soon as the sun went down but never enough to put my hat on. When I left, the truck thermometer said 50°.

The object was a small, two-lobed planetary with one side brighter and more stellar. I observed it at 102X, 209X & 390X. I tried a UHC filter and it didn't help much. It was better without a filter. Never tried the O-III. Even 390X, it didn't bring out much detail, just a slight mottling in the stellar side while the other lobe was a soft glow. The best view was at 208X, which was just enough magnification



without going too much, given the sky conditions.

In the brighter lobe, I described it as stellar-like and that may or may not have also been a hint of the central star. I'm positive I saw something twinkle just a bit. 390X didn't help much with that.

The drawing is using the best view at 208X.



**Joseph Rothchild:** LVAS Friend from Massachusetts

I observed NGC-2371/72 on March 10, 2018 on Cape Cod. It was a dark sky, but with up to 20 mph winds, which limited magnification. I observed with a 10-inch reflector at 89X. The planetary nebula's bi-lobed structure (appearing like a figure eight) was readily apparent, but faint. I couldn't see any detail. It was similar in size to the nearby Eskimo nebula, but with much lower surface brightness. Contrast was improved with a narrow band pass filter (NBP). This was my first time observing this object (in 50 years of observing).

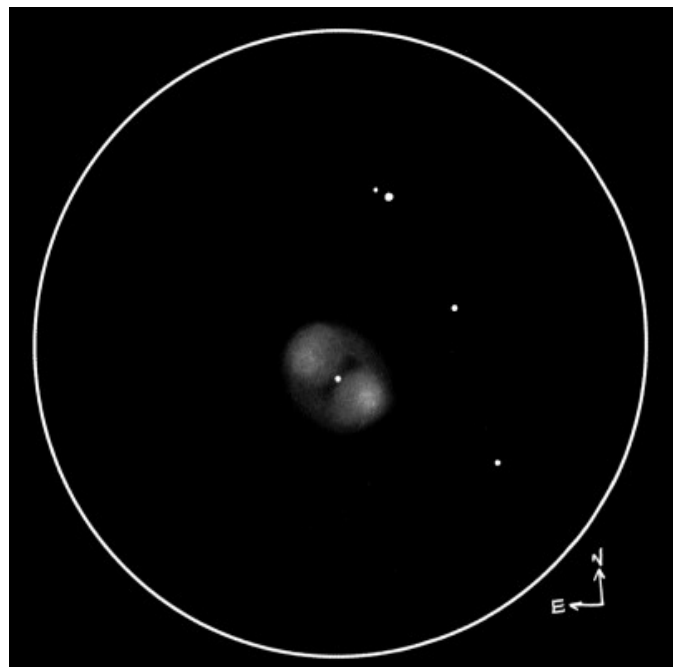


**Jaakko Saloranta:** LVAS Friend from Finland

I'm a big fan of planetary nebula for many reasons! One of the most important is that they often have high surface brightness and are thus easily seen even under suburban skies. When I first started visual observing, I quickly noticed I could see many of these, even from my backyard, especially

with the help of an OIII filter.

This is a great planetary nebula, even visible with a 3-inch reflector telescope @64X. Under moderately dark skies, and using 8-inch telescope, the nebula appeared as an elongated haze with an obvious bipolar structure. The SW lobe (NGC-2371) was slightly larger, brighter, and had a concentrated brightening in the W edge. It was very challenging to draw, and sketching took a lot of time to get the details correctly. The mag. 14 central star was, surprisingly, visible @ 267X during moments of good seeing. I noted good contrast with OIII and UHC filters. I did not see the fainter "wing" structure in the outer halo with 8-inch aperture.







**Craig Sandler:** LVAS Friend from Massachusetts

On March 16, 2018 I observed NGC-2371/72 from Petersham MA using an 8-inch SCT at 100X (24mm Zoom EP). The seeing was good, transparency fair to good and NELM 6.

I found this a wonderful object without a filter at low power, because of the fine field. It was also tremendous with an OIII at both low and high power because of the detail. It presented many different aspects, more so than most objects, I'd say. It was very three-dimensional. Lots of detail came out with patient looking. It was a great Observer's Challenge choice.



**Jay and Liz Thompson:** LVAS members from Henderson, Nevada



We looked at NGC-2371/72 with 17-inch and 24-inch Newtonian telescopes from a dark location as well as with a 16-inch SCT from our backyard at the edge of the Las Vegas Valley.

With the 17-inch and 24-inch, the nebula was evident as non-stellar at around 100X, even without a filter. Increasing magnification to around 250X showed the preceding lobe to be brighter, as well as revealing a very bright area near the south

edge of the preceding lobe.

With the 16-inch SCT, the nebula was evident at 102X. At 156X and with a UHC filter, the bi-lobal nature was evident. It showed up well at both 203X and 271X with the nebula filter. Without the filter, it tended to be a little washed out. It still was evident with the filter at 406X, but it was starting to get dimmed down by the magnification. We could not visually see the central star.

Despite an 11-day-old Moon being about 30° away, we decided to image NGC-2371/72 on March 27, 2018 with a 14-inch SCT and a UHC filter using a one-shot-color CCD camera. Ideally, the images would have been obtained at the f/11 focus for the best scale, but a focal reducer was already installed, giving an f/5.4 effective focal ratio.

When we first set on the field, the monitor was adjusted to monochrome (red only). It wasn't evident which object the nebula was. Resetting the monitor to full color immediately revealed the cyan glow from the nebula, which was then centered, and longer exposures obtained. We saw the faint central star in some individual 30-second sub-frames at full resolution. In the thirty-minute full resolution image, the outlying arcs can be seen faintly and are arrowed in the image.

