

MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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MARCH 2014

NGC-2359 (LBN-1041) – (Thor's Helmet/The Duck Nebula) – Diffuse Nebula In Canis Major

Introduction

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

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

NGC-2359 (LBN-1041) – (Thor's Helmet/The Duck Nebula) – Diffuse Nebula In Canis Major

NGC-2359 is a diffuse nebula that lies in the constellation of Canis Major. It's about 15,000 light-years away and about 30 light-years across. It's lit up by a massive mag. 11.4 Wolf-Rayet star. Because of the unusual shape, this nebula is also known as Thor's Helmet and sometimes as the Duck Nebula.

Observations/Drawings/Photos

Gus Johnson: Observer from Maryland



Using a 5-inch reflector at 30X with a UHC filter, it appeared as an elongated nebula and not very difficult. When observing the nebula with an 8-inch reflector at 40X, and also with a UHC filter, it was surprisingly easy and bright. It had a sharp right angle toward the north and a round area southward, possibly a swirl, but I saw it as only one nebula.

Jay and Liz Thompson: Observers from Nevada



Jay Thompson

On January 3, 2014, I observed NGC-2359 (the Duck Head Nebula) with a 17.5-inch f/4.5 Newtonian and 5-inch f/10 SCT from Meadview, AZ.

With the 17.5-inch at 63X and no filter, I could see it faintly. At 125X and with an OIII filter, the head and bill were apparent. Streamers coming off the duck head were faint but visible, with the streamer on the duck bill side more evident (I used an observing hood to block extraneous light). 227X was too much magnification. Going back to 125X but with no filter, embedded stars were more evident, but the nebulosity much less (as would be expected). The OIII filter really helped bring out the nebulosity.

At 50X with the C5 and an OIII filter, it appeared as a roundish glowing blob.

Liz Thompson

On February 1, 2014 I observed NGC-2359 (the Duck Head Nebula) with a 14-inch SCT from my backyard in Henderson, NV. The sky was very steady and transparent.

It appeared as a glowing patch with a 40mm eyepiece (98X) without any filter. Adding a deep-sky filter helped bring up the contrast, making the “duck bill” evident in addition to the round head.

Jim Gianoulakis: Observer from Nevada



NGC-2359, or Thor's Helmet is an emission nebula in the constellation of Canis Major. The nebula is approximately 15,000 light-years distant and is approximately 30 light-years across. The star at the heart of the helmet is Wolf-Rayet star HD 56925 and is an extremely large and hot star thought to be in a pre-super nova phase. A fascinating object to image, but I had less luck viewing it from my light-polluted back yard. The photo is a stack of 40 / 10-minute exposures through RGB and luminance filters (10 of each). Stacked in CCD stack and levels and curves applied in PhotoShop 6. The photo was taken with a 8-inch RC on an Atlas EQG mount utilizing a QSI mono camera and RGBL filters.



Rob Lambert: Observer from Nevada

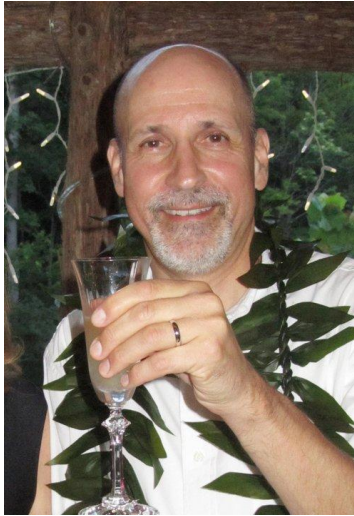


I have a difficult time viewing NGC-2359 visually and can normally see only wisps of Thor's Helmet. This is where my "video-assisted astronomy" with the Mallincam comes in handy. I've rotated my image clockwise to approximate the orientation of Jim's image. The Wolf-Rayet star, often mentioned in relation to Thor's Helmet and thought to have created the bubble that is Thor's Helmet and illuminates the emission nebula with its ionizing radiation, is the brighter star near the center of the helmet. Because I don't stack my Mallincam images, my image probably more closely approximates what one might see at the eyepiece. The left wing of the helmet, which is just above the chain of four stars to the left of the Wolf-Rayet star is just barely visible, while the right wing is more prominent. The Mallincam picked up another area of red nebulosity that is below and left of the chain of four stars. I was surprised to learn that NGC-2359 is called the "Duck Nebula" in The Night Sky Observer's Guide. I've turned the image every way that I can imagine and I've yet to see the duck.

The captured image is a single-frame, 10-second integration without any enhancements or adjustments. It was captured with a 5-inch apochromatic refractor resulting in a magnification of approximately 60X. No filters other than a light pollution filter were used.



James Dire: Observer from Hawaii



NGC-2359 is located $4\frac{1}{3}^{\circ}$ northeast of the star Gamma Canis Majoris, which itself is about the same distance east-northeast of Sirius. It is sometimes called the Duck Nebula or Thor's Helmet. It is a bright emission nebula. The glowing gas is excited by radiation from a Wolf-Rayet star in the center of the "helmet". Wolf-Rayet stars lack hydrogen lines in their spectra. Instead their spectra are dominated by broad emission lines of highly ionized helium, nitrogen, carbon and sometimes oxygen. They're thought to mostly be dying super-giants with their hydrogen layers blown away by stellar winds, thereby directly exposing their hot helium shells. These pre-supernova stars are incredibly hot and expel their outer layers at high velocity.

My slightly out of focus image was a 2-hour exposure with a 10-inch f/4.6 Newtonian. I haven't quite worked out the bugs in the proper spacing of the coma corrector from the CCD chip, which made the stars in the image look way out of focus. The exposure was two hours with an SBIG ST-2000XCM CCD camera. This exposure captured about the same amount of nebulosity that I saw visually in an 11-inch HD SCT telescope.



Sue French: Observer from New York



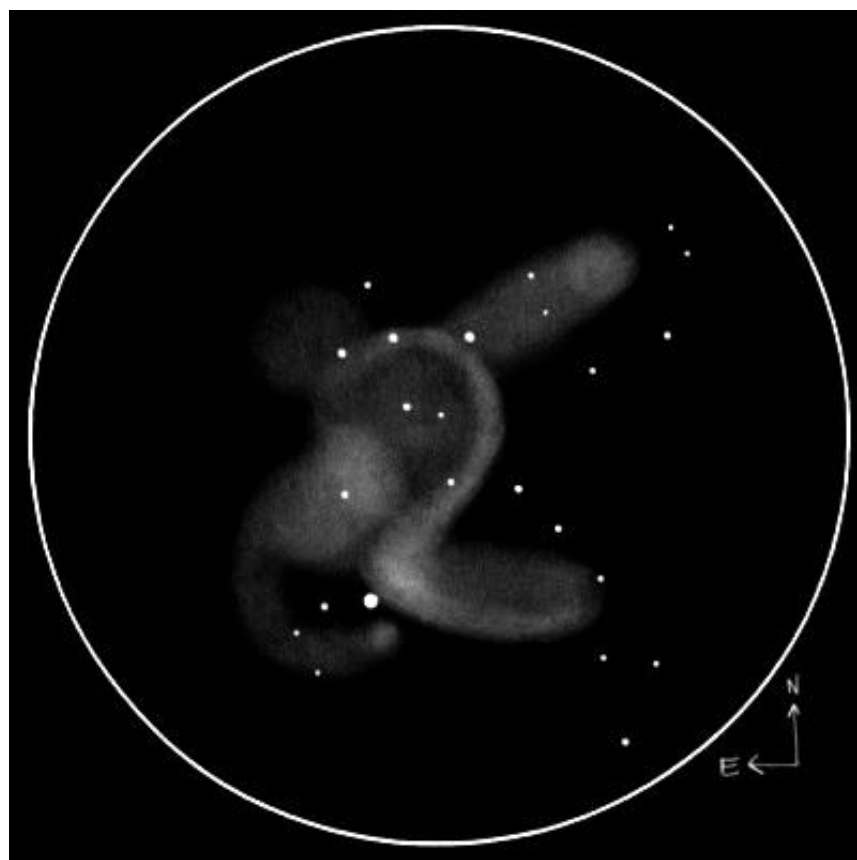
I used a 10-inch f/6 Newtonian at 70X with an O III filter for this observation.

NGC-2359 is a large, complex nebula. The brightest area spans $6\frac{1}{2}'$ and is shaped like a 2 with a lightly filled-in, shallow curve. Fainter extensions proceed northwest and east from the top (north) of the 2. The eastern one extends to the easternmost star in an east-northeast to west-southwest, $6\frac{1}{2}'$ line of four mag. 9-11 stars. A short, faint extension proceeds east from the base of the 2. A very faint, short extension goes west from it. Stars mark each end of the 2's curve and one sits along its inside edge. A UHC filter also works well, and the brighter parts of the nebula are visible even without a filter. The extension spreading west from the northern part of the 2 is also quite easy, while the others are more subtle.

Jaakko Saloranta: Observer from Finland



Observing a few years ago from Boca Tauce, Tenerife, Spain (2,034 meters/6,673 feet) with a 4.7-inch Newtonian @ 152X (20'), I found NGC-2359 filled with detail. I described it as follows: It's best visible with medium magnification. The brightest part appeared to be just NW of the mag. 9 star. The interior part of the nebula was somewhat C-shaped with the W edge being quite sharply defined and brighter than the rest. It appeared mottled and contained several stars within, most notable being the arc of three mag. 10 stars in the N edge. The NE extension was vague at best, appearing only as a somewhat round bubble extending NE from the main part of the nebula. The NW extension was NW-SE elongated, roughly 4' x 2' in size and might have been somewhat brighter from the tip. The SW extension was the brightest and largest. It appeared as an E-W elongated haze nearly touching a mag. 13 star in the W, with the S edge being more well defined and slightly brighter than the rest. The SE extension was the most difficult and uncertain. It appeared as an arc of some sort toward the mag. 9 star ending with a minute brightening. The shape was very difficult and mostly... guessed. With all the extensions, the size was at least 12' x 8'. There were several stars within. NGC-2361 was a small knot in the main part of the nebula, in the W edge.



Roger Ivester: Observer from North Carolina



Using a 10-inch reflector at 57X and with an O-III filter, the nebula appeared fairly bright. However, it was invisible without the filter, in-part due to a pesky street light in relatively close proximity. The nebula appeared more concentrated in the northern section. Using averted vision, two faint embedded stars sparkled intermittently. When I removed the filter, both stars shined fairly bright. The nebula extended south, and then curved toward the west, with some very faint extensions south and southeast. The overall shape, or greatest concentration, resembled that of the letter L. A chain of about eight stars led off toward the east.

NGC 2359 - Diffuse Nebula - Thor's
CANIS MAJOR. HELMET
MARCH 2014

TELESCOPE: 10-INCH REFLECTOR

STX - 1.1° FOV

NELM: 5.0

TRANSPARENCY: POOR

INVISIBLE WITHOUT O-III

BRIEFCST AND MOST

CONCENTRATION IN

NORTHERN SECTION.

CURVING SECTION TOWARD

THE WEST. USING AVERTED

VISION, NEBULOSITY CAN BE

SEEN ON AN INTERMITTENT

BASIS SURROUNDING BRIGHTER

SECTIONS. TWO STARS NOTED IN

CENTRAL REGION, WITHOUT FILTER.



ROGER J. JESTER

Fred Rayworth: Observer from Nevada



I've observed this object multiple times, and suggested it for this year's Observer's Challenge because of the relative ease of observing it and its unusual shape. I first came across it by accident when I spotted it on my Tirion star chart on February 9, 2008. I was at Redstone Picnic Area on the North Shore Road of Lake Mead. It was nice and calm, with a slight chill to the air, very clear and it stayed that way all night. I considered it an outstanding sky. At an altitude of 2,100 feet, it's my go-to dark sky site.

Using my 16-inch f/4.5 Dobsonian at 57X, it was just a haze against a darker background until I added the O-III filter, then it jumped out. Wow! I saw a central clump with several extended areas going out.

I next got a crack at it on January 28, 2011 from Furnace Creek Ranch in Death Valley at -192 feet. The temp was 55° but air movement already has an icy chill to it. It was very clear with just a slight haze in the distance. As the night progressed, it seemed to be a superb night and was one of the best I've seen in a long time. There was just the slightest hint of a light dome from Las Vegas to the southeast and Los Angeles to the southwest.

Once again using my 16-inch f/4.5, this time at 87X, Thor's Helmet looked wow! Found it first try. The O-III makes it really stand out. I saw a large swirl of gas with the main bubble and arms. I also noted a fainter nebulosity beyond the helmet. The wings extended quite a ways with some filamentary extensions and mottling weaved amongst them. It was quite impressive.

The next time I saw it was on February 1, 2014, once again at Furnace Creek. It was super clear, getting cold, with slight air movement. I thought it was going to be windy after the

earlier forecast and the high winds in the afternoon, but it never happened. Instead, the breeze ended up being light and variable right until midnight when I gave up. The sky was pristine until sometime after 10:30 when I noticed some stars in Eridanus were starting to get halos around them on the far Western horizon. I had a feeling something was up, and that was confirmed the next morning when I woke up to overcast skies again, just like the Friday previous. That one-night break was worth it, though.

With the 16-inch f/4.5, this time at 102X, it was like seeing an old friend, and a spectacular site I might add. I used this as an off-the-wall outreach object. Wow! Without a filter, it just looked like a nebulous area with a few stars in it, but it was still a distinct patch that stood out. With an O-III, it jumped out and really showed the wings and some of the helmet but the stars mostly disappeared. However, the UHC showed a more aesthetically pleasing view with the stars back in the picture plus all of the helmet and most of the wings. The only difference in the nebula was that the wings didn't show quite as prominent as in the O-III. Still, it was quite spectacular and everyone that saw it loved it.

I've seen it again twice since then, but these observations give the idea.

The drawing is a composite of the best versus my poor artistic skills. I finally figured out how to invert the colors using Picasa, a free photo processing program I'd once installed to work on book covers for a book I was going to self-publish but never did.

