MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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NGC-7380 (Sharpless 2-142) – The Wizard Nebula In Cepheus

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 7380 (Sharpless 2-142) – The Wizard Nebula In Cepheus

NGC-7380 is an open cluster in a star-rich area of Cepheus. Discovered by Caroline Herschel in 1787, she failed to note the nebulosity at the time. Later, when the nebulosity was discovered, it was given the designation Sharpless or Sh2-142. It's commonly known as the Wizard Nebula, a name derived more from photographic images rather than visually. Many confuse the nebula with the cluster and mistakenly list NGC-7380 as the Wizard Nebula when in fact it is merely the rather obscure cluster. At mag. 7.2, it's a loose collection of maybe 125 stars total, but good luck picking out which ones are actually part of the cluster! The magnitudes of the actual members vary widely. For most observers with backyard telescopes, the nebula will be invisible without a filter so be sure to have an O-III handy if one is available. If not, a UHC or LPR may help if the skies are dark. The challenge still counts if one sees either the cluster, the nebula or both.

Observations/Drawings/Photos

Tony Labude: Observer from Oklahoma

A long-awaited weekend trip to a very dark site was the best observing conditions of the year, so far. I acquired a refurbished laptop this summer and fellow observer Dennis Wigley loaded *Desktop Universe* on it for me. This was a great tool for me to locate NGC-7380 once I learned how to navigate my way around the program. Navigating the old 8-inch Dobsonian was a different story. Sweeping for the cluster, I found a miniature double cluster. To the laptop program to find out I was headed for M-52 and had found NGC-7510 and K19. Back the other way, and there next to a line of stars that formed an L was NGC-7380. The cluster was circular and lay at the heel of the L. I noticed a V-shape of brighter stars in the center of the cluster. At 53X, I could make out about 20 stars that seemed to have a hazy background. If I had just been sweeping for clusters, I think I would've passed it over without recognizing it as a cluster. The L with a double at the heel was the key for finding it.

I would like to thank Scott Owen for hosting me, Kevin, Dennis, Mike and Billy at his family cabins near the Arbuckles in southern Oklahoma.

The image credits go to Kevin Davis, Dennis Wigley and Tony Labude: 1hr total exposure time with an 80mm (3-inch) f/7 refractor, FLI microline 8300c.

Fred Rayworth: Observer from Nevada

I first saw this object on August 27, 2005 at Lee Canyon weather station at 6,500 feet with my 16-inch f/6.4 Dobsonian at 70X. I called it a sparse but distinct cluster of about 20 stars. I had no idea at the time any nebulosity was involved with it. That nebulosity, SH-2-142 was not easy to see. I should've picked it up on my Megastar charts but was probably using my Tirion atlas which likely just showed the open cluster.

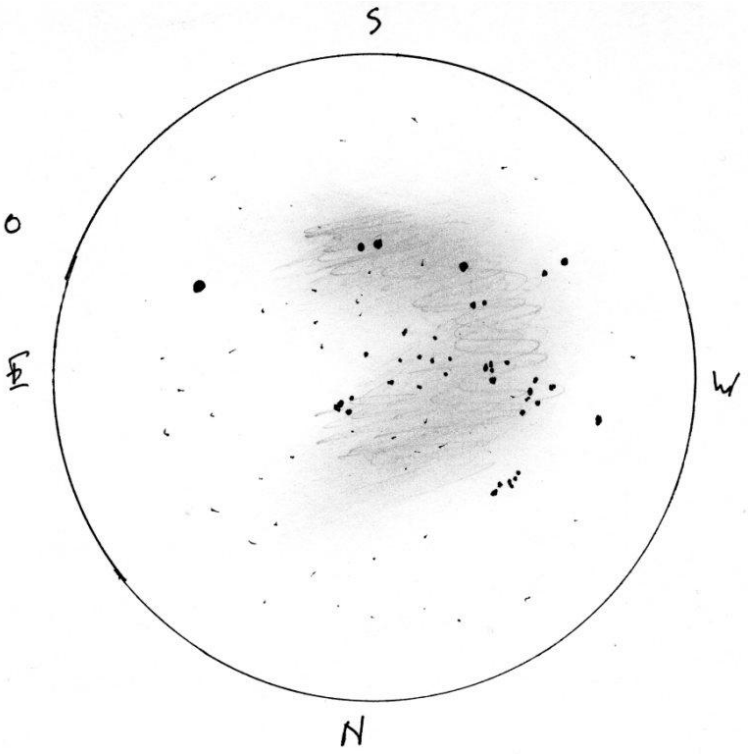
My next try was for this challenge at Cathedral Gorge on September 22, 2011 with my 16-inch f/4.5 Dobsonian at 102X. I hadn't realized I'd seen it before and it was quite challenging to find. A rather obscure cluster hidden among a rich star field, I finally gave up in frustration. However, I tried again the next evening. The cluster was light and unremarkable against the rich background. When I finally found it, I had to slap on the O-III to see any hint of nebulosity. Even then, I only saw just a bit of it, but it was definitely there. It surrounded the cluster but was restricted to it with just a small bit extending off to one side. It sure didn't extend off like it showed on the Megastar map. How they classified this as a distinct cluster was beyond me as without the filter, even by sweeping, I could hardly tell it from the background stars. It reminded me of some of those Herschel 1 open clusters that gave me grief. The magnitudes varied widely and it was hard to tell where the cluster began and the background ended. I didn't notice any particular colors.

The nebula was compact and a thick "C" shape and despite careful sweeping all around the area, I couldn't detect even a trace of it in the surrounding area. In fact, I almost lost the cluster entirely several times while I looked for traces of the nebula. As it turns out, my eyepiece field covered the entire field of the nebulosity anyway, so sweeping wouldn't have found any more nebulosity. Going back to Megastar, the way the nebulosity was drawn was a rough "C" shape, so I actually saw all of it. I was looking for something that wasn't there.

My overall opinion was that this was a really challenging object in that it was quite obscure, in an awkward part of the sky, being almost straight up, and being in a star-rich part of the sky.

NGC-7380

102X

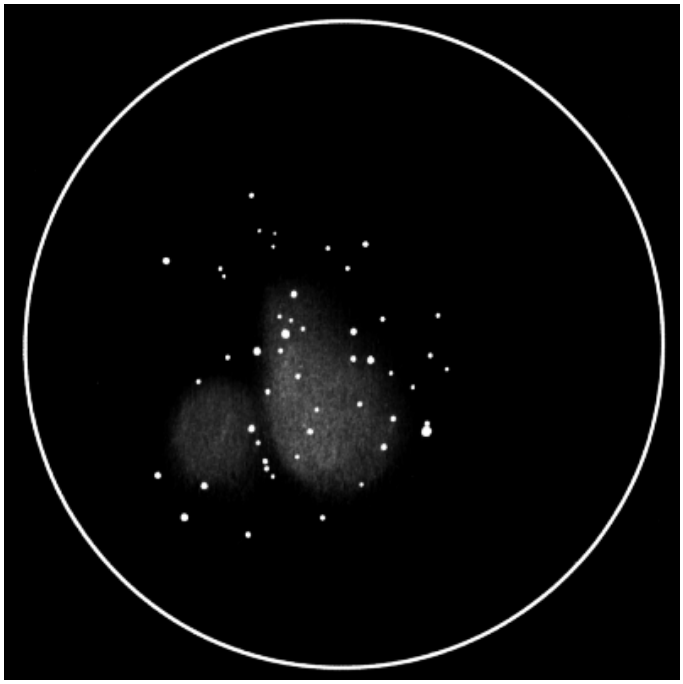


Jaakko Solaranta: Observer from Finland

NGC 7380 lies in eastern Cepheus, close to Cassiopeia border. Surprisingly, this cluster was discovered by Caroline Herschel, who sadly failed or at least didn't report seeing the nebulosity with her little 4-inch reflector. So, the designation of NGC-7380 applies to the cluster only and the nebulosity is SH2-142.

The commonly given size for the cluster is 20', but visually it's at least slightly smaller even with a vivid imagination. The core region is about 10' in size and this is what observers usually see and sketch. The bright mag. 8.5 star in the SW edge of the group is DH Cephei, but it's a non-member. The brightest star in the group is mag. 10, presumably being the variable star PS Cephei. The stars in the cluster form a beautiful and obvious triangular or fan-shape flying away from DH Cephei. In total, there are slightly over 30 stars brighter than mag. 12 and at least 80 stars brighter than mag. 14 in this cluster. Add in a faint emission nebula in the background and you have a pretty great deep sky object in your hands. The emission nebula is usually visible with O-III or UHC filters, given dark enough skies.

I spent roughly an hour observing this object on the night of October 21, 2011. The skies were clear, temperature was in the low 30s (Fahrenheit) in my light-polluted back yard and I decided to do a quick sketch for the LVAS's October's "Observer Challenge". The NELM measured from Cepheus yielded 5.7 and the SQM-L meter gave measurements between 19.00 – 19.05. Despite the poor conditions, the cluster itself was quite a beautiful thing to behold with my 8-inch Dobsonian. Even at higher power (150X), the cluster displayed a faint nebulous background but I assumed this to be only a glow from the faint unresolved stars. Adding in a UHC filter, I could still see a glow in the background. However, with averted vision, I could just squint a little gap between the two parts of the nebula. After this, I was pretty certain I had at least seen some of the faint emission nebula.



While in the region, check out some of the nearby asterisms. Directly south of NGC-7380 lies a fairly conspicuous asterism. The brightest star in this group is HD 215868 so it's only fitting to call it the HD 215868-group (also known as Alessi J2247.1+5742 after the Brazilian astronomer Bruno Alessi). This asterism is about 25' in size and consists of roughly 50 stars brighter than mag. 12 in a slightly NW-SE elongated form. The group is actually quite obvious when viewing NGC-7380 with a low-power eyepiece. Some might also notice a curious-shaped asterism around mag. 9 star HD 240037 as well as yet another scattered group of stars just east of HD 215286. With a wide enough field of view, you can see all four at the same time. Cepheus truly is one of those constellations teeming with asterisms, open clusters and funny-shaped groupings.

Roger Ivester: Observer from North Carolina

Locating and seeing this cluster with a 10-inch was easy, however, the associated nebula proved to be very difficult. The 10-inch presented this cluster as sparse, mostly irregular in shape at 104X, with about twenty-five brighter members. I could only see the nebula when using an O-III filter, with great difficulty, patience and averted vision, from my moderately light polluted observing site. The NELM during this observing session was 5.5 with good seeing. The brightest and most concentrated portion was in the central region, surrounding a chain of four stars, oriented in an approximate NNW-SE alignment. I could see other areas of nebulosity, but not constantly. I noted one very faint section to the west, and another toward the south. Just to the east lay a row of four very faint stars in a north-south orientation. A beautiful and fairly bright double-star lay to the west of the cluster.

The sketch was made using both a drawing and a soft graphite pencil, on a plain 5X8 note card. The sketch color was inverted using my scanner

Rob Lambert: Observer from Nevada

NGC-7380 is just off the direct path of the Milky Way, as is evident by the fairly dense star field in which this object lies. With an initial 10-second integration (exposure), at first, I didn't see the nebulosity. However, I found the five bright stars that form an "L" lying on its back with the top pointing down and to the left in my 4.7-inch refractor image. A double-star appeared to be the vertex of the "L" where the two legs came together. It wasn't until I increased the integration to 30 seconds that I began seeing the nebulosity. I still had a difficult time imagining a wizard in what I saw. What I could see was a disperse area of nebulosity surrounding a cluster of stars much smaller and dimmer than those in the "L". The central and denser region of nebulosity encompassed about 50 of these stars. Regions of less dense nebulosity appeared to surround this central area and its stars. On the CRT monitor during my live viewing of the object, the area of nebulosity appeared to have a faint pink tint, which would be expected in an area where star birth had occurred.

In the greater magnification of the 10-inch SCT image, the stars of the central cluster and the nebulosity were more apparent. In that image, there were two chains of stars that ran at almost a 30°angle to each other. These chains appeared to lie just outside the darker regions of the nebulosity and may provide the energy to illuminate the fringes of the darker regions. Comparing it with long-exposure photographs of other astronomers, this bears true. The double-star I mentioned being at the vertex of the "L" is near the top left corner of the image, with the longer side of the "L" running of the left edge of the image. Just below the center of the image, a fairly bright star appears to be somewhat embedded in a brighter spot of nebulosity. The darker regions of the nebula are below and right and left of this star. They appear to be dark areas that seem to support the two chains of stars in that orientation of the image.

By not using a nebula filter, I could only imagine how difficult this might have been to observe visually. I would think that even with a 16-inch or larger scope, a filter would've been needed to see any detail in the nebulosity.

The 4.7-inch refractor image was a single-frame 30-second integration and the 10-inch SCT was a single-frame 45-second integration, captured with my Mallincam VSS + cameras. This was truly video-assisted astronomy. I wasn't sure I would've seen anything with my eyes through the eyepiece. These images are representative of what I was seeing live on my monitor, although the images on the monitor were much better than what my capture software was able to render. Neither of these images was altered by any post-processing. They were as close to what I saw at the monitor as they could be.