MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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Report #116

NGC-7129 Diffuse Nebula & Open Cluster in Cepheus

"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-7129 Diffuse Nebula & Open Cluster in Cepheus

NGC-7129 is a young star cluster located about 3,300 light-years away in the constellation of Cepheus. It contains approximately 130 stars and they light up the nebulosity associated with it (LBN-497). It's about ten light-years across.

The apparent mag. is 11.5 for the overall cluster/nebulosity.

Observations/Drawings/Photos

Harold Corwin: Observer from New York

NOTE: We'd like to introduce new member and contributor Dr. Harold Corwin from New York. Welcome Harold!

NGC-7129 is a diffuse nebula enveloping three or four pretty bright stars. Both Herschels described it the same way, and JH measured the position angles and distances of two flanking stars with respect to the brightest, more central southern one, BD +65 1638. His mean position for the nebula, adopted in GC and NGC, is for that star.

Bigourdan apparently did not read JH's 1833 description before he examined the area in the 1884, 1889, and 1895. Bigourdan applied NGC-7129 only to the patch of nebulosity to the northwest of JH's star C, the northeastern of the three stars. He also found a "new" nebula in 1895 around JH's star A, the south-central of the three. This now carries the number IC-5134. In addition to the knot which he took to be NGC-7129, and IC-5134, Bigourdan measured four stars in the area, two of which to the southwest have only a faint cloud of nebulosity near them. Bigourdan did not mention nebulosity around any of these four stars, though all are associated with at least faint wraiths of nebulosity.

Another "nova" in the area from Bigourdan, NGC-7133, was apparently an illusion, as there's nothing near his place but faint stars.

NGC-7133 does not exist. Bigourdan describes it as a "Pretty extended area, perhaps 2 arc-minutes across, in which I suspect some extremely faint nebulosity, at the extreme limit of visibility." There's nothing near his single micro-metrically-measured position northeast of

NGC-7129 but a few faint stars. My guess is that this is another of what he would call his "fausse images," perhaps enhanced in his perception by the nebulae involved with NGC-7129.

Ed Fraini: Observer from Texas

I observed the October Challenge object, NGC-7129, on October 11, 2018 utilizing a 20-inch Dobsonian. The observing time spanned from about 01:30 to 01:50 GMT. The conditions were not the best, but it's been a while since it's not been cloudy. Seeing was at 4, but transparency was lower than average due to very high levels of moisture in the atmosphere. Dew started settling on equipment early in the evening. The NELM was estimated to be between 3.5 and 4 in Cepheus. Iota Cepheus was in and out, and I couldn't see the Garnet star, mu Cep, naked eye. Generally, at this dark site, this beautiful red star is visible.

My first observation was made with a 26mm eyepiece giving a magnification of 76X. The field of view was very pleasing. I observed open cluster, NGC-7142 to the southeast in the same area as NGC-7129. Initially, it appeared as a hazy patch, but within a couple of minutes, I could resolve stars in NGC-7142.

To the southwest, there was an interesting asterism of 7 stars that formed a distinct pattern resembling the number three. Across the northern edge of the field was a broad arc of stars pushed out slightly northerly. As for NGC-7129, I couldn't detect any nebulosity in this field of view.

When I increased the magnification to 117X, using a 17mm eyepiece, I noted a visible arc of stars bowed to the northwest. Four brighter stars appeared as two pairs. Around the northernmost two stars, I saw just a hint of nebulosity. I next switched to a 13mm, which improved resolution and increased the extent of the nebulosity around the top pair of stars.

Overall, the view with the 26mm eyepiece at 76X, with just over a 1º field of view was the most rewarding. It provided no view of the nebulosity, but showed both open clusters and a very notable asterism.

As for the challenge, I’d conclude that under the sky conditions at the time of the observation, it was indeed challenging and barely perceptible.

Doug Paul: Observer from Massachusetts

I keyed off Deneb and jumped over to NGC-7129 using the setting circles added to my motor drive. I got it centered in my field of view on the first try. It was a new moon, and NGC-7129 was high enough in the sky (~51°) for a good image.

In total, NGC-7129 isn't very bright, but since it's pretty small, its surface brightness is reasonable. Unlike some of the dimmer objects, it was easily visible in the individual subs. The light pollution here (Boston suburbs) is pretty bad (Bortle ~6), and the NELM was probably 4 to 4.5.

I shot some extra subs, for a total of 100, of which 81 survived screening. The rejects were mainly due to tracking errors. I'm pushing the limits of my inexpensive motor drive (Sky Watcher Star Adventurer) which causes some of the subs to be streaked. I processed it as usual with regim (lights, darks, flats, registration, and stacked, using sigma-clipped averaging), and stretched with my own stretcher. The stretcher also applies a daylight white-balance to produce natural colors.

Stats: 400mm, ISO 800, f/2.8, 81X30 sec subs = 40.5 min, 1/2 scale. Field of view: .74X.60°.

For those not familiar with astro-photographic terminology and processing:

*A "sub" or "light" is an individual exposure of the scene, typically 30 sec to 10 min.

* A "dark" is the same exposure as a sub, except it's taken with the lens cap on. It measures characteristics of the sensor and camera.

*A "flat" is an image of a uniform brightness surface. It measures lens and sensor characteristics (such as vignetting).

*"Registration" is aligning all of the images so the stars are in the same places for stacking.

*"Stacking" is combining all subs into a single image.

*The overall dynamic range of an astronomical image is usually far greater than any display device or the eye can handle.

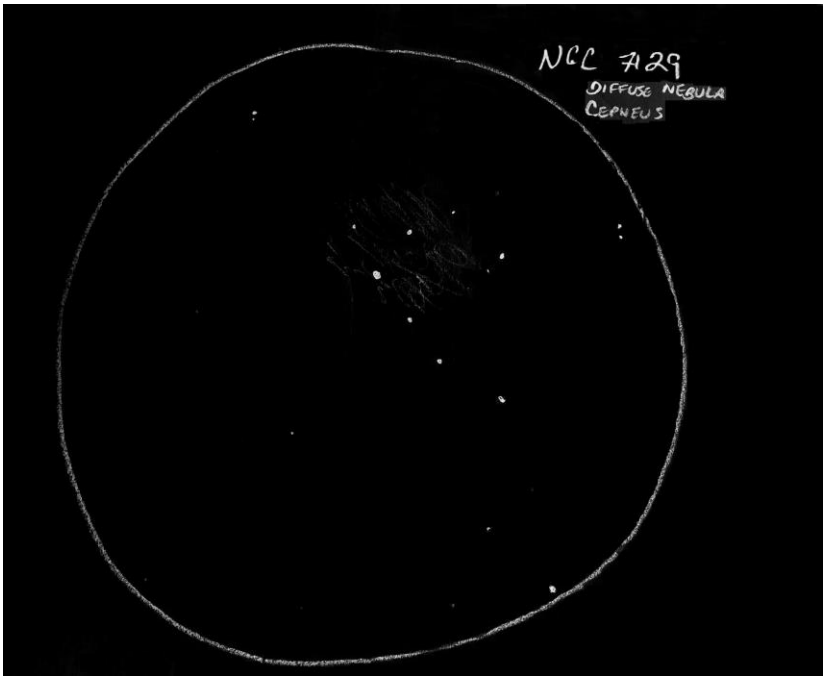
*"Stretching" is a non-linear mapping of the pixel intensities to remove the background (such as light pollution), brighten faint objects (such as nebulae and galaxies) and dim down the bright stars.

The processing used here is all pretty standard: *Intermediate_images=(lights-darks)/flats *Register and stack the intermediate_images. *Stretch, crop, write a description, and send to Roger... :-)

Craig Sandler: Observer from Massachusetts

I observed NGC-7129 on October 10, 2018 from Petersham, MA using an f/10 8-inch SCT @105X. Seeing was fair, transparency poor, and darkness was NELM 5.5.

The skies were moist and challenging in Western MA. I was gratified at how much detail I tease out of the nebula with long study, though I did not give my sketch the Ivester treatment of really taking one's time on the detail you see. This is a pleasing object, because the star patterns are attractive, contrasting with the subtlety of the nebula.

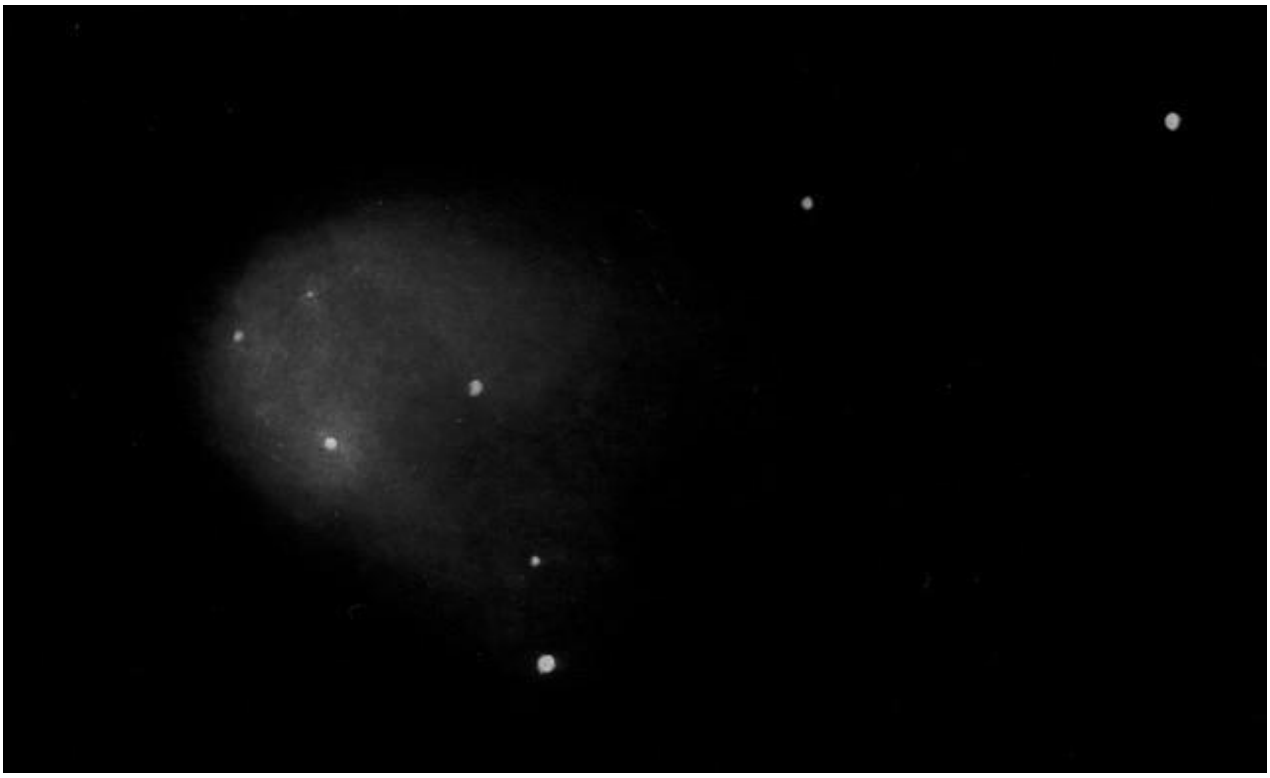


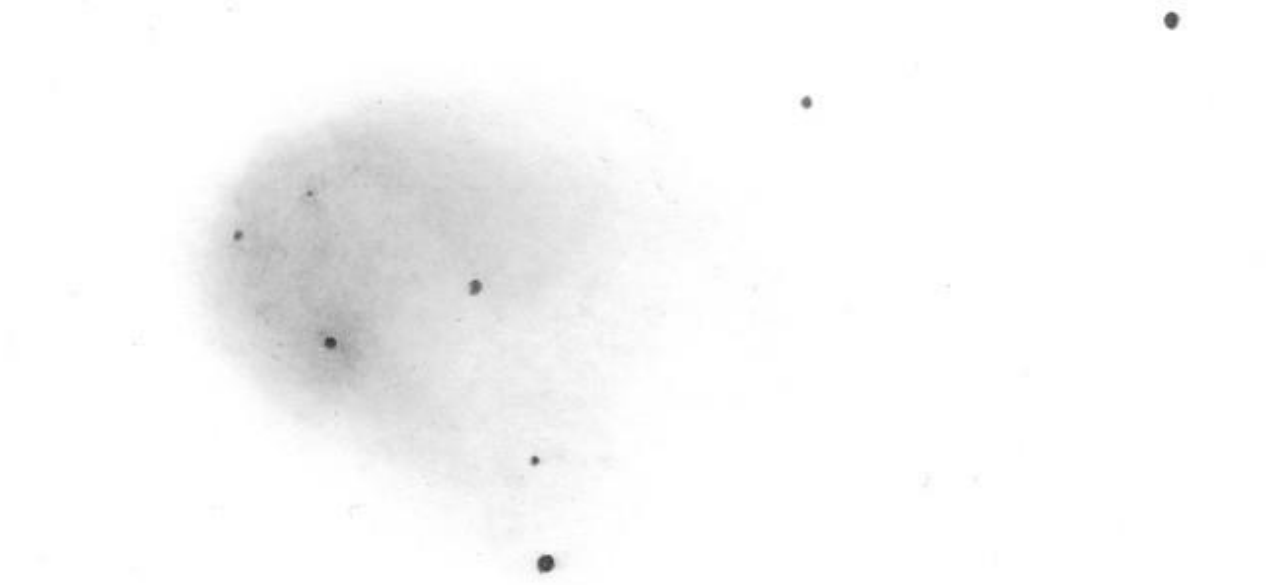
Sue French: Observer from New York

I used a 254/1494mm Newtonian (10-inch f/5.8) to observe NGC-7129.

43X: Swept up by moving 1.4º west from the pretty blue and gold optical double Argyle 43 (ARY 43; WDS mags. 6.4, 6.8; separation 100 arc-seconds). The nebula appears fairly faint but is readily visible.

115x: The sketch was mostly executed at this magnification, but it was slightly touched up in a couple places at 213X. The brightest part of the nebula occupies a region that includes four stars. The northernmost star in the haze is very dim and couched in its own tiny halo of light. It stands out better at the higher power. Insubstantial mist trails west-southwest from the main mass, but its extent and form are difficult to perceive. The southernmost star on the sketch glows with a golden hue.





Keith Caceres: Observer from Nevada

NGC-7129 is a reflection nebula, star-forming region, and open star cluster in the constellation of Cepheus that's approximately 3,000 light-years distant. The small open star cluster of young stars is easy to spot at mag. 11.5. The diffused nebula is dimmer and harder to see. The region has an approximate radius of 7 arcminutes.

I photographed it on the evening of September 8, 2018 with a Canon 70D, 8-inch SCT, 0.8X focal reducer (f/8), with exposure settings of 60 seconds at ISO 6,400. The photo was taken at our fall star party outing at Cathedral Gorge State Park near Panaca, NV, under very good sky conditions.

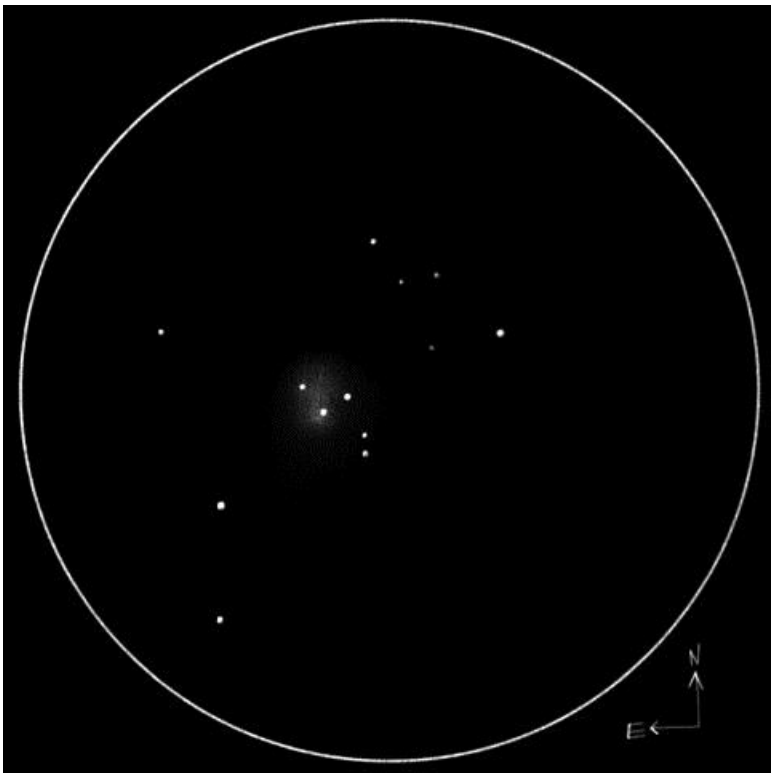
The star cluster had a bright central star, with three stars that were almost as bright. One of them nearby at the 5 o'clock position, and two further away at 7 and 8 o'clock almost formed a straight line with the 5 o'clock star. Two dimmer stars were also nearby at 1 and 2 o'clock. Through some photo enhancement (histogram stretching), I was able to bring out more details in the dim reflection nebula. The diffused nebulosity formed a near circle around the central star, but also swept through the 1, 2, and 5 o'clock stars in a near teardrop shape. There were hints of blue and purple in the nebulosity.

I was able to plate solve my image using *astrometry.net*. The original image indicated a 43.6X29 arc-minute field of view (FOV), while the crop submitted here has a 29.4X19.5 arc-minute FOV. Up is 268° east of north, with a pixel scale of 0.478 arc-seconds/pixel.

Sources: *National Optical Astronomy Observatory*, NASA APOD, *Sky Safari Pro v5*, and *Wikipedia*

Jaakko Saloranta: Observer from Finland

NGC-7129 was a fairly uniform, roundish glow surrounding three mag. 10-11 stars. Nebulosity appeared to flow toward a pair of mag. 10 stars to the SW when I used averted vision. It appeared the brightest around one of the stars in the middle. No response to O-III or UHC filters. Open cluster NGC-7142 remained invisible. I sketched the object on October 14, 2018 using a 4.5 inch reflector. Naked eye limiting magnitude (NELM) was around 5.5, with the SQM-L reading of 19.47 at the location of the nebula. Humidity was a frustratingly high 92%, and the temperature +10°C (50°F).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Chris Elledge: Observer from Massachusetts

On September 29, 2018, @9:30PM EDT, I used the ATMoB 25-inch f/3.5 reflector to observe NGC-7129 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6. NELM 4.5. Transparency was fair. Seeing was good.

I found NGC-7129 by starting at 7 Cephei and heading east 40' to a mag. 7 double star. NGC-7129 is 1° SE from there. The faint star cluster NGC-7142 is just to the SE of it.

At 89X (25mm, 0.8˚FOV), NGC-7129 appeared as a small set of eight bright stars. There were for mag. 7 to 10 stars in a line (TYC 4261-572, -842, -1795, and WDS 21430+6606) from the WNW to the ESE, that pointed to a fifth mag. 11 star (TYC 4274-934) slightly outside NGC-7129. To the S of the middle star of the 5 (-1795), there were 2 more mag. 10 stars (BD +65 1636 & 1635) with a 3rd very faint mag. 15 star (V987 Ceph) between them. The 2nd star of the 5 in a line from the west (WDS) appeared to be the brightest of the cluster and was actually a double star that I couldn't split. Just to the NE of this star was a fainter mag. 13 star (V373 Ceph).

There was very little nebulosity visible. What was visible just appeared as fuzziness surrounding some of the stars. The bright double star (WDS) had the most visible nebulosity with there being some around the middle star (-1795). The sky to the SW of the line of stars appeared slightly lighter than the sky to the NE of the line. Arcing from NW to SE around the NE side of the nebula were six mag. 8 to 10 stars.

At 222X (10mm, 0.3˚FOV), the cluster appeared with the same layout of stars I saw at 89X. The nebula was no longer visible around the stars, though. The lower power views were better for this object.

Richard Nugent: Observer from Massachusetts

The weather here in New England has been miserable for the last several months and it was the greatest factor concerning my observations of this object.

On a night of mediocre seeing and a nearly full Moon, I decided to lay down some ground work for this object by locating the open cluster. My plan was to wait for a clear, moonless night, but because of the aforementioned meteorological issues and other commitments, I was unable to attempt an observation of the nebulosity associated with the cluster.

The open cluster is a small group of mag. 10-11 stars whose collective light allowed me to pinpoint its location in the 80mm finder scope. Using my 10-inch scope, I was able to detect some of the surrounding fainter stars, but there was no hint of the nebula. I tried higher magnifications, but nothing could knock down the bright moonlight. As this is a reflection nebula, there should be no benefit gained by using light-pollution filters.

One highlight in the area was NGC- 7142. This faint, but rich, cluster is located 24' SW of 7129. At low powers, the cluster was a faint smudge of light but I was able to tease out quite a few stars at magnifications of 180X and 265X.

On November 10, 2018, I got a chance to view NGC-7129 under 5.3-ish mag. skies at the clubhouse using the 25-inch scope. At a magnification of 170X, I could see a faint, ill-defined glow around the stars BD+65 1637 and BD+65 1638. The glow was brightest around 1638. These two stars mark the base of the slender isosceles triangle that is NGC-7129. Nearby NGC-7142 was a delightful sprinkling of several dozen faint stars.

The weather in New England has made me realize I need a better strategy for observing the monthly objects. Instead of waiting for the specific month, I'm going to start observing as

many of the 2019 objects as soon as I can. I may have to get up before the crack of dawn, but I see it as one way to beat uncooperative weather. Perhaps we should all consider such a plan. Happy observing!

Gus Johnson: Observer from Maryland

I observed NGC-7129 in October, 1991 using a 6-inch reflector @ 59X. I saw five stars, and with averted vision, some very faint nebulosity around the two most northern stars.

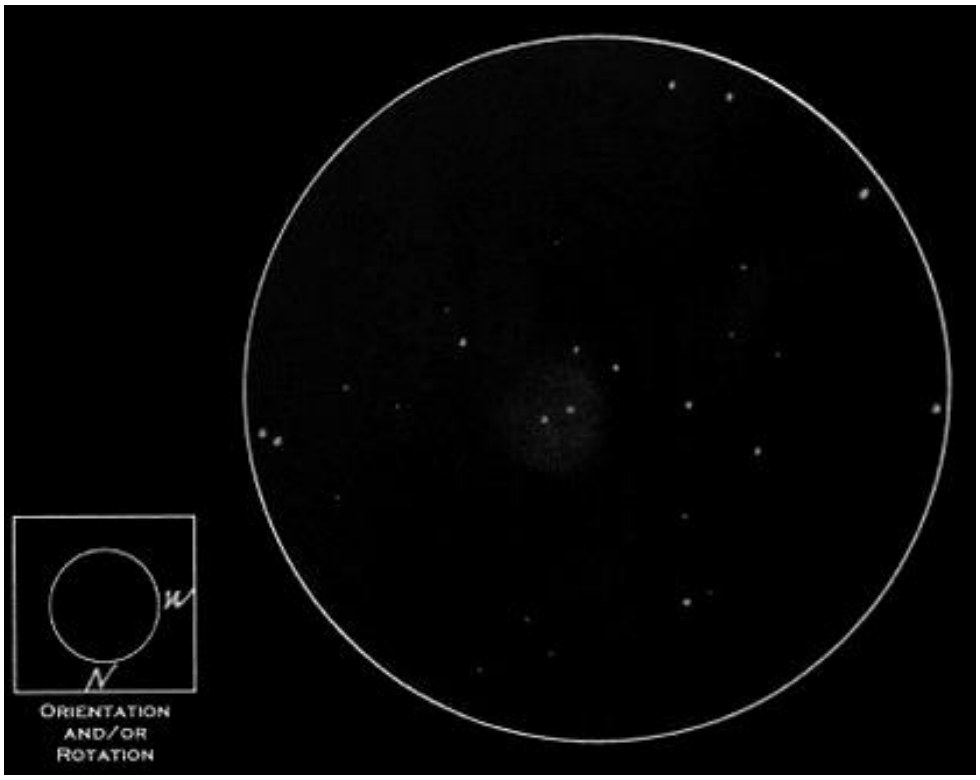
Mike McCabe: Observer from Massachusetts

The LVAS Observer's Challenge object for October, 2018 was NGC-7129, a cluster associated with nebulosity in the constellation Cepheus. I got my first look at this object on the evening of October 9, 2018, which also happened to be the night of the new moon. I was also in a unique location for this observation, having rented a cottage for the week in a place called The Gurnet, which is located in Plymouth, Massachusetts. The sky quality at the Gurnet, at least up where Cepheus is located at this time of year, is about a magnitude better than what I typically have at home on a good night. So, while I had a pretty good sky to work with during that first observation, the aperture of my observing instrument was limited by the amount of room I had available when packing the vehicle for the trip, which was not an astronomy-specific venture.

While the instrument itself was of good quality, the size of it (4.5-inch F/8) left something to be desired when chasing dim nebulosity. The cluster itself was readily obvious, with four relatively bright stars populating the area of the cluster. The nebulosity, however, could only be described as a 'suspicion' with averted vision, but it was definitely a strong suspicion. I think had I known the exact layout of the nebulous patch, then I could've made a more definitive observation on that night, even with the small optics.

My second look at this object came on the October 14, 2018, from my home location, with the seeing and transparency both decent at 3/5. This time I was using my 10-inch F/5 Newtonian reflector, and the nebulosity was readily visible with averted vision. I can't say that I was able to see the patch with direct vision, but it was definitely there every time I applied averted vision, and was never an intermittent apparition. I'm confident that from a dark sky site, the nebulosity would be definitively visible with direct vision in the same telescope, and probably a positive averted vision object in the smaller scope.

Cepheus is a wonderful constellation for these types of objects, and now that I know about NGC-7129 I'll be sure to return in the future for more sightings of this object.



Jay and Liz Thompson: LVAS members and observers from Nevada

From our backyard Henderson, NV with a 16-inch SCT, NGC-7129 appeared as a soft glowing area at 271X.

Under darker skies of Meadview, AZ, it appeared as a fairly small haze around a star at 125X using a 17-inch reflector. At 152X through the LVAS 24-inch, it showed up as a haze around three stars that make an approximate right triangle.

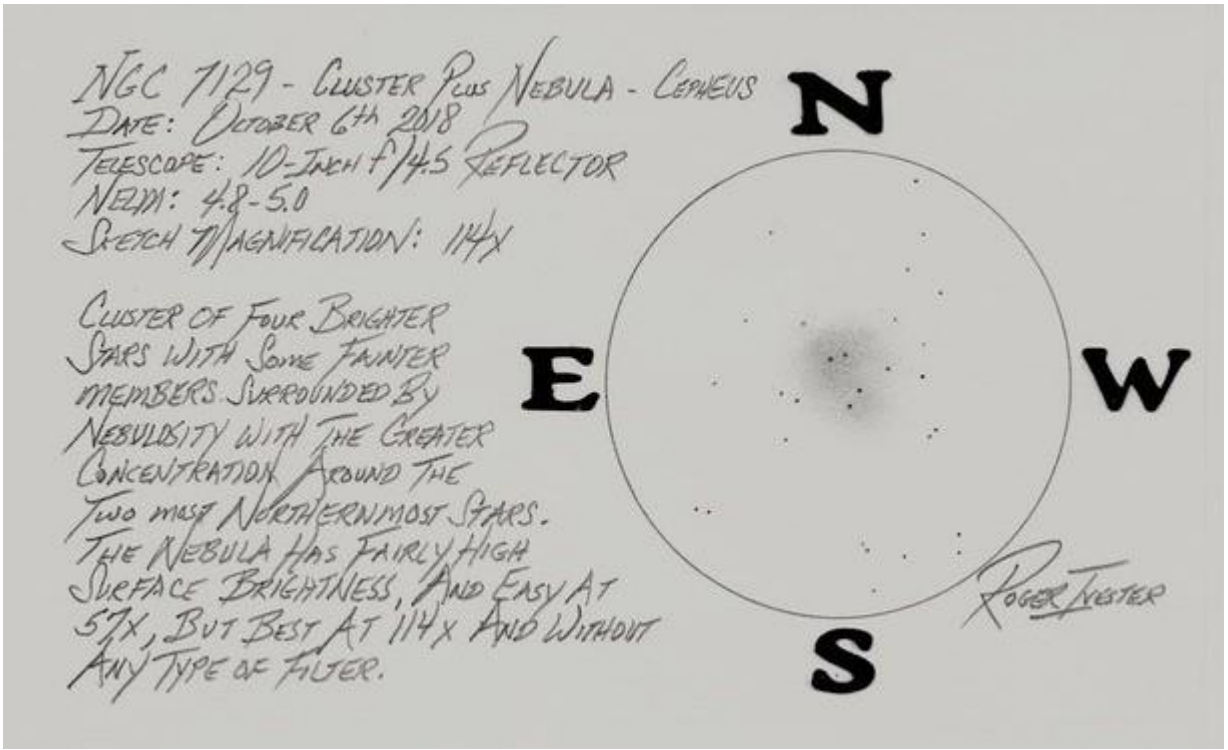
Mario Motta: Observer from Massachusetts

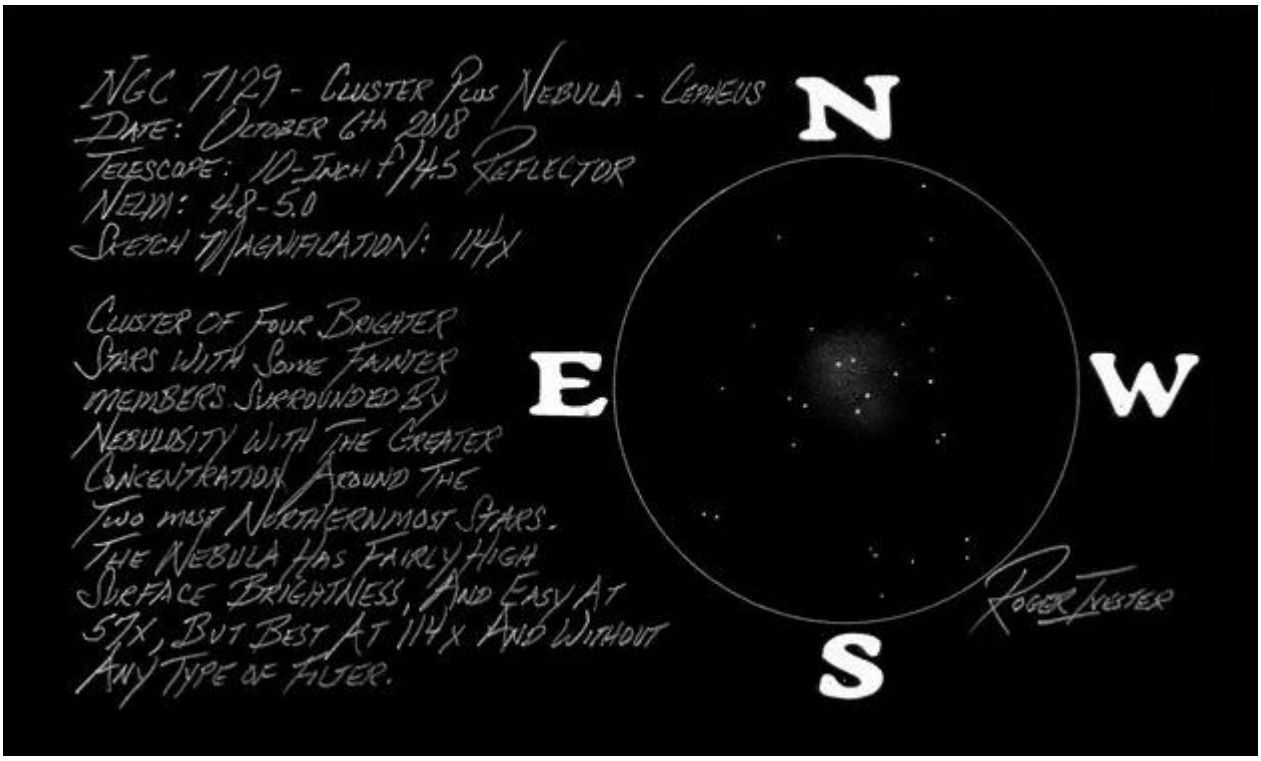
30 minutes luminance, 15 minutes each of red-green-blue filters, total 75 minutes imaging. The image was taken with a 32-inch f/6 reflector.

It was a difficult object, and I couldn't use narrowband filters, as NGC-7129 is a reflection nebula. I used color filters, but with the bright stars in the image allowing star bloat, subs had to be short, no more than 3-minutes each.

Roger Ivester: Observer from North Carolina

In my 10-inch reflector, a cluster of four brighter stars with some fainter members, was enveloped by nebulosity with greater concentration around the two northernmost stars. The nebula had fairly high surface brightness, and was easy to see at 57X, but was best seen at 114X, and without any type of filter. The sparse cluster and nebulosity was very easy to locate and see, and stood out prominently in the star field.




NGC 7129 - Cluster Plus Nebula - Cepheus
Date: October 6th 2018
Telescope: 10-Inch f/4.5 Reflector
Nelm: 4.8-5.0
Sketch Magnification: 114x
Cluster of Four Brighter Stars With Some Fainter Members Surrounded By Nebulosity With The Greater Concentration Around The Two Most Northernmost Stars. The Nebula Has Fairly High Surface Brightness, And Easy At 57x, But Best At 114x And Without Any Type of Filter.
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Fred Rayworth: LVAS AL Coordinator and Observer from Nevada

I've observed the object three times. The first was way back on September 4, 2005 from Cold Creek Canyon, near Las Vegas, Nevada at 5,200 feet. The temp was mild but it was breezy. I set up anyway. Through the night, winds gusted hard then stopped and this cycle continued until I quit. Planetary seeing was poor, but that didn't affect what I was looking at (deep sky). Just before I quit, I looked at the Lagoon Nebula and it looked blurry and the stars greenish. I could still see the dark areas within it though. Overall it was a good night.

Using my home-built 16-inch f/6.4 at 82X, NGC-7129 it was a very faint fuzz amid a few medium-bright stars. The O-III filter seemed to help a little at first, but overall, the object looked better without it and the overall nebulosity extended way beyond what the filter suppressed.

The second time was at Cathedral Gorge State Park in east-central Nevada at 4,800 feet. It was mild, calm and cooling, but still warm. The sky was mushy, but clearing. A few thick clouds showed here and there, but they pretty much dissipated when it got dark. A few thick areas picked up during the evening. It finally thickened a bit and I quit at 01:00 Friday morning.

Using my 16-inch f/4.5 at 102X, it looked almost like a coat hanger with a bit if nebulosity attached to it. Despite the altitude and conditions, I wasn't impressed. I noted nearby cluster NGC-7142, which was a nice sprinkling of stars. It was actually more impressive than 7129. However, besides the LBN area, I also noticed quite a bit of extended nebulosity going away from the LBN-497 which I took to be NGC-7133. It was just a vague hint and was not much, but I DID see it. I was expecting more and was disappointed.

The third and final time was at Furnace Creek in Death Valley at -190 feet and again at 102X. It started kind of meh, but the sky cleared up nicely and really opened up after it got dark. It was cool with a slight breeze now and then. The nearby golf club lights were an issue to the

northeast, so I had that to deal with, but otherwise, I didn't even have to put on my long-sleeved shirt until almost 23:00.

NGC-7129 was a sparse group of stars superimposed over, and including a smudge of distinct nebulosity. Like at Cathedral Gorge, I still saw the surrounding glow, just a hint of it that went beyond the LBN-497. I assume that extra glow is what's called NGC-7133, which consists of IC-5132, IC-5133, and IC-5134. Some say this object doesn't exist at all, yet not only did I see the glow, but it's plainly evident in images, some right here in this Challenge. Whether that extended nebulosity is just part of LBN-497 is up to debate, but to me, I'm accepting it as NGC-7133 for now.

I tried an UHC filter, and it dimmed it considerably, making the 7133 glow disappear, though the LBN part enhanced slightly but looked disappointing. I tried my O-III, which I knew was no good for this object, but since this is for posterity, I tried anyway and sure enough, it made it even worse, barely showing any glow from the LBN at all and suppressing more than half the dimmer stars in the background of the cluster.

NGC-7142 was plainly visible just off the edge of the field (which is not shown in my drawing). It was a nice little sprinkle of stars to the southeast.