MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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&

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NGC 2419 (Caldwell 25) Globular Cluster in Lynx

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 2419 (Caldwell 25) Globular Cluster in Lynx

Globular cluster NGC-2419, also designated as Caldwell 25 (among others) is known as the "Intergalactic Wanderer." It was named so because at one time it was thought not to be in orbit around our Milky Way galaxy. It's now considered to be a part of the Milky Way, though it's quite a ways from us and is very dim in comparison to many of the other Milky Way globulars we are aware of.

It was discovered by William Herschel on December 31, 1788. It's approximately 300,000 light years from us and about that same distance from the galactic center. It shines at an overall magnitude of 10.4, though it can still be a challenge for small scopes unless seeing conditions are good. Spotting details can be even more challenging, though not impossible.

The real challenge lies in seeing details, shapes and patterns in the stars. Of course, the larger the scope, the more likely it will be to see something. However, even a small scope may spot something unusual. Don't be afraid to check it out!

Observations/Drawings/Photos

Roger Ivester: Observer from North Carolina

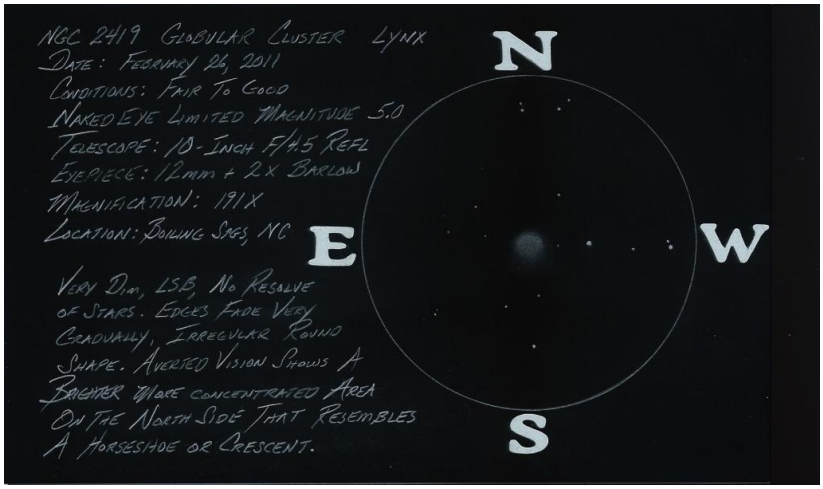
My first observation of NGC-2419 was on February 18, 1993, while using my 10-inch f/4.5 reflector, from my moderately light-polluted backyard, located in Boiling Springs, North Carolina. My notes from that night eighteen years ago were as follows:

"Temperature 30°, breezy, transparency good, seeing fair to poor. Located using 57X with some difficulty, as I was expecting something brighter. The surface brightness was low with a mostly round shape, no resolve of stars when using higher magnification, east of two bright field stars. My first impression was that it looked more like a galaxy than a globular cluster."

I was able to observe this globular again on February 26th 2011, and was anxious to see how my perception of it would compare to my previous observation and notes from years earlier. I used the same scope, eyepieces and also observed from the same location. The conditions were fair to good, with the naked-eye limiting magnitude being 5.0 or slightly better.

At 57X, it appeared very similar to my observations and notes from 1993. Again, the 10-inch presented it as very dim, with low surface brightness, a mostly round shape, and without resolving any stars. The globular lay just to the east of two mag. 7.5 stars. However, when I increased the magnification to 191X and used averted vision, I could see a brightening on the northern rim that created a crescent or horseshoe shape. My sketch shows this feature, but it was much fainter than what the drawing displays. I couldn't hold this shape constantly and was able to see it only twice during this observing session. The two brighter stars to the west of the cluster created a glare that reduced the contrast of this object significantly.

The sketch was made using a graphite pencil, blending stumps, on a white 5 X 8 note card. The colors were inverted on a copier/scanner to better illustrate and compare to the view as seen through the 10-inch reflector.



My supplemental report:

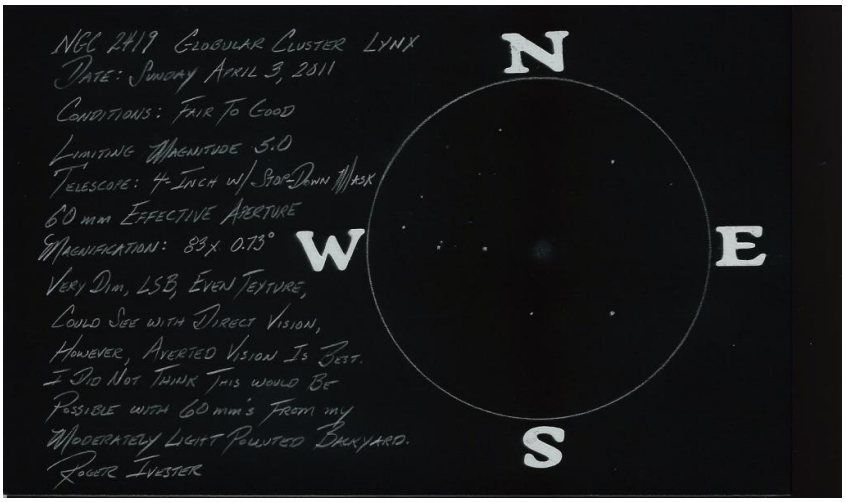
This would be my first observation of NGC-2419 using my 102mm (4-inch) refractor. Sunday April 3, 2011. Both seeing and transparency were good, with a limiting magnitude of 5.0.

Attempting to locate this object at 42X proved to be difficult. However, I did get a glimpse of a faint brightening to the east of the two bright field stars.

With direct vision, the 4-inch at 83X presented it as a very faint, mostly round glow. The surface brightness appeared very even, and I noted a slight brightness in the center.

In *Deep-Sky Wonders*, Walter Scott Houston said "I once saw it from Kansas with a 4-inch refractor stopped down to 2-inch and 100X."

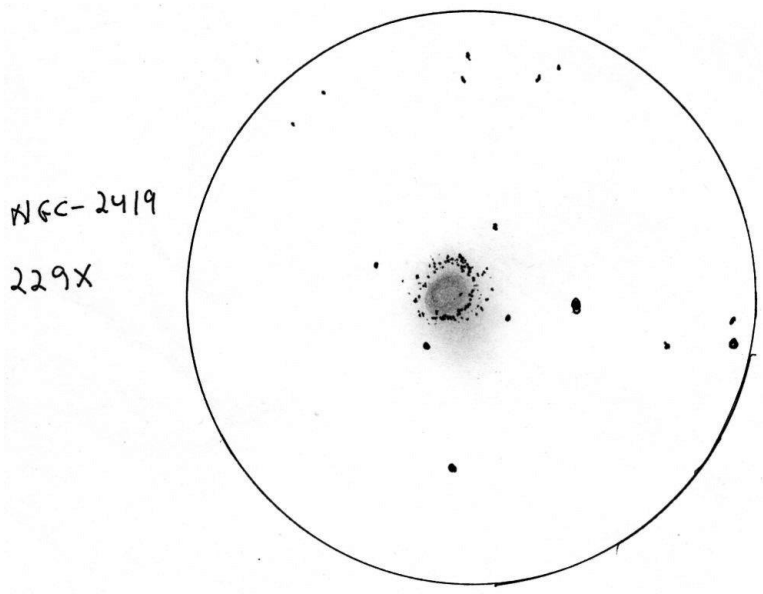
It has been my desire for some time to attempt NGC-2419 using a 2.4-inch refractor. I used a 60mm (2.4-inch) stop-down mask with my 4-inch and was surprised to see the cluster. It was difficult, but I could see it with direct vision. However, averted vision worked best. It appeared as little more than a faint featureless glow at 83X. This might seem insignificant, but to me it was a fabulous sight, as I didn't think it was possible to see this faint globular from my backyard with a 60mm (2.4-inch) refractor. I concluded that with the results I obtained, it was indeed a great night. This drawing was derived from my view as seen through a star diagonal.



Fred Rayworth: Observer from Nevada

I first observed this object from Sunset Overview at Lake Meade in January, 2005 with my home-built 16-inch f/6.4 Dobsonian. With the spot being so close to the skyglow of Las Vegas, I was forced to look to the east yet I still had a fairly decent view of the cluster. That night, I barely caught it as an extremely faint grainy glow. "Almost missed it. Small but distinct with averted vision at 70X."

My second attempt was with much better results at Death Valley in January, 2011 with a 16-inch f/4.5 Dobsonian. The weekend had one good night out of two and I was able to take full advantage of it. With clear dark skies, I zeroed in on the area and found the little globular right away. It was a very faint and fuzzy, mostly un-resolvable globular. Quite easy to spot yet not easy to resolve at 86X. It was right next to a brighter star which kind of distracted from it. At the same time, it was framed within a skewed square asterism of four stars much dimmer than that brighter one. After relooking at my drawing, I saw that the outer edges of the cluster had a kind of horseshoe appearance that I didn't initially notice. Wasn't from actually resolving stars but just an overall impression of brightness to one side. The center was a bit lumpy but milky in appearance. At 229X, the edges were more grainy and I was just able to detect a few pinpricks of individual stars. The magnification also exaggerated the ragged and uneven edges and that's what produced the horseshoe effect that I hadn't noticed in the field as I drew it. It was well worth the second visit and I hope to go back again for another look for even more details.



Rob Lambert: Observer from Nevada

I was disappointed with my image for this month's challenge. I captured it on a hazy night back in January and didn't get another opportunity to try again, not even at the LVAS Messier Marathon make-up weekend on April 1, 2011. By the time I was able to try another capture, it was down in the light dome of Vegas and the view was even worse than it was in January.

If I'd been able to obtain a better focus without the haze, I might've been able to resolve some of the stars within the cluster. I was able to observe that the cluster has an almost uniform roundness with only a few stars outside the periphery. The most notable feature in the image is the arrangement of 2 bright chains of 4 stars that encompass the cluster. Four of the stars in the upper half of the image seem to almost form a parallelogram with adjacent angles of 45° and 135°. The stars within the cluster are not evenly distributed, giving it a mottled look. There even appears to be a dark lane cutting across it from the lower northeast quadrant southwest toward the midline in the south.

My image was captured with a 10-inch SCT, with an f/6.3 focal reducer in front of the astro-video camera for a magnification of approximately 200X. The image is a single-frame 40-second exposure.

Buddy L. Barbee: Observer from North Carolina

This observation was made Friday, March 11, 2011 from my home in Winston-Salem, NC. I used my 66mm (2.5-inch) refractor with a 4mm eyepiece for a magnification of 100X. It was a cool 39° F with a calm wind but a high 60% humidity. The sky was beautiful in town that night, having a naked eye limiting mag. 4.4.

The moon was one day before first quarter and the sky was bright, but the weather had prevented me from getting a sketch of this cluster prior to now, so I decided to give it a try with the little 66mm (2.5-inch) refractor before the sky got any brighter. I started with a 20mm eyepiece, that had a 4° wide field-of-view, and star hopped from Castor to NGC-2419 using the *Uranometria 2000 Deep Sky Atlas*, second edition, as my guide. For star hopping, I find that the view through binoculars and this little telescope match those star charts fairly well. Having found the spot where this globular cluster was supposed to be, I could not see it yet. I started upping the magnification until I was using the 4mm eyepiece for a magnification of 100X. I still couldn't see anything but kept looking, being very confident that I was in the correct location. After several minutes I started to see, with averted vision a very faint glow where the globular cluster is located. With the small telescope in the light pollution of town, it was never anything more than a very faint glow. In fact, it was probably visible only about a third of the time with averted vision. But hey, I got it in spite of the light pollution with a small 66mm (2.5-inch) telescope. I was very satisfied to bag this one in town.

DEEP-SKY OBSERVATION FORM

CONSTELLATION: Lynx

OBJECT: NGC 2419
The Intergalactic Wanderer

Day & Date: March 11, 2011
Time (local): 11:20 PM EST
Time (UT):
Observer: BLB
Location: Home

Seeing (1-5): 3
Transparency (1-7): 3
NELM: 4.4
Temp: 39°F Wind: 0-5mph
Humidity: 60%

INSTRUMENT
Telescope: AT66
Aperture: 66mm
Focal Length/Ratio: 400mm
Eyepiece: 4mm
Magnification: 100x
Field-of-View: 00°36'
Filter: None

OBJECT
RA: 07 hr. 38.1 min.
Dec: +38 d. 52.9 min.
Type: Globular Cluster
Listed Magnitude: 10.3
Listed Size: 4.1'
Altitude of object: 70° ±

NOTES

With high humidity the transparency was not very good with the first quater moon high up in the sky.

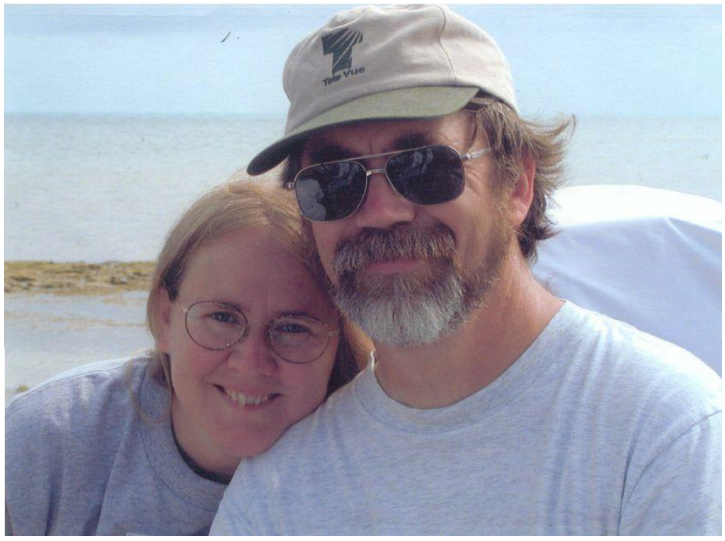
This globular cluster was very very faint and only seen with averted vision about 1/3 of the time, but I found it and saw it, I think.

Jim Gianoulakis: Observer from Nevada

Of the 150 or so globular clusters known or believed to be associated with the Milky Way galaxy, NGC-2419 is among the most remote. It was discovered by William Herschel in 1788. The 1999 *Catalogue of Parameters for Milky Way Globular Clusters* estimates NGC-2419 to be 275,000 light years from the Sun. This estimate, if accurate, places this globular cluster 100,000 light years more distant than the Large Magellanic Cloud. That is the basis of the objects' nickname, the Intergalactic Wanderer. The original name, "Intergalactic Tramp," was coined by Harlowe Shapely, a Harvard College Observatory astronomer in 1918. Shapely's name referred to the fact that the cluster was so far from the galactic center that it was barely moving or not moving in a planned direction, like a railroad tramp or a tramp steamer. This has evolved to the more politically correct Intergalactic Wanderer.

The image was 15 exposures of 20 minutes each for five hours total exposure, calibrated with dark, flat and bias frames and stacked using DeepSkyStacker. Processing was done in PhotoShop (levels and curves). I used an 8-inch RC (ATRC) telescope on an Atlas EQ-G mount controlled by EQASCOM. The camera was an Orion StarShoot Pro V2. I guided it all through a 110mm (4.4-inch) APO with a Meade DSI Pro II guide camera and PHD software.

Sue French: Observer from New York



We're very happy to have Sue, our esteemed colleague and contributing editor to *Sky & Telescope* add her observing notes for NGC-2419.

On March 20, 2007 at 10:25 pm EST, I used a 105mm (4.1-inch) APO refractor with a 610mm focal length (f/6). Seeing and transparency were fair.

22mm (27X): Visible as a softly glowing ball of light that grows brighter toward the center. At east end of a curve of stars of increasing brightness.

7mm (87X): Shows up very well now. Very slightly granular. ~ 2.6' across.

5mm (122X): Very faint star at extreme west edge, another ~ ¾' off NNW edge, a third on edge at ~ PA 145°.

4mm (152X): Now very granular. Almost sparkly.

On February 26, 2009 at the Winter Star Party, 11:20 pm EST, I used a 130mm (5-inch) APO with an 819mm focal length (f/6.3).

35mm (23X): Faint, round glow with brighter center, at east end of a curve of three progressively brighter stars mag. 7-9.

13mm (63X): Grows progressively brighter toward center. ~4' with several faint foreground stars scattered around the edges. Slightly patchy. Can be crammed in FOV with NGC-2424, which see.

With my 10-inch f/6 reflector, I observed NGC-2419 on March 10, 2004. The seeing and transparency were fair.

35mm (42X): Moderate size and brightness fuzzball even at this low power. Brightens toward center. Mag. 7 star just to west and a mag. 7½ star with a faint companion west of that.

9mm (166X): Lies along side of squat isosceles triangle of faint stars. Slightly patchy. Broadly brighter core. A fourth star (dimmer, to the east) puts the globular in a box.

7mm (213X): Makes the core look more patchy.

Dr. James Dire: Observer from Hawaii

NGC-2419 is the furthest globular cluster that can be resolved with a telescope. The cluster resides in the southwest corner of the constellation Lynx and is very difficult to see, nevertheless resolve in small telescopes. I could barely see it with averted vision in my 4-inch refractor under very dark Kauai skies.

The cluster glows at apparent mag. 10.4. For comparison, in my image of the cluster, the three bright stars arcing to the right and up from the cluster are mags. 7.2, 8.0 and 9.3. The magnitude 8.0 star has an optical double star of mag. 10.4, the same as the integrated magnitude of the cluster. The cluster spans 8.7 arc minutes.

NGC-2419 is called the Intergalactic Wanderer because of its vast distance from Earth. It lies 300,000 light years away from both the Earth and the center of the Milky Way. That's about twice as far from the center of the Milky Way as the Large Magellanic Cloud! The cluster may or may not be in orbit around our galaxy. It is too far away to tell for sure. If it is in orbit, it would take 3 billion years to complete one orbit. Regardless, it probably is the only star cluster visually observable in intergalactic space.

NGC-2419 has absolute magnitude similar to Omega Centauri, the brightest globular cluster in our skies. Omega Centauri spans 57 arc minutes and glows at magnitude 3.68. However, it's only 17,300 light years away.

My images of NGC-2419 and Omega Centauri (for comparison) were taken April 1, 2011 with a 102mm (4-inch) f7.9 apochromatic refractor with a SBIG ST2000XCM CCD camera from the KEASA observatory on Kauai. The Omega Centauri image was a 15-minute exposure while the NGC-2419 image was a 30-minute exposure.