

# MONTHLY OBSERVER'S CHALLENGE

## *Las Vegas Astronomical Society*

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*&*

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**NOVEMBER 2015**

### **NGC-7789 – (CR-460) – Open Cluster In Cassiopeia**

#### **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-7789 – (CR-460) – Open Cluster In Cassiopeia**

NGC-7789 is a medium-small open cluster in Cassiopeia. It's also known as Collinder 460 as well as Melotte 245. However, it was discovered by Caroline Herschel in 1783 and they gave it the designation H-056-7. It's known as the *White Rose Cluster* or *Caroline's Rose*. The name came from the impression some visual observers get in smaller scopes by the star patterns which can resemble the swirls of a rose as seen from above (*Wikipedia*).

The cluster lies approximately 7.6 lightyears away and shines at a respectable mag. 6.7. It stands out as a distinct clump within a rich star field and presents a nice challenge for all apertures.

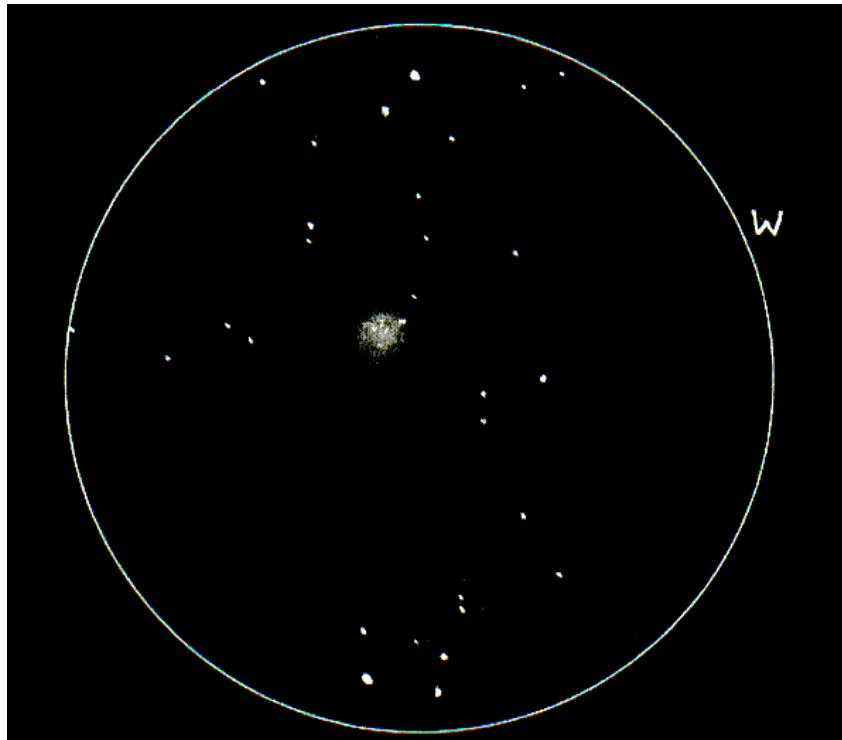
## Observations/Drawings/Photos

**Glenn Chaple:** Observer from Massachusetts



I just got in from making an observation of NGC-7789 on December 3, 2015. The attached sketch was based on an observation made with a 4-inch f/4 rich field telescope. Magnification was 28X and the field diameter was  $3^\circ$ .

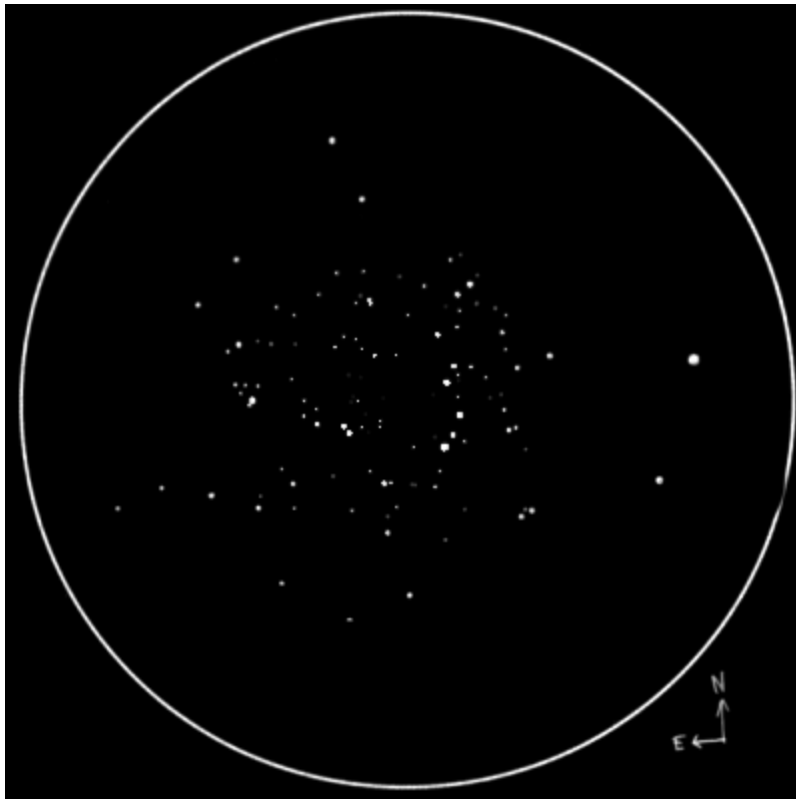
I saw a ghostly circular glow, sprinkled with tiny stellar specks.



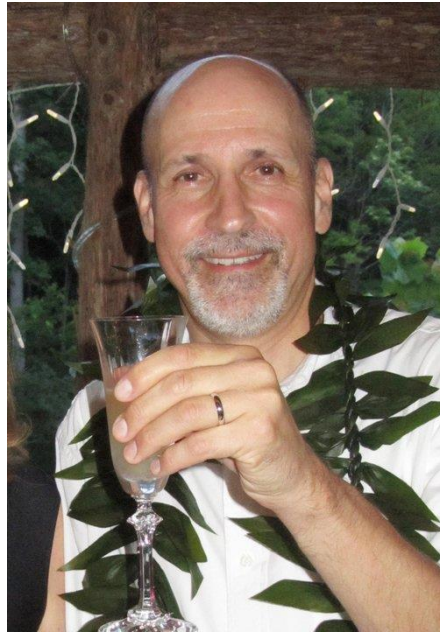
**Jaakko Saloranta:** LVAS Friend from Finland



Despite poor observing conditions, I saw a rich and very beautiful cluster. The strong background glow was lost at high magnification. Several dark pathways were visible within the cluster as starless regions. Brighter stars were concentrated toward the W edge. ~80 stars within 9' down to mag. 13. It resembles an open rose. Sketch done @ 101X (30') using a 4.5-inch reflector.



**James Dire:** Observer from Hawaii



The Constellation Cassiopeia resides along the bright swath of starry glow known as the Milky Way. We know this glow is the plane of our home galaxy and holds a multitude of open star clusters. Dozens of these galactic clusters are found in Cassiopeia. One of the finest, but often overlooked, is NGC-7789.

Cassiopeia is one of the most recognized constellations. The constellation is circumpolar for anyone north of a line from San Francisco to Baltimore. When high above Polaris, five of its brightest stars roughly trace out the letter 'M'. These stars from left to right (west to east) are named Caph, Shedar, Navi, Ruchbah, and Segin. NGC-7789 can be found  $3^\circ$  south-southwest of Caph. Note that south is the direction away from Polaris and west is to the left of the big M. In binoculars or a finder scope, you will see NGC-7789 about halfway between the stars Sigma and Rho Cassiopeiae. Both stars are approximately mag. 4.6. Sigma is a blue-white star and Rho is a yellow star.

NGC-7789 is worthy of being in Charles Messier's catalog, but Messier never recorded it. The cluster was discovered by Caroline Herschel in 1783. It is often called Caroline's Rose because its loops of stars and dark lanes trace out the pattern of rose petals, more clearly imagined at the eyepiece than in photographs.

Caroline's Rose is a rich, dense star cluster that is easily resolved. It is 25 arc minutes in diameter and its integrated mag. is 6.7. The brightest members of the cluster are mag. 11 and 12 stars and there are more than 150 stars inside the inner 16-arc minute diameter region. The cluster is 8,000 light-years away and thought to be around 1.6 billion years old.

My image of NGC-7789 was taken with a 10-inch, f/4 Newtonian with a coma corrector using a SBIG ST-2000XCM CCD camera. The exposure was 30 minutes. North is up and east is to the left. The image is 33 by 25 arc minutes, so most of the stars on it are members of the cluster. The bright red star on the right side of the cluster is SAO 35903, mag. 8.4. Above and to the right of this lies the second brightest star in the image, a mag. 9.4 white star. The red star on the upper left side of the image is mag. 9.8. All three of these stars are not members of the cluster but foreground objects!

In a 6- to 8-inch telescope, the clusters stars appear very uniform in brightness. I viewed it with my 6-inch f/6 Newtonian with a 13mm eyepiece. The cluster filled most of the field of view and the rose petals were quite obvious.



**Rob Lambert:** Observer from Nevada (LVAS President)



I observed NGC-7789 during the LVAS Fall Campout and Star Party at Cathedral Gorge near Panaca, NV in September 2015. Cathedral Gorge is an observing venue of the LVAS and we normally go there twice a year. Two great nights of observing allowed me to capture these two images of the “White Rose” Cluster.

I’m not sure that I can see or imagine the rose in either of my images of the cluster. The image was captured with my 80mm Apochromatic Refractor and Mallincam VSS+ camera. The exposure was only 3 seconds and approximates what one will see at the eyepiece when observing this cluster. At this exposure, the image reveals a hundred or more stars in the central cluster. North is to the left and east is down. The field of view is approximately  $2^\circ$  with a magnification of 30X. There is a chain of brighter stars that crosses the western half of the cluster. The brighter stars are mags. 10 and 11 while the dimmer stars of the cluster are mag 12 or dimmer. The brightest star in the image is TYC4009-2201-1 shines at mag. 8.4.





**Gus Johnson:** Observer from Maryland



I observed NGC-7789, the open cluster in Cassiopeia with a 10-inch Newtonian reflector.

At higher power, I saw a bright splash of bright and dimmer stars, taking up a full  $1/4^\circ$  and noted some dark lanes. At low magnification, I saw a very large hazy patch, and resolved many of the brighter stars.



**Jay Thompson: LVAS Members from Nevada**



We viewed NGC-7789 from several locations with a 17-inch Newtonian telescope and a 14-inch SCT.

From the dark skies of Meadview, Arizona, NGC-7789 in Cassiopeia is a big and bright open cluster. In the 3-inch f/4 at 18X, it showed well. With the 17-inch at 63X it was nice, and at 125X, it was truly awesome.

With the 17-inch under great skies at Cathedral Gorge, it took up a considerable fraction of the view at 95X when using an eyepiece with a 100° apparent field of view. It was very rich and reasonably compressed. It was a definite addition to our favorites list.

From the Redstone picnic area of the LMRA using the 17-inch, at 95X, we noted several red giant stars showing a definite orange tint. At 227X, the cluster took up the whole field of view, though the tints of the red giants were not as pronounced.

We also observed it with a 14-inch SCT from our moderately light-polluted back yard at the edge of Henderson, NV. On first glance at 98X, the cluster appeared rather sparse and loose, quite unlike the view with the 17-inch from a dark sky location. As we continued to observe, dimmer members became visible and filled in the areas between the brighter members. Though

not as impressive as when viewed under ideal conditions, the cluster still provided a pleasing view. It was well framed in the field of view at 98X, and filled the field of view at 279X.

We also viewed Espin 38 with the 14-inch SCT. Espin 38 appeared at the edge of NGC-7789, and was a double star that had a carbon star (Wildt's Red Star, V532 Cas) as the dimmer companion. Espin 38 was discussed by Sue French in the December, 2014 issue of *Sky and Telescope*.

AAVSO Ephemeris for maxima of V532 Cas are:

2456538.000 02 Sep 2013 12:00

2456988.000 26 Nov 2014 12:00

2457438.000 19 Feb 2016 12:00

We viewed Espin 38 on November 18, 2015, three months prior to the closest maximum of the carbon star. We'll revisit Espin 38 closer to maximum. At 98X, we saw the mag. 9.7 primary as white, with a dim companion. Upon closer scrutiny (and obtaining a precise focus), the companion had a definite garnet gleam. The color was easier to see at 98X than at 279X.

We also imaged the central part of NGC-7789 and Espin 38 with the 14-inch SCT. Images are attached.



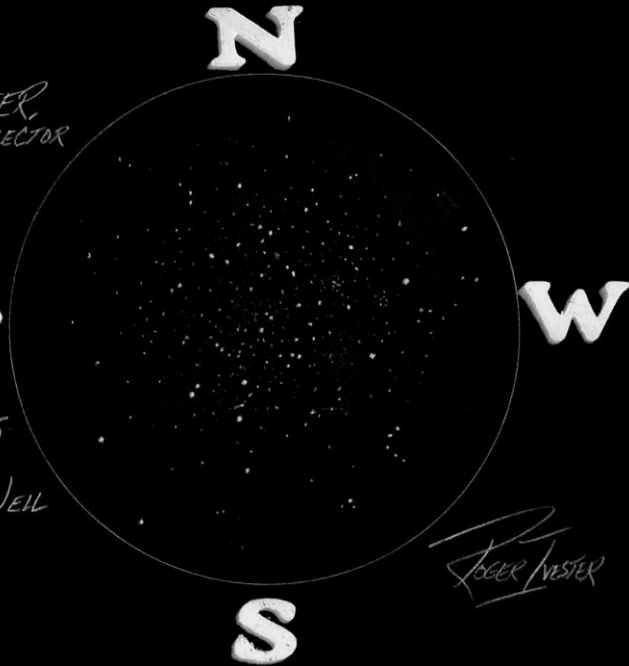
**Roger Ivester:** LVAS Member from North Carolina



I observed NGC-7789, the open cluster in Cassiopeia on October 7, 2015. The conditions were good with a NELM of 5.2. I used a 10-inch f/4.5 Newtonian reflector with a magnification of 104X, (FOV:  $0.79^\circ$ ), the same as applied to the sketch.

It was very bright and rich and I counted well over 120 stars. The cluster stars encompassed an area of about 25 arcminutes. I saw loops of stars with dark lanes throughout, but they mostly appeared to be a random scattering. A brighter mag. 9 star was located just off the cluster edge toward the west.

NGC 7789 - OPEN CLUSTER  
CASSIOPEIA - 10-INCH REFLECTOR  
OCTOBER 7<sup>th</sup> 2015  
CONDITIONS: GOOD  
NELM: 5.2  
MAGNIFICATION: 104x  
FOV: 0.79°  
VERY BRIGHT AND  
RICH, MORE SO IN  
THE CENTRAL REGION. LOOPS  
OF STARS. RED STAR  
LOCATED TO THE WEST. WELL  
OVER 120 STARS COUNTED.



**Fred Rayworth:** LVAS Vice President And AL Coordinator from Nevada



The first time I observed NGC-7789 was on October 2, 1997 at the Okie-Tex star party at Lake Murray, Oklahoma. At an altitude of 872 feet, it was warm, dry (37% humidity according to Jason Ware) and a slight breeze. Using my home-built 16-inch f/6.4, at 81X, it filled 3/4 of the field. The object was a dim peppering of even magnitude stars. Most appeared to be blue.

My second observation was on September 18, 2009 from Cathedral Gorge State Park in East-Central Nevada. At an altitude of 4,800 feet, it was calm, warm, but lots of clouds. It was supposed to be clearing by 10 or so. It actually did, and I got some good viewing until just before midnight when some more clouds came in. Using my commercial 16-inch f/6.4 at a magnification of 70X, a German acquaintance said this object was his favorite open cluster. However, it was so dim, I wondered why he thought it was so great. A moment later, I remembered that I'd forgot to take the O-III filter off after looking at IC-0063! Once I removed the filter, wow! It looked great. Quite impressive and a very dense open cluster, especially within the rich star field.

I observed it again on September 25, 2009 from Redstone Picnic Area on the North Shore Road at Lake Mead, Nevada. At an altitude of 2,100 feet, the breeze stayed calm and it was warm all night. However, there was some high-altitude junk that moved in and made the sky glow. The 1/4 moon made it worse and I had a real hard time finding anything. Using my 16-inch f/6.4 at 70X, the cluster was a nice, rich sprinkling of stars. Not as bright as it was at Cathedral Gorge.

For this challenge, I obtained my most recent observation, once again at Cathedral Gorge State Park on September 11, 2015. A bit clearer than the night before and the transparency was much better. No puffy clouds either. The moon was much lower to the horizon and the view was superb. However, seeing was bad and Saturn looked terrible. However, that wasn't my concern. The air stayed calm except an occasional zephyr. The temp never dropped as bad as the night before. An outstanding night. Using my 16-inch f/4.5 at 102X, I got the best view of the cluster yet and the one I based my drawing on. It was a nice peppering of maybe 70-80 bluish stars of

mostly even mag. There were probably well more stars but I didn't try to count that many. It was almost 3-D. I saw one bright yellow-orange star on outer edge while the rest were bluish-white. I never saw the rose patterns others have seen with smaller scopes because my aperture resolved way too many stars. At times, with the slight background haze, I almost had the impression of a partially resolved globular with the rest hidden in the background. The drawing only shows the core concentration because the spread of dimmer stars goes out further but much looser and I couldn't accurately draw them. Besides, I wasn't sure they were even part of the cluster.

