

# MONTHLY OBSERVER'S CHALLENGE

## *Las Vegas Astronomical Society*

*Compiled by:*

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*&*

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### **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.

### **M-35 & NGC-2158 Open Clusters In Gemini**

Messier 35 and NGC-2158 make a nice open cluster pair in southern Gemini and a nice challenge for all size apertures.

M35 was discovered by Philippe Loys de Chéseaux in 1745. It's an open cluster that lies approximately 2,800 light-years away. It was also independently discovered by John Bevis sometime before 1750. It shines at a mag. 5.3, or thereabouts. It's about eleven light-years across.

The companion, NGC-2158 is another open cluster, discovered by William Herschel on 16 November, 1784. It shines at a dimmer mag. 9.5 and is a denser cluster. It also goes by the Herschel number H-017-6. It's much further away and unrelated to M35, approximately 16,000 light-years away.

## Observations/Drawings/Photos (Contributors listed in alphabetical order)



**Gary Bruno:** Observer From Nevada

I targeted M 35 and NGC-2158 on 20 February, 2015. I've looked at M35 many times over the past few years, but as the seasons change, you have a tendency to forget about it. No matter how many times you look at it, it's always breathtaking. NGC-2158 is good also, but M35 is big, big, big! I used a 14-inch SCT with low power (41mm) (86X) so I could fit it all in.

It's an easy find. Just to the west of the foot of Gemini is a bright star, go another  $2^\circ$  west and then north. There it is.

On 21 February, 2015, with a 4-inch scope at powers of 100X, I was able to see nebulae surrounding a couple of the brighter stars, probably from humidity in the air. I was able to do this just before the clouds rolled in.



**Dr. James Dire:** Observer From Hawaii

$20^\circ$  west-southwest of the star Castor in the constellation Gemini, near the galactic equator, lies a pair of open star clusters, M35 and NGC-2158. Just under  $1/2^\circ$  separates the larger M35 from the tiny cluster NGC-2158. Wide field-of-view telescope-eyepiece combinations display both star clusters simultaneously, although in small telescopes, the 4 arc minute, mag. 8.6 cluster appears as a faint nebosity. At higher magnifications ( $>100X$ ) with an 8-inch telescope, many stars can be resolved. Most of the brighter stars are mag. 13 red giants, but there's a mag. 10.5 white star on the southeast edge of the cluster. The high concentration of stars in NGC-2158's center gives it the appearance of a small globular cluster, but it isn't one.

NGC-2158 is considered an intermediate age galactic star cluster because the oldest star is spectral class F0. Estimates place its age at two billion years. In comparison, M35 is thought to be merely 100 million years old and it contains main sequence stars in all spectral classes. NGC-2158 lies 16,000 light years away, much farther than M35. Were it the same distance as M35, the cluster would be much more impressive than its line-of-sight fraternal twin.



I viewed NGC-2158 recently in both a 6-inch f/4 Newtonian and my 14-inch f/6 Newtonian. In the 6-inch scope at 60X, the cluster appeared as an unresolved glowing blob on the outskirts of M35. Averted vision made it appear brighter, but I still couldn't resolve any of its stars. The cluster was quite different in the 14-inch Dob at 82X. I resolved myriad stars and the object did appear more like a small globular cluster than a galactic star cluster.

I've included two images of NGC-2158. On each image, north is up and east is to the left. I took the first image with a 4-inch f/6.3 apochromatic refractor using an SBIG ST-2000XCM CCD camera. The exposure was 30 minutes. North is up and west is to the right. The field of view was centered on M35 and NGC-2158 is found in the lower right hand corner. The second image was taken with an SBIG ST-2000XCM CCD Camera on an 8-inch f/8 Ritchey-Chrétien Cassegrain with 0.8X focal reducer/field flattener. The exposure was 60 minutes. The brightest stars in this image are foreground Milky Way stars. Note the bright white star on the southeast side of NGC-2158 that I mentioned above!

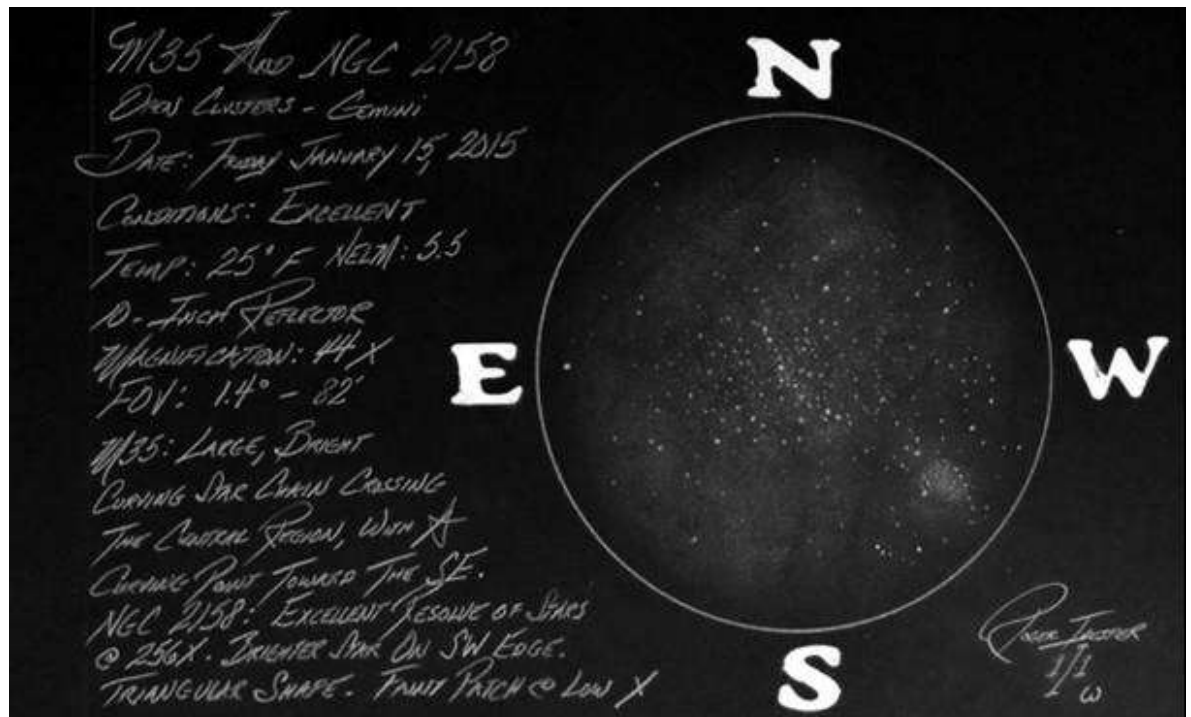


**Roger Ivester:** LVAS Member from North Carolina

M35 & NGC-2158 Compact Open Cluster. Date: Friday, 13 February, 2015. Conditions: Excellent, NELM 5.5. Temperature: 25° F. Telescope: 10-inch f/4.5 Newtonian reflector. Sketch: 44X. FOV: 1.4° - 84'

M35: Can be fairly easy to see naked-eye with a dark-sky. The cluster was bright, large, and very rich. A bright curving star chain crossed the center of the cluster from the NE toward the SW, making a slight curve with a V-shape pointing toward the SE.

Located just SW of M35, was the small and faint open cluster, NGC-2158. It can be seen with telescopes as small as 3-inches, but appears only as a faint, mostly round patch. With the 10-inch at 256X, I easily resolved the cluster, and it showed about 50 or more faint stars. It was brighter and had greater concentration in the central region. The cluster had a triangular shape, with an extension pointing toward the WSW. A chain of about 8-10 stars oriented in a NNW-WSW was on the west edge.





**Gus Johnson:** Observer from Maryland

February 1988: NGC-2158: With a 6-inch reflector @ 59X, it was a dim, mostly round cluster, near the edge of M35. With 12 X 50 binoculars, it was fairly easy to see, appearing more as a globular cluster. With a 4-inch refractor @47X, it was a dim patch. Not visible in the 10 X 40 finder.

February 20, 1976: NGC-2158: With an 8-inch reflector @129X, it was very easy and surprisingly bright. Mostly round with some excellent resolution of...maybe 25 faint stars. In a 2.4-inch refractor @ 18X, both M35 and NGC-2158 shared the

same field. With a 12.5-inch reflector @100X, it was a triangular shape, and I resolved 40 or more pin-point stars.



**Jim Mullaney:** Observer From Virginia

I really don't have much to add to the mass of glowing descriptions that have been published over the years (including my own) of the open cluster M35, except to say that I long ago dubbed this beautiful stellar jewel box "Lassell's Delight," after the British observer's excited description of it as seen in his 48-inch metal-mirrored reflector. Being a naked-eye object on a dark night, it's hardly a telescopic challenge!

But its dim little "companion" cluster, NGC-2158 is another story! Discovered by Sir William Herschel (his HVI-17), it lies within the same wide eyepiece field less than 1/2° southwest of

M35 itself. It's often been considered to be a difficult catch in anything less than a 5-inch (including by Scotty Houston himself). However, it can be seen in a 4-inch scope, and I've glimpsed it in a 2.4-inch glass at 30X with averted vision on a good night. Although classified as an open cluster, it looks for all the world like a globular cluster in 6- and 8-inch scopes, and may be a transition object between the two classes (a "semi-globular"). While M35 lies about 2,700 light-years from us, NGC-2158 is some 16,000 light-years distant - quite remote for an open cluster, but much more typical of a globular. What does it look like to you in your scope?



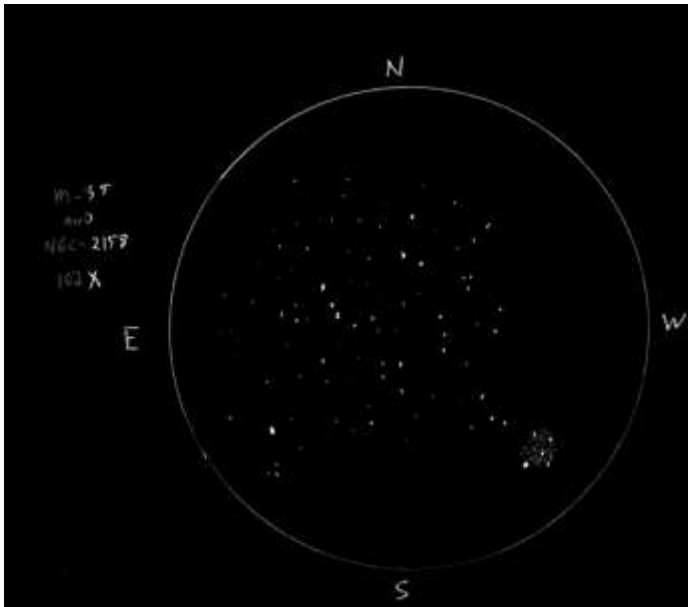
**Fred Rayworth:** LVAS Vice President and AL Coordinator from Las Vegas

I've bothered to log M-35 a total of fourteen times since 1984, but that's just the times when I actually took notes. As for NGC-2158, only nine times since 1987, when I finally noticed it was there. This is quite the fascinating pair.

For the Challenge, I did my observations from the Redstone Picnic Area on the North Shore Road of Lake Mead, Nevada. At 2,100 feet, it was cold, calm, with high, thin cirrus clouds floating over. There were holes and gaps that gave fairly wide spaces for viewing until 21:30. Transparency was pretty lousy

throughout the night except in a few areas, but there were only a few really clear spots. Most bright stars showed nebulae around them, whether they had any for real or not.

M35: Wow! It was a large open group of mostly bluish stars. At first blush, all of them seemed to be around the same mag. with a few odd ones brighter and dimmer. After letting the view sink in, I could see the mags. vary significantly throughout the cluster and the more I looked, the more stars I saw and I couldn't possibly count them all. I didn't notice any particular patterns as there were so many stars, they all kind've blended in together. It looked great at both 48X and 102X.



NGC-2158: It was a nice, uneven, grainy fog next to M-35 at 48X. It sort of looked like an un-resolved glob but the shape was wrong. Also, it almost looked nebulous. At 102X, it had a few loose members that almost looked like foreground stars, at least twenty that seemed to gather around the nebulousity which was more grainy and I could see some individual stars mixed with the brighter ones. At 229X, it took on a rough triangular/trapezoidal shape with a bright star at one corner, set off just a bit. I didn't notice any particular color except gray-blue. The bright one was almost white, but still had the off-white gray-blue tinge to it. Nice.

The image is a representation of what I saw but as for M35, I actually saw more stars. I got tired of making dots on the paper so I just put in the major ones and left it at that. I didn't want to get too sloppy and mess up the star points so I decided to quit while I was ahead.

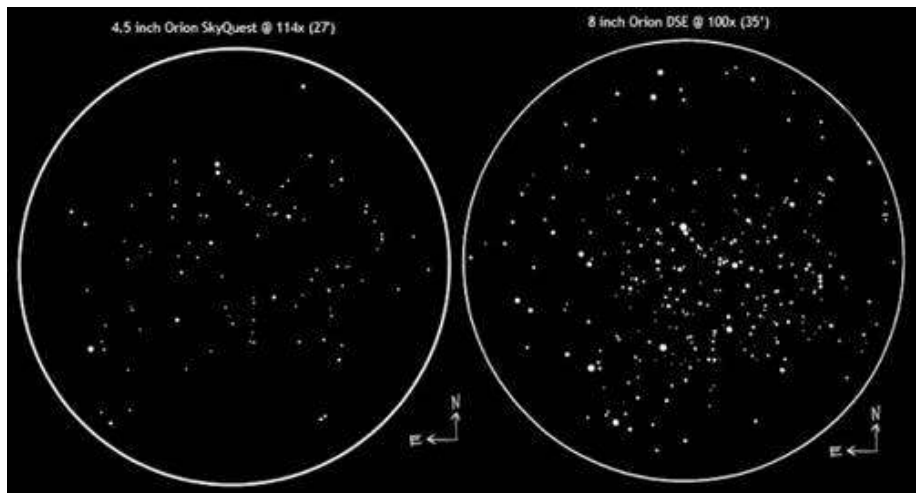


**Jaakko Saloranta:** LVAS Friend from Finland

On 10 February, 2015, I got the chance to do some observing, the first time since October. Among others, I sketched both M35 and NGC-2158 for the LVAS.

M35 was beautiful, as always. I sketched the object first with the 4.5-incher with a little bit too much magnification, just to show the dark markings or more like a large starless region near the center. Then I re-sketched the whole thing with the 8-inch Dob to emphasize the difference between star count. I have to say, sketching all those stars was far from pleasant. There must be at least 200 stars in the second sketch and I remembered why I hate sketching rich open clusters so much. You can get lost in the field completely and lose the entire sketch in the process.

Regarding NGC-2158: I was a bit surprised that I could somewhat easily see it from my light-polluted (NELM 5.0, SQM-L 18.30) and light-covered balcony. Even using the 4.5-inch Newtonian @ 76X (46'), it was a nebulous ball of light without resolution. I also sketched NGC-1977, NGC-1931 and M43. I'll try to revisit NGC-2158 under darker skies with the



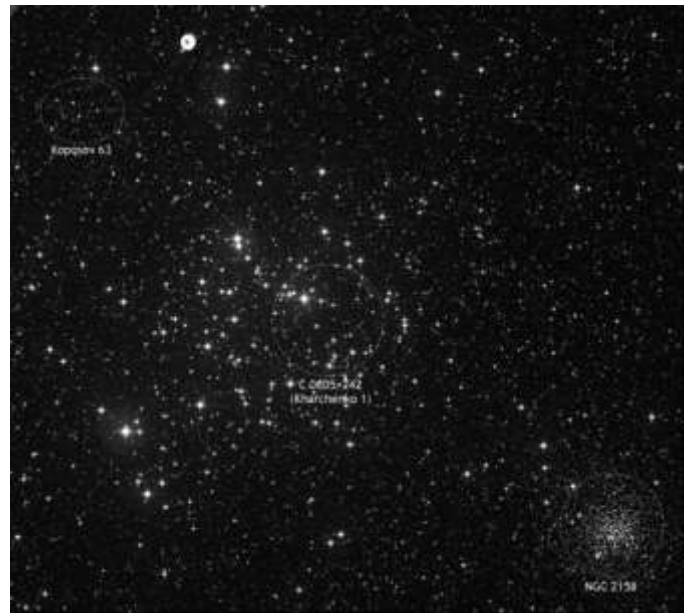
8-inch Dob to get two sketches of each.

I've attached two sketches of M35 as an attachment.

M35 is often noted as being a wonderful cluster pair with NGC-2158. I'm not sure how much you guys have looked into this, but a fun fact: M35 is actually more like a cluster quartet:

- 1.) M35 herself.
- 2.) ~25' SW from M35 is of course NGC-2158.
- 3.) ~20' NW from M35 is an open cluster Kaposov 63.
- 4.) C 0605+242 is basically just inside M35. Probably a more distant open cluster behind M35. (Kharchenko N., Andruk V., Schilbach E., 1997, AN 318, 253).

I've attached a DSS image (above to the right) to illustrate the clusters in the field. I've seen Kaposov 63 with my 8-incher some years ago when I was more active with observing newly discovered open clusters. C 0605+242 is something we've probably all seen but never identified. There's a concentration of faint stars in the position of C 0605+242, but I personally can't say I've seen it. Looks more like a bunch of fainter members of M35.



#### **Jay And Liz Thompson:** LVAS Member from Nevada



We observed NGC-2158 with a 17-inch Newtonian and a 14-inch SCT during December 2014 through February 2015.

From our backyard in Henderson, NV, we resolved NGC-2158 into faint stars with a hint of a v shape on one end using a magnification of 279X in the 14-inch SCT. The small cluster provided a pleasing contrast to nearby M35.

Through the 17-inch at Meadview, AZ, we resolved NGC-2158 very well at 227X. It was nice and bright, and very condensed, and made a nice contrast with brighter and much larger M35. NGC-2158 resolved at 125X, but it was a better view at 227X. At 426X, the cluster still fit in the field of view and was well-resolved, but was perhaps not quite as pleasing as at 227X. At 426X, the cluster was spread out a little too much.



We also observed NGC-2158 with the 17-inch from the Redstone picnic area in the Lake Mead Recreational Area. We saw it as a glow next to M35 at 63X. At 125X, it was somewhat more resolved. NGC-2158 at 227X, was triangular in shape and we easily resolved it.