

# MONTHLY OBSERVER'S CHALLENGE

## *Las Vegas Astronomical Society*

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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 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.

### **MESSIER 53 (M53)/NGC-5053 – Globular Cluster Pair In Coma Berenices**

Messier 53, also known as NGC-5024 is a globular cluster that shines at mag. 7.7, depending on the source, and lies in Coma Berenices. Johann Elert Bode discovered it in 1775 and Messier added it to his list because it was bright and comet-like and quite visible in the primitive telescopes of the time. The cluster lies approximately 60,000 light-years from the galactic center and about 58,000 light-years from earth.

Our other Challenge object, NGC-5053 lies about a degree to the southeast and shines at a deceptive mag. 9.0. It was discovered by William Herschel in 1784 and has a mass of about 16,000 suns, one of the lowest luminosities of all the known globular clusters. It has a very low surface brightness and the mag. 9.0 official brightness will send many on a wild goose chase, unless they're aware of just how dim this cluster really is. It takes very dark and transparent skies to dig it out of the background, so be prepared!

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

**James Dire:** LVAS Friend from Hawaii



Coma Berenices, known for a plethora of amazing galaxies, actually contains several globular star clusters. Its brightest two globulars are M53 and NGC-5053. M53 is  $1^\circ$  northeast of the star Diadem (Alpha Comae Berenices), while NGC-5053 is  $1\ 1/2^\circ$  due east of Diadem. At low power, both clusters can be spied in the same telescopic field of view.

Although not as big and bright as nearby M3 in Canes Ventici, M53 is still an impressive cluster. Shining at magnitude 7.6, M3 has a diameter of 22 arcminutes. It's visible in my 9X50 finder scope and looks splendid in my 14-inch f/6 dob! NGC-5053 shines at mag. 9.5 and has a diameter of 13 arcminutes. Comparatively, that makes M53 five times brighter. In a small refractor, M53 is easily resolved. NGC-5053 is not.

M53 was first discovered by Johann Elert Bode (of M81 fame) in 1775. Charles Messier independently discovered it in 1777. William Herschel was the first to resolve it into stars. NGC-5053 was discovered by Herschel in 1784.

With sufficient aperture and magnification, M53 can be resolved into scores of individual stars. Its brightest star is a mag. 13.8 red giant. It's one of the farthest Milky Way galaxy globular clusters from both the galactic center and us. It's close to 60,000 light years away from each. If M53 were as close as M13, it would rival it as one of the best globular clusters in our sky. It's a low metallicity star cluster, meaning the cluster's stars have few elements other than hydrogen and helium. This means its stars are very old and probably first-generation stars.

NGC-5053 is as different as a globular cluster can get from M53, even though they're both almost the same distance away. It has notably fewer stars than most globulars, and doesn't have the typical bright, dense core. At times, it was thought not to be a globular cluster, but spectroscopy has shown the stars are similar to those contained in other globular clusters. Telescopically, it's a loose collection of stars that are difficult to resolve. The collective faint glow is what's most apparent in the eyepiece.



I imaged M53 on June 6, 2014 using a SBIG ST-2000XCM CCD camera with a 102mm (4-inch) f/7.9 apochromatic refractor. The exposure was 30 minutes.

The brightest star in the field of view is SAO 100466 shining at mag. 9.3. This star is an optical double with a mag. 10 star located 1.5 arcminutes to the east-northeast (see image). I tried a similar exposure of NGC-5053, but didn't pick up enough light to capture the cluster. I'll attempt to image both together in the same field of view at a future date.

**Sue French:** LVAS Friend from New York



NOTE: Sue has provided some very valuable information showing what is possible using a variety of astronomical instruments and many years of practice.

**M53**

With 12X36 binoculars: Easy. Grows brighter toward the center. Tiny bright nucleus. Fairly large for its type.

15X45 binoculars: Fairly large globular. Granular around edges. Grows much brighter toward the center. Tiny, bright nucleus.

18X50 binoculars: Bright, large globular cluster with a large brighter core. Sits south of the west end of a meandering asterism of field stars. Alpha Comae in field of view.

105/610mm (4.1-inch f/5.8) refractor at 17X: A bright little cutie guarded by a little pair of mag. 9 and 10 stars south-southeast. Grows brighter toward the center. May see NGC-5053 in field of view. 28X: About 8' across. Shares field of view with NGC-5053, which is definitely visible now. 87X: Bright, granular core about 4' across that grows much brighter toward the center.

254/1494mm (10-inch f/6) reflector at 68X: Beautiful and bright with granulation and some stars in halo, particularly by the bright star in halo north-northeast. Large, brilliant core. 213X: A satellite went right across the cluster. Well resolved, partial resolution right to core. Very sparse outer halo about 10' in diameter. Raggedy inner halo (about 6') has many relatively bright stars. Contains the bright star mentioned above.

**NGC 5053**

18X50 binoculars: Shares field of view with M53. Faint, small, with a faint star at its east-southeast edge.

105/610mm (4.1-inch f/5.8) refractor at 28X: About 7' and shares field of view M53. Low surface brightness. Mag. 10 star off east-by-south side. 87X: Still a ghostly glow. Very slightly brighter in center.

254/1494mm (10-inch f/6) reflector at 68X: Large, granular glow with some brightening toward the center and a few star specks. Mag. 9½ star off east-southeast edge. Mag. 12½' star just off northeast edge. 115X: About 9' in diameter with several stars scattered across it. 213X: About two dozen stars.

368/2207mm (14.5-inch f/6) reflector at 170X: Large, low-surface-brightness glow with mag. 10 star just off east-by-south edge and many very faint to extremely faint stars sprinkled across its face. A star in the north edge looks enough brighter than the rest of the stars that it may be in the foreground.

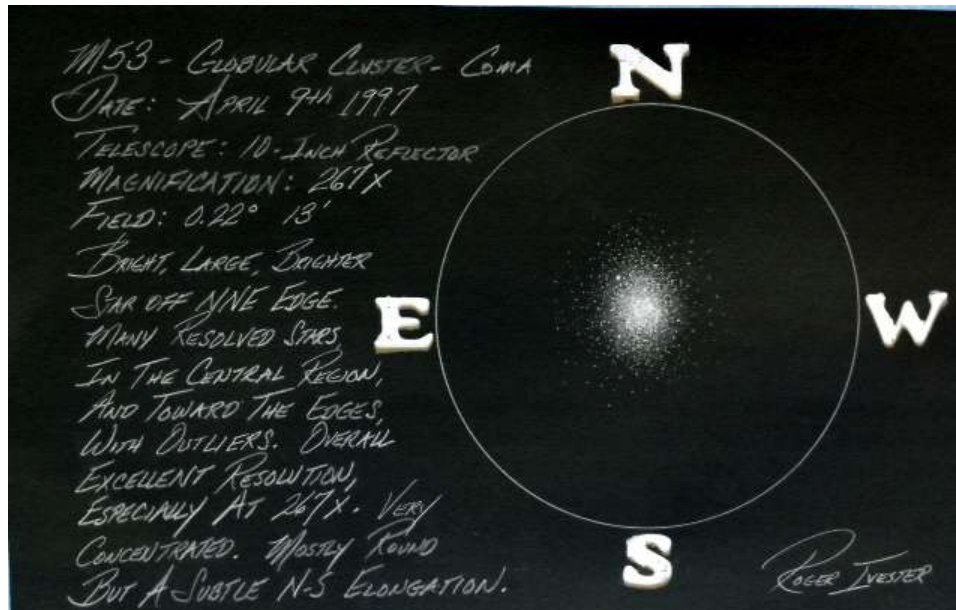
**Roger Ivester:** LVAS Member from North Carolina



On a night in April 1997, with superb transparency and seeing, using a 10-inch reflector at 267X, I partially resolved globular cluster M53 and counted over 100 stars. The core was very concentrated and bright, leading out to many faint stars enveloping the outer regions. The cluster has a subtle, but a noticeable N-S elongation. A brighter star was located on the NNE edge.

The weather in the southeastern US, for the past two spring and summer seasons, has been very poor, due to clouds, rain and thunderstorms. Unfortunately, conditions over this period hasn't allowed a new observation of M53, or the opportunity to observe the much fainter globular, NGC-5053. When looking through my notes last year, I was surprised the latter cluster hasn't been included in my many observations in this area over the years.... maybe next year will be better.

This year, 2014, I've not had my telescope outside since April, due to the weather and sky conditions.



**Gus Johnson:** LVAS Friend from Maryland



On June 13, 1991 I noted that here's a curious pair of globular clusters, with M53 having been discovered by Bode in 1775 and NGC-5053 by William Herschel nine years later. NGC-5053 had very dim surface brightness.

I've seen M53 in my 8X50 finder. My 8-inch reflector at 58 showed both in the same field of view using an Erfle eyepiece. My 80mm (3-inch) refractor at 38X failed to show NGC-5053.

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

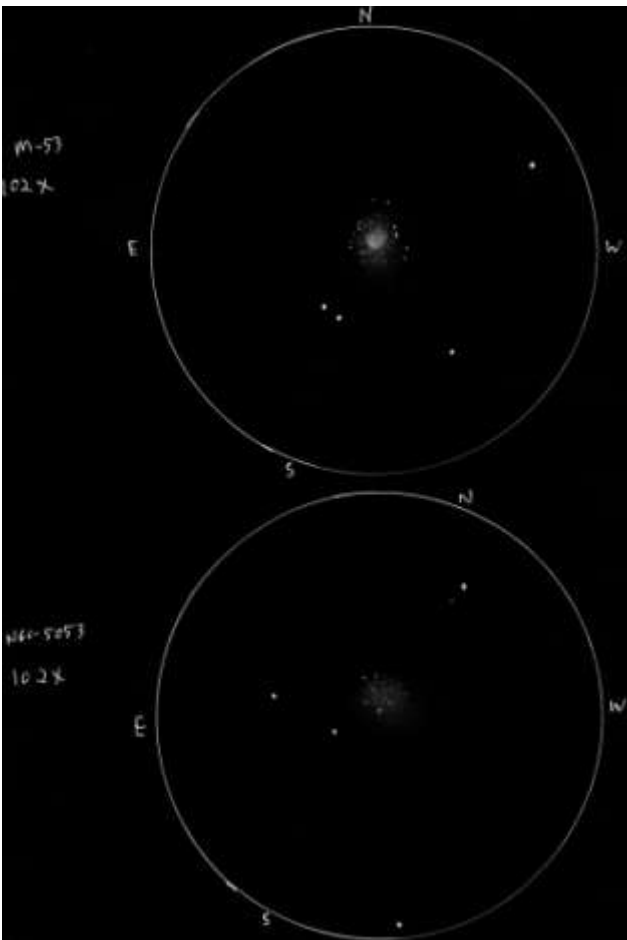


M53 is one of those objects I've seen multiple times, especially being a Messier and also since I obtained my Messier certificate over two decades ago. I've had quite a history with it, yet surprisingly, I've only logged a total of five observations.

The first time was on January 5, 1986, from Incirlik Air Base, in Turkey. At 230 feet, the dew point was pretty annoying but though it was cold, at least it wasn't too windy. My scope that night was my home-built 8-inch f/9.44 using a 32mm EP for a magnification of 60X. M53 was hard to see. It was too close to horizon. However, it looked good and compact.

My next opportunity was the next month from the same spot in my back yard on base at Incirlik on February 2, 1986, using the same scope and same magnification. The weather was cool, but nice. Same problem with dew, though. This time, it was bright compared to the galaxies in the area. Still couldn't resolve stars, which wasn't surprising considering the aperture, altitude and dew which was probably getting on the diagonal and hanging in the air, causing light scatter.

The next time I saw it was from my back yard in Tipton, Oklahoma on April 12, 1996. At an altitude of 1,300 feet, it was at least a step up from Incirlik, Turkey. However, despite being in a relatively remote part of the state, my neighbors believed in security lights and I had to take lots of measures to block them out. I still managed to get some darkness but with much effort. In this case, I was using a scope double in size, my home-built 16-inch f/6.4, with, surprisingly enough, that exact same eyepiece as before. Giving me 70X this time, M-53 was a nice globular, though not too big. I didn't have much for notes that night.



On May 22, 2004, from Sunset Overview at Lake Mead, Nevada, I had gaze #4. It was breezy in gusts, but warm. There must've been a high haze because there was a lot of light scatter and light pollution. It was very hard to see galaxies. The wind didn't end up being a problem though. There were way too many cars coming in and out. I couldn't keep my night vision. I also had to pay \$5.00 to get in the park even though I was a veteran. I used the same scope and magnification as the last time in Oklahoma. This time, the globular was nice and bright, but small. What made this observation unique was that I noticed a bright star in the foreground.

The first time I saw NGC-5053 was on July 10, 2004. On that July evening, we were at the Lee Canyon Weather Station up Lee Canyon road near Mt. Charleston, Nevada. The altitude was 6,500 feet. It was breezy, but not real cold. No clouds. There was a low haze in valley below. Using the 16-inch f/6.4 at 70X, NGC-5053 was very faint but as large as M53. It was very hard to pick out. As for M53, it was a nice soft and bright glow. I didn't notice any bright foreground star during this observation.

Now, for this Challenge observation, I observed the pair on June 28, 2014 from the Las Vegas Astronomical Society's Observatory site at the Mt. Potosi Boy Scout Camp complex. At an altitude of 5,890 feet, the truck boiled over on the way

up. Not sure why the radiator cap got loose, but it did. I had to put a bit of water into it. Anyway, the weather was very clear with a slight, sometimes annoying breeze. The air in the valley was thick and hazy. Apparently we never got high enough above it because the sky was bright and the transparency wasn't that great. I had a lot of trouble getting past mag. 12 with anything. However, views of Saturn were stunning. Still it wasn't a bad night and despite the altitude, I never had to put on a long-sleeved shirt by the time we gave up at almost midnight.

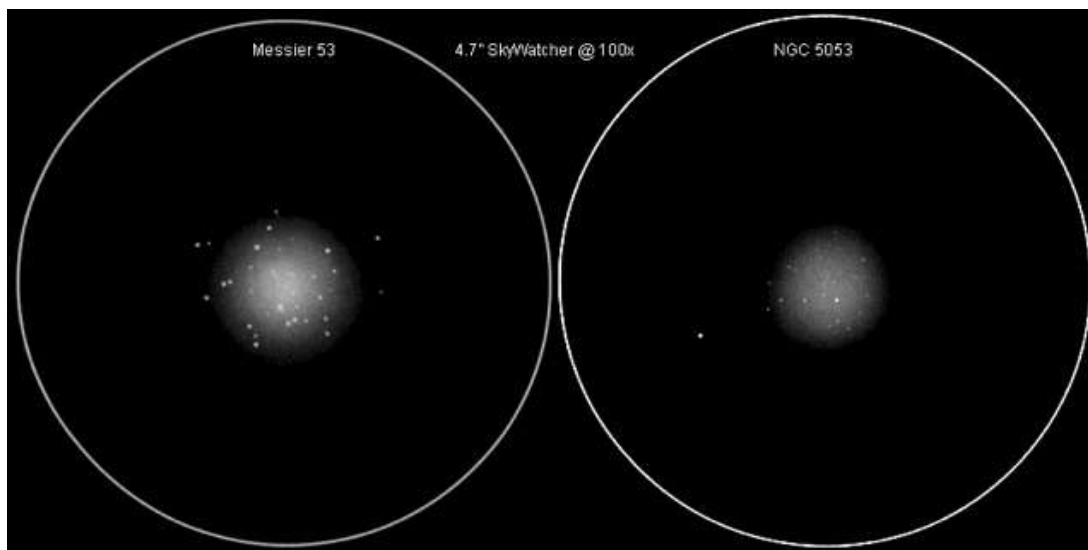
NGC-5053 was extremely subtle! I almost missed it because of the lousy transparency. It was just a condensed grainy haze against the background, next to a star. At 229X, a few of the brighter members stood out, outlining the general shape, but the EP blocked out the glow of the core. As for M53, it was bright with surrounding resolved stars that blended into the main core where they turned into a fuzz and an almost milky, but still grainy glow. I noticed the cluster was framed by an asterism of stars almost forming a V shape just at the outer borders. I sort of saw a foreground star around the middle that flashed in and out of the blend. I never noticed any particular color to any of the stars. I've started looking for color, especially in open clusters, so I checked this one out also but had no luck. The transparency was doing any favors.

**Jaakko Saloranta:** LVAS Friend from Finland



With an 8-inch telescope under suburban observing site, NGC-5053 can be seen as a very faint, even-brightness glow with a few stars flickering in front of it. The globular cluster can be observed only during the best of nights when the humidity is low and the naked eye limiting mag. is close to 6. This usually happens in March-April when the nights still are dark and snow has melted away.

The two sketches represent a view through a 4.7 inch refractor made at an altitude of 7,450 feet from a fantastic observing site close to the NOT (Nordic Optical Telescope) on the island of La Palma, Canary Islands. NOT is sitting at the highest peak in the island of La Palma - Roque de los Muchachos ("The Rock of the Boys") - and is somewhat equivalent to the observatories sitting on Mauna Kea, Hawaii (although sitting at a lower altitude). I described and sketched M53 simply as "Granularly brighter toward the center. Fairly well resolved," and the fainter companion as being "Fairly easy @ 24X. Slightly concentrated toward the center. Faint stars resolved within the halo. Very difficult @ 100X." With a careful gaze, the duo is visible with a pair of 8X30 binoculars mounted on a tripod.



**Jay and Liz Thompson:** LVAS Members from Henderson, Nevada



NGC 5053 and M53 (Liz)

I imaged M53 and NGC-5053 from my back yard in Henderson, NV using a 14-inch SCT with an effective focal ratio of f/6.5. M53 was much brighter and compact than NGC-5053. Both images are shown at the same scale. The images approximate my viewing impressions with a 17-inch telescope under dark skies.

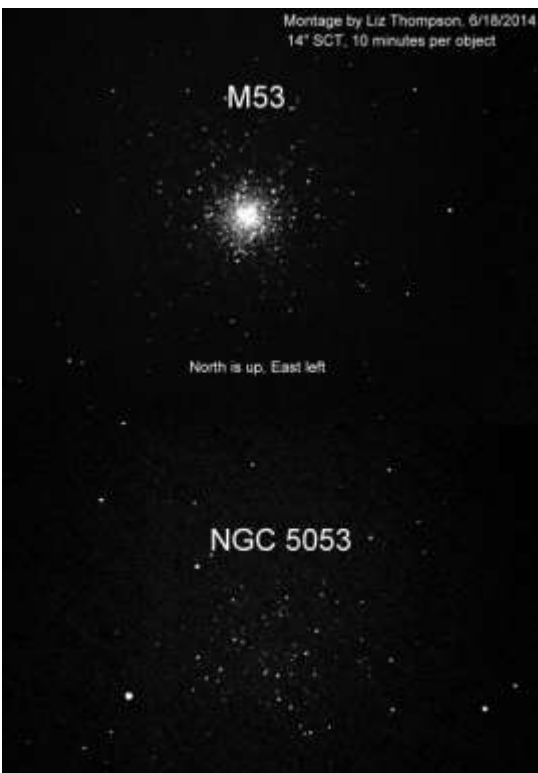


NGC 5053 and M53 (Jay)

Over the years, I've used NGC-5053 as a gauge of transparency and darkness, so I have many observations with a variety of telescopes at different locations. Of course, I view brighter M53 in conjunction with NGC-5053. The following observations date from March 2012 through June of 2014.

3-inch f/4 Newtonian: Only M53 was visible as a small, unresolved, fuzzy glow at 18X. It was easy from my backyard in Henderson, Mt. Potosi, and Meadview.

90mm (3-inch) f/13.8 Maksutov: M53 was visible at 36, 48, and 101X, though not quite resolved from my backyard in Henderson. M53 was not as bright as M3 but still showed up well, especially from dark sky locations such as Meadview. I could not see NGC-5053 with this telescope.



10-inch f/4 Newtonian and 10-inch f/6.3 SCT: M53 was resolved easily from my back yard in Henderson using the SCT at 80X and 160X. NGC-5053 was also visible at 80X, though faint. With the 10-inch Newtonian at Redstone, NGC-5053 stood out well at 63X. Using the same telescope and eyepiece at Mt. Potosi, NGC-5053 was very difficult even when west of the meridian (away from the Las Vegas light dome). M53 was resolved easily in the Newtonian at both Redstone and Mt. Potosi.

14-inch f/11 SCT: M53 was great even from my backyard in Henderson. NGC-5053 was visible at 279X with a handful of stars visible over a background glow.

17.5-inch f/4.5 Newtonian: From Meadview, only about a dozen stars were visible in NGC-5053 using direct vision at 227X, superimposed on a large background glow. A black cloth observing hood was used for observations of this dim globular. M53 was smaller, but more concentrated and brighter than NGC-5053, and was resolved well at 227X.