MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

Compiled by:

Roger Ivester, Boiling Springs, North Carolina

&

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With special assistance from:

Rob Lambert, Las Vegas, Nevada

August 2012

M-22 (NGC-6656) Globular Cluster In Sagittarius

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.

M-22 (NGC-6656) Globular Cluster In Sagittarius

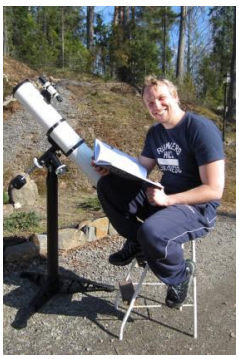
M-22, also known as Messier 22 or NGC-6656 is a globular star cluster discovered by Abraham Ihle in 1665. Charles Messier added it to his list of objects that were not comets in 1764. M-22 lies near the galactic bulge region of our Milky Way galaxy and is considered an elliptical globular cluster.

It consists of approximately 70,000 stars and is one of only four known globular clusters to contain a planetary nebula. It lies about 10,600 light years away and contains 32 known variable stars. It shines at a bright mag. 5.1 and on a dark night with the right conditions, it can be spotted with the naked eye.

M-22 has been compared to a little brother of Omega Centauri, the largest and brightest globular cluster in the sky. It's among the most observed in the northern latitudes along with M-13. There are many ways to visualize this excellent object, among them the Alien. The one feature you are not likely to spot is the very faint and tiny planetary nebula. Just discovered in 1986 with the IRAS satellite, it's an extremely tiny point source. With a blue central star and because of its tiny size, it wasn't even identified as a planetary until 1989.

Observations/Drawings/Photos

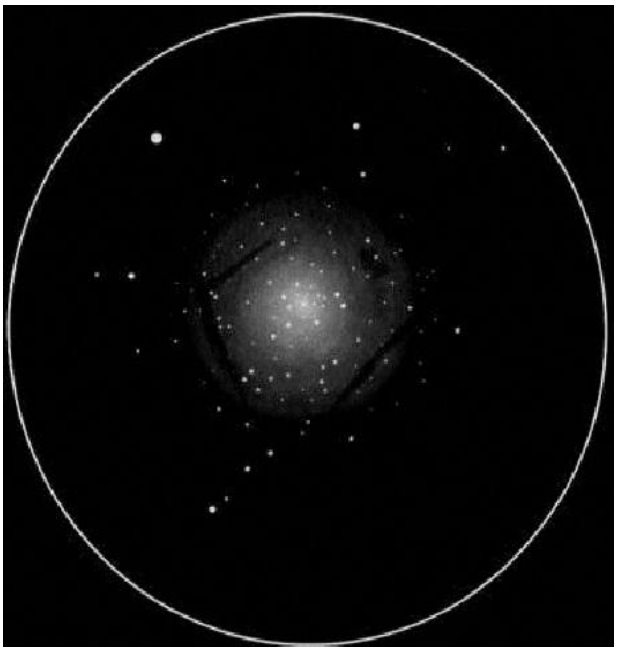
Jaakko Saloranta: Observer from Finland



Messier 22 rises only 5° above the horizon and this is during the summer months when the sky isn't dark enough for star gazing. So it's safe to say that even from southern Finland, this grand globular is a bit of a horizon kisser and a whimper at best. Despite this, I've managed to see the cluster with a pair of 8X21 binoculars from a somewhat dark location in rural Finland. M-22 is, of course, a great and bright naked eye object from the more southern locations I've visited such as Spain, Cyprus and the United States. At the eyepiece of even the smallest of telescopes, it takes just one glance to notice its' magnificence. The cluster explodes in to a swarm of hundreds of fireflies. With a large aperture telescope, be sure to try to nab the planetary nebula GJJC-1 from the heart of the cluster.

M-22 does harbor a fantastic and a complex set of dark lanes and brightenings throughout the entire face of the cluster. The core looks elliptical, rather than round. These features are somewhat visible in an old sketch of mine from 2004 made from the island of Tenerife, Spain at an altitude of 7,480 feet using my 80mm (3-inch) traveling scope with half the aperture. The description reads: "Easily resolved into about 80 individual stars. The center is clearly dominated by several mag. 10 and 11 stars. Three separate dark lanes visible: The most obvious in the NE as a sharp L-shaped figure against the halo. SW and NW sides contain the rest [of the two]. Size about 20'. Round."

Comparing objects is common between amateur astronomers and M-22 often gets compared to M-13. At least for me, there's no contest: Messier 22 wins, hands down. It's bigger by 12', brighter by 0.5 magnitude and the brightest individual star is 1.2 magnitude brighter than the one in M-13.



Rob Lambert: Observer from Nevada

The globular cluster M-22 is one of my favorite globular clusters. It's less than half the distance from earth compared to M-13, but it appears to be smaller than the Hercules cluster. This coincides with its apparent size of 32 arc-minutes and M-13's 20 arc-minutes when viewed at the same magnification. The mag. 8.62 star, TYC 6858-247-1 is located approximately 10 arc-minutes northeast of the cluster's center. Comparatively, the brighter stars in the cluster appear to be mag. 10 or 11. Overall, M-22 has a somewhat mottled appearance, with a number of brighter stars appearing to be in front of the more numerous dimmer stars. There are several groupings of these brighter stars. A significant number of both the brighter and dimmer stars can be resolved into pinpoints of light. Although higher resolution images depict the cluster as being more evenly rounded in star distribution, the stars in my image give M-22 the appearance of having greater width in a north-south distribution with its greatest east-west width being at the northern end of the cluster.

Sue French: Observer from New York

Sue French is a contributing editor and columnist to *Sky & Telescope's Deep Sky Wonders* column and is the author of several outstanding books including *Celestial Sampler* and *Deep Sky Wonders*.

July 15, 1991, 11:47 pm EDT, with 14X70 Fujinon binoculars. The seeing was poor but transparency was very good. It was a bright, fairly large, round, fuzzy patch with a little brightening toward the center.

September 18, 1995, 9:15 pm EDT, with a 254/1532mm (10-inch f/6) Newtonian, 9mm eyepiece (170X). The seeing was rotten but the transparency was good. It was a stunning globular cluster, about 10' across. Beautiful stars, many quite bright, right down to the center. There was an abrupt increase in star density at about one-half radius inward with a bright unresolved background. Many star chains, clumps, and dark patches visible. The outer halo seemed to extend farther northeast than it did in other directions.

August 13, 2007, 11:45 pm EDT with a 105/610mm (4.1-inch f/6) apochromat. Seeing and transparency were fair. At 47X, it just fit in the field of view with NGC-6642. Bright and beautiful with 25' halo and brilliant WSW-ENE 6' x 7½' core. At 87X, it was gorgeous, some resolution to center. Moderately bright to extremely faint stars. Outer core raggedy. Inner core riddled with dark lanes and dark spots.

March 4, 2011, 5:30 am EST, Winter Star Party with a 105/610mm (4.1-inch f/6) apochromat. See was good and transparency was fair to good. At 122X, it was a beautiful globular cluster, about 13'. Highly condensed center thinned outward to a faint, sparse halo. Cluster had many arms, drooping arcs, and rays of stars. Some resolution across the entire cluster. Large, bright core had hazy backdrop.

Dr. James Dire: Observer from Hawaii

For most of my life, I used to think that M-13 was the brightest globular cluster visible from mid northern latitudes (neglecting Omega Centauri which only comes a few degrees above the horizon a small fraction of the year). Sure I had seen M-22 many times, but Sagittarius never rises nearly as high as Hercules, so my views of M-22 were always through a much larger air mass than M-13, diminishing its brightness. Also, since M-13 is located in the relatively faint constellation Hercules, it's readily visible naked eye from dark observing locations. M-22 lies in the bright regions of the Milky Way making it much more difficult to see naked eye.

It turns out that M-22, at magnitude 5.1 is brighter than M-13 by 0.7 magnitude, making it the third brightest globular cluster after Omega Centauri and 47 Tucanae (those two are in a league of their own and splendid southern hemisphere objects). Also at 29 arc minutes in diameter, M-22 spans nearly 4 more arc minutes of sky than M-13.

I really didn't come to appreciate M-22 until I moved to 21º north latitude, where M-22 transits a full 44º above my south horizon. Wow! Is it ever so much cooler to view in a telescope than M-13!

I imaged M-22 this summer with a 4-inch f7.9 refractor with an SBIG ST-2000XCM CCD camera for 30 minutes as the cluster transited. The seeing and transparency were both excellent and this image is by far the best globular cluster image I have obtained. As you know, seeing (twinkling of stars) varies considerably with the altitude of an object, as does the atmospheric transparency. So it was good to have the star cluster so high in the sky. The image far exceeds my April 2012 attempt of Omega Centauri, which only rises 20º above my horizon when it transits. Next year, if I can get a good night of seeing at that altitude, I hope to do much better with Omega Centauri. I don't think I can get a better shot of M-22 using a 4-inch apochromatic refractor!

Gus Johnson: Observer from Maryland. **NOTE:** On April 19, 1979, Gus Johnson, visually discovered Supernova 1979C in spiral galaxy M-100. NASA announced on November 15, 2010, there was evidence of a black hole as a result of this supernova explosion.

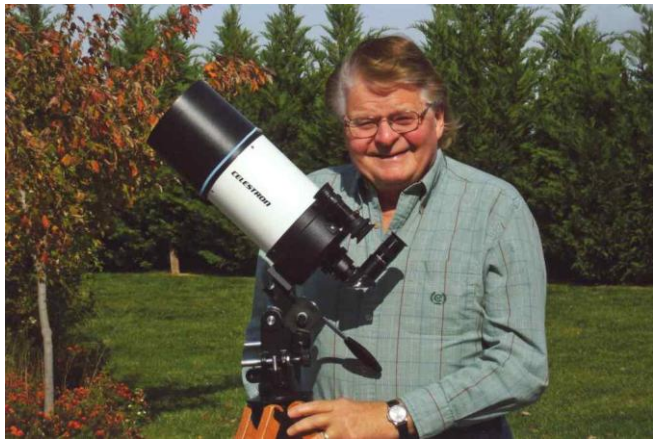
At my latitude of 39º N, M-22 and M-13 are about equal in splendor, but from where M-22 passes overhead, it would outshine M-13.

Reducing my 80mm (3-inch) refractor to 2-inches, and at 75X, M-22 resolves the cluster fairly easily.

I recall an ad wherein a 4-inch APO owner wrote in about seeing 4 globular clusters in a 3º field. I tried it using my 2.4-inch f/8.2 refractor at 16X. I saw M-22, M-28, and 2 small NGC globulars. At this low power the two NGC clusters were elusive. I had my 6-inch at 59X nearby to confirm what I was seeing. Both M-22 and M-28 were partly cut off by the edge of the field in the 2.4-inch. I was using a 32mm eyepiece.

James Mullaney: Observer from Deleware

Jim Mullaney is a former assistant editor at *Sky & Telescope*, and author of 9 books including *Celestial Harvest* (Dover) and co-author with Wil Tirion of *The Cambridge Double Star Atlas* and *The Cambridge Atlas of Herschel Objects* (Cambridge University Press). He's logged more than 20,000 hours of stargazing time over the past 60 years.



"I consider M-22 superior to M-13 and easier to resolve than the bigger globulars after M-4. I have seen stars to the center using a 6-inch on a steady night. It is, however, easily resolved to the center in 10-inch and 13-inch scopes, the latter showing many of the brighter stars as orange."

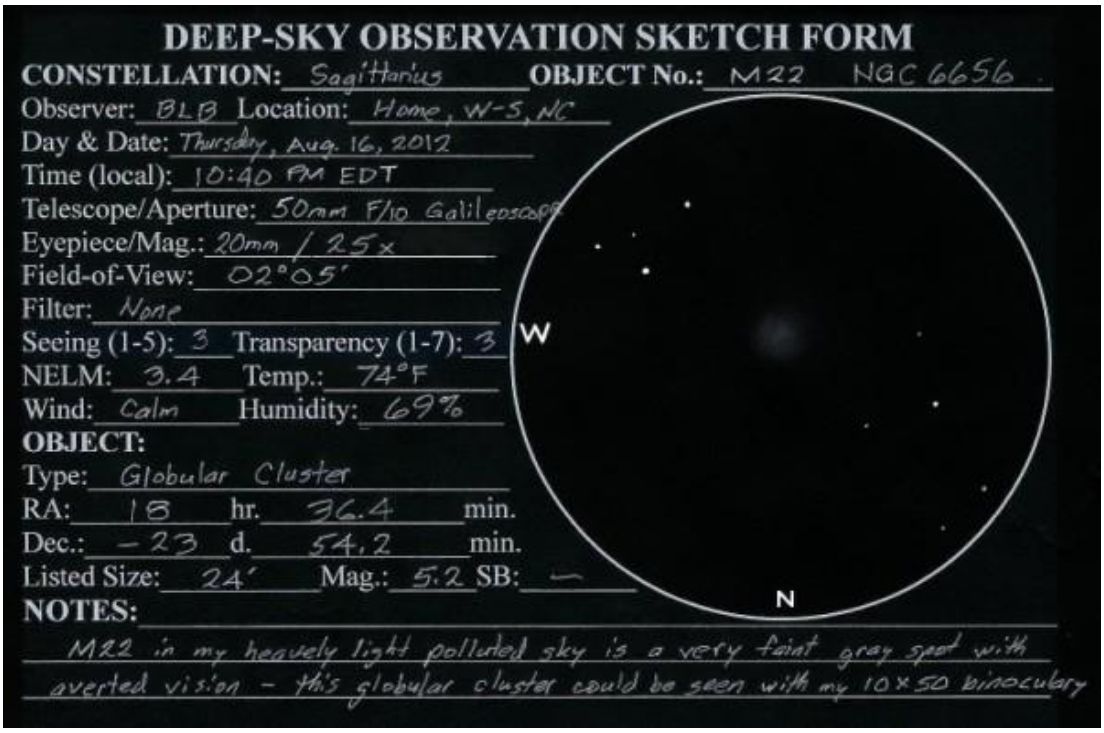
Buddy Barbee: Observer from North Carolina

This observation was made from my heavily light polluted backyard in Winston-Salem, NC on August 16, 2012. After almost a month of cloudy weather, it had finally cleared off last Thursday night, so I took my 10X50 Nikon binoculars out to take a look at the sky. The sky was bright in town as it always is here, but I was still able to see M-22 with the binoculars as a round gray spot northeast of lambda Sagittarius. Since it was late in the evening and I had not set up a telescope, I decided to grab my 50mm (2-inch) f/10 refractor for a look at M-22. Sometimes it is fun using the telescope minimalist approach when observing. At any rate, it's a great grab-and-go scope for fast setup and observing.

Using the little 50mm (2-inch) refractor with a 20mm eyepiece, which gave a magnification of 25X and a true field-of-view of 2º and 05 minutes, it was an easy star hop to M-22 from Lambda Sagittarius. The wind was calm and the temperature was a comfortable 74º F, but the humidity was 69% which made for a hazy sky with all the light pollution in town. Looking at M-22, through the little refractor, it appeared to be a small round gray spot that was brighter in the center and best seen with averted vision or movement of the scope. There were no stars seen in the cluster with the little scope but it was still a very satisfying view given the conditions.

Back in early June of this year, I had a chance to look at this cluster from home with my 150mm (6-inch) SCT using a 10mm eyepiece at 150X. I could see stars all across the gray background of unresolved stars. Still though, the view that I will always remember is the one I had with my 4-inch refractor several years ago from Oak Island, NC using my 13mm eyepiece for a magnification of 67X. I had hopped over to M-22 from the top of the tea pot, Lambda Sagittarius, and was not ready for the view I received when I looked in the telescope. Yes, M-22

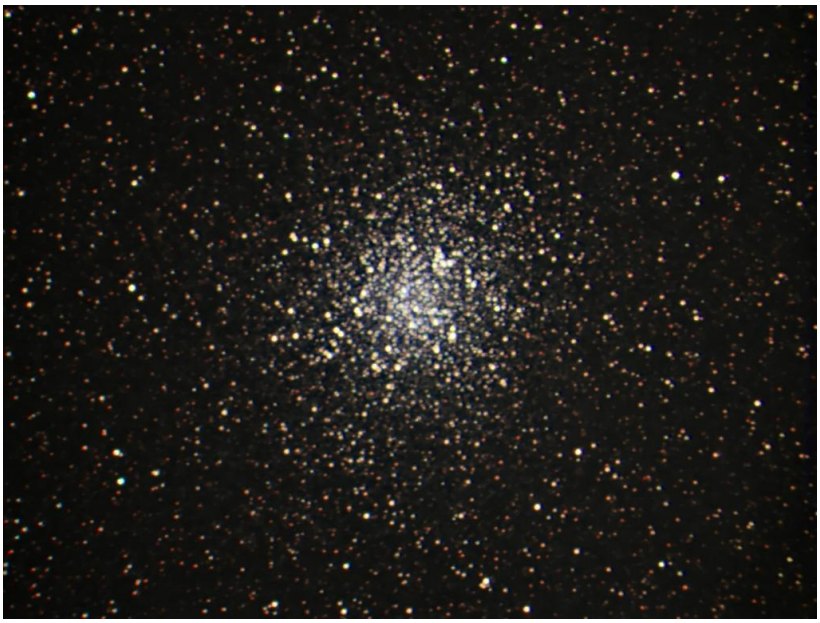
was still a gray spot, with stars visible across the cluster but it appeared to be swimming in a round swarm of star dust. I have never seen this before due to all the light pollution at my usual observing sights. Seeing M-22 over the Atlantic Ocean without any light pollution was simply amazing to me. It was a view I will never forget.



Jim Gianoulakis: Observer from Las Vegas

Mount: Paramount MX / Camera: QSI 583 WSG / Exposures: 10 X 300 seconds RGB calibrated with 20 darks, flats and dark flat frames.

Processing: Stacked with Deep Sky Stacker Aligned and combined in PhotoShop. Additional processing in PhotoShop – levels and curves additional noise reduction.

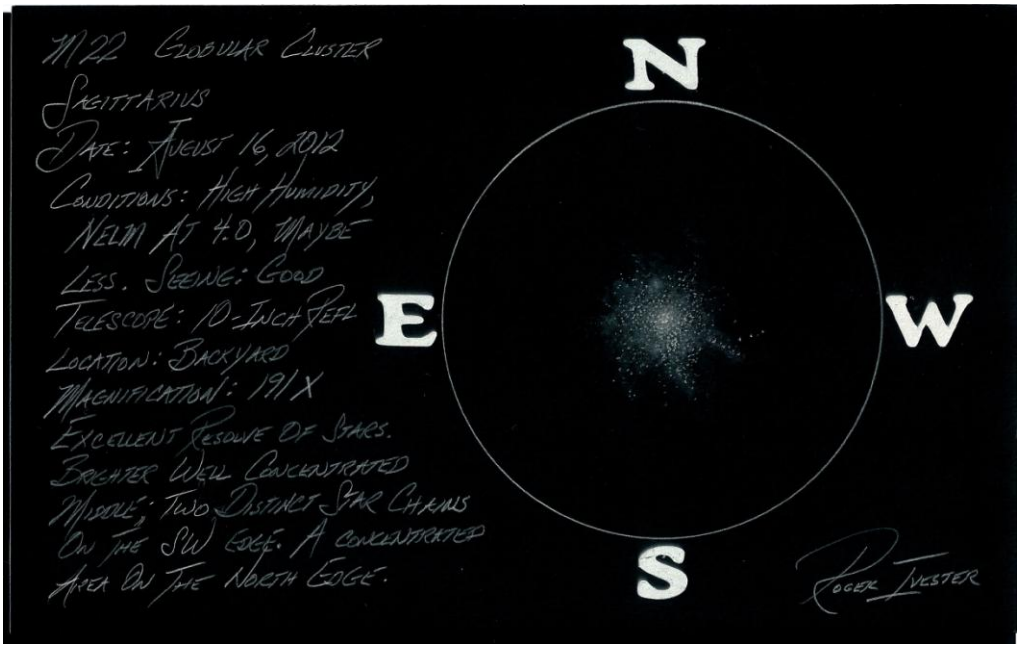


Roger Ivester: Observer from North Carolina

M-22 is possibly one of the most observed objects in Sagittarius by amateurs. When viewed at 191X with my 10-inch reflector, many stars could be resolved. The middle appeared much brighter with a greater concentration. I saw two strings of stars leading out from the SW edge. I easily noticed a small round patch on the northern tip, and another, however smaller toward the east.

After careful observing for the longest time, I would suggest that the cluster appeared to look like a strange alien creature. The star chains on the SW edge would be the legs, and the concentrated spots in the north and east are the eyes. It's very interesting to note that after many times of observing this globular over the years, I had never noticed this most interesting comparison.

My small 76 mm (3-inch) f/4 reflector at 25X presents M-22 as a fairly dim ball of unresolved stars.



Fred Rayworth: Observer from Nevada

Since I wasn't able to go out this August, or for my last chance, on September 2, 2012, two days after the full moon, I had to resort to my countless older observations (I did get out later. See more notes below my first drawing below.). This is an object I've observed with so much regularity, I haven't recorded even half of my sessions. Part of the reason is that it's a favorite outreach object and I usually don't record outreach observations as they are usually done under less than ideal conditions, meaning, extremely lousy!

This time for the challenge visual aid, I decided to go old school and scanned the page from my official Messier Certificate logbook. I used that logbook page as the format for my Herschel 1 and 2 pages even though I have the official books which are in a slightly different format. I just like this form better and have created two massive 400 page volumes to record those observations. As for the other catalogues I'm pursuing such as the Herschel 2500, the Skiff and Luginbuhl, the Tirions and others, well, I just don't have enough shelf space for such massive volumes so I'm sticking to simpler methods!

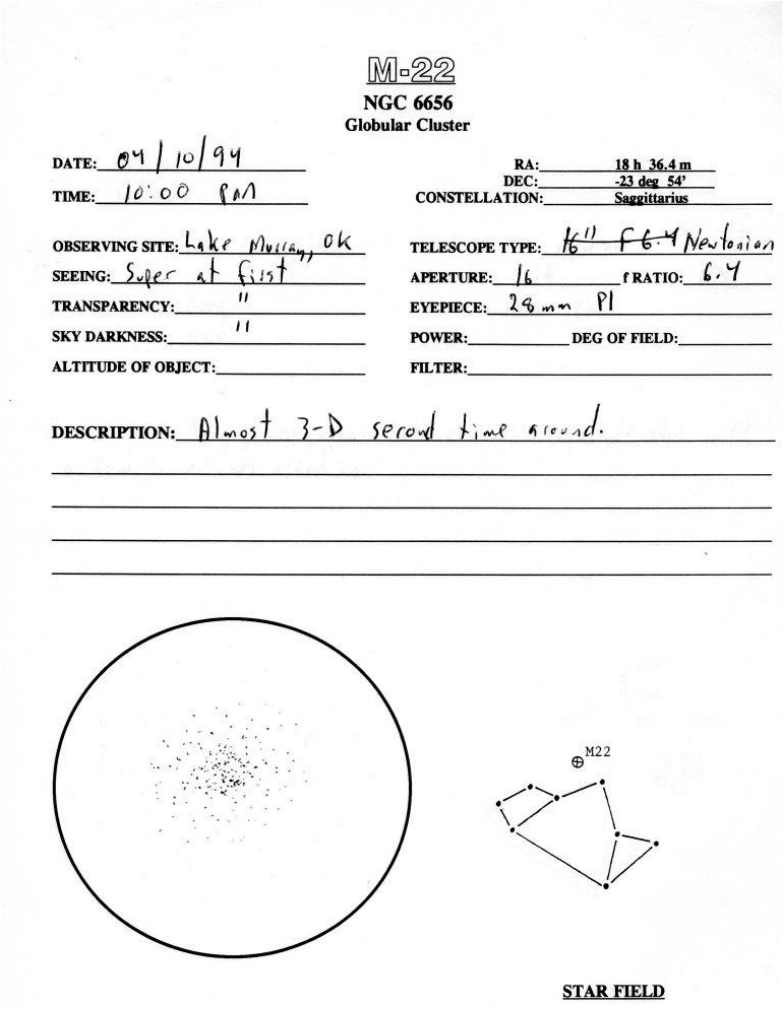
M-22 is by far my favorite globular cluster. The first time I set eyes on it, I was floored. Though M-13 is a fantastic object with the spider arms and propeller, M-22 has always swayed me with its massive size, thick mass of stars and almost 3-D appearance. The one thing I've never noticed was the alien, probably because with my aperture I'm seeing too many stars and the shape blends into the background. I was hoping to catch a glimpse of it tonight (as I write this report) but my observing partner couldn't make it and for safety reasons, I won't go out alone.

Every time I gaze at M-22, I get lost in the mass of stars. I don't always look for color but when I do, I see mostly yellow white and red-orange stars with an occasional trace of blue mixed in. A lot of that depends on the seeing, eyepiece and whether I'm recovering from a migraine. I've never really noticed any particular shapes though I've never looked for them. I have not noticed spider arms quite like M-13 though I have noticed a few strands of stars trailing off here and there. Once I saw an unusual clump of stars near the center, a v-shape. I never noticed it again, or at least noted it. One time it looked blotchy. However, most of the time it

was very rich with a dense core and appeared 3-D which is my most common description. I mentioned the colors a few times also.

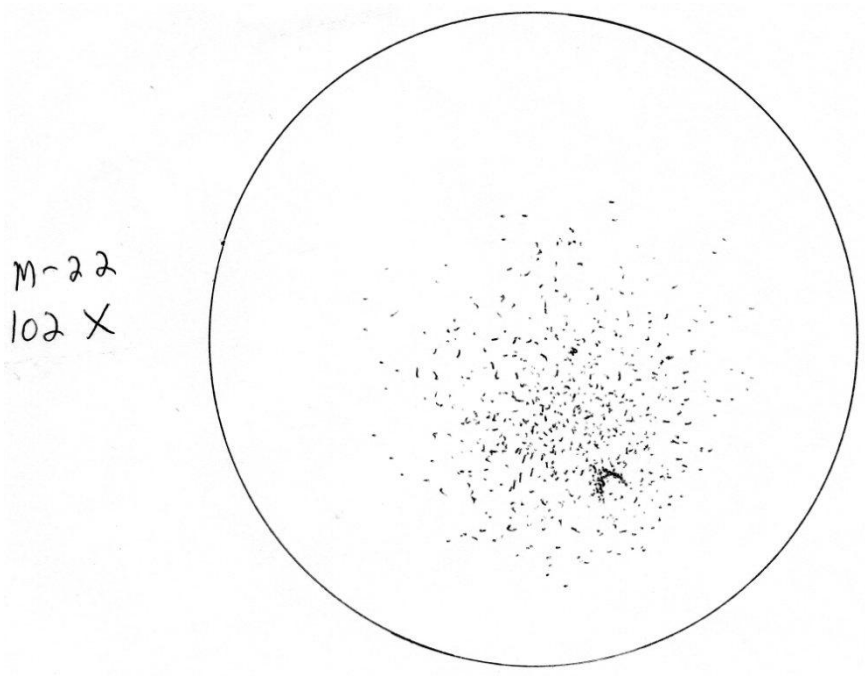
Overall, I find this cluster to be a real show even under lousy conditions.

My drawing doesn't do it justice and I didn't add in near as many stars as I see, even on a bad night. It looks more like an open cluster! Use your imagination and add in a fog in the middle. That's what it usually looks like except I can resolve hundreds of stars in that core. I used my home-built 16-inch f/6.4 Dobsonian at 93X.



I finally got another chance to check it out fresh for the challenge on September 8, 2012 at Red Rocks Visitor's Center on the west side of Las Vegas. I used my 16-inch f/4.5 Dobsonian. It was our rain check Outreach day for the Las Vegas Astronomical Society. Seeing and transparency were bad, but good enough for me to get at least a tolerable view of the cluster at 102X. I tried 229X and couldn't focus the stars. I also could not see any color whatsoever. Just gray-blue due to conditions.

It looked more like a dense open cluster with just a hint of fog in the center. What really stood out was the V-shaped wedge at one side of the core. That wedge really stood out and I made sure to feature it in my second drawing. I noted several spider arms trailing off also.



Jay and Liz Thompson: Observers from Nevada

We observed M-22 on several occasions with a variety of telescopes.

On June 16, 2012, with a 14-inch f/11 SCT, from Henderson, NV, M-22 was resolved well using a 14mm eyepiece (279X). It was somewhat attenuated due to its low altitude, appearing noticeably less bright than M-13. It appeared brighter than M-4, M-80, and M-56.

On June 18, 2012 from Cathedral Gorge State Park, M22 was resolved easily using a 4-inch f/10 SCT at 111X. In a 12-inch f/10 SCT, it was among the brightest and largest of globulars observed that evening (others observed were M-28, M-10, M-12, M-3, M-55, M-53, NGC-5053, M-4, and M-80).

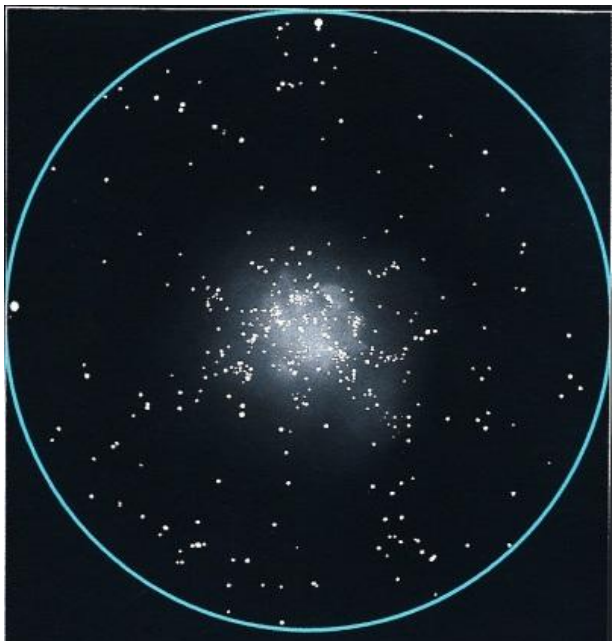
On August 12, 2012, using a 60mm (2.4-inch) 15-60X zoom spotting scope from Henderson, NV, M-22 was evident at 15X. The cluster held up well under increasing magnification up to the spotting scope's maximum of 60X.

Notwithstanding the nearby almost-first-quarter moon, on August 23, 2012, using a 5-inch f/10 SCT from Henderson, NV, M-22 was resolved into a beautiful swarm of stars at 50X and 142X.

Brandon Doyle: Observers from New York

Last summer, a friend was quite interested in the night sky so I chose to sketch this object for them. I spent several hours over the course of many nights to see what I might be able to gather. By not attempting to roughly jot down all of the details in a single night I was allowed to really explore the relative abundance of stars. Higher magnification was definitely necessary to be able to define one from the next, and on many nights in steady seeing I was able to see down to to ~15th magnitude. What was most impressive to me was the tiny "knots" or smaller groups of stars within the cluster that I couldn't resolve. They appeared as tiny splotches with faint surrounding halos.

After I was satisfied with the number of stars that I recorded on one sheet, I took another and recorded the mottled brightness of specific regions within the core. This left it as being very clumpy in appearance. Though it's hardly necessary to mention, this object resides in one rich star field! After finishing this final draft it struck my mind that I might want to record some of the fainter stars around the edges in its halo in the future. They may be beyond my current 'scope's limiting magnitude, but they have shown up as a faint, eerie glow extending about the center in combined brightness.



Object: Messier 72 - Sky & Telescope

Date: 8 . 4/5 . 11 -Site: Backyard

Seeing: 2 : 5 - Transparency: 2 : 5

Constellation: Sagittarius

Type: Globular Cluster

Magnification: 220 X - AFOV: 52 ° - TFOV: 0.29 °

Eyepiece(s): TMB Planetary II - 6MM

Instrument(s): 10" Orion Intelliscope Schmidt

Filter(s) Used: None

Artist(s): Brandon Bryde

Start Time: 11 : 41 - End Time: 12 : 25

Wind Vel: 2 mph - Cloud Cover: 5 % -Temperature: 69 °F

Wind Direction: North NE - Orientation:

Description: 8.4/5.11 = 72 minutes - 8.5.11 = 45 minutes - 8.16.11 = 50 minutes -

N