MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

May 2021

Report #148

Messier 3 (NGC 5272), Globular Cluster in Canes Venatici

Sharing Observations and Bringing Amateur Astronomers Together

Introduction

The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It's open to everyone who's interested, and if you're able to contribute notes and/or drawings, we'll be happy to include them in our monthly summary. 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 astronomers 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 Observer's Challenge. And for folks with an interest in astrophotography, your digital 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.

This month's target

Charles Messier discovered M3 on 3 May 1764 with a 3.5-inch refractor. The French text of Messier's catalog in the *Connaissance des Temps* translates into English as: "Nebula discovered between the Herdsman and one of the Hunting Dogs of Hevelius; it does not contain a star, the center is brilliant & its light imperceptibly fades, it is round; when the sky is good, one can see it with a refractor of one foot [at the time, telescopes were generally described by their length]; it is reported on the Chart of the Comet observed in 1779. *Mémoires de l'Académie of the same year*. Reexamined 29 March 1781, still very beautiful."

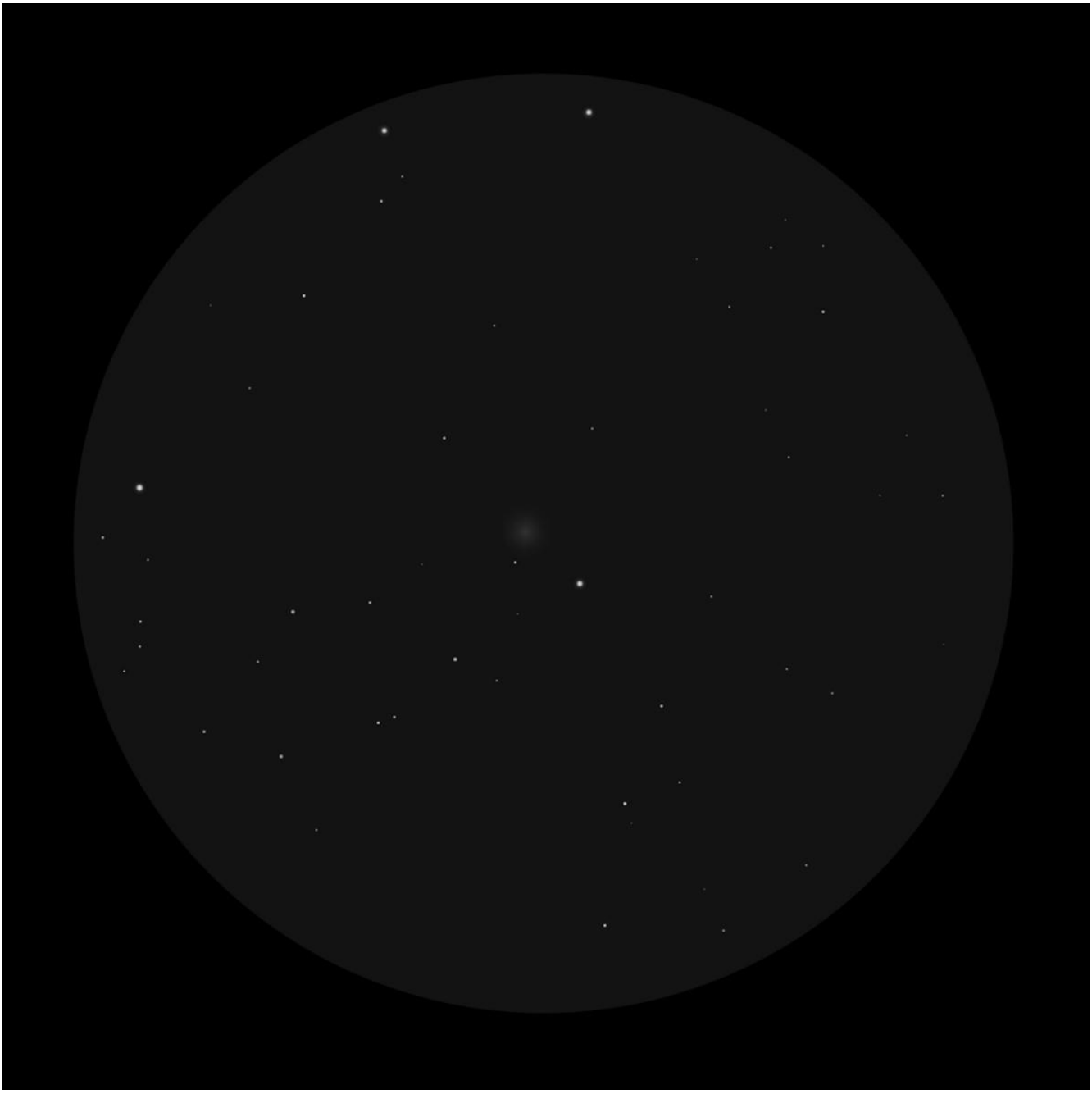
According to William H. Harris' *Catalog Of Parameters For Milky Way Globular Clusters*, http://physwww.mcmaster.ca/~harris/mwgc.dat, M3 resides 10.2 kiloparsecs (~33,000 light-years) away from us and 12.0 kiloparsecs (~39,000 light-years) from the galactic center. It shines with an integrated V-magnitude of 6.19, and the spectral type of the integrated cluster light is F6. Does its color look slightly yellow to you?

Rony De Laet: Observer from Belgium

One of the finest Springtime globular clusters is M3 in the Hunting Dogs. M3 was discovered by Charles Messier in 1764. Messier saw a circular nebula without stars, but with a bright core. This 6th-magnitude cluster is also considered to be a challenging naked eye object. The view in a pair of binoculars looks very similar to what Messier saw : a little nebula with a brighter center. The core looks stellar to me in the 8×56. I can see the core with direct vision. The easiest way to find M3 is to draw a line from Arcturus to Cor Caroli. You'll find M3 at about halfway the distance between these two bright stars. While you admire the view of this distant (34,000 l-y) city of light, imagine that this cluster of half a million stars orbits the galactic centre of our galaxy once every 300 million years.

Observing data:
Date: April 11, 2008
Time: around 22.30UT
Binoculars: Bresser 8×56
FOV: 5.9°
Filter: none
Mount: Trico Machine Sky Window
Seeing: 3/5
Transp: 2.5/5
NELM: 5.0
Sketch Orientation : N up, W right.

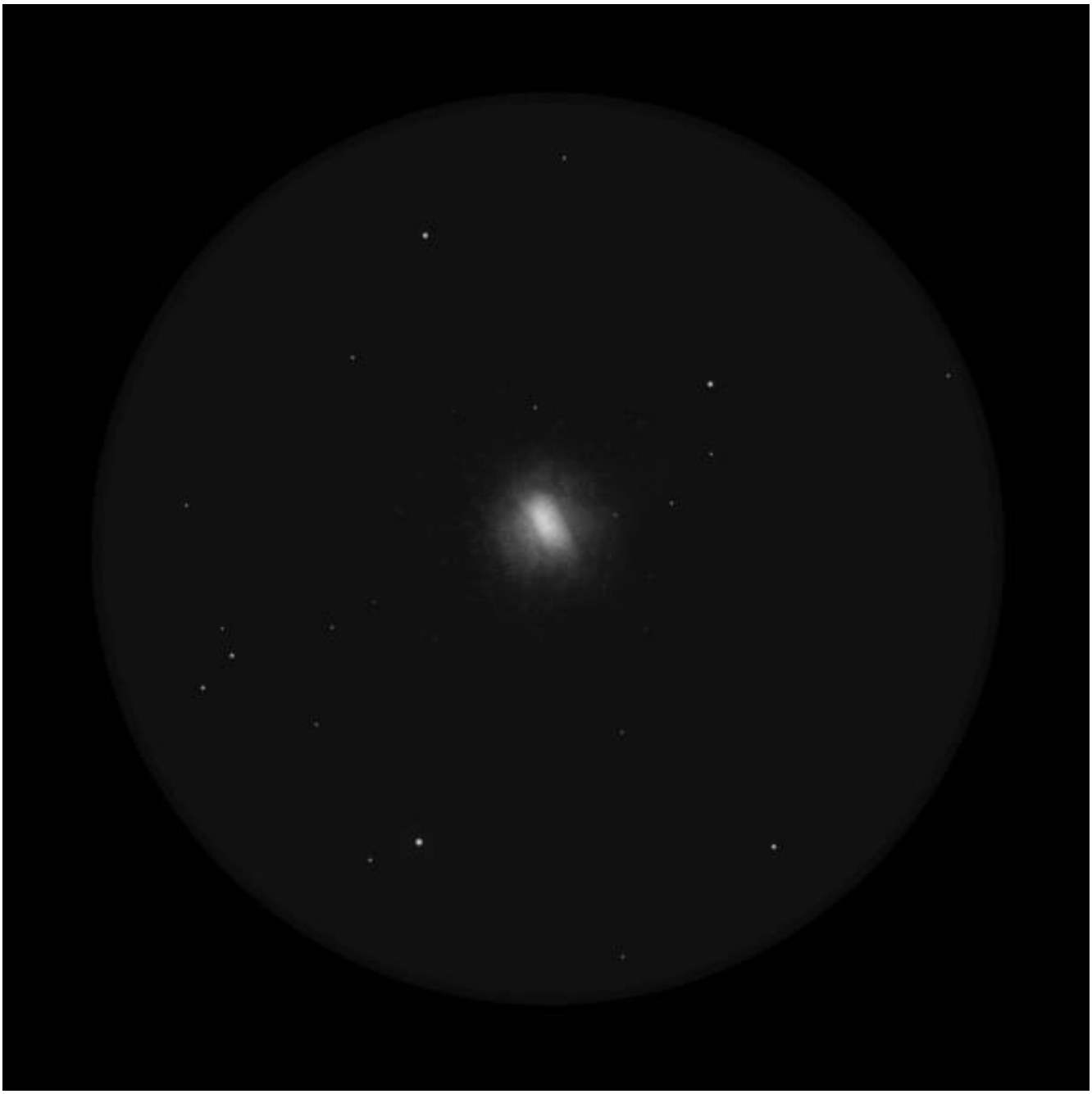
Digital sketch made with PhotoPaint, based on a raw pencil sketch.



Below is an impression of M3. I had fun teasing out as much detail as possible. Globulars are difficult to render. The mind might see patterns that aren't there. I tried to remain objective. Lots of faint stars were present in the outer region of the halo. I noticed some dark lanes in the halo, and the core looked elongated too. I hope you like the view.

Date: June 5, 2007
Time: 22.30UT
Scope: ETX 105/1470
Meade 25mm and 15mm SP
Power: 66× to 100×
FOV: 35′
Filter: none

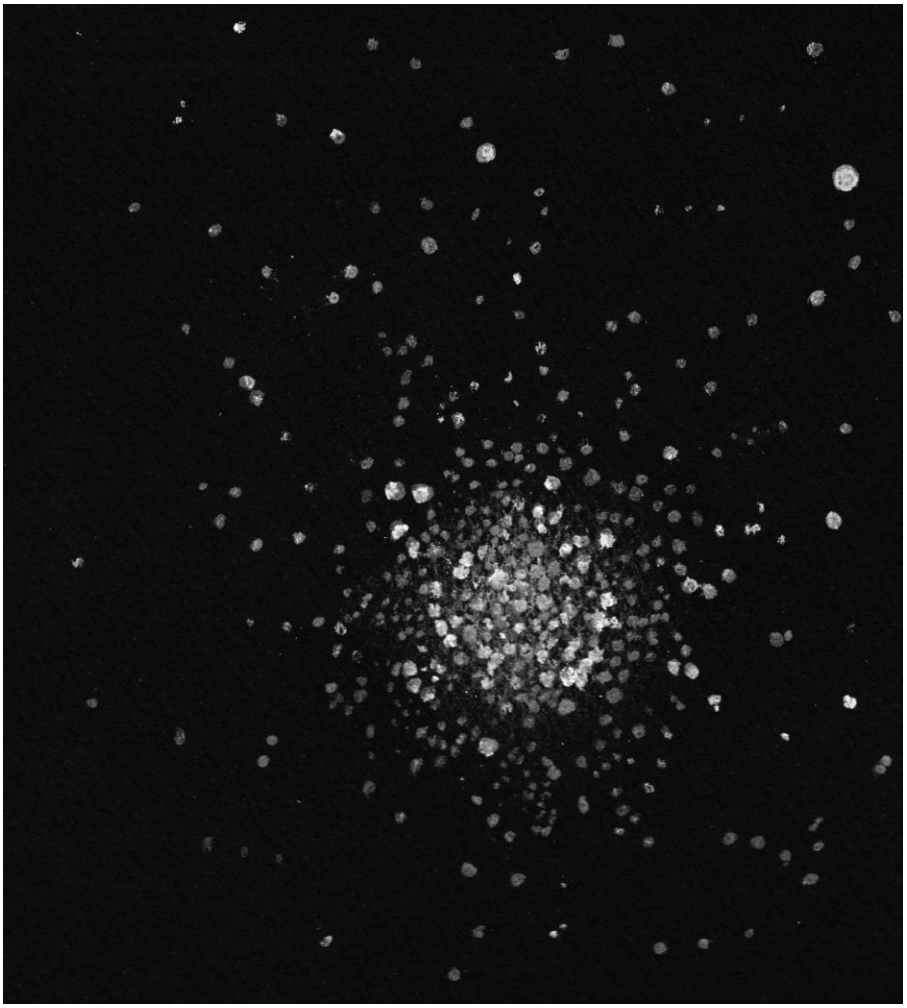
Seeing: 2.5/5
Transp.: 2/5
NELM: 4.9
Sketch Orientation : N up, W right.
Digital sketch made with PhotoPaint, based on a raw pencil sketch.



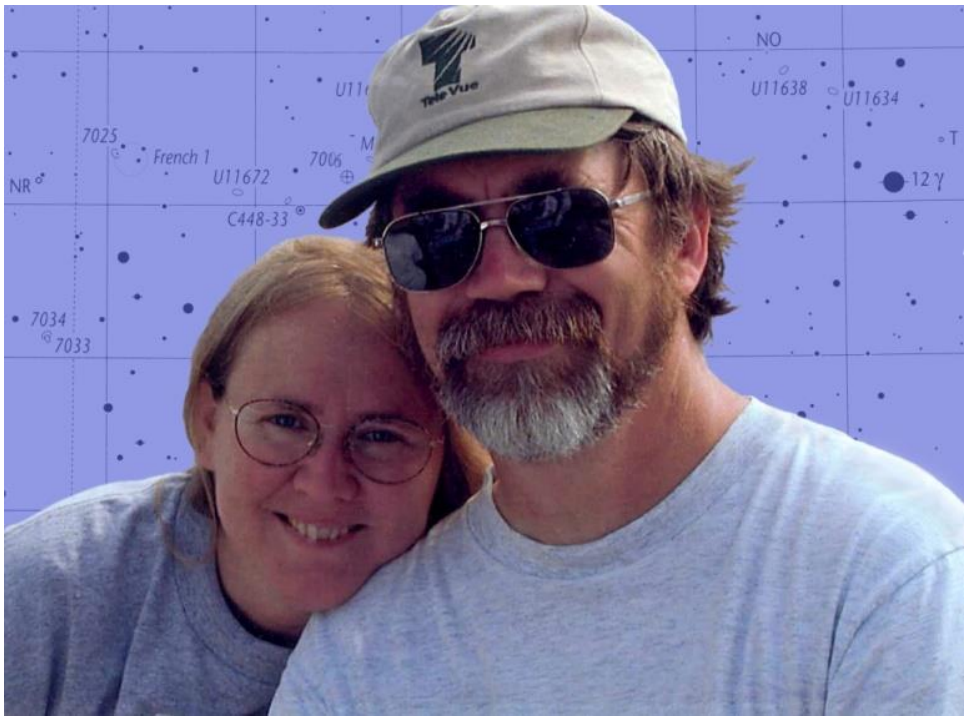
Dale Holt: Observer from England, 30 miles north of London

For M3 I used a 153mm f/9 triplet refractor and an old analogue Watec 120N+ deep sky video camera with custom cooling. The camera is B&W and delivers its image in near real time, typically 15 sec exposure to a CRT monitor in my observatory office where I sketch from the screen. Most commonly I used graphite pencil on sketch paper although sometimes I use white on black hard pastels where the object is nebulous. Post drawing I scan the image and invert using Paint.

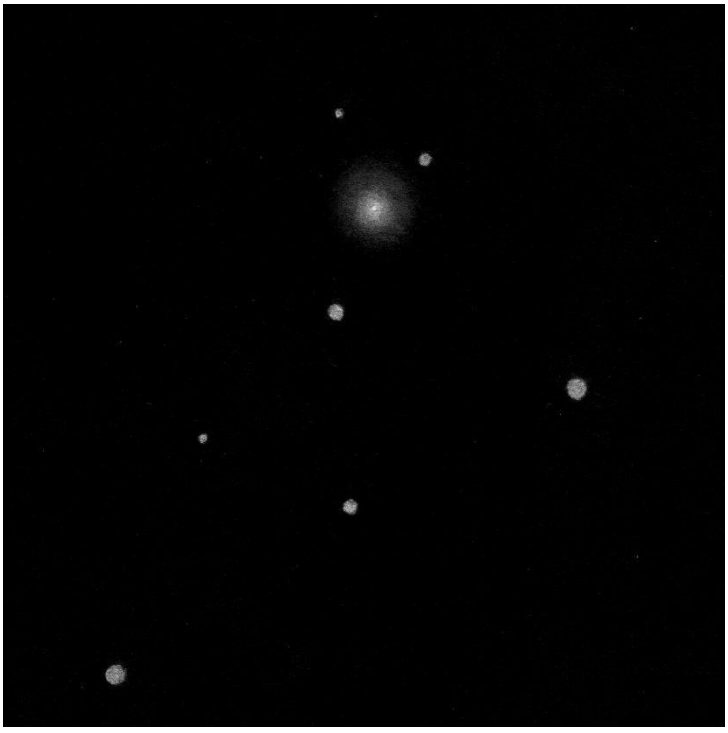
Sketch follows.



Sue French: Observer from New York

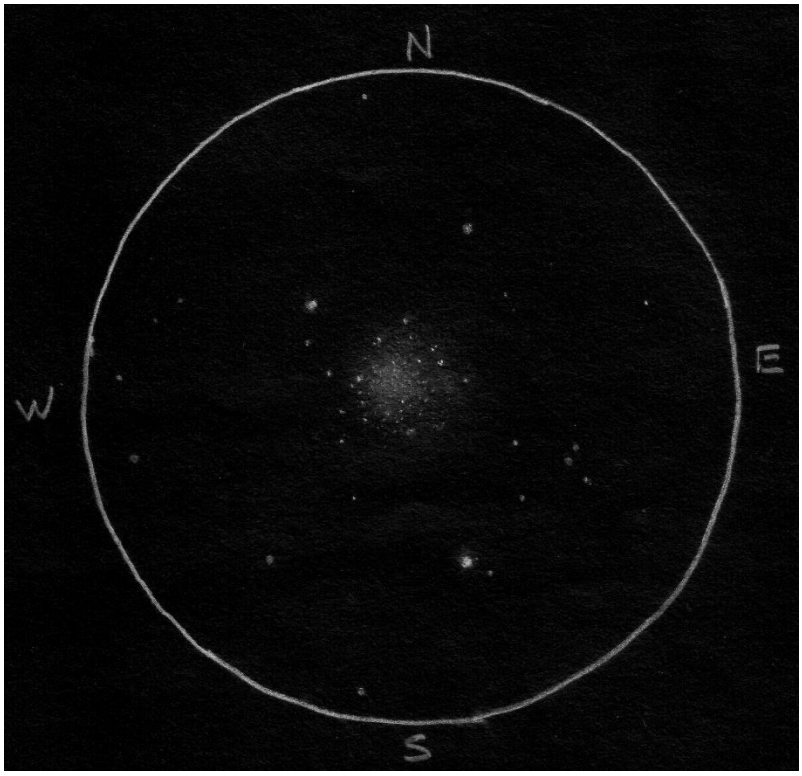


N



W

18×50 image stabilized binoculars. M3's moderately faint halo looks a bit grainy and spans about 10′. The cluster becomes brighter about halfway in and intensifies dramatically toward the center. An intense point of light dwells at its heart.



The sketch above was made in 1998 and is mirror-reversed as seen through my 105/610mm (4.1-inch f/5.1) refractor at 127×. The transparency was fair, with the faintest star visible to the unaided eye shining at magnitude 5.6. At the same magnification on a better night, the little scope resolved some stars right across the cluster's center.

This is a beautiful cluster through my 130/819mm (5.1-inch f/6.3) refractor sporting a bright core and a fairly bright, 9½′ halo when viewed through the refractor at 37×. At 164× the halo and core are rich in pinpoint stars, the core brightly backdropped with mist. A scattering of brighter halo stars stand out from the rest, most notably an 11.7-magnitude star in the western side. At 234× this stunning group shows stars right across the core's 2½′ glow. Some dusky areas shadow the outer core, and the cluster's brightest region is elongated roughly northeast-southwest.

Richard Nugent: Observer from Massachusetts

There are globular clusters and then there are globular clusters. The Milky Way Galaxy is home to over 100 of these objects but for observers in the northern hemisphere, six are standouts. They are: M2, M5, M13, M15, M22, and this month's object, M3. Also known as NGC 5272, this cluster lies some 33,000 light-years from Earth, is about 180 light-years in diameter, and contains several hundred thousand stars. Its Shapley-Sawyer Concentration classification is VI – moderately condensed. Being relatively nearby, the cluster spans some 18′ and shines at magnitude 6.2, making it visible with almost any optic. The brightest of its stars are about magnitude 12.7 and are easily seen in backyard telescopes. M3 is found nearly half-way along a line between Arcturus and Cor Caroli.

I've observed this cluster for decades, its appearance in the evening skies being the true harbinger of Spring! My middle son called it "the star ball" because, in large aperture scopes, the cluster's 3-dimensional structure can be easily imagined. For me, this month's challenge isn't about finding or seeing the cluster but determining the smallest aperture that is needed to resolve the cluster's individual stars.

I used a multiple-aperture mask on my 10-inch scope (1195mm focal length) operating at 178×. The night was not perfect. The sky was a bit hazy and seeing was mediocre with 4.6-magnitude NELM.

At 60mm, the cluster appeared as a faint, diffuse glow with two stars intermittently visible only with averted vision. The mask's 70mm and 80mm apertures gave a very similar view. Darker skies might have helped.

With the mask's 90mm aperture the cluster appeared somewhat granular with a few more stars which still required averted vision to detect.

At the full, 10-inch aperture, M3's true nature was revealed. With direct vision, dozens of stars were resolved and could be seen sprinkled across face of the cluster while the core remained hazy. While quite beautiful, a darker sky would surely make the cluster even more impressive!

I had an opportunity to view M3 through ATMoB member Steve Clougherty's 18-inch scope (5.2 NELM) and have viewed the cluster many times using my own 20-inch scope (4.7 NELM) and the views are nothing short of spectacular! Many hundreds could be seen with direct vision and by

carefully choosing the magnification and true field of view, this cluster can be absolutely breath-taking!

My homework assignment for readers: You owe it to yourself to view M3 – and the other clusters mentioned above – through a large aperture scope. Find an observatory or local club with just such a telescope and check out these magnificent objects. You'll never forget the view! Enjoy!

Larry McHenry: Observer from Pittsburg, Pennsylvania

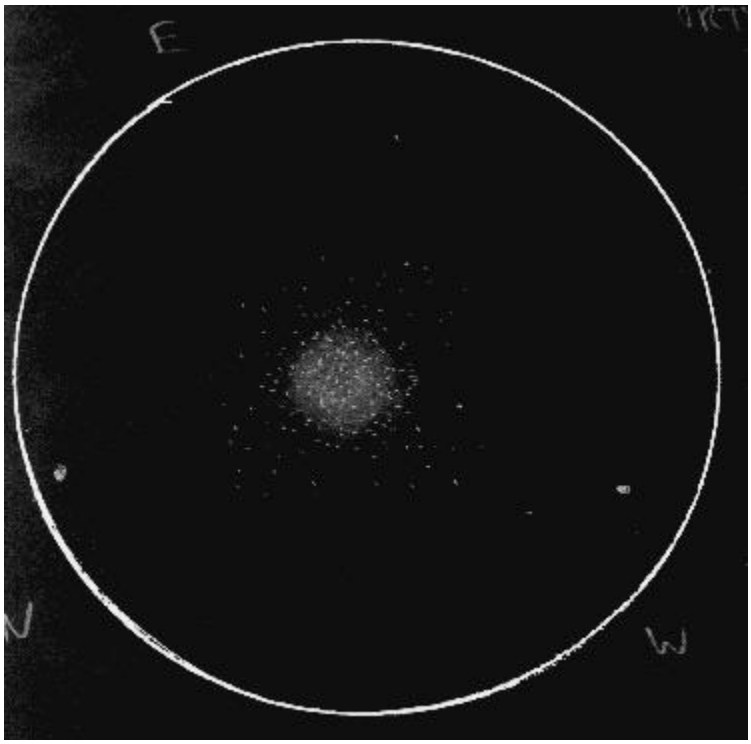
May: M3 – Globular Cluster – **Canes Venatici**: Mag. V= 6.2; Size 18′

Charles Messier discovered the 3rd entry on his "not a comet" list appropriately on May 3rd 1764. Some sources say that it is this object which prompted Messier to actually start his catalog.

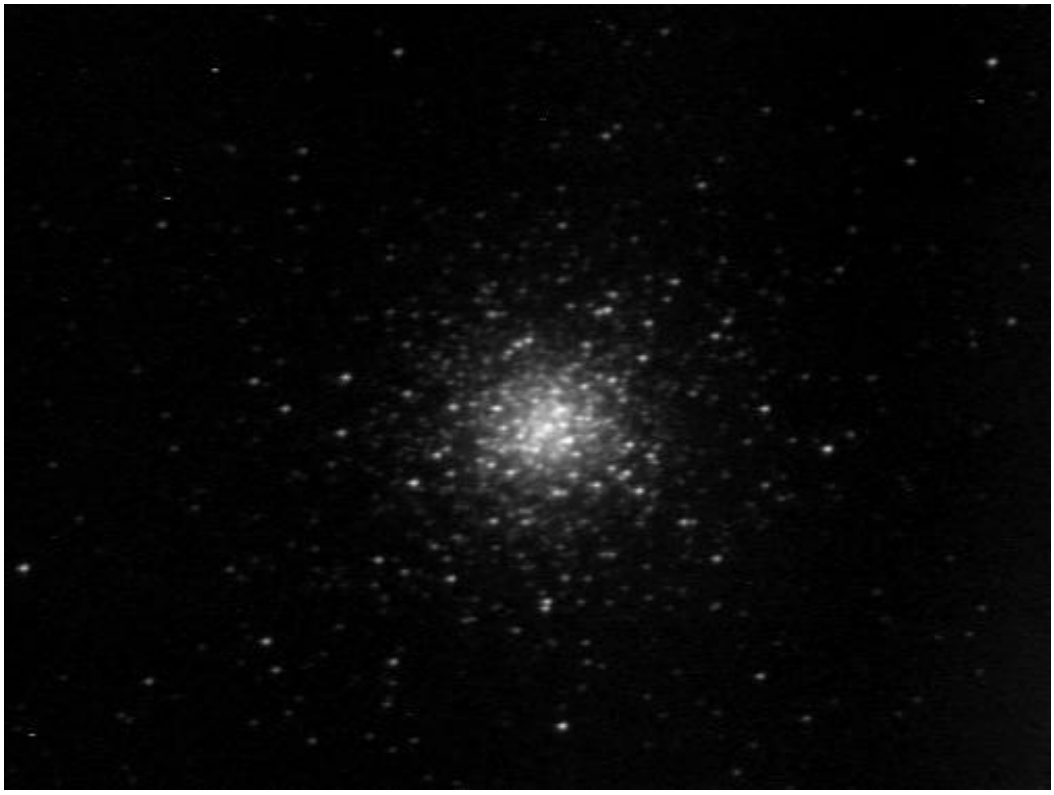
M3 is located in the spring constellation of Canes Venatici, Boötes' hunting dogs Asterion and Chara. At magnitude +6.3, the globular cluster has upwards of half a million stars in a glowing ball around 220 light-years in diameter, is about 34,000 light-years distant, and about 11.4-billion years old.

Visually in the telescope, M3 is a large and bright globular cluster, with many resolved stars. A number of star-chains radiate outwards from the cluster's core. Two moderately bright (8th- & 9th-magnitude) field stars "guard" either side of the cluster.

Visual Eyepiece Sketch: 05/18/1987 from suburban backyard in Louisville, KY. Using a 13.1-inch f/4.5 Dob reflector and 12.5mm eyepiece @ 92×. West is to the lower right.



Video-Capture: 04/05/2013: from Big Woodchuck Observatory in Pittsburgh, using a 6-inch RC optical tube @ f/9 on a GEM Mount, using an analog video-camera & IR filter @ 25 seconds, unguided single exposure.



Mike McCabe: Observer from Massachusetts

Man, was I glad that the observer's challenge object for May 2021 was M3, because I finally got to be able to sit down at a small telescope that I love using and was still able to effectively observe the month's challenge object. I was really looking forward to that. It's not that I don't like an observing challenge – I do, but the first four months of this year have presented us with pretty much less than ideal skies with which to deal with some very dim subjects.

Take April's challenge objects for example – interacting galaxies NGC 3226 and NGC 3227 lie just about a degree east of Gamma Leonis, and both shine in the vicinity of 13th magnitude. Under my sky, which typically averages Bortle 6/7 and often sports a transparency rating of 2/5, these objects are hard to see even in a 10-inch Newtonian reflector. They take a minute to come into view, even when the scope is aimed right at them.

M3 is a different story altogether. This 11-billion-year-old gathering of 500,000 stars is notable in the fact that it was the first object on Messier's list that he actually discovered himself. In his notes he indicated that he saw just nebulosity without stars, which is entirely repeatable by any modern observer who views M3 through a small telescope. In my 4.5-inch f/8 Newtonian reflector, M3 appears perfectly smooth from the center out towards the periphery, where it then takes on the appearance of having translucent nebulosity.

It takes a little more aperture to begin resolving individual stars in M3, but one doesn't have to wield a huge scope on it to reveal the globular cluster nature of it. In my prior notes of M3 observations, I have it as 'amazing with many stars resolved' in my 8-inch Newtonian @ 267×, and "individual stars resolved in the halo" in my 10-inch Newtonian @ 140×. Any way you slice it, M3 is a spectacular object in the eyepiece!

Sketch follows:

OBSERVATION LOG - OBJECT: MESSIER 3/NGC 5272

DATE MAY 15 '21 /Z TIME 22:35 /Z EDT LOCAL OBSERVING LOCATION 42°N 71°W

SCOPE/APERTURE 4.5" F8 NEWTONIAN

EYEPIECE 25mm 60° MAGNIFICATION 37X/1.6°

FILTER — SEEING 3/5 TRANSPARENCY 2/5

TEMP 60°F BARO PRES. — WIND CALM

COMMENTS:

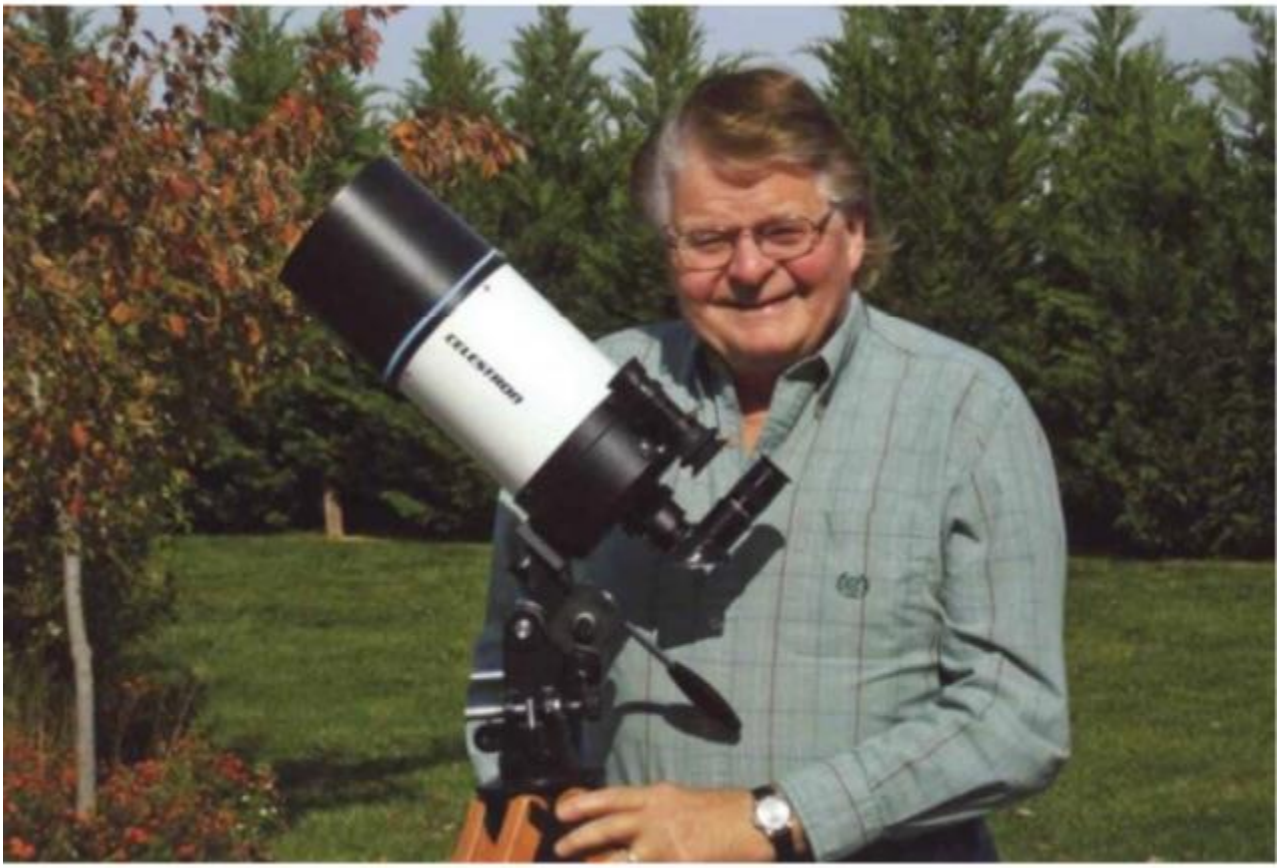
A TRULY SPLENDID OBSERVATION IN A SMALL TELESCOPE.

LARGE, SMOOTH GLOW THAT BECOMES TRANSLUCENT IN THE PERIPHERY.

LARGE APERTURES BEGIN TO RESOLVE INDIVIDUAL STARS.

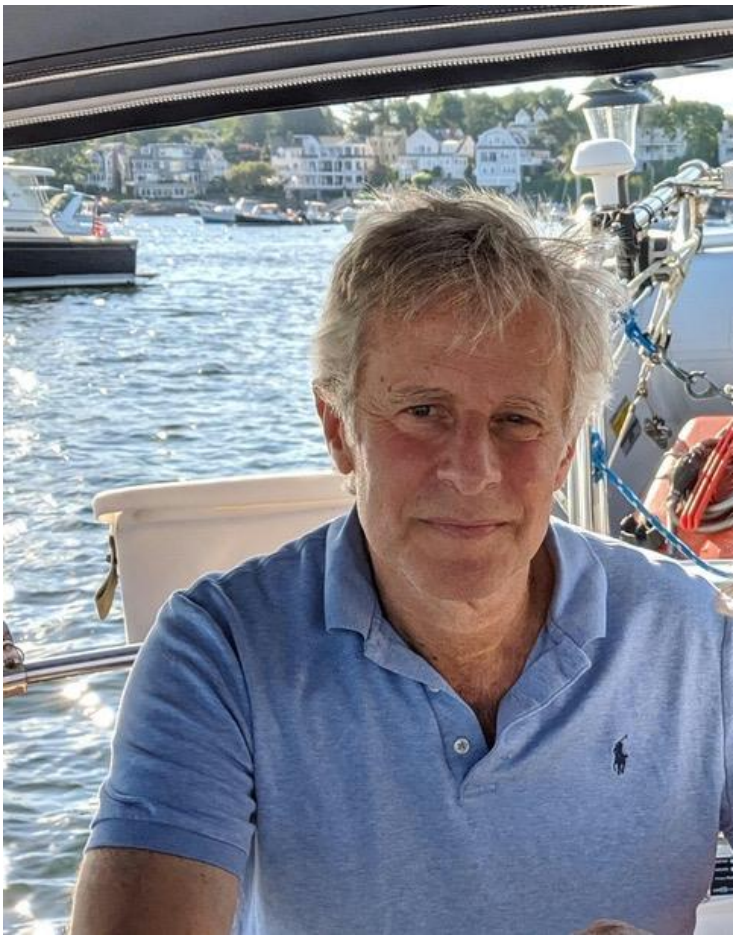
ORIENTATION AND/OR ROTATION

James Mullaney: Observer from Delaware



I've always referred to M3 as "Spring's Globular" since it's the first bright one of its exalted class of the season. Resolved across its brilliant core in an 8-inch SCT at 160× and a truly awesome stellar beehive in a 13-inch refractor at 290×!

Barry Yomtov: Observer from Massachusetts



One of the challenges of imaging a bright globular cluster like M3 is being able to bring out the outer stars of the cluster while trying to avoid “blowing out” or creating too much glare in the core. It’s always a tug of war between stretching the image while keeping the core’s detail.

So I decided to try a technique I had previously when imaging the Orion Nebula (M42). I imaged M3 at two different exposures. With the RASA 11 f/2.2 optics, the short exposures allow for getting many more subs in a shorter period of time. So with M3, I took 65 images at 20 seconds and 49 images at 10 seconds (total of 30 minutes exposure). I stacked each set of images separately (DeepSkyStacker), and processed (PixInsight) each resulting composite image independently.

I then used the Layers function in Photoshop to align and place the core (i.e. 10 second version) within the 20 second image. The resulting image follows.

Mario Motta: Observer from Massachusetts

April is generally a bad month in Massachusetts, with plenty of rain and good weather this week until the moon was around. So, the above is an image taken of M3, six years ago in color. Note the dark lane through the SE in the following image, which is also visible on Roger Ivester's sketch.

My 32-inch telescope, with my older SBIG STL1001E camera, RGB filters. About 1.5 hours totaling my older subs on file.

For this image I retook some frames, and reprocessed my old, better image with stars separated to the center, but the dark lane is now gone, overwhelmed by many more stars.

Michael Brown: Observer from Massachusetts

M3 is one of the brightest globular clusters and a prominent object in the spring sky. I looked through my observing notes for the past several years and noticed that I virtually always observe it during any session in the spring. I've always thought of it as being in the "second tier," just below top globulars M13 in Hercules and M22 in Sagittarius, which I can't see from my house due to tall trees to the south but always observe from my regular summer vacation spot on Paradox Lake, NY. Despite that status in my mind, I have made comments several times in my notes such as "Wow!" and "spectacular."

My most recent observations of M3 were on May 12 and May 13. I noticed the interesting field, with three relatively bright stars forming an elongated triangle with the globular inside near the close pair of stars (short side of the triangle) to the north. M3 seems not to be highly concentrated at the center compared to some globulars such as M15 with a much larger density gradient. Through my 8″ SCT, I can see individual stars at the center, but it's not completely resolved. Instead, there is a kind of grainy appearance in the cluster's core.

I photographed M3 on April 7 through the 8-inch scope using my Canon digital SLR at ISO 3200 and a total exposure of 9 minutes. Visually, I had the impression that the diameter of the cluster was roughly half the distance between the two brighter stars to the north. This seems confirmed in the photograph, though it depends where the edge of the cluster is judged to be.

Image follows.

James Dire: Observer from Illinois

M3 is a globular star cluster located in the constellation Canes Venatici. The cluster is 12 degrees northwest of the bright star Arcturus. M3 was first cataloged by Charles Messier in 1764. It has a visual magnitude of 6.2 and is roughly 38 arcminutes in diameter.

M3 is one of nearly 200 globular star clusters forming a spherical halo around our Milky Way galaxy. It is located 33,900 light years away. The cluster has a mass of a quarter million suns in a diameter of 180 light-years. Like most globular clusters, the stars are very old, perhaps 8 billion years, and are probably first generation stars.

I took two images of M3 shown here. The first was taken with an 8-inch f/8 Ritchey–Chrétien Cassegrain (with a TeleVue 0.8× FF/FR) with a SBIG ST-2000XCM CCD camera. The second was taken with a 10″ f/6 Newtonian with a TeleVue Paracorr Type 2 Coma Corrector with the same camera. Both exposures were 40 minutes. In each image north is up and east to the left.

Joseph Rothchild: Observer from Massachusetts

M3 is one of my go to objects that I have observed for over 40 years with both binoculars and telescopes. It is easily found, about 40% of the distance from Arcturus to Cor Caroli. I observed M3 on May 12th with my 10-Dob from dark skies on Cape Cod.

The globular was best observed with a 14mm eyepiece at 102×, which showed a compact core, and with excellent resolution of many stars. There was also a halo of stars. I did not see or note any distinctive patterns. Not as impressive as M13 or M22, but still satisfying.

Anas Sawallha: Observer from Jordan

Location: Irbid, Jordan
Telescope: 10-inch Dobsonian SQ XT10
Eyepiece: 12.4mm Plössl
Seeing: Very good.

This month's target, globular cluster M3 it is in the constellation of Canes Venatici but it's actually at the boundary of the constellations of Boötes and Coma Berenices.

It has always been said that M13 is the grandest of globular clusters, but for me M3, is by far more beautiful. And Omega Centauri for me…is the most fabulous of all, however, too far south for most northern observers.

Zooming into M3 reveals a lot of individual stars, with excellent resolution. I used a 12.4mm Plössl with 3× Barlow for a sight that was magnificent…difficult to describe.

Sketching is fun, but also very challenging.

Sketch follows.

Gregory Brannon: Observer from North Carolina

I have observed Messier 3 several times this season. It's a nice globular cluster with some granularity suspected even in my C90, which is *not* a deep-sky scope.

Attached is my best sketch of M3, from when I visited a slightly darker site than my bright suburban backyard.

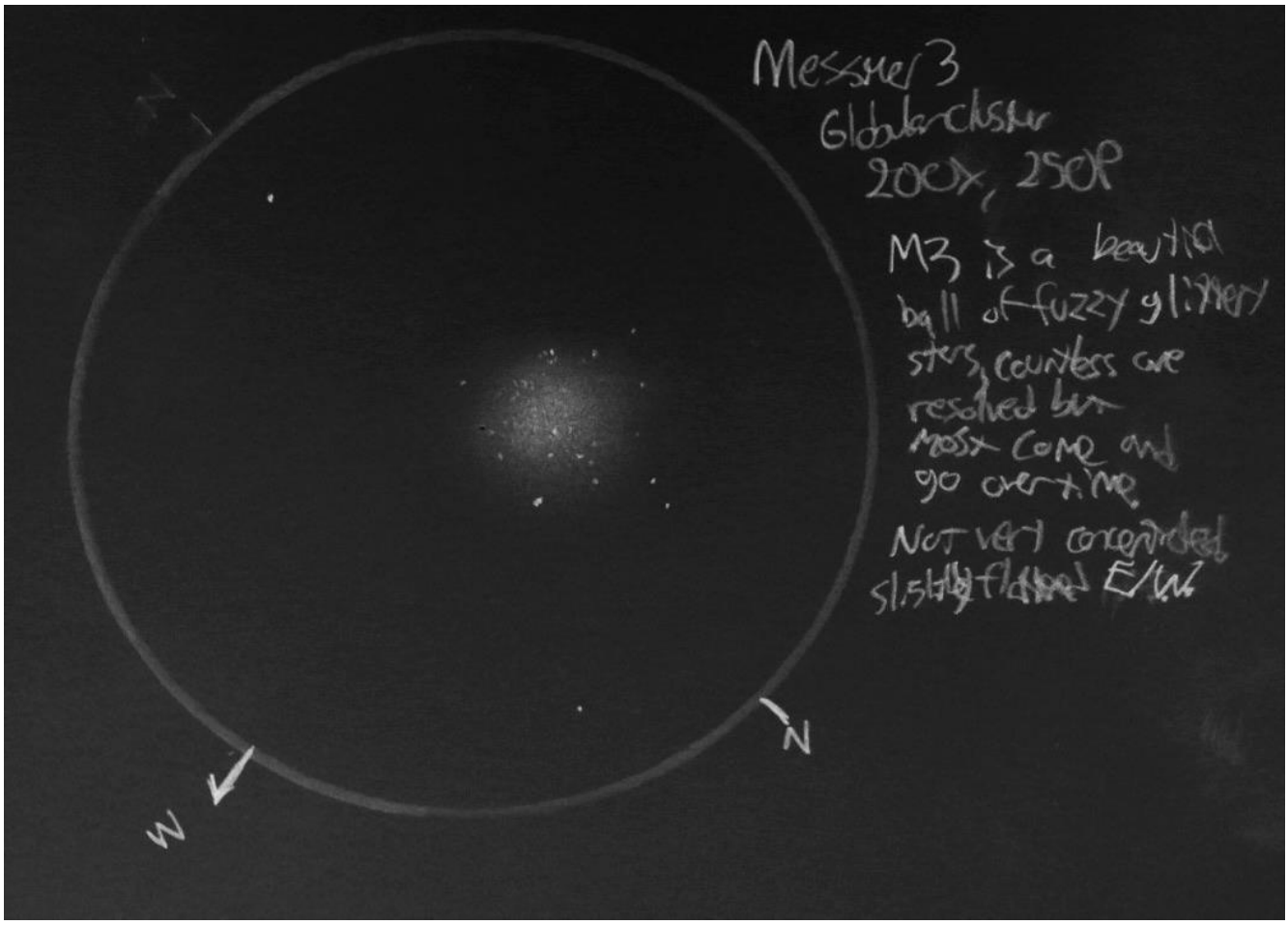
FlexTube 10″ Dobsonian, 200×

Messier 3 is a beautiful fuzzy ball of glittery stars, countless are resolved but most come and go over time. Not very concentrated. Slightly flattened in the east/west axis.

Messier 3 has an easy star-hop. It's halfway between Arcturus and Cor Caroli, or just a smidge closer to Arcturus. It's easily visible as a little fuzzy ball in 7×50 and 15×70 binoculars.

Globular clusters are interesting because they reward high and low magnification in different ways. I usually sketch globs at high power, sometimes 1mm or 0.5mm exit pupils, and they can get really dim– but then all of the stars are more easily resolved. But at low power, they reveal their larger-scale structure a little better and are just more comfortable to look at.

Sketch follows.


Messier 3
Globular cluster
200x, 250P
M3 is a beautiful ball of fuzzy glittery stars, countless are resolved but most come and go over time.
Not very concentrated slightly flattened E/W
N
W

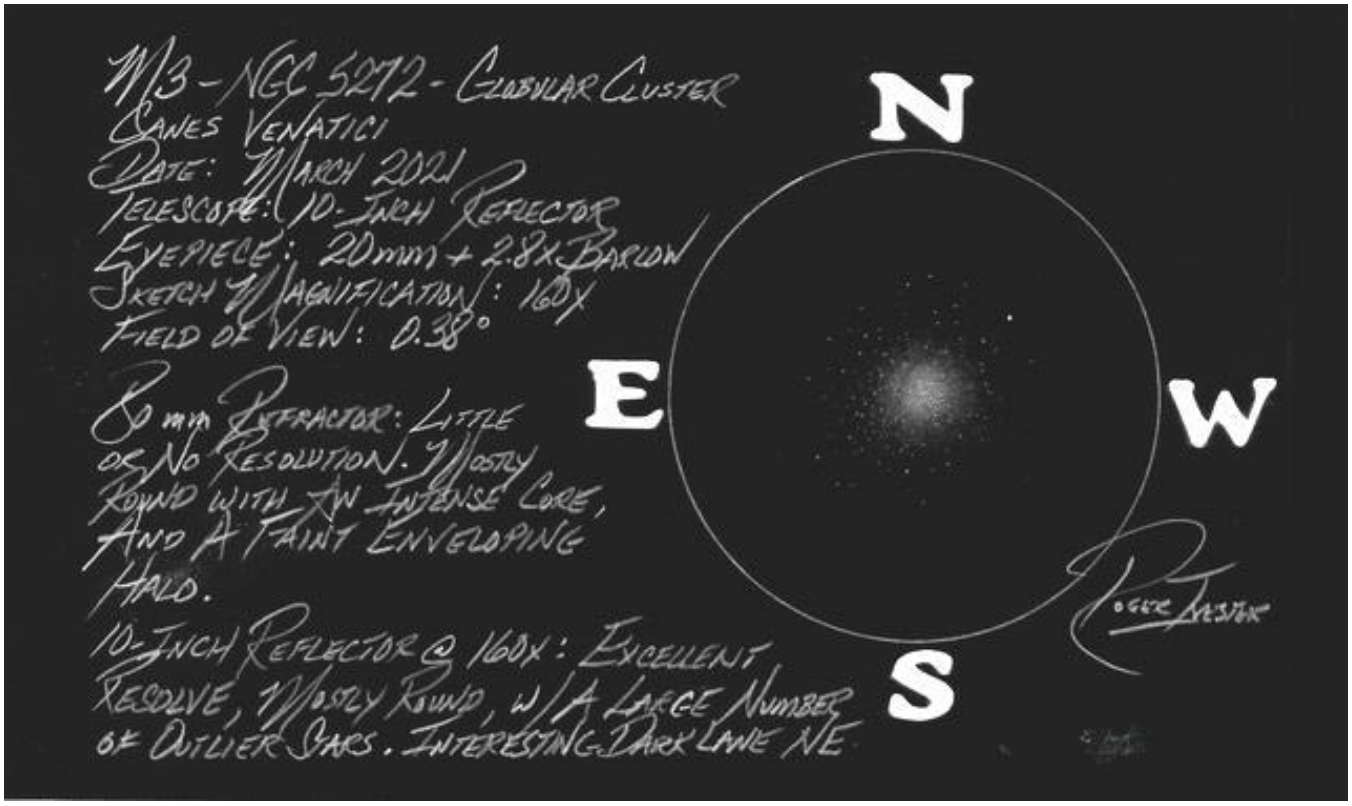
Roger Ivester: Observer from North Carolina

M3 (NGC 5272) globular cluster in Canes Venatici
Date: March 2021

80mm refractor: Little or no resolution, appearing mostly round with an intense core, and a fainter enveloping halo.

Telescope: 10-inch f/4.5 reflector
Eyepiece: 20mm + 2.8× Barlow
Sketch magnification: 160×
Field of View: 0.38º
Excellent resolution of stars. Mostly round with a large number of outlier stars beyond the halo. A very interesting dark lane was noted in the SE-NE of the cluster.

Sketch follows.



The following is the complete listing of all Observer's Challenge reports to-date.
https://rogerivester.com/category/observers-challenge-reports-complete/