

MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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MARCH 2017

M67 (NGC-2682) Open Cluster In Cancer

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.

M67 (NGC-2682) Open Cluster In Cancer

M67, also known as NGC-2682 or Collinder 204, was discovered by Johann Gottfried Koehler in 1779. It shines at a mag. of approximately 6.1 and is about 2.6 to 2.9 thousand light-years away. It may not be the oldest, but it's up there with the oldest known open star clusters in the sky. It's also one of the most studied clusters next to the Hyades. For more details on the cluster, check out Dr. Jim Dire's outstanding description below.

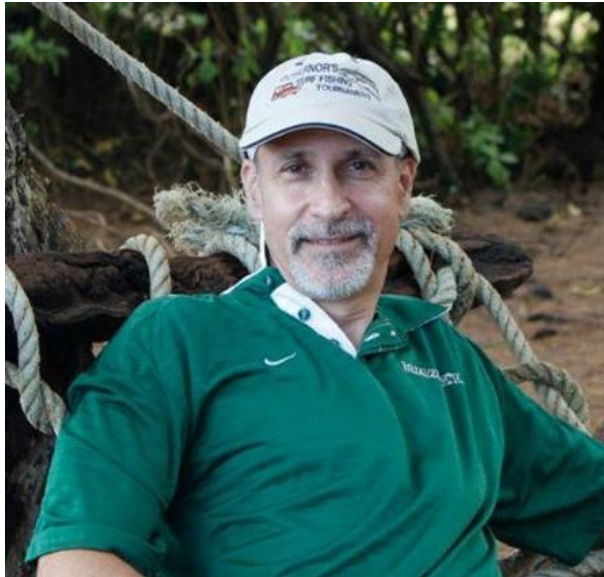
Observations/Drawings/Photos

NOTE: We'd like to welcome David J Eicher, editor of Astronomy Magazine to the Observer's Challenge.

David Eicher: Editor – Astronomy Magazine and Observer From Wisconsin

M67 is a beautiful object. Two- and three-inch telescopes show a misty patch of light speckled with a few tiny, gleaming stars. A 6-inch telescope at 120X resolves the cluster into dozens of faint pinpoints, but an overall haze pervades the field of view. A 10-inch scope at 100X does a better job, because it resolves the group into what is clearly an open star cluster without nebulosity.

Dr. James Dire: Observer From Hawaii



M67 is an open star cluster in the constellation Cancer, located 105 arcminutes west of the star Acubens (Alpha Cancri). The cluster is also cataloged as NGC-2682. It was first recorded by the German astronomer Johann Gottfried Koehler in 1779 and then by Charles Messier in 1780. The cluster is mag. 6.1.

Messier 67 has nearly 100 stars between mag. 10 and 14, spread over a diameter of about 30 arcminutes. The cluster is 2,960 light-years away and approximately 25 light-years across. It's one of the closest open clusters and thus one of the most studied. The cluster is several billion (3.2-5) years old. Unlike most star clusters that reside in the plane of the Milky Way, M67 lies 1,500 light-years away from the plane.

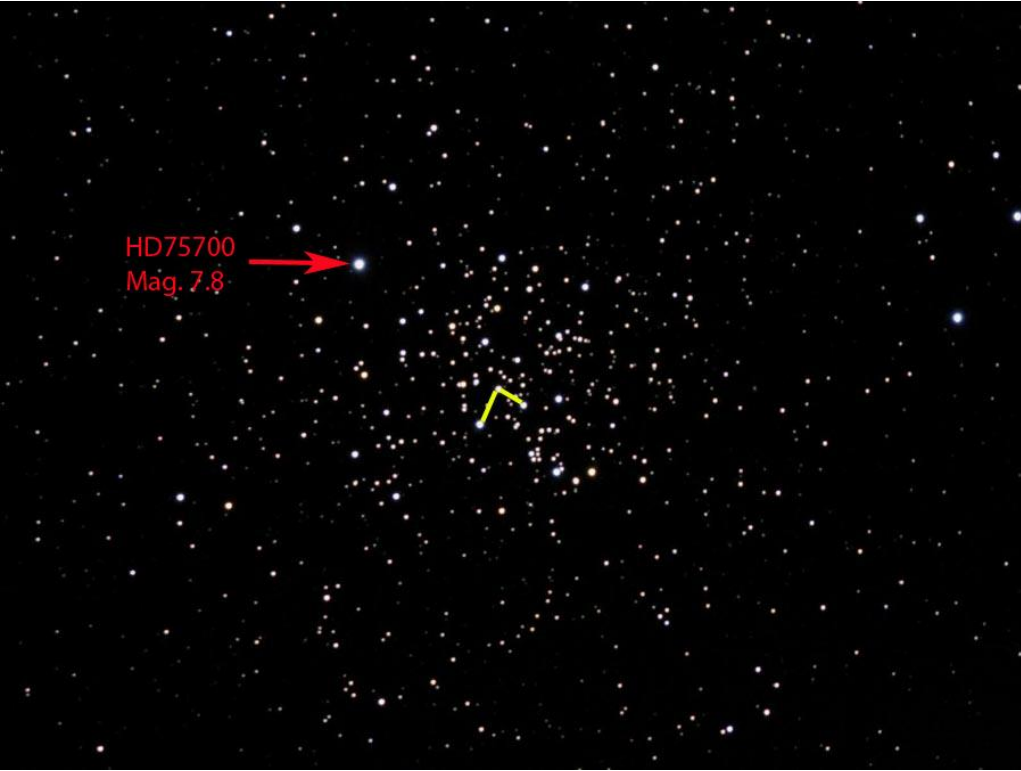
Stellar interactions have flung most of the lighter stars to the outer regions of the cluster, leaving the more massive stars in the center. In possibly 5 billion more years, it will no longer exist as the stars will have spread out too far from one another to be gravitationally bound.

My image of M67 was taken with a 190mm (7.5-inch) f/5.3 Maksutov-Newtonian telescope with an SBIG ST-2000XCM CCD camera. The exposure was 20 minutes. North is up and east is to the left. The faintest star in the image is mag. 15. The exposure captures how the cluster looks in my 14-inch Dobsonian (Newtonian).

I viewed the cluster this month with a 6-inch f/6.5 achromatic refractor with a 20mm eyepiece (50X). The brightest star, shown with the red arrow on my second image, is mag. 7.8. This star appeared orange to me, but my image doesn't show that color. That was probably due to my image processing. I captured this image in 2010 and no longer have the original file to check my color processing accuracy.

Three stars stood out at the center of the cluster forming an “L” shape. I’ve drawn the L in yellow on the second image. The brightest of the three is mag. 9.6, while the other two are 10.2. With the 6-inch refractor, I couldn’t visually resolve the half-dozen stars inside of the triangle formed by those three stars. However, the area inside the triangle didn’t appear as dark as the space between other stars. So, my eyes were capturing some of the photons from those unresolved stars.





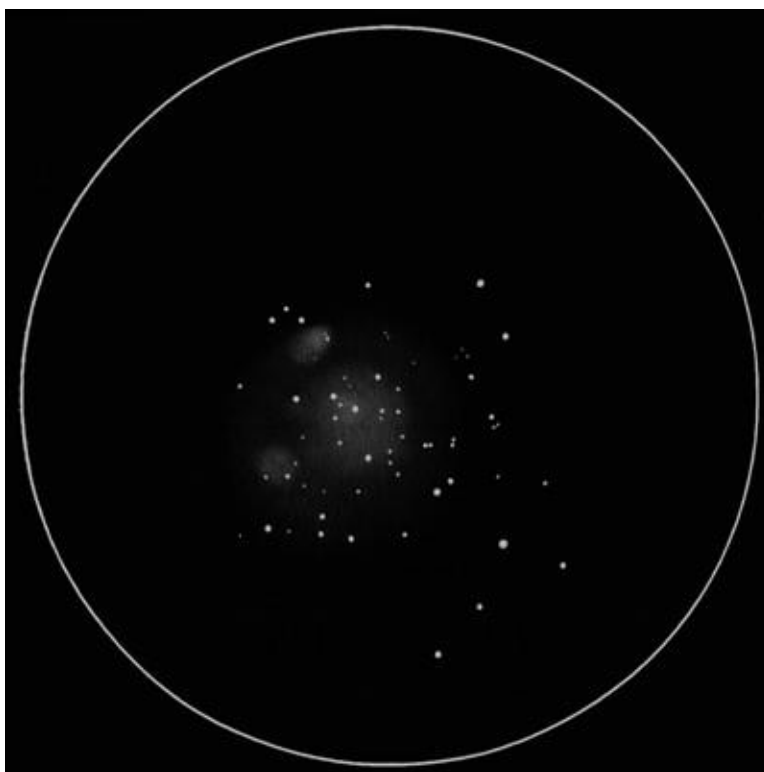
Jaakko Saloranta: Observer from Finland



I observed M67 with a 4.5-inch reflector. This cluster was barely visible to the naked eye as a nebulous patch in the same “field of view” with Praesepe under truly dark skies. I was observing from Teide National Park, Canary Islands, Spain, at an altitude of 7,480 feet. Switching to a pair of 8X30 binoculars, the nebulous stars showed signs of resolution.

With a 4.5-inch Newtonian, this is truly a fine cluster, even under average observing conditions. I called M67 “A fine cluster of about 50 stars and many swirling chains of stars.” At low power, there was a faint glow visible in the background, slightly concentrated toward the middle. The core region of the cluster was roughly 12’ in size. With low power, I saw several chains of stars running NW and SE, increasing the cluster’s visual size to nearly 30’, with a bit of imagination. A foreground mag. 8 star NE from the cluster appeared a “topaz yellow.” The brightest actual member of M67 was probably mag. 9.8 TYC 814-1515-1.

I discerned two small patches of nebulosity within the cluster. The SW one resolved into 4-5 stars between mags. 11-13 with high magnifications. The NW one was slightly larger and with high magnification, displayed a fan-shaped grouping of ~8 stars. The NW section also showed a circular region without stars but this feature was best seen with a larger aperture reminding me of NGC-7789. I couldn’t identify the nearby cluster candidates Chupina-1 or Chupina-2 with the 4.5-inch telescope. Also, I failed to see a specific form in M67, although I commonly see this cluster as an octopus.



Chris Elledge: Observer from Massachusetts



I attempted M67 with 15X70 binoculars from my front yard (LP Bortle Scale 8). I was able to locate the open cluster, but was unable to identify any structure, other than a slightly brighter patch with averted vision. The brightest star of the cluster at the NE tip resolved amidst the rest of the patch. However, it wasn't bright enough to for me to determine a color.

Joseph Rothchild: Observer from Massachusetts

I observed M67 twice. My initial observation with a 6-inch reflector and first $\frac{1}{4}$ moon in suburban skies revealed a faint compact cluster with about 20 visible stars. My second observation with a 10-inch reflector under dark skies showed over 50 cluster members with a prominent notch on one side of the cluster.

Richard Nugent: Observer from Massachusetts



Observation notes on M67 & some other thoughts...

Thursday, March 23, 2017.

I observed with Steve Clougherty at the clubhouse. We used his 18-inch reflector. The sky was fair, a Bortle Scale 6, or perhaps a little better, but conditions worsened. By 11 PM, clouds overtook the sky and we ended our observations for the evening.

We decided to take a look at M67. It's a lovely little cluster but, truth be told, I've never found it particularly interesting and have seldom observed it. Thanks for including it in the challenge list because I've learned quite a bit about it over the last month! By the way, there's a nice limiting mag. chart of M67's stars on page 69 of this year's *RASC Handbook*. I was particularly interested in seeing if it was possible to note the color of some of the cluster's K-type giant stars. The only color I could observe through Steve's scope was a slight yellow-orange color in HIP 43491 (Spectral type K3) at mag. 9.8.

I didn't pay attention to the nearby, brighter (mag. 7.9) K0 foreground star (HIP43519/SAO98178), but I'll check for color when the skies eventually clear.

Steve and I discussed the value of having an adequate star chart and capable finder scope when star-hopping to deep sky objects (we had been searching for April's challenge, NGC-3395/6). I'll bet when hunting for challenging objects, the real challenge isn't seeing the object as much as it is *finding* the object! You have to be looking in the right place, right? My favorite print star atlas to have near the telescope is *Interstellarum Deep Sky Atlas*. This fine atlas shows stars to mag. 9.5 which is perfect for the 80mm (3.1-inch), RACI finders I use on my telescopes (I use Project Pluto's Guide v9.0 on my laptop when I need to go deeper). As experienced star-

hoppers well-know, we live and die by our finder system. I use a green laser pointer to roughly aim the scope, then acquire the proper star field using the finder. If I can see the desired object in the finder...Bingo! I win. The next best thing to seeing the object itself is seeing the surrounding field stars visible in the atlas. Line the scope with those stars and...Bingo! I win. While I enjoy the chase, I don't want it to take all night because I really enjoy the view!

As we all have seen, the finder scope that comes with many commercial telescopes is simply inadequate. I try to respectfully implore newbies with such telescopes to upgrade to a "pointer" (Telrad or green laser) and to buy a quality finder scope. It's all about aperture, right? I decided to run a little test with M67.

Saturday, March 25.

The sky cleared during the early evening. Temperatures dropped and surfaces began to freeze over. Framingham enjoys (ahem!) Bortle Scale 7 skies most of the time. I could see Acubens (Alpha Cancri, mag. 4.2) but not much fainter. I could just barely see M44 with my naked eyes, but only with averted vision. I made a series of observations of M67 (60° in altitude) using 10X21, 8.5X44, 10X50, and 20X80 binoculars. Here are my notes:

10X21: M67 was barely visible. Easily missed! HIP43519/SAO98178 wasn't visible.

8.5X44: A whisper of light. Averted vision necessary. HIP43519/SAO98178 wasn't visible.

10X50: Visible, faint, diffuse. Averted vision was helpful. HIP43519/SAO98178 was visible, but difficult

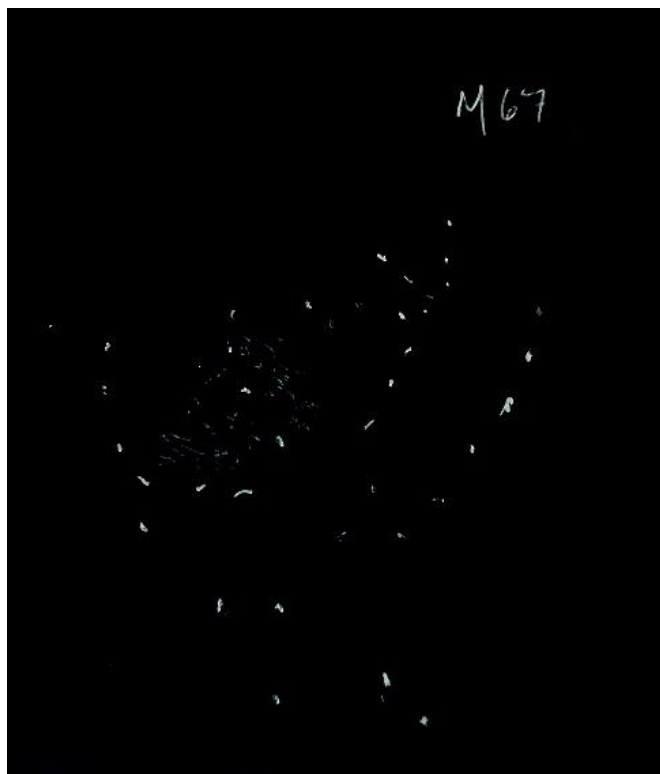
20X80: Easy, obvious! HIP43519/SAO98178 was easily visible.

Craig Sandler: Observer from Massachusetts



I observed M 67 a number of times in February and March, and was very interested to view it from different angles as it rotated around the NCP. My first note read “an angel or a bird.” That was my impression based on the shape of the central area of perhaps 250 stars observable with an 8-inch SCT. However, it definitely didn’t have that form seen setting late on a March evening. The bright star the AMTOB club has been writing about appeared a shade paler than Betelgeuse to me. This is among my very favorite OCs, and I only paid attention to it because of the Challenge!!!

M67



Mike McCabe: Observer from Massachusetts



M67 is very conveniently located about a degree west of Acubens, the alpha star in Cancer, where there's a lovely little arrangement of four stars in the mag. 4 & 5 range that guide you right to this under-appreciated open cluster. In 7X50 and 10X50 binoculars, the open star cluster is just a fuzzy patch, but in 20X80's, I could begin to resolve some stars in the center.

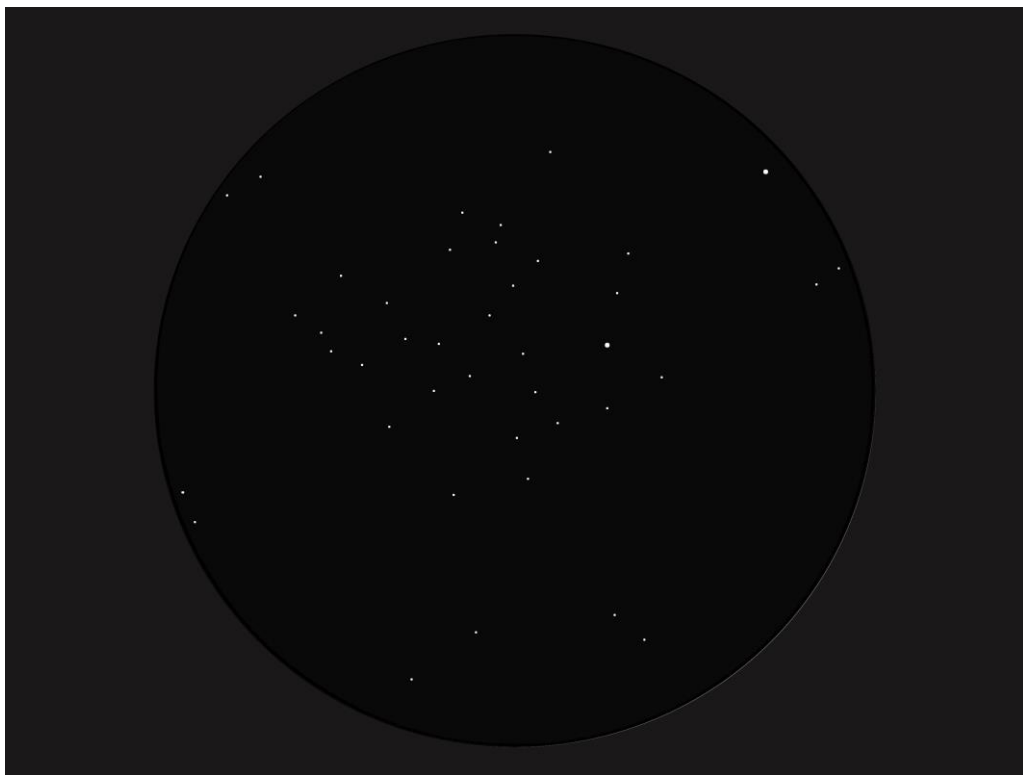
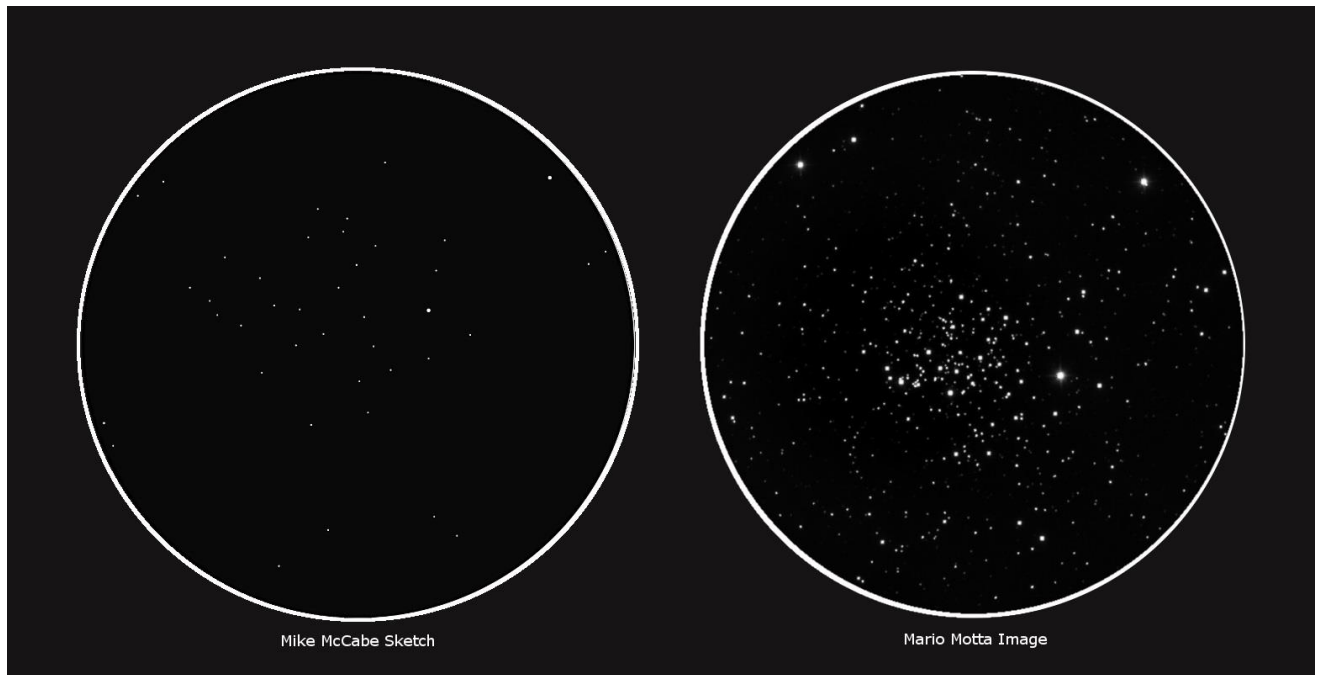
In my 4.5-inch Newtonian and my 5-inch refractor at 100X, there were a few dozen or so stars in the eyepiece, and all are in the mag. 10 and 11 range, except for one lone mag. 8 star just to the east of the core.

In my 12.5-inch Newtonian, this cluster became an absolute showpiece! There were easily over 100 stars in the $.5^\circ$ FOV provided by the 12mm eyepiece I was using and the view was simply amazing. It almost makes one wonder why M67 isn't more celebrated, but it's probably because you really *do* need a large scope to bring out the best in this cluster. The view in the smaller scopes was nice, but doesn't have much wow factor.

Where M44, with its massive size and large population of bright stars really lights up the eyepiece of a small rich-field telescope, the relatively dim M67 doesn't have much punch. However, put some aperture on it, and stand back! In fact I see M67 as the much better object for a larger scope, because M44 is so huge that it typically doesn't fit into the smaller field of view provided by bigger scopes, and adding magnification just causes you to lose the "cluster" effect with M44's spread out population.

I chose to sketch M67 at the eyepiece of my 5-inch refractor. I counted about 40 stars visible in the eyepiece and I didn't see color in any of them. For comparison purposes, I flipped, cropped and rotated Mario Motta's image to match the orientation of what I was seeing in the

eyepiece. I always find it interesting to compare my drawings to the real deal and see how accurately – or not – my brain and my body transferred what I was seeing onto the paper.



Glenn Chaple: Observer from Massachusetts



My 70th birthday was March 23. It was low-key – just dinner out with my wife. We'll be getting together with immediate family for a more formal celebration on Thursday night. After returning home, I decided to spend a few hours at the ATMoB clubhouse. Because an extended period of cloudy weather was predicted for the upcoming week, I had decided to work on the Double Star Marathon using my 4.5-inch reflector. Steve Clougherty was there with his 18-inch Dob and he was busy with Rich Nugent working on the March and April LVAS Observer's Challenges!

I spent just enough time to work on the double stars setting in the west (Andromeda, Triangulum, Aries, Eridanus, and Lepus), plus a batch in Orion. Then I put things away and observed with Rich and Steve.

While I'd been working on the Double Star Marathon, Steve had been busy observing interacting galaxies, NGC-3395-96 in Leo Minor. The pair was faintly visible under mag. 5 and rapidly hazing up skies.

He then turned to M67. Rich has already sent you a report on what he saw that night. I took a peek and, like Rich, had difficulty noting any obvious coloring of the main stars. I did notice that the cluster seemed to be comprised of two distinct populations – a dozen or so relatively bright members accompanied by several dozen fainter ones.

My first encounter with M67 was on the night of January 11, 1978, when I viewed it with a 3-inch f/10 reflector at 30X. I wrote in my log book, "Faint, ghostly, beautiful. Reminds me of M11. Contains three visible stars attended by a soft glow. Glow bursts into speckles of light with averted vision. General funnel shape." More recently, I re-observed M67 with the same

scope and a higher magnification of 60X. The cluster was better resolved, with a half dozen faint stars surrounded by another dozen or so averted vision stars.

Sue French: Observer from New York



Through my 105mm (4.1-inch) refractor at 17X, Alpha Cancri and M67 share the field of view. This stunning group of many barely resolved and densely packed stars is irregular in both concentration and outline. A considerably brighter, yellow-orange star adorns its northeastern edge. At 47X, a heavily populated tree of stars dominates the group, its shining trunk and star-leafed branches overspread 11'. At 87X, I count 80 stars in this amazing cluster, which spans about 22'. Sue French *Deep-Sky Wonders*.

Mario Motta: Observer from Massachusetts



I believe I took this some time ago, with my 6-inch refractor, f/7.6.

Used this for the Messier book of Steve Omeara (I took all the M objects for his book).



Gus Johnson: Observer from Maryland



I observed M67 in March 1983. It was easily visible in a 10X50 finder.

I once again observed it in April 1985 with a 2-inch f/12 refractor and resolved it at 21X.

Roger Ivester: LVAS Observer from North Carolina



I observed M67 on March 25, 2017 using a 6-inch f/6 reflector with a 11mm 82° AF EP giving me a magnification of 83X and a true FOV of 1.0° (as used in the sketch).

The brightest star of the cluster on the NE tip appeared yellow. The cluster was very bright and large, consisting of two sections, the sparse eastern section, and the more concentrated western part. I counted ~ 30 to 40 total stars, with many faint ones being in the background, causing a hazy appearance in these areas. A lane separated the east from the west, traveling north to south, or the entire length of the cluster. With careful and patient observing, I noted several dark lanes.

I noted an almost perfect circle, devoid of stars in the most concentrated area on the western side.

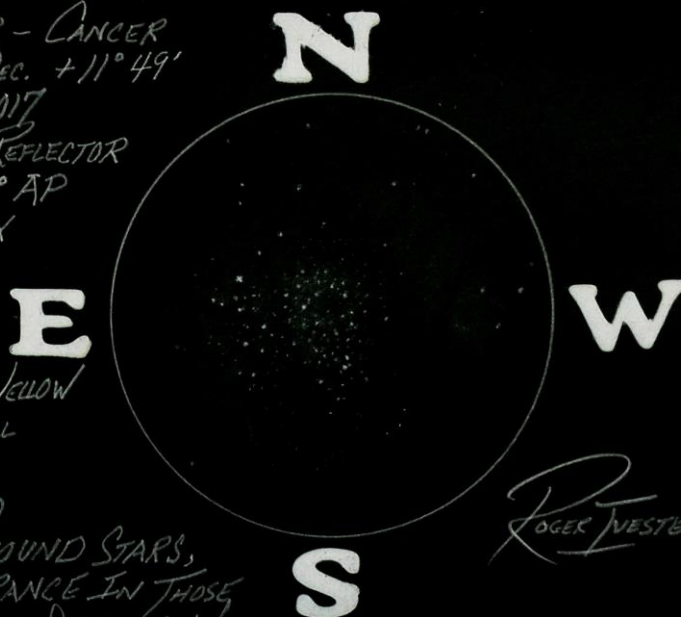
M67 - OPEN CLUSTER - CANCER
RA: $08^h 50.4^m$ DEC. $+11^\circ 49'$
DATE: MARCH 29, 2017
TELESCOPE: 6-INCH REFLECTOR
EYEPiece: 11mm 82° AP
MAGNIFICATION: 83X
FOV: 1.0°

HIGHLIGHTS:

BRIGHTEST STAR NE YELLOW
WESTERN SECTION WELL
CONCENTRATED.

~30-40 STARS COUNTED

MANY FAINT BACKGROUND STARS,
CREATING HAZY APPEARANCE IN THOSE
AREAS. HOLE DEVOID OF STARS IN WEST.



ROGER LESTER

Fred Rayworth: LVAS AL Coordinator and Observer from Nevada



For some reason, M67 is one of the least observed of the Messiers for me, though I've seen it through both my home-built 8-inch f/9.44 back in 1986 in Spain and several times through my home-built 16-inch f/6.4 from various locations. It's not by far the champ of least seen Messiers, but not a common object, let's put it that way.

To complete the Challenge for March, I did my most detailed observation on January 27, 2017 from Furnace Creek in Death Valley at an altitude of -190 feet below sea level. As I've probably mentioned before, one would think all that atmosphere would be a hindrance, but that's not necessarily so. What's just as important is sky darkness, and almost anywhere in Death Valley is a national dark sky site.

This night, it was cold with occasional gusts, just enough to make it uncomfortable. The skies were clear. Seeing was poor, but transparency was excellent.

At 102X, it was a fairly even mag. bluish clump of about 50 stars with one brighter, slightly orange one off to the side that may or may not be a member. During this observation, I did my best to be more aware of star color, something I've strived for given what I've learned through the Challenge. In this case, due to seeing, though plenty of stars cut through the muck, extra color wasn't along for the ride. Not only was it hard to see on this object, but even much brighter ones as well. Last month's Winter Alberio was another example. It took a lot of strain and looking between waves of boiling sky just to pick out what should've been blatant colors on that easy double.

As for M67, while I tried to differentiate other colors, or even just subtle differences, I came away with either the bland gray-blue so common to many clusters, or that one orange one off to the side. Slightly orange as well, because sometimes it blinked more white than orange.

Some of the main cluster stars would barely give me blue as well, while once in a while, they'd flash a deeper blue which was much more so than normal.

Note that the drawing blended the mags. a little more homogenous than they actually appeared in the scope. That's my lack of drawing skills and the pen I was using. The lighter stars, especially the squiggly ones were done in pencil. Also, I omitted a few of the more minor peripheral members on the edge, now that I look at it.

