MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

August 2020

Report #139

Messier 20 in Sagittarius

Sharing Observations and Bringing Amateur Astronomers Together

Introduction

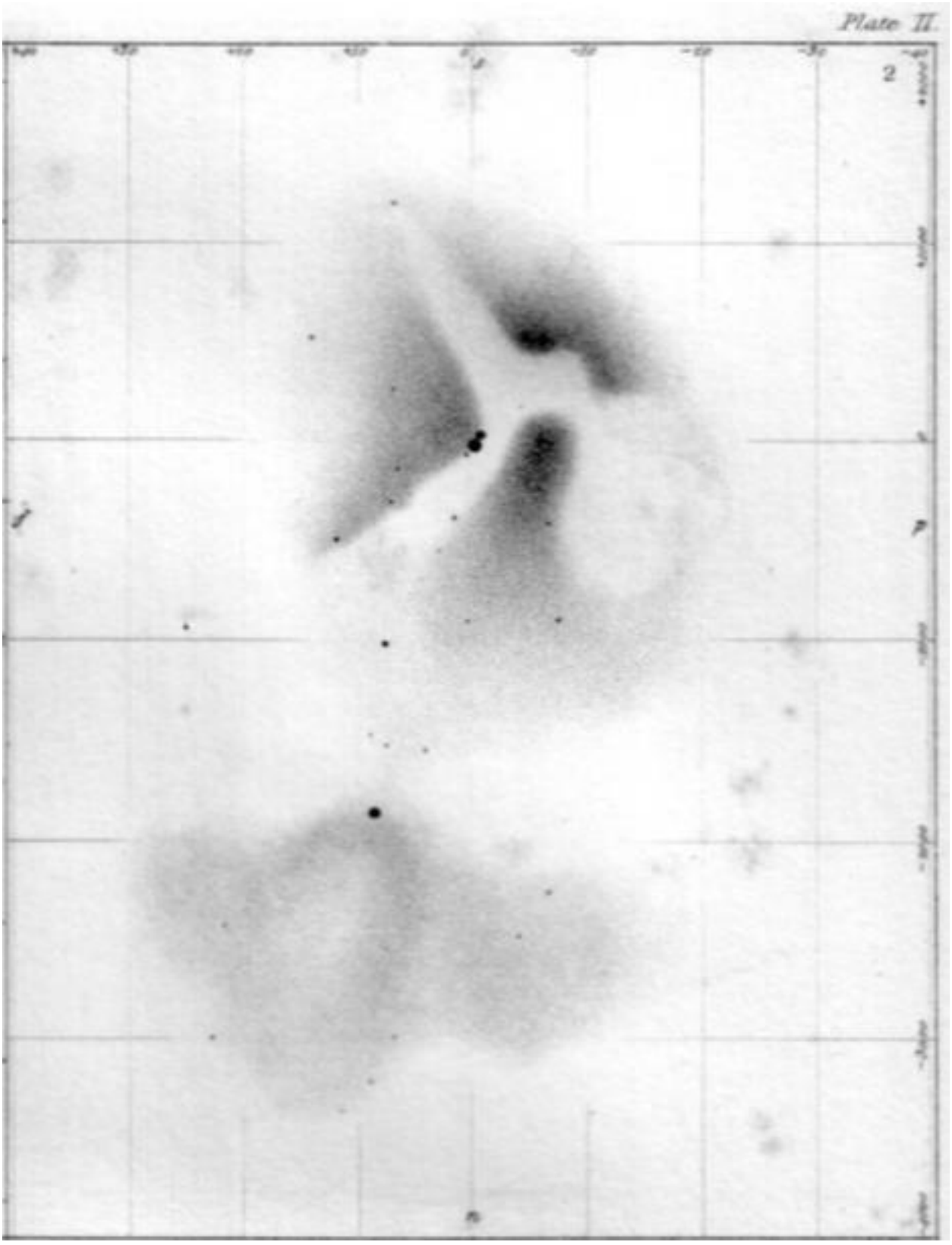
The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It's open to everyone who's interested, and if you're able to contribute notes, and/or drawings, we'll be happy to include them in our monthly summary. Visual astronomy depends on what's seen through the eyepiece. 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

Messier 20 is a magnificent combination of objects that includes an emission nebula, reflection nebula, star cluster, and star-forming region. In addition, the heart of the emission nebula holds a multiple star system, whose brightest component is the main source of the nebula's ionization.

M20 is commonly called the Trifid Nebula due to the appearance of its bright, emission component, with John Hershel being responsible for the name. In his 1849 *Outlines of Astronomy*, Herschel writes that the nebula "is singularly trifid, consisting of three bright and irregularly formed nebulous masses, graduating away insensibly externally, but coming up to a great intensity of light at their interior edges, where they enclose and surround a sort of three-forked rift, or vacant area, abruptly and uncouthly crooked, and quite void of nebulous light. A beautiful triple star is situated precisely on the edge of one of these nebulous masses just where the interior vacancy forks out into two channels. A fourth nebulous mass spreads like a fan or downy plume from a star at a little distance from the triple nebula."

John Herschel sketched the nebula, but he wasn't completely satisfied with the result. Although he'd made a careful drawing of the object, it was lost. The drawing below was made later. It was the work of a single night and not as meticulously laid out.



Anas Sawallha: Observer from Jordan

I observed the Trifid nebula from a Bortle 2 location near the small town of Al-Safawi in eastern Jordan, on August 8th 2020. The sky was literally on fire, the Milky Way was unbelievable, but unfortunately nothing is perfect, as the seeing conditions were not as good as I had hoped.

Although the nebula was bright, I did have some difficulties sketching it, especially the dark nebulous part with the segments of the H II region.

Given the small-sized telescope that I use, I kept shaking the tube and using averted vision till I came up with this result.

A UHC filter did help a little, but I preferred to sketch without using it.

Telescope: 5-inch Newtonian reflector

Eyepiece: 10mm.

Magnification: 100×.

Location: Al-Safawi, eastern Jordan.

Uwe Glahn: Observer from Germany

Object: Messier 20 "Trifid Nebula"

Telescope: 27" f/4.2 Newton

Magnification: 172×

Filter: UHC

NELM 7.0+

Seeing: III-IV

Location: Edelweißspitze

Unfortunately I live in Middle Europe at around 47°N, so M20 is always in the depths of extinction. So I drove to a high Alpine site at around 8400 feet to get as little extinction as I could. On this night we had a NELM of around 7.0 magnitude. But I'm sure southern locations could bring out more detail.

I needed at least 4 hours to make the finished sketch.


M20

Rony De Laet: Observer from Belgium

A long time ago, when I was a kid, it was an analog picture of the Trifid nebula that triggered my interest in astronomy. Each time I look up the Trifid Nebula, that old picture of ’84 comes to my mind.

My first sketch of M20 was made with a 105mm Maksutov telescope in 2006. I was observing from a roof terrace in a small city in Spain. The stars were drawn without a filter. The nebula was observed with a UHC filter. I was very excited that I could see the lobes of the clover, just like that old picture!

North is down, West to the left.

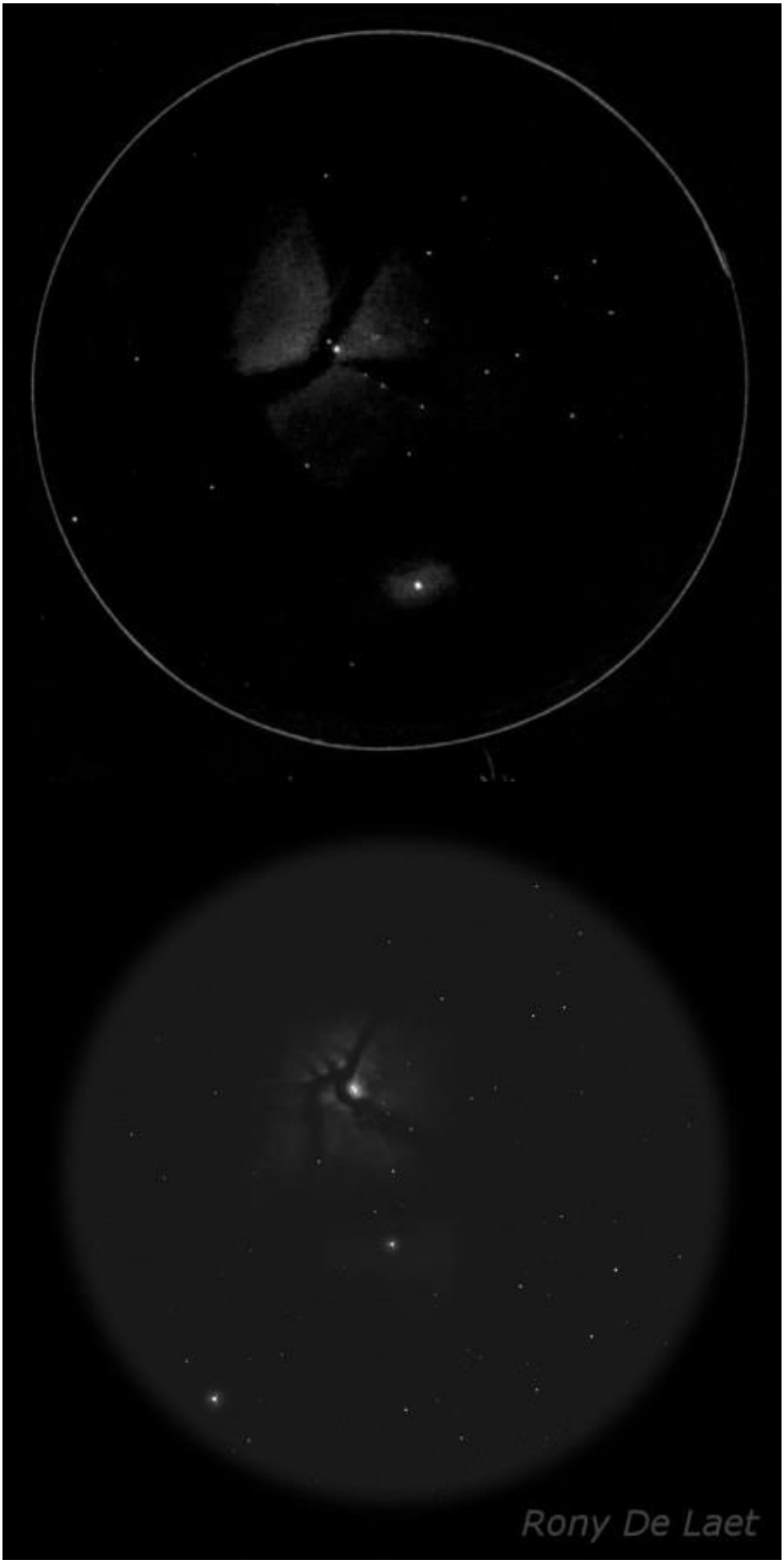
My second sketch was made at home a few weeks ago with a 16- inch Dobson. I first observed the stars, and then I added a UHC filter to sketch the nebula. Again the 12.5mm eyepiece delivered the best view. M20 is a very delicate object in my Bortle 5 sky, so it takes time and patience to note all the subtle details of the Trifid. Sketching this nebula is always a pleasure.

Telescope: 16-inch f/4.5 truss Dobson

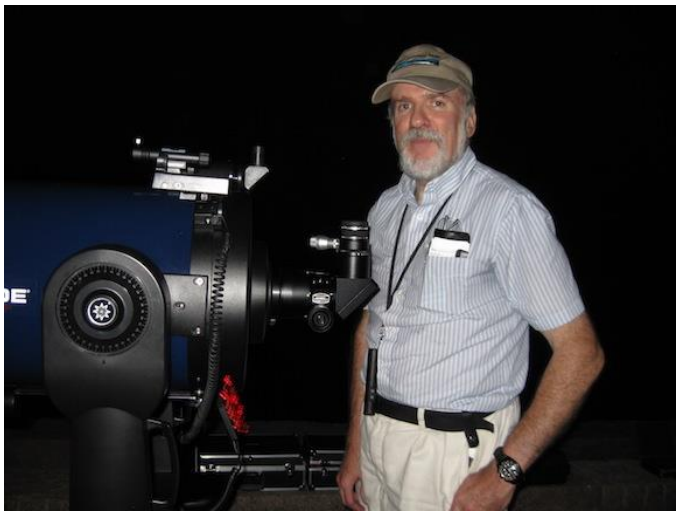
Eyepiece: 12.5mm 76° AF

The fov is 32 arc minutes

North is down, West to the left.


Rony De Laet

Dwight Lanpher: Observer from Maine

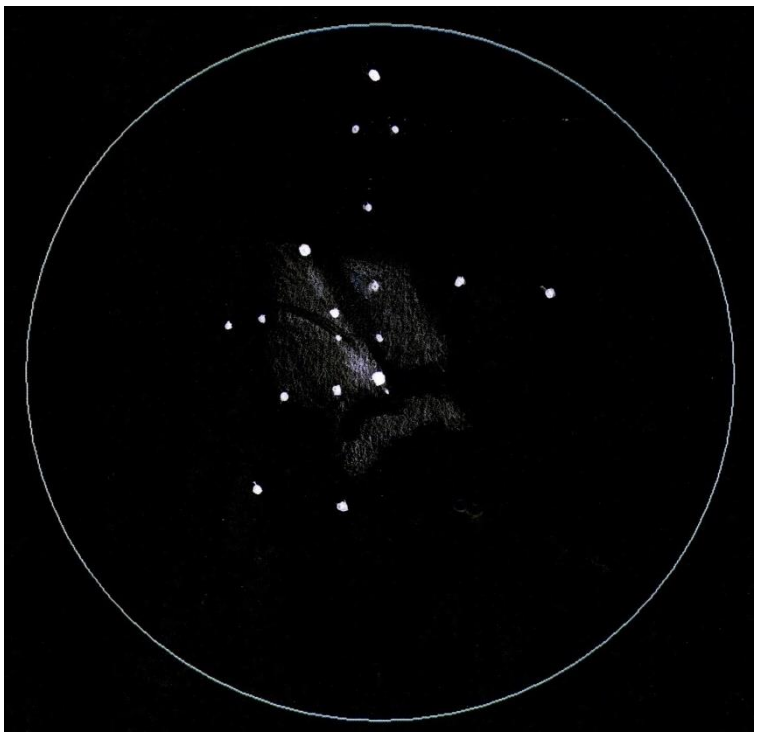


A week ago, three other Downeast Amateur Astronomers and I met at Cobscook Bay State Campground in Edmunds, Maine. We each brought our own telescope or binocular setup (unshared). This would have been the site of the annual Maine State Star Party but, due to Covid 19, this year's event was cancelled. Despite that, our small group decided to observe individually, looking forward to the Bortle class 2+ skies. It was a spectacular night, cloudless and wide open from horizon to horizon, and everyone had great views all evening. I had brought my 12″ SCT to sketch the Trifid nebula but I also brought along the new scope that I used last month to image the Lagoon Nebula. Last month, in order to let the image be judged without bias, I kept the identity of the equipment a secret. I'll now identify it as a Vaonis Stellina observing station. This new smart telescope plate solves to determine where it is pointing in the sky, autofocuses and then starts taking 10 second images, stacks and processes the image in real time. The output is transmitted to up to ten tablets or smart phones. One of the other three observers also connected his smart phone during the session. I had my tablet set up on a stand and the half dozen campers that did visit with us could maintain a safe distance and still view the object on the 12″ iPad. With no eyepiece, it's the perfect touchless Covid-19 friendly telescope for these current times.

Because of its automation, that evening while observing and sketching, I was still able to image the Ring Nebula (very small), the Trifid Nebula, and the Helix Nebula. All this was done while I was operating my SCT and sketching the Trifid. I purposely chose not to look at Stellina's image until after I finished sketching. I wanted to find out how much I could see without trying to separate what I remembered from the tablet image and what I was actually seeing. I did later notice that I was not able to see any of the blue nebulosity at the eyepiece that was present in the tablet image.

M20 Trifid Nebula, August 22, 2020, (86) 10 second subs, 14 min 20 secs total exposure.

This is the “Observers Challenge” with visual seeing and sketching as a primary goal, so as well as the observing station’s image, I am humbly including my sketch of the Trifid Nebula, I got started late with this hobby and I feel I still have a long way to advance in developing my observing and sketching skills but I find that Stellina assists in my full appreciation of what I observe.



M20 Trifid Nebula, August 22, 2020, 12″ SCT 145×

Stellina is not a high-end imaging rig but I believe that it does bring a new tool to visual astronomers. Its images are not comparable to the detail that a talented astrophotographer can produce. But I do think that they are closer to what I see in my eyepiece and I'm already finding that it makes me a better visual observer.

My ultimate goal is to use Stellina in combination with my visual scope at future outreach events. I can assist visitors at my eyepiece while Stellina builds a more detailed color image of the object on a tripod mounted iPad. My hope is that the public can use the stacked image to give them a detailed hint of what they are looking at in the eyepiece and help them see more. My experience has shown that teenagers and twenty somethings will love the technology, maybe enticing some new astronomers.

At the end of the evening I took down all of the equipment, as we were located in a field substantially away from my tent, and I then retired to sleep for a few hours. I had seen the Orion Nebula in previous year's Maine State Star Parties during late morning trips to the outhouse and thought this would be the perfect object to test with Stellina. It nicely fills the wide 1.0° × 0.7° field of view. I got up around 3:45 am and again setup Stellina in the field; it takes about 5 minutes. Leveling the tripod with the bubble level plate takes most of the time. And then I spent another 7 or 8 minutes operating the tablet establishing a wi-fi connection, initializing the telescope, auto focusing, selecting the nebula and letting the scope find M42. A couple minutes after 4:00 am I had already started imaging the nebula. Setting up my SCT would have taken 45 minutes (plus tear down later) and I was not interested in that challenge this early in the morning… I'll wait until my traditional late winter sessions when I can observe Orion at a more reasonable, but colder, hour of the evening.

There are other less expensive assemblies of telescopes, cameras and software, but none with the turnkey configuration, compact size, ease of setup and essentially autonomous operation which makes it worthwhile to me. The Unistellar EVscope is another possibility but I was looking for a wider field of view, higher pixel resolution and no eyepiece or manual focusing. The cost of these will eventually come down and I am looking forward to what the future brings with larger than 80mm aperture optics and a more sensitive camera to make it a more capable imaging rig.

But, for the moment I have the tool that I wanted to aid my visual observations.

Richard Nugent: Observer from Massachusetts

My interest in astronomy was remarkably high during the summer of 1970. I had acquired an 8-inch Newtonian telescope and, because my Dad supported my interest in the sky, the telescope was mounted in a roll-off observatory atop our garage roof, mounted on a heavy equatorial mount (both fabricated by Dad), and was driven by a superb clock drive.

Earlier that year, I replaced the telescope's original prism diagonal with an aluminized elliptical flat. The views were amazing and so, at the ripe old age of 16, I felt gratitude for what I had and observed every clear night.

My notes from that year suggest that I was extremely interested in the moon and planets. Considerable time was spent on these objects.

However, as I obtained better resources - a copy of Norton's Star Atlas and a field edition of the Skalnate Pleso atlas-my observations began to include deep sky objects.

Sadly, the observatory's roof rolled off to the south and my neighbor's tall maple tree-also to the south-blocked many of the Messier Objects in Sagittarius. My first mention of M20 was on the exceptionally clear evening of August 31.

My notes from that night in 1970 are as following:

"The sky is crystal clear, (the) best sky of the summer! The milky way is the best I have ever seen! The Milky Way was very bright; visible from Cassiopeia all the way to Sagittarius. The west side of the rift was bright, but the east side was brilliant! The Scutum Star Cloud was bright, also M17, M8, and M20 were also bright!"

But that was the last mention of M20, which makes me think I was not impressed by it. Perhaps it was too far south, perhaps it did not pop. I did, after all, have other objects to observe.

Fast forward to today. While my equipment is far more advanced, the skies have degraded substantially due to light-pollution. My experience with this object would suggest that Messier 20 is not going to impress unless you observe with moderate apertures, using filters, and under a

dark sky. My observing site in Framingham, MA is heavily light-polluted and offers a NELM of about magnitude 4.8-on a good night.

For this report, I observed this object during August 2020 (using both 10-inch and 20-inch reflectors. The 10-inch is outfitted with 12×80 finder scope. While nearby M21 was visible in the finder, there was no hint of the Trifid. Without filters, the 10-inch showed almost nothing except the nearby, pretty star field. My best view came when using an UHC filter in an eyepiece that gave a 1.1º field-of-view and an exit pupil of 3.2mm.

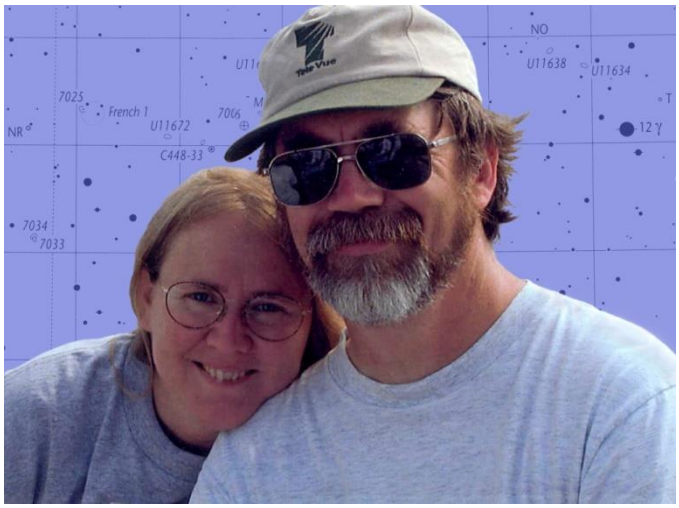
I used an eyepatch and shroud to shield ambient lighting. Averted vision was needed. The object showed a very faint glow with only a hint of structure. The blue reflection nebula to the North was not visible.

The 20-inch gave much more pleasing views. Again, under a shroud, using eyepieces with a UHC filter and exit pupils between 2 and 3 millimeters, the nebula could be seen with direct vision. Now, the lobes of the nebula were visible. To me, they resemble the petals of a Petunia flower. Other than the subtle dark lanes, no other detail was visible however, the brightest portion of the reflection nebula was faintly visible.

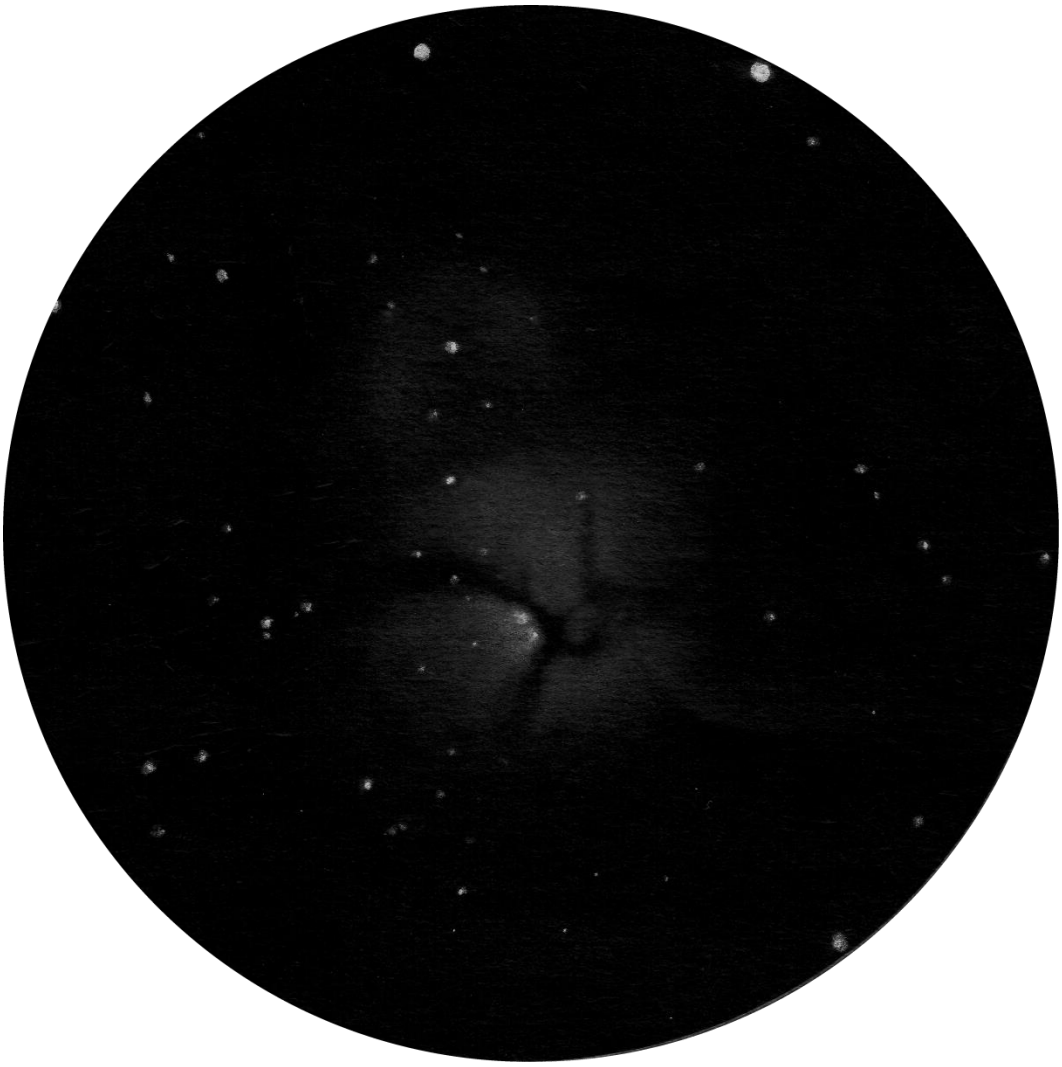
The O-III filter was less effective at bringing out the nebulosity.

I tend to shy away from most emission nebulae since they melt into my bright skies. The Trifid is an amazing object but, short of inventing a time machine, you'll have to observe M20 under the darkest skies possible using a UHC, or similar filter, to really appreciate it.

Sue French: Observer from New York



This sketch was made at one of my club's observing sites from a filterless view through my 130mm refractor at 117×. Since no star diagonal was used, north is up and west is to the right.



Glenn Chaple: Observer from Massachusetts

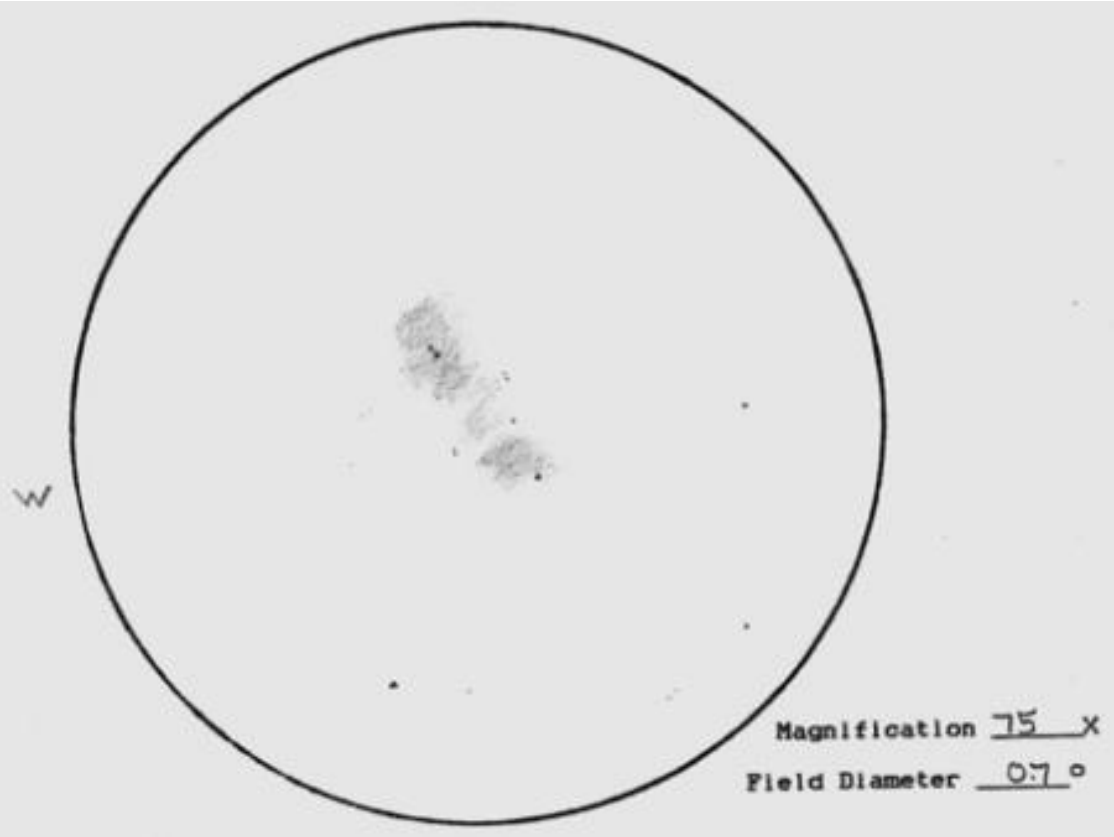
This second installment of the "Summer of Sagittarius" takes us to M20, nick-named the "Trifid Nebula." Like last month's Observer's Challenge (M8, the "Lagoon Nebula"), the Trifid is a nebula/cluster complex. It is also 5200 light-years away and may be associated with the Lagoon. Although not a naked eye target, the Trifid Nebula is easily located just 2 degrees north and slightly west of the Lagoon; in fact, they can be viewed together in the same low-power, wide-field telescopic view.

M20 was discovered by Charles Messier on June 5, 1764. William Herschel viewed it 20 years later and catalogued it as four separate objects. Oddly enough, his son John saw three segments of the nebula, and was the first to describe it as "trifid."

My initial sighting of M20 occurred on the evening of August 20, 1977. Because I had just viewed M8 with my 3-inch f/10 reflector, I was able to note that M20 is much fainter. Sharing a one-degree field with M20 was the open cluster M21. Because of the low magnification used (30×), I failed to notice the Trifid's bright embedded double star, identified by the William Herschel designation H N 6AC (magnitudes 7.6 and 8.7, spectral classes O8V and B6V, separation 10.7 arc-seconds). Two summers later, I resolved this pretty pair with the same 3-inch and a magnification of 60×. A sketch of M20 I made while attending the 2012 Stellafane Convention and observing with a 4.5-inch f/8 reflector (magnifying power 75×) shows both nebulosity (just 2 areas) and double star.

Compare my sketch with the image made by Mario Motta with a 32-inch scope. Not only are four lobes visible (what Stephen James O'Meara likens to as a "four-leaf clover"), but so is the intervening dark nebula (Barnard 85) that separates them. Also visible are the striking colors red for the four-lobed part of M20 (an emission nebula) and blue for the area surrounding a 7th-magnitude star further north (left on Motta's first image in this Observer's Challenge report). Its bluish hue indicates that it's a reflection nebula – a cloud of dust illuminated by the embedded star.

Here are some challenges you might consider while observing M20. Are you able to see the four lobes of O'Meara's "clover?" He notes that the fourth leaf is fainter than the others, and jokingly adds that "you should feel lucky if you glimpse it!" Check out H N 6 with high magnification. Can you spot a magnitude 10.4 star just 6.2 arc-seconds north-northeast of the main star (essentially on the opposite side from its magnitude 8.7 partner)? This stellar pair bears the designation H N 40. Why two catalog identities for the same star? Don't ask me. You'll have to ask William Herschel, and he's not around to provide the answer.



Chris Elledge: Observer from Massachusetts

On July 27th @10:38pm EDT, I used a 10-inch f/5 refractor to observe M20 from Arlington, MA. Sky conditions were: Bortle Scale 7; NELM 3.0 near M20; Transparency: Fair; Seeing: Good.

I observed M20, the Trifid Nebula, immediately after observing M8, the Lagoon Nebula, the same night. With the 1.9˚ FoV of my scope at 36× power, both M8 and M20 were visible within the same view. Placing M8 in the SSE of the view revealed M20 in the NNW.

At 36× (35mm) a trapezoid of stars stands out and is composed of HD 164492 (mag. 7 SW), HD 164833 (mag. 7 E), HR 6727 (mag. 7 NNE), & HR 6716 (mag. 6 WNW). There are 4 slightly fainter stars contained within the trapezoid HD 164514 (mag. 7), HD 164704 (mag. 8), HD 313716, & HD 164534 (both mag. 9). There are 6 other stars mag. 10 and fainter also visible within the trapezoid. Several faint stars are spread between the NNE trapezoid star and the M21 open cluster to the NE. There is one bright star in the cluster (HD 164863 mag. 7) and 7 fainter stars scattered around it. I get a slight hint of nebulosity in the area, but it's hard to detect it against the bright background.

Adding a UHC filter made it possible to detect the nebulosity concentrated around the Southern star of the trapezoid. It extends North towards HD 164514 and makes a mostly circular glow with that radius. I don't get any hint of the reflection nebula around HD 164514. An O III filter provides a similar view to the UHC while a H-beta filter darkens the SW side of the nebula more than the NE side.

At 115× (11mm) the SW star of the trapezoid at the center of the nebulosity (HD 164492) splits into two stars with HIP 88330 about 10″ to the SSW. At this power the nebulosity is barely visible unfiltered. The visible portion is similar in shape to what I saw at lower power with an UHC filter, but determining where the edges are is difficult. The brightest part of the nebula is very close to the star pair in the center. Adding the UHC filter to this magnification reveals a

dark hole in the nebulosity right next to the center star pair. It seems to mostly surround them, separating them from the brighter nebulosity a short distance away. The O III filter provides almost the same view. The H-beta filter, though, makes it more difficult to see the hole, but does make the SE part of the nebula immediately adjacent to the stars appear brighter than the other parts surrounding the stars.

The reflection nebula around HD 164514 continues to elude me. The bright sky background and inability to enhance the contrast of it with a filter keeps it hidden from view.

Gus Johnson: Observer from Maryland

(Visual Discoverer of Supernova 1979C)

Messier 20: June 1978: 6-inch reflector @ 59×: Central dark lane very easy, and with an 8-inch @ 98× the nebulosity is enlarged, and with the brightest part of the nebula being on the SW edge.

A UHC filter enhances the nebula, but my views reported here were without a filter.

Mike McCabe: Observer from Massachusetts

For the August 2020 Observer's Challenge, I got to view Messier 20, the Trifid nebula on two separate occasions. The first was on August 14th under the dark skies of Hazen's Notch campground in Lowell, Vermont. The second was on August 20th under a hazy Bortle 4 sky at Ellisville Harbor State Park in Plymouth, Massachusetts.

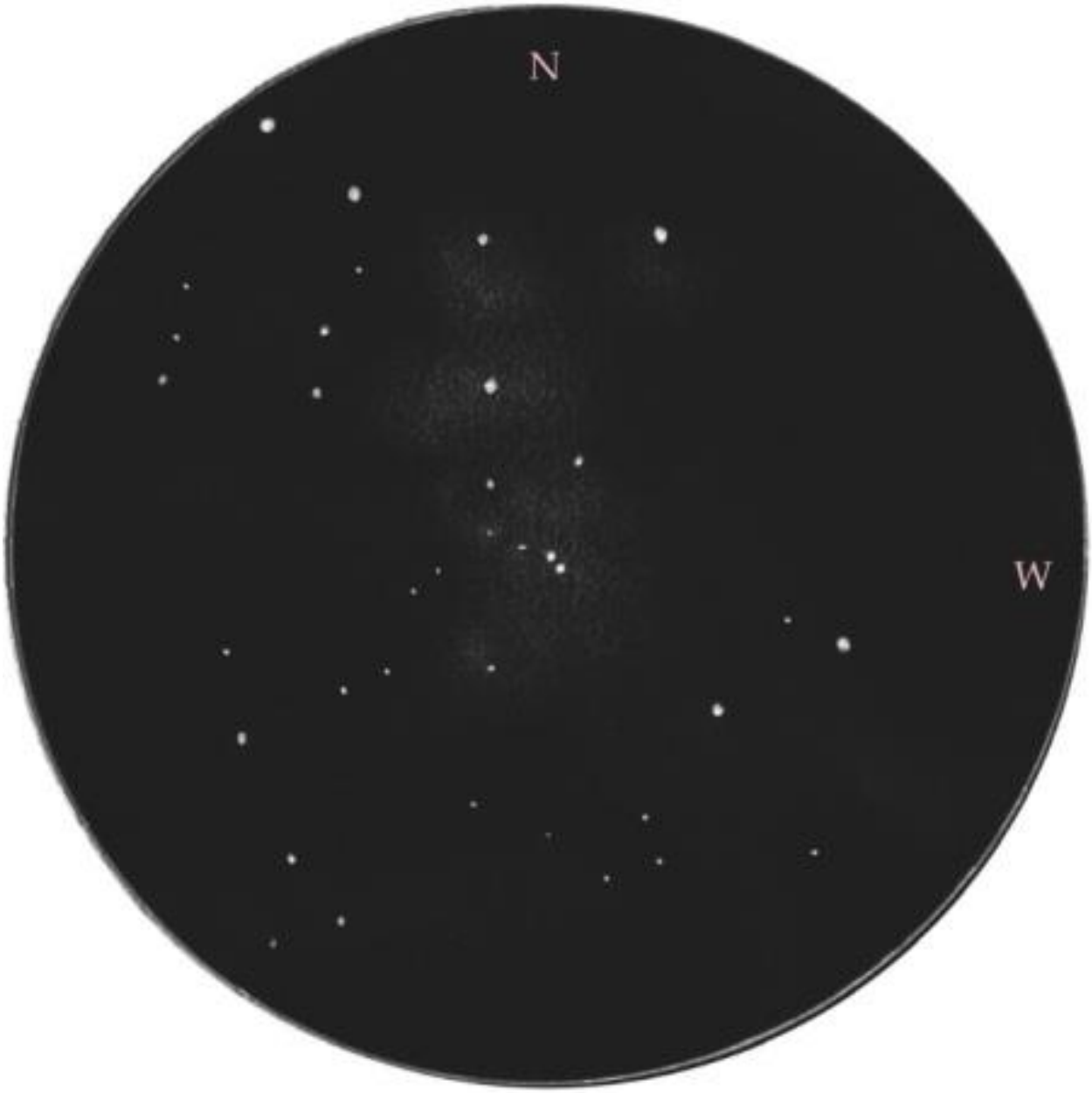
For the first observation, I used a 6-inch f/8 achromatic refractor with a 24mm, 82º AF eyepiece and a UHC filter. The 50×/1.6º TFOV easily encompassed the entire cluster and nebulosity, and M21 could even be squeezed into the view as well. The star-field was beautiful, and the nebulosity was fairly easily seen but I can't say that the signature dark lanes were ever well discerned during my observations.

For my second observation of M20, I used a 10-inch f/5 Newtonian reflector, again with a 24mm, 82º AF eyepiece and UHC filter. The magnification and field of view were very similar to the 6-inch experience, as was the overall visibility of the nebulosity.

This was due to the fact that Ellisville is not quite as dark as Hazen's Notch and the sky was also not quite as clear.

Considering that going forward it wouldn't be likely that I'd get another chance to view the object, I got down to the business of making a sketch. Having missed the July challenge due to a month of poor sky conditions, it felt good to be sitting at the eyepiece drawing little dots on a piece of paper again.

Long live the observer's challenge!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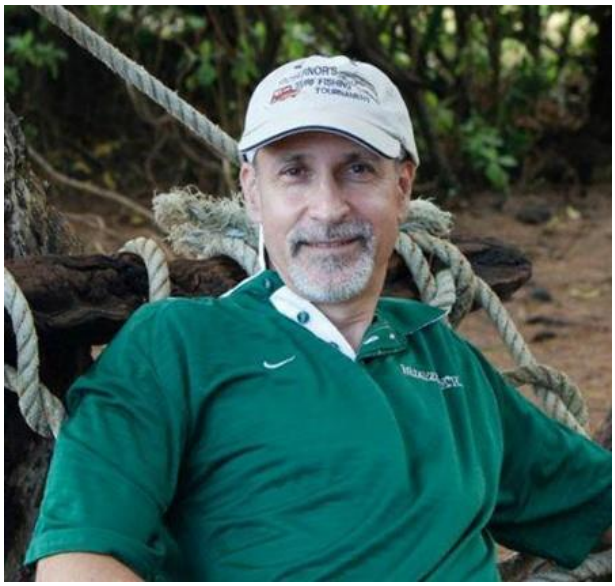
James Dire: Observer from Illinois



M20, also cataloged as NGC 6514, is one of the most famous objects in the sky. It contains an open star cluster, an emission nebula, a reflection nebula and dark nebulae. French astronomer Guillaume Joseph Hyacinthe Jean-Baptiste Le Gentil de la Galaisière discovered M20 sometime before 1750. Charles Messier added it as the 20th entry in his catalog in June 1764. Messier just described it as a cluster of stars as his optics could not pick up the nebulae. William Herschel was the first to catalog M20's nebulae and his son John was the first to call it the Trifid Nebula. M20 is two degrees north of the Lagoon Nebula (M8) and even closer to the star cluster M21.

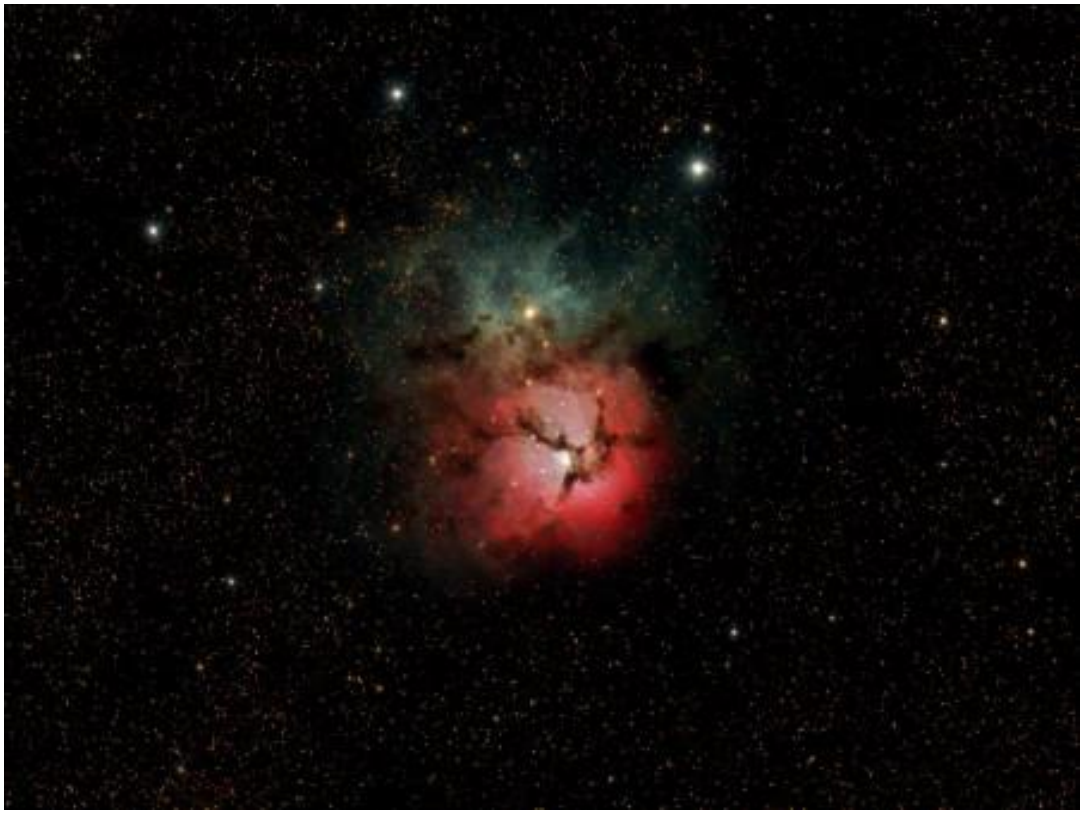
The Trifid gets its name due to three lobes of emission nebula separated but three lanes of dark nebulae. Visually, even in my 14-inch Newtonian, the bright nebulae appear colorless. But images picked up the red light from hot hydrogen gas. The star that excites the hydrogen gas to glow is HD 164492, located not at the intersection of the three dark lanes, but at the tip of the southeastern lobe. HD 164492 is a six-star system with an integrated magnitude of 7. The two brightest components are separated by 10.6 arcseconds. The presence of the stars makes estimating the nebula's brightness difficult. Magnitude estimates range from 6.8 to 9.

The emission nebula is around 15 arcminutes in diameter, while the entire M20 structure is 30 arcminutes in size, similar to the Moon in size. The reflection nebula resides at the north side of M20. Appearing blue on photographs, the reflection nebula contains a magnitude-7.5, yellow star near its center.

M20 lies 5200 light-years away and is on the more distant side of a great complex that contains the Lagoon nebula. The Trifid spans about 10 light-years. It is thought to be a mere 300,000 years old. Most of the cluster's bright central stars are young hot *O* stars.

Images of the Trifid Nebula were often seen on the Starship Enterprise in the original Star Trek television show!

My image, as following, of the Trifid was taken with a William Optics 132mm f/7 apochromatic refractor using a Tele Vue 0.8× focal reducer/field flattener. With a SBIG ST-2000XCM CCD camera, the exposure was 90 minutes. In the image north is up and east to the left.



From Roger Ivester:

When I read the above sentence, I remembered it so well: “The Alternative Factor” — Season 1, Episode 27, which aired on March 30th, 1967.

Star Trek the original series, Paramount Television Studios.

Mario Motta: Observer from Massachusetts

M20 in R,G,B, Lum, and a bit of Hα, to produce a color image with both the emission and reflection part of the nebula. Total about 5 hours. I had to drop some frames one of the nights, due to wind and bloated stars, taken with 32-inch and ASI6200 camera.

North is to the left.

Narrow band image of M20, taken several years ago, about 3 hours of Hα, S2, O3 filters, comparison of why NB is better for sharpness and detail, but will not capture the reflection part of the nebula. (The blue section) which was taken through my 32-inch with SBIG 1001E camera.

North is up.

Joseph Rothchild: Observer from Massachusetts

I have observed M20 regularly every summer, although it's always upstaged by nearby M8. I observed it again on August 17, 2020 on Cape Cod under slightly hazy, but dark skies.

It was visible in 14×70 binoculars, but without any appreciable detail.

I then observed with my 10-inch reflector at 45× and 88×. The nebula was faint with poor contrast. I was able to see only the three main dark lanes with the emission nebulosity and the adjacent reflection nebula. I was surprised that the emission nebula did not enhance well with a nebula filter (NBP), although one of the lobes was slightly more prominent.

Roger Ivester: Observer from North Carolina

Whether you are driving a car or riding your bicycle, always stop and help the turtles cross the roads. In my area, this has always been the rule of the road, especially for cyclists.

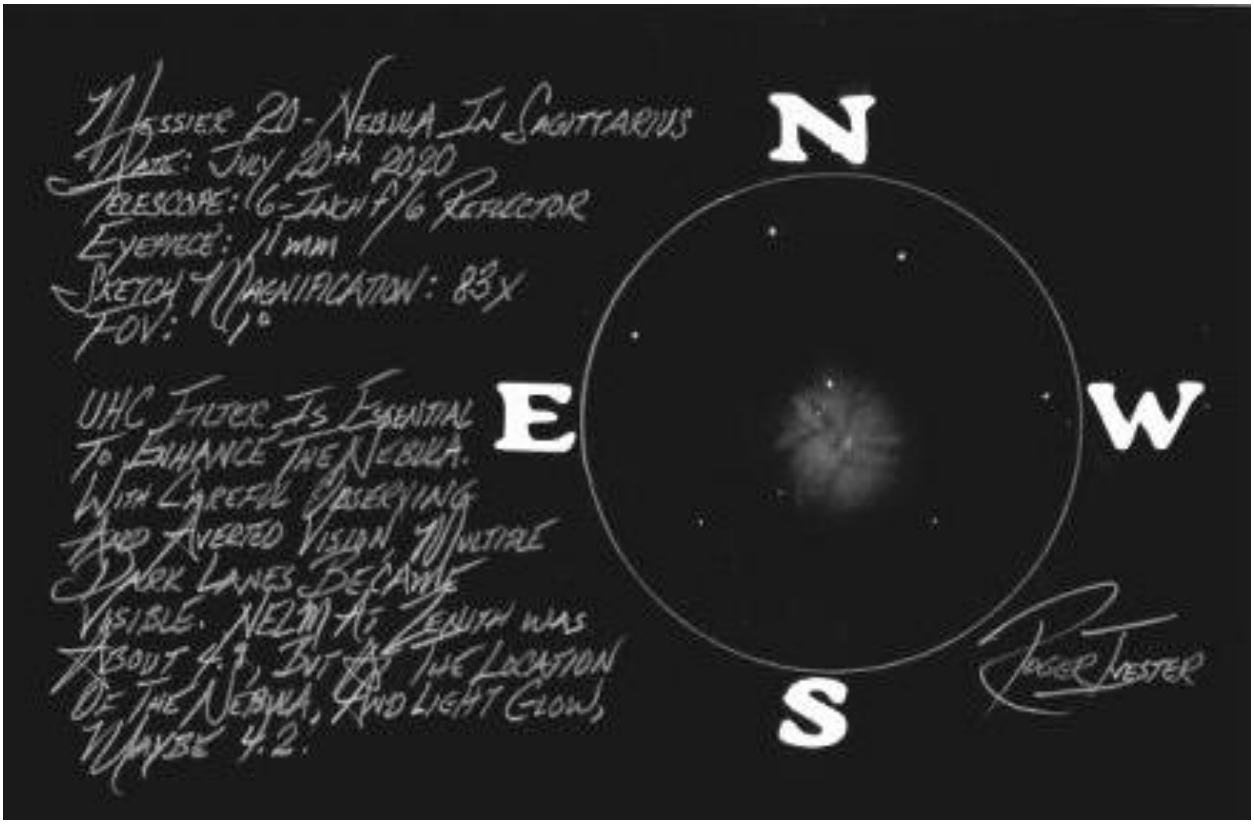
After a rainy and cloudy spring, I was finally able to get outside, on July 11, 2020. Messier 20 has always been a favorite deep-sky object of mine, but the far south position has always been a problem. And looking over the town of Boiling Springs made it extremely difficult, due to light pollution.

The NELM during this session was ~4.9 at the zenith, but considering the light pollution in the location of this object, it was near 4.2 or maybe even less. This just goes to show, regardless of the light pollution, and with patient and careful observing, and using a hood, amateur astronomy is always possible.

I was using a 6-inch f/6 reflector, and at low magnification could see a mostly round nebula with a brighter star in the middle and little more.

When increasing the magnification to 83×, and adding a UHC filter and with very patient observing, several dark lanes became obvious as shown in my sketch. However, they were very difficult.

What started out as a couple stars enveloped in some faint nebulosity at low magnification, and without a filter, became an incredible object with dark lanes. See my sketch as following:



The following is the complete listing of all Observer's Challenge reports to-date.

https://rogerivester.com/category/observers-challenge-reports-complete/