MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

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September 2021

Report #152

NGC 6823 & Sh 2-86, Open Cluster & Emission Nebula in Vulpecula

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:

The nebula surrounding the open cluster NGC 6823 suffers an identity crisis. It's not NGC 6820, as many sources claim, but rather a small knot of nebulosity 16 arcminutes in position angle 218 degrees (southwest by south) from the bright quadruple star at the cluster's heart.

Here is NGC/IC maven Dr. Harold Corwin's explanation:
NGC 6820 is a small knot of nebulosity, roughly 1′ × 1′, perhaps a reflection nebula around a few young stars or pre-stellar objects. It is specifically NOT the much larger HII region Sharpless 2-86 as has been many times been claimed, nor is it the cluster Collinder 404 = OCl 122, though that may represent the stars involved with the nebula. Marth's original observation with Lassell's 48-inch reflector mentions only the nebulosity: "F, S, R, bM". [Faint, small, round, brighter in the middle]
http://haroldcorwin.net/ngcic/ngcnotes.all

The position of NGC 6820 is $19^h\ 42^m\ 27.9^s$ +23° 05′ 15″. Consider this a bonus object if you'd like.

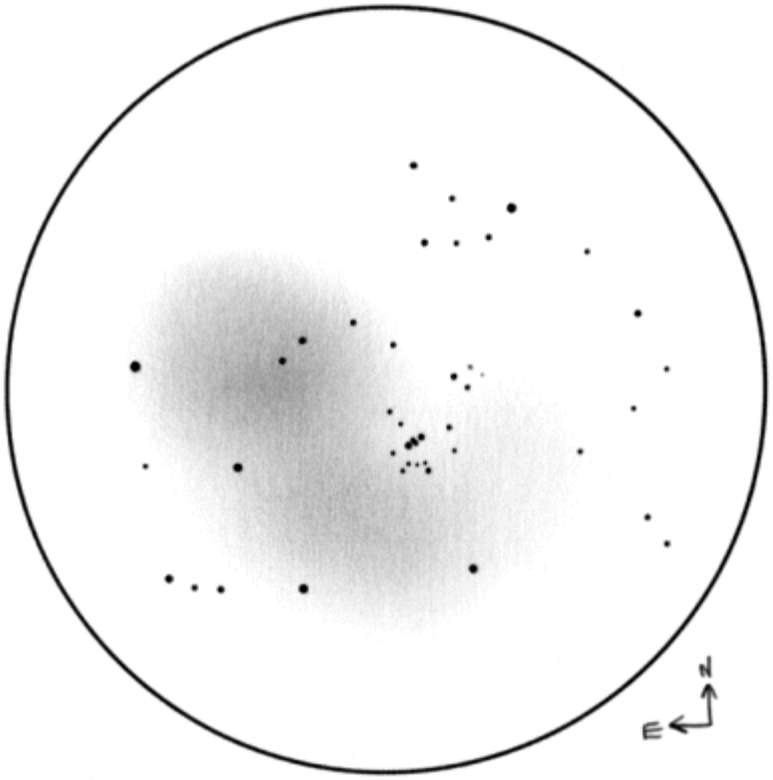
Jaakko Saloranta: Observer from Finland

4.7″ Sky-Watcher

Object: NGC 6823 + Sh2-86
Obs. place: Kruununpuisto, Hyvinkää, Finland (108 m / 354 ft.)
Date: 6./7.9.2013
NE Lim.mag: 5.9 (zenith)
SQM-L: 19.85 (zenith)
Background sky: 5 (average)
Seeing: 4 (fair)
Transparency: 4 (fair)
Weather: +7.4°C, humidity ~77%, 1011 hPa, no wind, clear.

Altitude: 49°
Description: Quite small but bright and compact open cluster. Only a handful of stars visible. Slightly concentrated towards the visual quadruple star in the center. Size 5'. With a UHC filter, the "elusive" emission nebula Sh2-86 is visible even under urban skies and 4" aperture. It appears as a very faint, irregular-shaped diffuse nebulosity forming a faint nebulous arc around the cluster to the E and S. The nebula ends quite abruptly in the NE. The exact border for the entire nebula is impossible to discern. The area surrounding the cluster seems to be nearly clear of nebulosity. The nebulosity in the background could be simply faint glow from very faint stars in the background if it wasn't for the E/NE

edge of the nebula which is clearly brighter than a typical background glow.



NGC 6823 with 4.7" Sky-Watcher @ 80× (30′) + UHC

Chris Elledge: Observer from Massachusetts

On September 3rd 2021 @10:00pm EDT, I used a 10-inch f/5 reflector to observe NGC 6823 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6; NELM 4.5 near NGC 6823; Transparency: Good; Seeing: Fair.

13 Vulpeculae was a challenge to see naked eye, but once I centered it I was able to star hop to 12 Vulpeculae and then to NGC 6823. A line of mag. 8 to 9 stars to its NW helped locate it.

At 36× (35mm, 1.9° FoV) the line of stars running from the West of NGC 6823 towards its North stands out as the brightest asterism in the view. It wiggles a bit from its NE/SW linear path and is composed of at least 16 moderate brightness stars. Overall the field has a pretty rich concentration of mag. 11 and brighter stars. There's a group of five mag. 7 to 8 stars on the Western side of the view. A bright mag. 6 star sits to the South (HD 186310). Far to the SE in the view, there's a line of mag. 9 stars heading NE/SW along with mag. 7 HD 186412.

It's difficult to separate the NGC 6823 cluster from the surrounding stars. There's a little roof over the cluster, five mag. 9 to 10 stars making a little peak over it to the SE if you pretend that the long line of stars to the NW of it is the ground. In the center of the cluster there are two brighter mag. 9 stars contained in the cluster with a third sitting just to its NE edge. There are a lot of faint stars surrounding the pair in the cluster making a faint cloud around them. I couldn't detect any nebulosity in the area.

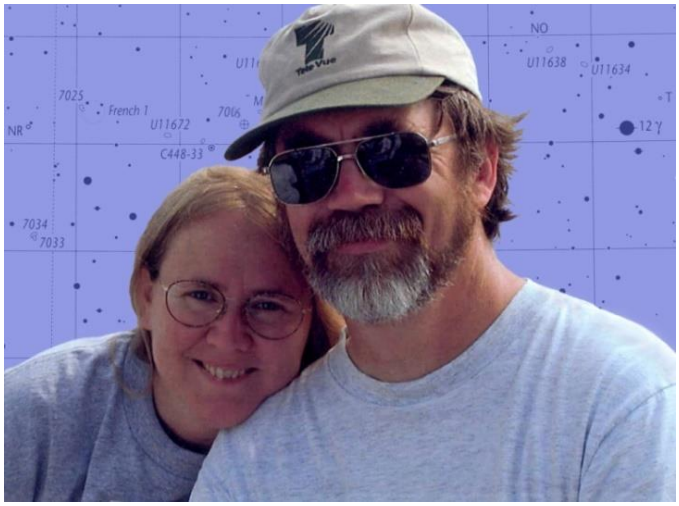
At 115× (11mm, 0.7° FoV) the "ground and roof" I described now fill the view. There are a few fainter stars very close and to the West of the centermost bright star in the cluster (HD 344784). The center of the cluster appears to have a fan shape of stars that radiate from the center bright star like blades on the fan. The bright star in the South side of the cluster (HD 344783) has a few nearby fainter companions, but mostly sits on its own compared to the centermost star.

At 270× (4.7mm) the cluster appears much the same as at 115× with the view filled by a spattering of stars. I can easily resolve about 20 stars.

I revisited NGC 6823 again in the ATMoB 25-inch f/3.5 reflector on September 11th at 10:45pm. Transparency was fair and seeing was poor. With my lowest power 63× (35mm, 1.1° FoV) eyepiece and a Hydrogen-beta filter I was able to see traces of nebulosity surrounding the cluster. The brightest concentration of nebulosity is South of the cluster and it stretches around to the East side of the cluster. When panning past the nebulous area, the background sky would get noticeably darker. There's a bit of nebulosity that stretches towards the West from the Southern side. It falls off very rapidly as it gets further from the cluster. On the Northern side the nebulosity has bits and pieces but continues down the row of stars to the ENE of the cluster.

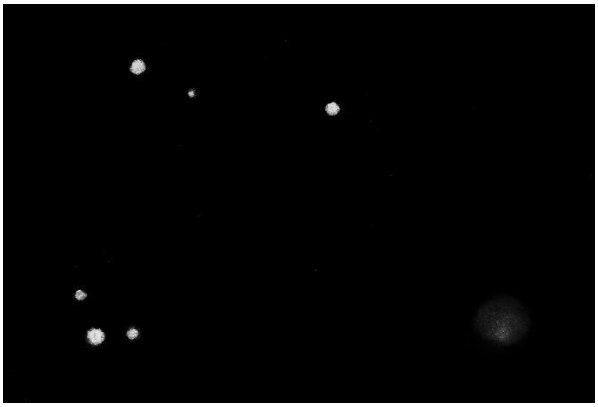
Given the large exit pupil of this telescope at this power, this nebulosity should be visible with the filter in a smaller aperture as well, but I didn't have a chance to check.

Sue French: Observer from New York



I made the above sketch over a few nights in September using a 10-inch reflector. Stars were sketched at 115×, whereas nebulosity was added from the view at 68× with the aid of a UHC filter. The nebulosity appeared quite faint and is exaggerated here to show on a scan. The sketch shows only my basic impressions. North is up and west is to the right.

The close-up sketch below was made a day later with the same telescope and shows the real NGC 6820. The nebula was visible at 115×, but appeared small and faint. It was more obvious at 166×, but 187× gave the best view. The little nebula spanned roughly 40 arcseconds, as judged by the distance between two field stars, and looked brighter in the south.



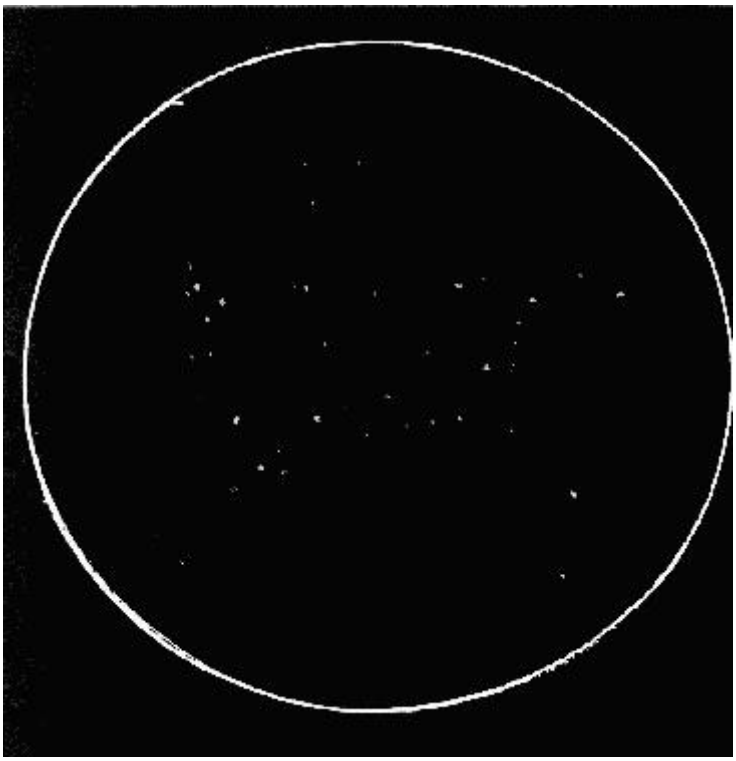
Larry McHenry: Observer from Pittsburgh, Pennsylvania

September: NGC 6823/Sh 2-86: Open Cluster/Emission Nebula – Vulpecula; Mag. V=7.1
RA: 19h 43m Dec. +23° 18′ Cluster Size 7.0′ – Nebula Size 40′ × 30′

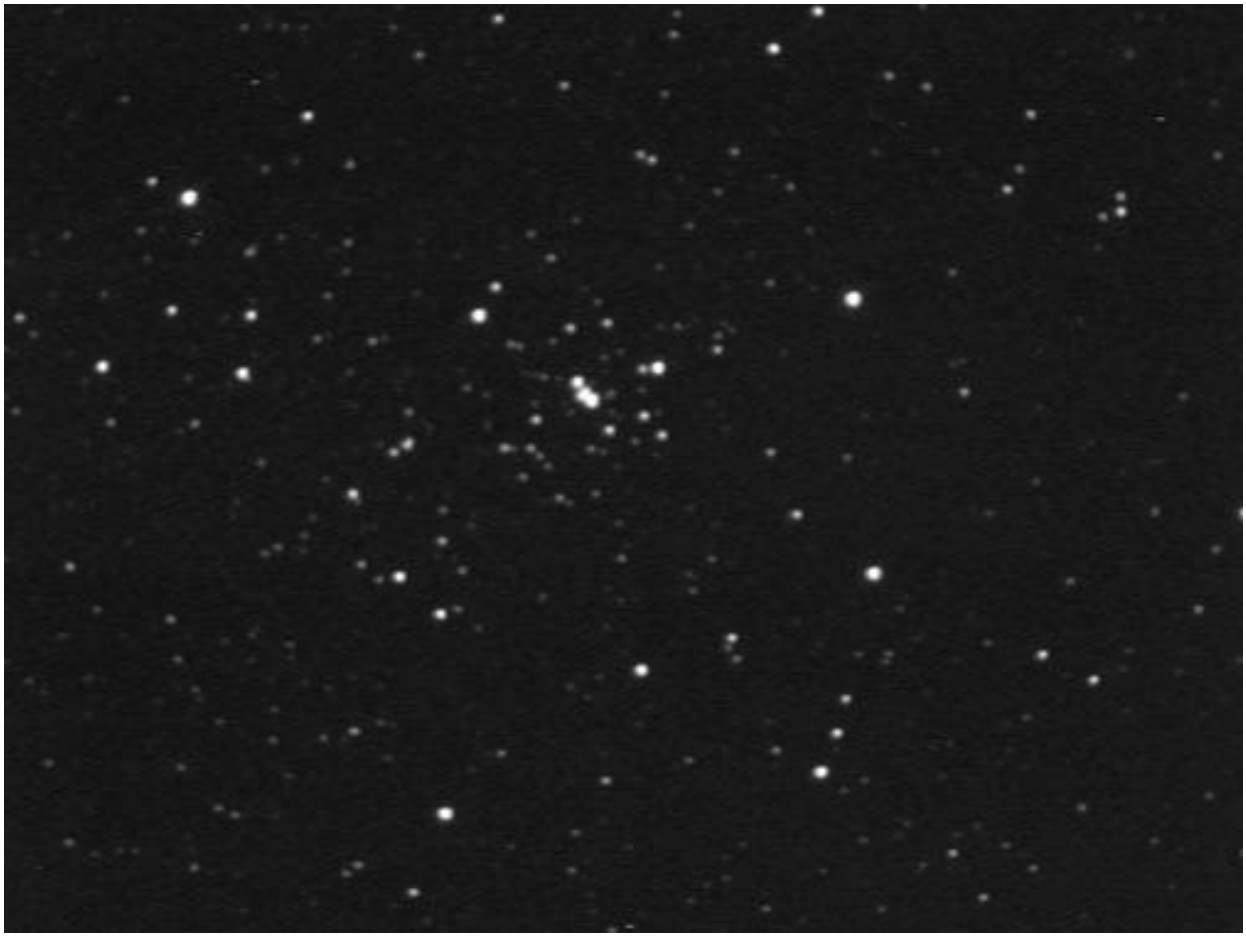
Sh 2-86 (nebula) and NGC6823 (open cluster): Located in the summer constellation of Vulpecula, 'The Fox', NGC6823 is a somewhat sparse young star cluster embedded within an H II emission region Sh 2-86. The cluster shows several nice star-chains, even in short (<10 seconds) exposures, but the surrounding nebula requires longer exposures and may need to use a filter. Several large dark spires/pillars display, similar to the Eagle Nebula – M16.

The entire region is a part of a larger OB-Association of stars known as Vulpecula OB-1.

Visual Eyepiece Sketch: Vulpecula OB-1. **09/05/1993**: from county park in Pittsburgh, PA, using an 80mm f/3 refractor and 32mm eyepiece (10×).



08/05/2013: from AstroBlast Star Party at the ORAS Observatory in Two-Mile Run State Park, PA, with a 6-inch RC @ f/5 on a Gem Mount, using an analog video-camera & IR filter @ 25 seconds, unguided.



06/29/2020: from Big Woodchuck Observatory backyard in Pittsburgh, PA. Using an 8″ SCT optical tube @ f6.3 on a GEM mount, with a CMOS color camera and Ha/OIII/H-beta narrowband filter @ 120-second guided exposure, livestacked for one hour.

Mike McCabe: Observer from Massachusetts

Whenever I see the words '*cluster associated with nebulosity*' in the description line for an object, I automatically start to consider the possibility that I won't see any nebulosity whatsoever when I put that object in the eyepiece. This response is borne from my many years of experience observing under a sky that averages a Bortle 6 rating, rarely reaches Bortle 5, and often comes in at Bortle 7. Those kinds of skies typically aren't kind to observations of dim, diffuse subjects, so when a target includes diffuse nebulosity as either all or part of the observation my expectations tend to be somewhat muted.

With that said, my experience with the Observer's Challenge objects these past couple of years has been remarkable in that I've been able to see the nebulosity in every target that has included it as part of the observation. So kudos to the team that has been picking the monthly objects, because someone has been nailing it as far as the uniqueness/observability balance is concerned.

I chose my 5-inch refractor to view NGC6823/Sh 2-86, specifically for the increased contrast offered by the unhindered light path through the optics. It turned out to be a good choice. The transparency was a little above average for my area on the night I chose to look at the September target, and even without filtering I could detect vague hints of nebulosity throughout the field of view. Installing a UHC filter under the eyepiece caused an increase in the density of the nebulosity to the east and northeast of the cluster. The cluster itself was small and comprised of mostly very dim stars save for a few 9^{th} magnitude components, so nothing earth shattering there. Overall though it was an interesting target, especially when you consider that professional studies of the area have determined the age of the combined cluster/nebulosity system to be between two and three million years old, so really quite young from a cosmological perspective.

Sketch follows.

Observation Log - Object: NGC 6823/20

Date 9/4/21 /z Time 22:00 /z EDT Local Observing Location 42°N 71°W

Scope/Aperture 5" F/9.3 ACHRO

Eyepiece 24mm Magnification 50x

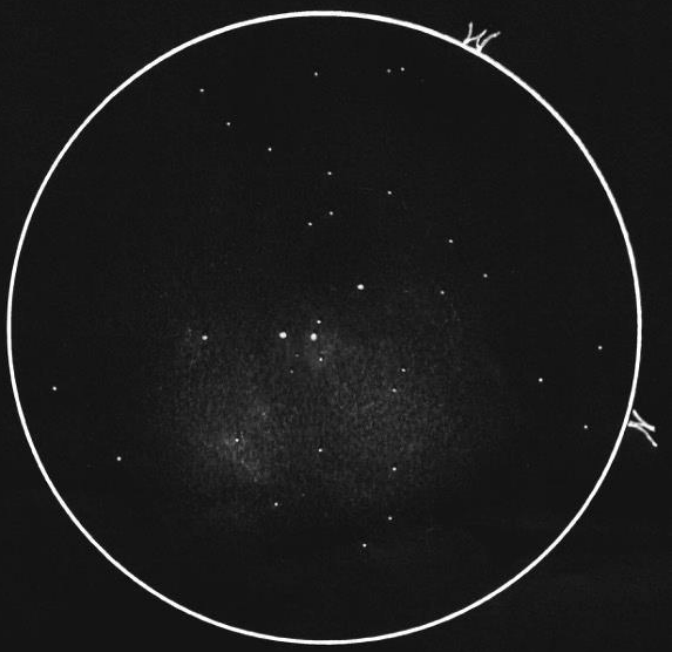
Filter UHC Seeing 2/5 Transparency 3.5/5

Temp 62°F Baro Pres. — Wind CALM

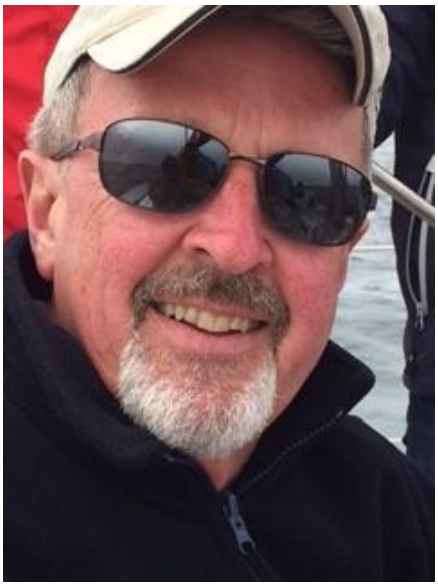
Comments:

VAGUE HINTS OF NEBULOSITY THROUGHOUT THE FIELD, BUT SEEMED TO BE MORE CONCENTRATED TO THE AREA BELOW THE CLUSTER AS SEEN IN THE EYEPIECE.

Orientation and/or Rotation



John Bishop: Observer from Massachusetts



On 9/6/21, I observed NGC 6823 and Sh 2-86, an open cluster and associated nebula in Vulpecula. I observed from the ATMoB Clubhouse in Westford, Massachusetts. The sky was clear; seeing and transparency were fair. I observed with my 8.25-inch f/11.5 Dall-Kirkham reflector, at 48× to 134×. The scope is a portable setup on an equatorial mount with motor drive, without goto.

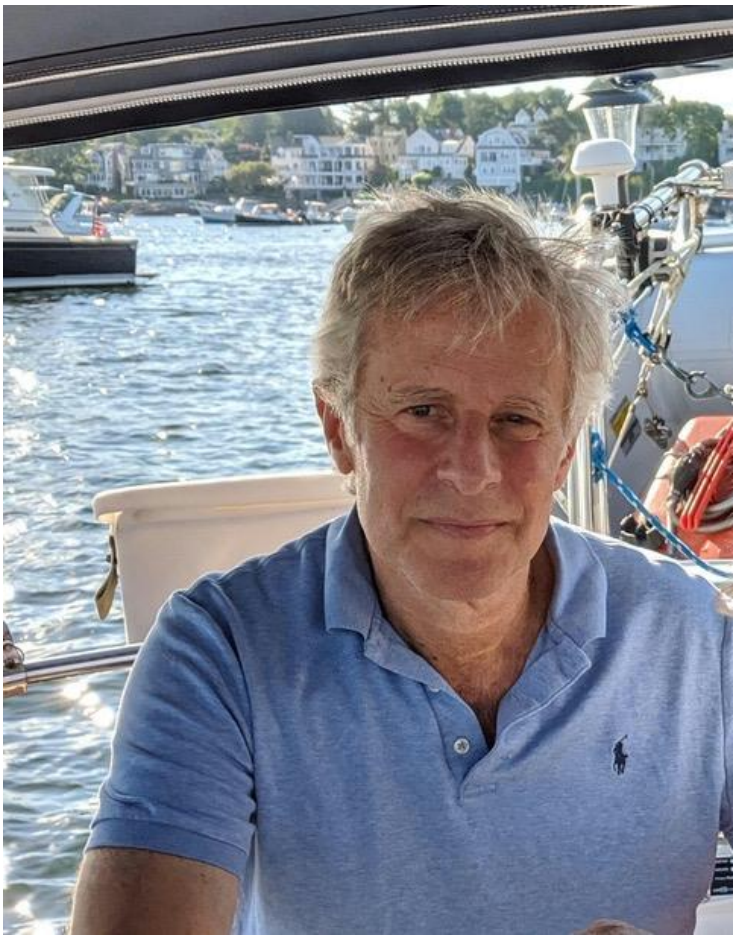
NGC 6823 (I saw no nebulosity at all) was a bit more of a challenge for me than the August Challenge object, M57. Not that it was difficult to locate, but it took me some time to confirm that it was in fact the correct object. Unlike the distinctive Ring Nebula, NGC 6823 is a fairly small, somewhat generic, loose open cluster, set in a field of background stars.

I began the observing session by using "dead reckoning", rather than true starhopping, to locate NGC 6823. I aimed my Telrad at the spot I estimated the object would be, roughly halfway on a line between Albireo and M71, and began sweeping with my 2-inch format, 50mm eyepiece at 48×. This less methodical technique works often enough, and it did here. Soon, I spotted a concentration of stars that proved to be NGC 6823. The problem was that I couldn't correlate the field stars in the eyepiece at 48× with any patterns shown on my 7.6 and 8.5 magnitude star charts, to confirm the object. I had bypassed using my finder scope in beginning my search. After spending some time trying in vain to orient the field, I finally turned to my 7×50 finder scope, and, of course, that was the solution. The finder scope field showed NGC 6823 sitting at the open end of a distinctive curving "V" of 6th magnitude and fainter stars that was evident on the charts. Object confirmed.

NGC 6823 is a small, loose open cluster with a small knot of stars at the center. At lower power, the cluster looks sparse, but at higher power there is greater density around the bright central "star." The bright central star at first looks like a double, but with higher magnification, appears to be the tiny four- star asterism described by Luginbuhl and Skiff. The boundaries of the cluster were hard to say amidst all the background stars.

I saw no nebulosity at all when using an O-III and UHC filters which only darkened the image. NGC 6823 reminded me of NGC 2362, a pretty open cluster in Canis Major, although the latter is richer. It is one of James Mullaney's top deep-sky objects.

Barry Yomtov: Observer from Massachusetts



With continued bad weather and uncooperative cloudy skies, I needed to dip into my image data archives for this month's object, NCG 6823 and Sh 2-86. The question of what astro-photographers do on cloudy nights…they reprocess their images.

For this month's observer's challenge object, my only imaging session goes back to September 13, 2016. My equipment was very different compared to my submissions for this effort to-date. Also, 2016 was my first year of imaging with fast optical systems: A Schmidt-Cassegrain 9.25-inch telescope with a HyperStar lens providing f/2.3.

At that time I was imaging with Canon DSLRs, having not much image signal in the full RGB image (i.e., unable to detect the reflection nebula 6820). So I decided to reprocess only the Ha narrow band (12 nm) stacked image and utilize both PixInsight and Photoshop tools to bring out greater detail.

During the imaging session I was able to obtain 25 images at 75 second exposure for 31 minutes. With the f/2.3, which is equivalent to 233 minutes with the 9.25-inch f/10 and a 6.3 focal reducer.

The results in reprocessing the image with PixInsight and presented in grey scale, was able to bring out greater detail especially in the central star forming region near the open cluster NGC 6823. This area reminds me of the Pillars of Creation in the Eagle Nebula. I was also able to discern greater detail in the dark lanes within the emission nebula Sh 2-86.

Michael Brown: Observer from Massachusetts

I observed this month's object visually and attempted to photograph it and found both to be, well, challenging.

I had basic background knowledge on the object from some cursory reading. NGC 6823 is an open cluster of young, luminous, hot stars within a nebula (Sh 2-86), variously described as a reflection or an emission nebula. New stars are forming from the gas in the nebula. The nebula is notable for pillars of gas and dust that appear as black globules in deep photos.

I had been familiar with this object (mainly the cluster portion) as one of several attainable objects near the Dumbbell Nebula. So I've seen it previously, but never before lingered to ponder the details.

I observed the object visually, with my 8-inch SCT, three times over the course of an 8-day period in early September. The cluster contains a small number (seven or so) of bright stars and many dimmer stars, appearing fairly packed together against the background star field (itself quite rich in Vulpecula). I saw the nebula as a faint, ill-defined glow surrounding the cluster, somewhat clearer with a UHC filter. On the second night of viewing, I was a bit more certain that I could actually see the nebula and noted that it was brightest to the east of the cluster, and to a lesser extent to the south. I judged the nebula to approximately span the field of my 9 mm/140-power eyepiece (roughly 1/2 degree) in the north-south direction. The nebula was slightly easier in a 25mm eyepiece (50-power). I was able to persuade myself that I was really seeing nebulosity by slewing in various directions and seeing the slight contrast between the faint nebula and surrounding darker areas of sky.

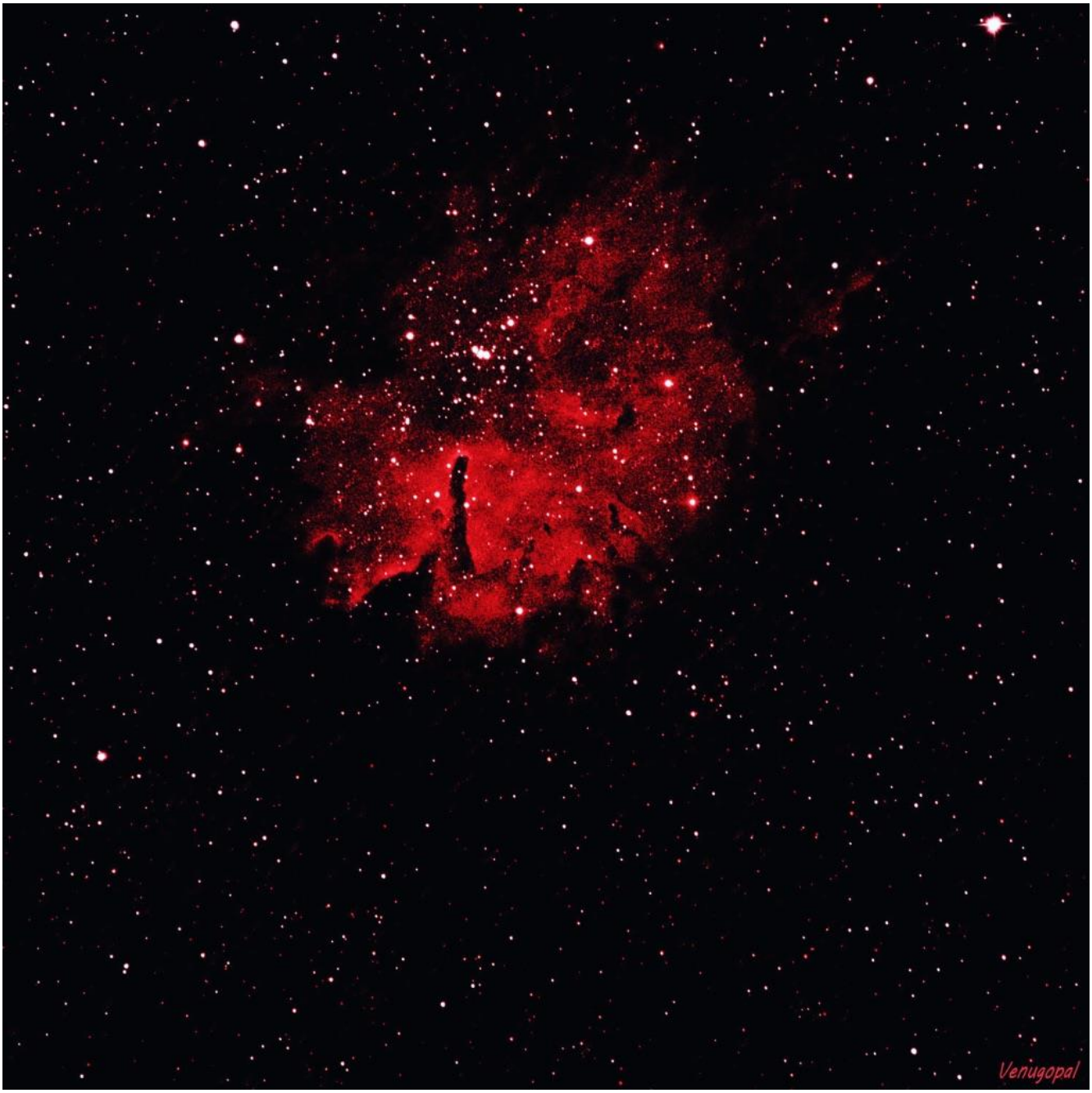
Later, at the September ATMoB club meeting, Glenn Chaple was describing this object and stated that it was very difficult to see the nebula visually. Considering my modest telescope and somewhat light-polluted skies, this made me wonder whether I actually saw it. But I recorded a sighting of the nebula, so that's my story and I'm sticking to it!

My photograph is a total 48-minute exposure through the 8-inch scope, using my Canon digital SLR camera at ISO 1600. I centered the photo a little east and south of the cluster, based on my visual impression that the brightest nebulosity lay in those directions. Well, it's a pleasing star field, but there is no hint of the nebula! I assume this is related to the insensitivity of consumer digital SLR cameras to the red light of nebulae, perhaps combined with the faintness of this object.

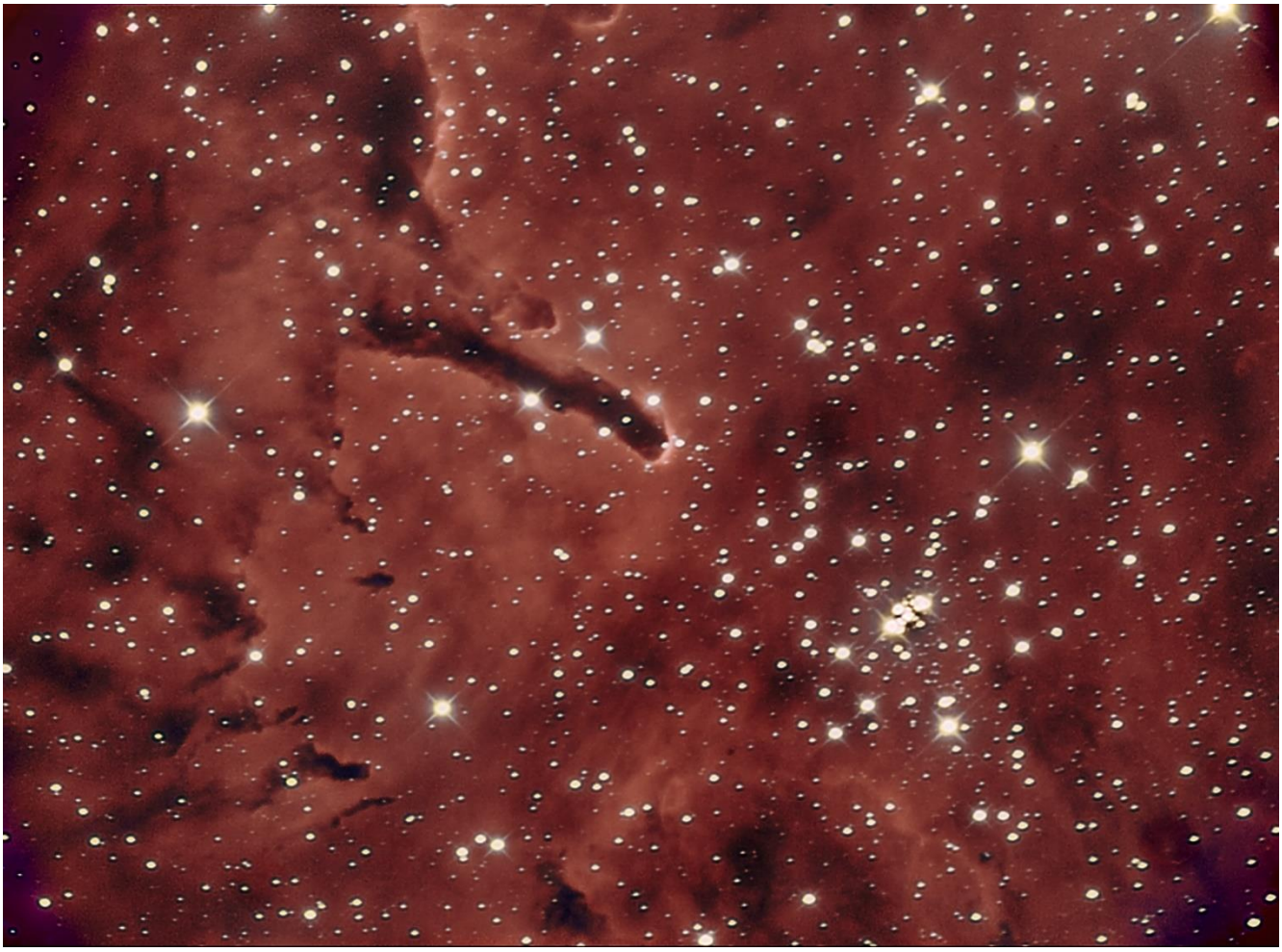
Venu Venugopal: Observer from Massachusetts

The following image was taken from my Chelmsford, MA backyard on 9/8/21.
Telescope: 8-inch f/4 Newtonian reflector, GEM 45, ZWO ASI533MC

Optolong L-eNHance filter; 30 minutes total exposure and 30-second sub frames.


Venugopal

Mario Motta: Observer from Massachusetts



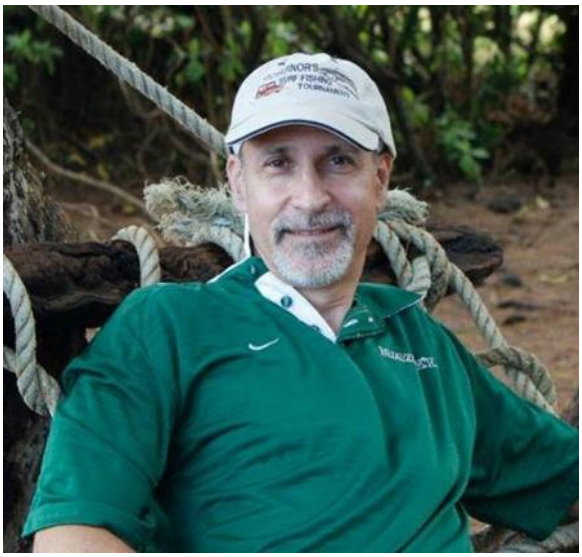
The above image was taken with my 32-inch f/6.5, with ZWO ASI6200 camera, using 2 hours Halpha, 1 hour each O3 and S2 NB filters. Processed in PixInsight.

I love the field with young new open star cluster (NGC6823) and the surrounding nebula Sh 2-86 filled with "pillars" and Bok globules, reminiscent of the Eagle nebula nearby.

This region would benefit from a nice wide-field image of the full surrounding nebula, but I will leave that to the imagers with a much wider field to take, and I will "zoom" into the fine detail at the heart of this nebula.

For scale the open cluster is 50 light-years across, and the nebula is 600 light-years away.

James Dire: Observer from Illinois

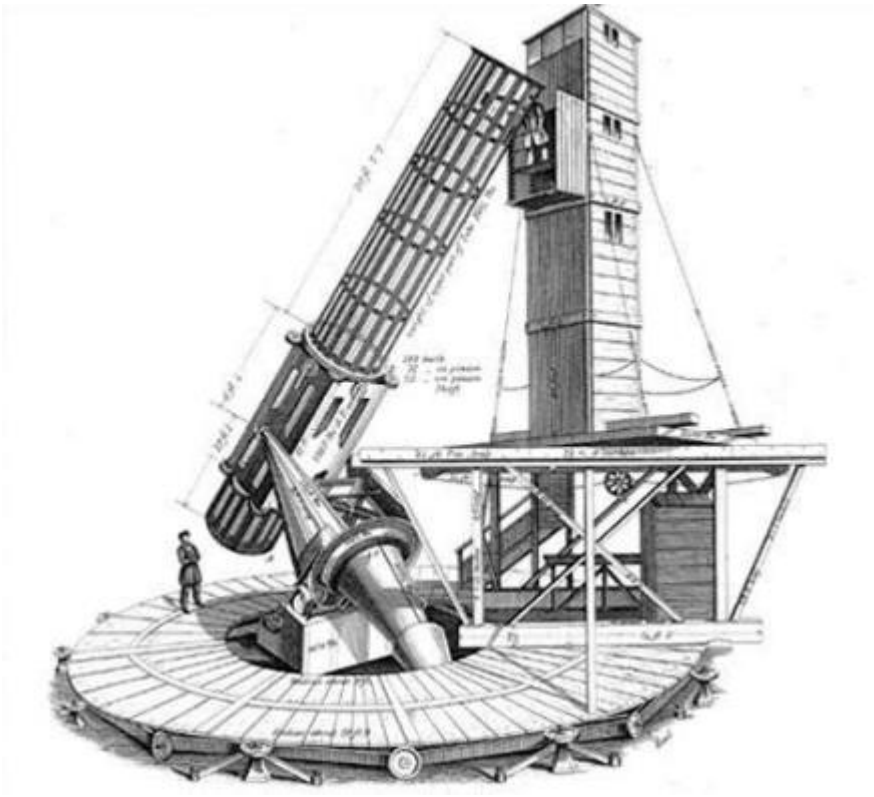


NGC 6823 is a magnitude 7.1 open cluster found in the constellation Vulpecula. The cluster is 3.75 degrees west and 0.25 degree north of the famous Dumbbell Nebula! NGC 6823 was discovered by William Herschel in the year 1785 using his 18.7-inch Newtonian. The NGC catalog lists the cluster's diameter at 12 arc minutes.

NGC 6823 has scores of stars. The brightest is near magnitude 9 and about a dozen or two stars are brighter than magnitude 13. Many of the brighter stars are spectral classes O and B, attesting to the cluster's young age. The cluster is estimated to be 10,400 light-years away.

NGC 6823 is embedded in a large nebula known as Sh 2-86. The nebula is 30 by 40 arc minutes in size. I could not find an estimate of its visual magnitude. But it is faint, too faint to be seen in amateur telescopes that I have used. The NGC catalog lists its B (blue) magnitude at 15.

German astronomer Albert Marth discovered nearby NGC 6820. Marth was an assistant to the British astronomer William Lassell, himself famous for discovering moons Umbriel, Arial, Hyperion and Triton. Lassell also built telescopes. His largest was a 48-inch f/9.4 Newtonian reflector constructed in the 1850s. This reflector was housed in Liverpool. But its last years of service, 1861-1864, were in Malta where Marth discovered NGC 6820 in 1864.



Lassell's 48-inch f/9.4 Newtonian reflector

NGC 6823 is both a reflection and an emission nebula. The bright hot O and B stars in NGC 6823 are responsible for the reflection portions while the emissions are mostly from ionized hydrogen (HII).

I took an image of NGC 6820 and NGC 6823 with an 8-inch f/8 Ritchey–Chrétien Cassegrain (with a Tele Vue 0.8× focal reducer/field flattener yielding f/6.4) in Jubilee College State Park, Illinois. The image is a 190-minute exposure (10-minutes subframes) using a SBIG ST-2000XCM CCD camera. All of the equipment rides on a Paramount Equatorial mount in a Sky Shed Pod observatory.

In the image below, north is up and east to the left. To me the nebula looks like a fainter and smaller version of the Rosetta Nebula. The four bright stars along the bottom and left sides of the image are foreground star with magnitudes between 8.5 and 9.8. The two bright stars near the upper right corner, as well as the bright star to the upper right of the image center, are also foreground stars. The brighter stars tightly grouped in the center of the cluster are actually cluster members and are between magnitudes 9 and 10.

NGC 6823 is a nice cluster to view at about 100× in an 8-inch telescope. Even though the brightest stars in the eyepiece are not cluster members, they enhance the visual senses of seeing an open star cluster.

Anas Sawallha: Observer from Jordan

This month's Observer's Challenge object is open cluster NGC 6823, surrounded by nebula, Sh 2-86 in Vulpecula, located about 6,000 light-years away.

The nebula was difficult to see through my 5-inch reflector, however with the aid of a UHC filter, it became more apparent.

I observed this object from a Bortle 2 location and could see a rhomboidal-shaped nebulosity, but unfortunately I did not sketch.

At a later date, I revisited from a Bortle 3-4 location and not surprisingly, the nebula was much diminished from my first observation with the darker site, as to be expected.

Sketch follows:

Roger Ivester: Observer from North Carolina

NGC 6823/Sh 2-86: Cluster/Nebula in Vulpecula

Date: September 2, 2021

Telescope: 10-inch f/4.5 reflector

NELM: 4.9

Sketch Magnification: 160×

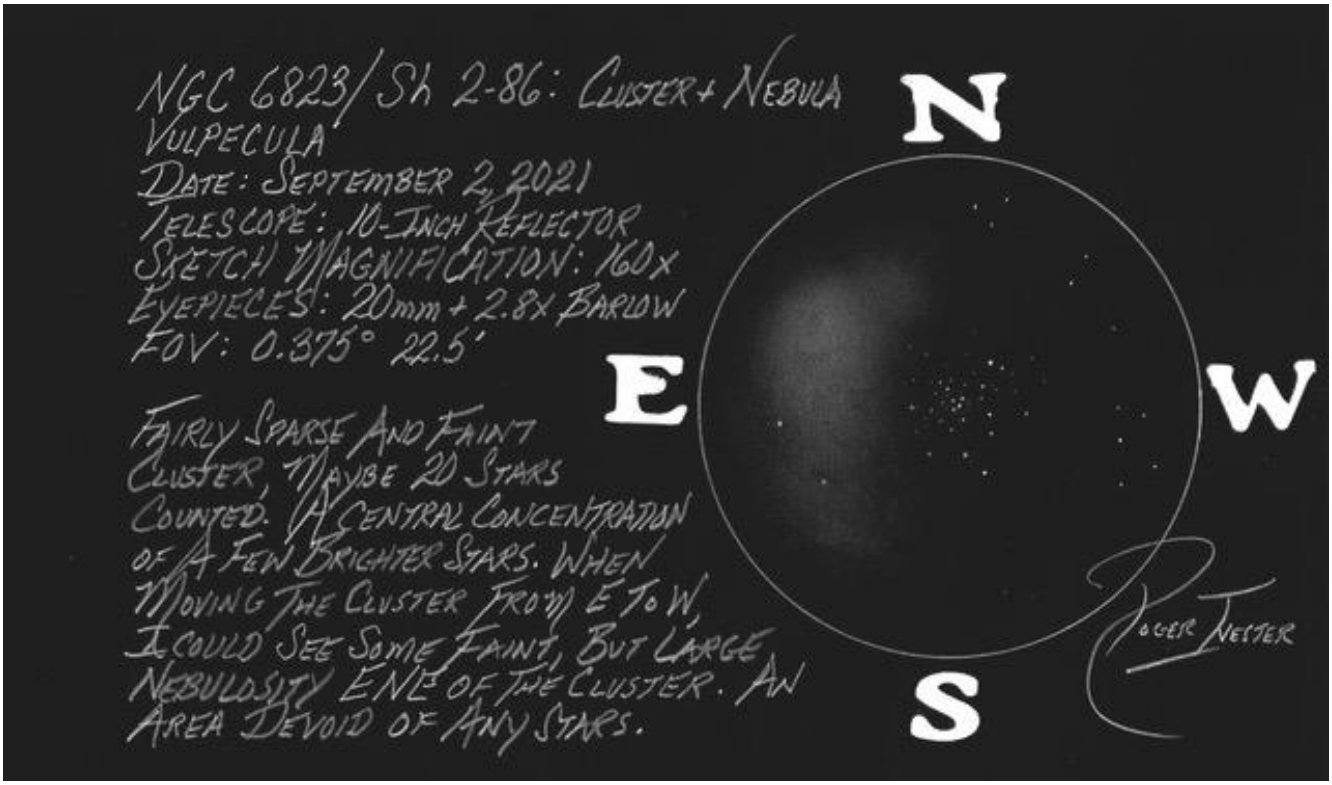
Eyepieces: 20mm Erfle + 2.8× Barlow

Field of View: 0.375º – 22.5 arc minutes

Sparse cluster with ~ 20 stars counted @ 160×, with a central concentration of several brighter members. With careful and patient observing, despite the less than optimum transparency, and moving the cluster in-and-out of the view, from east to west, I could see some faint, but very large nebulosity ENE of the cluster. No filter was used.

To be able see the faint nebula after more than an hour was well worth the time, but once seen, it was surprisingly easy.

Sketch follows.



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

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