MONTHLY OBSERVER'S CHALLENGE

Compiled by:

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&

Sue French, New York

February 2021

Report #145

IC 1893 and IC 410, Cluster and Emission Nebula in Auriga

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.

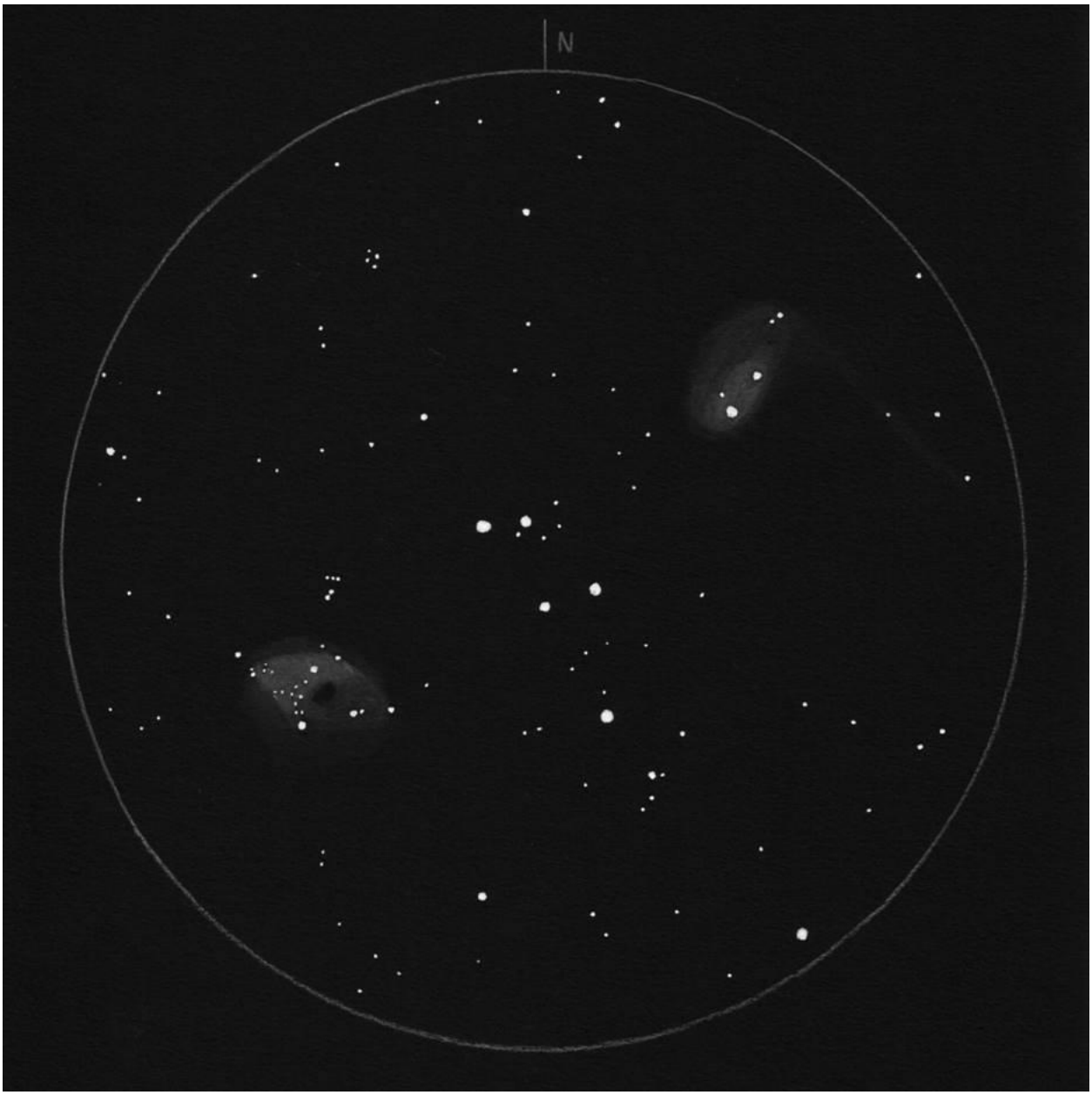
This month's target

John Herschel discovered the open cluster IC 1893 in 1827 with the 18¼-inch reflector at Slough in Buckinghamshire, England. His handwritten journal reads: "Rich, coarse, scattered and straggling. It more than fills the field. The stars are 9…15 magnitude." The engulfing nebula, IC 410, wasn't discovered until 1892, when Max Wolf found some new extended nebulae on photographic plates taken with a 6-inch Voigtländer portrait lens. My paraphrased translation of the pertinent section of his discovery says: *The ribbon-rich nebula shown on the plates around the star cluster surrounds the star BD+33 1023* [HD 242908] *should also be new. It largely encloses the whole group.*

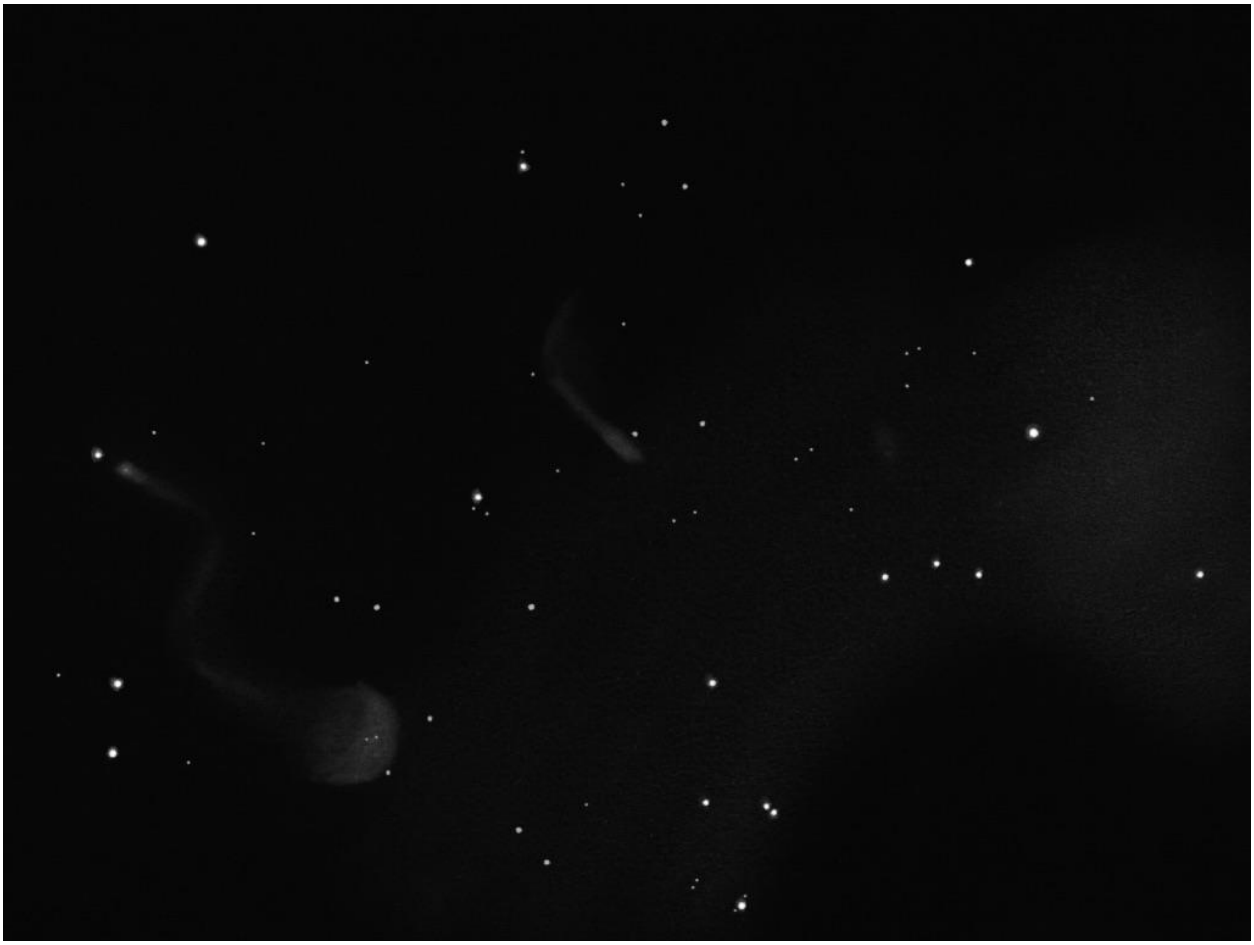
The nebula is roughly 11,000 to 12,000 light-years distant, and the adolescent cluster within it is at least 4-million years old.

Uwe Glahn: Observer from Germany

NGC 1893, IC 405, IC 410
20×125 Binoculars
3º Field of View



IC 410 (NGC 1893)
27-inch reflector @ 172×



Rony De Laet: Observer from Belgium

My first contribution is an observation with a pair of binoculars: The galactic treasures of central Auriga.

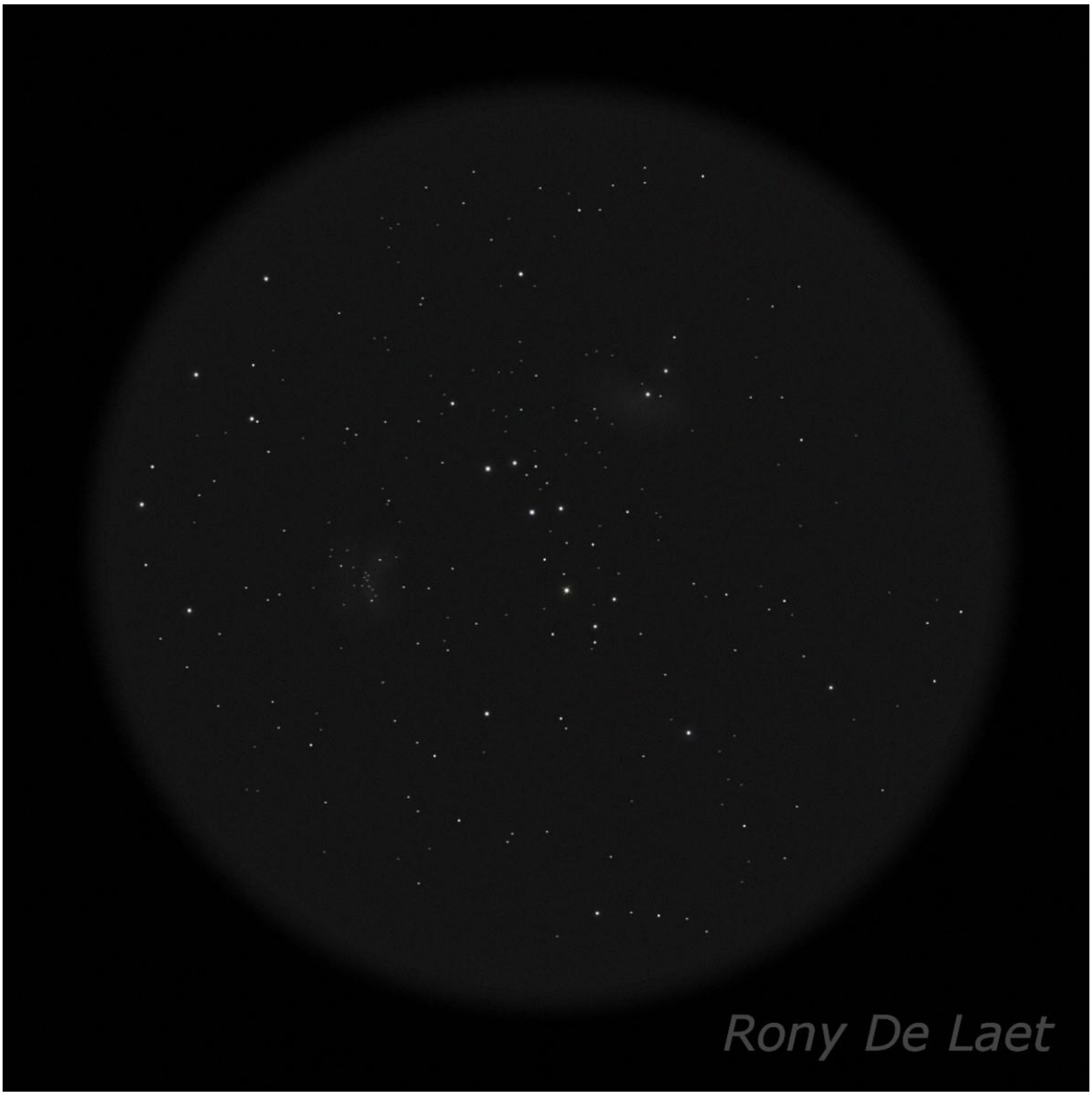
The constellation of Auriga, the Charioteer, offers us a very deep look into the winter Milky Way. Here we look in the direction of our galaxy's rim. Therefore Auriga is very rich in galactic clusters. A beautiful binocular field can be found near the star chain formed by 16, 17, and 19 Aurigae. This interesting star chain looks like a wide open cluster, which can be seen with the naked eye on a dark night. While they form not a real cluster, these stars are all about 230 to 450 l-y away. At less than one degree to the NW, the bright star AE Aurigae can easily be found. AE Auriga probably is a runaway star, which was born in the M42 region. At a distance of 1500 l-y, AE Aurigae is moving through a cloud of gas and dust. This interstellar cloud around AE Aurigae is called IC 405, the Flaming Star Nebula. IC 405 is illuminated by the passing runaway star. A small portion of this reflection and emission nebula can be seen with averted vision in a pair of binoculars. Look for a small diffuse glow SE of AE Aurigae.

Let's go back to our first star chain. Another fine treasure can be found in the opposite direction of AE Aurigae: the young and loose open cluster NGC 1893, embedded in the pale emission nebula IC 410. A pair of binoculars will show the combined glow of the cluster and the surrounding emission nebula in which it was born. NGC 1893 is 15,600 l-y away and has a true diameter of 54 l-y. IC 410 has an impressive diameter of about 150 l-y.

IC 405 and AE Aurigae are about 4 times further away than the central star chain, while NGC 1893 and IC 410 are maybe 40 times further away.

Site : Le Castellard Melan, France (44° N)
Date : September 30, 2008
Time : around 00:30UT
Binoculars : TS Marine 15×70 ; FOV: 4.4°
Filter : none
Mount : Trico Machine Sky Window
Seeing : 2/5 ; Transp. : 4/5
Sky brightness : 21.35 magnitudes per square arc second near zenith (SQM reading).

Nelm: 6.4
Sketch Orientation: N up, W right.
Digital sketch made with Corel Paint Shop Pro X2, based on a raw pencil sketch.

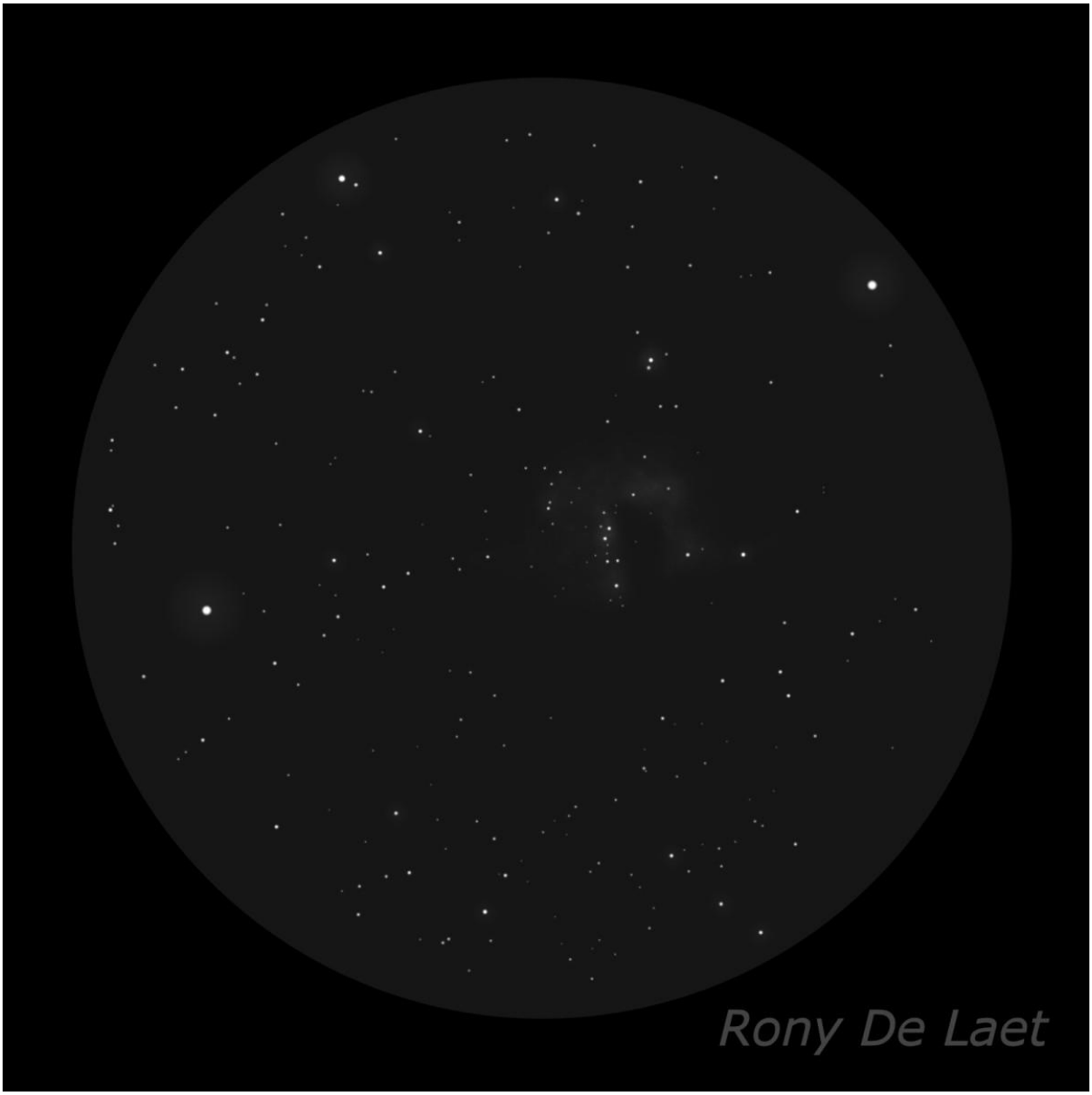


My second contribution is an observation with a 102mm refractor: IC 410 : an interesting Galactic Nebula in Auriga.

IC410 was the subject of the 'Object of the Season' in the 55th (December/January 2008) *Interstellarum* magazine (German astronomy magazine). After reading the article, I was curious to see if I could grasp it with my little scope. Luginbuhl & Skiff called it 'difficult to view with amateur instruments.' So I was warned. I tried my luck when Auriga was high overhead. Starhopping was easy, with 16 Aur as the guide star. The field of view was filled with plenty of pinpoint Milky Way stars. With the lowest power available I could locate NGC 1893 very quickly. And indeed, the cluster was involved in a large elusive haze!. The best result I got with 25× plus the UHC filter. The nebula could not bear too much power at all. I enjoyed this observation very much. IC 410 does show some interesting details (like a key-hole) in my little instrument. The observation took about an hour. Only one field width away lies the better known

IC 405, the Flaming Star Nebula. I could easily compare both nebulae. IC 410 does appear to be the easier one of the two, but that can be due to the presence of NGC 1893.

Date : February 6, 2008
Time : around 20.00UT
Scope : SkyWatcher 102/500
Eyepiece : Vixen LV 20mm
Power : 25×
FOV: 120′
Filter : Lumicon UHC
Seeing : 2.5/5 ; Transp. : 2.5/5
Nelm : 4.8
Sketch Orientation : N up, W right.
Digital sketch made with PhotoPaint, based on a raw pencil sketch.



Mike McCabe: Observer from Massachusetts

Finally! February 2021 was an abysmal month for deep-sky observing here in southeastern Massachusetts. Early on in the month we had precious few clear nights, and those that were presented poor transparency. Certainly not very good conditions for eking out dim nebulosity in the eyepiece. As the month wore on, the moon dominated the sky and again the prospects of seeing dim nebulosity seemed – ahem – dim.

Fortunately things have improved in March, and the evening of the 6th was a beauty! When I stepped out the door after dinner, I was presented with cool temps and a steady breeze, but also above average transparency and above average seeing. Bonanza!

The star hop to NGC 1893 is straight forward enough, it being very conveniently located next to the collection of bright stars near the Flaming Star Nebula in Auriga. Simple as it was to get there, it's not entirely clear in the eyepiece which stars belong to NGC 1893 and which just belong to the Milky Way in general. There is a slightly increased density in the area though, so that's where I concentrated my efforts.

I had heard that IC 410 would be challenging, so it was a pleasant surprise to be able to see some nebulosity associated with the region. Interestingly, my 2″ eyepiece w/UHC filter didn't work quite as well as my 1.25″ eyepiece w/ALP filter. I found it interesting because the ALP filter is significantly older and presumably lower-tech than the modern UHC filter, but I could definitely see more nebulosity through the ALP.

The nebulosity appeared densest towards the northwest of my field of view, and extended somewhat southwest and a bit northeast as well. All in all it was a very pleasant observation on one of the clearest nights we've had this year.

Sketch follows.

OBSERVATION LOG - OBJECT: NGC 1893/IC 410

DATE 3-6-21 /z TIME 19:30 /z EST LOCAL OBSERVING LOCATION 42°N 71°W

SCOPE/APERTURE 10" F/5 NEWTONIAN

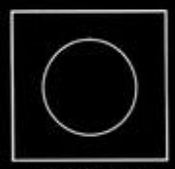
EYEPIECE 24mm 68° MAGNIFICATION 52X/1.3°TF

FILTER ALP SEEING 3/5 TRANSPARENCY 3.5/5

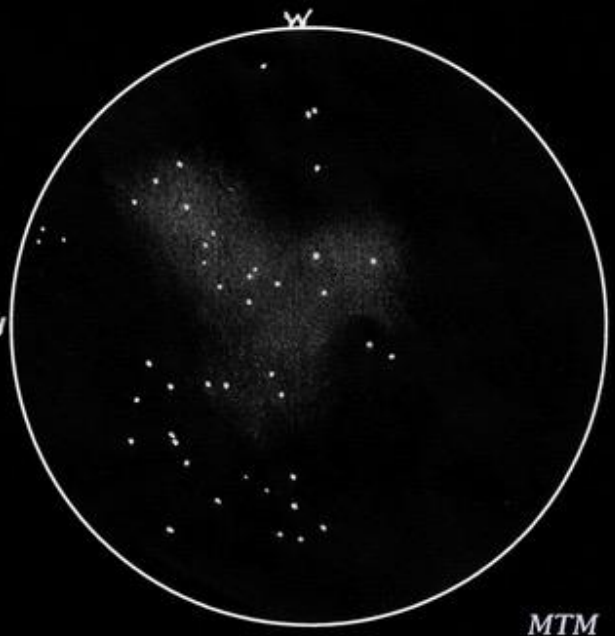
TEMP 27° BARO PRES. — WIND NW 7

COMMENTS:

PRETTY STARFIELD, NEBULOSITY BROUGHT OUT WITH ALP FILTER

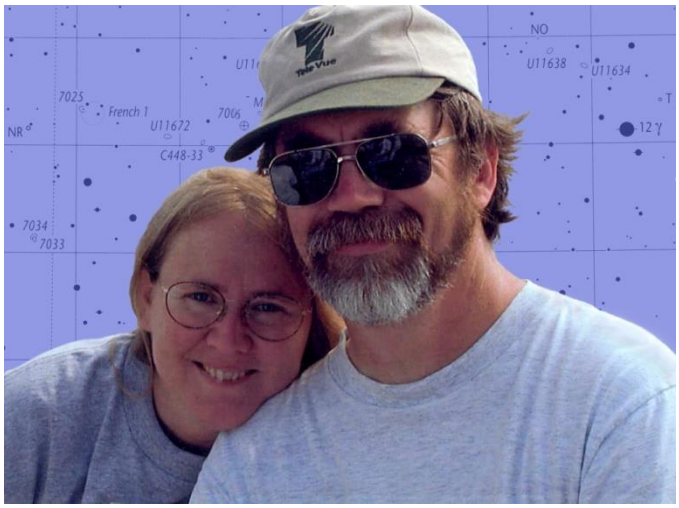


ORIENTATION AND/OR ROTATION



MTM

Sue French: Observer from New York



Through my 105mm refractor at 28×, open cluster NGC 1893 is coarse gathering of suns framed by a triangle of 9th-magnitude stars and ensnared in the eastern reaches of the gauzy emission nebula IC 410. The cluster appears about 12′ across while the nebula spreads across 19. Boosting the magnification to 76×, I count forty 9th- to 13th-magnitude stars. The nebula is patchy and irregular, with a dark blotch just west of the cluster's center and a fairly dark bay in its eastern side.

NGC 1893 reveals about 45 moderately bright to faint stars in 23′ when seen through my 10-inch reflector at 44×. The brightest stars form a shape that resembles two crossed candy canes, while the brightest star in the northeastern part of the group shines with a golden hue. IC 410 stretches westward for about 6′ to a 9th-magnitude star and continues faintly beyond toward the nice double star Espin 332. The pair consists of an 8.9-magnitude primary with a 9.6-magnitude secondary 14.7″ SW×S. The eastern border of IC 410 appears concave toward the east. The view at 70× increases the star count to 60, and the nebula also stands out a bit better.

I suspected a small brighter spot in the nebula about one-third of the way from the golden star to the 9.8-magnitude star at the center of the cluster. At least one very faint star was involved. I nudged the magnification up to 118×, which made the patch of enhanced brightness pretty obvious. A faint star shone within, and a couple dimmer ones lay near the edge. At 192× it was easier to pinpoint the two dimmer stars with respect to the bright spot: one lay to its west-southwest and the other to its south. This bright region marks the head of Simeis 130, one of IC 410's cometary nebulae. Nicknamed Tadpoles, they are sites of denser gas and dust being eroded by stellar winds and radiation from the cluster. I didn't see the head of the other Tadpole, Simeis 129 located 4′ northwest, nor did I see the Tadpoles' tails trailing away from the cluster.

Glenn Chaple: Observer from Massachusetts

This month's Observer's Challenge takes us to the emission nebula IC 410 and its embedded open cluster NGC 1893. The cluster is comprised of several dozen members, some twenty of which are magnitude 9 to 12. Most are massive O and B-type stars. They appear relatively faint because the entire system is 12,000 light years away.

It's the surrounding nebulosity that provides the real challenge. A haze surrounding NGC 1893 might be glimpsed with 6- or 8-inch scopes from remote dark-sky locations, but observers working from typical suburban environments will need as much as twice that aperture and possibly an assist from an O III filter.

A distinctive feature of IC 410 is a pair of gaseous streamers northeast of NGC 1893 that point away from the cluster. Their similarity in appearance to larval frogs gives IC 410 the nick-name the "Tadpoles Nebula." They appear in the close-up image of IC 410 taken by ATMoB member Mario Motta. For an ultimate Observer's Challenge, see if you can spot them visually.

Located at RA 5h 22.7m and Dec +33° 24′, this cluster/nebula complex is a quick star-hop from Melotte 31, a stellar group that includes the 5th-magnitude star 16 Aurigae. About 20 arc-minutes west of 16 is the near-twin double star Struve 666 (magnitudes 7.85 and 7.89, separation 3.2″). Before moving on to NGC 1893/IC 410, give this little gem a look-see!

Larry McHenry: Observer from Pittsburg, Pennsylvania

NGC 1893 / IC 410 is located in the winter constellation of Auriga – 'The Charioteer'.

This 7.5 magnitude deep-sky object is a moderate-rich open star cluster embedded within a faint ionized H II emission nebula making up the core of the **Auriga OB 2** association. An *OB* association is a large, very loose form of an open star cluster consisting of young, spectral type *O* and *B* stars.

While *OB* associations are considered a separate deep-sky category from open clusters, both types can be found together, with an open cluster forming the core region of a larger *OB* association. Visually, *OB* associations are great binocular and rich-field telescope objects. I have a number of *OB* association finder charts and sketches on my webpage: http://www.stellar-journeys.org/OB-Tour.htm

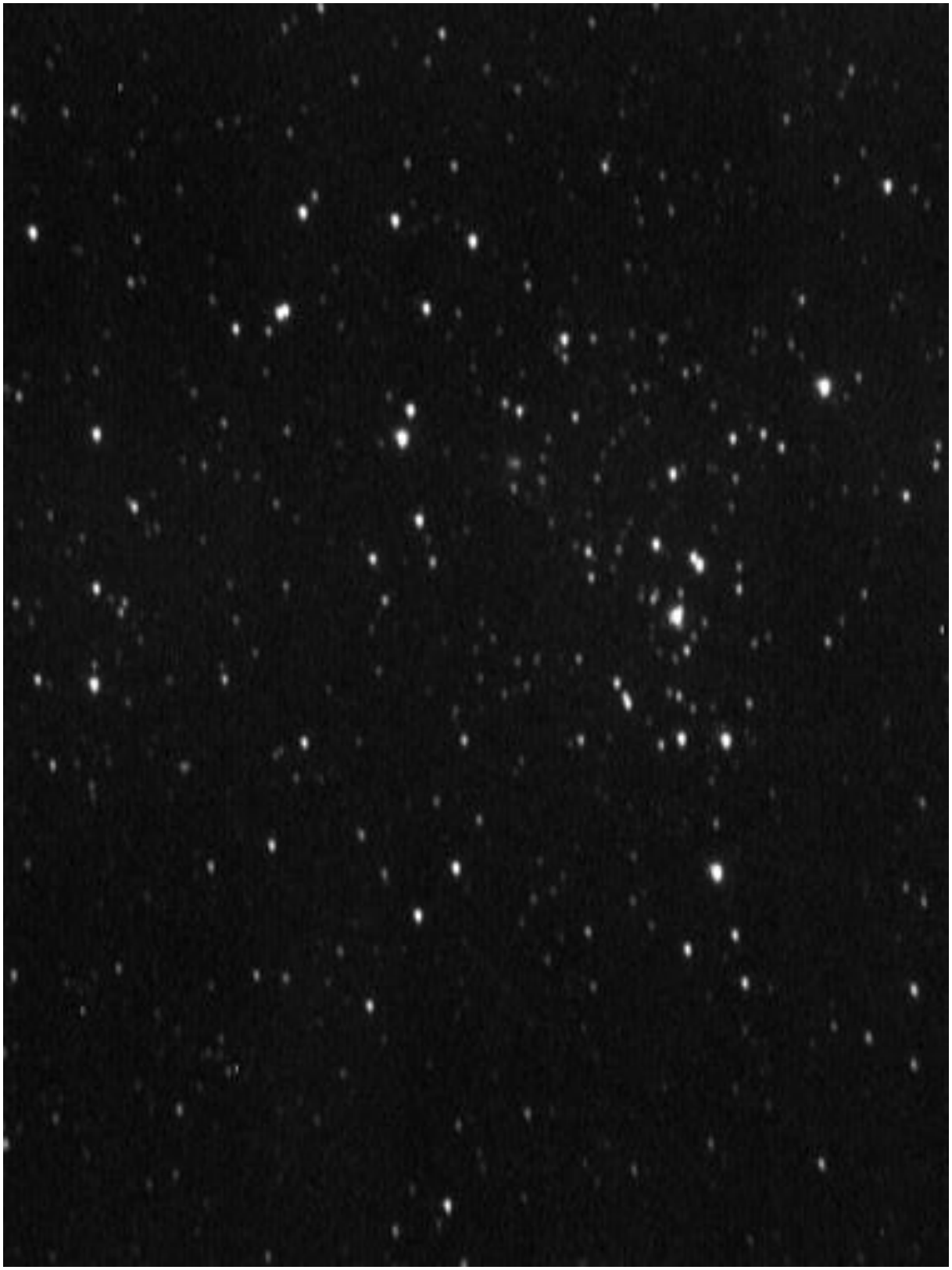
Within Auriga OB 2, the star cluster **NGC 1893**, also cataloged as Collinder 63 and Melotte 33, contains a visually elongated mix of around two dozen medium-brightness stars and another several dozen fainter stars, with many more visible in images. It is about 12,400 light-years distant with a diameter of around 70 light-years, and around 3 million years old.

The nebula, **IC 410**, (also cataloged as Sh 2-236), nicknamed the "Tadpole" covers around 100 light-years in diameter. It is faint visually, though enhanced by UHC filters, but prominent in narrowband imaging.

The two bright cometary nebula globules that give IC 410 its name, located to the northeast of the cluster center, are Simeis-129 and 130 (the brighter of the two). Both are about 10 light-years in length with their shapes eroded from the main nebula by stellar winds and radiation from the nearby young star cluster.

Video-Capture: NGC 1893

09/05/2013 from Cherry Springs State Park, Pa. at the Black Forest Star Party, using a 6-inch RC optical tube @ f/5 on a GEM mount, using an analog video-camera & IR filter @ 15 seconds, unguided single exposure. North is up and west is to the right.



Visual Screen Sketch:

NGC 1893 and IC 410

01/09/2021 – 8-inch SCT f/6.3 GEM mount, CMOS/USB color camera & Hα/O III/Hβ narrowband filter, 60 second exposure. Open cluster and emission nebula.

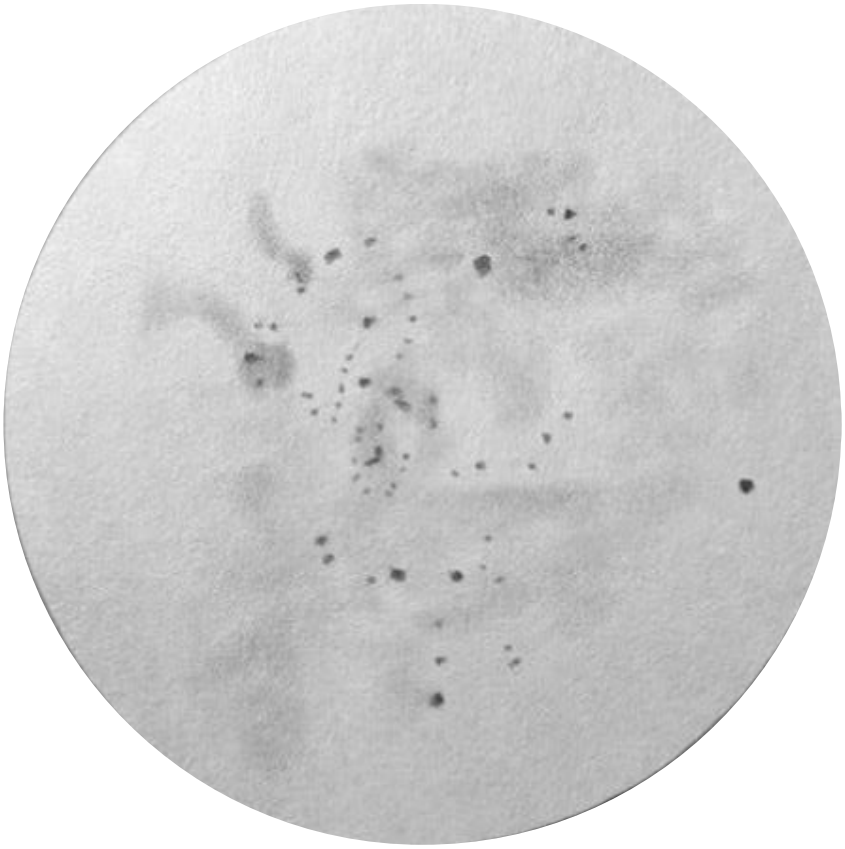


Image:

NGC 1893 / IC 410

01/09/2021 from Big Woodchuck Observatory backyard in Pittsburgh, PA.

Using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, with a CMOS/USB color camera and Hα/O III/Hβ narrowband filter @ 60-second guided exposure live stacked for 30 minutes.

North is to the up and west is to the right.

Image follows.

Gregory Brannon: Observer from North Carolina

The Moon was a bright waxing Gibbous, which made it hard to see even Messier 38, which is typically plenty bright enough to see. I had made a list of several clusters in the region to look for, informed by star maps and Skiff & Luginbuhl's handbook, but through ergonomics concerns and a moon-polluted sky, I ended up giving up after seeing just M38 and NGC 1893.

Notes from 2021 February 24th in the evening:
NGC 1893 – 10-inch f/5, 10mm Plössl (120×), 52° AFOV faintly dim grouping of stars, hard to tell apart from the field stars. Forms two groups, sort of connected by a very tenuous bridge of three dim stars (at 48×; the bridge seems to have disappeared at 120×)

Really tough to pull NGC 1893 out from the star field at 48× with the bright moon, but somewhat distinct at 120×.

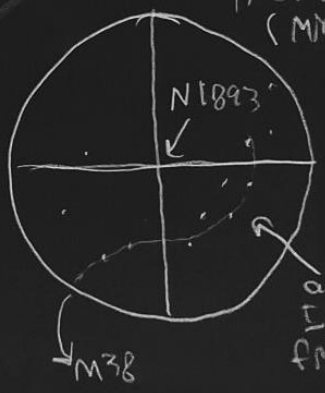
Finderscope: 8×50 (mirror diagonal): demonstrating that it's sort of at the center of a bright arching asterism which I use to find M38.

NGC 1893
10" f/5, 10mm Plossl
52° AFOV

a fairly dim group of stars, hard to tell apart from NO field stars,

Forms two groups, sort of connected by a very tenuous bridge of three dim stars.

finderscope 8x50
(Mirror diagonal)



Really tough to pull NGC 1893 out from the star field at 48x with the bright moon, but somewhat dimmed at 120x.

Anas Sawallha: Observer from Jordan

This nebula is embedded in a very dense star field, which made it difficult to draw all the stars in the NGC 1893 field, especially using a manual Dobsonian. I'm not quite sure about my sketch, but the following sketch is my result. I would like to have another go at it, but the weather has not been good.

Telescope: 10-inch Newtonian Reflector

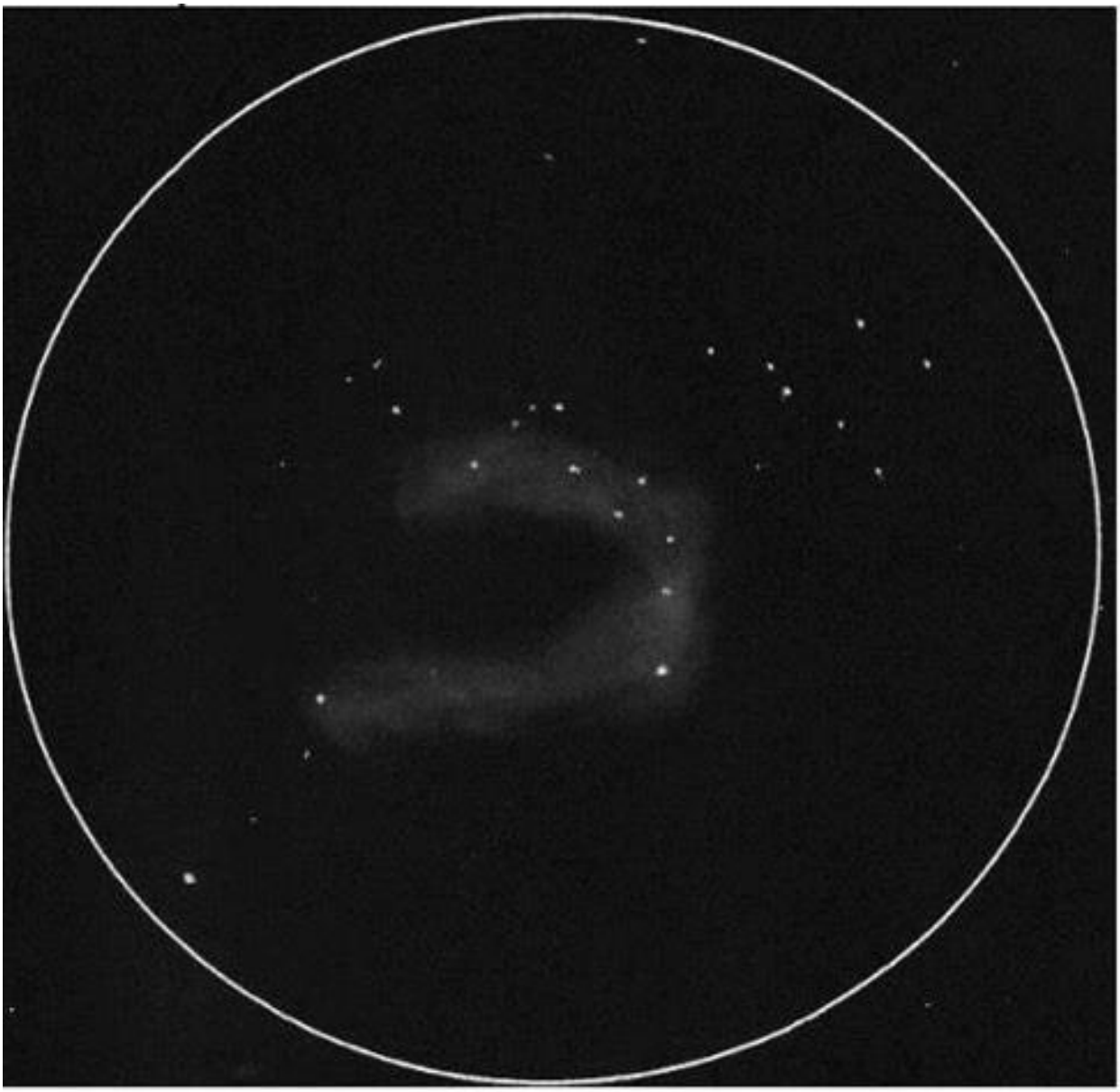
Focal length: 1200mm

Eyepiece: Aspheric 25mm

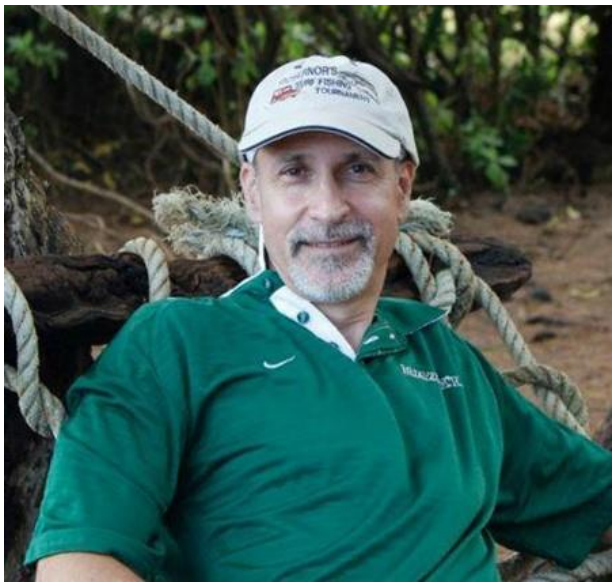
Seeing: II

Location: Al Kharaneh palace (Mwaqqar)

Bortle: up to date 4



James Dire: Observer from Illinois



NGC 1893 is an open star cluster surrounded by an emission nebula IC 410. The complex is located in Auriga five degrees north of the star Elnath (mag. 1.67) and five and one-third degrees east of the star Hassaleh (mag. 2.68). The cluster is about 25 arc minutes in diameter while the nebula is roughly 40 × 30 arc minutes in size. They lie approximately 12,000 light years away. Visually the cluster is magnitude 7.5. The nebula is drastically fainter. I have never seen it in a telescope…but have captured it on images.

NGC1 893 was discovered by John Herschel in 1827. IC 410 was discovered by the German astronomer Maximilian Franz Joseph Cornelius Wolf of the University of Heidelberg. He found the nebula on a photographic plate on September 25, 1892.

NGC 1893 is a relatively young cluster. The cluster is forming massive O and B stars whose radiation excites the gases in IC410. A study of the cluster by Maheswar et. al in 2007 [Mon. Not. R. Astron. Soc. 379, 1237–1247 (20070] found five O-type stars whose ages were estimated to be between 2 and 4 million years old. A study of NGC 1893 by Xue et al. in 2019 [Mon Not R Astron Soc (2019) 482 (1): 658-697] found 147 variable stars in the cluster including 15 eclipsing binaries. While the NGC 1893 appears as a loose galactic star cluster in amateur telescopes, it is estimated to contain between 4000-5000 formed stars, with more on the way.

My image of NGC 1893 and IC 410 was taken with a 190mm f/5.3 Maksutov-Newtonian telescope using and SBIG ST-2000XCM CCD camera. The exposure was 6.5 hours using 10-minute subframes taken over three nights. In the image, north is up and east to the left. IC 410 looks a lot like the Rosette Nebula in Monoceros, although it is not as close, large, or bright.

The brightest star in the image is the double-star on the right edge, HD 34760 shining at magnitude 8.32. The two components are magnitude 8.9 and 9.6 and are separated by 15 arc seconds. The next brightest star is HD 242908 located just north of the center (dark hole) of the nebula. There is a bright patch in the nebula located northeast (upper left) of the center of NGC 1893. This region is the only part of the nebulae that can be easily captured in an eight-inch telescope. The faintest stars in the image are magnitude 19!

Welcome to our new contributor.

Barry Yomtov: Observer from Massachusetts

With our uncooperative weather here in New England, I have not been able to get any imaging done this month. So my image of IC 410/ NGC 1893 for the February object of the month was actually taken in November and December of 2016.

My image processing skills with PixInsight having significantly improved since 2016, so I decided to reprocess the image data, so it's like a brand new 2021 image.

The equipment I used during the 2016 session was actually my initial set up was with fast optics; a 9.25-inch Schmidt-Cassegrain with a Hyperstar 3 lens providing f/2.3 speed. I was imaging with DSLRs at that time: Canon DSLR 60Da for RGB color images, and a Baader filter modification to a Canon T4i for all Hα (12 nm) narrowband images. In reviewing my notes in my log, the RGB component (60Da) was taken at ISO1600, 30 images at 25 sec/exposure (13 minutes). The Hα 12 nm narrow band images were taken over 3 evenings; ISO1600, 82 images at 75 seconds for 102 minutes total exposure.

With my improved processing with PixInsight and still applying PhotoShop, I was able to bring out greater detail of the Tadpoles. I've also included the Hα image in gray-scale, as it enhances the surrounding nebulosity in this wide field image.

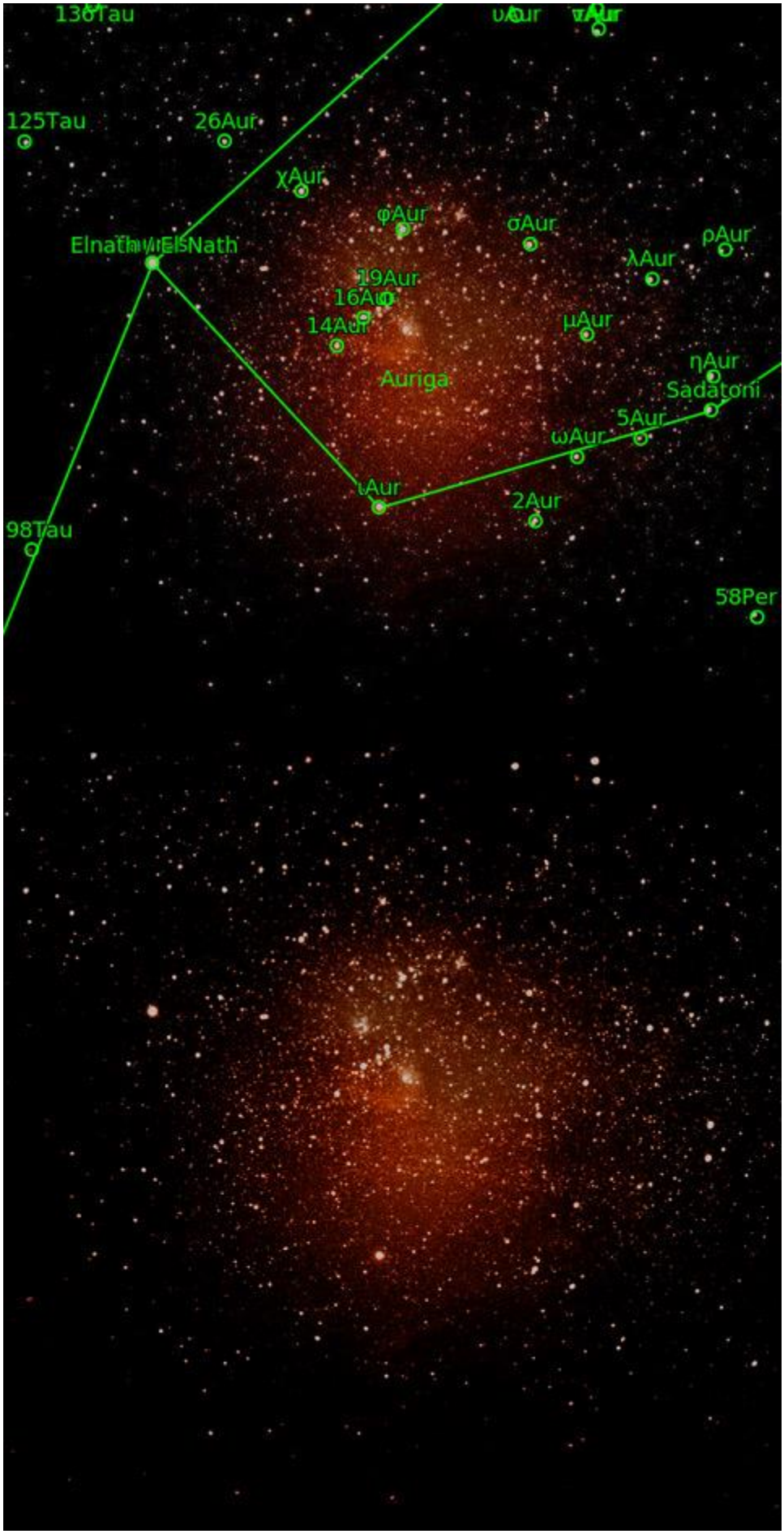
Mario Motta: Observer from Massachusetts

Went deep in this, 2 nights, 2.5 hours Hα, 1 hour O III, 1 hour S II, total about 4.5 hours. I actually took over 6 hours of subs, but the first night had gusty winds, so I had to drop many less than optimal sub frames. I used the Hubble palate on this; it has a very strong oxygen component, which is why it has the blue nebula background. The star cluster NGC 1893 is 4-million years old, and my guess is it must have had one or more supernovae to account for the oxygen and sulphur in the nebula. This is 12,000 light-years away. The remarkable "tadpoles" on the left are Bok globules being radiated away by the star cluster's hot stars, likely some star formation going on within them.

Venu Venugopal: Observer from Massachusetts

This challenge object for February has been a challenge for me, primarily due to the cloudy skies we had this month (Chelmsford, MA).

On Feb 17th a rare clear sky prompted me to test my new T-Adapter to connect a 35 mm Nikon lens attached to a ZWO 533 color on a iOptron GEM 45 mount and took 10 second exposures for about 10 minutes. There are two images, one which was stretched using SharpCap and another using the same raw exposures stacked using Deep Sky stacker and processed with the Adobe Photo Shop. They look distinctly different in the nebulosity and I am unable to see the tadpoles for example (perhaps the lens too wide to capture it ?). The image stacked with DSS and processed with Adobe shows the larger nebulosity. I ran this image through a plate solver.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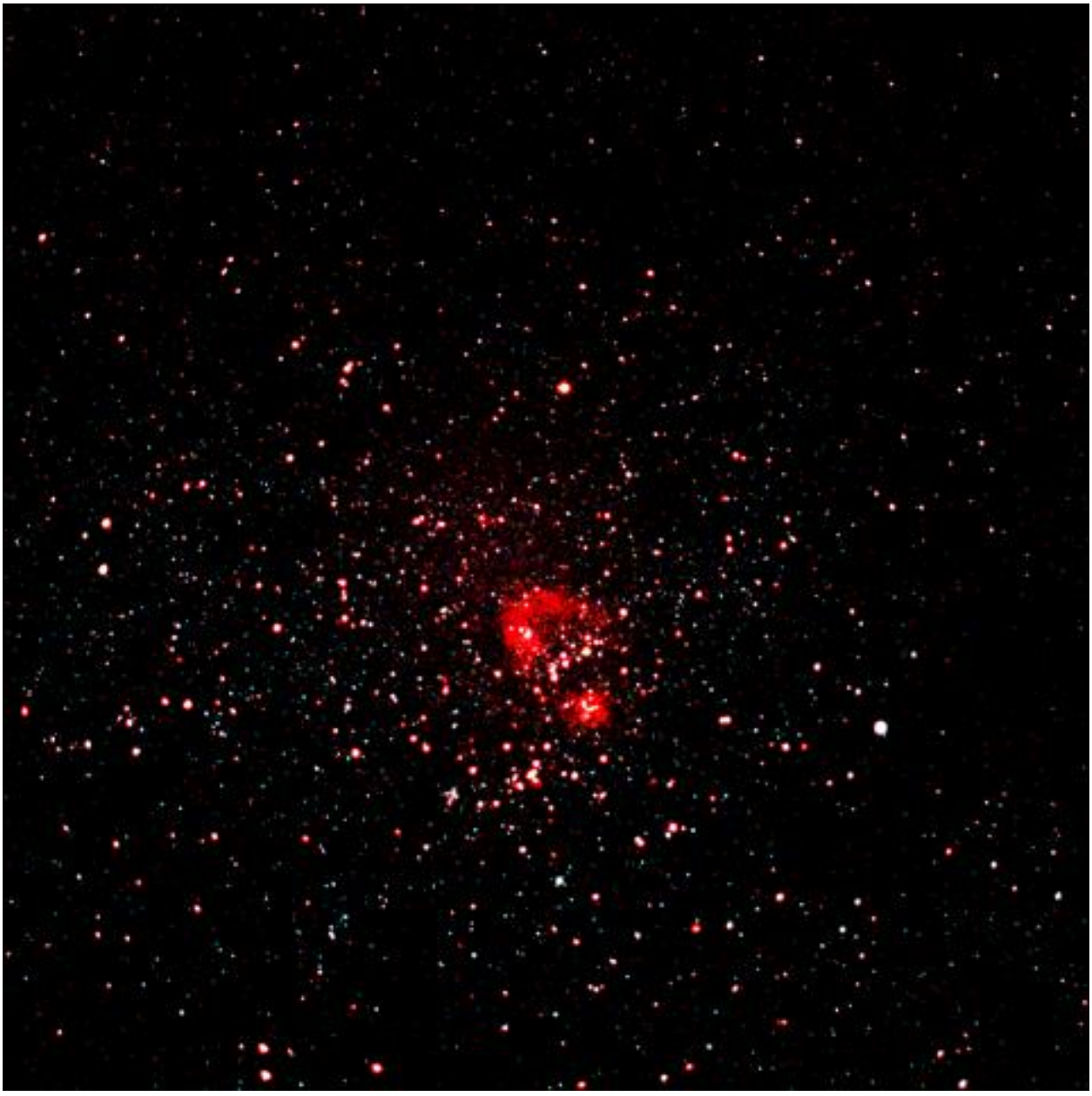


Joseph Rothchild: Observer from Massachusetts

The weather has been poor recently, but I was able to observe the February object (NGC 1893 and IC 410) on January 7th. I observed with my 10″ reflector on Cape Cod. This was a new deep-sky object for me.

This object was easily located in Auriga near a row of 3 stars: 17, 18, 19 Aurigae. There was an arc of 10 stars in the cluster with a faint nebulosity. There was also a group of 4 stars in the shape of a rhombus. Best viewing was with a 14mm eyepiece at 102×. The nebulosity was slightly more visible with a narrow-bandpass (NBP) filter.

Roger Ivester: Observer from North Carolina

NGC 1893 open cluster and emission nebula IC 410 in Auriga
Dates: January 9th, 12, and 14th
Telescopes: 10 and 6-inch reflectors
Sketch: 6-inch reflector
Sketch Magnification: 35× – 2.0º Field of View

Using my 10-inch, I was able to observe the faint and small open cluster, NGC 1893, on three different nights during January. At 136×, I could count at least 50 faint stars, with an overall triangular shape. This cluster also contains a couple nice pairs of double stars. A faint cluster for sure that can be difficult to locate, due in-part to being located in a very rich star field.

However, I was unable to see the faint surrounding nebula, IC 410, with the 10-inch, despite using various magnifications, including 36×, and several hours over the three night period. I did try a UHC filter, but without any success.

On my 3rd night, I chose to also use my 6-inch f/6 reflector at a magnification of 35×, with a 2º field of view. I was observing from my moderately light polluted back yard with a NELM of about 5.0 on this night.

I was able to see some faint nebulosity enveloping the cluster, after continuous crossings over the cluster and repeating, using the RA slow-motion control on my equatorial mount. After more than an hour on this night, the nebula became visible, appearing as an extremely faint haze surrounding the cluster.

I was very pleased. After three nights of searching and observations dating back to January 1994, I had finally seen IC 410. I felt a great sense of accomplishment. For the visual observer, nothing can be more rewarding than after many nights of failure, and then finally seeing a very faint deep-sky object.

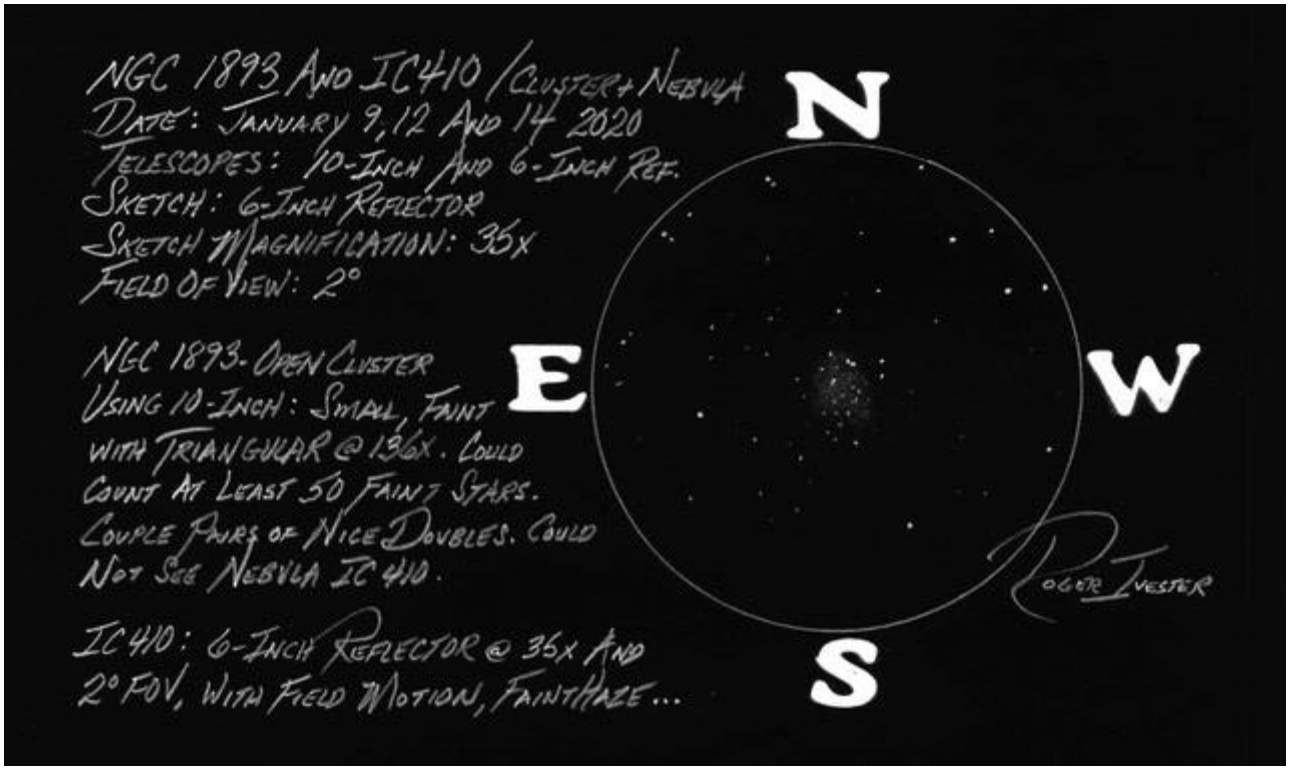
Amateur astronomy is not just observing the showpiece objects, but often times, the greatest satisfaction can be "finally" seeing the faintest of deep-sky objects.

There have been many other deep-sky objects, that took multiple observations over a period of years to see. A few examples would be: The companion to Sirius, the fifth component of the Virgo Diamond, and NGC 6822, known as Barnard's Galaxy, just to name a few. It was only after reading that many observers found the best view of NGC 6822 when using a small refractor.

From Burnham's Celestial Handbook: "Hubble found it (NGC 6822) "fairly conspicuous" in a short focus 4-inch finder with a low-power ocular, but "barely discernible at the primary focus of the 100-inch."

So, in September 2014, I used my 102mm refractor, rather than my 10-inch reflector and saw (NGC 6822) almost immediately from my back yard, despite unshielded streetlights being in close proximity. This galaxy deserves a dark sky, with excellent transparency.

The following is my pencil sketch of NGC 1893 and IC 410, using a blank 5 × 8 notecard, with a 3-inch circle and the colors inverted.



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