MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

January 2021

Report #144

IC 348, Cluster and Reflection Nebula in Perseus

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

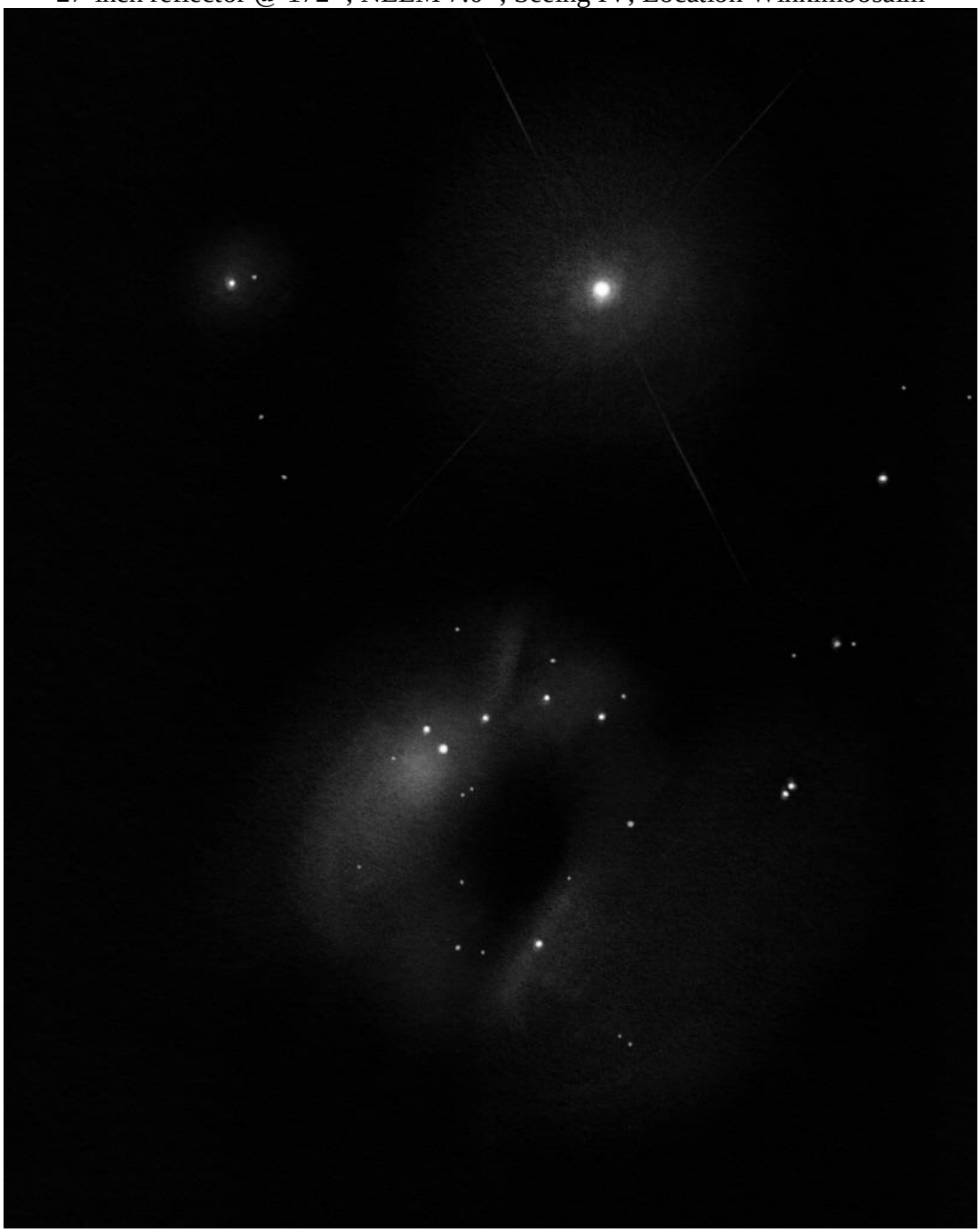
During his term as the first director of Dearborn Observatory, Truman Henry Safford discovered IC 348 on December 1, 1866, with the observatory's 18.5-inch refractor. Safford published his observation in a table of objects found at Dearborn in the years 1866–1868. The table uses the alphabet-soup notation common to the era, which decrypted means: *very large, very gradually brighter in the middle, pretty bright*. Additionally, a note below that section of the table describes the object as "A loose cluster with nebula." The combo appeared in the *First Index Catalogue*.

IC 348 has the dubious honor of bearing two IC designations. Edward Emerson Barnard independently discovered the nebula in 1893, and it was placed in the *Second Index Calalogue* as IC 1985, without anyone tumbling to the fact that it was already in the previous IC catalog. Unlike Safford, Barnard didn't note the existence of the cluster within the nebula.

IC 348 is thought to be roughly 1000 light-years away and a youthful 2–3 million years old. It holds about 500 stars, with brightest being hot, blue-white stars on the main sequence. The cluster's visual magnitude is 7.3.

Uwe Glahn: Observer from Germany

27-inch reflector @ 172×, NELM 7.0+, Seeing IV, Location Winklmoosalm



Mike McCabe: Observer from Massachusetts

I've been waiting and waiting for a good clear night to try and capture the nebulosity of IC 348 in the eyepiece, and last night I felt was my final opportunity before deadline. As it turned out, an hour at the eyepiece in 15° temps, yesterday evening got me nothing but cold feet. The transparency up these ways has been poor for an unusually long stretch this winter. It's been a tough period for observing so far this year.

My first observation of IC 348 was conducted on January 7th, 2021, and although the sky apps forecasted above average transparency for that night, that's not what took place. In what could only be rated as less than 2/5 transparency conditions, I was able to see about ten stars of the cluster in the eyepiece, but the nebulosity was not happening. My observing equipment was a 10-inch f/5 Newtonian reflector with a 24mm 82° eyepiece. The addition of a UHC filter proved fruitless under those conditions, as I knew it would, but I wanted to try anyway.

Any additional attempts at having a more rewarding experience at the eyepiece were thwarted by poor sky conditions time and again. I fear that I left the only good night of the month on the table when during the daytime prior I had taken a two hour bike ride in 28° conditions, and when it came time to go out and observe the embedded cold in my bones caused me to rethink that. Ever the eternal optimist, I never think that the poor conditions will dominate the sky interminably, but this time they have.

OBSERVATION LOG - OBJECT: IC 348

DATE 1-7-21 /z TIME 19:30 UT/z 7:30 PM LOCAL OBSERVING LOCATION 42°N 71°W

SCOPE/APERTURE 10" F/5 NEWTONIAN

EYEPIECE 24mm 82° MAGNIFICATION 52x, 1.5°TF

FILTER UHC SEEING 3/5 TRANSPARENCY <2/5

TEMP 35°F BARO PRES. — WIND CALM

COMMENTS:

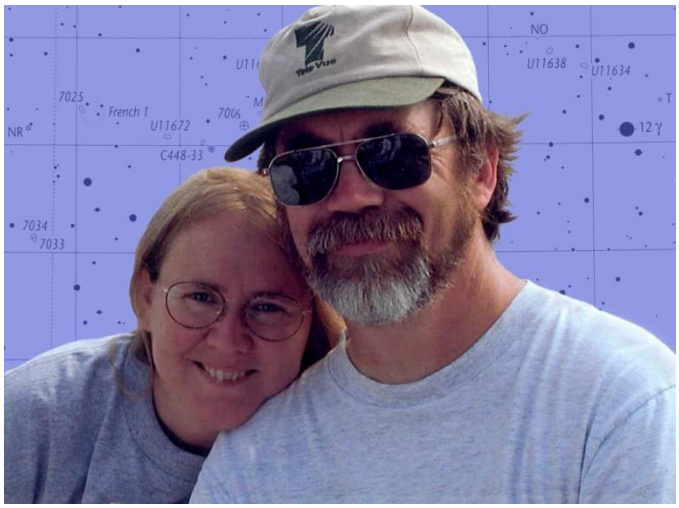
CLUSTER CONTAINED ABOUT 10 STARS, MOST OF THEM VERY DIM. POOR TRANSPARENCY MADE THE NEBULOSITY AN ABSOLUTELY NOT. TRIED A UHC FOR THE HECK OF IT. NOPE.

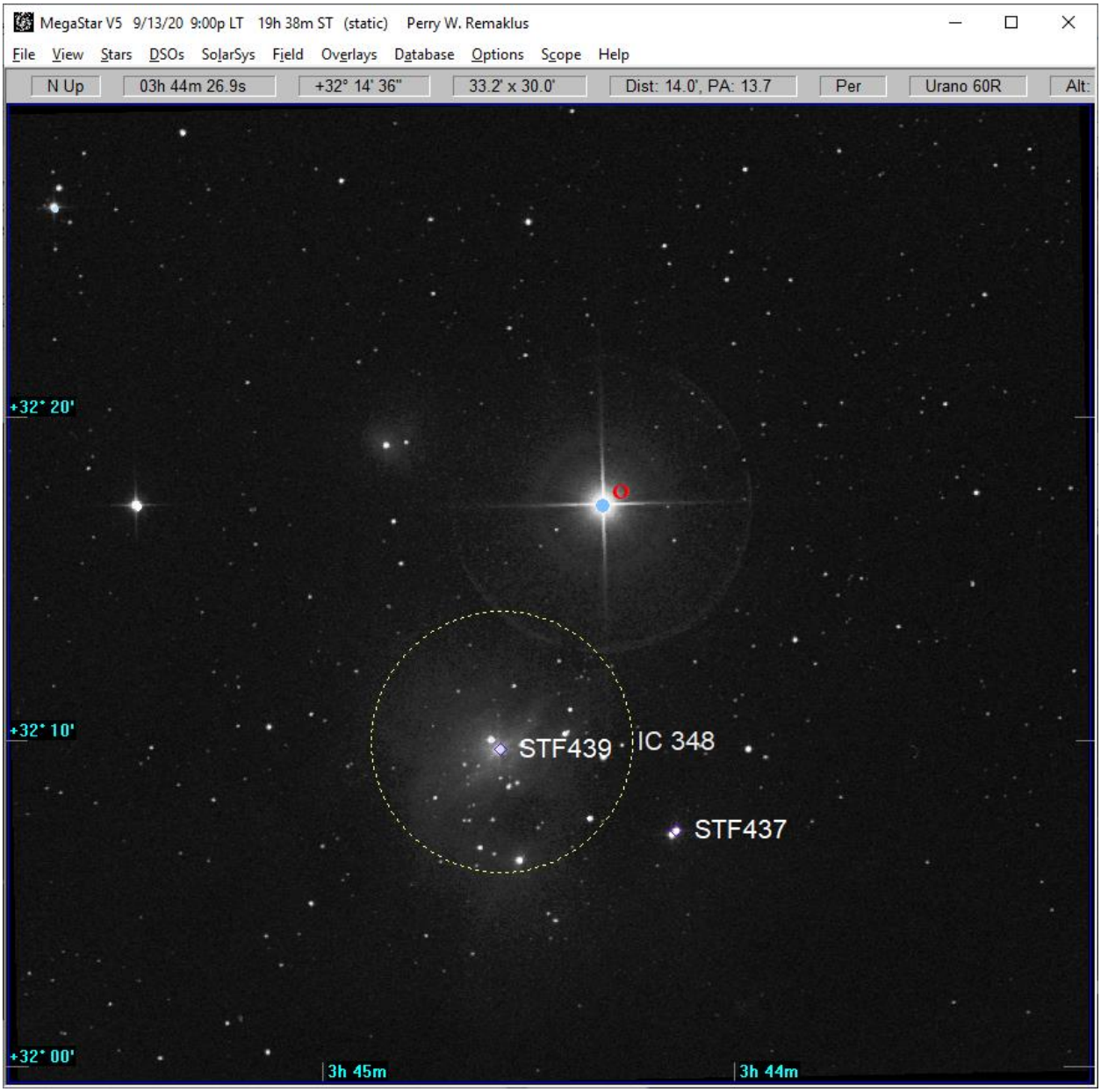
UNFORTUNATELY, NO BETTER NIGHTS PRESENTED ANY ADDITIONAL OPPORTUNITIES FROM 1/7 - 2/9 2021.

ORIENTATION AND/OR ROTATION

M.T.M.

Sue French: Observer from New York





Through my 105-mm refractor at 153×, the little star cluster IC 348 shows 10 stars mostly gathered into a 5′ oval ring. If I keep Omicron (ο) Persei out of the field, I can faintly see nebulosity enveloping the brightest star and the two stars closest to it. A third star sits on the nebula's western edge. The brightest star (magnitude 8.8) and the one to its northeast (magnitude 10.3) form the visible Σ439 AB-C pair. The A and B components are only 0.6″ apart, which is too snug for my little refractor to split. Σ437 sits a short distance west-southwest of the oval ring in the same field of view, its stars closely matched at magnitudes 9.8 and 10.0.

Through my 10-inch reflector at 115×, the blended AB component of Σ439 looks white, and its wide companion appears yellow. The stars of Σ437 seem white and pale yellow to my eyes. The brightest and largest piece of nebulosity is visible around Σ439 and a small, dimmer patch cocoons the southernmost star in the cluster. Very faint nebulosity envelopes and connects these patches, extending farther east than west.

Glenn Chaple: Observer from Massachusetts

IC 348 is a star-forming region in Perseus, located just 7 arc-minutes south and slightly east of the magnitude 3.8 star omicron (o) Persei. It contains several hundred stars, most of which are too faint to be seen with typical backyard scopes. The cluster illuminates the surrounding reflection nebula VdB 19. Visually, a small-aperture scope will capture a dozen or so of the brighter cluster members, while the nebulosity mandates medium to large apertures and a dark-sky location.

In her book Deep-Sky Wonders, Sue French mentions a triple star, Σ439, and a double star, Σ437, that are associated with IC 348. In most scopes, Σ439 appears as a magnitude 8.8 and 10.3 double separated by 23.4″. The brighter star is actually a tight binary system (BD+31°643) whose magnitude 9.3 and 9.5 components, both hot B5-type main sequence stars, are just 0.6″ apart. Σ437 is a near twin system comprised of magnitude 9.8 and 10.0 stars separated by 11.4″.

IC 348 is a young open cluster, perhaps no more than 2 million years old. Cluster and nebula are 900 to 1000 light-years away.

Sketch follows.

OBSERVING LOG

NAME: Glenn Chaple

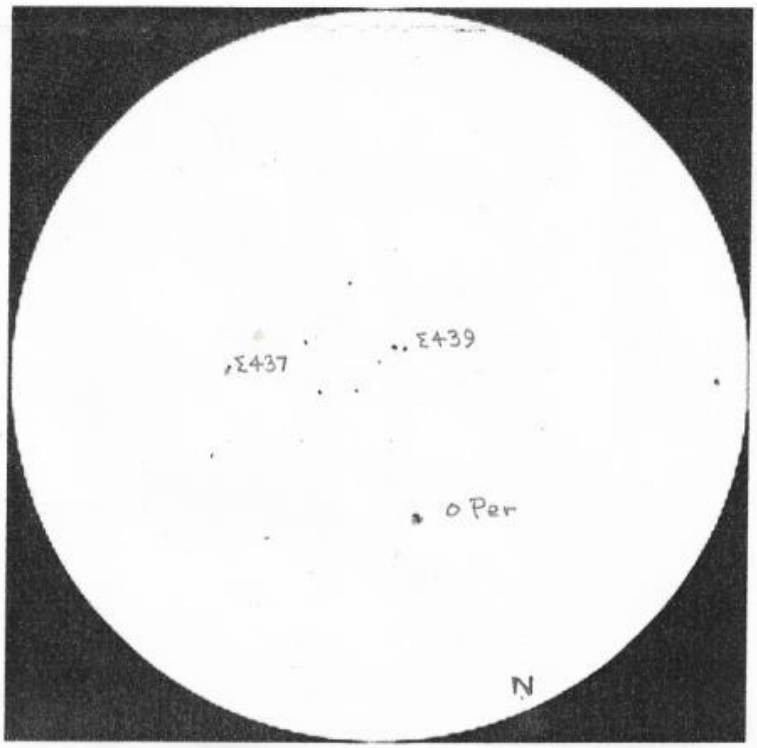
DATE (M/D/Y) 12 / 08 / 2020 TIME: 8 :15

OBSERVING SITE: 82 S. Harbor Rd. Townsend MA

SKY CONDITIONS: Seeing (Antoniadi Scale) IV Poor Limiting Magnitude 5

OBJECT: IC 348 TYPE: OC CONSTELLATION: Per

SKETCH (note direction of west)



NOTES:

Rather sparse cluster. Only a handful brighter than 11th magnitude.

Cluster dominated by the wide double Σ439.

No sign of nebulosity, even with narrowband filter

OBSERVING EQUIPMENT

Binoculars ____X____

Telescope: 10" f/5 reflector Eyepiece: 9mm Nagler

Mag: 141 X Field Diam: 0.6 ° Filter (if any): _____

Larry McHenry: Observer from Pittsburg, Pennsylvania

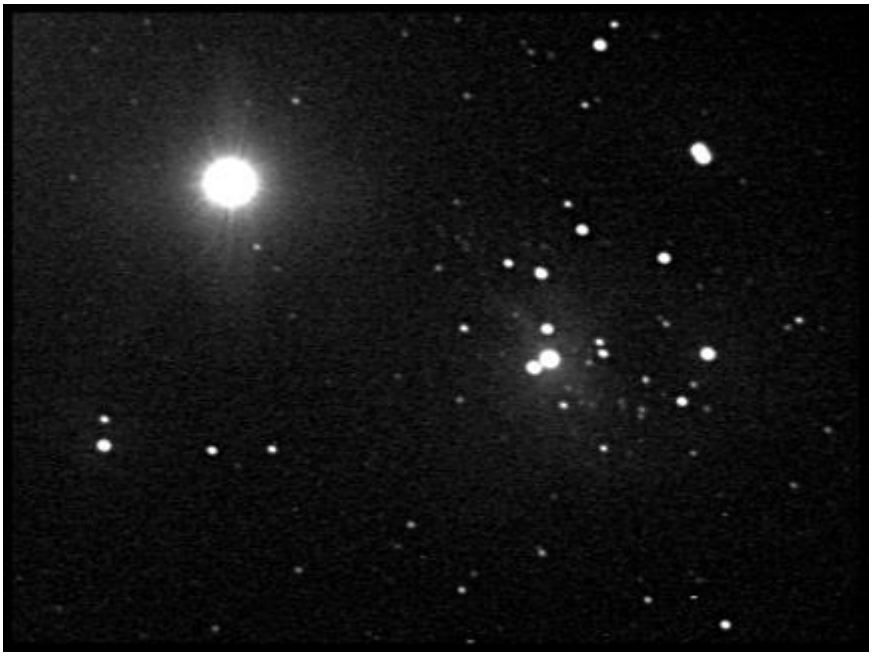
January: IC 348 – Cluster & Reflection Nebula – Perseus; Mag. V=7.3; Size 8′
RA: 03h 45m Dec. +32° 10′

IC 348 is located in the fall constellation of Perseus – "The Hero" near 3.8-mag Omicron Persei (Atik).

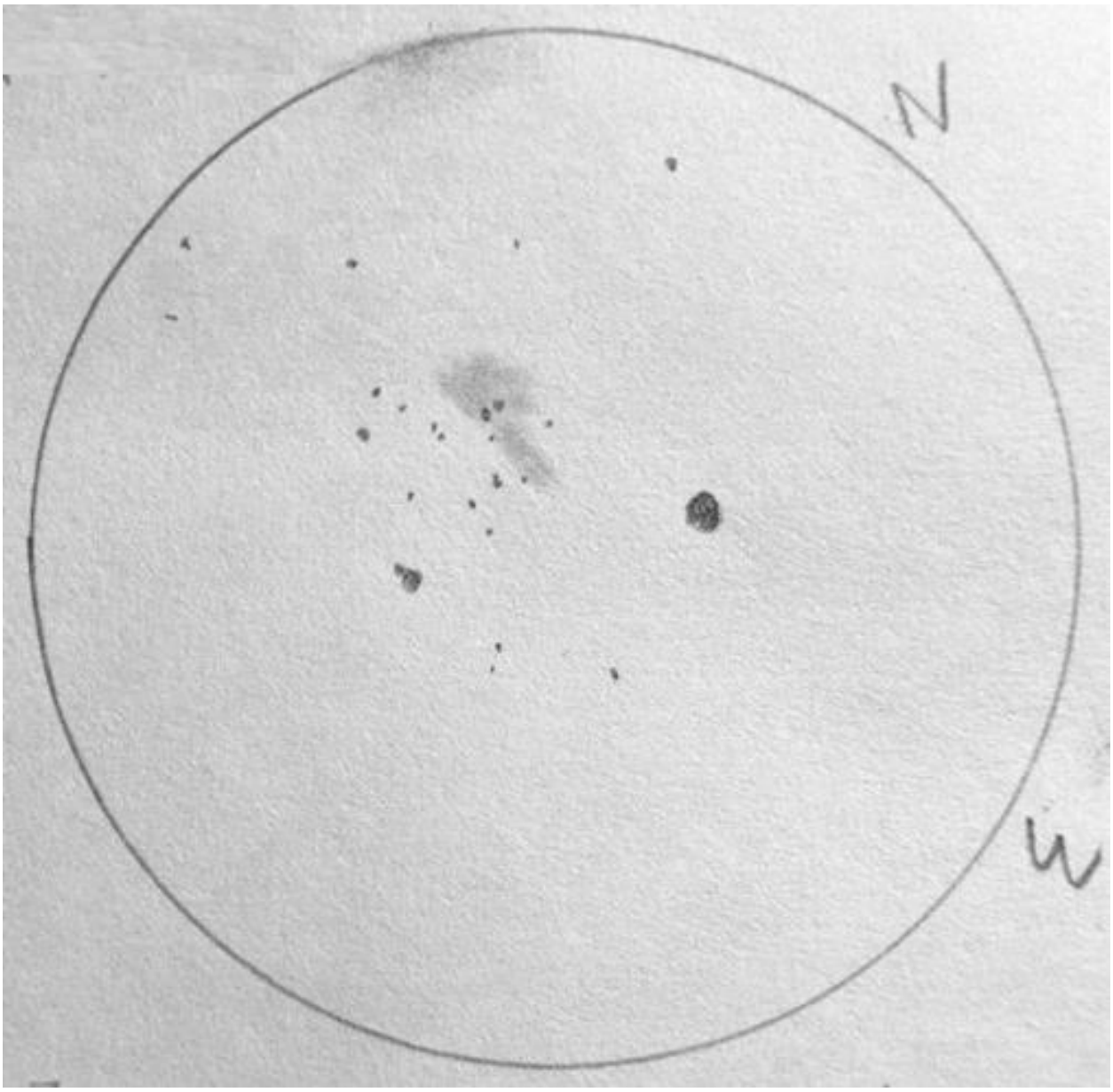
This 7th -magnitude deep-sky object is a sparse open star cluster embedded in a faint reflection nebula cataloged as vdb19. The nebula is difficult to observe visually due to the nearby bright star. The star cluster, also known as Collinder 41, contains around 12 stars visible to amateur astronomers, but has close to 288 stars in total with over 20 identified as brown dwarfs. It is about 1,028 light years distant, and about 2 million years old.

Video-Capture: 10/08/2010 from rural location near Mansfield, OH at the Hidden-Hollow star party, using an 8-inch SCT optical tube @ f/6.3 on a CG-5 mount, using a StellaCam-3 analog video-camera @ 45 seconds, unguided single exposure.

Using an 8-inch SCT optical tube @ f/6.3 on an Atlas HQ6 mount, with a ASI294MC color camera and L-Pro filter @ 30-second guided exposure live-stacked for 2 minutes.



The visual screen sketch as following was made in January 2021 from Big Woodchuck Observatory, backyard in Pittsburgh, PA.



Gregory Brannon: Observer from North Carolina

Well, it's not called the observer's challenge for nothing. As a visual observer, I found this object to be, well…underwhelming. And I feel a bit silly, I mean, in my four years of observing I'm not sure I've seen a reflection nebula with success even once, except maybe with the 24-inch CDK at the Cline Observatory, and if so there's nothing in my logs. I should have learned by now that when someone says "cluster associated with nebulosity" or "reflection nebula," as far as I'm concerned in my suburban skies, that just means it's a star cluster.

On both occasions I learned just how much your brain is willing to trick you into seeing something you want to see. On the first evening, I observed through intermittent haze, and it ended up where dew would form within seconds of putting my face up to the eyepiece no matter what I did. It isn't hard to see how I may have fooled myself into seeing nebulosity in the scattered light.

On the second occasion, I discovered an optical illusion (which I later confirmed as such with the help of Messier 35) where a combination of scattered light and brain weirdness conspire to add a spurious nebulous web between dim stars when viewed at high power.

Part of me wanted to avoid submitting a report this time, out of an embarrassing mismatch of expectations and reality. But this is a useful learning experience, and what you don't see is often just as important as what you do see.

IC 348 is really easy to find, as it is right behind the 4th-magnitude star Atik, which is visible even in my suburban skies, next to 3rd-magnitude Zeta Persei. Zeta Persei is the closest bright star to the Pleiades in the direction of Perseus. At first you will notice two dim but easy double stars near Atik, then you will notice the dim stars making up the rest of the cluster. These double stars are true binary systems and are part of the cluster.

Sketches from two nights are attached.

My notes from 2021 January 4th, with the 10-inch Dobsonian:

IC 348. Cluster in Perseus. I was using a FlexTube 250mm telescope, a 25mm+2.5× Barlow. 120×. Transparency could be better. The cluster is small, and contains few visible stars. Notably it does contain two double stars. The bright star, Atik, is easy to find near the Pleiades. It has a faint haze, but this is due to light scatter, not nebulosity. There seems to be an unevenness suspected in the scattered light, but I may be seeing things. No nebulosity otherwise. Update — Atik is not a part of this object and has no nebulosity anyway.

The dew problems lead to me, frustrated, returning inside early.

I decided I had better go and observe the object one more time before the end of January, so despite being ill, I went out on January 20th with my 6-inch Dobsonian. My strategy this time was to observe at highest power to catch any stars I may have missed, and try to pull the nebulosity out of the skyglow. The moon was at first quarter, so the conditions were still not ideal. The notes read:

IC 348 – 6-inch reflector, the cluster is comprised of five bright stars, the two pairs of double stars and a single lone star, as well as half a dozen smaller, much dimmer [difficult] stars. There is this faint hint of a brighter patch of sky which meanders and follows the nebula's [sic] stars, but it could easily be an illusion, or scattered light from the bright star 44 Per [sic, I meant Atik] which shares the field. The desire to see a tough nebulosity, even one which may be impossible in a given set of sky conditions and instruments, is enough that it seems easy to trick yourself into seeing something. There is also a fine line between looking up pictures and sketches to know what to expect, and doing so to trick yourself.

I took out the 10-inch Dob–the conditions were fairly nice, after all, and I observed again. I found that there was no increase in the brightness of the spurious web-nebula I had illustrated, though I still thought I could see it, but that the difficult half a dozen or so stars were much easier to see. However, no additional stars were seen compared to those sketched with the 6-inch Dobsonian.

But perhaps, in paying attention too much to the reflection nebula and whether I could see it, I've ignored something special. Is the Pleiades not beautiful without its photographic clouds? Two double stars right next to each other and easy to find. That's worth something on its own.

Sketches follow.

2021-January-4 08:21 PM EST

IC 348, 10" Dobsonian, 120x

IC 348
Cluster in Perseus
250P, 25mm + 2.5x Barlow
120x

transparency could be better.
the cluster is small, and contains few visible stars. Notably it does contain two double stars.

the bright star, Atik is easy to find near the Pleiades. It has a faint haze, but this is due to light scatter, not nebulosity. There seems to be an unevenness surrounding the scattered light, but I may be seeing things. No Nebulosity otherwise.

Update — Atik is not a part of this cluster and has no nebulosity anyway.

2021-January-20 07:32 PM EST

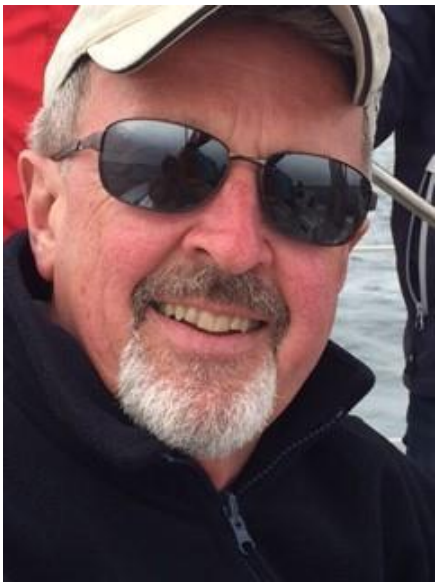
IC 348 - 6" Dobsonian, 200x

the cluster is composed of five bright stars, the two pairs of double stars and a single lone star, as well as half a dozen smaller, much dimmer stars.

there is the faint hint of a brighter patch of sky which mentions and follows the nebula's stars, but it could easily be an illusion, or scattered light as from the bright star 49 Per when shades the field.

the desire to see a tough nebulosity, even one which may be impossible in a given set of sky conditions and instruments, is enough that it seems easy to fool yourself into seeing something. There is also a fine line between looking up pictures and sketches to know what to expect, and doing so to trick yourself.

John Bishop: Observer from Massachusetts



On 1/8/21, I observed IC 348 from a suburban site outside Boston, MA. The sky was clear. Transparency improved during the evening as early intermittent thin haze dissipated. The disc of Mars was "boiling" a little in the eyepiece, indicating that seeing was only fair. Air temperature was 28 degrees F. at 9:00 pm.

I observed with my usual 8.25 inch f/11.5 Dall-Kirkham reflector, at powers ranging from 48× to 193×. The scope is on an equatorial mount with a motor drive, but no goto.

IC 348 was easy to locate. It is very close to Omicron Persei, a 3.8 magnitude star in Perseus, and both were within the FOV at 48×.

I had not observed IC 348 before this night. My observing session was arranged on short notice, and I didn't happen to preview IC 348 (e.g., see a picture) before going out. Sometimes I will go out without a preview, so I can "discover" the object with a clean slate in my brain. This night may have been an occasion when some research would have helped. Here, when I first looked at the object, at 48× in my 2-inch, 50mm eyepiece, I realized that I didn't know for certain what I was looking for: cluster or nebula? I recalled a reference to the word "cluster", but the Pocket Sky Atlas and Sky Atlas 2000.0 charts show IC 348 as a small bright nebula. In fact, I have since learned that IC 348 has a somewhat convoluted naming history, including two IC designations. Some sources classify this object as a cluster with a related nebula, while others list a nebula, with or without a related cluster. In practice, some sources refer to IC 348 as the cluster, and vdB 19 as the nebula (from the van den Bergh catalogue of reflection nebulae).

What I saw at 48× was a large, bright, more or less round, blue halo surrounding Omicron Persei. It was so bright that I thought that it might be condensation on my optics. I confirmed that it was not. There was a sparse star cluster just south of the Omi Per halo, with a dozen or so stars visible. To my eye, a few of the brighter stars in the center of the cluster roughly formed a parallelogram. At first glance, I didn't see any nebulosity around the cluster. With a little time and averted vision, I saw a faint brightening in the parallelogram, brightest at the eastern side. At times it looked like the hazy glow of unresolved faint stars (for a moment it reminded me of the "diamond dust" look of NGC 7789 in Cassiopeia). I may have been seeing a combination of nebulosity and unresolved stars in that area.

I did not see the distinctly outlined nebula seen in some astro images. I can say that after extended viewing, I began to see a subtle brightening over the general area of the cluster. But I wasn't convinced that it was "true nebulosity", rather than scattered blue light from Omi Per in the optical train.

The bottom line is that I can only confirm seeing a small amount of faint nebulosity, in the center of the cluster. Dominating the entire field was the blazing blue light from Omi Per and its halo. What was the halo? Was it part of the nebula, illuminated by Omi Per? Or was it merely glare or some other optical effect? Is Omi Per a member of the IC 348 cluster, or is it an unrelated neighbor? A quick Google search shows that the star and the cluster are roughly the same distance away: IC 348 (1028 light years), Omi Per (1121 light years). (Postscript: since writing the above, I have learned that Omi Per is not catalogued as a member of IC 348).

Omicron Persei has another interesting aspect. It is at least a double star. At low power, I thought Omi Per had a little too much "shape." As I increased power, in moments of steady seeing, Omi Per just barely separated into two components. 193× was too much power, however, as the image became too unstable. I have since learned that Omi Per is a triple star. I observed components A and B, which are separated by about one arcsecond. Component A is a spectroscopic double, Aa and Ab.

Finally, there is some interesting history around the proper name for Omi Per, which is Atik. Historically, some sources have attributed the name Atik to nearby Zeta Persei. See, e.g., Pocket Sky Atlas and Sky Atlas 2000.0. In 2016, the IAU, as part of an initiative to catalogue and standardize names for stars, approved the name Atik for component Omicron Persei A.

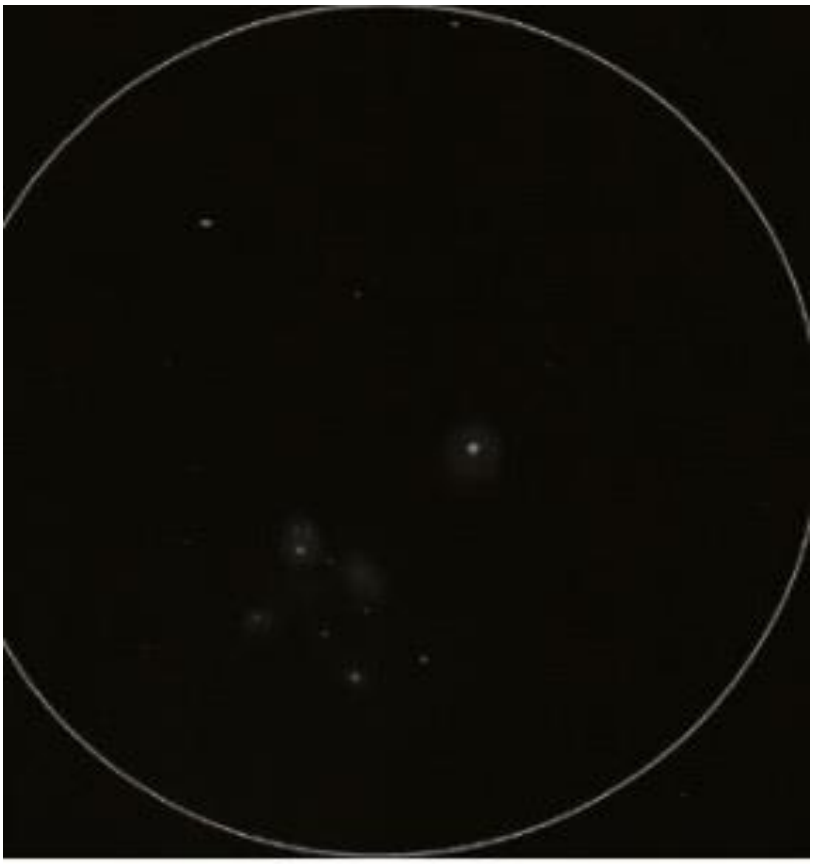
A relatively easy target that raised more questions for me than I expected!

Anas Sawallha: Observer from Jordan

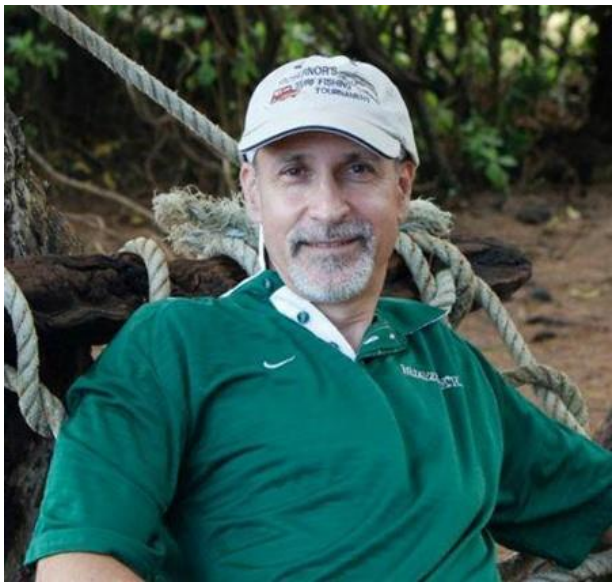
Again this target proved to be a lot more difficult than I expected, despite its relative brightness and the observation from a Bortle 4 location.

It was almost at the zenith and with a Dobsonian telescope the sketch was rather difficult. I could not focus well enough looking through the eyepiece, due to field rotation, but I was able to sketch from memory.

I had hoped to see the entire nebula, but I'll give it another shot when I'm out again and compare with this sketch.



James Dire: Observer from Illinois



IC 348 is the catalog number of a galactic star cluster and a reflection nebula on the southern edge of the constellation Perseus. IC 348 is very easy to find. About 8 degrees due north of the Pleaides lay two naked-eye stars: Zeta Persei (magnitude 2.9) and Omicron Persei (magnitude 3.9). Omicron Persei is also known as Atik. IC 348 lies just south of Atik.

The IC 348 star cluster is small, about 8 arcminutes in diameter. The cluster contains maybe a dozen or two stars bright enough to see in small telescopes. It lies 1260 light-years away and has an integrated magnitude of 7.3. The brightest star "appearing" in the cluster is HD 281159 at magnitude 8.7. HD 281159 is a double star with the dimmer star shining at magnitude 10.3. They are separated by 23.7 arcseconds. The primary is actually two 9th-magnitude stars separated by 0.5 arcseconds and difficult to resolve in most amateur telescopes. HD 281159 is actually a foreground star system to the star cluster.

The IC 348 reflection nebula is approximately 10 arcminutes in size and is located 718 light-years away. The HD 281159 star system is embedded in the nebula. Its light illuminates the nebula.

Seeing IC 348 was very difficult this month as there were no clear cloudless nights. January is the cloudiest month in Central Illinois. I did manage to image IC 348 on a rare clear night close to the first quarter moon phase.

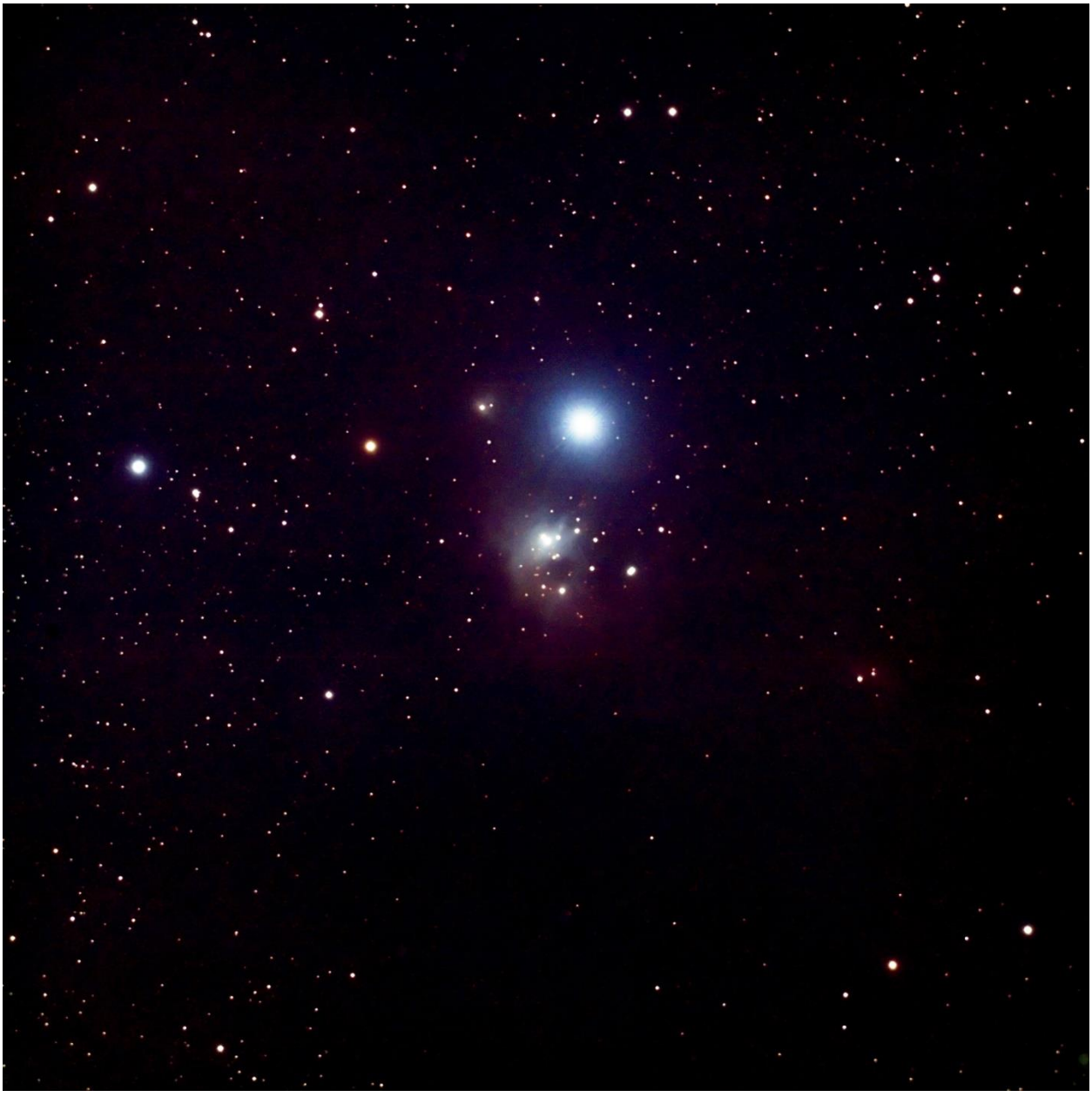
The attached image was taken with a 132mm f/7 triplet refractor with a 0.8× focal reducer/field flattener. I used an SBIG ST-4000XCM CCD camera. This camera has a color chip, so I did not use any filters. The exposure was 90 minutes. In this image, north is up and east to the left.

The bright star in the center is Atik. The second brightest star, near the left edge is magnitude 6.7 HD 23478. The orange star between them is magnitude 7.9 HD 23322. The IC 348 star cluster is just below Atik. As can be seen, it is a very loose cluster.

The double star HD 281159 is located in the brightest part of the nebula, just south and a little east of Atik. The nebula covers most of the cluster's foreground and extends all the way up to the east side of Atik.

Note the lack of stars to the south and southwest of Atik. This region, devoid of many stars, is also apparent at the eyepiece. It is due to a large dark nebula known LDN 1470. This dark nebular region extends over an area 2 × 2 degrees. The portion captured in my field of view is the northeast corner. Regions of LDN 1472 are cataloged under such names as Barnard 3, Barnard 4, LDN 1468, and LDN 1470.

Longer exposures of IC 348 show much more of the reflection nebula and better contrast with the dark nebula. Perhaps on a future clear, moonless night, I'll be able to take more images of this region.



Welcome to our new contributor.

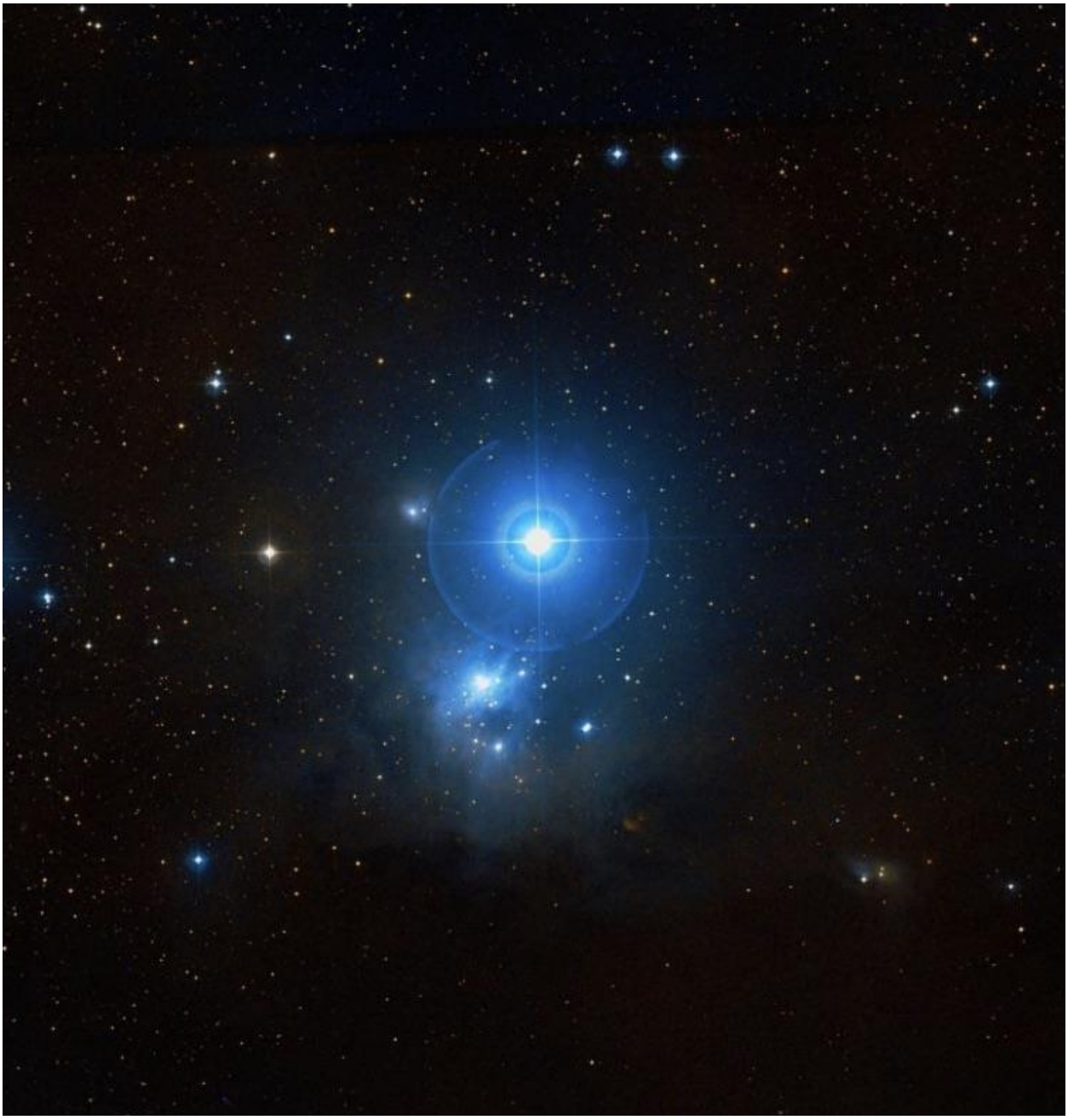
Barry Yomtov: Observer from Massachusetts

Here is my most recent image of IC 348. I am located in Marblehead, MA. The transparency started off ok (Jan 10, 2021), but deteriorated about two-thirds though my imaging session so I was able to only use 71 images. My equipment is the RASA 11 (f/2.2) with the Astrodon light pollution filter, and the ZWO ASI-183MC Pro CMOS camera. The total exposure was 41 minutes.

Mario Motta: Observer from Massachusetts

This is 90 min, about 30 mins each Red/green/blue through the 32-inch scope, asi6200 camera interesting in that I thought was mostly a reflection nebula, but the nebula is both red and some blue, so must be both reflection and some emission.

I intentionally put bright star Omicron, to the north, just out of the field to prevent it from overwhelming the image. That star is very blue and bright, and it must be ionizing some of the nebula.



Joseph Rothchild: Observer from Massachusetts

I observed IC 1985 (also IC 348) in Perseus on January 7th. I observed under dark skies on Cape Cod with my 10-inch reflector. The cluster and nebula were easily found near Omicron Persei. There was a U shaped group of stars and two pretty double stars in the cluster. Very faint nebulosity was seen with direct vision, best with a 14mm eyepiece and Paracorr (102×). Overall, an interesting object, but not very impressive from a visual protective.

Roger Ivester: Observer from North Carolina

IC 348, open cluster in Perseus enveloped with nebulosity:

Just to the south of bright star Omicron Persei (apparent visual magnitude 3.8) lies the sparse and scattered open cluster IC 348, which contains about 10 mostly dim stars.

When using my 10-inch reflector at a magnification of 114× with averted vision, and much patience and field motion (lightly tapping the telescope) I could see some faint nebulosity surrounding areas of the cluster. This effort required over an hour of careful observing to finally see sections of the nebula.

It's was necessary to move Omicron out of the field to see the nebulous areas within the cluster.

The nebulosity was extremely difficult, with the most concentrated area being in the NE region surrounding the wide and uneven double star, Struve 439. This double is actually a triple, but the third component is far too close for most back yard telescopes.

Another double, Struve 437 is a beautiful equal pair of white magnitude 10 stars located on the SW edge of the cluster.

Sketch follows.

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