MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

Compiled by:

Roger Ivester, Boiling Springs, North Carolina

&

Fred Rayworth, Las Vegas, Nevada

With special assistance from:

Rob Lambert, Las Vegas, Nevada

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NGC-6822 (Caldwell 57) Barnard's Galaxy – Barred Irregular Galaxy in Sagittarius

Introduction

The purpose of the observer's challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, we will be happy to include them in our monthly summary. Observing is not only a pleasure, but an art. With the main focus of amateur astronomy on astrophotography, many times people tend to forget how it was in the days before cameras, clock drives, and GOTO. Astronomy depended on what was seen through the eyepiece. Not only did it satisfy an innate curiosity, but it allowed the first astronomers to discover the beauty and the wonderment of the night sky.

Before photography, all observations depended on what the astronomer saw in the eyepiece, and how they recorded their observations. This was done through notes and drawings and that is the tradition we are stressing in the observers challenge. By combining our visual observations with our drawings, and sometimes, astrophotography (from those with the equipment and talent to do so), we get a unique understanding of what it is like to look through an eyepiece, and to see what is really there. The hope is that you will read through these notes and become inspired to take more time at the eyepiece studying each object, and looking for those subtle details that you might never have noticed before. Each new discovery increases one's appreciation of the skies above us. It is our firm belief that careful observing can improve your visual acuity to a much higher level that just might allow you to add inches to your telescope. Please consider this at your next observing session, as you can learn to make details jump out. It is also a thrill to point out details a new observer wouldn't even know to look for in that very faint galaxy, star cluster, nebula, or planet.

NGC-6822 (Caldwell 57) Barnard's Galaxy – Barred Irregular Galaxy in Sagittarius

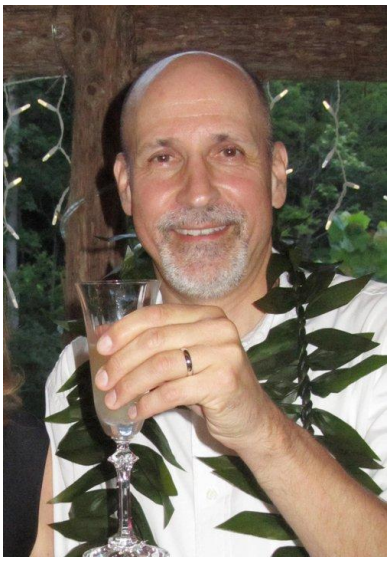
NGC-6822 goes by several names, including Caldwell 57, IC-4895 as well as Barnard's Galaxy, not to mention PGC and MCG designations and a few others. This frustrating, but fascinating galaxy is a barred irregular galaxy in Sagittarius. It was discovered by E.E. Barnard in 1884. What's really surprising is that he found it in a 6-inch refractor!

That should give you a clue that this is attainable by small instruments. The caveat is that okay, he had much darker skies back then, but at the same time, his optical train and eyepieces were probably not up to the same visual standards as what we have available today, even though it was probably an observatory quality scope (possibly an Alvin Clark refractor). He probably wasn't able to get as bright of an image as one could today with a shorter scope of the same aperture, due to that lack of coatings and higher power. One could argue, but the fact is, this galaxy has been seen with much smaller instruments, yet has been missed with very much larger ones.

It's one of the closest neighboring galaxies and is about 1.63 million light-years away. It's about 7,000 light-years across. It shines at a deceptively dim mag. 9.3, but the surface brightness is extremely low, making it very hard to pick out of the background. Low power seems to work best to spot it, though it can take magnification if the transparency is high.

Observations/Drawings/Photos

Dr. James Dire: Observer From Hawaii



NGC-6822 is an irregular galaxy located in the northeastern corner of the constellation Sagittarius. It's located halfway between Rho Sagittarii and Alpha Capricorni. In a telescope/eyepiece combination with a 1º real field of view, planetary nebula NGC-6818, the Little Gem Nebula, can be seen in the same field of view.

Barnard's Galaxy is a member of the local group. It's 1.6 million light years away. The galaxy is classified as irregular, similar to the Small Magellanic Cloud, which is a lot closer. Edward Barnard discovered it in 1884 using a 6-inch refractor. In 1924, Edwin Hubble calculated its distance using Cepheid variables, the first galaxy beyond the Magallanic Clouds to have its distance determined. The galaxy is 11.8 arcminutes in diameter and has an integrated mag. of 9.4. Like the Magellanic Clouds, NGC-6822 has lots of active star forming regions!

Because of its low surface brightness and lack of a bright central core, Barnard's Galaxy can be very challenging to find without a GOTO telescope. I have viewed it in various size telescopes, but all were unimpressive except my 14-inch f/6 Dobsonian reflector where I could collect enough light to see some shape. Although many people report it to be square shaped, to me it looks more elliptical. This is due to a bar-like feature running north-south.

My image was taken with a 190mm (7.5-inch) f/5.3 Maksutov-Newtonian with a SBIG ST-2000XCM CCD camera. The exposure was 170 minutes, barely enough time to capture faint detail. However, several H-II regions are visible in the image. Most of the resolved brighter stars are actually foreground Milky Way stars. What appear to be dimmer Barnard's Galaxy

stars in it are probably brighter regions, not resolved individual stars, as those would be impossible for my telescope to resolve at 1.6 million light years distance.

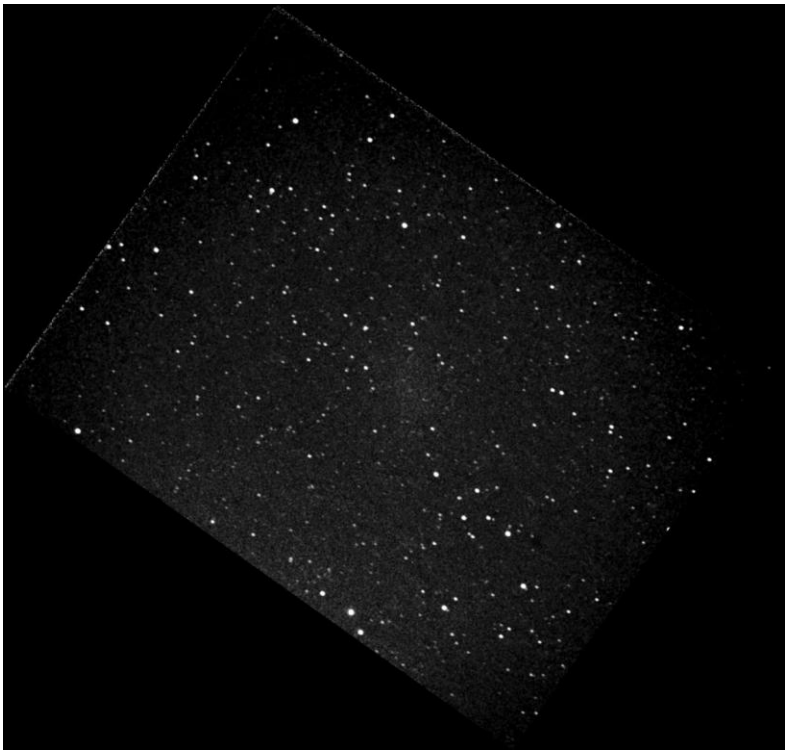
Jay Thompson: Observer from Nevada

I observed NGC-6822 (Barnard's Galaxy) with a 90mm (3-inch) Maksutov and a 17.5-inch on May 31, 2014 from Meadview, AZ. In the 90mm (3-inch) scope at 36X, I could see a faint glow.

In the 17-inch at 63X, I could make out a soft glow. Upping the magnification to 125X with a 16mm eyepiece, I could make out the galaxy taking up a sixth of the field of view (FOV). The view at 125X exhibited better contrast than at 63X. At 227X, I could still see the galaxy, framed in and taking up about a quarter of the FOV. I could see it with direct vision.

On June 19, 2014, I imaged it from my backyard in Henderson, NV. I used a 10-inch SCT with a focal reducer giving a focal ratio of f/4. A three-minute exposure yielded the attached image. The image was rotated to make north approximately up. The imaging telescope was mounted altazimuthly and the galaxy was well east of the meridian. The soft glow in the center of the image approximates the contrast seen visually.

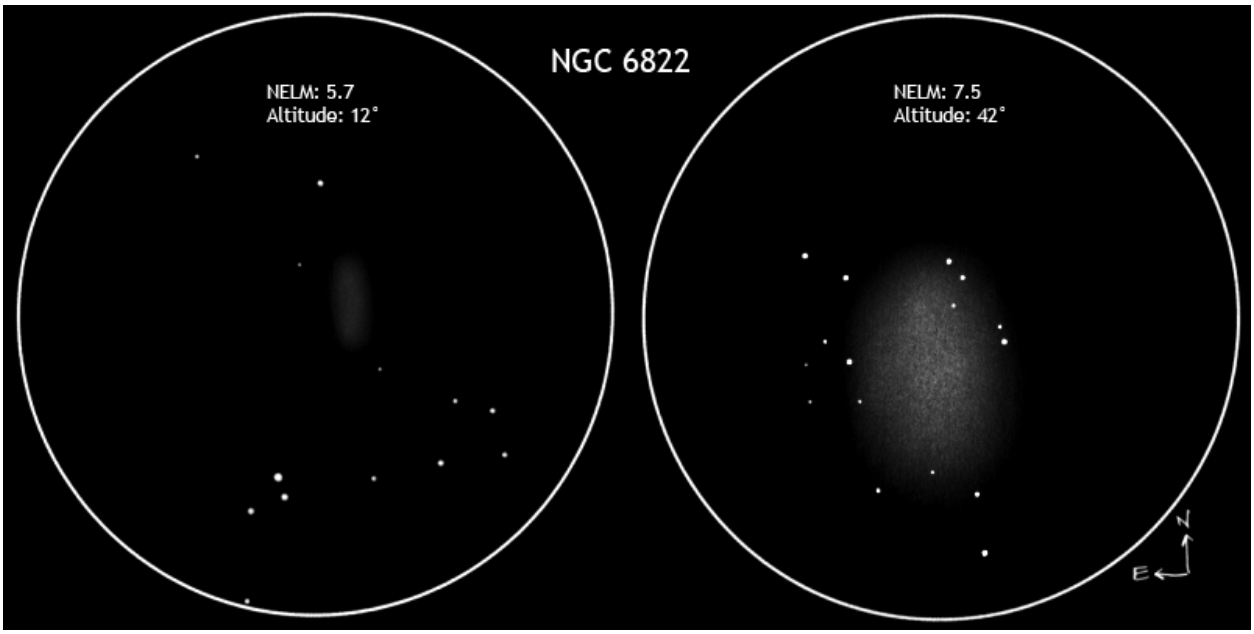
The visibility of Barnard's Galaxy is primarily a function of sky conditions. Raw light gathering power is of much less help than having very dark skies.



Jaakko Saloranta: Observer from Finland

I was able to glimpse NGC-6822 on the night of August 23, 2014. During the day, it was mostly cloudy with constant showers. Eventually, it cleared up enough for me to head to my spot at around 23.30. I noticed right away that sky conditions weren't as good as the night before, and conditions would be deteriorating fast as humidity was on the rise (~95%). I was also somewhat worried about aurora activity (didn't notice any, but some were noted on the night before) as well as approaching clouds (which eventually came only in the morning). After about 20 minutes in the general field of NGC-6822, I was ready to give up, but then suddenly, I got a few glimpses of an elongated, extremely faint patch of nebulosity at the NE edge of the field @ 46X (64'). I could only repeat this observation a few times afterward, but managed to sketch the object nonetheless. I looked at the drawing immediately after I got back home at around 2.30AM, and despite initially being quite skeptical of having actually drawn the object at the right place, it was obvious: I *had* sketched the galaxy perfectly at the right position! I took a SQM-L measurement from NGC-6822 and it showed 19.80 (20.50 at zenith) at an altitude of 12º. Without a doubt, it would've been quite a lot easier to see the galaxy if it was higher in the sky, but it doesn't get much better than this up here in Finland.

The second drawing was made back in 2011 from GMARS, in Landers, California. Back then, I described the galaxy as follows: "Low surface brightness galaxy, but weakly visible even with direct vision. N-S elongated with a faint bar running in the middle and overall a slightly mottled structure. Several faint stars visible in the periphery, H-II regions not looked for. Both drawings were made using a 4.5-inch reflector."


NGC 6822
NELM: 5.7
Altitude: 12°
NELM: 7.5
Altitude: 42°
N
E

Gus Johnson: Observer from Maryland

On July 27, 1992, using a 4.25-inch reflector at 38X, it was dim and difficult.

On September 15, 1984, using an 8-inch reflector @50X with poor transparency, it was barely visible.

On October 29, 1978 from Virginia, using a 12.5-inch reflector @ 80X, it was very dim and large. Using a 6-inch reflector @ 48X, it was very dim and elongated with fading edges. Using a 2.4-inch refractor @ 30X I barely suspected it was there. It was very difficult.

Gary Bruno: Observer from Nevada

I viewed NGC-6822 on the August 5 & 6, 2014. The 5th wasn't the best, but the 6th was good. My best view of the dwarf galaxy was using at 95X (41mm) with my 14-inch SCT. There were also a couple of nice double stars next to it that were fun to split.

On the way there from Altair I came across NGC-6820. Using 244X (16 mm) on the same scope and a deep sky filter (the O-III was way too dark), I could make out a good portion of the nebula. There was a grouping of stars close to the center that at 71X (55mm) almost resembled the stars in the Orion nebula, the Trapezium.

Roger Ivester: Observer from North Carolina

I have attempted to observe galaxy, NGC-6822 from my backyard since the early 90's. My problem has been due in-part to a pesky unshielded street light in relative close proximity to my house. On the night of about September 14, 2014, using a utility building for a light block, I was surprised and elated to finally see this galaxy. I used a 102mm (4-inch) refractor with a magnification of 63X, and also used a dark cloth to cover my head to reduce ambient lighting.

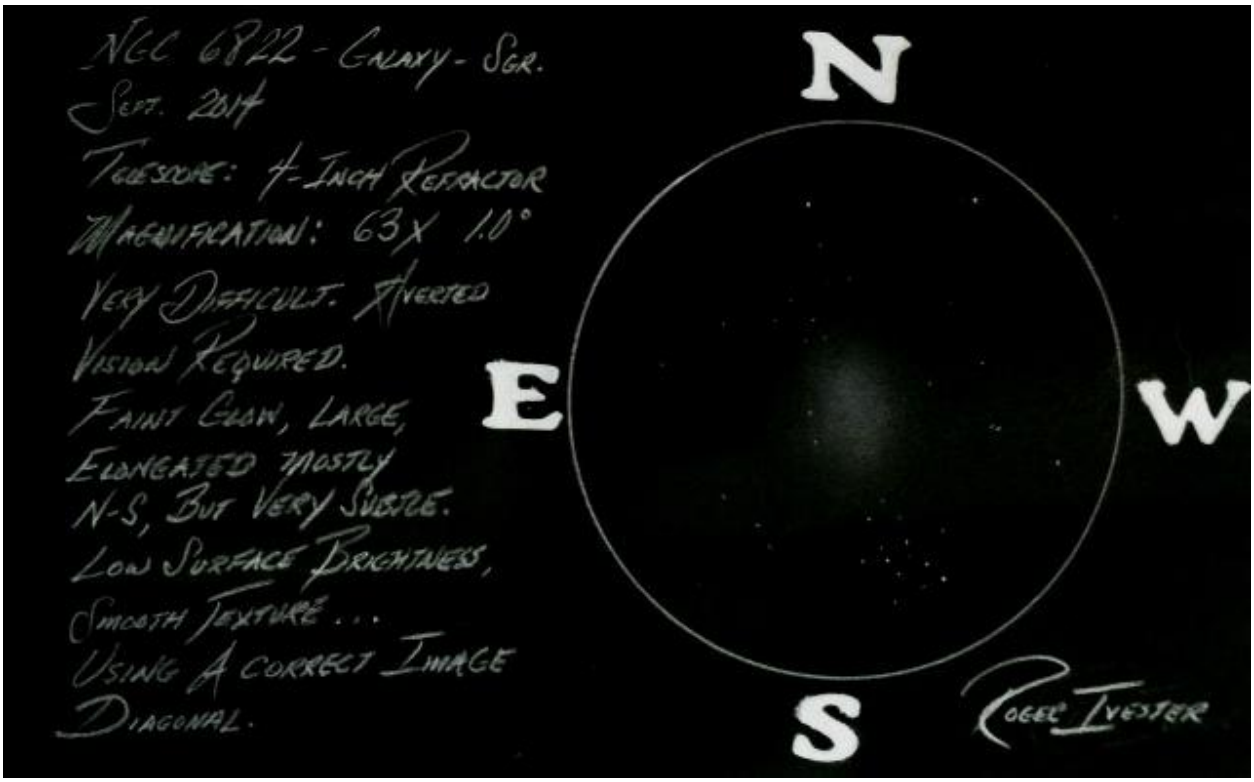
It was very difficult, and I would continue to check my atlas. After more than an hour, using a variety of eyepieces, still no luck. I began to wonder if this was going to be another year of not seeing it. Twenty two years is a long time to have looked for one galaxy that many have seen with a 60mm (2.4-inch) refractor, but probably from a much better site.

After another check of my atlas, taking a deep breath, and using a small amount of field motion, I could see a faint brightening. I became a bit excited, as I knew this was it. Moving the telescope back and forth ever so slightly, the faint glow or brightening became obvious. Once I had seen the brightening, I could move it out of the field of view and then find the glow again fairly easily. I was finally able to make that long awaited sketch and some notes. I noticed a subtle N-S elongation. The size was fairly large with very low surface brightness.

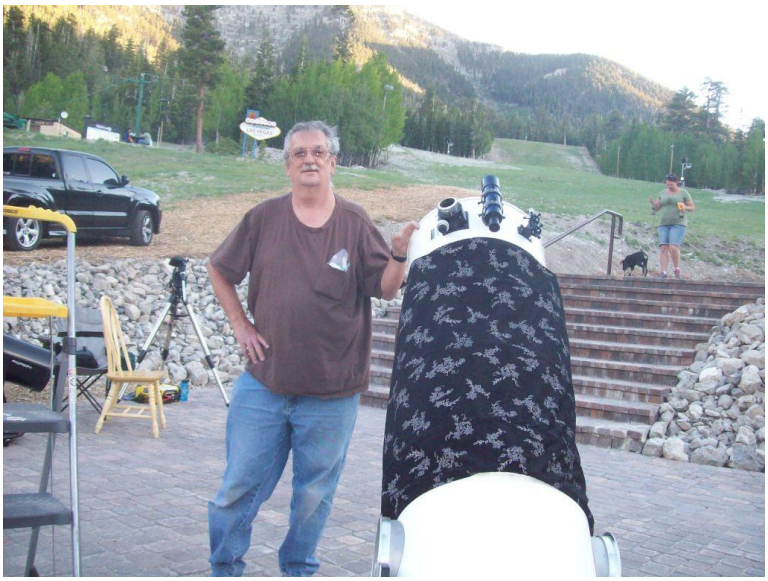
Saturday night, September 20, 2014: Our local astronomy club met at Lost Arrow Ranch, nestled in the South Mountains for an observing session. This is a really good site and on occasion I've estimated the NELM (naked eye limiting magnitude) at mag. 6.5. However, on this occasion, the transparency was not good due to high moisture content in the air. The NELM was reduced to about mag. 5.3, however, with good seeing.

During the event, and using a friend's 9.25-inch SCT telescope, I was able to see the galaxy, but with difficulty. Quite a few of the group observed it through this scope, with all having difficulty.

We had a great night of observing, and I'm hopeful to use this site more often in the future. The following sketch was made with a No. 2 pencil, a blank 5 X 8 note card with the colors being inverted with a computer.



Fred Rayworth: Observer from Nevada



This galaxy was a real challenge for me, especially under less than ideal skies. Despite being at an excellent observing site at the Las Vegas Astronomical Society's new observatory site up on Mt. Potosi, the skies were not cooperating. However, I digress.

The first time I tackled NGC-6822 was on August 24, 1990 from Eurovillas, Spain. Despite being at an elevation of 4,387 feet, and after going around the neighborhood and turning out all the street lights, I didn't have any luck spotting it. The weather was clear and calm and my neighbors to the south across the street weren't home, so no porch or inside lights. Still no sign of it at 70X with my home-built 16-inch f/6.4.

I had better luck on August 15, 2009 from Sawmill Trailhead up Lee Canyon Road near Las Vegas, Nevada. At 7,400 feet, it was cool, clear and calm. There was a slight haze from the Calee' fornia fires. At 19:10, the smoke was a lot more evident as the sun set. A quick gust of wind came up and it was cold. I had to get into my long-john shirt and coat, and it wasn't even dark yet. A park ranger came along at 21:00 and told everyone to get out, as she was closing the gate. She was hostile. She came back again at 10 and kicked us out. A good night wasted, but I managed to see that galaxy before she came back.

Using my commercial 16-inch f/4.5 at 70X, it was an extremely faint graying in the background. I could see no real shape, except a spread out oval ghost.

For this Challenge, I got another crack at it at the observatory site at Mt. Potosi. At 5,890 feet, it was clear with a few clouds to the extreme far north. There was a bit of a breeze, but it was hard to tell if it would be a problem and it turned out it wasn't. However, like the last time I was up

there, the sky was quite bright. Despite being able to see the Milky Way from horizon almost to horizon, the sky was quite bright and I couldn't see down to very dim magnitudes. I spent most of the evening searching, with few results.

It took a while to find the right area. Wow! What a tough one! I couldn't see it at all at 102X, except just the vaguest hint that something was in the background. By sweeping, I could tell something was amiss, but not exactly a shape, just a disturbance to the blackness. However, at 48X, it began to take shape as an extremely dim and grainy oval that fit within the star patterns, according to my detailed map. Just to the far edge sat the nice little planetary, NGC 6818. This observation was a great way to get an eye ache (translated to headache) as the strain of trying to see it through a virtual gray background, instead of black, was straining, to say the least. I would've enjoyed it a lot more if I had a black background that gave it at least a little contrast. The real highlight was the planetary, which was a nice little blue dot. Then again, that's not why we're here but it was a nice bonus.