MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

April 2020

Report #135

NGC 3877 Galaxy in Ursa Major

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.

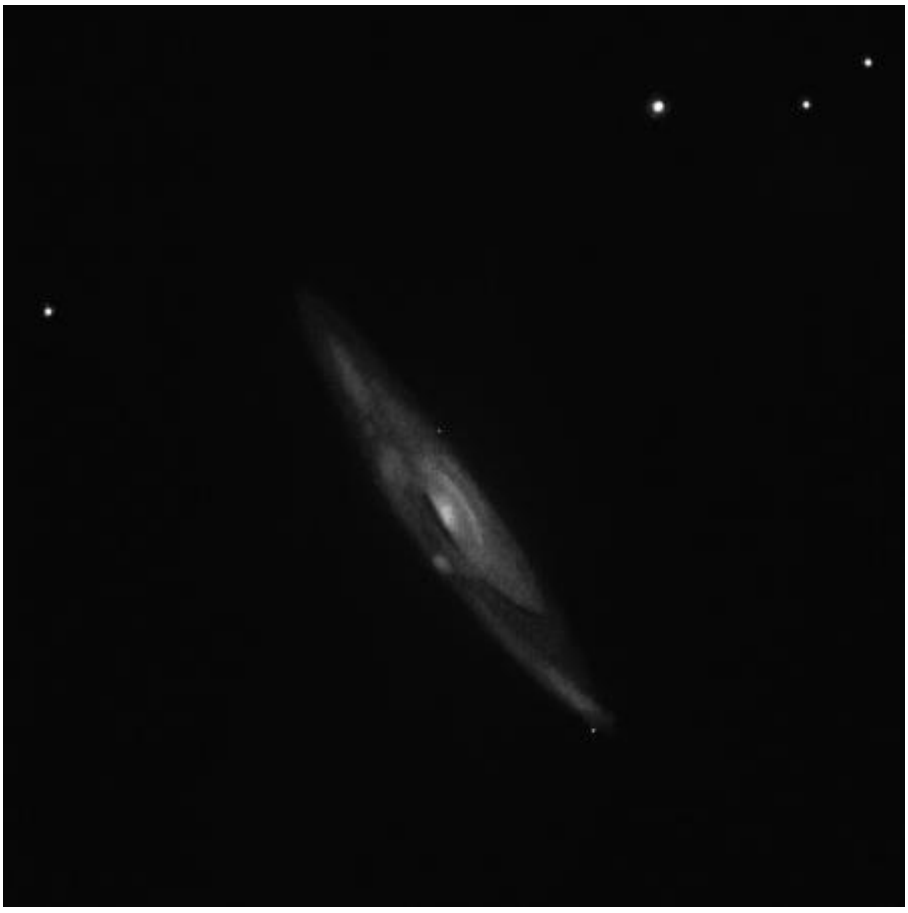
NGC 3877

NGC 3877 is a spiral galaxy highly inclined to our line of sight. Its arms are quite open and spring from the galaxy's small central bulge. Deep images show a small but bright, bar-shaped star-forming region near the center of the galaxy. Recent sources place NGC 3877 somewhere in the vicinity of 53 million light-years away from us.

William Herschel discovered NGC 3877 in 1788 with an 18.7-inch, speculum-metal reflector. His journal entry reads, "Pretty bright, much extended, nearly in the meridian 4 or 5′ long. 1′ broad." Tackling NGC 3877 with a much smaller scope in 1865, German astronomer George Rümker pronounced it a faint and large nebula that was difficult to observe through a 4-inch refractor.

Uwe Glahn: Observer from Germany

Telescope: 27-inch f/4.2 Newtonian. Magnifications: 293× – 488×
NELM: 6.5+, Seeing: III
Location: Sudelfeld



Rony De Laet: Observer from Belgium

Welcome to our new contributor Rony. You can enjoy his many sketches at: http://rodelaet.xtreemhost.com/index1.html

Telescope: 10-inch f/5 truss Dobsonian

I had never before observed this galaxy. So I didn't know what to expect. I used the Stellarium app on my smartphone to locate this object. It is something that I started using since last year. I can switch my phone to the red night mode and dim the screen. It works really well to preserve my night vision. I point my red dot finder to the nearest star that's visible with the naked eye and then I use my phone to star hop from star to object with my lowest power eyepiece. Stellarium pointed me towards Chi UMa. That shouldn't be a difficult search. I switched off the phone and centered Chi UMa in the eyepiece of my 10-inch truss dob. Now what? Where's the galaxy? Back to Stellarium for another look. It turned out that Chi is a perfect beacon but also a blazing lighthouse in a 24mm eyepiece at 53×.

I swept over the galaxy's location without noticing it. Once I knew what to look for, I could detect the galaxy's dim glow. With 91×, Chi was still present in the fov. And it ruined my night vision once again. Time for a higher magnification.

With 144× I could finally separate NGC 3877 from its pesky beacon. I prefer to slowly sweep my target through the fov. It triggers my dark adapted retina.

With Chi UMa staying around, it would be useless. I found the best view at 211×. It allowed me to study the core and nucleus of the galaxy in detail. The nucleus appeared not stellar, but rather elongated in the same position angle as the elongated halo. I noticed a small dark arc between the SE-side of the nucleus and the core. Maybe a dust band? The core tapers toward the bar shaped halo. Its SW tip continues as if it forms a spiral arm? The elongated halo doesn't seem to be symmetrically shaped. I returned to 144× to study the halo's edges. The NW curved long edge of the halo appears darkened where it nears the nucleus. The SE long edge of the halo is more developed.

The sketch is based on observations over two nights from my backyard. The NELM was mag 5.2. I observed NGC 3877 for about an hour and a half in total. The first night I tried to sketch as much detail as I could. The second night, I returned to the galaxy to check the details of the first encounter. Second visits produce more accurate observations.

The sketch is a digital reproduction of a raw pencil sketch behind the eyepiece.

The field of view is 20 arc minutes.

North is up and West to the right:

Venu Venugopal: Observer from Massachusetts

Image taken on 4/12/2020 from Chelmsford, MA backyard of my house.

Exposure - 20 minutes. Skywatcher 8 Quattro, iOptron GEM45, ZWO533MC, 8 second subs stacked in SharpCap.

Spiral galaxy with Radial Velocity/Redshift at 902 km/s. 11.8 (mag).

Discovered by William Herschel on February 5, 1788.

Supernova 1998S occurred in NGC 3877 and reached an apparent brightness of magnitude 12.1, thus competing with the whole galaxy.

Carl Bellitti: Observer from Massachusetts

I am a new member of the South Shore Astronomical Society. I have an EAA setup and still learning the ropes. A fellow member informed us of the challenge, so I decided to give it a shot. I have attached an image.

My notes are as following:

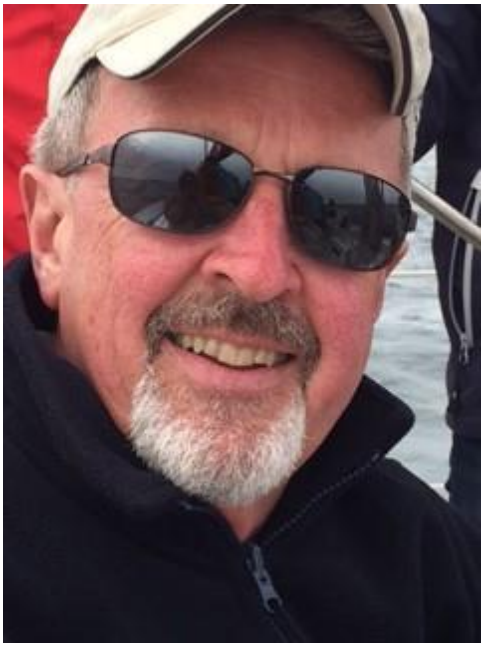
Location: Hanover, MA
Seeing: 3/5
Transparency: 4/5
Bortle: ~5
Time: 9:30 EST
Telescope: 6-inch Schmidt-Cassegrain with f/6.3 focal reducer
Camera: Canon EOS Rebel T5, 1200D (unmodded)
Exposures: (6) × 30″ live stacked

Observations:

- Bright Center clearly visible
- Galaxy is nearly on its edge but probably skewed a bit. (Somewhat Similar to M82)
- Al Kaphrah is clearly visible and dominates the shot, but adds interest.
- I had set my expectations low, but results exceeded them.

Orientation: North is to the left, and West is up.

John Bishop: Observer from Massachusetts



Here is a summary of my observations of NGC 3877 in April 2020:

I observed NGC 3877 on 4/11/20 and 4/16/20 from a site in Plymouth, MA. Both nights were clear, with good transparency. Seeing was fair, with noticeable breeze diminishing over the course of both evenings. Temperature on both nights was in the 40s F. at sunset, dropping into the 30s F. by 11:30 pm.

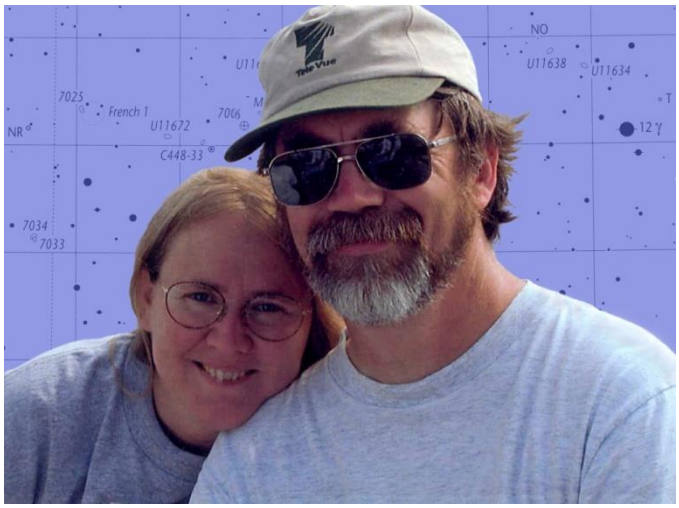
I observed with an 8.25 inch f/11.5 reflector at 48×, 100×, and 193×.

NGC 3877 was fairly easy to locate. It lies close to Chi Ursa Majoris. At 48×, with Chi UMa to one side of the FOV, I saw an obviously elongated hazy patch with a slight brightening in the center. This was NGC 3877. Increased magnification confirmed the elongated cigar shape. The bright center was itself slightly elongated, and not very concentrated.

At 193×, there was more to see, but the image became less steady. The image cycled in and out of steady focus. (I assume this was the atmosphere at work.) At steady moments, the galaxy was bigger and brighter, but the surface was not as uniformly bright. I saw a dark lane cutting at an angle across the arms on the NE side of the core. The image was soft, but the dark lane was definitely there. After the observing session, I looked at images of NGC 3877 online. Several images (including nice images by Mario Motta and James Dire) show the dark lane that I observed. That was cool!

First time for me observing this interesting object, which lies in a region full of interesting objects.

Sue French: Observer from New York



4-18-2020, 10-inch f/5.9 Newtonian, Seeing: fair. Transparency: good. Gusty wind.

43×: NGC 3877 appears highly elongated and grows gently brighter toward the center.
187×: Sketch. The galaxy grows longer with averted vision, and it harbors an elongated core.

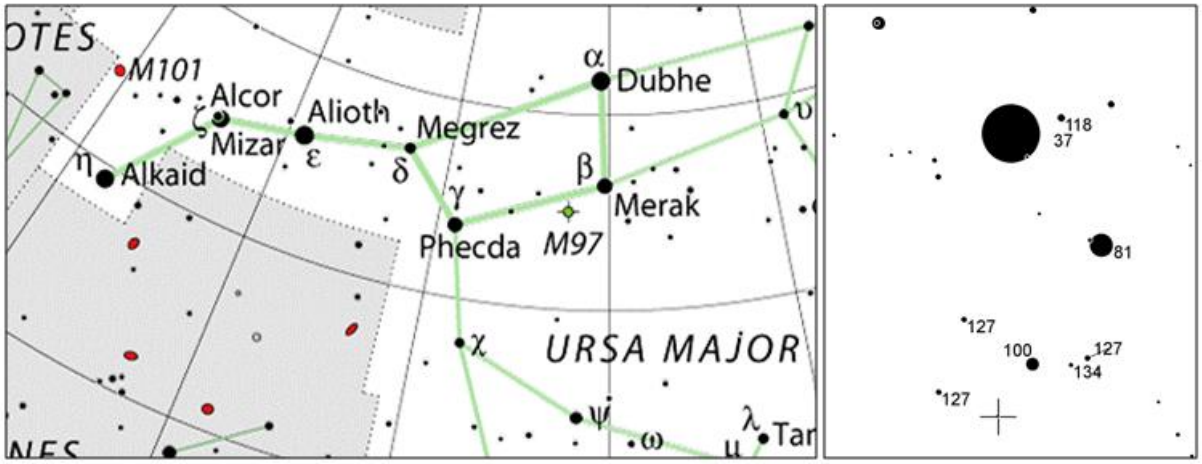
Glenn Chaple: Observer from Massachusetts

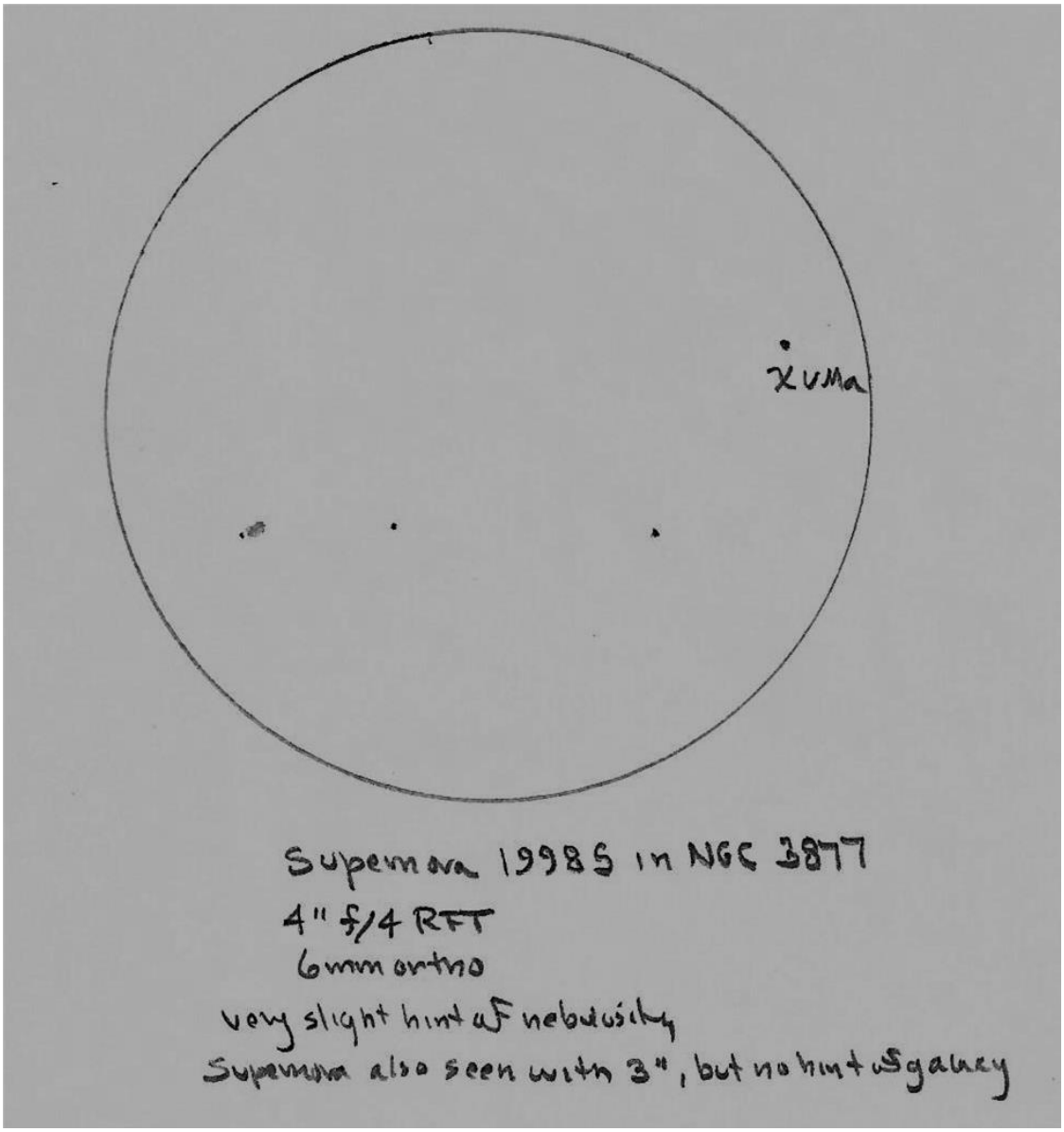
The best star-hops are those that require no hopping at all. Such is the case with this month's Observer's Challenge, the near edge-on spiral galaxy NGC 3877. Center the magnitude 3.7 star Chi (χ) Ursae Majoris in the field of your scope's finder and then peer into the eyepiece. If your eye is properly dark-adapted, you should see an oval haze just ¼ degree to the south.

In March of 1998, a supernova appeared in NGC 3877, quickly reaching 12th magnitude. It was visible in my 4-inch f/4 rich-field reflector (Edmund Scientific's Astroscan), as was the galaxy itself. To see NGC 3877 with such a small aperture demands dark-sky conditions. In Vol. 2 of *The Night Sky Observer's Guide*, authors George Kepple and Glen Sanner note that an 8 to 10-inch scope will reveal the galaxy's central condensation, while scopes with twice the aperture should bring out the mottled appearance of its outer regions.

NGC 3877 was discovered by William Herschel on the night of February 5, 1788. Along with M109, it belongs to the Ursa Major Galaxy Cluster. Its distance is variously recorded as 42 to 50 million light years. If at the latter distance, NGC 3877 would span some 80,000 light-years.

Finder charts for NGC 3877 below. Bright star in right-hand chart (from AAVSO Variable Star Plotter) is Chi (χ) UMa. Numbers refer to magnitudes of field stars. North is up in this 25′ by 30′ field.





NGC 3877 and supernova 1998S, March 25, 1998. Magnification 74× FOV 20′. North is to the right. Sketch by Glenn Chaple (ATMoB)

Vladislav Mlch: Observer from Massachusetts

Date: April 18, 2020

Location: White Mountains National forest, New Hampshire

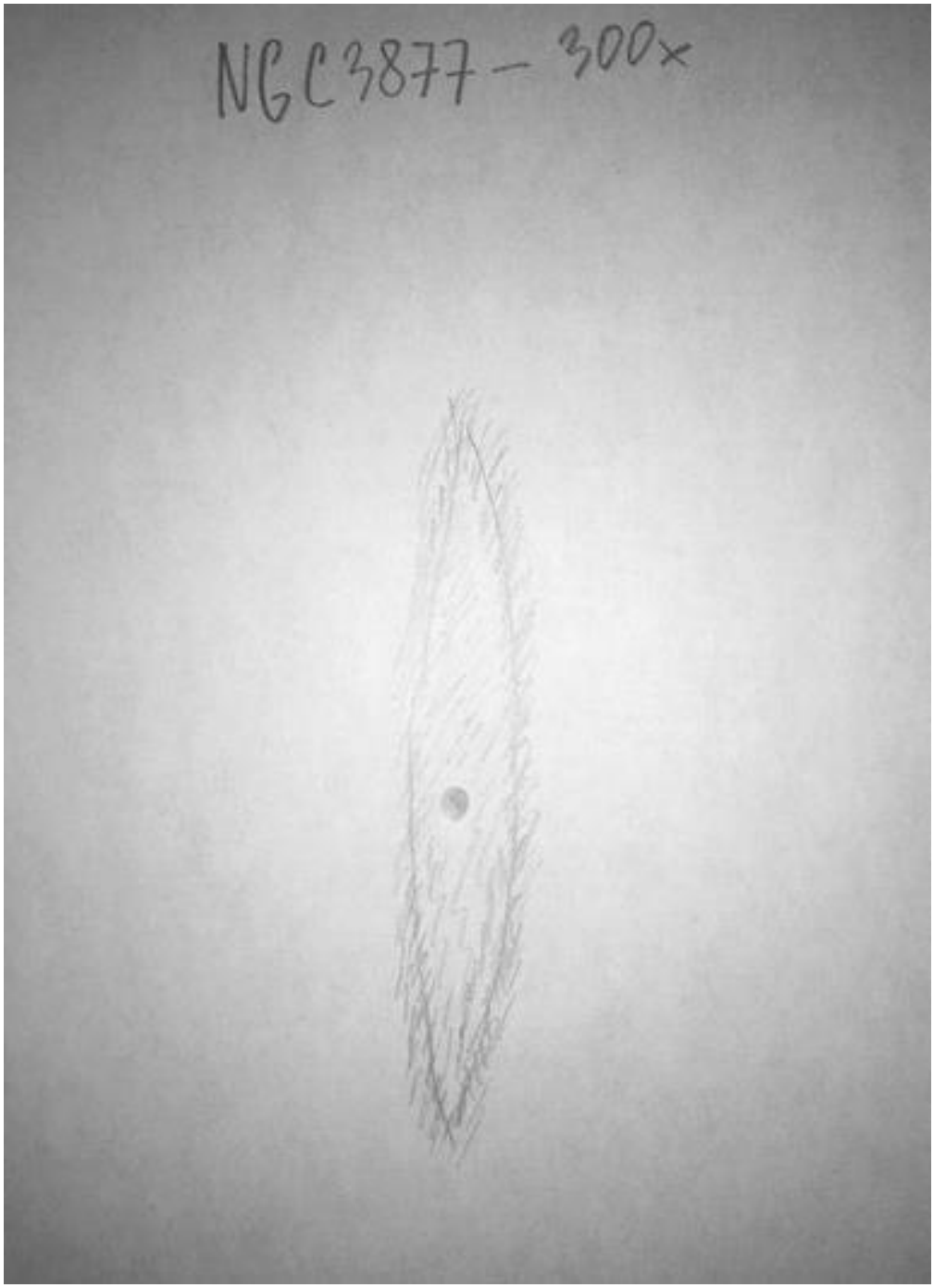
Conditions: Bortle 2, average seeing

Using: 22-inch f/3.3 DOB with 17mm Ethos (110×, FOV=55') and 6mm Ethos (300×, FOV=20')

Filter: no filter

Notes: At 110× NGC 3877 is relatively bright "elongated smudge." After centering it and increasing the magnification to 300× the galaxy extends nicely across the FOV. The bright central region looks "star like." No other details were visible.

Sketch, next page.


NGC3877 – 300×

Gus Johnson: Observer from Maryland

April 1998: 6-inch @ 118× with a first-quarter moon. Highly elongated with a bright core. When observing with an 8-inch reflector @ 116×, the galaxy appears much brighter than the 6-inch, as to be expected. However, mottling and unevenness could now be seen in the arms.

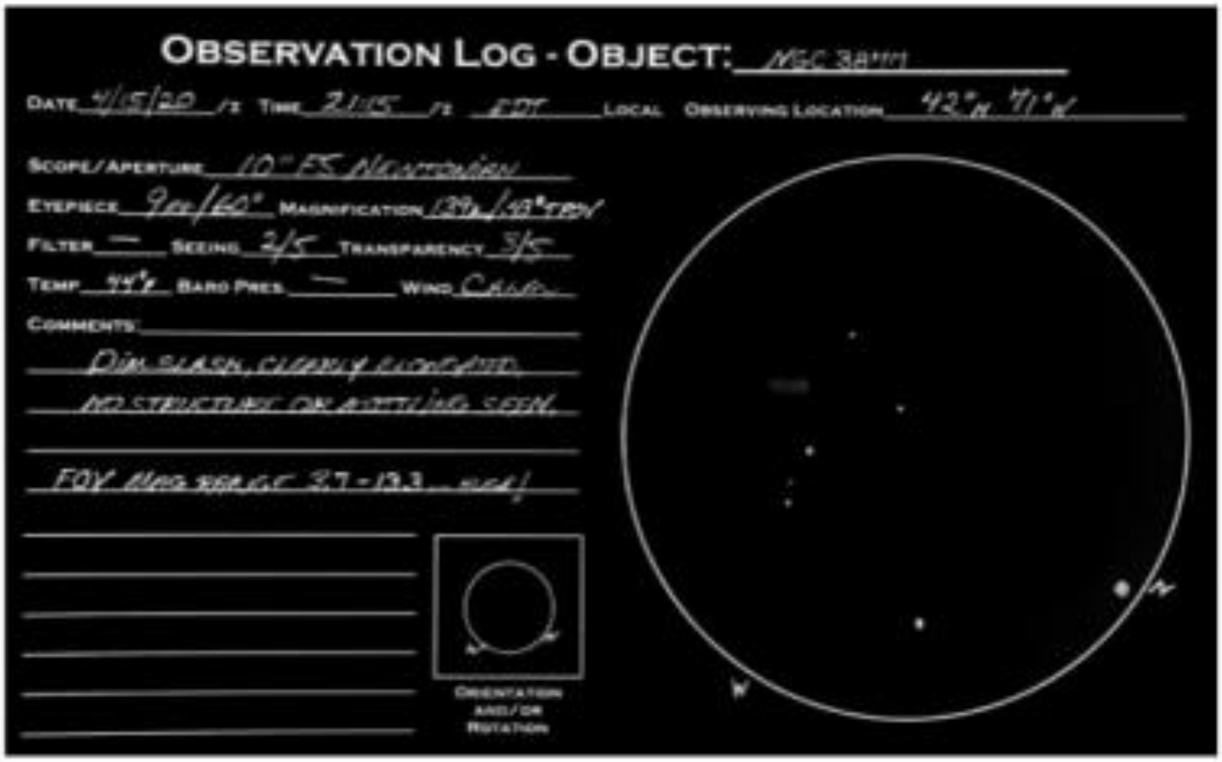
Mike McCabe: Observer from Massachusetts

NCG 3877 is a type Sc spiral galaxy located in the constellation Ursa Major and shines at about mag. 12 with a surface brightness somewhere north of mag. 13. The galaxy is very easy to find due to its close proximity to the bright star Chi Ursae Majoris, which at mag. 3.7 and located very near the Big Dipper asterism, is easily seen naked eye.

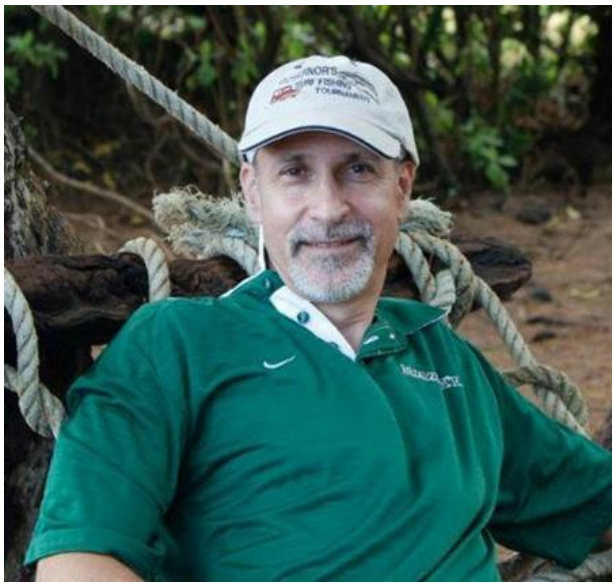
I viewed 3877 on the evening of April 15th, formally known as "Tax Day" in the USA. The sky was clear with a transparency rating of 3/5, and the seeing was less than optimal with a rating of 2/5. The temperature was a comfortable 44º F and the wind was calm. It was quite pleasant for observing. It should be noted for the record, this observation was made during the peak of the Covid-19 World Pandemic. Observing alone in one's yard makes for a stark contrast to the chaotic situation that the world is enduring at this time, the severity of which is astounding. Appreciation for being able to still do something enjoyable was not lost on this observer.

A 10-inch Newtonian reflector was used to make this observation. At 139× with a 0.43º true FOV, Chi Ursa Majoris easily fit into the field with 3877, making for an interesting situation. Between the brightness of Chi and the dimmest star seen near the galaxy at mag. 13.3, there was a nearly ten magnitude difference in brightness throughout. But once again the human eye proved up to the task of accommodating the huge dynamic range, something that no camera is capable of doing!

NGC 3877 appeared as a dim slash, clearly longer than its width, and oriented NE/SW. No structure, mottling, or brightness variations were noted. It looked like a little cigar in the view.


OBSERVATION LOG - OBJECT: NGC 3877
DATE 4/15/20
TIME 2115
EDT
LOCAL
OBSERVING LOCATION 42°N 71°W
SCOPE/APERTURE 10" F5 NEWTONIAN
EYEPIECE
MAGNIFICATION
FILTER —
SEEING 2/5
TRANSPARENCY 3/5
TEMP 44°F
BARO PRES. —
WIND CALM
COMMENTS:
DIM SLASH, CLEARLY ELONGATED.
NO STRUCTURE OR MOTTLING SEEN.
FOV MAG RANGE 3.7-13.3
N
W
ORIENTATION AND/OR ROTATION

James Dire: Observer from Illinois



NGC 3877 is an 11th magnitude spiral galaxy in the constellation Ursa Major. To find the galaxy start at the star Megrez, the star where the handle of the Big Dipper connects to the cup. Follow an arcing line from Megrez through Phecda (bottom star in cup below Megrez) curving south to the third magnitude star Al Kaphrah. The three stars are close to equally spaced with Al Kaphrah a tad dimmer than Megrez. NGC 3877 is a mere 17 arc-minutes directly south of Al Kaphrah, making it one of the easiest 11th-magnitude galaxies to find star hopping.

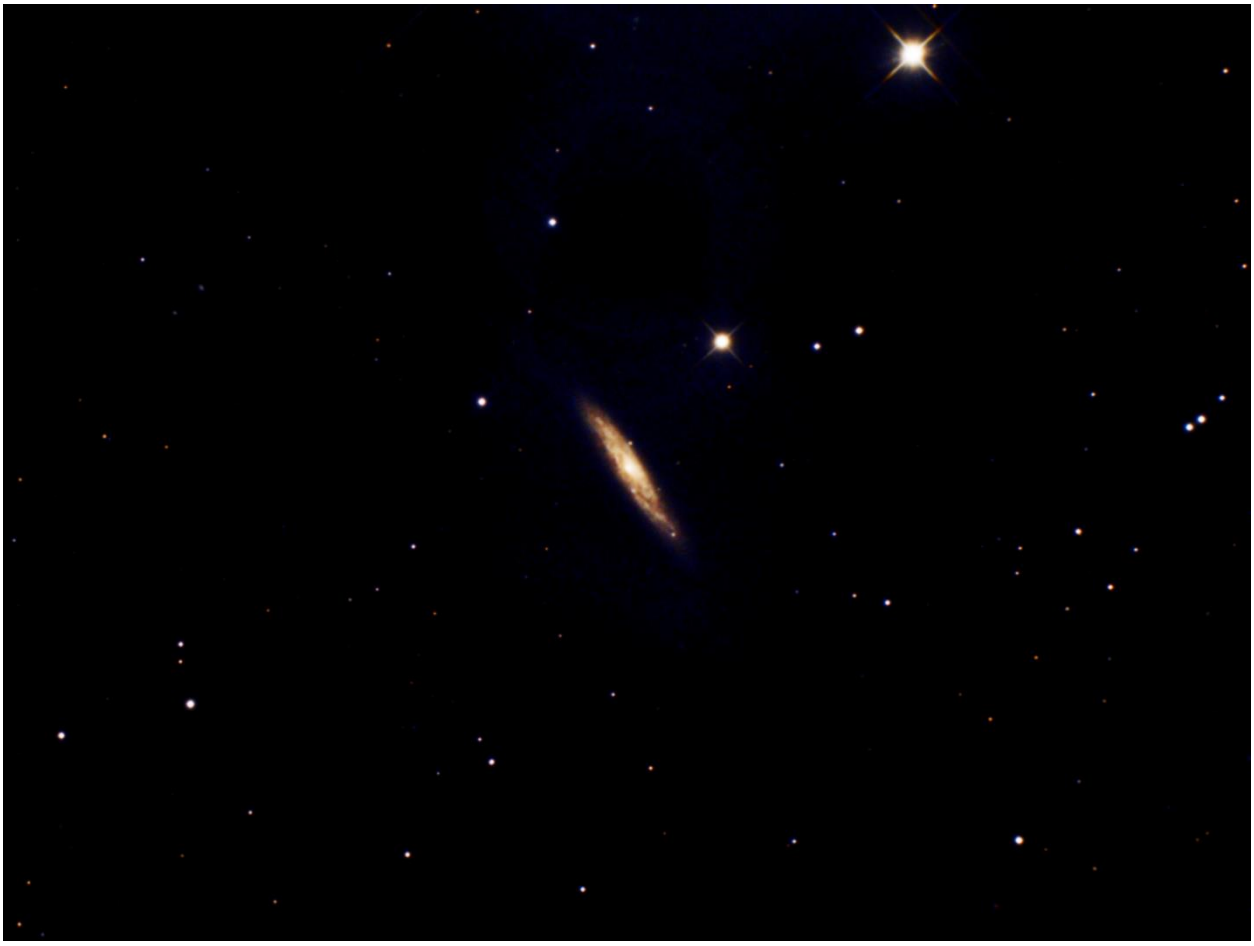
NGC 3788 is a nearly edge-on spiral galaxy 5.4 arc-minutes long and 1.2 arc-minutes wide. The galaxy is classified Sc, which means is has a very small core surrounded by whirling spiral arms. William Herschel discovered NGC 3877 in the year 1788 using his 18.7 inch Newtonian.

Through an 8-inch telescope the galaxy looks cigar-shaped with a bright stellar-looking core. No detail can be seen in the spiral arms. I imaged NGC 3877 with an 8-inch f/8 Ritchey–Chrétien Cassegrain (with a TeleVue 0.8× focal reducer/field flattener yielding f/6.4) using an SBIG ST-2000XCM CCD camera. The exposure was 180 minutes.

To image this galaxy with a reflector is tricky because if you don't get the star Al Kaphrah out of the field, the required exposure to pick up the galaxy would cause the star to drown out the image. In my image the bright star near the top of the image is 8th-magnitude SAO 43884. Al Kaphrah is outside of the field of view straight above (north) of the galaxy. During my three-hour exposure, ghost reflections of Al Kaphrah appeared on the image as well as two bright diffraction spikes from my secondary mirror spider. I removed those from the final image.

About 5 arc-minutes to the northwest of the core (upper right) lies a magnitude 9.9 star with four diffraction spikes. Just below this star is a magnitude 16.7 star that is very red in color. Just at the edge of the lower right diffraction spike is an even fainter red star shining at magnitude 17.7. This is one of the faintest stars in the image.

The image picks up the tightly wound spiral arms of the galaxy. In between the arms are several dark dust lanes. The three stars that appear on the outskirts of the galaxy are Milky Way foreground stars.



Chris Elledge: Observer from Massachusetts

On February 22nd @11:25pm EST, I used a 10-inch f/5 refractor to observe NGC 3877 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6; NELM 5.0; Transparency: Average; Seeing: Average.

NGC 3877 is easy to locate at just 17′ from Al Kaphrah. At 36x (35mm) there are 4 mag. 8 to 10 stars near Al Kaphrah that form two parallel lines NW to SE lines. The NW stars of each form a line together with Al Kaphrah in the NE to SW direction. The SW line of HD 102158 and BD+48-1965 point SE to NGC 3877 a short 4′ away. The galaxy looks like a short line with averted vision. It has a NE to SW orientation.

At 115× (11mm) the galaxy is still only visible with averted vision with a NE to SW orientation. The apparent length of the galaxy is slightly shorter than the distance from the galaxy center to nearby BD+48-1965. There are several 13 mag. stars around the galaxy. One to the East, one to the NNE, and two to NW just past BD+48-1965

At 270× (4.7mm) the galaxy is very faint but still visible with averted vision. It is more difficult to determine the length at this magnification. The core of the galaxy is slightly brighter than the extremities. I get fleeting moments of seeing a dark lane across the length of the SW side of the galaxy.

Mario Motta: Observer from Massachusetts

Taken the night of March 27-28 through 32-inch telescope. Five-minute subs, total 60 minutes integration time.

Camera is my new ZWO ASI6200. Processed in PixInsight.

Joseph Rothchild: Observer from Massachusetts

I observed NGC 3877 twice from dark skies on Cape Cod (3/21 and 4/22), although the second observation on April 22nd was hampered by 20 mph winds.

I observed with my 10″ reflector at 89×. The galaxy is easy to find near the bright star Al Kaphrah in Ursa Major. It is best seen with the star just out of the field. The galaxy is faint, uniform, and spindle shaped with 3-4:1 ratio. I was unable to see any internal structure on either observation.

Richard Nugent: Observer from Massachusetts

April 2020…NGC 3877

A galaxy in Ursa Major. I had high hopes for this one because it appears to be prominent on Sky Safari 6 Pro.

On 29 Feb I was able to observe this galaxy using the ATMoB 25″ Dob. The galaxy was easily visible at 278× and appeared as diffuse, elongated glow. Very pretty!

During an observing session in mid-March using my 20″ scope, the galaxy was barely visible at mid to high powers. It was not visible at my lowest power (120×) but the sky's NELM that evening was a typical (For Framingham, MA) magnitude 4.8 at best.

On 29 Mar, using my 10″ Dob, I could just detect the object at 250× while shielding my eyes from extraneous light and using averted vision. A darker sky is necessary.

I had a remarkably good night on 16 April with a NELM of 5.1 and was using my 10″ scope once again. This time I successfully observed this galaxy as a faint but easily discernible oval of light. I was quite surprised but pleased that I could see it! The best view came at 200×.

The galaxy was not visible on 22 Apr with the 10″ under a 4.9-magnitude sky.

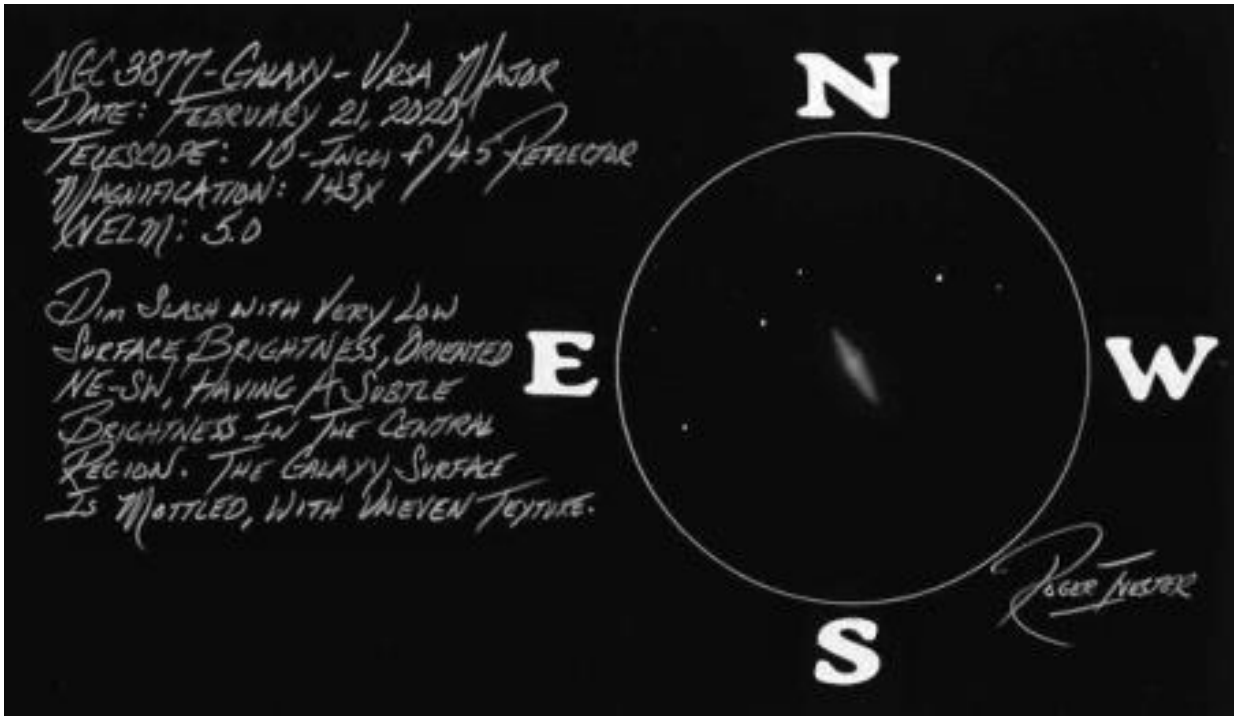
Of course while using a large Dobsonian I was not surprised to see the galaxy so well. Getting down to a more typical-sized telescope, it would seem that the key to successfully observing this galaxy is to view it, of course, under dark skies.

Roger Ivester: Observer from North Carolina

Telescope: 10-inch f/4.5 reflector: Date: February 22, 2020

NGC 3877. Dim slash with very low surface brightness, oriented NE-SW with a subtle brightening in the central region along the highly elongated core. The galaxy arms show some mottling and uneven texture.

Pencil sketch: 5 × 8 blank note card with the colors inverted, next page:



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

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