MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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&

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APRIL 2018

M81/82 Galaxy Pair 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 that's interested, and if you're able to contribute notes, and/or drawings, we'll be happy to include them in our monthly summary. We also accept digital imaging. 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 the astronomer 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 Observers Challenge. We're not excluding those with an interest in astrophotography, either. Your 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.

M81/82 Galaxy Pair In Ursa Major

Messier 81, also known as NGC-3031, was discovered by Johann Elert Bode on December 31, 1774. Because of that, it's also known as Bode's Galaxy. Years later, in 1779, Pierre Méchain and Charles Messier re-identified it and it became Messier 81, known as "not another comet #81," more or less.

It's a large and relatively close spiral galaxy, approximately 11.9 million light-years away, and shines at a relatively easy mag. 6.94 to 7.9, depending on the source. It's been the source of only a single supernova, SN 1993J, despite being one of the most highly studied galaxies in the night sky.

Messier 82, also known as NGC-3034 and ARP-337, made the Herschel catalog and received the number H-079-4, even though it was another discovery by Bode on the same day he

discovered M81, 31 December 1774. It was also later added to the Messier catalog, though he did not discover it specifically.

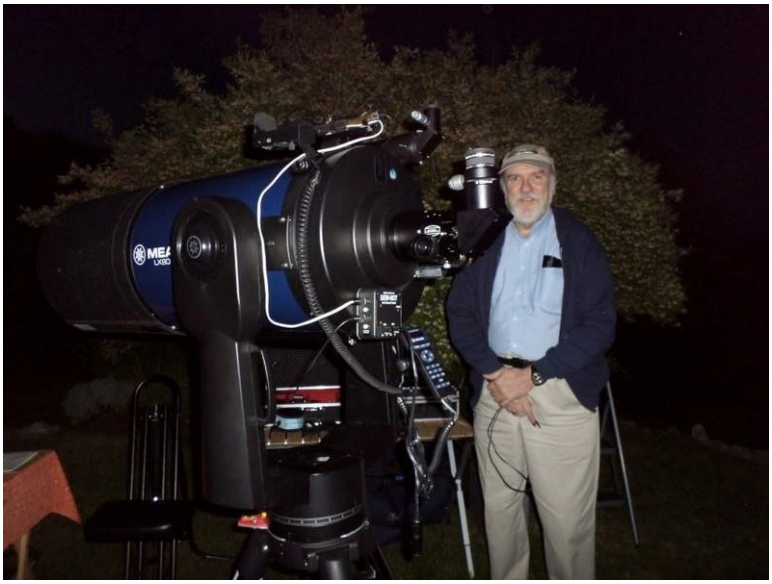
M82 is a starburst galaxy, seen partially edge-on, giving it the moniker the "Cigar Galaxy." It's about five times more luminous that our own Milky Way. It lies approximately 12 million light-years away and shines at a mag. 8.41 to 9.3, depending on the source.

These two objects are relatively easy, even in binoculars. Increasing aperture reveals more and more detail, but just about any optical aid shows something to feast the eyes upon. Our participant John Bishop sums it up the best:

The sight of these two distinctive galaxies, seeming to hang in space in the eyepiece, is a dramatic image which never fails to please. John Bishop

Observations/Drawings/Photos

Dwight Lanpher: Observer from Maine



Editor's Note: We'd like to introduce new Challenge member Dwight Lanpher.

I've always been interested in astronomy. A child of the fifties, I felt fortunate to grow up when I could follow the evolution of the space program. My parents gave me a telescope for Christmas when I was 11 or 12. It was a 3-1/2-inch Sears reflector. I looked at the moon and figured out how to do projection of sunspots without blinding myself. However, it seemed like every star I looked at was just another dot in the sky.

Fast forward to 2003. A mechanical engineer and satellite designer from California moved here to set up Island Astronomy on Mt. Desert Island. He sold telescopes and binoculars to summer tourists and locals. He also gave Friday night lectures on various astronomy topics. I attended all of his lectures and he became my astronomy mentor. After the lectures, he would drag a Dob outside and show us various objects. I got my first views of the Ring Nebula, M13 and, of course, Saturn! The following summer, I bought a 127mm (5-inch) Maksutov for myself as a birthday present. So Island Astronomy evolved into the Island Astronomy Institute. I was invited to join the Institute as a board member and became more involved running star parties here on Mt. Desert Island where I developed my observing skills. We began a collaboration with Acadia National Park, doing night sky measurements using the NPS Night Sky team survey system. In 2009 we worked with the Park to create the Acadia Night Sky Festival. I was responsible for recruiting astronomers for a star party on Cadillac Mountain. That year we had 12 telescopes and 700 visitors. The next year was even more successful with 15 telescopes and 1000 visitors. I've continued to recruit astronomers and the festival has now grown to 80+ astronomers with 53 telescopes and 1,800 visitors. I've been told it's the largest yearly star party event in the National Park System. Because of the success, politics got involved and various

commercial and other entities excluded the Island Astronomy Institute from the event. The institute's other work with grants slowed and eventually the Institute closed.

I joined the Penobscot Valley Star Gazers in Bangor and am currently their president. It's a small group of about 30 members, almost all of which are more experienced than I. I ended up joining all of the clubs in Maine and several more in New Hampshire and Massachusetts. Up until 2003, the only asterisms that I knew were the big and little dippers. I now go to as many meetings and star parties as I can manage, and last year, travelled 8,900 miles for astronomy events. Along the way, I upgraded my night gear several times from the little 5-inch Mak to my current 12-inch ACF, and a 101mm (4-inch) APO refractor. However, my favorite activity is solar viewing with a 90mm (3.5-inch) DS Hydrogen-Alpha, and my most recent 80mm (3-inch) Sodium-D filtered refractor as well as a solar spectrometer. Daytime viewing is my favorite because you can actually see who you are talking to. On the other hand, I do now recognize a lot of night astronomers across New England just from their voice.

I also like to travel to astronomical installations as well as club facilities and many planetariums. I have visited the Greenwich Royal Observatory, Quebec's Mt. Mégantic Observatory, the Paris Observatory and the location of Messier's observatory at the Musée de Cluny – Musée National du Moyen Âge in Paris. In September, I'll be visiting the Earl of Rosse's seventy-two inch Leviathan of Parsonstown at Birr Castle in Ireland.

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When I upgraded to a 12-inch catadioptric, the 3,048mm focal length resulted in high magnification and narrow fields with most eyepieces. It made it difficult to get both M81 and M82 galaxies fully in the field of view. However, a 41mm wide field was recently suggested by a member of Bangor's Penobscot Valley Star Gazers. The calculated actual FOV seemed interesting, and I acquired one at this year's NEAF. I was anxious to try it out, but the weather

on the coast of Maine has been less than conducive to observing this spring. So, even with a gibbous moon and clouds barely cooperating, I decided to drive to a star party in Cumberland, ME on Thursday evening with Southern Maine Astronomers for the Greeley Middle School. Besides, showing kids objects in the skies is one of my favorite activities in astronomy. With all of their electronic diversions, I keep hoping that some of them will remember being out under the stars and also become amateur astronomers.

I had briefly considered doing a sketch, but I knew that with the expected 40+ students and parents, I'd never have enough free time. Afterward, I had a long ride back home. Despite driving to this star party in the rain, a little after 9:00 PM, the skies parted and were completely clear of clouds. It was time to try centering the image in my new eyepiece. However, with a 74X, 0.86° FOV, I was pleased to find that I could nicely frame both M81 and M82 simultaneously. With an 86% illuminated moon, I wasn't expecting too much. However, with these objects located in the northern sky, looking away from the moon, they were surprisingly bright. I like to show these two because of the contrasting differences between the nearly flat-on spiral Bode's Galaxy and edge-on presentation of the elongated Cigar Galaxy.

That night, under the moon, and with occasional auto headlights, my eyes never fully adapted. Perceiving much detail in Bode's Galaxy was at best, difficult. However, I saw an apparent slight dimming at the midpoint of the Cigar Galaxy. Thankfully, the students' teachers must have properly prepared this Hubble generation as to what to realistically expect from telescope observations. They were happy to see a galaxy and there were even a few "Oh Wow's! That made my trip worthwhile. Several students mentioned how much brighter M82 was than M81. They were amused that I called these galaxies "nearby" at only about 12 million light-years away.

David Broderson: Observer from Nevada

Editor's Note: We'd like to introduce new Challenge member Dave Broderson.

I've always had an interest in astronomy. However, I avoided taking any classes because I can't seem to pull of memorizing the names of things.

One day, while camping with my Dad, I noticed a really bright "star." Dad had his binoculars with him, so I walked over to the outhouses so that I could lean against something and have a closer look at it. I could see the moons of this "star" and quickly realized it was Jupiter! What a revelation - I was seeing the moons of Jupiter with just binoculars. I had no idea that could be done without a telescope.

When I returned home, I searched the web for telescopes that might work for a person who knew nothing about the subject. To make a long story short, I discovered GOTO telescopes and soon realized there was a means for the astronomically inept to enjoy astronomy. I decided upon an 8-inch Schmidt-Cassegrain. When the telescope arrived, I was beyond excited and immediately took it to Mt. Charleston, believing the higher you go, the more "gooder" you see. As this very silly video will attest (https://youtu.be/4fGOizo1hmA), the maiden voyage for R2D2, so named because its shadow looks a bit like Star Wars R2D2, was a bust. This was about 8 years ago.

Early in my journey, I found out about LVAS and determined to join the club. During my first meeting, one of the members expressed surprise at my lack of knowledge about astronomy and convinced me that it would be best not to join because my foundation in astronomy was so low that I didn't have a prayer of entering a conversation with anyone. He was right, of course. I knew less than nothing about the subject. So, I struck out on my own

with the consolation that even though I didn't know anything about the subject, I could still enjoy looking at the stars.

Over the years, I found there were more interesting things out there than just planets. Orion's Nebula was a complete shock. The various star colors were amazing. It took a couple of years searching around before I found the Cats Eye nebula, largely because I was expecting something much larger and was still having trouble focusing the telescope. It wasn't until after I obtained the EQ mount that I read a blog post about the importance of turning the focusing knob CCW as the last effort.

I determined that I'd like to take some pictures and quickly discovered long exposures on my Alt-Az telescope were impractical. Later, I found out about stacking and was able to take my first good photos of Orion's Nebula and the Andromeda Galaxy. It was a shock to find that the galaxy was around the size of the moon. The stacked pictures were good, but I wanted to do better.

Better meant an EQ mount. So, I sold my Harley and used the money to purchase an 11-inch SCT with an equatorial mount and a few accessories. I'm slowly learning how to set up and operate this critter. My first attempt using this telescope as an astrograph was a complete failure. I didn't have the mount set up right in terms of polar alignment. So, I joined LVAS with the hopes that I could find someone who would help me out. It didn't pan out. At the time I was confusing RA with Declination, and my vocabulary was so short of the mark that once again, I couldn't keep a conversation with anyone with the potential of helping me out with the scope. So, it was YouTube videos. I soon realized that there were a lot of people with even less knowledge than I who were offering incorrect advice on setting up an EQ mount. My efforts of setting up the mount with a polar scope were dismal at best. Since I couldn't get the mount set up with a polar scope, I purchased a PoleMaster, and problem solved. Now, I could align the scope and start looking around which was much better than what I got with the 8-inch. I still have star drift in my pictures. However, as promised, it isn't nearly as bad as with Alt-Az. My most recent purchase has been a guide scope and camera. So, the next adventure is to figure out how to get that working.

I think one of the best decisions that I made was to join the LVAS Facebook group. Therein, I've had some good conversations and have been able to get some great help with my questions.

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Shot with a Nikon 7100 ISO 3200 100 image stack no darks or flats through an 11-inch OTA with a Hyperstar attachment. Forgot to flip the image.

Rob Lambert: Observer from Alabama

Two of my favorite objects to share with the public are M81, Bode's Galaxy and M82, the Cigar Galaxy. I especially like pulling down these two galaxies from the light polluted skies of a city like Las Vegas or Birmingham, Alabama. People are amazed that they are visible from a brightly lit city with my Mallincam. The photo below, however, was captured with my ED127mm (5-inch) refractor and my Canon T3i DSLR at prime focus from a darker site. Like I normally do, I tried to produce an image that closely approximates what one would see at the eyepiece. I think I got pretty close with this image of M81 and M82. It provides a view at almost 20X. The exposure was 30 seconds, unguided, resulting in the beginnings of star trails. This was my best image of the night. It's a single frame image with no post-processing of any type.

M81 is the face-on spiral on the left and M82 is the near edge-on spiral on the right. If you look closely, you can faintly see the two spiral arms of M81. It somewhat reminds me of Superman's letter "S". At 20X, there's no visible detail in the structure of M81 that you might see in longer exposure photographs, but then you wouldn't see that much structure at the eyepiece either. The core of M81 is exceptionally bright at this magnification. M82 does, indeed, look like a cigar, even a Cuban cigar with the dark band near its center. The dark band divides what appears to be an elongated core, creating two bright areas that dominate the center of the galaxy. A few years ago, I was able to observe the Type 1a supernova that appeared in the lower half. I remember being able to view and show the supernova to the public over a several month period. It was amazing how the supernova dominated and outshone the galaxy. I enjoyed sharing with the public how Type 1a supernovae were used to measure and verify the approximate distances to galaxies in which they occur.

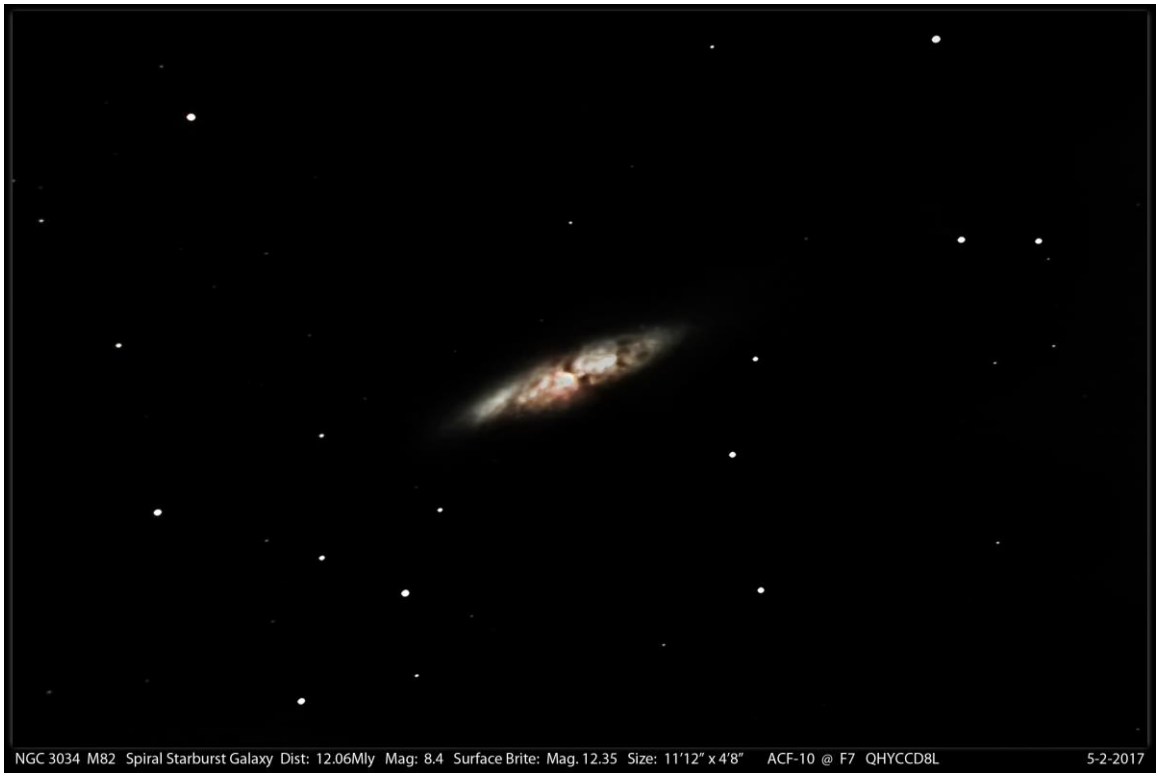
Gary Ahlers: Observer from Nevada

M81 and M82 are two galaxies in the constellation Ursa Major, part of the M81 group. They're quite close to the NCP and easily visible most of the year. M81, M82 and NGC-3077 are a trio of interacting galaxies about 12 million light years from Earth. Both are extremely bright objects and show the shape contrast between a face on spiral and an edge on spiral galaxy.

M81, also known as Bode's Galaxy, is a standard 2-armed spiral, 92,000 light-years in diameter, with very bright core containing a supermassive black hole. While the core is super bright, the arms are comparatively dim and are a bit challenging to image.

M82, or the Cigar Galaxy, is about 1/3 the size but much more uniform in brightness, presenting a very thick disk. In fact, the Cigar Galaxy was originally thought to be an irregular galaxy until the arms were discovered in 2005. I found it relatively easy to image, although the bipolar filaments (in infrared) still elude me.

NGC 3031, M81, Bodes Galaxy Spiral Type, 12 Million Ly Distant, Mag 6.9, Size 21x10 arcmin



Gus Johnson: Observer from Maryland

I've observed both M81 and M82 multiple times and with different instruments.

In April, 1967, I used an 8-inch reflector to observe M81 which also resolved double stars Struve 1386 and 1387.

In April 1975, the dust lane of M82 was visible using 12.5-inch reflector at 177X.

In April 1978, I saw no internal structure of M81 with a 12.5-inch reflector.

In May 1978, M81 and M82 looked beautiful together in a 3.5-inch f/11 reflector.

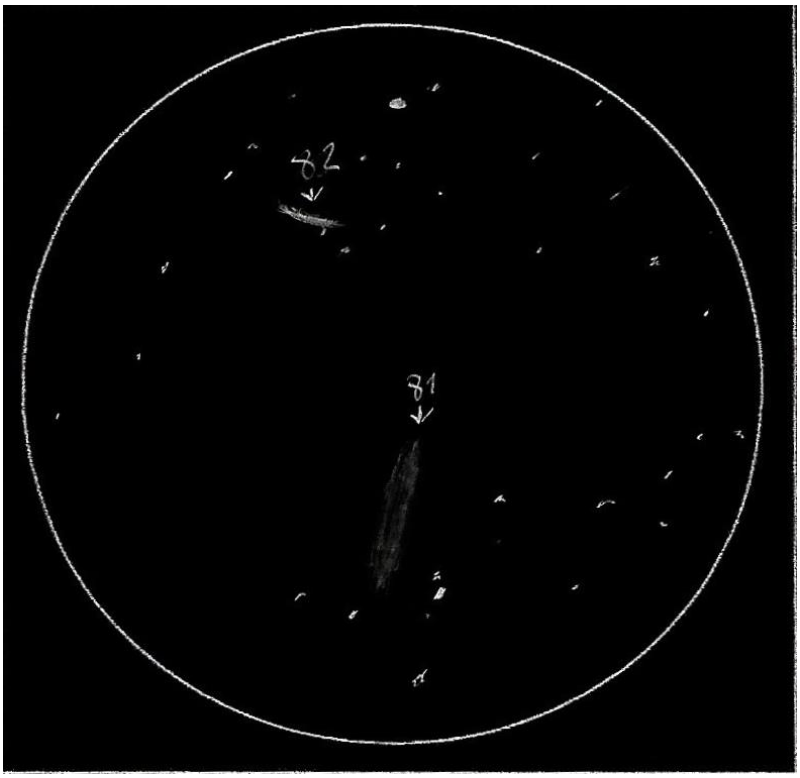
In May 1978, the dust lane of M81 was visible with a 12.5-inch reflector at 177X.

In January 1994, both galaxies were visible using a 7X30 Amici finder.

Francisco Silva: Observer from Nevada

I observed M81 & 82 on April 21, 2018 with a 4.5-inch f/7 reflector at 40X. The temp was 59°F, the humidity was 23% and there was no wind. The moon was a waxing crescent at 34%. Transparency was 4 out of 5 and seeing was 2 out of 5.

For me, it was neither easy nor difficult to find these galaxies in the night sky. I used the star Dubhe to draw a line to find them. The drawing speaks for itself.



John Lourdes Pierce: Observer from Nevada

In the dark skies found in the hills of Lake Mead, the galaxies M81 & M82 showed well. I was using a 10-inch scope with 90X magnification. This sketch was done in the field during the observation and later brought to life on my home computer.

Ed Fraini: Observer from Texas

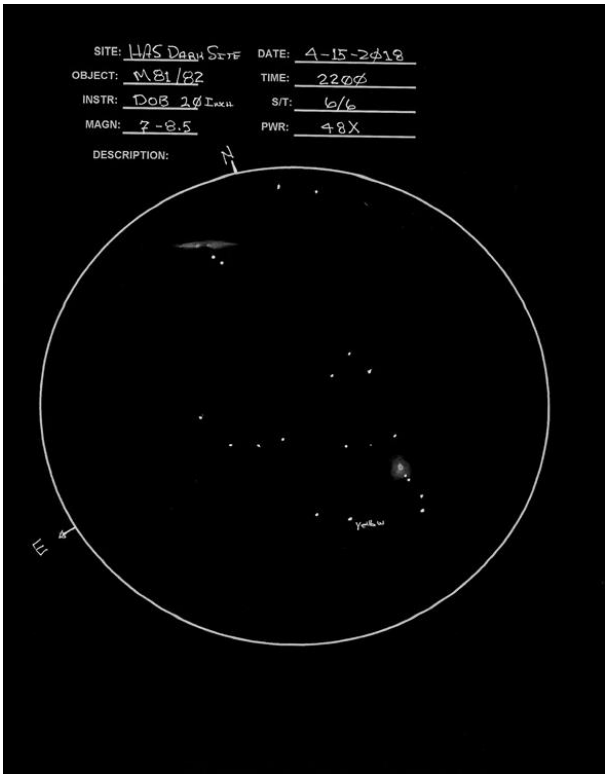
According to *Burnham's Celestial Handbook*, there are 113 galaxies within the constellation boundary of Ursa Major (**EDITOR'S NOTE**: Not sure what standard, or scope, Burnham went by, but there are significantly more than that, depending on the scope used). These objects have presented me with endless opportunities to hunt for faint fuzzy objects. There are over 30 objects that are magnitude 12.6 or brighter, and I have logged many of them on numerous summer evenings. None have drawn more attention than M81 and 82.

We had a robust front move through Southeast Texas on April 14th, giving us temperatures in the mid 40's and lower than average humidity.

On the evening of April 14th, I observed the month's targets from my home in suburban Houston between 21:00 and 22:00. I used 12-inches of aperture and located M82 first by positioning a single reflex finder in the appropriate area and doing a manual spiral search till I recognized the proper field. I started with a power of 37X, then 57X, and lastly with 115X. The sky would not support more power. Next, I pushed the scope to the north to locate M82. From this location, with a DSM reading 18.3 and a limiting mag. given as 4.7, both of the galaxies looked like classic fuzzy objects. Both seeing and transparency were good and I logged them as 6/5. I was unable to reach the DSM indicated limiting mag. Alioth, at mag. 3.3 was steady. With extended time at the eyepiece, no other stars popped in. The critical observation for this session was the very pronounced difference in the brightness of M81 (mag. 7) over M82 (mag. 8.5). The ability to quickly move from one to the other gives you a great perspective on how significant a delta of 1.5 mags. can be.

On April 15th, I changed locations to a dark site with a DSM measurement of 20.1. Temperatures were still low, and the winds had calmed, improving the seeing.

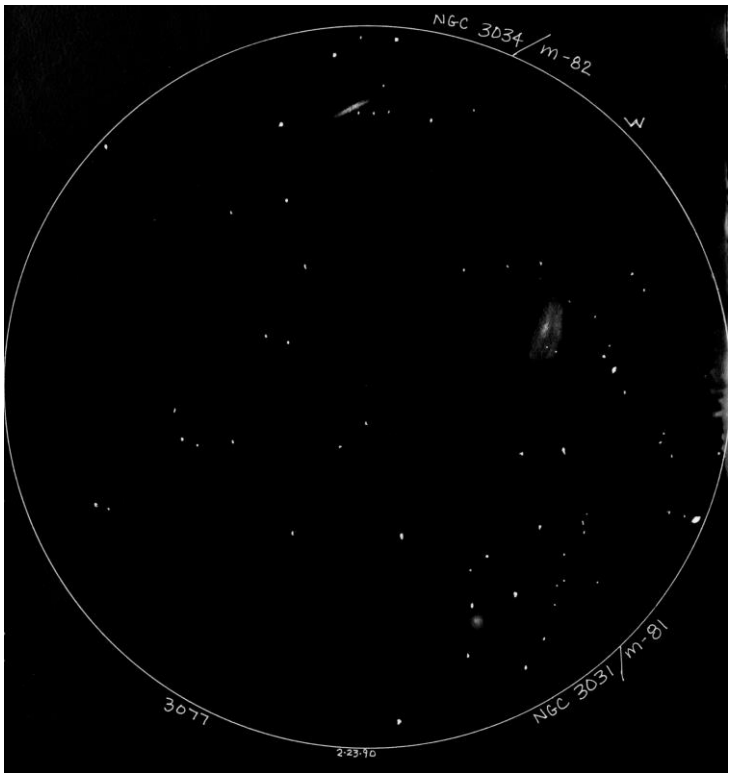
Observation of the target pair lasted for about 45 minutes at approximately the same period as the previous night. I used a 20-inch Dob, giving higher powers for the same three eyepieces - 48X, 74X, and 147X. At 48X, I could observe both M82 and M81 in the same field. Using the same eyepiece, you can also capture M81 and NGC-3077 (mag. 12.0) in the same eyepiece by moving the field of view slightly to the ESE. In this observing session, much more detail appeared, and I saw some star color. While observing at the eyepieces for an extended time, five to six minutes with each eyepiece, I never saw any hint of spiral arms in M81. The core was sharply brighter, and the overall shape was somewhat elongated along a north-south line, but not egg-shaped. Doing the same for M82, it looked to me like the NW edge of this edge-on galaxy was much sharper than the opposite side. Also, in M82 there was a significant notch on the SE side at the midpoint that contrasted well to what appeared to be brighter blobs on either side. It also seemed that the SW or lower half of M82 was brighter than the top half.



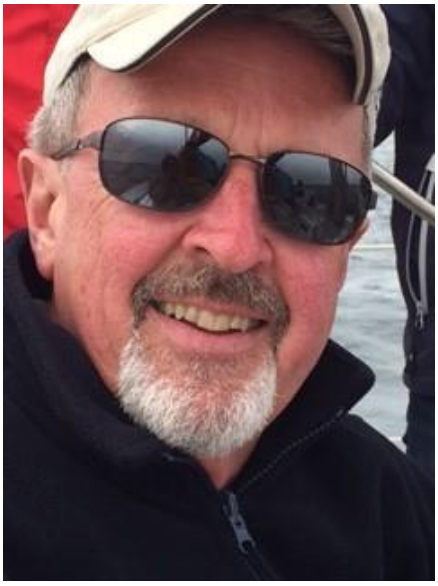
Kenneth Drake: Observer from Texas

My very first observation of M81 & M82 were with a pair of 10X50 binoculars on January 30, 1983 from the front porch of my house 3 miles east of Woodlands, Texas and about 35 miles north of Houston. I used an *Edmond Mag 6 Star Atlas* to hunt them down. M82 was a small, faint elongated smudge while M81 was larger and easier to see and slightly football-shaped, but still just a smudge. I was thrilled, since this was my first galaxy to see in the old binoculars. It was 10 PM and both galaxies were well placed to observe about 40° up.

Later, on February 23, 1990, I observed both in the same 1.7° FOV at 37X in my 10-inch f/5.6 Dobsonian. I was drawing the Herschel 400 to scale and wondered why Herschel did not include the brighter M81 in his catalog of 2,500 objects. My drawing includes the observed companion galaxy NGC-3077, a mag. 10 round fuzzy nearby, just 3/4° away from M81. All 3 can easily be seen in the same low power field. When using higher power to study M82, there was all sorts of detail that jumped out, including 2 bands that cut across its width east of center and clear amounts of mottling. I call it cigar shaped in position angle 60°, and about 8'X2' in size. M81 was much more oval about 15'X7'. At higher power, it showed mottling and granular stuff in the central 3' with a bright inner core.



John Bishop: Observer from Massachusetts



On April 21, 2018, I observed M81 and M82 from the ATMoB Clubhouse in Westford, Massachusetts. I used a 5-inch APO refractor at 35X, 58X, 139X, and 208X. I didn't use any filters.

The Moon was at one day before first quarter, setting at about 1:40 AM the following morning. This was not ideal for deep-sky observation by a small-bore observer. Bad weather this month has prevented viewing during the new moon cycle. This night, however, the sky was clear, and transparency was generally good. Seeing was fair to good. I observed doubles, brighter objects, and objects in the eastern and northern sky, away from the setting moon.

By this measure, M81/82 were fairly well situated. In fact, they were easy to locate using low power, when both objects fit nicely into the field of view.

The sight of these two distinctive galaxies, seeming to hang in space in the eyepiece, is a dramatic image which never fails to please.

At 35X and 58X, the two galaxies were fairly bright and obvious, although small. Even at low power, M81/82 obviously had different shapes and sizes. M81 appeared as a bright, concentrated sphere without halo or extensions from the nucleus. As I increased magnification to 139X and then 208X, I saw the suggestion of a halo outside the core when I used averted vision, but saw no detailed structure. I assume this was due to modest aperture and reduced contrast due to moonlight.

M82 started to show its unusual features even at low power, i.e., its unusual shape. It's uniformly thicker than a typical edge-on galaxy (presumably, the source of the "Cigar" nickname). As I increased magnification, I barely detected irregularities in the shape and in the

surface texture (uneven areas of light and dark), sometimes when using averted vision, at other times, when the image seemed momentarily to “snap” into focus. This suggested to me the “mottled” surface mentioned by others. I saw the principal dark lane crossing at an angle to the core, and another darkening (a second dark lane?) further along the bar, on the other side the core.

139X provided the most pleasing view of M82, with the best combination of size, brightness, and detail. 208X produced a slightly distorted image.

Truly an “irregular” galaxy.

Richard Nugent: Observer from Massachusetts

I first observed this pair on February 26, 1970. I commented that M82 was "…very thin and bright – absolutely beautiful! Sort of a slightly curved arc of light." For M81 I noted "…very round and bright with fainter arm extensions." These observations were made using my 8-inch f/7.6 reflector on a homemade equatorial mount. The mount was clock driven but had no setting circles. I most likely found the pair by (crude) star-hopping. I had a copy of *Norton's Star Atlas* and probably pointed the scope toward the galaxies' general location, then swept back and forth until I spotted them. Today, I live in the alt-az world and use more sophisticated star-hopping techniques.

I love star atlases and own more than I can count. Most are printed copies…my current favorite it *Interstellarum Deep Sky Atlas*. I appreciate the look and feel of the large format book, but I love its' depth. The stars plotted are as faint as I can see through my finder scope and the visibility of deep sky objects is indicated by the boldness of their labels. Although I keep a copy near the telescope, the atlas I'm most likely to use during observing is *Project Pluto's Guide v9.0*. This digital atlas goes very deep but also gives detailed info for just about everything it shows. When I'm star-hopping I set the program's aperture circle to my finder's true field of view and always ask for one critical piece of info about the stars I'm using – their spectral class.

Using a telescope to amp up the photons reaching your eye, your retina's color-sensing cone cells are triggered and you can sometimes see a star's true color. M-stars are deep orange, K's are a pale orange, G's are yellow while F-types are a pale yellowish-white. A-stars are white and B- and O-stars are bluish white. If you know the color of the stars you are hopping to and from, you'll have an added tool to help you know if you're looking at the right star.

To get to M81/82, I use this path: I begin at the mag. 3.6 star 23 Uma, then move nearly 5° northwest to a small isosceles triangle of mag. 5 stars. These are Rho Uma (M0), Sigma-1

UMa (K5), and Sigma-2 UMa (F8). A quick look through the telescope should confirm the expected colors. Then, a line through the sigma stars 3.5° north leads me to the mag. 4.6 star 24 UMa (G5) and mag. 5.7 SAO14966 (K0). I'm now about a degree away from M81 (it's just to the east) and I should be able to see it in my finder scope. Both galaxies should be visible in your telescope's low power field of view. Ta-da♪♪. Remember. Star-hopping may sound complicated, but it's not!

From my (now) mag. 5.1 skies (the snow has all melted), I was able to see M81 using a pair of 10X50 binoculars. Since I had the aperture mask for my recent Polaris B observations, I decided to check out these galaxies. The mask provides four, unobstructed 90, 80, 70, and 60mm apertures that I can select by rotating a cardboard faceplate. Of course, the galaxies appeared brighter at the larger apertures, but the view using the 60mm opening was quite pleasing. The galaxies were easily visible although I could see no detail in M82. With the mask off, I could see some mottling in M82. Stepping up to the 20-inch, the galaxies were amazing. M81 showed its bright central region surrounded by a faint haze of light – the spiral arms. I saw no sign of spiral structure. M82 showed a wealth of detail with its irregular dust lanes. Both galaxies were very bright and held magnification well. If your skies are dark enough, look 1° south of M81 for the mag. 10.1 galaxy, NGC-3077. I couldn't see it with my 10-inch scope, but it was easy in the 20-inch.

Although no one needs a special reason to observe these extraordinary galaxies, I'm reminded of mag. 11 SN2014J that was visible in M82 during mid-January of 2014. Seeing a star that had met its end some 12 million years ago made me ponder the vastness of the universe and our humble existence in it.

Joseph Rothchild: Observer from Massachusetts

M81 and M82 are two of my favorite objects. I recall viewing them with binoculars in suburban skies nearly 50 years ago. 30 years ago a view of M82 through someone else's 10-inch Dob at the ATMoB clubhouse convinced me to upgrade to a 10-inch scope, which I still use.

I observed M81/M82 on April 11, 2018 on Cape Cod through dark skies with fair transparency with a 10-inch reflector. At 42X, both were visible in the same field, which is always my preferred view. At 81X, I could see a suggestion of the dust lane in M82. M81 showed the central core with a faint haze of the spiral arms. The outer structure was more visible with averted vision. I saw no spiral arms.

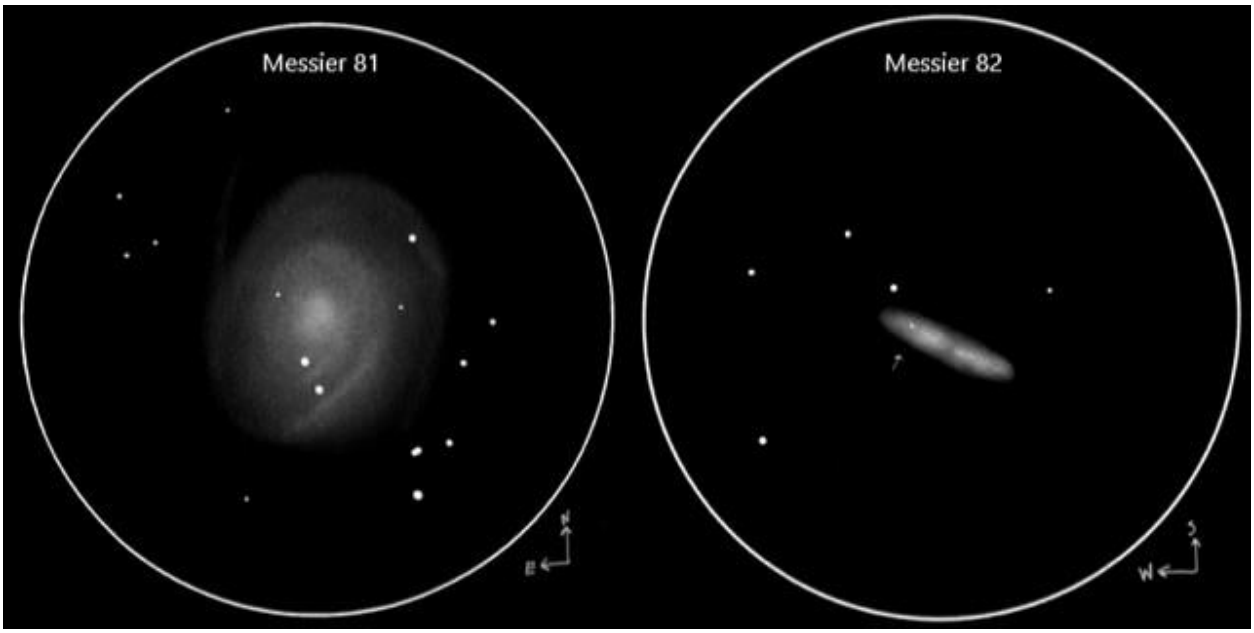
Jaakko Saloranta: Observer from Finland

I have seen both M81 and M82 with several instruments ranging from naked eye to a 25-inch Obsession. Here are a few more memorable observations:

Under pristine skies at the Nordic Optical Telescope, La Palma, Spain (7,840 ft), M81 was visible 35% of the time without optical aid and with optimal averted vision. It was non-stellar, barely elliptical. Naked eye limiting mag. ~7.5. M82 was easily visible with any optical instrument.

Using a 4.7-inch reflector, M81 appeared as a fairly large, pretty bright galaxy with a non-stellar nucleus surrounded by a NW-SE elongated halo. The spiral structure was very difficult to spot but obvious signs of it were visible when I used averted vision. There were several stars involved within the halo of the galaxy.

Messier 82 was a smaller, NE-SW elongated cigar shape, roughly 6’ X 2’ in size. I used a slightly smaller instrument (4.5-inches) and observed it under suburban skies. An obvious dark lane sliced the galaxy midsection in half, which I saw with high magnification, and the SW section of the galaxy appeared somewhat mottled. The sketch also shows the supernova 2014J.


Messier 81
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Mike McCabe: Observer from Massachusetts

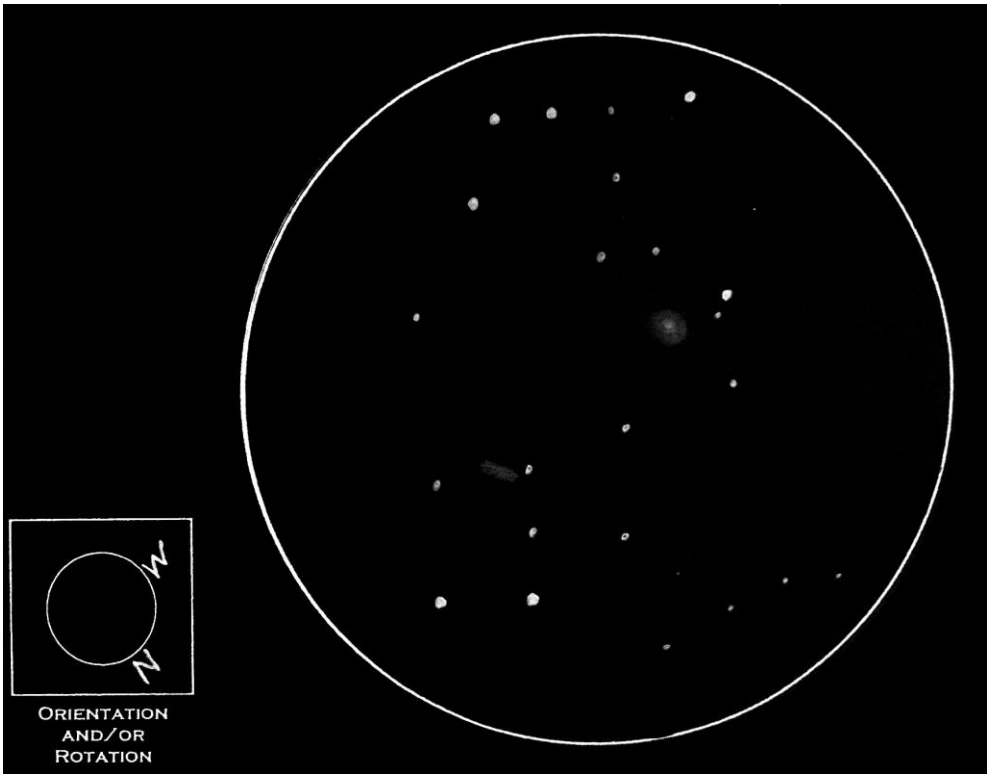
With the LVAS Observer's Challenge for April 2018 being iconic galaxies M81 and M82, I had high designs for my report sketch. Having looked at this duo countless times over the years, I planned to have a good sit-down with a quality optical instrument and painstakingly capture as much detail as my limited art talent could muster. It would be one of my best ever, maybe the best ever drawing I've ever made of an astronomical object. April, however, had other ideas in mind.

Maybe you haven't noticed, but up here in the good ole' northeast of the United States, we've been stuck in a weather pattern that hasn't been very conducive to astronomical observing. Even normal people have become so winter-weary that they've been identifying days not by their conventional month/day format, but by the number of days into the year. Using this format, I finally made my observation for this report on what we're now referring to the 106th day of January.

Regardless of the challenges brought forth by the weather, we did get a break or two here and there to get a peek at the sky, and one of those breaks came on April 16, 2018 – the night of the new moon. For reasons that meteorologists don't even understand, all of a sudden, the cloud cover broke and we were presented with a crystal clear sky. I swiftly deployed my little SV80ED (3.1-inch) scope to have a look around. I was just touring around a bit when it dawned on me that I should probably take advantage of this hole in the ceiling to get my challenge sketch made. It actually worked out better than I expected.

The little refractor has always put up good images, but 80mm isn't exactly a ton of horsepower when it comes to deep sky stuff. Regardless, the transparency was good and the image was better than I expected. No, I wasn't seeing spiral arms in M81 or dust lanes in M82,

but the image was very pleasing and I enjoyed getting the sketch. This is one fine deep-sky duo, and they're always a pleasure to observe.



Craig Sandler: Observer from Massachusetts

I observed M81/82 using an 8-inch SCT at 100X from Petersham, MA on March 16, 2018. The seeing was good, transparency fair to good and NELM 6.

I had quite the excellent time drawing these sketches. That's because it was getting so cold, yet it was so still and clear, I had to take advantage, not knowing if I'd be back out in April! So, to speed things up, I did these without looking at the paper. I just held the clipboard and recorded what I saw by feel. I cannot, for the life of me, tell you why the stars around M82 are so much less distinct than those around M 81. That's just how my hand interpreted them. I CAN tell you this was a delightful exercise – yet one satisfying quirky experience out under the stars.

Chris Elledge: Observer from Massachusetts

M81/82 were surprisingly easy to see, even with bad light pollution. I do wish I had a chance to see them from the clubhouse without clouds in the way. Perhaps I'll revisit them this month if I get the chance.

On April 18, 2018 @9:30 PM, EDT, I used a 10-inch f/5 reflector to observe them from my house in Arlington, MA. Sky conditions were Bortle Scale 8: NELM 4.0: Transparency good: Seeing fair.

Between the poor weather and some complications, I was unable to observe at the clubhouse with clear skies. I did manage to observe M81 & M82 through high clouds earlier in the month from the ATMoB clubhouse, but my observations from my light polluted, but cloud-free driveway were slightly better.

I had surprisingly good luck finding them by placing my red dot finder to form a right triangle with Dubhe and 23 Ursae Majoris. M81 was easily visible in the 1.9° FOV of my eyepiece.

At 35X (35mm, 1.9° FOV), both galaxies fit easily in the view. M81 looked mostly round, with a hint of elongation in the NW/SE direction. M82 was a much more dramatic oval, with the elongation in the E/W direction. It showed up as a distinct cigar shape. M81's central core appeared like a pinpoint star right in the middle. There were two mag. 9 stars in a line to the S (SAO 15017/8 which is actually a double star and HD 85458). There was another line of mag. 9 stars to the SE, but spaced further apart (HD 85743 and ODE4). There was a faint mag. 11 star within the oval of M81 just to the SSE of the core (TYC 4383-0565-1). M82 has a bright mag. 9 star just to the SW of its core (BD +70 587) and another mag. 10 star just to the SW of

that one (TYC 4383-1099-1). The cigar shape points to a faint mag. 13 star (GSC 4383-0971), just to its E.

At 51X (25mm, 1.4° FOV), both galaxies still easily fit in the field. M81 now had two faint stars visible just to the S of the core and within the oval of the galaxy (TYC 4383-0565-1 and a fainter companion I don't know the designation of). The elongation of M81 still appeared NW/SE. There was no hint of spiral structure visible in this level of light pollution. Its central core still appeared stellar. M82 also retained its striking elongated shape. There were some very faint mag. 13 stars just to the core's WNW. M82's center core didn't have the stellar appearance of the M81's core.

At 127X (10mm, 0.6° FOV), the galaxies no longer fit in the same view. For M81, only the core of the galaxy was visible, but the very center of the core was very bright. It retained its stellar appearance even at this magnification. M82's central core seemed slightly offset to the eastern side of the galaxy.

At 270X (4.7mm, 0.3° FOV), I noticed that what I thought was a mag. 9 star to the S of M81 was actually a double star (SAO 15017/8) with two mag. 10 components separated by 9". At this magnification, the central core of M81 no longer looked stellar, having become more diffuse. What I could see of M81 at this amount of light pollution filled up most of the view at this magnification. The direction of elongation was more difficult to detect, but it still seemed slightly longer in the NNE to SSW direction. M82, on the other hand, made a very easy to see cigar shape that stretched across most of the view from the E to the W. I needed averted vision to see most of it. Looking directly at parts other than the core caused them to fade into the background.

Dr. James Dire: Observer From Hawaii

M81 and M82 are a superb set of galaxies in Ursa Major. The contrast between the two, and the fact that they can both be seen in the eyepiece simultaneously make the pair very popular for optical astronomers.

M81 is a large spiral galaxy of classification Sb. It shines at mag. 6.9 and is 27X14 arcminutes in size. The galaxy has tightly wound spiral arms and a small bright core. Johann Elert Bode discovered it on December 31, 1774. Consequently, it's sometimes referred to as "Bode's Galaxy." In 1779, Pierre Méchain rediscovered M81, which was subsequently listed in the Messier Catalogue.

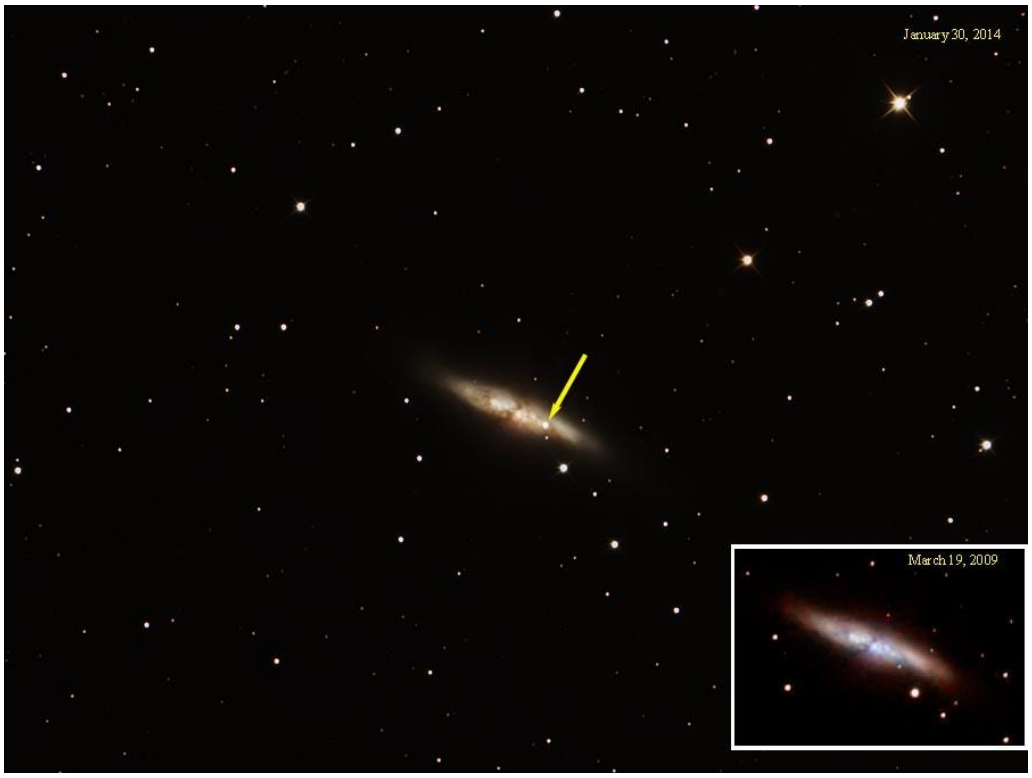
M82 is an edge-on spiral galaxy that is classified in older literature as an irregular galaxy. It shines at mag. 8.4 and is 11.2X4.3 arcminutes in size. Bode discovered M82 on the same night as M81 (how could he not?). Méchain also rediscovered it at the same time as M81 and reported them both to his mentor Messier. M82 is sometimes called the starburst galaxy due to the massive star formation activity occurring there.

Both M81 and M82 are located approximately 12 million light years away. They're members of a galaxy group containing a few dozen galaxies, with M81 the largest. The M81 group is a neighbor galaxy group to our Milky Way's Local Group. Both groups are members of the Virgo Supercluster.

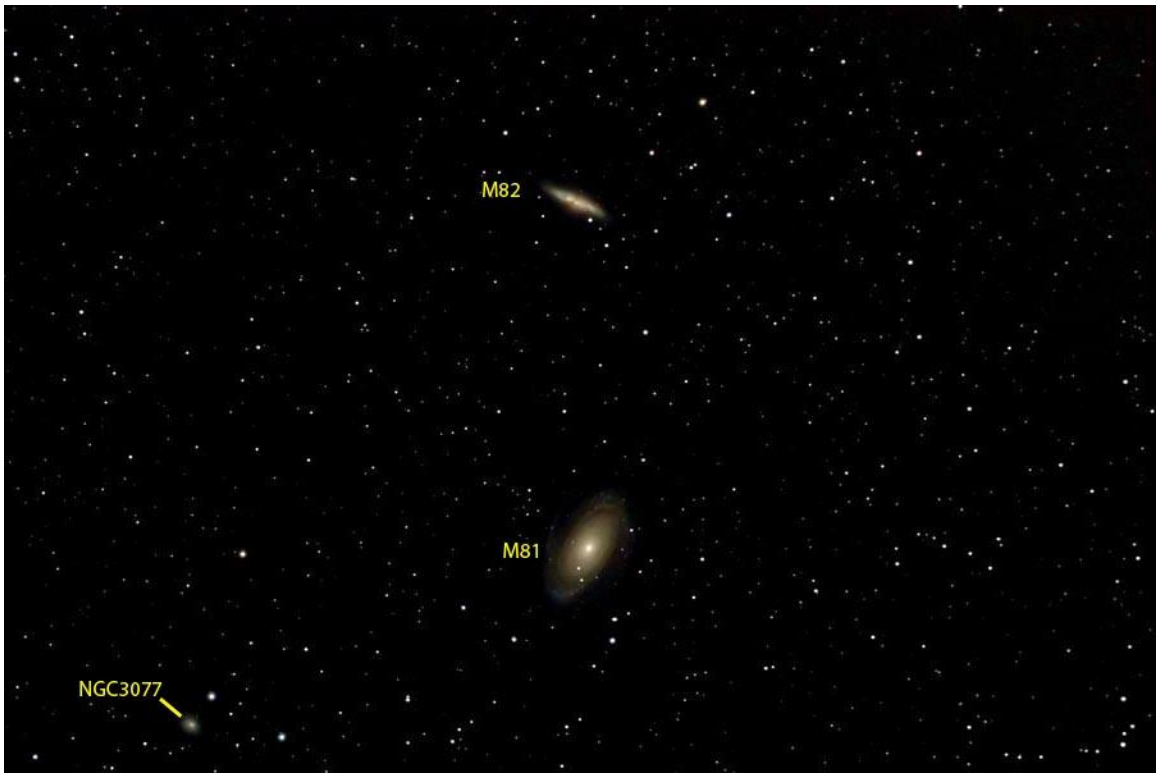
I have viewed M81 and M82 in every sized telescope from 70mm (2.75-inches) to 20-inches. They're great objects for any sized telescope. The detail visible increases with aperture.

I’m submitting three photos for this article. The shot of M81 was taken with a 10-inch f/6 Newtonian with a coma corrector, yielding a 1,753mm focal length. It was taken with an SBIG ST-2000XCM CCD camera and the exposure was 110 minutes.

The second photo is of M82. The arrow shows a supernova I captured in 2014. Because of the massive star formation occurring in M82, supernovae are common. The image was taken with a 10-inch f/4 Newtonian with a coma corrector, yielding a 1,168 mm focal length. It also was taken with an SBIG ST-2000XCM CCD camera and the exposure was 70 minutes.



The final image is a wide field shot of M81, M82 and companion galaxy NGC-3077. NGC-3077 is a mag. 10 spiral galaxy measuring 5.2X4.7 arcminutes in size. This image was taken with a SV102 102mm (4-inch) apochromatic refractor at f/6.3 (using a 0.8X focal reducer/field flattener). It was shot with a Canon 30D camera and the exposure was 60 minutes.


M82
M81
NGC3077

Jay and Liz Thompson: LVAS members and observers from Nevada

We observed M81 and M82 with a 24-inch f/4 Newtonian telescope from the dark skies of Meadview, AZ.

At 152X, we saw some darker areas in M81, delineating the spiral arms and structure near the core. At 277X, we saw lot of detail in M82 near the center.

At 519X, the dust lanes near the center of M82 were more evident. With averted vision we could see several of them, although some of the darker ones were visible with direct vision. There were brighter areas on each side of the dark lanes near the middle of the galaxy. The seeing was kind of marginal for this much magnification.

Mario Motta: Observer from Massachusetts

Done with a 32-inch reflector.

M81 is a mosaic of 2 fields as it exceeded my field of view on my 32-inch scope. With my SBIG STL 1001E camera, I get 17X17 arc minutes on my 32-inch F/6 homemade relay telescope.

My FL is 4,800mm. Each field was about 60 minutes luminance, and about 30 minutes each in RBG, for total imaging of about 4-5 hours.

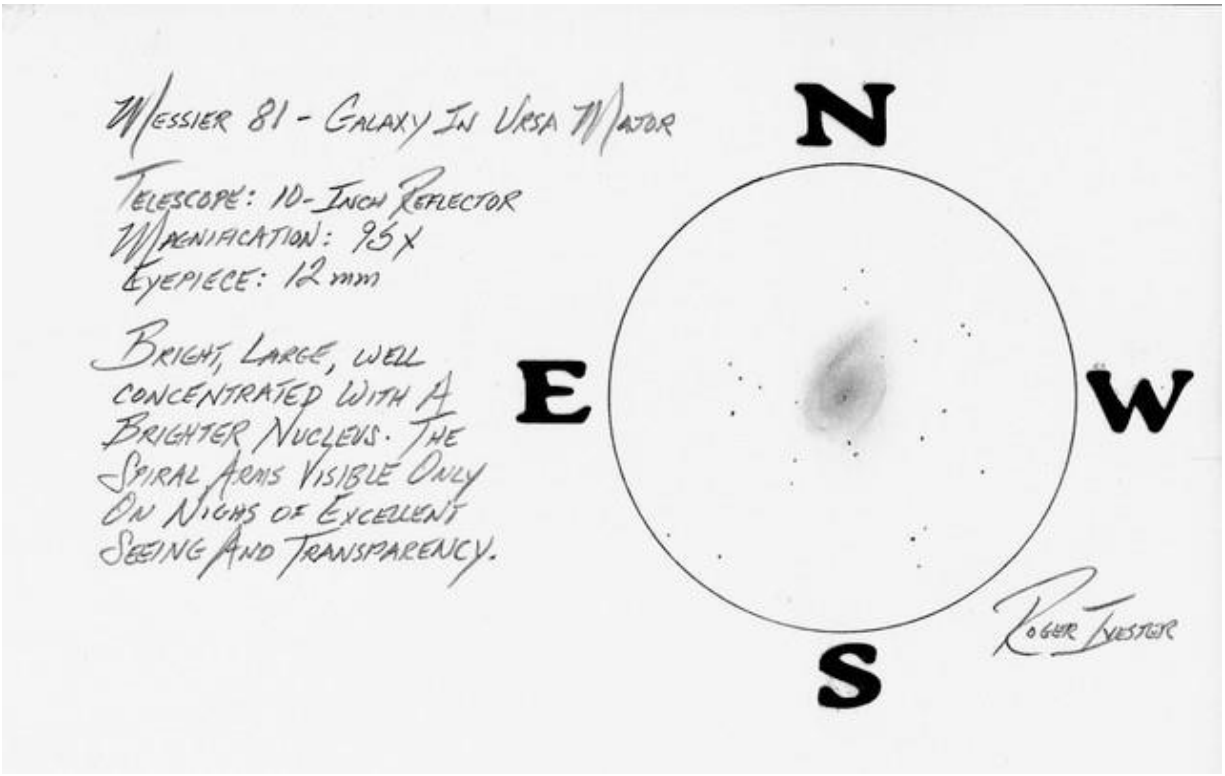
M82 single filed, similar specs, 1 hour luminance, 30 min each RGB, but augmented by H-alpha for the red.

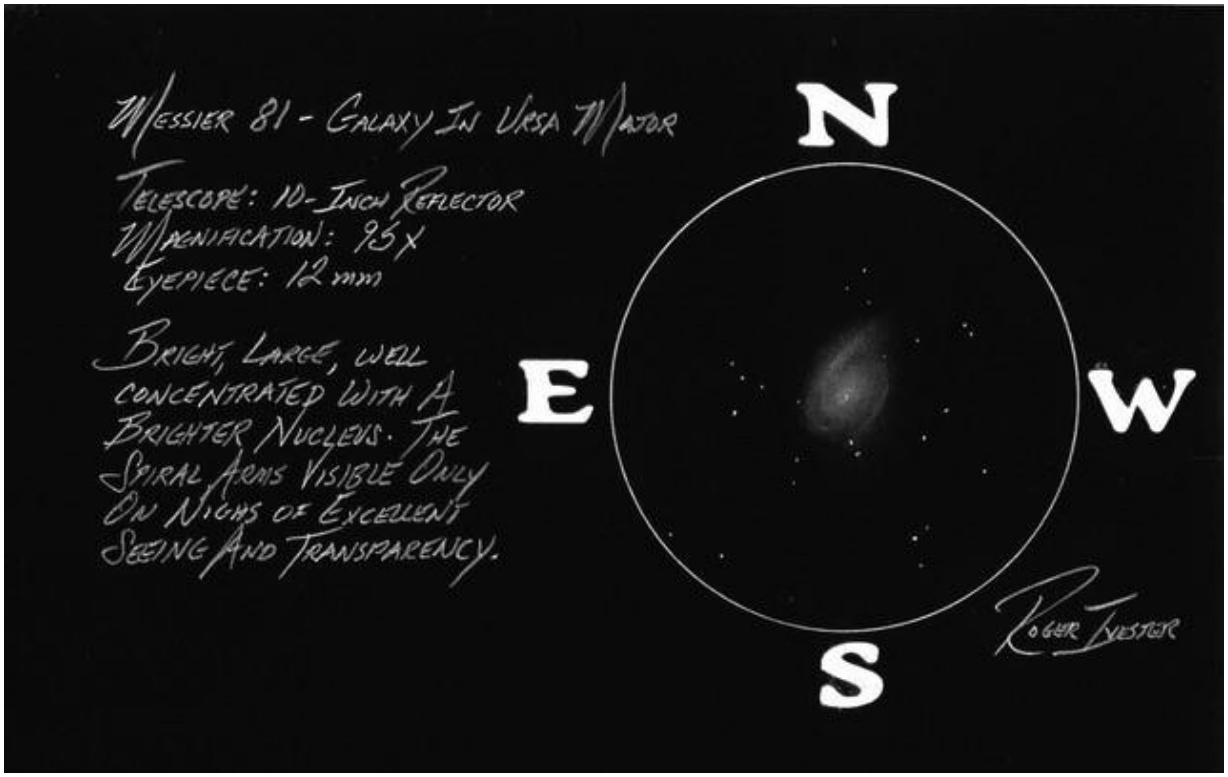
Roger Ivester: LVAS Observer from North Carolina

I observed M81 with a 10-inch f/4.5 reflector from my backyard in the foothills of North Carolina using a 12mm EP with an FOV of 0.68º - 41 arc minutes and a magnification of 95X.

I also did an earlier observation using an 80mm (3.1-inch) refractor at 33X. M81 was large, bright, mostly round with a brighter nucleus, and was nicely framed with companion galaxy M82.

With the 10-inch reflector at 95X, M81 was bright, large, well concentrated and elongated, but subtle, NE-SW. It had a very bright nucleus, almost stellar. Only on nights of excellent seeing and transparency can I see the spiral arms from my moderately light polluted backyard.

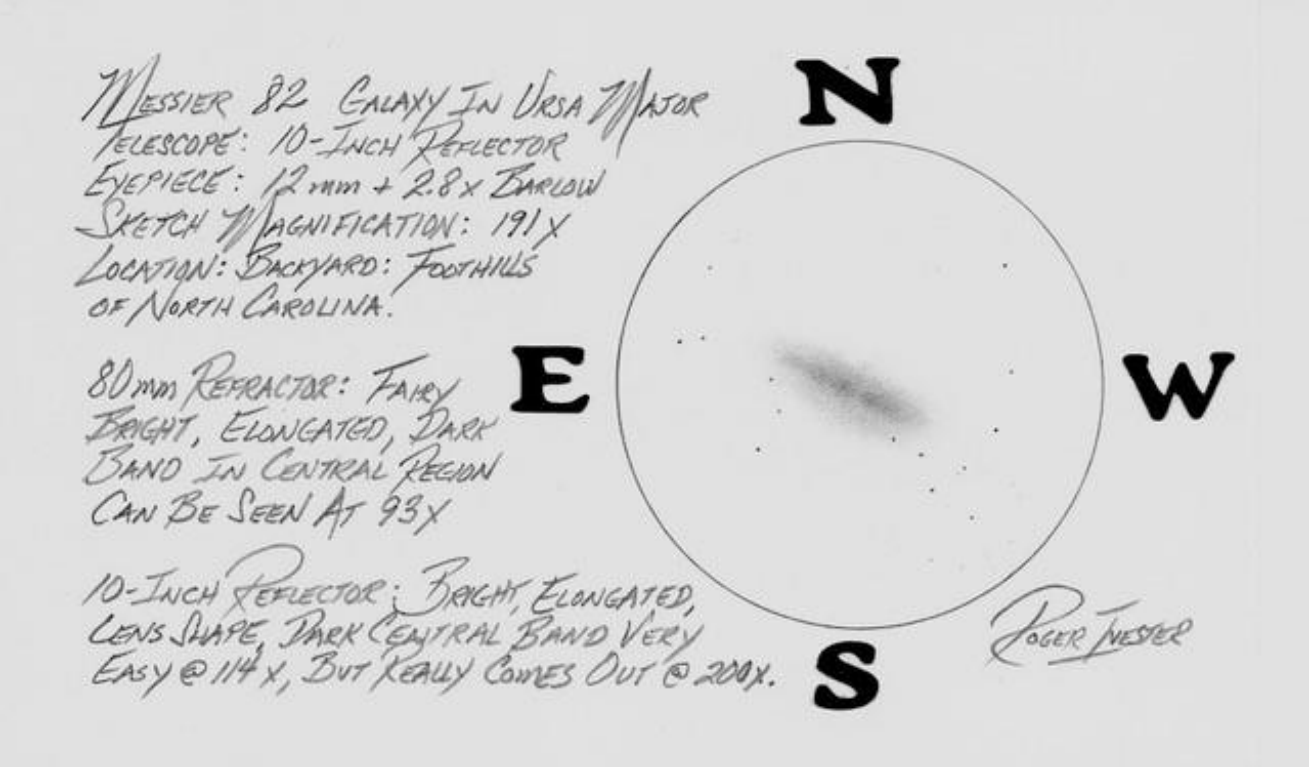


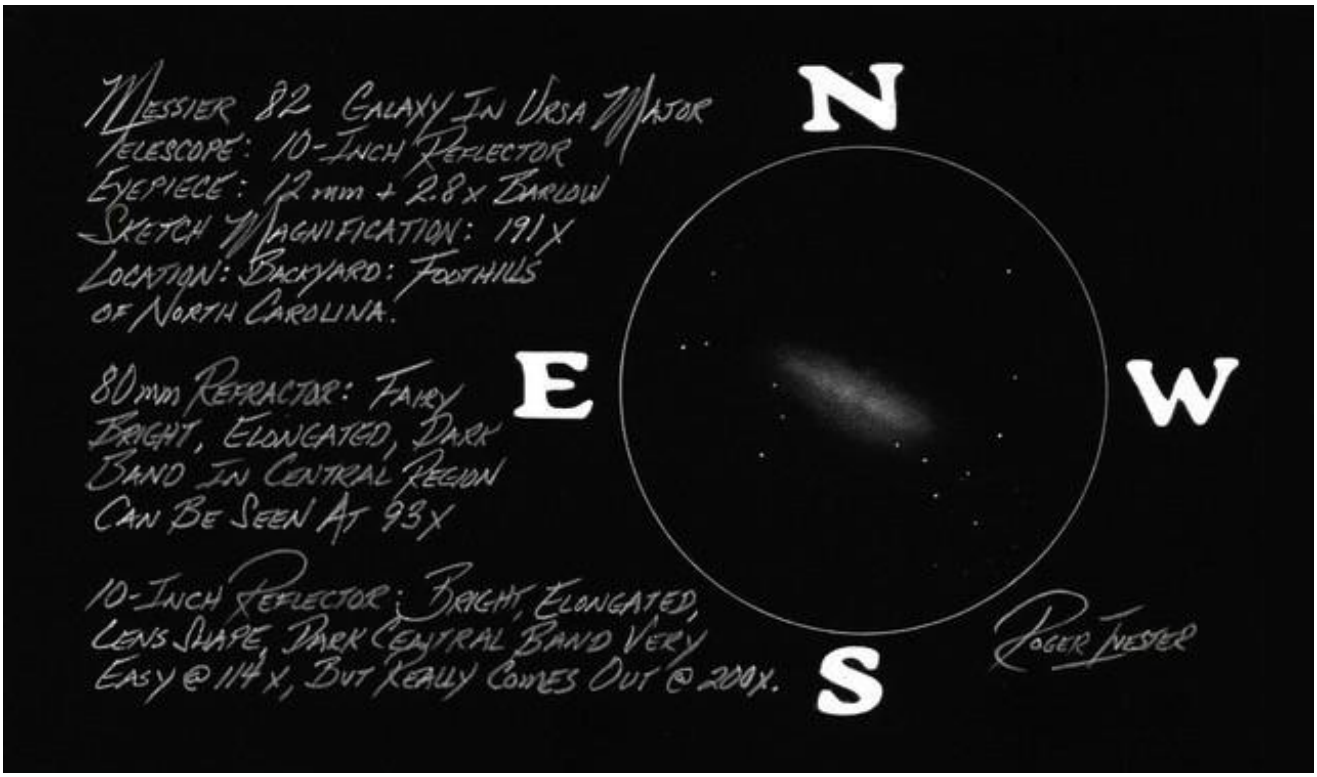


I observed M82 with a 10-inch f/4.5 reflector from my backyard in the foothills of North Carolina using a 12mm EP + 2.8X Barlow with an FOV of 0.34º - 2-0 arc minutes and a magnification of 191X.

I also did an earlier observation with an 80mm (3.1-inch) f/5 refractor. It was surprisingly bright, elongated, with a lens shape and smooth texture at low magnification. When increasing the magnification to 75X, the galaxy became very uneven and mottled, with two brighter knots toward the middle, and an outer elongated halo. This galaxy was much fainter than its' companion, M81.

With the 10-inch reflector, it was bright, very elongated, and with a dark band in the central region that almost separated the galaxy, and was very easy at 114X. However, it really came out at 200X. At the higher magnification, it became very mottled, and with a faint surrounding halo extending the length of the galaxy. The NE and SW edges or tips of the halo were smooth.





Supplemental: Notes from April 1978.

It wasn't until the mid-70's when I acquired my very own telescope, a 4 1/4-inch reflector, which was not my first choice, but the best my budget would allow.

I'll never forget one special night using this telescope. I was attempting to locate M81 and M82, two of the most beautiful galaxies in the heavens. By this time, the fabulous skies of my early years were gone. I'd moved to an area packed with houses and street lights, and the light pollution was very severe in my backyard.

Attempting to find even the brightest deep-sky objects under these conditions proved to be difficult. I had tried on many occasions to find M81 and M82, without success.

One night, while observing, time was running out. It was already after 11:00 PM, and I needed to get up early the next morning. I used my hands in an attempt to block the ambient light from entering my eyepiece, and then it happened – a small, faint fuzzy object entered my telescope view. I then nudged the scope slightly and then another – finally both M81 and M82. What a beautiful sight! I savored the view for the longest time and to this day, I can still feel that excitement.

Fred Rayworth: LVAS AL Coordinator and Observer from Nevada

I've recorded M81 thirteen times in my database and M82 sixteen times. I'm not sure why the discrepancy with two galaxies that are virtually in the same field with most modern wide-field eyepieces except to say that back in the day, when I was using a narrow-field EP, well…there you go. It was luck of the draw with my home-built 8-inch f/9.44 reflector back in 1983, not long after I first started taking serious observational notes in Eurovillas, Spain.

I can say that not only have my observing skills, but description notes evolved. Also, I have observed these two galaxy gems many more times than I recorded them. Out of laziness, especially at many outreach events, I neglected to take any notes at all.

For the April Challenge, I observed it on February 17, 2018, 'jussincase' I wasn't able to get out again before April. It turns out I *was* able to get out again April 14th, but I was so wrapped up tracking down Herschel objects in the Virgo area that I totally zoned out everything else, including the Challenge objects. Lucky for me, I had that February observation.

I went to my usual "undisclosed location" on the North Shore Road at Lake Mead at an altitude of 2,100 feet. It was clear, cool, and calm and pretty much stayed that way except right around 22:00, when gusty breezes picked up a bit. They weren't consistent, but enough to knock everything around for a moment, then die off for a few minutes, then pick up again. Seeing was nothing to write home about, but the transparency was pretty good. There was a band of clouds to the SSE, but they never crept up into view above the ridge to the south. I only knew they were there because I saw them on the way to the site. It got immediately cold as soon as the sun went down, but never enough to put my hat on (which also covers my ears). When I left, the truck thermometer said 50°.

M81 was a nice oval glow, kind of flattened compared to the usual images, at least in this particular observation. Decent sized and extended, touching several nearby stars. Just a hint of spiral arms flaking off the edges, but just wisps. There was a solid and dense core, but not stellar. 208X emphasized the arms a bit more and gave more depth to the separation where they break off from the main body.

M82 was an elongated and flattened oval. It was bright and stood out against the background. It was also dense and mottled. 208X brought out the mottling more, which kind of crisscrossed along the streak. It was sure nice!

UGC-5336 was an extremely faint glow near M-081. Looked face-on. It was super hard to see, but I caught it with averted vision. It was next to a faint star.

NOTE: I forgot to add in a couple of the stars near and within M81 – either that or they're blended in with the halo. I can't remember now. Also M82 was a bit smaller than what shows in the drawing.