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, Alabama

MAY 2018

NGC-4236 Galaxy In Draco

"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.

NGC-4236 Galaxy In Draco

NGC-4236, also known as Caldwell 3 was discovered by William Herschel on April 6, 1793 and given the designation H-051-5. It's a barred spiral galaxy that lies approximately 11.7 million light-years away and is part of the M81/82 galaxy group. It is highly inclined toward us so it appears narrow making the bar not so obvious. It also has a very low surface brightness (around 15.1) making its' listed mag. variations of 9.6 to 10.1 highly deceptive.

It puts the challenge in The Challenge!

Observations/Drawings/Photos

Gary Ahlers: Observer from Nevada

NGC-4236 is a barred spiral galaxy in the Constellation Draco, member of the M81 galaxy group.

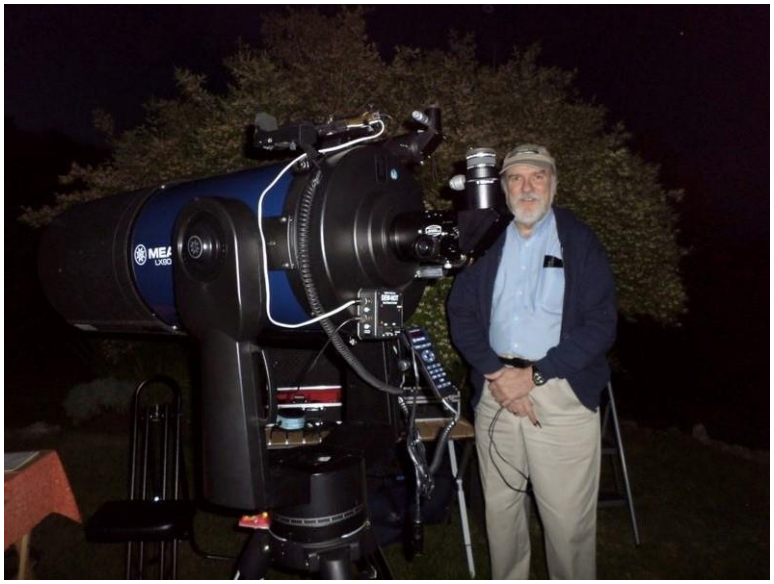
It presents a steeply inclined disk with a bright, oblong core and poorly defined arms. This is a perfect example of disparity between visual mag. (Vm) and surface brightness (Sb) and the confusion it causes.

It has a Vm of 10, so the core will show easily, but as a star, possibly elongated. To show as a galaxy, though, it must be imaged according to the surface brightness of mag. 16. This image was taken with 10-inch SCT @ F/7 QHYCCD8L camera, 10 frames @ 30 min. exposure. It needs more data, but I simply ran out of time.

David Brodersen: Observer from Nevada

NGC-4236 taken with an 11-inch SCT.

Dwight Lanpher: Observer from Maine

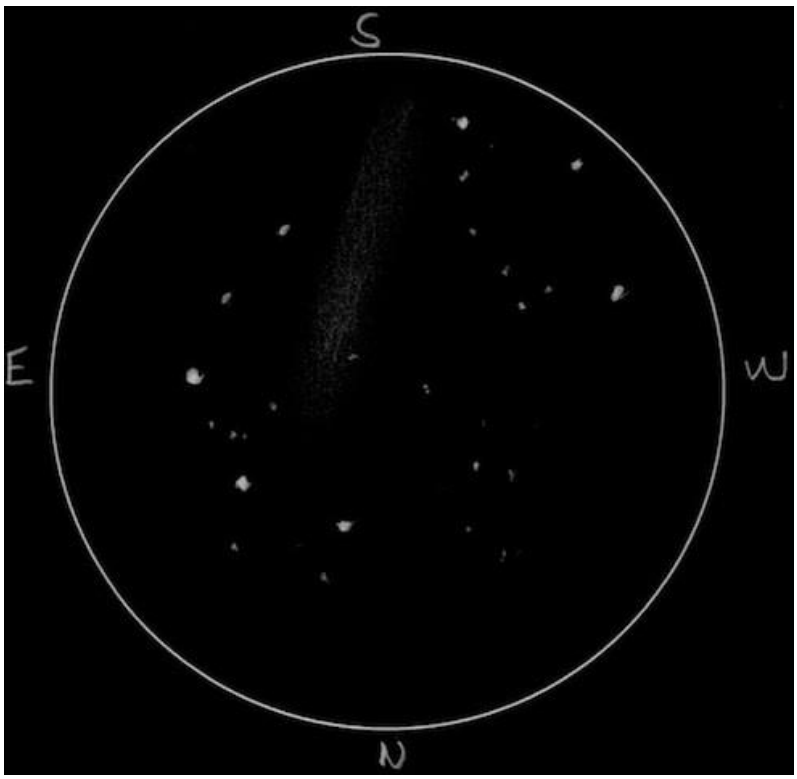


I started the evening with a number of familiar Messier objects for the group attending Central Maine Astronomical Society's June 9, 2018 star party. The seeing and transparency were very good, 4/5 or better, with Jupiter fairly stable and cloud bands easily visible. The temperature started at a balmy 65° and no dew formed on my scope all evening. I finally had a chance to turn to the challenge object, NGC-4236 in Draco around 10:20, when I thought it looked dark enough. However, this was probably a little too early. Nautical twilight was 9:45, and astronomical twilight was at 10:45 at this site. Fortunately, the skies were dark in Whitefield, ME. The Brower Observatory site has trees to the northwest that obscure the small light dome from Augusta, and Gardiner 14 miles to the west. I had measured an SQM reading of 21.40, including the Milky Way in July of 2016 (never got around to checking last night).

I used my 12-inch f/10 ACF SCT and started with a 31mm eyepiece yielding a 0.79° FOV at 98X. I stared at the field for many minutes, thinking that I was seeing something, but not entirely convinced. At first, it seemed to encompass a larger area as my eyes wouldn't allow me to define an edge. It seemed just barely brighter than the background. A novice friend looked, and she saw nothing. I tried O-III and Hydrogen-Beta filters that I had in my kit and, as expected, they didn't help. Then, as it continued to get darker, a longer object started to emerge and become better defined. CMAS president Jon Silverman looked, and he, too saw the image that I was describing. I switched to a 41mm with a true field of view of 0.86° at 74X to see if I could get a little brighter image. It helped. At that point, I attempted the following sketch. A word of advice...remember to bring a pencil sharpener with you! I had to hack a point on my broken pencil with a Swiss army knife. The stars might have been a little less ragged if I'd had an actual point on my pencil.

The image is erect but mirrored left and right (diagonal on an SCT-style scope).

Personally, I doubt that I'd have been able to see this galaxy with a smaller telescope. For me, this was a tenuous object. I remember earlier days observing the Helix with an 8-inch and only convinced myself that I could see the object by tapping the scope and seeing if the image moved with the telescope. This object definitely fell into that class. I ended the night with a peek at Saturn that was finally up and, despite being low in the sky, cloud bands and the Cassini division were clearly visible. Finally satisfied, I had to start packing up at eleven because I had a two and a quarter hour drive home to Acadia.



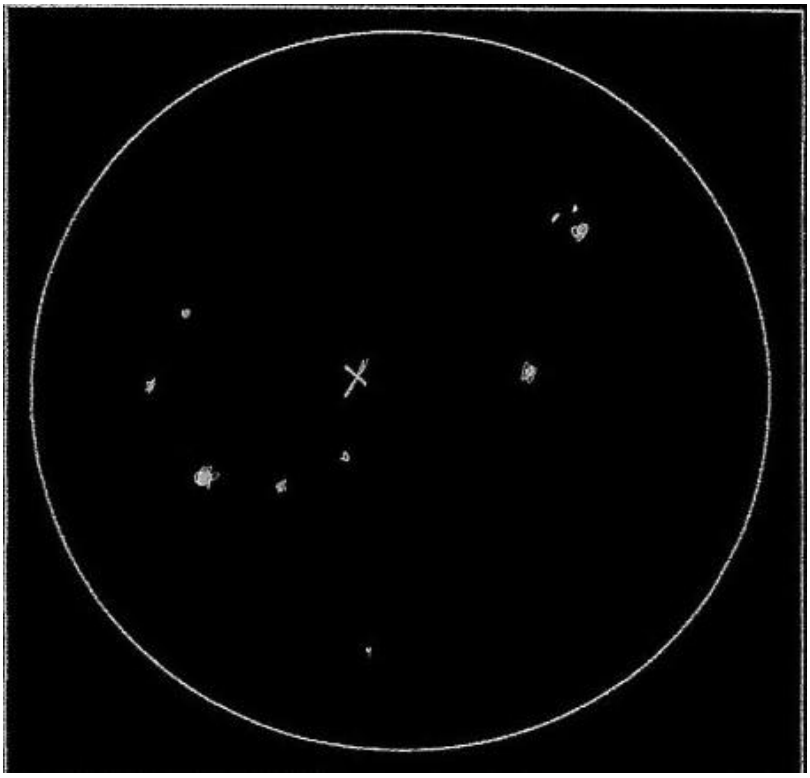
Gus Johnson: Observer from Maryland

Located near the unaided eye triple star, Kappa, 4 and 6 Draco, I failed to locate NGC-4236 using a 6-inch Newtonian at 59X. In *Deep-Sky* Magazine, Dennis Casper wrote that a very clear sky is needed, and with a slight haze, he found it almost invisible in a 13-inch.

Francisco Silva: Observer from Nevada

On May 25, 2018, I attempted to observe NGC-4236 using my 10-inch reflector at 66.7X. Transparency was 4 out of 5, seeing was 2 out of 5 and there was no moon. However, I was in the Las Vegas Valley, which wasn't the darkest spot to observe from.

The galaxy should be in the X that I drew on the map. I tried from two different places without success. I'll admit that in both cases, I was in the south of Las Vegas, which doesn't facilitate the situation. It didn't show up even as a blurry cloud. This one is staying on my list of pending objects to see in the future!

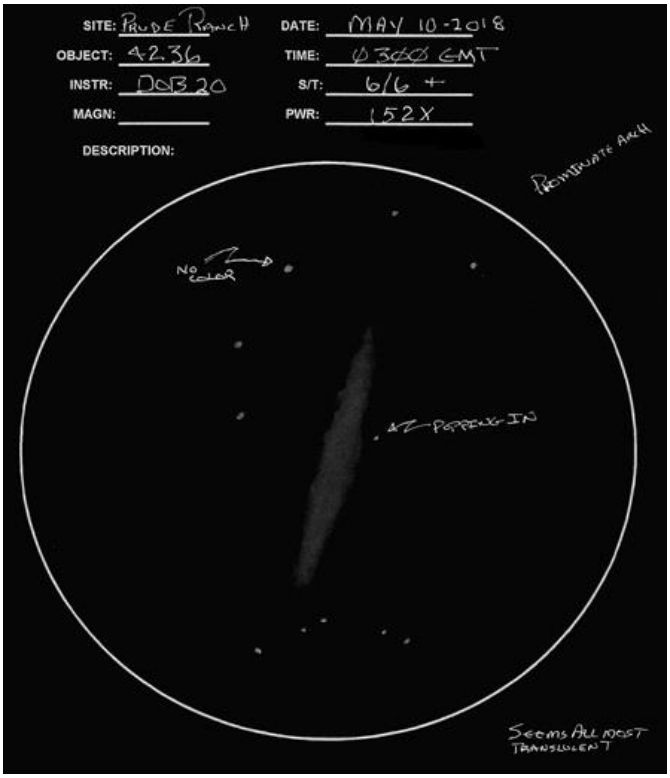


Ed Fraini: Observer from Texas

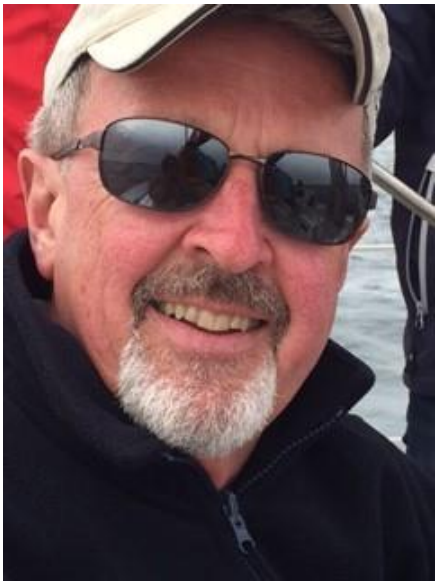
A group of observers at the Texas State Star party all observed NGC-4236 at the same time on May 10, 2018 between 22:00 and 24:00, just after it had passed the meridian. The scopes ranged from small refractors up to my 20-inch Dob. All the scopes with an aperture of 11-inches or higher were able to locate the galaxy with moderate power. I logged seeing and transparency as 6/6 at a minimum, and mag. six stars in the bowl of the big dipper were visible with naked eye observation.

With the big Dob, using the 50X power of a 40mm eyepiece, the field of view captured the overarch of stars to the north and a unique line asterism running SE to NW below the object. Immediately, an extended contrast shape was apparent. As I continued to look through the eyepiece, the galaxy began to look more and more like an edge-on galaxy. As the sides became more defined but still soft, the long thin shape revealed itself as homogeneous. The low surface brightness made it seem translucent.

After switching to a 13mm EP, bumping up the power to 152X, I could see slight concentrations of brightness. The top or north side was definitely brighter than the bottom half. This effect was small, and did not look like a galaxy core at all. Even at this power, the edges were still very soft. The most brilliant star in the field, (SAO15756) in the arch, reportedly is a yellow star, but I noted no color.


SITE: PRUDE RANCH
DATE: MAY 10-2018
OBJECT: 4236
TIME: 0360 GMT
INSTR: DOB20
S/T: 6/6 +
MAGN:
PWR: 152X
DESCRIPTION:
PROMINENT ARCH
NO COLOR
AZ POINTING IN
SEEMS ALL MOST TRANSLUCENT

John Bishop: Observer from Massachusetts



The following constitutes an unconventional report concerning NGC-4236.

After spending a total of some 3.5 hours on May 5 and June 2, 2018 at the ATMoB Clubhouse in Westford, MA, staring into an eyepiece, I regret to report that I could not see NGC-4236 through my 8.25-inch reflector. I thought at a few points that I detected a slight haziness that might be the subject, but I believe this was the result of wishful thinking, enhanced by the power of suggestion. I cannot report that I observed this object in my scope.

I did not realize when I set out to view the galaxy how dim it was! On May 8, in decent conditions, our top observer had some difficulty locating it with an 18-inch Dob. On June 2, in fair conditions, others observed it in a 25-inch Dob, but sometimes only with averted vision!

I only observed it briefly through the 18-inch on May 8. It was as advertised: Faint and elongated. I thought the nebulosity had a transparent quality to it.

I'm not complaining. That's what the word "challenge" means.

Richard Nugent: Observer from Massachusetts

Well, this was a tough one! The visual mag. is usually give around 9.7, but this is obviously not the entire story. If you look up the absolute mag. of this galaxy, you'll find it to be around ~18. That means if it were a point source located a mere 10 parsecs (32.6 light years) from Earth, it would appear about 250 times brighter than the full moon! However, NGC-4236 is neither a point source nor is it that close. This galaxy is a member of the M81 group and lies 11.7 million light years away. It's also large — its diameter is about 75,000 light years — so it has a large angular size on the sky. These two factors cause its surface brightness to be around mag. 15. That's why it is a very difficult object if you're observing under urban or light-polluted suburban skies.

I have the observing planner *Eye & Telescope v3.0*, which allows you to input your telescope and eyepieces as well as your NELM. As I've mentioned in previous reports, my skies typically run at 4.8 with exceptional nights at 5.1. Under these conditions, the program predicts NGC-4236 will be invisible using any of my telescope/eyepiece combinations. Indeed, using my 10-inch reflector, the galaxy wasn't visible. The "tilted bowl of stars" was there, as was the mag. 9.8 star, BD +70 692, but no galaxy. Unfortunately, due to weather, the moon, and life, I was unable to use the 20-inch. I was able to see the galaxy through the ATMoB's 25-inch, f/3.5 reflector under a sky with a NELM of 5.5 using a 17mm eyepiece (131X, 0.76° true FOV, 4.9mm exit pupil). I could see a very faint, elongated glow extending from BD +70 692 into the "tilted bowl of stars." I couldn't see any structure. The telescope was very busy because we were approaching moonrise, so we spent only a short time on this object. More time might've revealed some structure.

Some online references suggest the galaxy is visible in a 3-inch scope. How could this be? Dark skies. Just because it took a 25-inch scope for me detect this object, don't think a large

scope is an absolute necessity! Get to the darkest skies you can and you'll likely see this object through much smaller telescopes. For more on this, check out the *RASC's Observer's Handbook* (USA edition, pages 54-57).

Remember...*keep observing*. Push the limits of you and your telescope. Don't give up. Have fun!

Joseph Rothchild: Observer from Massachusetts

I observed NGC-4236 for the first time on May 11, 2018 under dark skies on Cape Cod with a 10-inch reflector. The galaxy initially required averted vision and required confirmation using *Sky Safari*. It's located just southward of a five-star asterism in the shape of a miniature teapot. The galaxy appeared as a faint smudge. However, with careful and patient observing, I was able to see the galaxy with direct vision, best at 88X. I couldn't see any structure, but the galaxy definitely had a (fat) cigar shape.

Mike McCabe: Observer from Massachusetts

The LVAS Observer's Challenge object for the month of May, 2018 was galaxy NCG-4236 in Draco. For now, I have to say that this is the one that got away. My first attempt to resolve this one came on the evening of May 8, and apparently, I wasn't the only one that got out that night. The very next day, a string of emails landed in my inbox, all touting the apparent difficulty of this particular object. My response went like this:

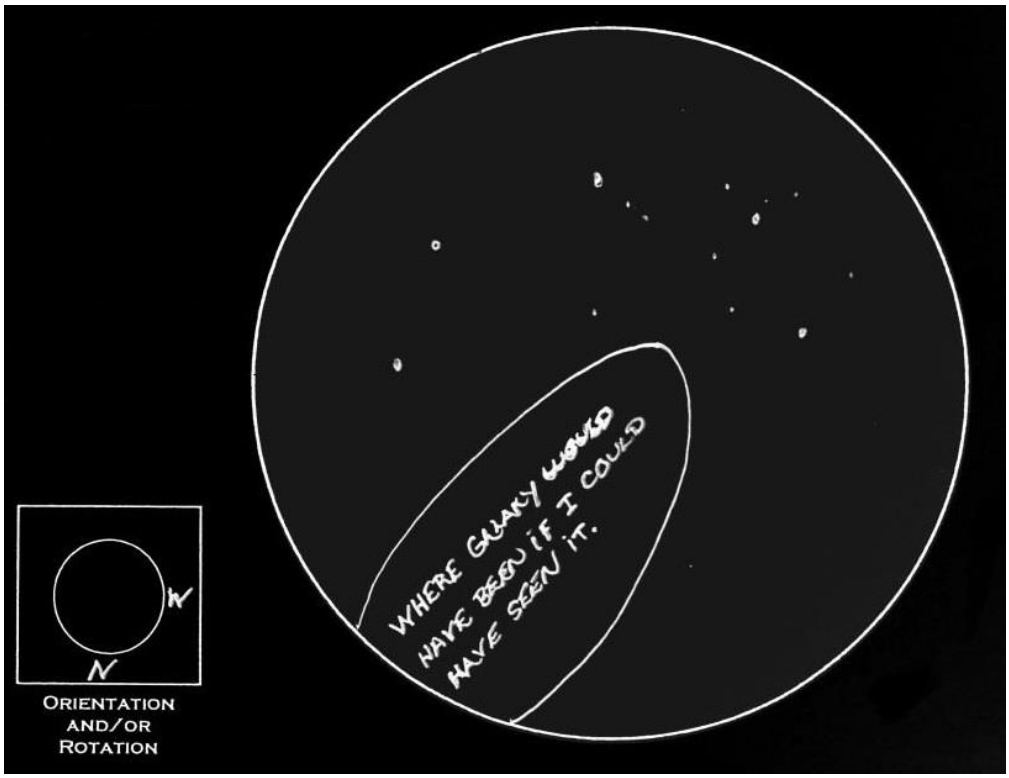
"Well, I'm glad to hear that I'm not the only one enduring no success with this difficult galaxy. I stared at the area for 90 minutes last night with my 12.5" Newt with no success. Like Roger, I had poor conditions to deal with – seeing 1/5, transparency 1 or 2 of 5, depending on how the high clouds came by. I did draw the bowl of stars, though, and now know to only go there with low power, so hopefully we'll get a clear night around the new moon to tackle this again."

I have to agree with the others – "A big challenge this one is!"

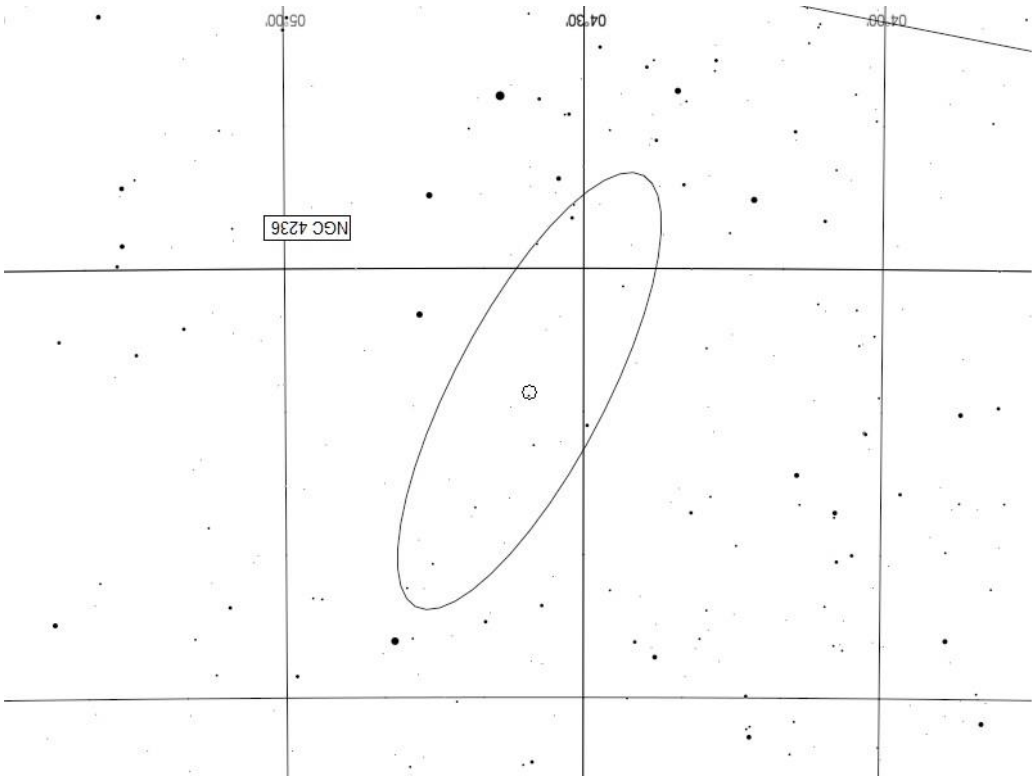
First off, I have to admit that I was making some mistakes in my first attempt to observe it. On paper, it didn't appear to be exceedingly difficult. Sure, it was a galaxy listed at mag. 10.5, with a low surface brightness, but we've all dealt with that before, and somehow found success. The part that flummoxed me this time was just how low the surface brightness really was, how large in apparent dimensions it really was, and what would be required to view such an object. Thus I made what could be seen as a rookie mistake when I applied more magnification in an attempt to view something that I already knew was dim, when what really needed to happen was to apply *less* magnification to get some sky around the diffuseness for any hope of seeing anything.

Thus I ended my first attempt with absolutely zero success in seeing anything except the star field in the area. I also got to go back twice more during the month, on both May 14 and May 31, both times with different instruments and applying a low power/wide field approach to boost my chances of glimpsing the faint fuzziness. Neither of those attempts bore any fruit either. I just didn't have the sky to pull it off.

This observation log shows just how far off I was in true field of view on my first attempt to see this object. I went in with the "it's dim, use more power" philosophy which admittedly made poor use of what was probably my best chance all month to see the object.



Having experienced no success whatsoever that first night, I checked in with *Cartes Du Ciel* the next morning to be sure I was looking exactly where I should've been. There was no doubt about it. I had accurately recorded the infamous "bowl of stars" on the night before, but this CDC screenshot of the region clearly shows how much more field I needed to be using in order to separate the galaxy from the background sky. The orientation is south-up, just as it's seen through a Newtonian.



I hope that sometime in the future I can experience the pleasure of having conquered the challenge of seeing NGC-4236 in the eyepiece. For now, this is the one that got away. That, my friends, is why it's called a challenge!

Dr. James Dire: Observer From Hawaii

NGC-4236 is a faint, nearly edge-on barred spiral galaxy in the constellation Draco. The constellation is often overlooked due to its low surface brightness. The galaxy is relatively large in our sky, spanning 24X6.8 arcminutes. Its integrated mag. is 9.63. It's located 11.7 million light-years away and is part of the M81 galaxy group. It rivals M81 in size. However, M81 is 3 mags. brighter!

The galaxy is located "above" the open cup of the Big Dipper asterism. Its distance above the cup is approximately the same as the distance between the two stars forming the top of the cup – Dubhe and Megrez. It lies just over a degree west of a linear trio of stars: 4, 5 and 6 Draconis. Both 4 and 6 are mag. 5 and are orange and yellow, respectively, while 5 is mag. 4 and blue in color.

Despite its brightness and location near naked-eye stars, NGC-4236 can be very difficult to find, even with a GOTO mount. Therefore, I created a wide-field image of the galaxy to aid in locating it (Image 1). Image 1 was taken with a 70mm f/6 apochromatic refractor using a 0.8X focal reducer/field flattener. The exposure was a whopping 3 hours. In the image, north is up and east to the left.

In the image, the bright blue star on the left edge is 5 Draconis. The orange star is 4 Draconis. Those two stars are separated by 40 arcminutes. The smudge just above the center is NGC-4236. The exposure captured about half the actual length of the galaxy, essentially the galaxy's central bar and the inner, brighter spiral arms.

To help identify the galaxy in the eyepiece, note the arc of three stars on the northeast side of the galaxy. The top star is mag. 8.3, while the lower two are mag. 10.5. There's also a mag. 9.8 star on the south end of the galaxy's major axis. Seeing these four stars in the eyepiece allows one to center the galaxy in the eyepiece and then use averted vision to see it.

I viewed NGC-4236 this month in three telescopes. The first was a 190mm f/5.3 Maksutov-Newtonian reflector using a 14mm eyepiece (71.4X). I centered the galaxy using the four stars around it, as described above. I could not see it with direct vision. However, with averted vision I was barely able to make out the elongated shape of the very diffuse galaxy.

I next viewed the galaxy using a 12-inch, f/4.9 Dob using a 20mm eyepiece (75X). The galaxy was just as difficult to see in this scope as the Mak-Newt. This was probably because the Dob's optics are nowhere as good as the Mak-Newt. Plus, I later discover that the primary mirror on this astronomy club telescope was extremely dirty (I have since professionally cleaned it and re-collimated it).

Finally, I viewed NGC-4236 with a friend's 14-inch, f/4.6 Dob with clean optics and a good collimation. Through this telescope, I could see the galaxy directly. I could see about the same detail as in Image 1!

My second image (Image 2), was taken with an 8-inch f/8 Ritchey–Chrétien reflector with a 0.8X focal reducer/field flattener. The exposure was 5 hours! As in Image 1, north is up and east to the left. The galaxy should extend from the top to the bottom of this image. Despite

5 hours of exposure, my image only captures half of the extent of the galaxy. The central bar shows up quite well, as well as the spiral arms coming off the ends of the bar. However, this exposure didn't capture the outer regions of the galaxy. The spiral arms on the south side of the bar appear notably brighter than on the north side. Several other tiny galaxies were captured in the image. Most are mag. 17-18. Unlike the fainter stars, they're not round, but slightly elongated smudges.

Jay and Liz Thompson: LVAS members and observers from Nevada

We observed NGC-4236 from Lake Mead Recreational Area with a 17-inch reflector. 227X was too much magnification, with the galaxy taking up more than the 84° apparent field of view (AFOV), 125X was better, and showed the galaxy as an elongated faint streak. Better still was the view from Meadview, AZ with a 100° AFOV, 21mm eyepiece giving 95X in the 17-inch. With the same eyepiece giving 116X in the 24-inch from Meadview, it appeared as a large, faint streak that took up over half the field of view. It showed up well but was not as impressive as some of the brighter edge-on M-objects.

Most recently, we viewed it with a 16-inch f/10 SCT from Meadview. At 102X, it took up almost all the field of view. It was very low contrast, and we could see some brighter areas, especially near the center when we used averted vision. At 156X, we saw a little more detail

around the central core and a little to one side. It appeared definitely asymmetric. We could see some structure in the brighter parts at 203X, with some faint foreground stars becoming more evident, but the galaxy less so. The best overall views were at 102X and 156X.

Mario Motta: Observer from Massachusetts

Not the best night, taken through some high haze, and it was faint!

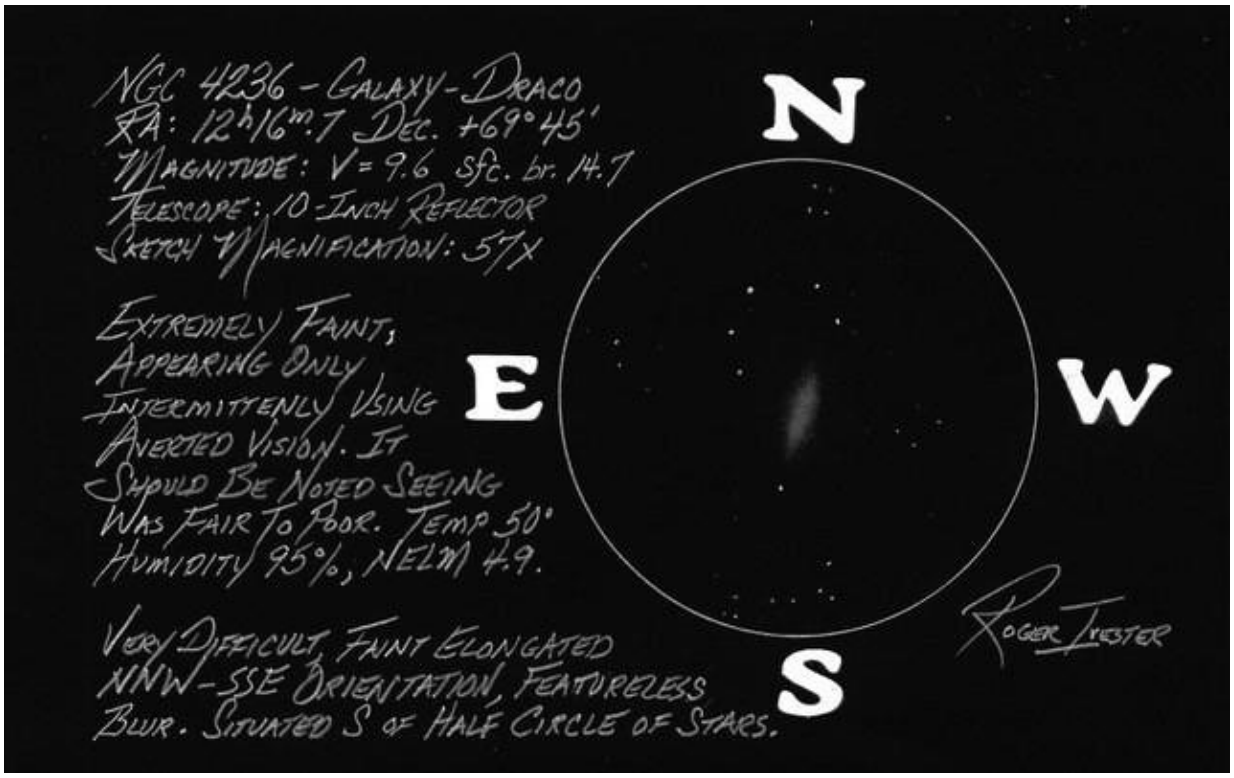
NGC-4236, taken with 32-inch, SBIG STL 1001E camera, 10 min subs, total 90 minutes, (had to delete some subs due to haze and clouds). This object was bigger than my field of view, which is 17X17 arc-minutes.

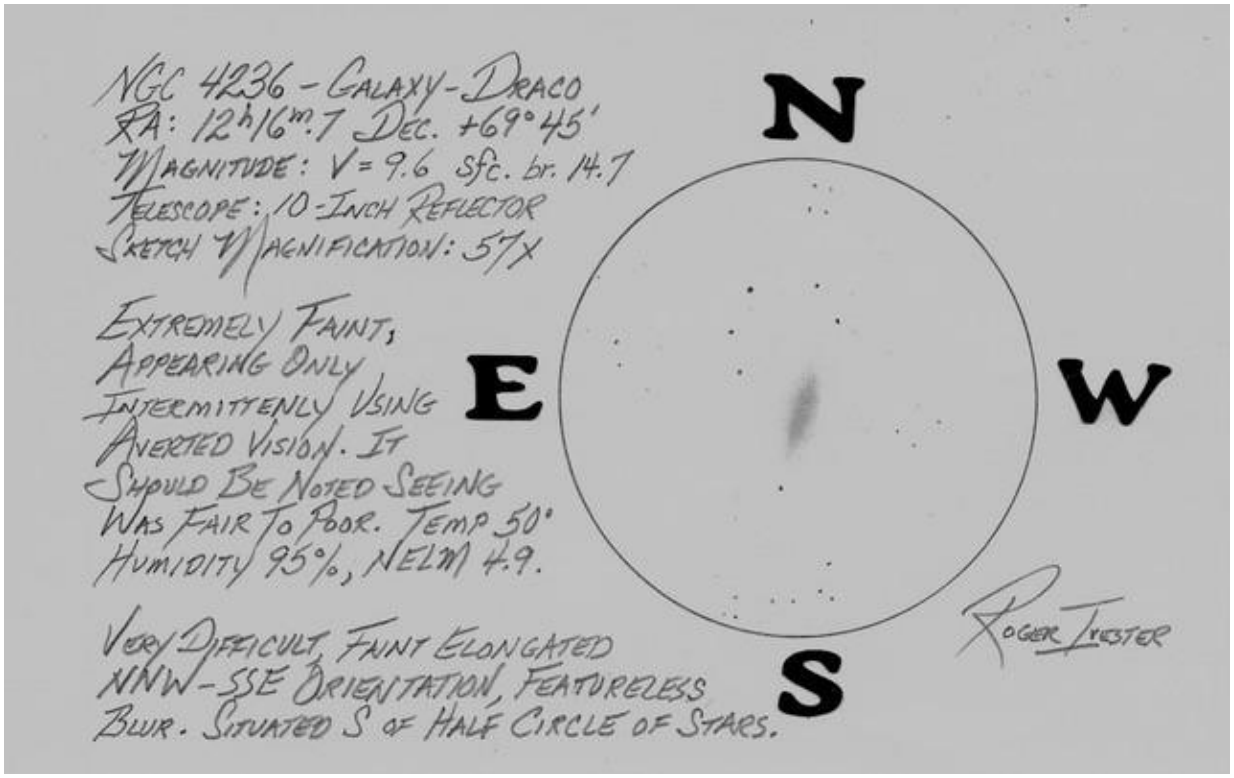
Roger Ivester: LVAS Observer from North Carolina

I used a 10-inch reflector from my backyard, and spent four hours in my attempt to see galaxy NGC-4236, of which the first three were unsuccessful. However, during the fourth hour, at well past 1:00 AM EDT, I glimpsed an extremely faint, elongated NNW-SSE oriented blur of light, as shown in my sketch. The galaxy appeared featureless, due to the extreme low surface brightness, and it was visible only intermittently with averted vision.

The sky conditions were poor, with a NELM of 4.9, which is about normal for springtime in the foothills of North Carolina. There was a distinctive, tilted half-circle of five stars, just to the NE of the galaxy, which worked well to assist in determining the exact location of this very faint object.

On the previous night, under the same conditions, using a 6-inch reflector, the galaxy was invisible, despite spending two hours in my search.


NGC 4236 - GALAXY - DRACO
RA: 12h16m.7 DEC. +69° 45'
MAGNITUDE: V = 9.6 sfc. br. 14.7
TELESCOPE: 10-INCH REFLECTOR
SKETCH MAGNIFICATION: 57X
EXTREMELY FAINT, APPEARING ONLY INTERMITTENLY USING AVERTED VISION. IT SHOULD BE NOTED SEEING WAS FAIR TO POOR. TEMP 50° HUMIDITY 95%, NELM 4.9.
VERY DIFFICULT, FAINT ELONGATED NNW-SSE ORIENTATION, FEATURELESS BLUR. SITUATED S OF HALF CIRCLE OF STARS.
N
E
W
S
ROGER IVESTER


NGC 4236 - GALAXY - DRACO
RA: 12h16m.7 DEC. +69° 45'
MAGNITUDE: V = 9.6 sfc. br. 14.7
TELESCOPE: 10-INCH REFLECTOR
SKETCH MAGNIFICATION: 57X
EXTREMELY FAINT, APPEARING ONLY INTERMITTENLY USING AVERTED VISION. IT SHOULD BE NOTED SEEING WAS FAIR TO POOR. TEMP 50° HUMIDITY 95%, NELM 4.9.
VERY DIFFICULT, FAINT ELONGATED NNW-SSE ORIENTATION, FEATURELESS BLUR. SITUATED S OF HALF CIRCLE OF STARS.
N
E
W
S
ROGER IVESTER

Fred Rayworth: LVAS AL Coordinator and Observer from Nevada

I've observed this difficult object three times since 2005. The first time was on September 4, 2005 with my home-built 16-inch f/6.4 from Cold Creek Canyon north of Las Vegas at 5,200 feet. The temp was mild, but it was also breezy. We set up anyway. Through the night, the winds gusted hard, then stopped, then started again and this cycle continued until I quit. Planetary seeing was poor, but didn't affect what I was looking at. Just before I quit, I looked at the Lagoon Nebula and it looked blurry and the stars greenish. Could still see the dark areas though. Overall a good night.

At 82X, NGC-4236 was extremely faint, but large. Oval shaped. No other detail.

The second time was August 23, 2008 with my commercial 16-inch f/4.5 from the Sawmill Trailhead up Lee Canyon road west of Las Vegas at 7,400 feet. It was very clear with an occasional wind. I was still in T-shirt at 20:00, but needed to put a long-sleeved shirt soon after. As the night progressed, seeing was poor, planetary-wise. Could not focus Jupiter, though I tried various times throughout the night. Neither could anyone else. Though it looked dark, I was just not seeing some of the galaxies I was shooting for. At the end of the night, the dimmest thing I saw was mag. 13.1. I still managed to nail some good galaxies and even a couple of open clusters. However, the night looked better than it actually was, once I got to the eyepiece.

At 70X, all I noted from NGC-4236 was a broad oval haze and that was about it. I certainly wasn't in Challenge mode, which is a shame because of the altitude, I should've been able to see more, or so it would seem, though sky conditions weren't all that great.

For the Challenge, I had a very small window of opportunity on May 10, 2018 at our observing site at Cathedral Gorge State Park in North Central Nevada at 4,800 feet. It was partly cloudy and cool, with intermittent breezes. It cleared up after dark, but that didn't last long, and

soon, the transparency went bad with a thin, almost invisible haze moving over from the west. Eventually, we noticed a visible dimming of stars and couldn't find even bright galaxies. We had to shut down at 22:50.

Faint and fuzzy it was (NGC-4236), and I'm still scratching my head that we picked an SB mag. 15 object for this Challenge. Well, hey, it isn't called a Challenge for nothing!

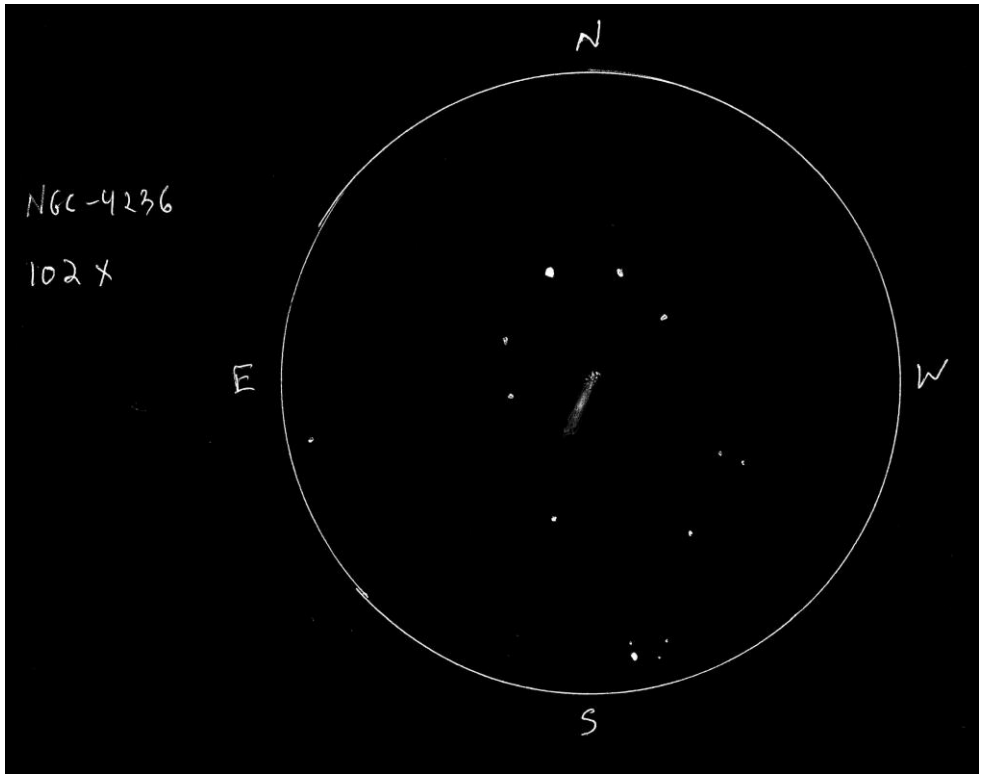
I found it pretty easy with my Sky Commander (push-to digital setting circles). Good thing, because it I'd done it manually with my green laser pointer, I almost surely would've missed it. It was just a ghost of a flat oval, with a slightly more dense core, that barely, and I mean *barely* took direct vision. Even with averted vision, I couldn't see much structure except a slight bit of mottling and a grainy presence toward the NW(?) end. To the NE was a crown of five stars with the middle one a mag. 8 jewel. On each side of the center star was a pair of mag. 10+ stars. The galaxy lay at an angle, pointing toward the northwest pair.

I did most of the observation at 102X but cranked it up to 208X for a bit. That darkened the background and I got a more distinct impression of the core and the northwest grainy end, just a bit, but the southeast end was weak and tenuous.

Folks, overall, no matter the magnification, this galaxy was nothing to write home about in terms of real detail that stood out. Even in my 16-inch, it took a good bit of eye strain just to see what I did. The inexperienced man with me took a look at both magnifications and he saw it, but just a smudge. He said it was oval and that's all he could tell.

Mag. 10.1? Pffft!

Faint and fuzzy it was, and I'm still scratching my head that we picked an SB mag. 15 object for this Challenge. Well, hey, it isn't called a Challenge for nothing!


NGC-4236
102 X
N
E
W
S