MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

Compiled by:

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&

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NGC-891 (The Outer Limits Galaxy)

Introduction

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

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

NGC-891 (The Outer Limits Galaxy)

Discovered by William Herschel in 1784, this spectacular galaxy was missed by Charles Messier who was observing with the equivalent of a 3.5-inch scope. It can be very difficult with scopes of less than 6-inch aperture, but has been reported with scopes as small as a 60mm (2.4-inch) refractor. A dark site with both excellent seeing and transparency are essential for seeing the fine details. It's a faint streak bisected by a dark lane and there are numerous bright stars superimposed in front of it. As mentioned previously, it has been spotted with a 60mm (2.4-inch) refractor under optimum conditions from a very dark site. For direct vision observations, especially with the less than ideal skies most of us live under, an 8-inch or larger scope would likely be needed for a good view. Even then, it may take a 12-inch or larger to see the dark lane. Also known as the "Outer Limits Galaxy," it received this moniker because it appears on every episode of the early 60's TV show, The Outer Limits. It doesn't take much imagination to see that it resembles a flying saucer, and that may be why it was chosen for the TV show.

Though it's considered an unbarred spiral galaxy, recent research has suggested it may actually be barred. However, because of the steep edge-on angle, it's impossible to see any barred structure without some other way to detect it.

The challenge this month is not only to see it, but to look for the foreground stars, any lumpiness within the glow, and if the scope is large enough, see the dark lane bisecting it. Maybe the distinct UFO shape will be visible either visually or through a photo.

Observations/Drawings/Photos

Roger Ivester: Observer from North Carolina

This beautiful edge-on spiral galaxy has always been a favorite of mine. It should be noted that though this galaxy is listed as mag. 10, this can be somewhat deceiving for the visual observer due to the extent and the very low surface brightness. If conditions are not good, it can be difficult to see using my 10-inch reflector from my moderately light polluted backyard in Boiling Springs, NC.

This faint galaxy has an excellent sky position at + 42° N latitude, and is high in the sky for all observers in the continental United States. However, it is best observed from a dark site under good sky conditions.

On Friday, November 13, 2009, I observed it with excellent transparency and seeing using the 10-inch. Weather-wise, the area had received almost 4 inches of rain, with accompanying wind gusts of over 30 MPH from a tropical storm that ran up the eastern coast during the earlier part of the week. Thursday afternoon it began clearing. The rain and wind had cleared the air and Friday night was superb for the observation of deep-sky objects.

The galaxy was easy at 57X, appearing as a faint elongated streak of light with little or no visible details. The excellent conditions allowed the use of a 16mm eyepiece, with the employ of a 2X Barlow. This combination with the 10-inch gave me a magnification of 125X which was perfect for my sketch and notes. It's normally difficult to use a magnification that high on this galaxy due to the very low surface brightness.

The 10-inch at 125X presented a highly elongated galaxy that could be measured to a full 8-10 arc minutes in length. It appeared very thin with a faint subtle brightness in the central region. With difficulty, I saw a very dim core using averted vision. A faint mag. 13 star at the tip of the more extended SSW arm was fairly easy to see. It could possibly have been an illusion, but the SSW arm appeared somewhat brighter. This is a feature that I haven't noted before. A mag. 12.0 star lay just north of the brighter central region within the halo of the galaxy. I saw a much fainter star just off the NW edge of the core. Due to the lack of concentration, this galaxy had a translucent texture… as if I could see right through it. This object is indeed faint, but the edges appeared very sharp and well defined, especially when using

averted vision. A larger telescope is required to see the dust lane which is so prominently shown in photographs. I couldn't see this feature with the 10-inch.

Fred Rayworth: Observer from Nevada

This was a relatively easy challenge for me. I've observed it before, but never noted the dark lane. For example, on September 28, 1992 with my home-built 16-inch f/6.4 Dobsonian, I described it as "Extremely faint. Found it by star-hopping. Saw a very faint oblong smudge with averted vision, but couldn't see it at all with direct vision. Using field motion or jiggling the scope made it more apparent." Then on October 16, 1993, I saw "an elongated uneven oval. Faint." That wasn't a very good description either time, so I was anxious to check it out in more detail with my 16-inch f/4.5 Dobsonian. I got the chance on November 21, 2009.

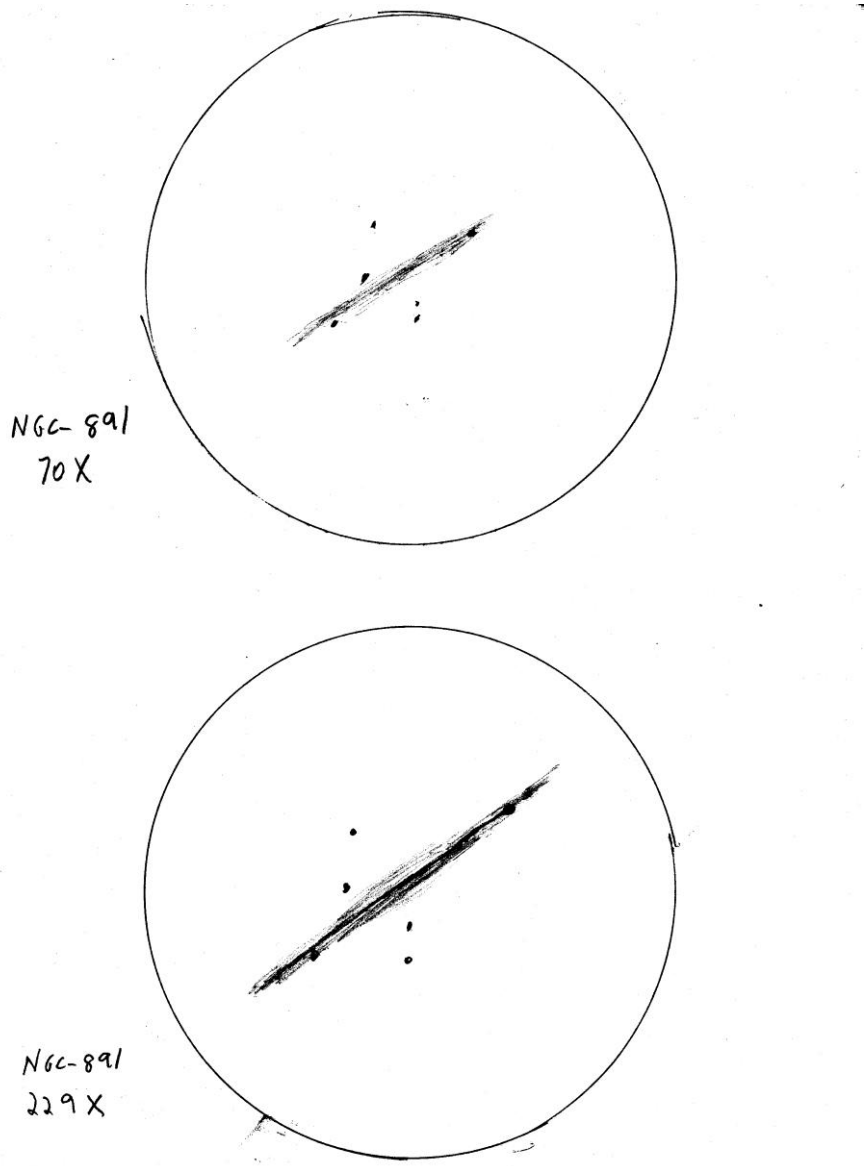
The night started with a sliver of moon that was a lot brighter than I expected. What should've been a windy and cold night at Redstone Picnic Area on the north shore of Lake Mead turned out to be a Horsehead night. Despite the moon, I was able to spot many obscure galaxies, though it was later when the details became more apparent. At first, NGC-891 was just the oblong streak as mentioned in my earlier notes. However, at about 8 PM, just as the moon was burying itself in the pollution and skyglow of Las Vegas, details started popping out.

This was also a chance for me to try some new eyepieces. I picked up a 17mm and an 8mm and they really showed their value while looking at NGC-891. I started with my trusty 26mm (70X) and the galaxy was a semi-bright elongated streak. On one side, I noticed a bright star near the tip of the streak and a clumpy bright "something" a little closer to the core. On the other side of the core was another star embedded near the tip of the streak with several pairs of stars above and below the streak.

When I switched to the 17mm (109X), I caught just a hint of a dark lane. The streak was larger and fatter and that little clump of something turned out to be two stars close together in front of the galaxy. I could plainly see the dark streak with averted vision, but straight on, there was just a hint that something was there. When I switched to the 8mm (229X), the dark lane jumped out. In fact, I saw it directly and just to be sure, I had several other people look at it, including Rob Lambert. There was no doubt that the dark lane was there. In fact, because of it,

the galaxy looked more like the UFO impression as seen on The Outer Limits. I later went over to Rob Lambert's Mallincam and saw it in a bit more detail. What I couldn't see visually was that very tiny smudge of a galaxy just off the edge of one side of the streak. It shows on photos, but not visually and as far as I was able to find out, it isn't listed anywhere. Just one of those random unidentified galaxies.

Overall, I was quite impressed with this deep sky jewel and was glad to have the chance to observe it again.



Rob Lambert: Observer from Nevada

The "Outer Limits" Galaxy presented a more difficult object to observe than last month's NGC-253, but was worthy of the hunt. To make my notes easier to understand, I marked the cardinal directions on my images with north being to the left, while west is up. That's if I've correctly interpreted the orientation of the galaxy from the notes of other expert observers.

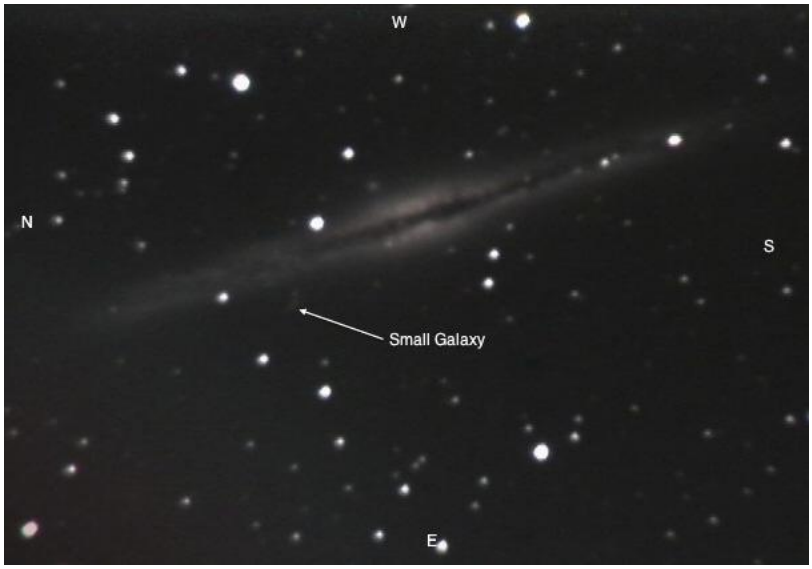
Before observing NGC-891 with my Mallincam on November 21, 2009, I had the opportunity to observe it through Fred Rayworth's 16-inch Dobsonian before the moon had set. My night vision isn't as good as Fred's, so through his scope, the galaxy appeared as an elongated smudge with a perceived darkening along its mid-line. I'll leave the detailed description of the galaxy as seen through the Dobsonian to Fred, who'll do it more justice.

When NGC-891 was first seen on the Mallincam's monitor, it appeared to have been moving southwest to northeast (upper right to lower left) until it got wedged between two stars - one just northwest of the galaxy's central bulge and the other located about half-way between the central bulge and the northeastern tip on the eastern side of the galaxy. It also seemed to have been pushed in this direction by the bright star on its southwest tip. On the opposite (northeast) end, a very dim star seemed to be guiding the galaxy through space. There was also a chain of three stars running almost due east, away from the galaxy, starting with a dimmer star located just southeast of the central bulge leading to a pair of brighter stars (probably mag. 14). The three stars formed a slight left parenthesis "(" just below and right of the central bulge in my image), with the dim star being the top of the parenthesis. I was able to observe 20 stars of various brightness's superimposed on the galaxy.

There was a definite brightening of the galaxy's core, even though most of it was hidden by the obvious dust lane that seemed to stretch the entire length of the galaxy and thickened at the galaxy's center. The lane was more prominent on the southern extremity than on the northern end. The dust lane was not uniform in density or thickness and even had a small area where the core seemed to almost break through the dust lane. Overall, the dust lane was rather splotchy and irregular in shape all along its length.

I could just make out the small galaxy located on the northeast, mid-way in distance between the two wedge stars mentioned above (see tip of arrow on image), but I couldn't see the one due west of the core. The image on my CRT was better than what I was able to capture, so the small galaxy in the 28-second exposure image may not be visible.

It's more visible in the 56-second exposure even though the quality of the image is worse.



The only processing done on these images was stacking with dark frames to remove the hot pixels. Other than that, the images here depict what I saw on the CRT at the time the images were captured.

Like NGC-253 last month, I would love to see NGC-891 from the top and observe its spiral structure. In observing NGC 891, you can understand where the idea for the shape of early flying saucers came from, and why the "Outer Limits" Galaxy is a fitting name for this November's Challenge Object.

Tony Labude: Observer from Oklahoma

I took my Grandson's 10.1-inch reflector on a fishing trip in hopes of observing NGC-891. The two nights planned for observing were very good, but my choices for eyepieces were not. My search for NGC-891 was in vain at 36X and 44X. The next weekend was a public star party at Greenleaf state park. As the crowd thinned out one of my observing partners, Dennis Wigley, and I started the hunt for NGC-891 in our 8-inch reflectors. Dennis quickly decided that Kevin Davis' 25-inch reflector was needed. Stubborn Tony kept after it at 110X with the 8-inch' and finally came across a distortion in the center of a grouping of stars, a near vertical line very faint. Sharing time at the eyepiece of the 25-inch with the few remaining public revealed a near vertical edge-on with a center dust lane and a bulged middle. Kevin and Dennis imaged NGC-891 at this party last year and I regret not observing it then, because the sky stayed clear longer.

Dennis Wigley: Observer from Oklahoma

Here's the NGC-891 image that me and that Kevin Davis took at Greenleaf in 2008. This image was taken after the public had left the observing field. It is 36 X 1 min through an 80mm (3-inch) f/7.0 refractor. It was guided with the DSI Pro through the 66 mm (2.5-inch) f/6.0 refractor.

This year, I searched for NGC-891 first with my 8-inch f/8.0, but didn't find it. I finally located it using Kevin's 25-inch and a 35mm eyepiece. I have seen it better than he did that night. It was thin and oriented as a vertical line with the dark line of dust down its center line. I put Kevin's 17mm in the focuser and the galaxy filled the field top to bottom. The central dust lane was quite visible and the lighter portions of the galaxy faint. There were a couple of foreground stars which overlaid the galaxy. I figure they had poor transparency as the galaxy was fainter than what I remembered, even using Kevin's 25-inch.

Dr. James Dire: Observer from North Carolina

NGC-891 is an edge-on mag. 10 spiral galaxy in the constellation Andromeda. The galaxy is quite small compared to M-31, Andromeda's most famous galaxy. It's more comparable in size to M-110, one of the elliptical companions to M-31. NGC-891's longest dimension is about the same apparent size as the minor axis of the elliptical M-110, which itself is dwarfed by M-31. Although 2 mags. fainter than M-110, NGC-891 is about as easy to pick up in a telescope as M-110 since the elliptical galaxy's light is spread out over a much larger area. NGC-891 is located 19º due east of M-110.

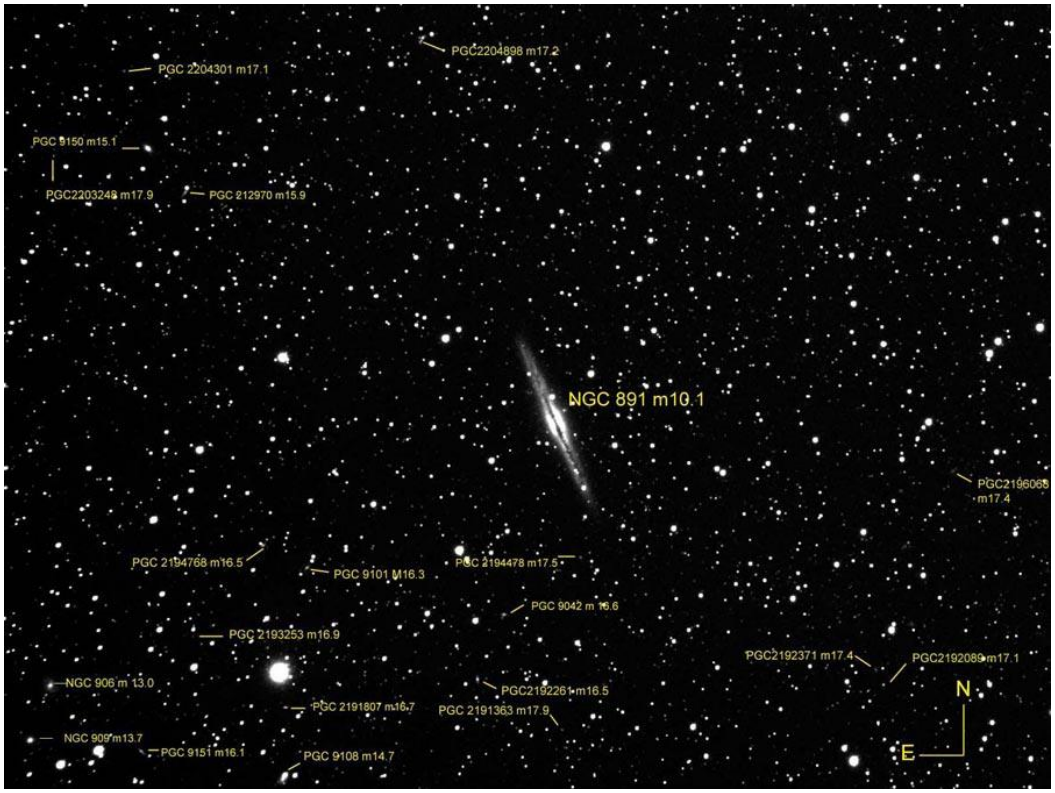
I have viewed NGC-891 in telescopes from 4-inch to 20-inch, although never in dark skies with a large telescope. In the 20-inch telescope at the U.S. Coast Guard Academy Observatory, the galaxy's dark dust lane was quite apparent.

In June, 2005, I photographed the galaxy using this 20-inch Ritchey-Chretien telescope and an SBIG ST-2000 XCM CCD camera. Under relatively poor seeing conditions, the galaxy's central budge and dark dust lane came out quite well in a ten-minute exposure.

In January 2007, I imaged NGC-891 a second time using a 105mm (4-inch) f/6.4 apochromatic refractor and the same CCD camera. This much lower magnification image shows considerable detail in the galaxy, again with only a ten minute exposure.

In the last image, I labeled 20 additional galaxies, brighter than mag. 18, that appear in the same field of view of NGC-891. The brightest of these 20 is NGC-906, a face-on mag. 13 spiral galaxy. It was taken in November 2007 from my observatory in Earl, North Carolina using a 102mm (4-inch) f/7.9 apochromatic refractor.

The image is a combination of 3 ten-minute exposures, stacked to produce a higher signal-to- noise ratio and to account for the slower optical system compared to the f/6.4, 105mm (4-inch) APO. Note the better detail in the structure of NGC-891's dark lane in this image.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m17.4
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NGC 906 m 13.0
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PGC 2191807 m16.7
PGC 2191363 m17.9
N
E
NGC 909 m13.7
PGC 9151 m16.1
PGC 9108 m14.7

Frank Barrett: Observer from North Carolina

I took this photo on November 30, 2005 in Gastonia, NC with an 8-inch SCT focal reduced to 1540mm f/7.7, the scope mounted on a Losmandy G11. The exposure was 10 X 15 min with a SBIG ST-200XCM.