MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

Compiled by:

Roger Ivester, Boiling Springs, North Carolina

&

Fred Rayworth, Las Vegas, Nevada

With special assistance from:

Rob Lambert, Las Vegas, Nevada

April 2011

NGC-3190 Galaxy Cluster (Hickson 44) in Leo

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-3190 Galaxy Cluster (Hickson 44) in Leo

NGC-3190 is the primary component of galaxy cluster Hickson 44, a group that also includes NGC-3193, NGC-3187 and NGC-3185. Located in the constellation of Leo, William Herschel discovered NGC-3190, a tightly wound spiral galaxy, in 1784. It contains two super novae. One was discovered in March 2002 and the other two months later. This galaxy, the largest in apparent size of the group, shines at a dim mag. 12.1.

NGC-3193, a rather featureless elliptical ball, shines at mag. 11.8. NGC-3187, the faintest of the group at mag. 13.4, is a fascinating barred spiral with its edges pulling off in trails. The final object, NGC-3185 is a barred spiral with an outer ring that shines at mag. 13.0.

This group of galaxies is thought to be gravitationally related. They should all fit in the field of a wide-field eyepiece. The challenge is not only to see them all, but to see them with the smallest scope and to see as many details as possible. For the smaller scopes, the challenge may be to see all four of them while for the larger scopes, it may be to see details such as the trailing tails off the edges of NGC-3187.

Observations/Drawings/Photos

Roger Ivester: Observer from North Carolina

My first observation of the NGC-3190 Leo galaxy cluster was on May 5, 1994, using my 10-inch f/4.5 reflector. The conditions on that Saturday night, from my backyard were above average, naked-eye limiting magnitude was 5.5, temperature was relatively warm at 40° and the wind was calm. I have observed this fabulous group many times since, always impressed as the galaxies one-by-one drifted into my eyepiece field.

My best observation occurred on March 19, 2004 from a dark site in the heart of the South Mountains, located about thirty minutes north of my home in Boiling Springs, North Carolina. My notes from that night are as following:

Date: May 05, 1994. Location: South Mountains, North Carolina. Naked eye limiting magnitude: 6.0. Transparency and seeing: Excellent. Telescope: 10-inch f/4.5 reflector, magnification: 114X.

NGC-3185: "Very faint and dim with low surface brightness. Averted vision was required to see the elongated shape which was very subtle. This galaxy can be difficult from my moderately light polluted backyard, but even under fair to moderate conditions it can be seen reasonably well with averted vision."

NGC-3187: "The most difficult of the group at mag. 13.1. The 10-inch presented this galaxy as little more than a very faint, mostly round glow. When observing this galaxy from my backyard, it can be very difficult and can be seen only about 50% of the time."

NGC-3190: "This galaxy was fairly bright and could be seen relatively easy with the 10-inch. It was elongated SE-NW, with a lens shape and a brighter more concentrated core with a mostly even texture."

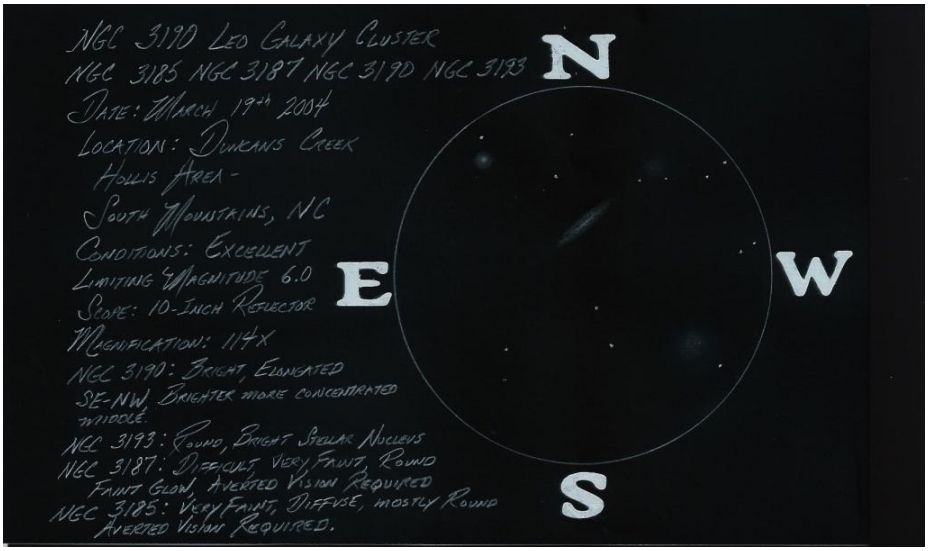
NGC-3193: Round with a bright stellar nucleus, located a minute or so south of a bright mag. 8.5 star."

Date: April 24, 2011. Location: Backyard, Boiling Springs, North Carolina. Naked-eye limiting magnitude: 5.0. Transparency fair to poor due to high moisture and pollen. Seeing: Fair with very soft stars at medium magnification. Telescope: 4-inch f/9.8 refractor, magnification: 125X.

NGC-3190: "Fairly bright, elongated, with an even texture. This galaxy was much easier to see than NGC-3193."

NGC-3193: "Difficult with the 4-inch. This galaxy appeared as a faint mostly round glow, with averted vision. I could not hold this galaxy constantly."

NGC-3185 and NGC-3187: "Couldn't be seen with the 4-inch on this night and location."



Fred Rayworth: Observer from Nevada

I had to use multiple observations for this month's challenge. Because of the lousy observing conditions in Nevada, and though I've observed it twice in 2011, I was never able to see NGC-3187 this year. However, on February 9, 2008, I saw it with my home-made 16-inch f/6.4 Dobsonian from Redstone Picnic Area. My drawing is a combination of that observation plus the more recent ones from this year.

The conditions on February9, 2008 were ideal with a clear and calm sky, and Redstone was the perfect place to be. Using my 16-inch f/6.4 at 70X, the four galaxies were easily seen as variously shaped smudges. NGC-3190 was a fairly bright oval smudge right in the middle of the group and appeared as featureless. Below it and next to a relatively bright star was NGC-3193, a slightly brighter ball of light that was an obvious elliptical galaxy. It reminded me of an unresolved globular. At a quick glance, it looked like an almost out-of-focus twin to the star next to it. Almost in line with but double the distance from them was NGC-3185. This round soft glow lay just off and slightly up from two dim stars. It looked almost face-on. By far the hardest one to see was NGC-3187. From my orientation in the eyepiece, just to the left of NGC-3190 and between two faint stars, I spotted a very faint oval smudge. There seemed to be something wrong with the smudge, like it was distorted, but I couldn't tell what was wrong with it. It just didn't look quite right, like the shape was off. I discovered later why when I saw images of this quite amazing galaxy and the pinwheel trails of gasses and dust that drag off the leading edges of each end of the opposing dust lanes.

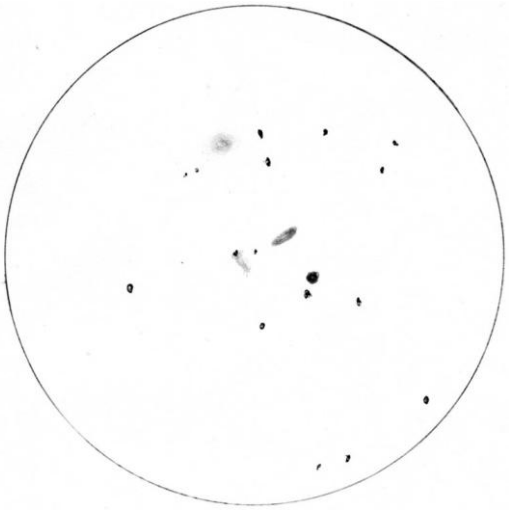
On April 1, 2011, on a rather lousy night near the apex of Blue Diamond Road in Nevada, I tried for it again in almost red zone skies and barely caught a glimpse of NGC-3190 and NGC-3193 so I don't count that observation. From this point on, I was using a 16-inch f/6.4 Dobsonian as seen in the picture above.

On May 7, 2011, from the Desert National Wildlife Refuge at Corn Creek, I had a final chance to observe this cluster for the Challenge. Through rather thick skies, I spent approximately 45 minutes observing Hickson 44. Using anywhere from 86X to 229X, I observed the same results as I did back in February, 2008 with the exception of never quite spotting NGC-3187. I finally gave up in frustration, especially after observing M-13 through a 24-inch scope where it compared to viewing through an 8-inch scope. I figured it was time to pack it in.

My drawing is a composite of my observations from 2008 through 2011.

NGC-3190

86 X



Buddy L. Barbee: Observer from North Carolina

This observation was made Tuesday, March 1, 2011 from my club field near Pilot Mountain, North Carolina. I was using the 10-inch Dobsonian and a 13mm eyepiece for a magnification of 92X. It was a cool 40°F with a calm wind and low humidity. The sky was beautiful that night, having a naked-eye limiting magnitude of 5.8.

Friday, February 25, 2011 was a great night, but I had other commitments, so when the weather cleared up Tuesday, I decided to head out to the club field and give it a go. I set up the 10-inch Dobsonian hoping it would stay clear long enough to draw NGC-2261, and it did. After finishing the sketch, the sky was one third covered with a haze and the southwestern horizon was covered with clouds. I had to hurry to complete this sketch. I didn't realize how easy it would be to locate Hickson 44 (or the NGC-3190 galaxy group). Centering my 8X50 right angle correct image finder scope on a mag. 8 star halfway between gamma and zeta Leo, I looked in the telescope to see this group of galaxies almost centered in the 1.4° field-of-view. I was using my 24mm eyepiece to locate these galaxies at 50X. It was easy to see three of these galaxies almost touching at 50X. I didn't see NGC-3185 in the rush to up the magnification.

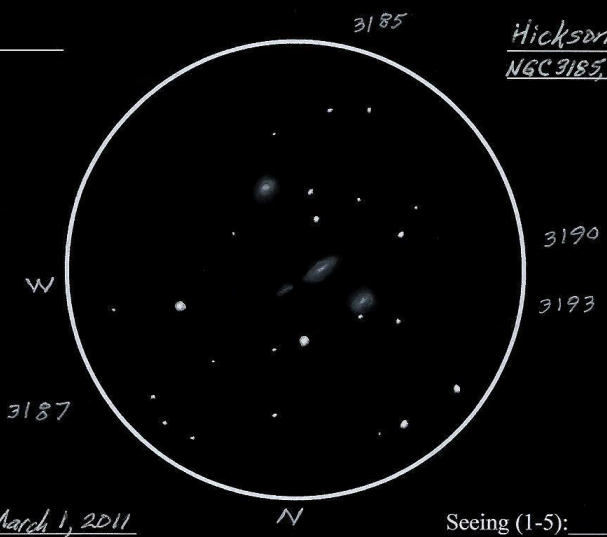
Using my 13mm eyepiece, for a magnification of 92X and a field-of-view of 53 arc minutes, I could easily see all four galaxies in the group. NGC-3187 was the smallest and the faintest in the group with NGC-3190 being the largest and the brightest. NGC-3193 is a small bright elliptical with a bright core. NGC-3185 was almost as large as NGC-3193 with a faint stellar core. I wish that I'd had more time to up the magnification some more and maybe see the dust lane in NGC-3190 but I didn't.

As I finished my sketch, looking up I noticed that the forecasted haze was quickly moving in. So it was a race to see a few more objects before all observing was lost for the night.

DEEP-SKY OBSERVATION FORM

CONSTELLATION: Leo

OBJECT: Hickson 44
NGC 3185, 3187, 3190 & 3193



Day & Date: Tue, March 1, 2011
Time (local): 8:20 PM EST
Time (UT):
Observer: BLB
Location: Club field

Seeing (1-5): 3
Transparency (1-7): 4
NELM: 5.8
Temp: 40°F Wind: 0-5 mph
Humidity: 39%

INSTRUMENT
Telescope: 10" Dob
Aperture: 254 mm
Focal Length/Ratio:
Eyepiece: 13 mm
Magnification: 92x
Field-of-View: 00°53'
Filter: None

OBJECT: NGC 3190
RA: 10 hr. 18.1 min.
Dec: +21 d. 49.9 min.
Type: Galaxy Group
Listed Magnitude: 11.1$_v$ (13.05B)
Listed Size: 4.4' x 1.5'
Altitude of object:

NOTES

I found NGC 3190 with a 24mm eyepiece @ 50x in a 1.4° FOV. At 50x this group appeared to be three galaxies that were almost touching each other. I was looking at these three and did not even notice NGC 3185. Although bright, it is the smallest and looked almost stellar.

With a 13 mm eyepiece at 92x all four galaxies were easily seen and seperated. NGC 3190 is the largest and the brightest of the four. Although NGC 3187 is larger than 3185, it appears smaller and dimmer

Jim Gianoulakis: Observer from Nevada

NGC-3190 is a spiral galaxy with tightly wound arms and lying in the constellation Leo. It was discovered by William Herschel in 1784. NGC-3190 is member of Hickson 44 galaxy group, estimated at around 80 million light years away, and consisting of four galaxies in a tight group. NGC-3193 is fairly featureless, NGC-3187 is a dim but striking spiral galaxy and NGC-3185 has a barred spiral structure with an outer ring.

In 2002, two supernovae were observed in the galaxy. A Brazilian amateur astronomer, (Paulo Cacella) detected one supernova in the southeastern part in March 2002 (SN 2002bo), and then an Italian team, while studying the first one, detected a second supernova (SN 2002cv) on the other side two months later.

In 1982, the Canadian Astronomer, Paul Hickson, using the red prints from the Palomar Observatory Sky Survey, published a catalog of 462 galaxies thought to exist within compact groupings. These groupings are now referred to as "Hickson Compact Groups" (HCG). Compact groups are typically four or five galaxies in close physical proximity to one another. They are among the densest concentrations of galaxies known, comparable to the centers of rich galaxy clusters. Compact groups are worthy of intense study as they provide a rich opportunity to study galaxy interactions and merger events. Proof of proximity is difficult and relies on a variety of observational evidence including common redshifts in space.

The four dominant members of Hickson Compact Group 44 consist of three spirals and an elliptical galaxy, NGC-3190, NGC-3193, NGC-3185, and NGC-3187. Two dwarf galaxies are also part of the group but are not included in the Hickson catalog. Signs of tidal encounters between members of HCG 44 are present. NGC-3190, distribution, photometry, and other parameters together are known as Hickson's isolation criteria.

The true nature of compact groups has been the subject of much controversy. Interpretations have run the gamut from the belief that all represent true physical associations to the belief that they are mere chance alignments. More than likely, most are true physically related dynamically bound systems although some are certainly projection artifacts. A recent analysis has shown beyond question that almost half of all HCG galaxies show features indicative of interactions or mergers. This figure is bound to rise with more detailed studies.

Current theory is that compact groups represent physically related galaxies that are in the process of merging into a single object, most likely an elliptical galaxy. Compact groups are relatively short lived entities that form via mergers of galaxies within loose subsystems and groupings. Simulations predict that merging of the group members should proceed rapidly within one billion years to form an elliptical galaxy. Hickson groups are therefore snapshots at various stages in this merging process. The more evolved groups are smaller and more deficient in neutral hydrogen while the least evolved resemble galaxies in looser groups. Observational evidence shows that interaction is occurring in a large fraction of galaxies in HCG supporting this model for the origin and evolution of HCG. The cosmological implications of compact groups are significant. Astronomers believe they may represent an intermediate stage between loose groups and individual galaxies. A better understanding of the nature of HCG could help explain galaxy formation on a larger scale in the early universe.

The dominant edge-on spiral shows considerable warping of its dust lane on the side nearer to NGC-3187. NGC-3187, also known as ARP-316a shows numerous tidal tails well above and below its disk plane.

About the photo: The photo is a stack of 9 X 20 minute exposures. Darks and flats were applied with DeepSkyStacker. The camera is an Orion Star Shooter Pro V2 one shot color camera. The mount is an Orion Atlas EQ-G guided with a ZenithStar refractor using PHD guide software. Image acquisition was done using Nebulosity. Levels and curves applied in PhotoShop.

Gus Johnson: Observer from Maryland

This group was shown, as a negative, in my first "Sky and Telescope" magazine, January or February 1953, as photographed with the Mount Wilson 100-inch. Many dim background galaxies could be seen, something I've not seen in any other photo of the NGC-3190 group.

In May 2009, I could barely see the two brightest, NGC-3190 and NGC-3193, using a 3-inch stop-down mask over my 8-inch reflector, at 77X.

Most clear nights only allow the 8-inch to see NGC-3190 and NGC-3193 plus NGC-3185. The faintest of the group, NGC-3187 is very elusive, but twice my 6-inch reflector, at 118X glimpsed it.

"Deep-Sky" magazine, issue #30, Spring 1990 has two sketches of the NGC-3190 group, one by Arizona's Michael Sweetman, using a 6-inch refractor, at 102X, on page 33.

See also issue #32 Autumn, page 39, a sketch using a 32-inch.