MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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&

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NGC-7293 (Caldwell 63) (The Helix Nebula)

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-7293 (Caldwell 63) (The Helix Nebula)

NGC-7293, otherwise known as the Helix Nebula, or more recently, the Eye of God is a planetary nebula in Aquarius. It is a notoriously difficult object to see visually, and many have missed it completely even in larger telescopes. It has been listed in catalogues with no magnitude, as with diffuse nebulae, but has also been shown to have magnitudes from 7.2 up to 13.5. The latter is the most realistic brightness as the nebula is half the diameter of the full moon and is quite diffuse. However, it has been seen in binoculars and depending on the conditions, can be seen with almost any telescope. For significant details, a larger scope is preferred.

The closest and largest of the planetaries (D=500LY), with an apparent size half that of the moon, it is large enough to fill the view of many eyepieces. In appearance, it is similar to a much larger version of the Ring Nebula and has similarities to the Dumbbell Nebula in structure. It presents an excellent challenge.

There are many features within the nebula including the 13 mag central star as well as several others peppered throughout. There is the central area which may appear dark or washed out. There are several rings, or thickened areas as the nebula spreads from the center. It is also one of the first planetaries known to have knots of gas in it. These features are what to look for along with the overall shape.

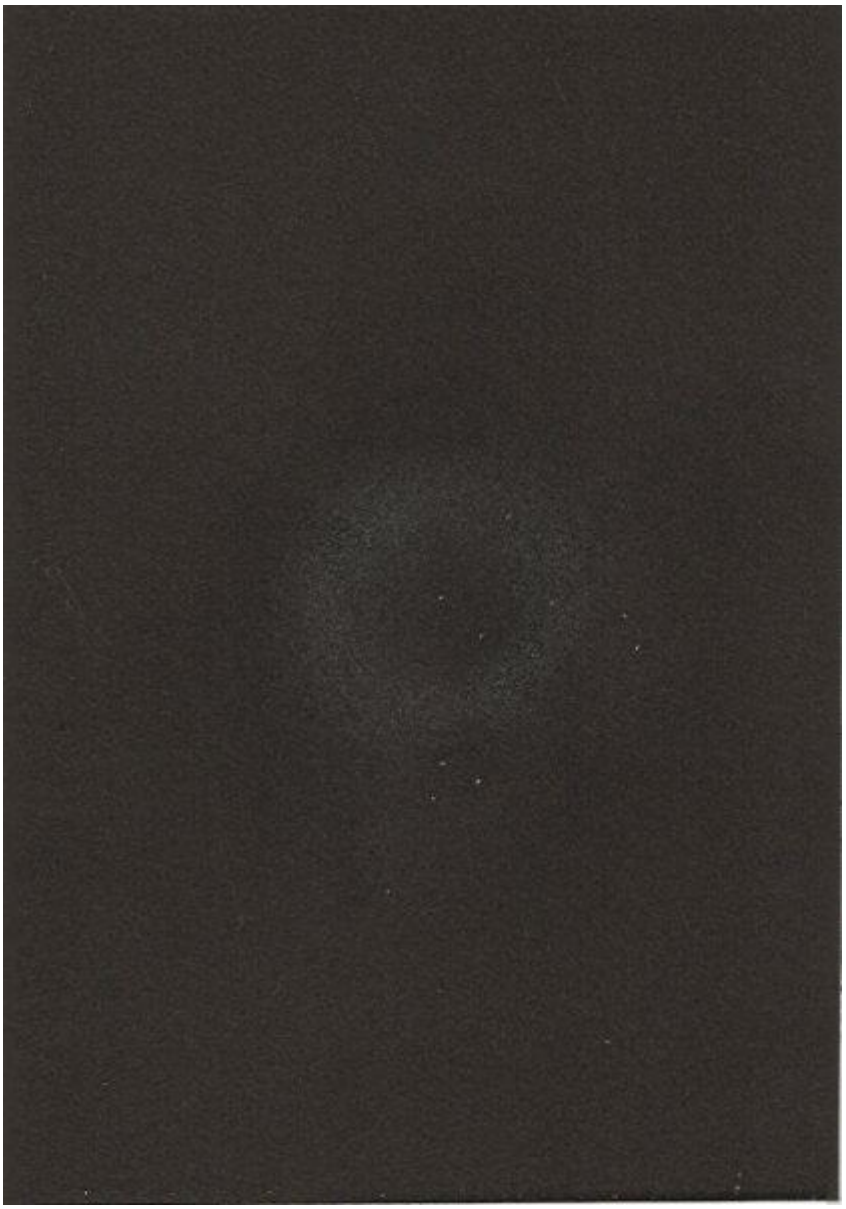
Observations/Drawings/Photos

Roger Ivester: Observer from North Carolina

The first time I observed the Helix Nebula was in August 1992 from an observing site several miles west of Boiling Springs, North Carolina. The conditions were fair but the air was laden with moisture, and the light glow from distant cities reduced the contrast significantly. During that session I used my 10-inch f/4.5 reflector at 57X. The appearance was that of a very subtle glow without any noted details. With the use of a nebula filter, it appeared as a large, mostly round circle with a slightly darker central region.

I was able to observe it again this past week using a friend's 12-inch f/5 reflector from a darker site in the edge of the South Mountains, about 25 minutes north of the original site that was used in 1992.

The 12-inch view without the use of any filter presented a very similar appearance to that of the 10-inch. It presented a faint glow, best seen by using field motion (moving the scope in a back and forth motion in an attempt to better see a faint object). At 59X, and with the employ of an O-III filter, the Helix appeared very large, mostly round with a distinct darker central region. I saw the central star and a companion as well as several other faint embedded stars. With the removal of the O-III filter, the stars within the nebula became much easier to see. It was difficult to detect any knots or uneven texture in the rings. Transparency was only fair. The moisture level during this session was very high which reduced the contrast and a loss of fine detail.



When using a 4-inch refractor at lower power, along with an O-III filter, the Helix appeared very dim and difficult at best. I couldn't see the darker central region or any of the faint embedded stars.

Fred Rayworth: Observer from Nevada

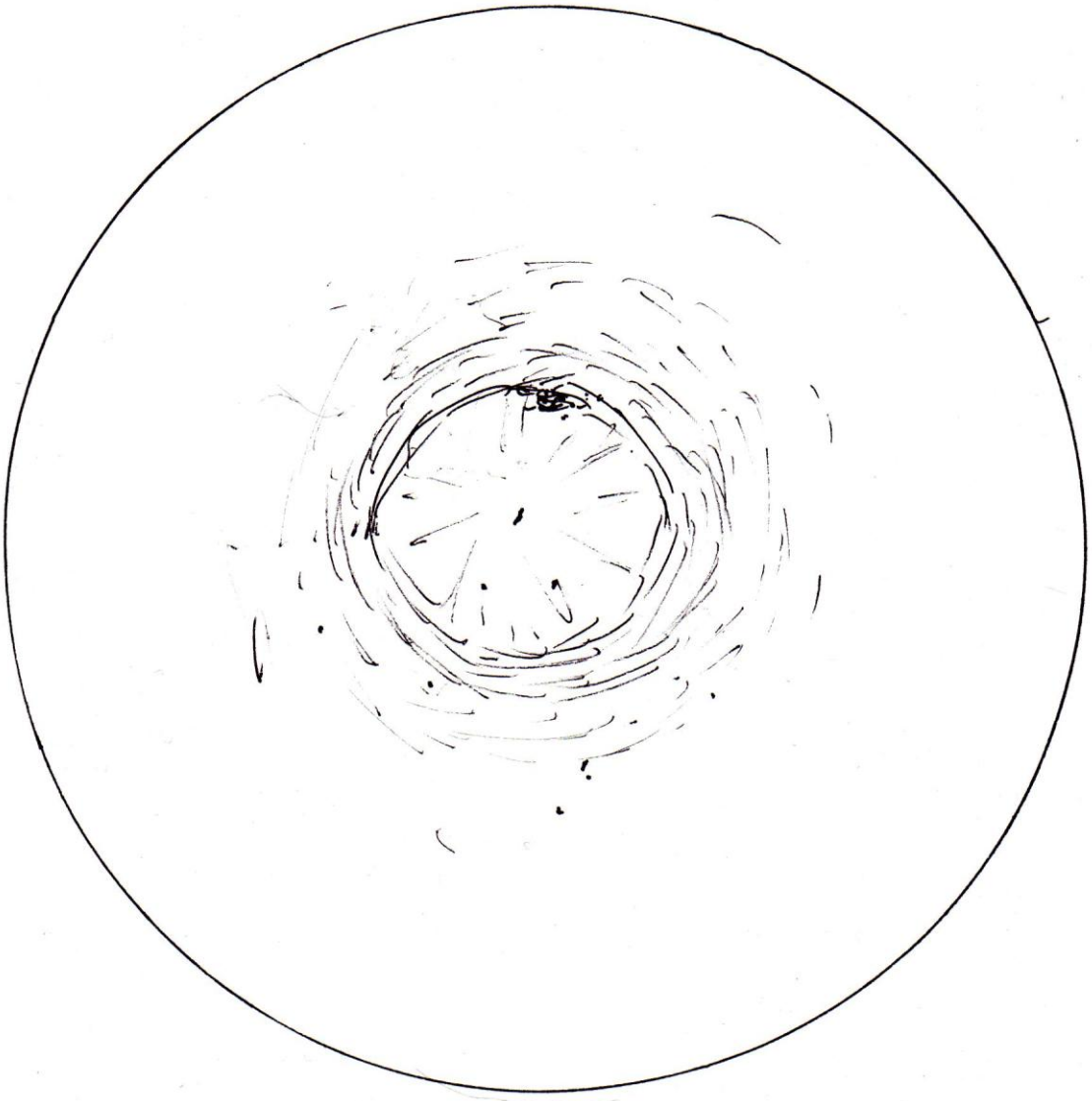
I was able to observe the nebula on September 17, 2009 at the Cathedral Gorge Star Party using a 16-inch f/6.4 Dobsonian. The conditions were off and on, with some spectacular holes between clouds and that night turned out to have the best viewing to the south.

The nebula was very faint, but still visible with no filter and a 26mm eyepiece, for 70X. When I added a 2X Barlow, the nebula filled the view and brought out the individual stars. With an O-III filter, the nebula jumped out but suppressed most of the stars.

At 70X with the O-III, the nebulosity extended almost to the edge of the eyepiece. I saw the center comparatively dark, but still a bit filled in. The first ring of nebulosity was a bit lumpy with some mottling and breakup around the perimeter. The next level of nebulosity was lumpy and faded quickly.

With no filter, the stars jumped out, including the central star. I counted at least 7 individual stars and at the time, they seemed to form a Y pattern with the central star being the bottom of the Y. However, on examining detailed photos later, I couldn't distinguish the Y pattern, so I may have thought I saw an extra star where there wasn't one.

Without the O-III, I noticed a slight greenish tint that was just on the edge of perception. Otherwise the color was gray. I didn't notice any particular color in any of the stars. Overall, it was one of the best views of the nebula I'd seen since I was in Spain.



Rob Lambert: Observer from Nevada

Unfortunately, the weather has not been very cooperative with me regarding my observing sessions for the Observer's Challenge. This month was no different. The LVAS outing to Cathedral Gorge gave me three hours of observing on Friday night and less than two on Saturday night.

With teaching new members and catering to the public visitors each night, I was only able to spend about 15 minutes observing the Helix Nebula this month. I was able to capture a set of images taken at 56 seconds on September18, 2009, using the ST120, but didn't get a chance to adjust the settings on either night to see if I could pull in more detail with my LX200. I also used a 28-second integration image that I captured on August 22, 2009 with the LX200. The following paragraphs are what I was able to observe.

With the Mallincam, I was able to see the central star and the nebulosity of the Helix at the same time without problem. At the 28-second integration, I was able to count 17 foreground and background stars within the boundary of the nebulosity.

At 56-seconds, I saw 5 more stars in the darker center of the nebula and since at this integration, the ring was more extended, especially toward the northwest side of the nebula, some of the stars that appeared to be outside the nebula were actually within the periphery of the fainter outer ring. I was able to see the nebula curve out and up toward the mag. 10 star to the northwest, but couldn't quite see it rejoin the ring past that star.

It looked as though the mag. 10 star sat in a gap in the nebula's ring. The 56-second image definitely brought out the existence of an inner and outer ring. The inner ring appeared to be more uniformly round, whereas, the outer ring appeared to be blown out on opposite ends. Both the inner and outer rings appeared to have some reddish or pink color while the interior of the nebula had the typical blue-green appearance associated with planetary nebulae. The 28-second integration with the LX200 closely approximated what I've been able to see when visually observing the Helix through my 10-inch Dobsonian, minus the color.

At estimated magnifications of 40X in the ST120 and 125X in LX200, I wasn't able to see the comet-like structures of the inner ring, but at one moment of excellent seeing, I thought I caught a glimpse of the faint galaxy located in the gap between the edge of broken outer ring and the mag. 10 star to the northwest. Neither of my images captured the galaxy. "Ah, something to look for again on a future hunt. Maybe an update next month, after our Death Valley outing."

Frank Barrett: Observer from North Carolina

Frank took a very nice photo of the nebula on October 22, 2003 in Robbins, North Carolina. He used an 8-inch SCT, focal reduced to 580mm making it f/2.9. The exposure was L: 6X5 min., RGB: 6X5,5,8 min. He used an SBIG ST-7E and a Losmandy G11 mount.

Steve Davis: Observer from North Carolina

While one of the closest planetary nebulas to the Earth, this object can pose a challenge for smaller instruments even under good conditions. A nebula filter, such as an O-III or UHC, and wide field optics are almost universally employed to observe it.

Utilizing an O-III filter in the 12-inch f/5 @ 58X (26mm wide field), the nebula displayed a slightly oval overall structure with a slightly darker central region of approx 2/3 of the overall diameter. There was a very slight indication of (coarse) structure in the outer brighter regions, but this could've been the result of observing conditions.

Removal of the filter resulted in an almost total loss of contrast with the stellar background. While still (barely) visible, movement of the instrument was required to detect the object with any certainty. This does however allow evaluation of the field stars embedded in the nebula. Utilizing this method, the observer could more accurately position those stars within a sketch (ideally identical eyepieces would be utilized, one filtered, one without for quick substitution).