

# MONTHLY OBSERVER'S CHALLENGE

## *Las Vegas Astronomical Society*

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*&*

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**July 2010**

### **NGC-6543 (Caldwell 6) The Cat's Eye 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-6543 (Caldwell 6) The Cat's Eye Nebula**

NGC-6543, or Caldwell 6 is more popularly known as the Cat's Eye Nebula. This one is going to be a real challenge for those with smaller scopes. At 70X it appears as an out of focus fat star. It'll be easy to miss if you don't look carefully.

William Herschel discovered this fine planetary in the constellation of Draco in 1786. William Huggins was the first to study the spectrum of planetary nebulae and in 1864, discovered that it consisted of hot gas and not stars. It's one of the most studied planetary nebulae. The nebula's apparent size can partially be attributed to its' 3,300 light-year distance.

With a mag. 9.8, it's well within the reach of even 60mm (2.4-inch) scopes. However because of its' size, it'll take significant magnification to sort it out from the background stars where details can be seen. With larger backyard scopes and high magnification, many details can be seen, though vaguely and nothing like those Hubble photos.

Though the central star is around mag. 11, it can be hard to spot against the brightness of the nebula, especially with scopes below 12-inch, though it has reportedly been seen with scopes as small as 4-inch.

Speaking of Hubble photos, by doing a quick search, many spectacular images of this nebula may be found. The colors and shapes within it seem endless in variety. Though as telescopic observers, unless one has a 30-inch or larger aperture, the real challenge is to just see a few of these details like the central star, the visual bluish color of the nebula, or maybe the two most prominent lobes. Give it a try. It'll definitely hone your observation skills.

## Observations/Drawings/Photos

**Roger Ivester:** Observer from North Carolina



NGC-6543, the Observers Challenge for July has always been a favorite of mine. It was the *Finest Deep-Sky Objects* by James Mullaney that first brought this most interesting planetary nebula to my attention. I feel it's most unfortunate that I don't have any notes of that first observation from many years ago. My first recorded notes were made in 1994 using my 10-inch reflector. The following is a description from that night. All observations were made from my moderately light polluted backyard, located in Boiling Springs, North Carolina.

This planetary was bright and easy to locate with the 10-inch using 57X. It presented a bright, mostly round, bluish disk. Couldn't see the central star. When using direct vision, the outer nebula seemed to disappear, leaving only the core visible. This effect was rather significant – the color was more vivid at lower magnification. The blinking was very noticeable at 57X, but diminished at 190X. This effect was very similar to that of NGC-6826, known as the “The Blinking Planetary”.

My observations of the past couple of weeks were made using both my 4-inch refractor and 10-inch reflector. It's surprising, but the small refractor presented the planetary almost as well as the 10-inch. The bluish color was obvious at all magnifications. The mostly N-S elongation was best seen at higher magnification. The texture appeared very even, with high surface brightness. At lower magnification, the edges seemed sharp and well-defined, but when using 167X and averted vision, the edges became less smooth and with some irregularity.

The view through the 10-inch presented a blue N-S oval situated a few minutes ESE of a mag. 8 star. A fainter star to the north created a triangle with the nebula and the brighter star. The texture appeared mostly even and I couldn't see the central star when using magnifications from 57X to 266X.

When I used my 4-inch f/10 SCT, it presented a very similar view as that of the 4-inch f/9.8 refractor. The shape was mostly round, with a hint of elongation when using averted vision at 167X. The bluish color was recognizable and the texture appeared very even, the edges were well defined and rather sharp. The high surface brightness of this object allowed for a decent view even with a first quarter moon.

NGC 6543 PN DRACO

DATE: JULY 14<sup>th</sup> 2010

10-INCH REFLECTOR

190 x 0.34° 21'

MOSTLY EVEN TEXTURE.

ELONGATED, DUNISH

COLOR, UNEVEN EDGES

CANNOT SEE CENTRAL

STAR.

E

N

W

S



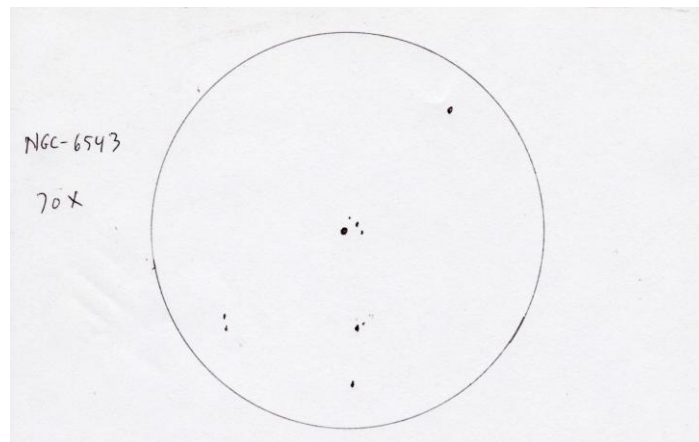
**Fred Rayworth:** Observer from Nevada



I've seen it many times over the years. In 1984 through my 8-inch f/9.44 reflector, I saw just a nice small planetary, but not the central star. In 1993, with my 16-inch f/6.4 Dobsonian at 70X, I saw a beautiful greenish-blue disk and with averted vision and the central star. The next year I saw it again with the same setup but it appeared solid. In 2005, with the same setup, it looked like Uranus.

On July 5, 2010, with my 16-inch f/4.5 Dobsonian, I did my most detailed observations under much higher powers. The sky conditions were conducive to much more detail and I was able to magnify it substantially. The night was hot with only an occasional gust of wind. This was a six bottle of Gatorade night!

It appeared very small. At 70X looked like a bluish-green planet. The color was washed out at higher powers.



At 229X, the central star popped out. I could sometimes see it directly, other times with averted vision. At 70X it looked round. However, at 229X it started to look more oval. The center was still filled in but the central star stood out. At 390X, I saw the central star directly. Still filled in but much less and could tell a difference in intensity between the edges and the center. Edges flaked just a bit. Couldn't see the lobes directly but with averted vision, just caught a glimpse that something was not quite right. I also noticed a slight haze that extended beyond the edge of the main nebula.

NGC-6543  
390X



**Rob Lambert:** Observer from Nevada



This month's Observer's Challenge, NGC-6543, the Cat's Eye Nebula, was probably the most difficult for me as far as teasing details out of the object. It's a very small object, and I wasn't sure I had it in my sights until I compared the image I was seeing with star maps and other photos of the area. At approximately 33X, it mostly resembled a fuzzy star, with no detail at all. At this magnification, there were no halos or rings or any definition of features that could be distinguished from the fuzzy object. The 4.7-inch refractor just wasn't able to resolve the object sufficiently to even recognize it without comparing with other photos.



Because of the initial size of NGC-6543 through the refractor with the Mallincam at  $f/2.5$ , I decided to forego a focal reduction and attempted to locate the object in my 10-inch SCT. Even at 300X, it didn't begin to reveal the detail seen in much larger telescopes. It did, however, begin to reveal a single thick ring and even what I thought to be its central star. Or, it may have been just the greater concentration of matter surrounding the central star.



It's easy to tell that the object is longer on its north-south axis and it has a tail-like appendage protruding from its northern end. In higher resolution photos, this corresponds to the brighter region of the northern lobe. I wasn't able to see either of the two inner lobes or any of the concentric rings of the nebula's halo that are visible in Hubble images.

The Cat's Eye seems to be sufficiently bright to support greater magnification. The next time out, hopefully at the Great Basin Astronomy Festival, I'm going to attempt observing it at 450X and see if I can tease out some more detail. I'll hopefully have three nights to concentrate on future and past Challenge objects.



**Gus Johnson:** Observer from Maryland

**NOTE:** We welcome Gus Johnson from Swanton Maryland. He is shown standing beside the 1910, 11-inch Brashear refractor, owned by the AAAP in Pittsburgh, Pennsylvania. Gus has been an amateur for many years and was the **visual discoverer** of a supernova in galaxy M-100, in April, 1979. The first supernova in modern times to be discovered visually was SN 1885A in M-31. It was discovered by Hartwig, a professional astronomer at the Dorpat Observatory. The first visual discovery of a SN by an amateur was by Jack Bennett of South Africa in July 1968. In April 1979, the second SN discovery by an amateur was made by Gus Johnson of Maryland, USA. Gus was using an 8" reflector, and located the SN before maximum brightness of around mag. 11. We would like to thank him for being a contributor to the Challenge and look forward to his participation in the future.



NGC-6543: Almost overlooked as a slightly out-of-focus star using a 6-inch at 59X. 118X showed it to be round and pale blue October 12, 1979. On August 12, 1990 my 4 1/4-inch at 38X saw it easily as a star that hazy night. At 63X showed a solid disk, bluish.

**Buddy L. Barbee:** Observer from North Carolina



This observation was made Thursday, May 6, 2010 while at the Mt. Airy Granite Overlook, in North Carolina on the Blue Ridge Parkway near mile post 203.

I used my 10-inch Dobsonian with a 5mm eyepiece that gave me a magnification of 240X. The night was slightly above average in both seeing and transparency, with low winds and humidity. The temperature was a mild 65°.

This small planetary nebula was presented as a bright bluish oval with high surface brightness, and a hint of brighter inner structure. I only saw this inner structure intermittently. The inner structure appeared as a brighter elliptical shaped line, whose visibility came and went as the seeing changed. There was no central star visible on this night. In retrospect, I think that maybe I should've used a filter to bring out this detail.

# DEEP SKY OBSERVATION FORM

CONSTELLATION :

Praco

OBJECT:

NGC 6543  
Cat's Eye Nebula



Day & Date: Thurs, May 6, 2010 W  
Time (local): 11:20 PM EDT  
Time (UT): 09:20 Fri, May 7, 2010  
Observer: BLB  
Location: Mt. Airy Granite Overlook  
on the Blue Ridge Parkway

## INSTRUMENT

Telescope: 10" Dob  
Aperture: 254 mm  
Focal Length/Ratio: \_\_\_\_\_  
Eyepiece: 5 mm  
Magnification: 240x  
Field of view: 00° 15'  
Filter: None

Seeing (1-5): 3/5  
Transparency (1-7): 4/7  
Limiting Magnitude: 5.6+  
Temp: 65°F Wind: 5-10 mph  
Humidity: 50%

## OBJECT

RA: 17 hr. 58 min. 39 sec.  
Dec: +66 d. 37 min. 59 sec.  
Type: Planetary Nebula  
Listed Magnitude: 8.1  
Listed Size: 23" x 17"  
Altitude of Object: \_\_\_\_\_

## NOTES

This Planetary Nebula is a bright oval with a hint (approx.  
20% of time) of a brighter structure that is more of an ellipse.  
no central star is visible