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

September 2012

NGC-6826 (Caldwell 15) The Blinking Planetary In Cygnus

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-6826 (Caldwell 15) The Blinking Planetary In Cygnus

NOTE: Though this was the 2010 Summer Supplemental object, we liked it well enough to bring it back as the official object for September.

NGC-6826, also known as Caldwell 15, is more commonly known as the Blinking Planetary.

Our very own James Mullaney along with his partner, Wallace McCall noted the blinking effect in an August 1963 *Sky & Telescope* article, again in January 1966 "Finest" series and then in an October 1966 response to the January "Finest" letter. Jim actually named it the Blinking Planetary (also see his observational notes below). Combining these notes, descriptions and response, it makes plain that Jim Mullaney was the first to coin the name Blinking Planetary for this object.*

Though other planetaries may exhibit the same visual phenomenon, this is the nebula that is the most well-known for blinking. At mag. 8.8, it lies just above the left arm of Cygnus' northern cross.

Discovered by William Herschel in 1793, it exhibits the odd phenomena where the bright central star obliterates the central structure of the nebula when looked at directly. However, when moving the eye to the side using averted vision, the structure pops out. Looking directly and then with averted vision over and over again produces this blinking that reveals structural details. In smaller scopes, the observer may only see the central star at first. However, looking to the side, the nebula pops out. This phenomenon is a bit different in larger scopes as the nebula can be seen directly but the structural detail is wiped out by the central star. Averted vision brings out the fine details.

Some observers have reported seeing a bluish tint to the nebula while others have only seen gray. Sky conditions play a significant role in seeing color.

The nebula has two bright patches at the extreme ends of its oval shape. These patches, known as FLIERS (fast low-ionization emission regions) provide plenty of controversy for researches who argue over whether they're stationary or expanding from the central star. More research is needed to determine the correct answer. Those bright patches are very difficult to see visually except with the largest scopes. However, they can be photographed.

One final feature is a vague haze beyond the rim of the nebula. It's most easily seen in photographs and may not be possible to see visually.

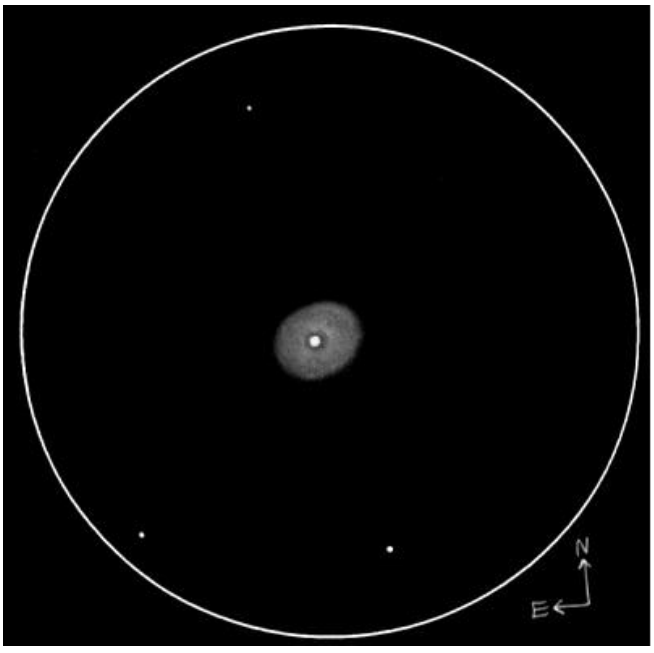
***NOTE:** Tom English supplied us with the source articles for this information.

Observations/Drawings/Photos

Jaakko Saloranta: Observer from Finland

As is typical of Finland in September-December, it has been rainy, cloudy and misty. Luckily, I had a short window last night to sketch NGC-6826 for you guys. Too bad I couldn't do a better sketch in better conditions.

Observed on September 30, 2012 with an 8-inch Dobsonian. Sky conditions were poor with a NELM ~4.5, scattered cloud and 99% moon visible in Pisces at an altitude of 20°. It was visible as a non-stellar star @ 38X (1° 23') of gray color. The mag. 11 central star was burning clearly in the center of the nebula. Elongated in the ESE-WNW direction with a size of ~25" X 20". With a high magnification of 400X (6'), the ring structure was quite evident and some mottling was visible close to the central star. The bright inner ring surrounding the central star wasn't visible. The "blinking effect" was not apparent. The FLIERS were invisible in this weather as was the outer halo. Good contrast with an O-III.



David Blanchette: Observer from Nevada

Below is a 90-second exposure at prime focus on a 12-inch SCT, with an f/6.3 focal reducer. There seemed to be more detail on my computer screen seen through the red plastic light shield. I couldn't seem to duplicate this by adjusting the color with some image software. Next time, I may try adding a red filter to camera. I should also drop the focal reducer, as the object is on the small side.

Glenn Chaple: Observer from Massachusetts

We're very happy to welcome Glenn Chaple to the Observer's Challenge.

I've been an avid amateur astronomer since the summer of 1963 when a high school friend showed me Saturn through his telescope. I went on to major in astronomy at the University of Massachusetts, then spent 2 years as a planetarium instructor and another 32 as a middle-school science teacher. My favorite activities in amateur astronomy include variable star observing and capturing sky objects within the reach of small-aperture telescopes, especially double stars and asteroids. The launch pad for most of my astronomical adventures is the backyard of my home in Townsend, Massachusetts. I currently write the monthly "Observing Basics" column for *Astronomy Magazine* and am a member of the Amateur Telescope Makers of Boston and the American Association of Variable Star Observers.

I hadn't seen the "Blinking Planetary" in quite awhile, so was prompted by your email to check it out again. I viewed it with my 4-inch and 10-inch Dobsonian reflectors. Here are my notes from September 15, 2012 (8:30-9:15pm EDT).

"Due to its location near the zenith, extremely hard to locate with my 4-inch Dob (Jim: maybe I'd better look into a right-angle finder - my back can't handle seeking out zenith objects with a straight-through finder). Located near a pretty double star (16 Cyg). Unable to detect "blinking illusion with the 4-inch. With the 10-inch Dob and 6mm eyepiece (208X), blinking effect obvious but not immediate unless I stared at the nebula for several seconds. When I did, the nebulosity faded until just the central star was visible. A quick sideward glance and "voila," the nebula reappeared."

Rob Lambert: Observer from Nevada

As one might expect, the Blinking Planetary (NGC-6826) doesn't blink when viewed with the assistance of a video camera. In order to experience the blinking phenomenon, I had to abandon my Mallincam and observe the nebula with (gasp), an eyepiece, through my 10-inch SCT, a 16-inch LightBridge, and a 25-inch Obsession belonging to two LVAS members and friends. With the increase in size of each telescope, the blinking became less noticeable. In fact, I had to stare directly at the nebula for a couple of seconds to make it disappear in Fred's LightBridge and I almost couldn't get it to blink out in the 25-inch Dob.

My Mallincam image provided a distinct planetary-esque object that seemed to have two different regions of nebulosity. The larger and fainter region was almost circular and surrounded a smaller brighter region that appeared to be a little more oblong. I wasn't able to see the so-called Fliers that are on opposite sides of the central star, unless they were the contributors to the oblong shape of the interior region of nebulosity. Maybe with more magnification during another observing session, these might be more distinctly visible.

The image below was captured with my Mallincam VSS through my 10-inch SCT with a f/6.3 Focal Reducer in the optical path. The effective eyepiece focal length of the Mallincam was 8mm. This combination of telescope, focal reducer, and Mallincam produced a magnification of approximately 195X. Again, my images attempt to produce results similar to those of observing through an eyepiece rather than producing magazine type photos.

I hope to have my Astronomy Lab students observe this object during our observing field trip in October. I want them to experience the blinking phenomenon related to the difference in sensitivity of the cone and rod cells of the eyes. This object is a great example for demonstrating averted vision, a concept that novices have a difficult time understanding until they can actually experience it.

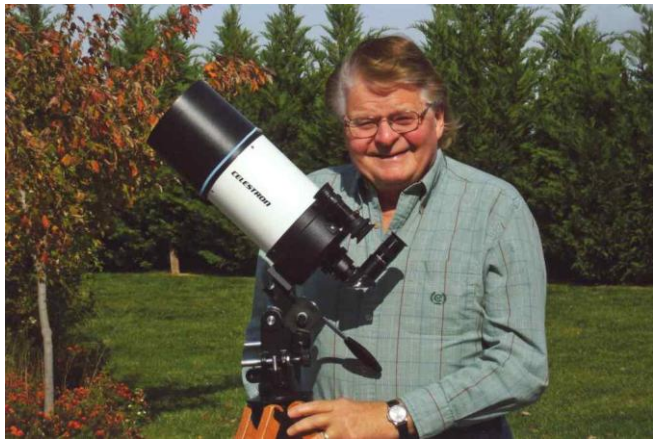
Gus Johnson: Observer from Maryland. **NOTE:** On April 19, 1979, Gus Johnson, visually discovered Supernova 1979C in spiral galaxy M-100. NASA announced on November 15, 2010, there was evidence of a black hole as a result of this supernova explosion.

This was a bright and bluish planetary with an oval shape in a 6-inch at 57X. At 148X, a bright center was noted, but not as a clearly defined star, nor were the edges sharp, but the seeing was a bit lacking. In my 4-1/4-inch reflector at 48X, it looked like a star, slightly out of focus. August 31, 1984.

In my 8-inch at 116X, the central star was easily seen and the nebula seemed bluish.

James Mullaney: Observer from Deleware

Jim Mullaney is a former assistant editor at *Sky & Telescope*, and author of 9 books including *Celestial Harvest* (Dover) and co-author with Wil Tirion of *The Cambridge Double Star Atlas* and *The Cambridge Atlas of Herschel Objects* (Cambridge University Press). He's logged more than 20,000 hours of stargazing time over the past 60 years.



I coined the name "Blinking Planetary" for NGC-6826 in the August, 1963, issue of *Sky & Telescope* and it's definitely been accepted. I've seen the blinking effect in everything from a 2.4-inch refractor and 3-inch reflector up to a 30-inch reflector and 30-inch refractor (!). But it appears most dramatic in medium-size apertures. It's at its amazing best as seen in the 13-inch Fitz-Clark refractor at the Allegheny Observatory in Pittsburgh (the instrument primarily used for "The Finest Deep-Sky Objects" *S&T* series and reprint - and the one in which Wally McCall and I first "discovered" the blinking effect). But here's what I consider really fascinating: Sir William Herschel discovered this object and often observed it, using a variety of instruments. Yet, he never mentioned its apparent blinking (nor did his son, Sir John). Could it be that the planetary has evolved since that time and its visible light has shifted its peak wavelength enough to make it supersensitive to averted vision when it previously wasn't?

Buddy Barbee: Observer from North Carolina

This observation was made Thursday, August 27, 2010 from Hagan Stone Park in Pleasant Garden, NC. I used my 4-inch refractor, with a 7mm eyepiece for a magnification of 125X. The night was below average in seeing and transparency, with low winds. It was hazy with high humidity. The temperature was a mild 71º F.

This was the first time since the fourth of July that I've been able to get a telescope out for viewing. This summer has really not cooperated with anyone wishing to do anything astronomical unless you've looked at the sun. Take heart though, the Blinking Planetary is still blinking.

I had some difficulty finding this planetary nebula in the magnitude 3.5 early evening sky with the haze, light pollution and the moon on the horizon about to rise, but I did. I found NGC-6826 using a 24 mm eyepiece, providing a magnification of 37X. At this magnification, the nebula looked like a small bluish disk amid all the pinpoints of light that were stars. Having found the nebula, I changed to the 7mm eyepiece for a magnification of 125X. At this magnification, the central star was easily visible amid a dim circular haze with direct vision. Placing the planetary nebula in the center of the field-of-view and looking high and to the right, putting the nebula in my averted vision sweet spot, the nebula looked much larger and was brighter than the central star, making the central star appear to disappear. You could immediately look back only to see it disappear, seeing only the central star and the dim haze around it. Hence, the blinking effect. Looking at the star, then away and back again as many times as you like always makes me laugh. Try it and see if you don't laugh too.

DEEP-SKY OBSERVATION FORM

CONSTELLATION: Cygnus

OBJECT: NGC 6826
Blinking Planetary

Day & Date: Aug 27, 2010
Time (local): 9:35 PM EDST
Time (UT):
Observer: BLB
Location: Hagan Stone Park
Pisgah Garden, NC

Seeing (1-5): 3/7
Transparency (1-7): 5/7
NELM: 3.5±
Temp: 71°F Wind: 2-3 mph
Humidity: 55%

INSTRUMENT
Telescope: TV-102
Aperture: 4"
Focal Length/Ratio: 880mm f/8.6
Eyepiece: 7mm
Magnification: 125x
Field-of-View: 00°22'
Filter: None

OBJECT
RA: 19 hr. 44.8 min.
Dec: +50 d. 31.5 min.
Type: Planetary Nebula
Listed Magnitude: 8.8
Listed Size: 27"x 24"
Altitude of object: 80°±

NOTES

The Blinking Planetary at 37x with my 24mm eyepiece looks like a small Hazy ball. At 125x with my 7mm eyepiece, the central star is visible in the center of the nebular haze. Using averted vision the nebula appears much larger and brighter than the central star, making both the nebula disappear and you only see the central star in the dim circular haze.

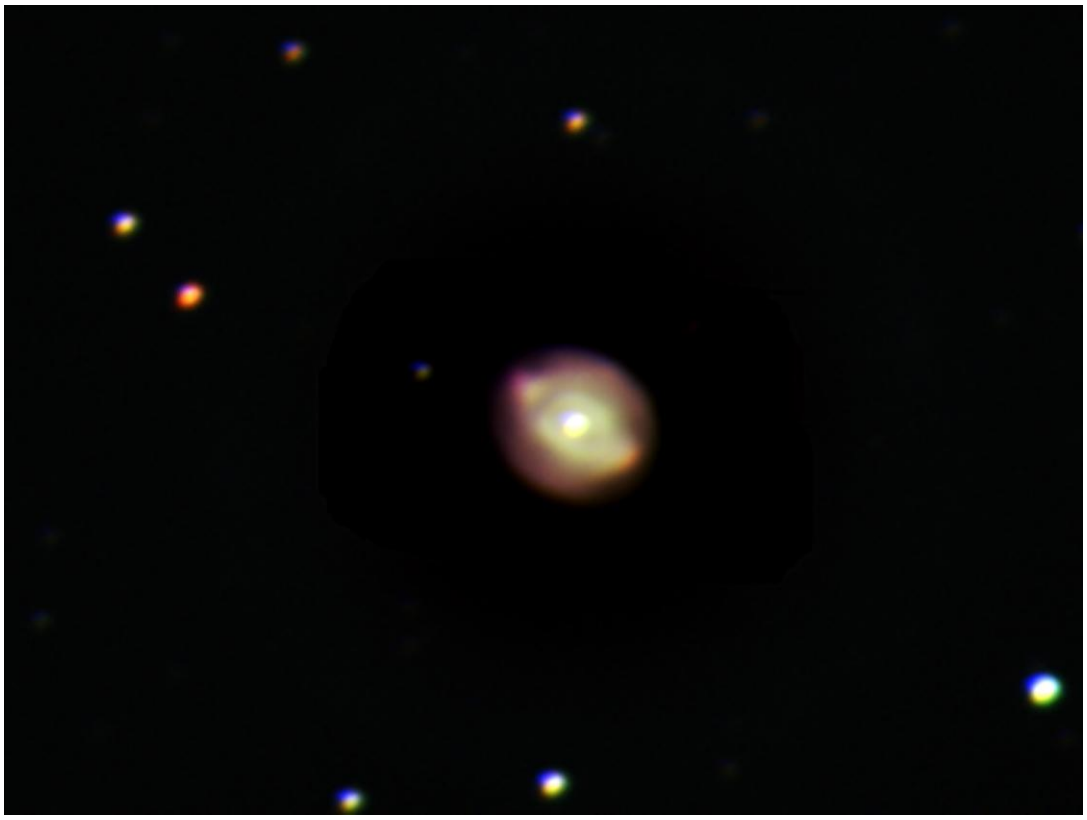
Jim Gianoulakis: Observer from Las Vegas

NGC-6826 (also known as Caldwell 15) is a planetary nebula located in the constellation Cygnus. It's commonly referred to as the "blinking planetary". The explanation per James O'Meara's Deep Sky Companion – The Caldwell Objects, is directed at how our eyes are constructed. Cone cells are responsible for visual acuity with little sensitivity to light while rods are sensitive to light. This is why with averted vision, the planetary nebula's outer shell seems to "blink" in and out of view as the observer's eye wanders.

A distinctive feature of this nebula is the two bright patches on either side, which are known as FLIERs, or Fast Low-Ionization Emission Regions. They appear to be relatively young, moving outwards at supersonic speeds. According to Bruce Balick (University of Washington), "some of their observed characteristics suggest that they are like sparks flung outward from the central star late in the very recent past (a thousand years ago).

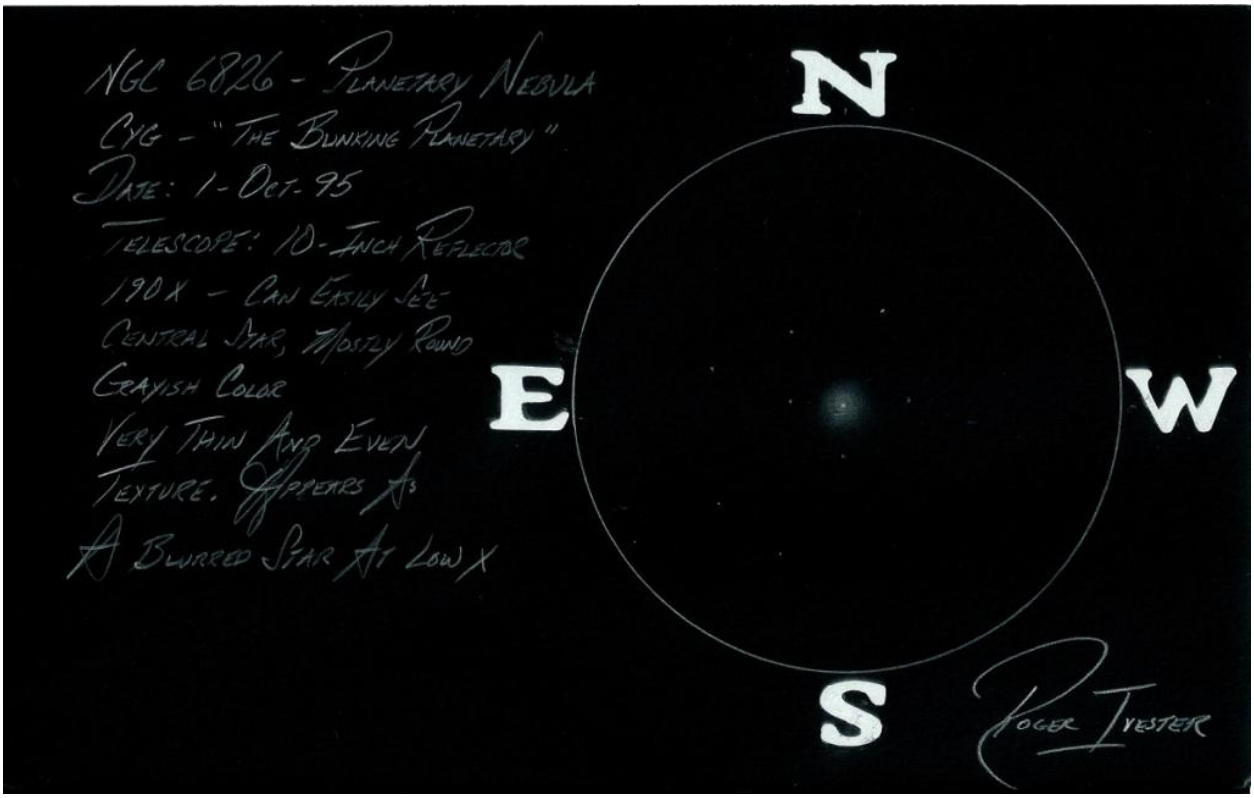
This was a difficult object to image because its' small size required a very long focal length to capture much detail. I photographed it with a 14-inch SCT at F/11 utilizing a focal length of over 3800 mm. This produced an image scale of approximately .28 arc seconds per pixel which far exceeded the seeing at my location. Well, you do what you do.

The image itself is made up of 30 sub-frames (10X Red/Green/Blue) of 5 minutes each. These were calibrated using darks, flats and dark flats.



Roger Ivester: Observer from North Carolina

NGC-6826 is also known as the "Blinking Planetary," so-called because when observed with direct vision, the outer nebula appears to vanish, leaving only the central star. When viewed with averted vision, the nebula reappears. This phenomenon can be observed in scopes as small as 2-inches. When observed with a 10-inch reflector at 190X, this planetary appears as mostly round, grayish in color, and fairly bright. The surrounding nebula is fairly thin, with a translucent appearance, and uneven edges. The mag. 11 central star appears very bright when observed with a 4-inch refractor, or 10-inch reflector.



Debbie Ivester: Observer from North Carolina

On Saturday night, October 13, 2012, my husband, Roger, asked if I would be part of an experiment. He was telling me about a planetary nebula that was named "The Blinking Planetary." He said that when looking directly at the object, the nebula surrounding the central star would disappear. I'm not a skilled observer, but he was interested in my perception of the planetary, so I agreed, however, dubious of the blinking effect. The 10-inch reflector was already set-up in the backyard and I used a magnification of 114X.

I looked into the eyepiece and could immediately see an object that was different from the other stars in the field. It looked like a bloated star, and it had a subtle bluish tint. I noticed the color difference immediately. Roger asked me to look from left to right, and then look directly in the center. Wow! I was surprised to see the outer part of the star disappear, and then when looking toward the edge, it would reappear. The central star was pretty easy to see with both direct and averted vision. I must admit this was a lot of fun, and I was pleasantly impressed with "The Blinking Planetary."

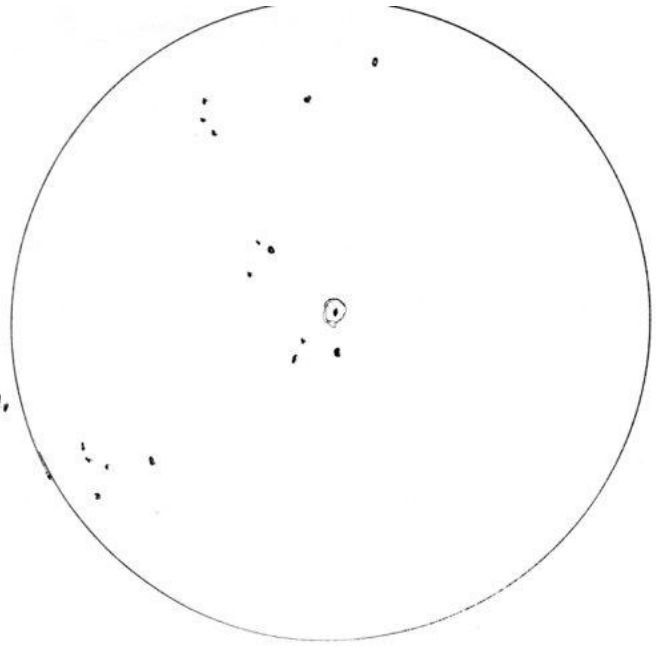
Fred Rayworth: Observer from Nevada

I was glad to have another chance to observe this unique planetary, especially under the dark skies of Cathedral Gorge State Park in central-eastern Nevada. At an elevation of 4,800 feet, the skies can be really great and they certainly were for me the night I observed it. Despite high thin clouds moving through, I caught a break and found the tiny planetary right where it was supposed to be.

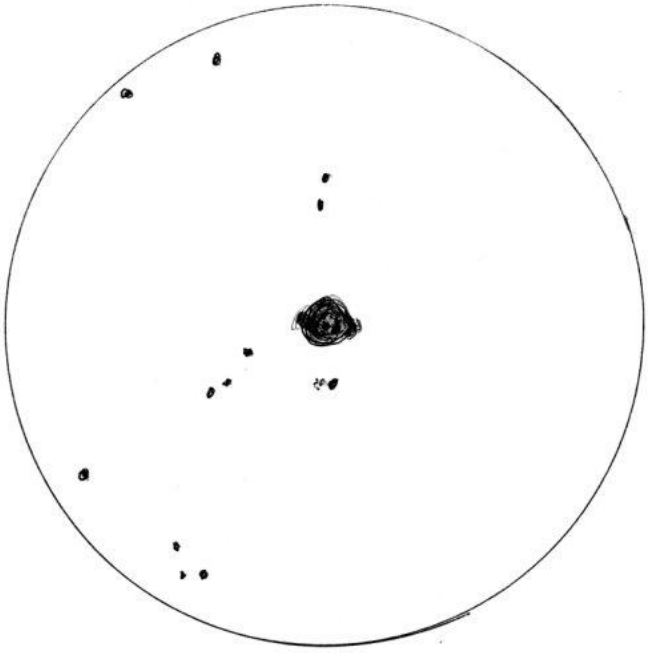
As with the last time I observed it in 2010, at low power, this time 102X, it was a star with a nebulous halo around it. However, when I used averted vision, the hollow ring filled in. I played with the effect, making the nebula blink in and out. The star and outer ring dominated while the vaporous nebulosity was a ghost that only appeared at the edge of my eye. I could detect no details or color in it.

All that changed when I cranked the magnification up to 390X. The nebula filled in and I could not get it to blink no matter what I tried. It was a solid ball. Not only that, but between blurs, which were due to the slightly unstable conditions up there, it would settle down and I got some incredible views of slight mottling within the delicate membrane between the central star and the outer ring. Not only that but I detected the Fliers, a slight flaking of the edges, on opposite sides on one axis. It was very slight, but definitely there. I don't remember seeing this in 2010, maybe because I was using different eyepieces. Also, it might have been the location. Either way, I really enjoyed revisiting this planetary. The only downside was that I could detect no color. Later that night, I found several other planetaries in the neighborhood that provided stiff competition for Uranus and Neptune in the color spectrum.

NGC-6826
102X
Looking to the side, it fills in.



NGC-6826
390X
Solid with direct vision.



Jay and Liz Thompson: Observers from Nevada

Jay and Liz Thompson observed NGC-6826 on several occasions with a variety of telescopes at two locations. These were:

September 14, 2012: 10-inch f/6.3 SCT at Cathedral Gorge State Park, NV

September 15, 2012: 17.5-inch f/5 Newtonian at Cathedral Gorge State Park, NV

September 18, 2012: 10-inch f/3.9 Newtonian at Henderson, NV

September 20, 2012: 14-inch f/11 SCT at Henderson, NV

The appearance of NGC-6826 was similar in the two 10-inch telescopes, notwithstanding the different locations and optical layouts. Blinking of the planetary nebula was evident in the magnification range of 113X to 263X. The central star was most visible using direct vision, with the nebula "blinked out", at 160X to 200X.

With the 14-inch and 17.5-inch telescopes, the effect was more of fading than blinking. A nebular haze could be seen around the central star when using magnifications around 250X and direct vision. The nebula was very bright when using averted vision.