MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

January 2022

Report #156

NGC 1501 Planetary Nebula in Camelopardalis

Sharing Observations and Bringing Amateur Astronomers Together

Introduction

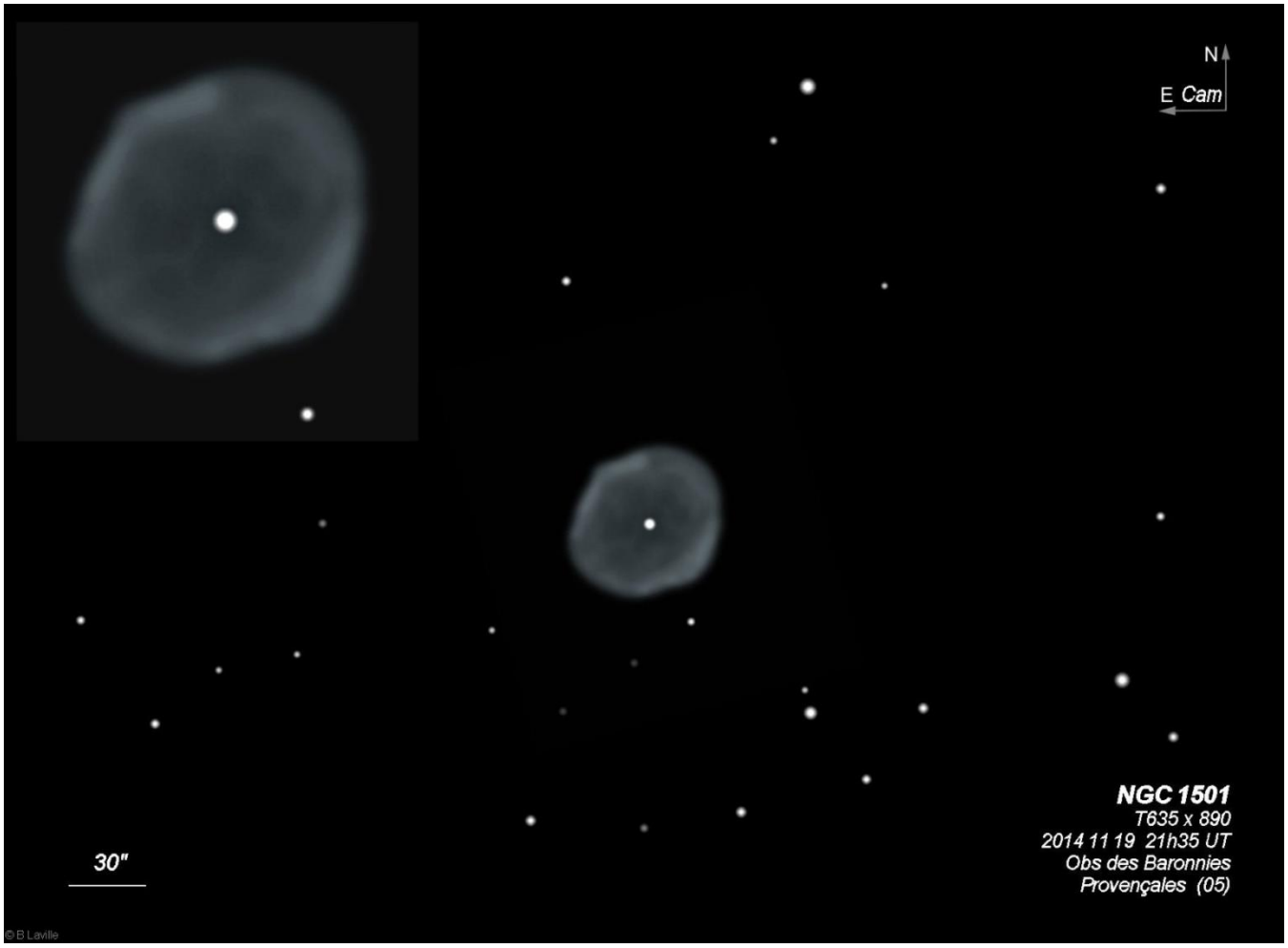
The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It's open to everyone who's interested, and if you're able to contribute notes and/or drawings, we'll be happy to include them in our monthly summary. Visual astronomy depends on what's seen through the eyepiece. Not only does it satisfy an innate curiosity, but it allows the visual observer to discover the beauty and the wonderment of the night sky. Before photography, all observations depended on what astronomers saw in the eyepiece, and how they recorded their observations. This was done through notes and drawings, and that's the tradition we're stressing in the Observer's Challenge. And for folks with an interest in astrophotography, your digital images and notes are just as welcome. The hope is that you'll read through these reports and become inspired to take more time at the eyepiece, study each object, and look for those subtle details that you might never have noticed before.

This month's target:

William Herschel discovered NGC 1501 with his 18.7″ reflector on 3 November 1787. As handwritten by his sister Caroline, his description, reads: *A very curious Planetary nebula near 1' diameter. Round, pretty-well defined of a uniform light and pretty bright.* Not surprisingly, the open cluster NGC 1502, sitting just 1.4° north of the nebula, was the next discovery in Herschel's sweep.

Lawrence Parsons (the 4th Earl of Ross) and his assistant Ralph Copeland observed NGC 1501 several times with the 72-inch Leviathan.. Perhaps the best description comes from Lord Rosse's observation on 15 January 1868: *A bright ring and inside it a dark annulus, very decided. A star in the centre seen very clearly and continuously with various powers; suspect variable [unequal?] brightness in the ring, perhaps a dark spot in it nearly on the preceding* [western] *side. The following* [eastern] *side of the ring appears broadest and to approach the central star nearer than the preceding side does. The north and south sides of the ring seem rather brighter than the preceding and following sides. Suspect other bright points in it, but am not at all certain. It is slightly elliptical, its major axis being preceding and following.*

Bertrand Laville: Observer from France



Date of observation:	20 November 2014 21:35 UT
Duration de of observation:	60 min
Position of the object:	Alt: 64.5°, Az: 37.9°
Observing conditions:	SQM at zenith 21.25 Seeing~1.0"!!! NELM(UMi) 6.4 Transparency 2 (1 very good to 5 very bad) Light pollution 2.5 (1 very good to 5 very bad) Seeing 2 (1 very good to 5 very bad)t
Observing location:	Observatoire des Baronnies Provençales
Instrument:	TN 635 Dobson Obsession
Principle eyepiece:	TeleVue Nagler 3.5mm Type 6
Magnification:	890×

You can see more of Bertrand's sketches at: http://www.deepsky-drawings.com/

Uwe Glahn: Observer from Germany

Objects: NGC 1501

Telescope: 16″ f/4.5 Newtonian

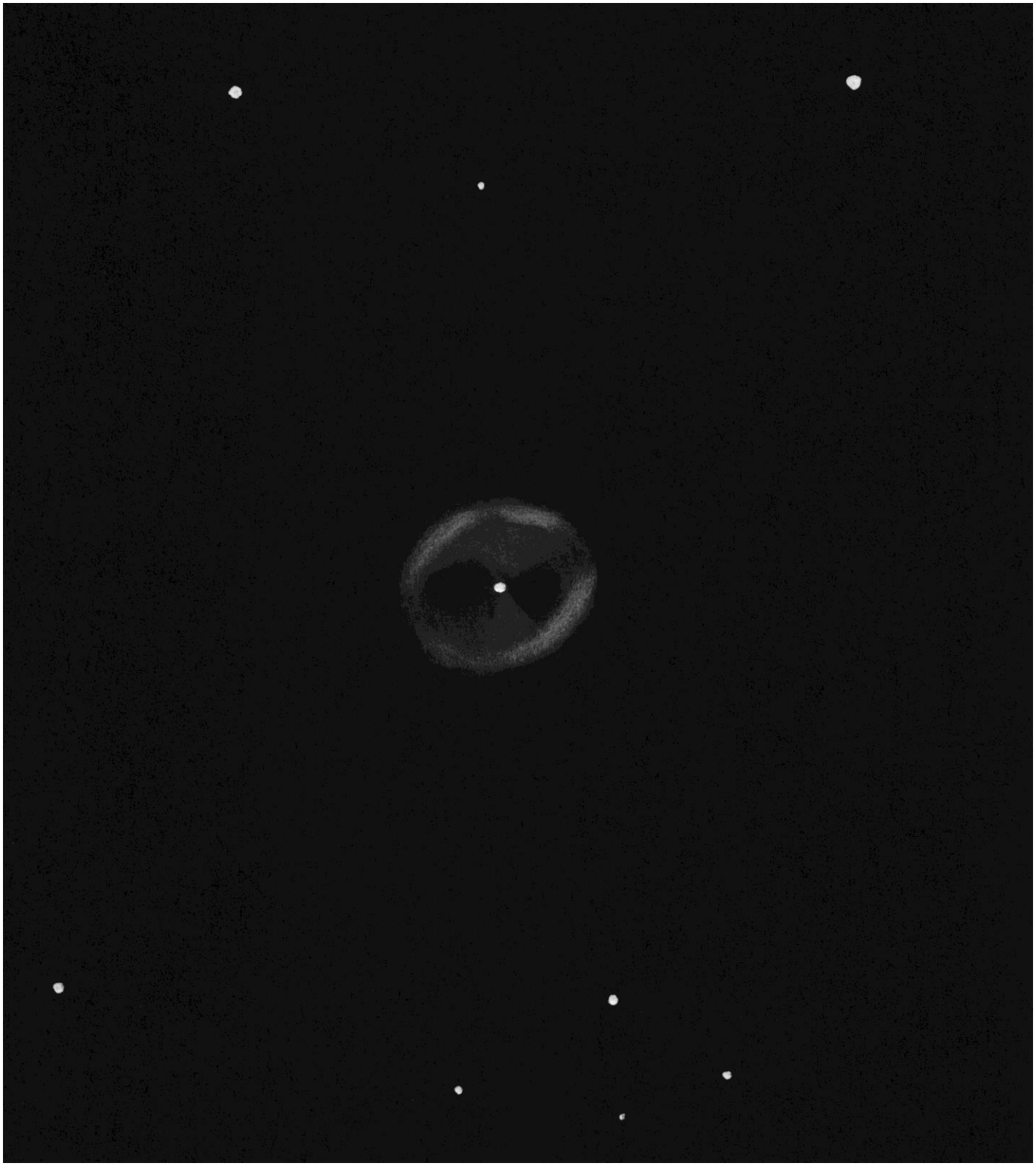
Magnification: 450×

NELM: fst 6m8

Seeing: V

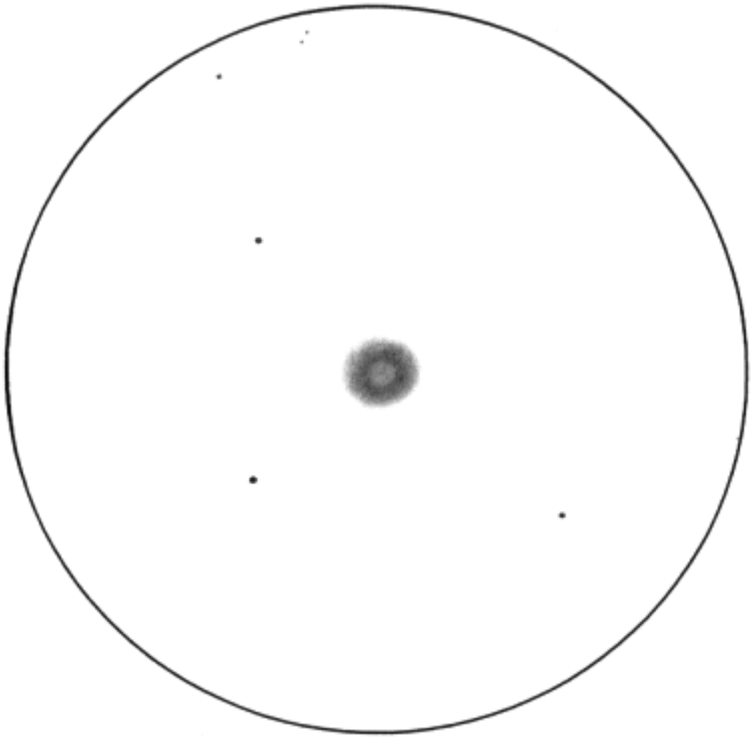
Location: Fuscher Törl

You can see more of Uwe's sketches at: http://www.deepsky-visuell.de/



Jaakko Saloranta: Observer from Finland

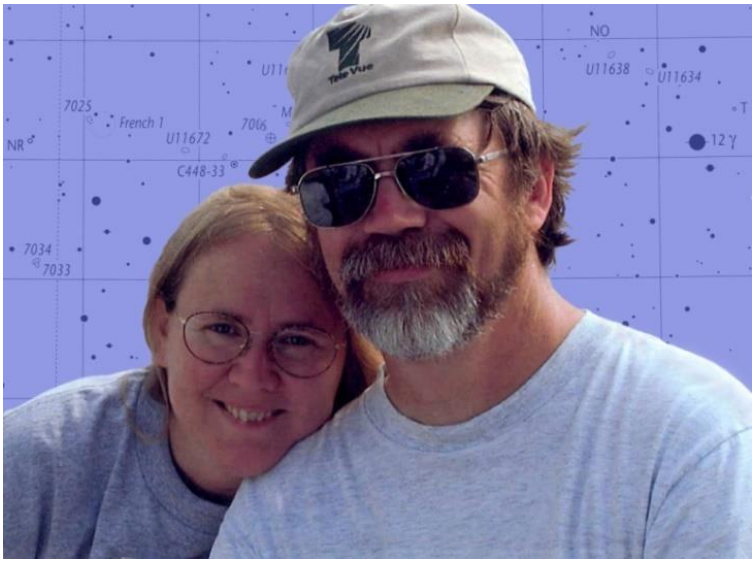
Description: Faint, but pretty large. Ring structure quite easy. No central star.
Original field notes: Ring.

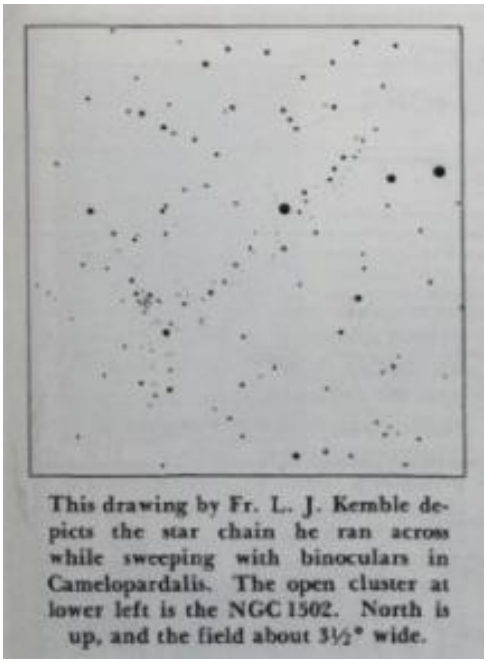


Obs. place: Rajakylä, Vantaa, Finland
Date: 10./11.10.2004
NE Lim.mag: 5.9^{m}
Background sky: 3
Seeing: 3
Weather: -0°C, cold breeze from N.

NGC 1501 with 8″ SkyQuest @ 196×

Sue French: Observer from New York





This drawing by Fr. L. J. Kemble depicts the star chain he ran across while sweeping with binoculars in Camelopardalis. The open cluster at lower left is the NGC 1502. North is up, and the field about 3½° wide.

The planetary nebula NGC 1501 is easily visible as a little gray disk through my 130-mm refractor at 23×. At 102× it appears about 50″ across with a slightly fainter center. The annulus shows much better with a narrowband filter. It also responds to an O III filter, but the view is a bit dimmer.

Through my 10-inch scope at 171× NGC 1501's central star winks in and out of view. An O III filter makes the planetary's annular nature a little more apparent, but the central star disappears. At 220× the nebula looks blotchy and its darker center shows fairly well with averted vision.

With my 14.5-inch scope at 245× under rather pathetic conditions, NGC 1501 was surprisingly very pretty. No filter was needed to enjoy its annular nature.

In some photos, the central star resembles a pearl at the heart of a textured oval shell, a combination giving this planetary its nickname of the Oyster Nebula. Visually, an O III filter improves the view of the shell's structure, but its pearl disappears.

The open cluster NGC 1502 perches 1½° north of the Oyster Nebula. My 130-mm scope at 23× displays four single stars and a line of four star pairs. At 102× I see 31 stars, with several nice pairs and trios, occupying 7′. The group's dominant pattern reminds me of a crossbow.

NGC 1502 guards the southern end of Kemble's Cascade, a charming asterism formed by a fall of stars plunging southeastward for 2½°. With 12×36 binoculars, I count 19 stars. Most are 7th- to 9th-magnitude, but a lone 5th-magnitude star ornaments the chain.

Father Lucian J. Kemble of Canada chanced upon this group while scanning the sky with 7×35 binoculars. He called it a "beautiful cascade of faint stars tumbling from the northwest down to the open cluster NGC 1502." Kemble mailed his description and a drawing to Walter Scott Houston, who published it in the December 1980 issue of *Sky & Telescope*. Thereafter, Houston called this striking alignment Kemble's Cascade.

Glenn Chaple: Observer from Massachusetts

There are two major reasons why this month's Observer's Challenge, the planetary nebula NGC 1501, is largely unobserved. First of all, it's located in the extremely faint circumpolar constellation Camelopardalis. Star-hoppers will have a rough time navigating around a constellation that lacks stars brighter than 4th magnitude. A second reason has to do with its published magnitude, 13.0 in a number of web sources and observing handbooks. That's faint enough to scare away anyone observing with a small-aperture scope! But 13.0 is its photographic magnitude. Its visual magnitude is a more accommodating 11.5.

Although NGC 1501 can be viewed with small-aperture scopes under dark-sky conditions, its mottled appearance requires larger instruments. The 14.5-magnitude central star will challenge an 8-inch telescope. Embedded in the surrounding nebulosity like a pearl in a shell, it gives NGC 1501 its nick-name, the Oyster Nebula.

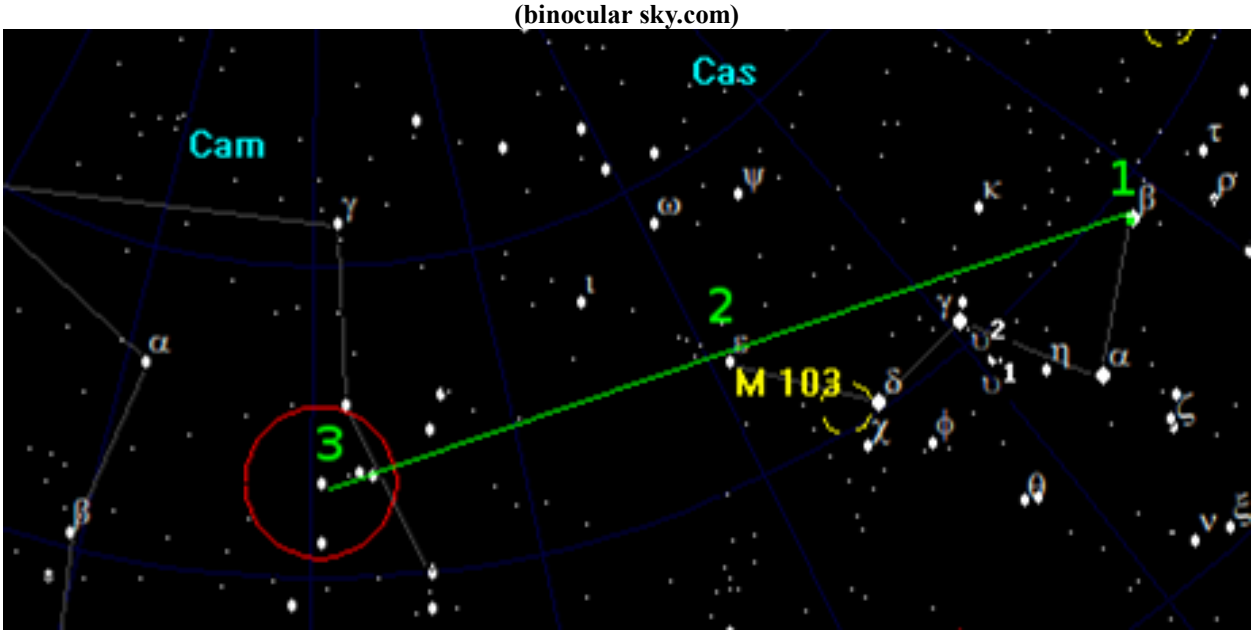
If you own a GoTo scope, you can get to the Oyster by punching in its 2000.0 celestial coordinates: RA 04^{h} 06^{m} 59.4^{s}, DEC +60° 55′ 14.4″. Star-hoppers can begin at nearby Kemble's Cascade, a remarkable asterism consisting of a 2½ degree-long near-straight chain of some 20 magnitude 7 to 10 stars punctuated near the middle by a 5th magnitude star. To find the Cascade, make a low-power (25-30×) search of the area marked by a line drawn from beta (β) to epsilon (ε) Cassiopeiae and extended an equal distance beyond (refer to finder Chart A). Once you've found it, keep the low power eyepiece in place and take a moment to admire this stunning stellar arrangement. At its southernmost end, you'll spot a tiny sprinkling of stars. This is the open cluster NGC 1502. A switch to a higher magnification (60-75× will reveal several dozen stars of 9th magnitude and fainter surrounding a pretty double star (Struve 485, magnitudes 6.9 and 6.9, separation 18 arc-seconds). If you had gone directly to NGC 1502 via GoTo technology, you would have missed an amazing asterism, a neat little star cluster, and an attractive double star. Your final leg of the star-hop takes you 1.4 degrees south of NGC 1502 (refer to Chart B). Once the Oyster comes into view, you'll want to switch to the highest magnification your telescope and the seeing conditions will allow.

My first encounter with NGC 1501 was via a 3-inch f/10 reflector (Edmund Scientific's Space Conqueror) on the evening of February 2, 1986. According to the notes I wrote in my logbook it was "very faint, but definitely seen. Visible at 60×." A sketch made with 120× shows the roundish form I saw. I was surprised to see this planetary at all, as my source gave a magnitude of 13.3, and I estimated it to be more like 11.0.

NGC 1501 was discovered by William Herschel on August 27, 1787. Its estimated distance is around 5000 light-years, which translates to an actual dimension of 1.3 light-years.

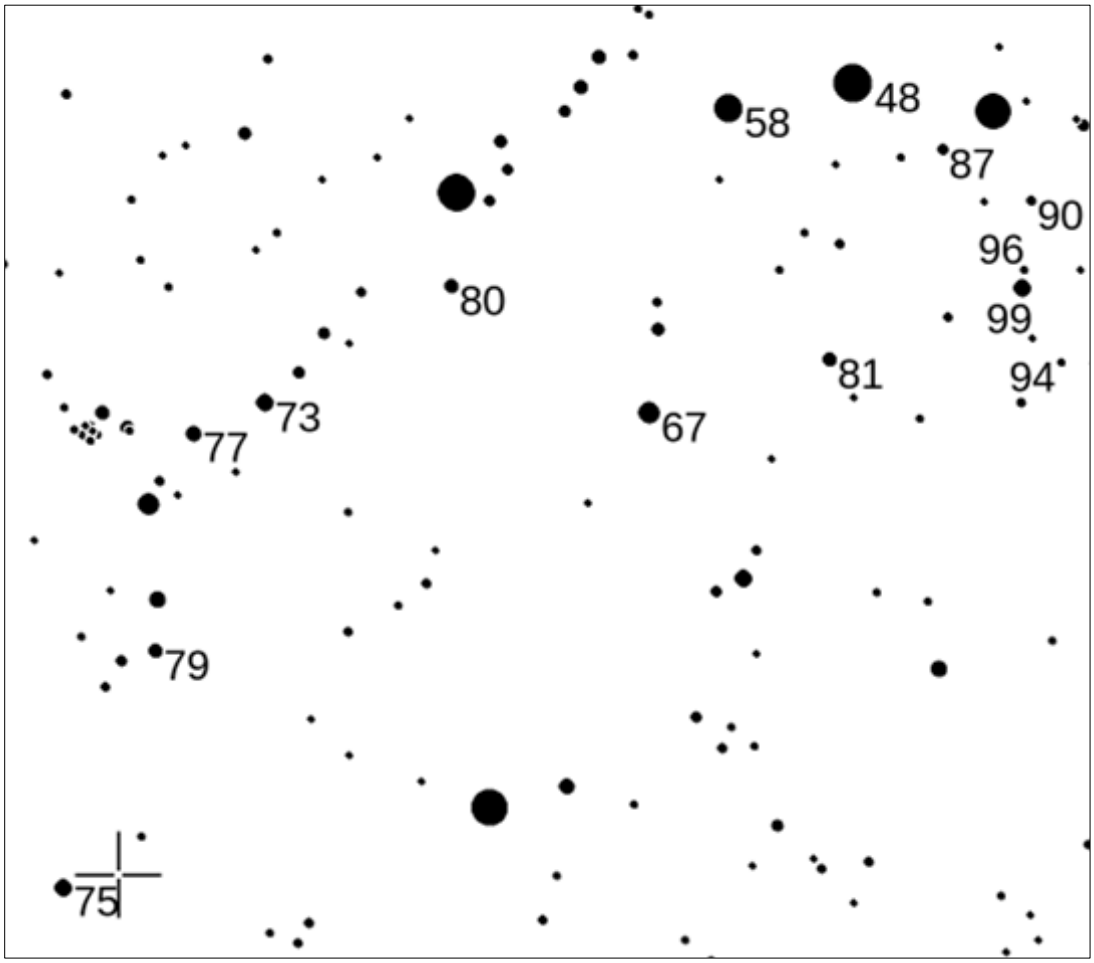
FINDER CHART A Star-hopper's path to Kemble's Cascade

(binocular sky.com)



FINDER CHART B

(Created using the AAVSO's Variable Star Plotter [VSP]. Stars plotted to magnitude 10.0. Numbers are stellar magnitudes, decimals omitted. Field is 3 degrees square, with north at the top. Kemble's Cascade is the chain of stars running diagonally from middle top to middle left. NGC 1502 appears just left of the magnitude 7.7 star in the Cascade. NGC 1501 is labeled with an + at bottom left.



Joseph Rothchild: Observer from Massachusetts

I observed NGC 1501, a small planetary in Camelopardalis on January 4, 2022. I observed with my 10 reflector on Cape Cod.

The object was easily found at the end of Kemble's Cascade. It was best seen with my 14-mm eyepiece at 102×. It appeared as a faint oval, approximately the same size as the well-known planetary NGC 2392, but much fainter. I did not detect the central star or any internal structure. I also could not appreciate any internal structure with my NBP filter, but the planetary did appear brighter with it.

Mike McCabe: Observer from Massachusetts

OBSERVATION LOG - OBJECT: NGC 1501

DATE JAN 4, 22 Y/Z TIME 20:15 /Z EST LOCAL OBSERVING LOCATION 42°N, 71°W

SCOPE/APERTURE 10" F5 NEWTONIAN

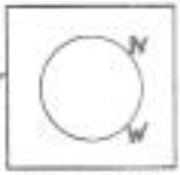
EYEPIECE 21mm, 9mm MAGNIFICATION 52x, 140x

FILTER — SEEING 2/5 TRANSPARENCY 2/5

TEMP 20°F BARO PRES — WIND W 5-7

COMMENTS:

THIS NEWTONIAN OBJECT WAS VERY PLEASING IN THE EYEPIECE. IT WAS EASILY DISCERNIBLE AT LOW POWER AND HELD ITS VISIBILITY AT HIGHER POWERS. A VERY GREY BACKGROUND SKY PREVENTED ANY STRUCTURE FROM BEING DISCERNED ON THIS LARGER THAN JUPITER PLANETARY NEBULA.



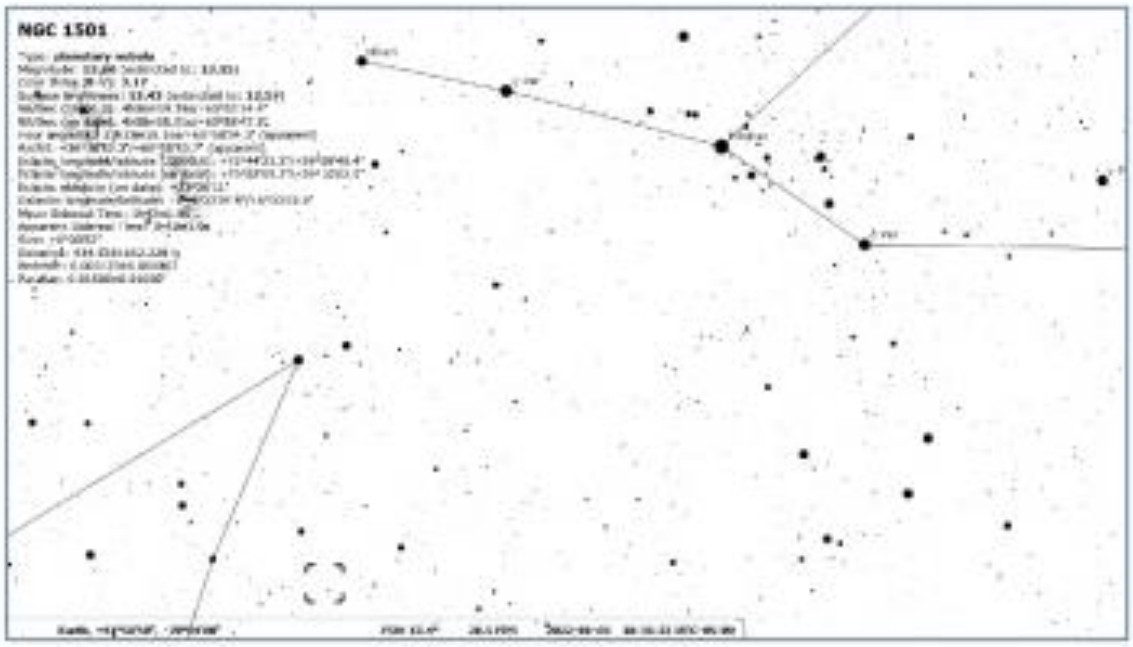
ORIENTATION AND/OR ROTATION

NGC 1501 is a planetary nebula situated in the constellation Camelopardalis, which of course denotes a giraffe, not a camel. This was a fun object to observe on a cool winter evening. I found that you can't believe the magnitudes you see listed for this object as you cruise around the internet trying to find out more about it. In my experience they were not fairly representative of the viewability of this object in the eyepiece, as I found it to be really quite visible in just a 10-inch scope.

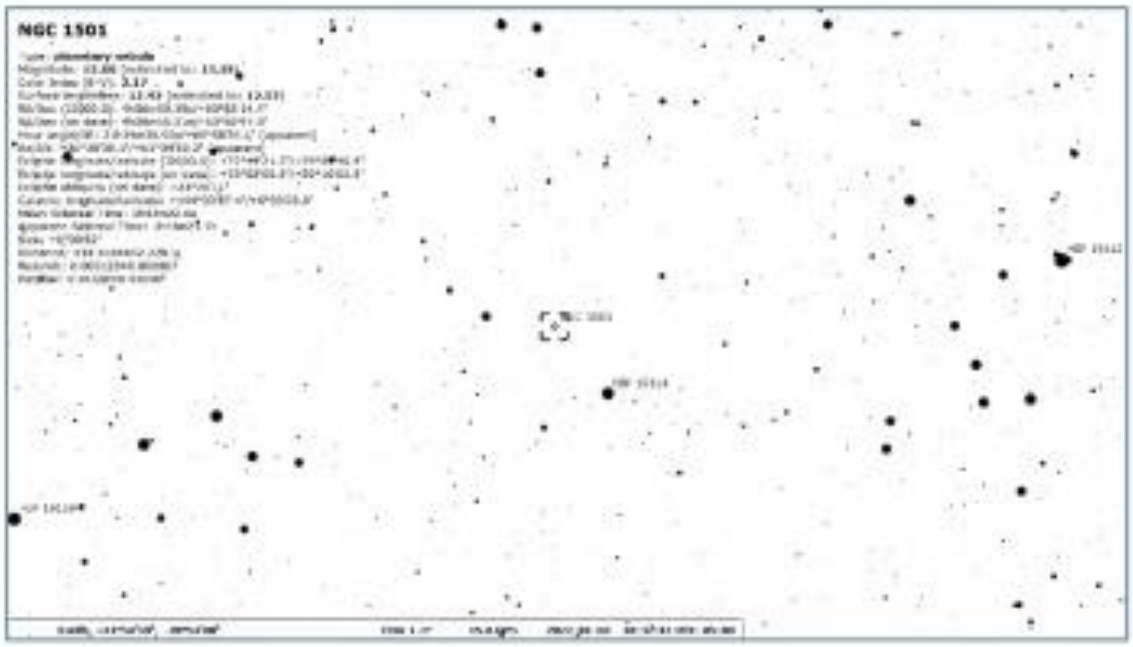
Included in my report are the charts I used to locate NGC 1501, with my Dobsonian-mounted 10-inch Newtonian reflector, and also the sketch and notes, made at the eyepiece.

The eyepiece view section of the sketch form was then inverted and adjusted in GIMP. Something to note would be the grey level of background sky. It was really that bright, which I thought would hurt the view, but the planetary nebula still presented itself very well.

January 2022 – NGC 1501 – Planetary Nebula in Camelopardarlis



Finder Chart



Eyepiece Chart

Larry McHenry: Observer from Pittsburgh, Pennsylvania

January: NGC 1501 – Planetary Nebula – Camelopardalis; $mag_v = 11.5$; Size 52″

RA: 04h 07m; Dec: +60° 55′

NGC 1501 (planetary nebula): Located in the fall constellation of Camelopardalis, "The Giraffe," glowing at +13th magnitude and is about 4,240 ly distant.

The "Oyster Nebula" displays a central star embedded in the center of the planetary's mottled circular nebulosity. The planetary is visible without using filters, but a narrowband filter helps to bring out internal details.

NGC 1501 was first observed on November 3rd, 1787 by William Herschel using his 20-ft telescope, who described it as "*a pretty bright planetary nebula, near 1' in diameter. Round, of uniform light and pretty well defined*…."

Video-Capture/EAA:

11/06/2021: from dark-sky location at Calhoun County Park, WV.

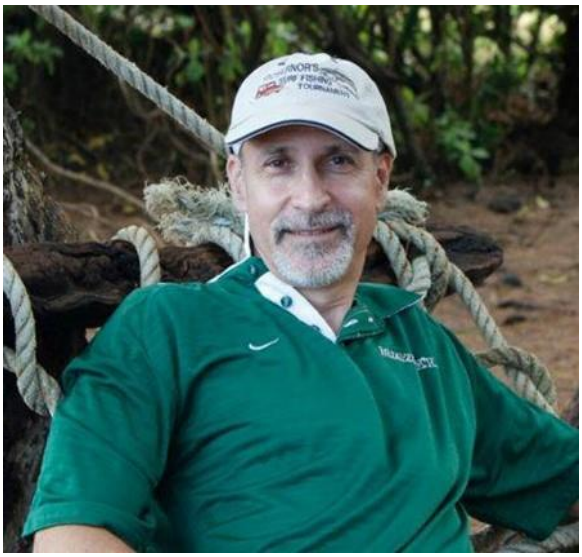
Using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, with a CMOS color camera and narrowband filter @ 60-second guided exposure, livestacked for 5 minutes. More camera/mount details on my website. http://stellar-journeys.org

Image follows.

Mario Motta: Observer from Massachusetts

Planetary nebula, NGC 1501, image taken with my 32-inch telescope f/6.5, ZWO ASI6200 camera, with narrow band filters (Ha, S2, O3)

James Dire: Observer from Illinois



NGC 1501, the Oyster Nebula, is a planetary nebula in the constellation Camelopardalis. The nebula was discovered by William Herschel on August 27, 1787. Camelopardalis is a very faint constellation. So star hopping to NGC 1501 is very difficult. The nebula lies approximately 7 degrees west of 4th -magnitude Beta Camelopardalis. The nebula is also about 60% of the way from Beta Camelopardalis to the magnitude 4.26 star CS Camelopardalis.

The nebula shines at magnitude 11.89 and is 0.9 arcminutes in diameter. The Oyster Nebula's central star is magnitude 14.5. The star has spectral class WC4, which tells us the star is red, has very little hydrogen in its spectra, and has a strong carbon spectral signature.

I took an image of NGC 1501 with a 132mm f/7 apo using a SBIG ST-2000XCM CCD camera on January 26, 2022 from rural Hartford County, Maryland. The seeing was near one arc second and the sky transparency was excellent. For this image, I used a Optolong L-eNhance filter which only passes light around the blue hydrogen beta and oxygen III and red hydrogen alpha wavelengths. The Full Width Half Maximum (FWHM) is approximately 30nm centered on O-III and 15nm centered on H-alpha. The exposure was 120 minutes.

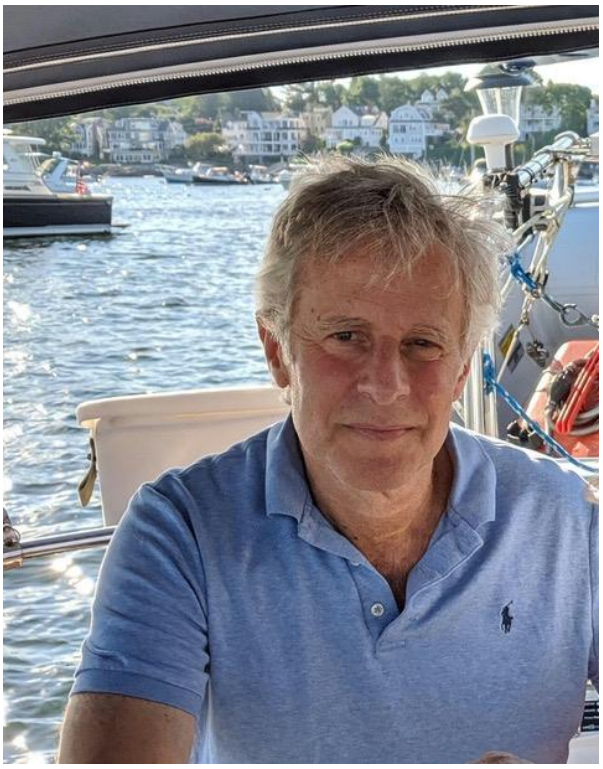
As seen in the uncropped image, stars that radiate much more in the red than blue appear red, while stars that radiate more in blue than red appear blue. Stars that radiate equally in red and blue appear white in the image. The nebula radiates strongly in blue light and viewing it is benefited by an O-III filter.

The brightest star in the full image is HD 25734. This is a magnitude 7.44 *B*9 white star. The faintest stars in the image are slightly dimmer than magnitude 15.

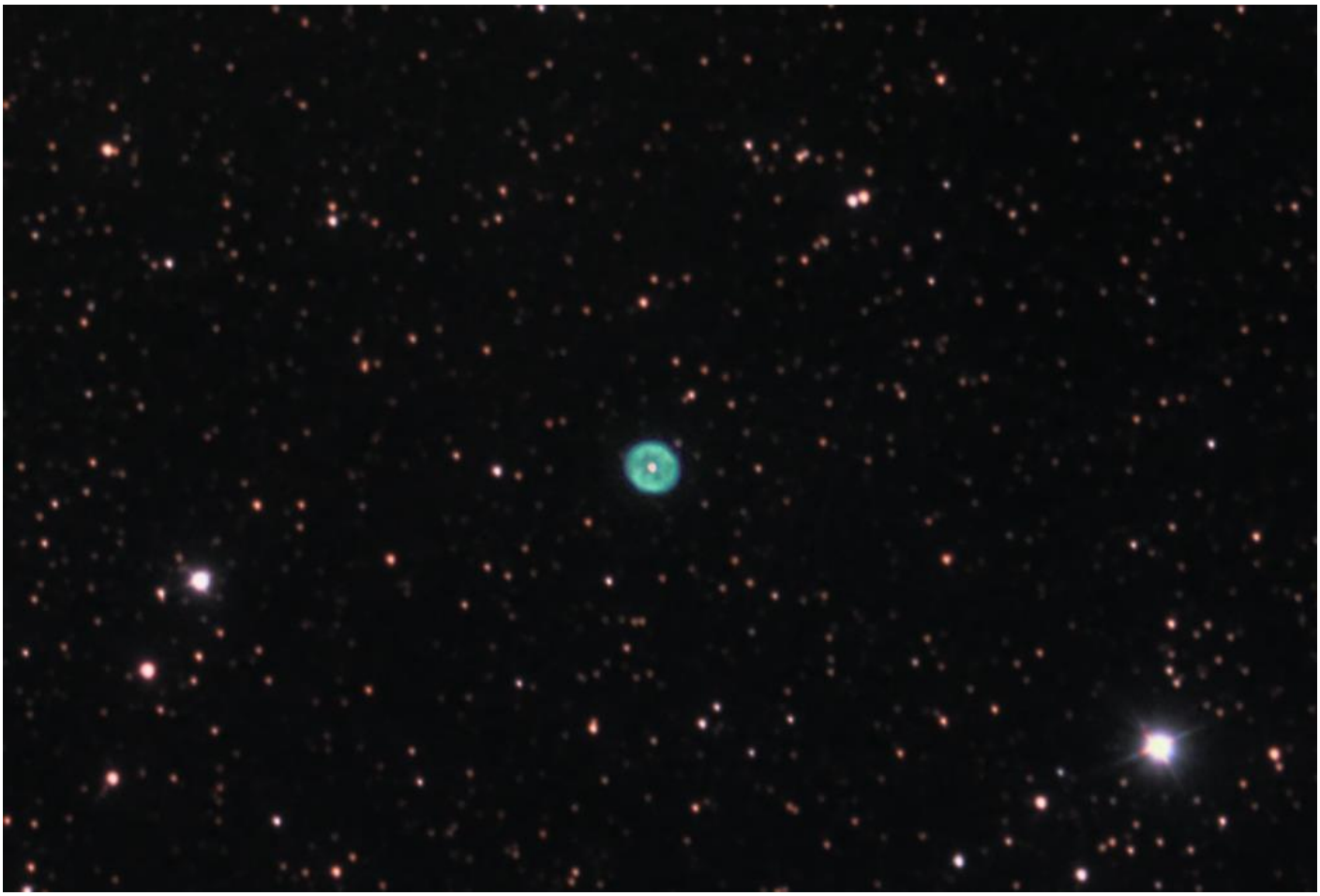
The cropped and enlarged image shows some of the structure within the planetary nebula. I was surprised at how much structure could be captured with a 5.2-inch telescope. Hubble images of NGC 1501 show myriad filaments and voids inside the nebula. There are some faint red hydrogen emissions in the nebula and the red central star was easily resolved.

Visually the nebula appears as a blue disk. Its appearance is similar to the planet Neptune with high magnification. The central star is too faint to see in small to medium amateur telescopes.

Barry Yomtov: Observer from Massachusetts



January's challenge object is a small (0.863 arc minute) planetary nebula, NGC 1501 (also known as the Oyster Nebula). The fast f/2.2 optics of the RASA 11 provides limited detail of the complex structure. The bright central star is very distinguishable within the image. The following image was taken on January 4, 2022 with 88 stacked images at 30 second per exposure for 44 minutes total exposure.



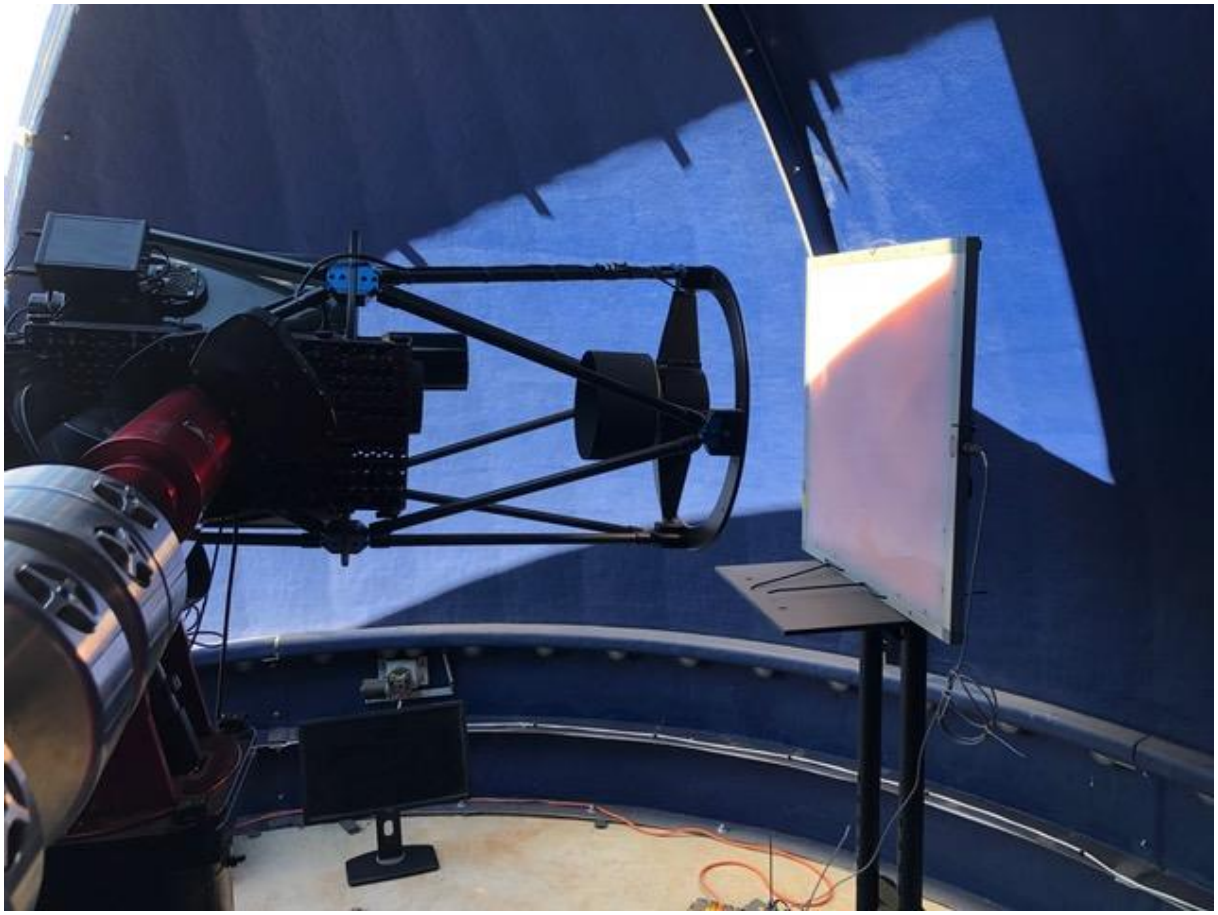
James Gianoulakis: Observer from Las Vegas

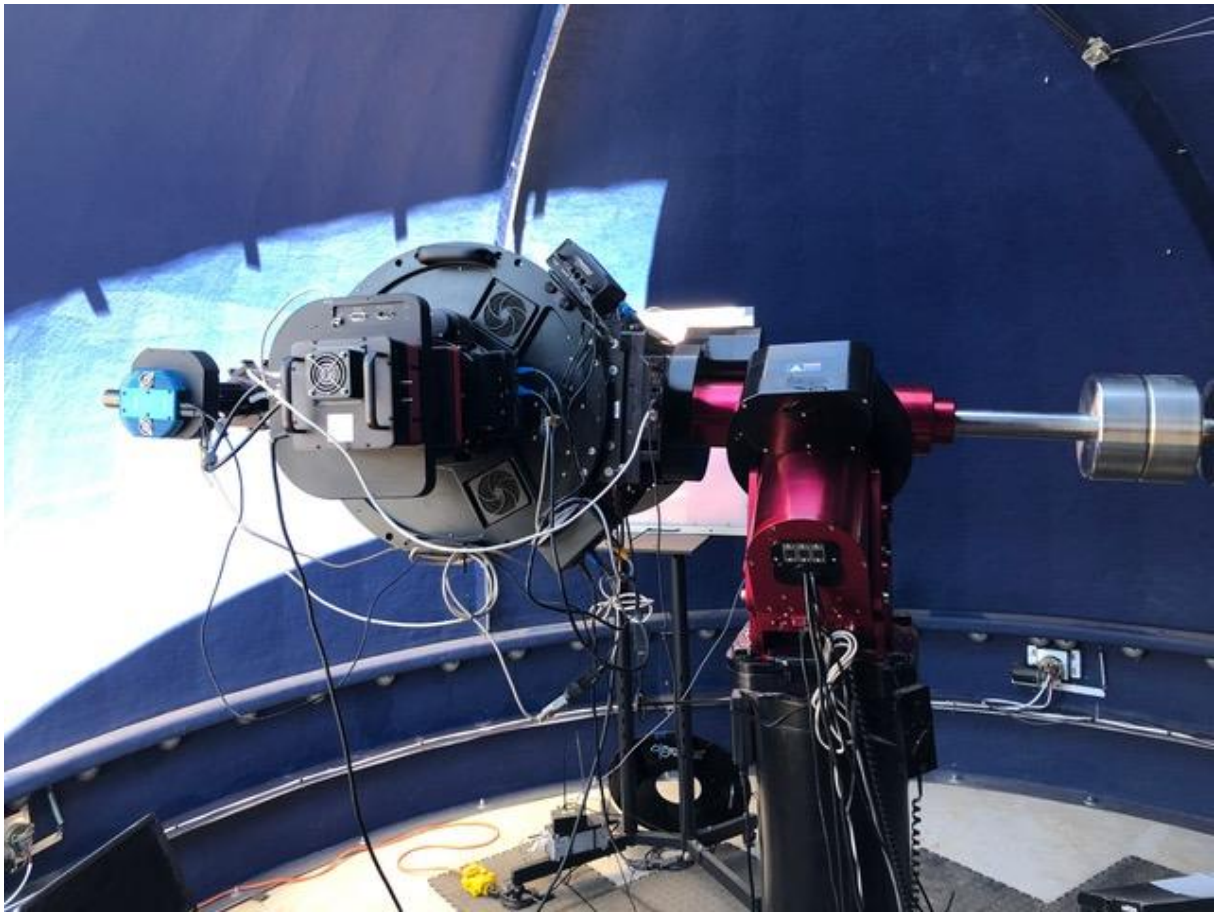
NGC 1501 Planetary Nebula: AKA The Oyster nebula.

The object was discovered in 1787 by William Herschel and resides in the constellation Camelopardalis. The object is approximately 5000 Light Years from Earth. There is a lot going on in this small planetary nebula. The central star is a pulsating star similar in nature to a Wolf-Rayet star. It's brightness changes regularly. The brightness of the object can change significantly in 30 minutes.

57 × 60 seconds blue Photo data as following:
Instrument: Planewave CDK 17, Detector: STX 16803
58 × 60 seconds Luminance
58 × 60 seconds Red
57 × 60 seconds Green
230 minutes (3 hours 50 minutes) total integration.

I tried a new technique (for me) on this image. My ability to guide is unavailable currently so I took 60 second unguided images (a lot of them) through LRGB filters to produce a color image. Processed in PixInsight. My first shot with PixInsight. Incredible software, I've just scratched the surface. Adam Block has a set of tutorials that really helped with the learning curve. https://www.adamblockstudios.com/





Gus Johnson: Observer from Maryland

October 1992: Very easy using a 4.25-inch reflector at 38x appearing fairly large, but dim and with an oval shape.

February 1997: 6-inch (Cave) reflector at 59×, very easy, and so very close to Kemble's Cascade.

I was using a 20mm Erfle, which was given to me by the late Thomas Cave, while in Long Beach. In the mid-1950's, I drove from my home in Pittsburgh to Long Beach to pick up an 8-inch Cave reflector, which I had ordered earlier.

Roger Ivester: Observer from North Carolina

NGC 1501 – Planetary nebula in Camelopardalis

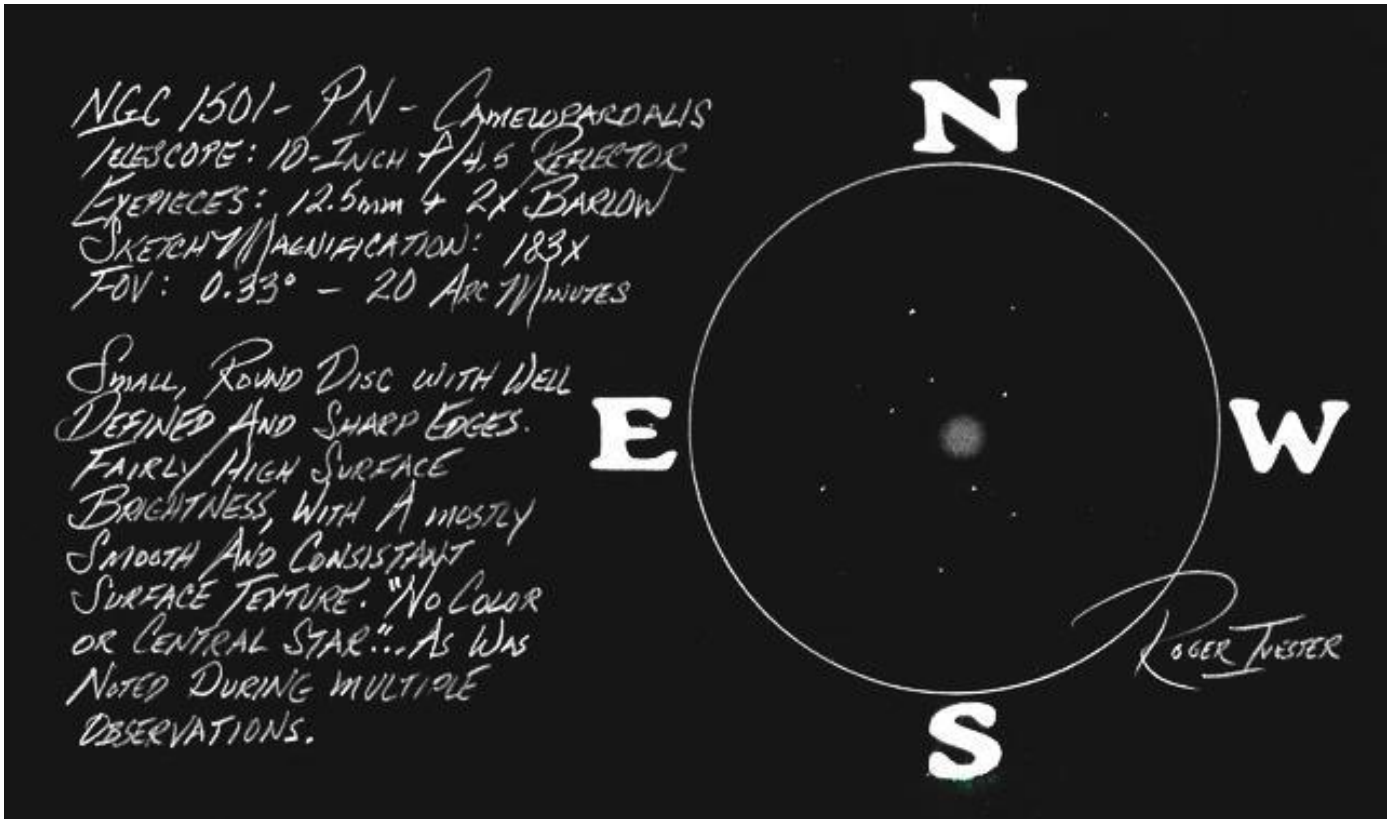
Telescope: 10-inch f/4.5 reflector

Sketch magnification: 183×

Field-of-view: 0.33º – 20 arc minutes

Small, round disc with well-defined edges. Fairly high surface brightness with a mostly smooth surface and without color. The central star requires a much larger telescope.

Sketch follows.



The following is the complete listing of all Observer's Challenge reports to-date.

https://rogerivester.com/category/observers-challenge-reports-complete/