MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

Compiled by:

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&

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NGC-6853 (M-27) The Dumbbell Nebula In Vulpecula

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-6853 (M-27) The Dumbbell Nebula In Vulpecula

NGC-6853 or M-27, known as the Dumbbell Nebula or the Apple Core Nebula is a fascinating summer object and is easily seen in almost any sized scope. It gets its name from the distinct dumbbell shape. Most planetaries are round and larger than a star, and because many of the smaller ones resemble planets, got the name "planetary nebula." They come in a variety of colors, sizes, and shapes. In fact, speaking of color, many objects in the sky are gray and devoid of color. However, many have distinct bluish or greenish tints to them. If you have an 8-inch or larger scope, you have a good chance of seeing those colors. Some have even seen color in as small as 4-inch scopes. If you do not know your way around the sky, it's well marked in the star charts found in *Sky & Telescope* and *Astronomy* magazines.

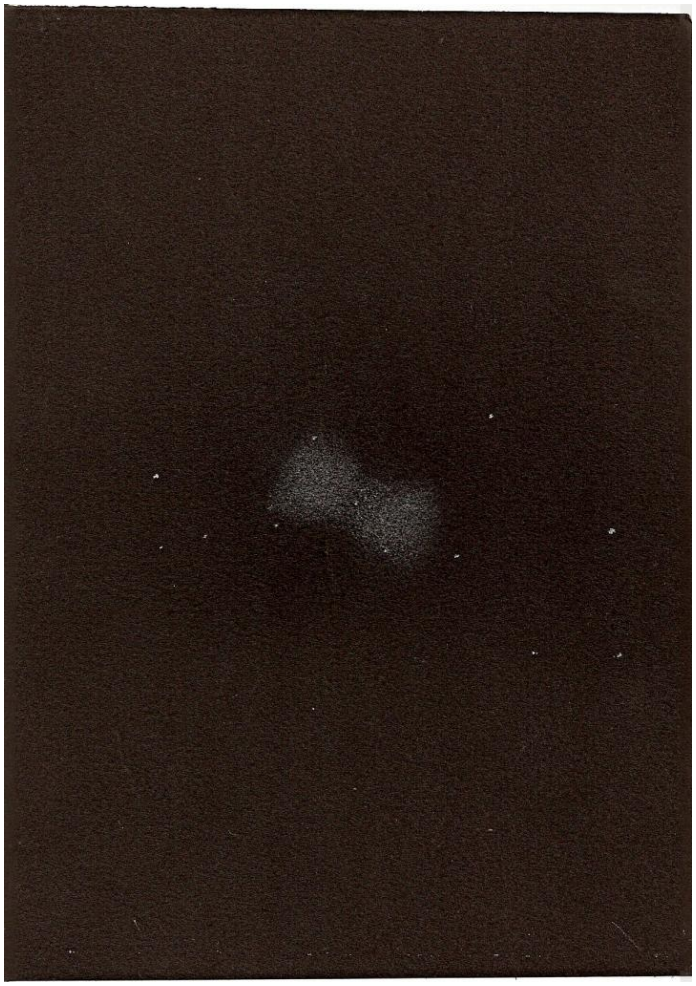
The challenge is to see more than just the dumbbell shape or a fuzzy blob. There are also several stars within it.

Observations/Drawings/Photos

Roger Ivester: Observer from North Carolina

M-27, the Dumbbell nebula was easy to see through a 7 X 50 finder as a small and fairly bright, elongated glow. When I observed it through a 10-inch reflector, the dumbbell was presented as two bright lobes joined in the middle. The SW lobe was brighter with greater concentration and I also noted some subtle knots. The texture of the Dumbbell was very uneven.

With the 10-inch, I couldn't see the faint extensions between the lobes as shown in many photographs, however the hourglass shape was very easy. I saw a mag. 9 star just off the west edge at medium power. When increasing the magnification to 190X, using a 12mm eyepiece and a 2.0X Barlow, I saw the very faint central star. It was difficult and I could only glimpse it with averted vision during moments of steady viewing. It was fleeting in and out and I couldn't hold it constantly. There were at least two other stars that would pop in and out of view, also with difficulty.



While observing M-27 with a friend and local observers through a 14.5-inch reflector, I saw two bright lobes and an hourglass shape with the faint extensions, presenting an almost round appearance. The central star was very easy at 85X as well as several other stars within the nebula.

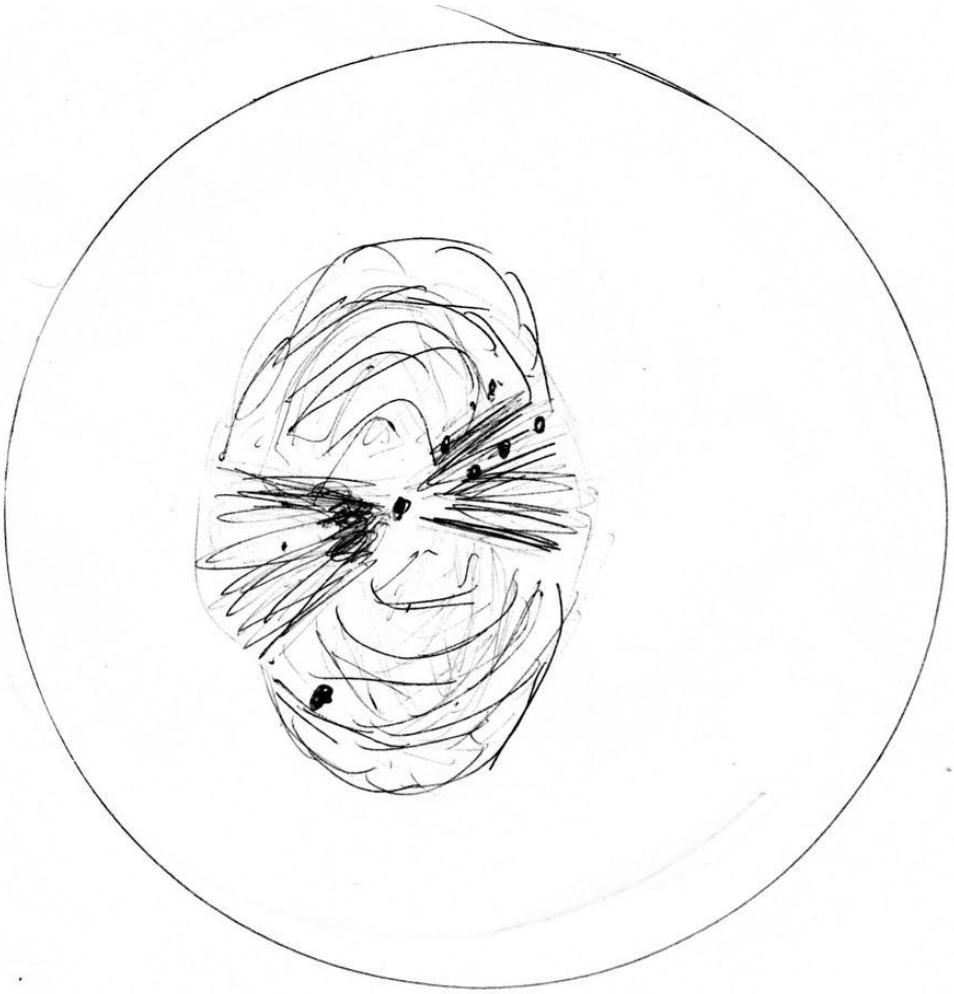
John Mallas of the *Messier Album* could see color with his 4-inch refractor, but I haven't been able to see color with any of the scopes that I've used.

When observing M-27 with either a 4-inch refractor or a 3.5-inch Maksutov-Cassegrain, the nebula had a very uneven texture and some brighter knots. The dumbbell shape appeared mostly as a rectangle, but upon careful examination with higher magnification, I could easily see the two lobes. I couldn't see any superimposed stars with either of the small scopes.

Fred Rayworth: Observer from Nevada

I've observed M-27 hundreds of times and have actually recorded those observations 19 times since July, 1982. I've most often noted a greenish tint to it, fuzzy to flaky edges, and various intensities of the dumbbell shape. However, I've never made note of the stars or star patterns.

On August 15, 2009 at Sawmill Trailhead, Nevada, despite an unpleasant experience with a park ranger, I managed to view M-27. My equipment was a 16" f/4.5 Dobsonian, a 26mm eyepiece (70X), a 2X Barlow, and an O-III nebula filter. I noted the dumbbell shape going one direction and a fainter oval going the other. I saw no stars at 70X. However, at 140X, the central star jumped out and there was a slight lumpiness to one side of the center. The O-III filter brought out the nebulosity at both 70X and 140X but obliterated the stars within it. I saw three stars for sure, and as many as seven within the nebula. A pair of pinpricks flashed in and out that may have been fainter stars also. However, I didn't notice the color this time, despite the altitude (7,400 feet). I didn't see the devil face, and forgot to look at the star background that the nebula is set within.



m-27

Rob Lambert: Observer from Nevada

I observed M-27 with the assistance of my Mallincam Color Hyper Plus video camera. I used 14, and 28 second integrations to explore it. At 14 seconds, I saw more color within the nebula – primarily bluish green from the center out toward the periphery where the gas and dust became pink or red as it became more dense.

At 28 seconds, I lost most of the color but was able to see more of the nebula's structure. Rather than the dumbbell shape typically seen at the eyepiece, I discerned more of a rugby ball shaped shell, with nebulosity unevenly distributed across it. The portions of the nebula that obviously give the nebula its nickname were distinctly visible but mottled, indicating varying density of gas and dust throughout. The dumbbell portions of the nebula formed the more dense middle or fat part of the rugby ball shape, while the ends of the rugby ball were much less dense in nebulosity. There was noticeable symmetry in both the dumbbell lobes and in the lighter ends of the rugby ball.

There were a number of stars visible either in front of or shining through the nebula from behind. I counted at least 36 brighter stars (probably foregrounds stars) and 24 lesser stars (probably background stars) within the visible boundary of the nebula. There were several straight-line chains of three or more stars spread across the nebula running both parallel and perpendicular to the brighter lobes. I discerned the triangular devil face in the southwest lobe, which was opposite the brightest lobe. My 14 and 28 second images are oriented with north down and west to the left (images from an SCT are flipped vertically and horizontally). Two dark holes (eye sockets) were distinctly visible in the nebula, just under the downward curved shell that seems to make up the devil's down-turned horns. Two stars seemed to be eyes shining out of these two eye sockets. Two chains of three stars, running toward the northeast, gave the impression that the devil was crying. There was a spot of elongated darkening of the shell between the last two stars in these chains, which gave the appearance of the face having a mouth.

There was a bright star on the edge of the northeastern lobe from which there appeared to be a stream of matter, and a chain of four stars extending slightly to the northeast from the bright star in the nebula. The central star was distinctly visible slightly off-center from a dark area that was almost dead-center within the nebula. In the live image on the CRT, I could just make out what I thought was the companion to the white dwarf central star, just northwest of it. On the images provided, the companion would be located at about 8:30 relative to the central star. It was not obvious in the captured images.

This nebula really impresses first-time visitors/observers, especially when they begin to understand that what they are seeing is one of the phases in the life cycle of a star similar to our own Sun.

Frank Barrett: Observer from North Carolina

Frank generously allowed the use this photo of M-27 from his Celestial Wonders web site. Below are his notes explaining how he obtained this outstanding image:

"This image was first light for the Ovision worm upgrade. The image is a salvage attempt as the camera was malfunctioning and couldn't take usable dark frames. Noise was removed via Photoshop's despeckle and dust/scratch removal filters. The image is composed of 4 luminance subframes of 15 minutes each combined with the color channel from my image taken last year."

Note: This image won 2nd Place at the 17th Annual Region Meeting of Amateur Astronomers (aka "BobFest") for the category "Deep Space, CCD."

Date: September 13, 2008, Location: Gastonia, NC. Optics: 10-inch SCT at 2800mm f/11. Exposure: L: 4 X 15 min, RGB: 12 X 5 min each. Camera: SBIG STL-11000M. Mount: Losmandy G11 w/Ovision worm.

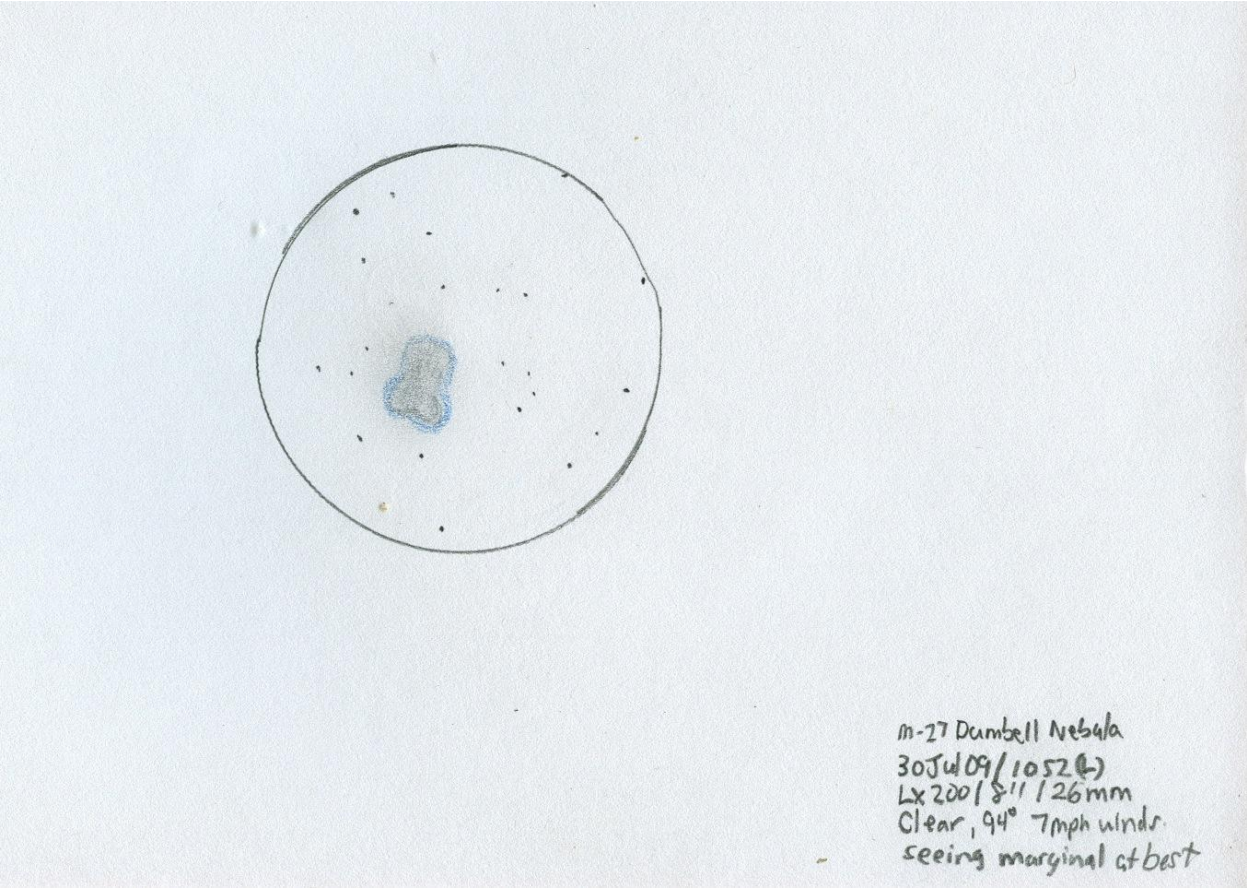
Jim Gianoulakis: Observer from Nevada

I captured this image over several nights, mostly in May before the clouds descended. It is a stack of 33 300-second exposures, dark subtracted. Stacked with Deep Sky Stacker and processed in PhotoShop.

Jason Snyder: Observer from Nevada

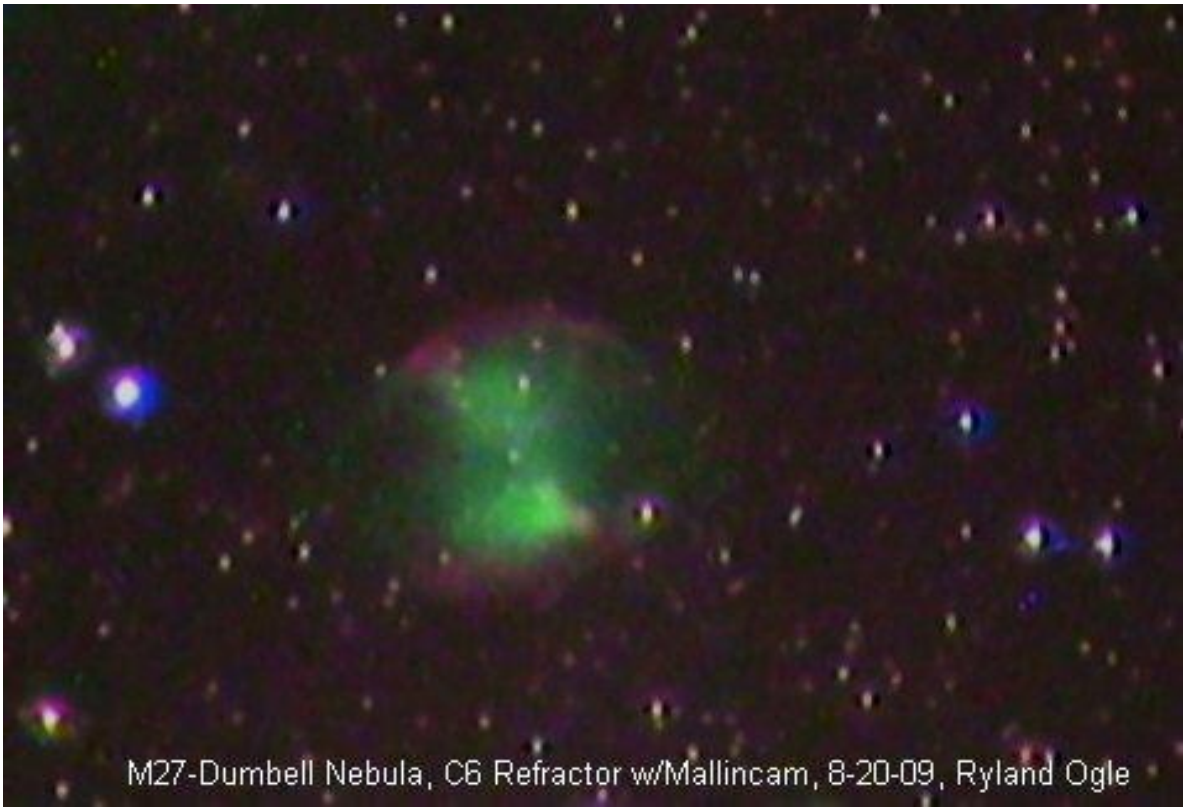
I finally got out on Friday, July 31, 2009 to observe and try M-27 again. The weather wasn't the best, and seeing was marginal. The skies were clear, with patchy clouds, finally clearing around 10:30 PM (L). The temperature was 94º and winds were around 7mph.

With the Las Vegas light dome, M-27 was barely visible using a 26 mm eyepiece, and I couldn't resolve the central star. I was able to make out a faint blue-to-gray hue of one half of the dumbbell using averted vision. I sketched what I could and managed to snap a picture of it. The camera was a Cannon Rebel XT, through a Lumicon GEG, into an 8-inch SCT F/10 scope. The bulb timing was approximately 18 seconds.



Ryland Ogle: Observer from Las Vegas

I used a 6-inch refractor for this image. I'm still learning how to use the Mallincam, but as can be seen, I didn't do too bad.



Tony Labude: Observer from Oklahoma

As for M-27, I got out on the July 21, 2009 and according to the clear sky clock, to a Bortle class-4 site with average transparency and seeing. I wished I'd gone to M-2 first (the August Challenge), but moved to M-27 instead. I used my 8-inch F/7 Dobsonian and started with 55X. I had never taken time to observe the star patterns around the nebula, but sure enough, recognized the blanket it sits upon. I also noticed two groupings similar to the Trapezium, one to the SE and the other to the NW. When I increased magnification to 120X, the image looked terrible, so I decreased magnification to 90X. That was somewhat better, but I saw no central star at that power. However, I thought I saw a star in the SE corner that might have been in the foreground. The clear sky became increasingly overcast and I saw no overall shape but a gray fluffy pillow, and no devil face. I still had fun, and it was the first time I'd observed M-27 in years.