

## HEAVENLY NEWS

“Doughnuts and Dumbbells”

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What do a dumbbell, owl, blue snowball, cat’s eye, butterfly, ant, Eskimo and doughnut have in common? Give up? These are all common names for night sky objects known as planetary nebulae. A nebula is a cloud of gas and/or dust dense enough to be seen with a telescope. These particular nebulae are clouds of gas expelled by a dying star. When a star reaches the end of its life, if it is a very large star, it will explode in a blaze of glory known as a super nova. If the star is midsize or smaller, its death results in the less spectacular, but still interesting, planetary nebula.

With the first telescopes, these objects appeared round in shape. Early astronomers called them “planetary” because they resembled planets. M57, the Ring Nebula, appears as if the viewer is looking through a fuzzy doughnut. Other mostly round examples are M97, the Owl, C7662, the Blue Snowball, NGC6542, the Cat’s Eye, and NGC2392, the Eskimo. These nebulae are more opaque, resembling soap bubbles filled with smoke. What causes these interesting shapes in the night sky?

For most of a star’s life span, the energy created by the nuclear fusion that converts hydrogen into helium balances out the gravitational forces in the star. As the star matures the hydrogen is used up. As the energy from nuclear fusion diminishes, gravity is no longer counteracted and the star contracts and heats up. As the core of the star heats up, this drives the outer opaque part of the star away from the center. The energy generated by the star’s core causes the expanding shell of gas to glow. This glowing gas is what we can see with a telescope.

With some planetary nebulae, the glowing gas takes on fanciful shapes. Two of the more well-known shapes, M27, the Dumbbell and M76, the Little Dumbbell, have two regular lobes. Several others have been named for insects. NGC 6302, the Bug Nebula, M2-9, the Butterfly and Menzel 3, the Ant, all very closely resemble their namesakes.

The night sky is sprinkled with an uncountable number of stars. Some are very young, only about a billion or so years old. Most are middle aged, and some are very old, as old as 10 billion years. Planetary nebulae are a relatively short-lived stage at the end of the life of a star. Scientists estimate that these formations last ten thousand years or so before they become too spread out to see. The gases expelled from the star continue expanding rapidly as the star cools and eventually there is not enough energy to maintain the glow.

Catch the glow every Friday, Saturday and Sunday night after sunset at the Cameron Park Rotary Community Observatory in Placerville. For more information and driving directions, check out our website, [www.communityobservatory.com](http://www.communityobservatory.com).