

The Crab Nebula, a Nebulous Remnant in the Milky Way

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Have you ever heard of the term “supernova”? A **supernova** is basically a stellar explosion that may be triggered either by turning off or suddenly turning on the production of energy of a massive star through nuclear fusion. After the core of an aging massive star ceases to generate energy from nuclear fusion, it may undergo sudden gravitational collapse that ultimately heats and expels the star's outer layers. These supernovae are extremely luminous and cause a burst of radiation that often briefly outshines an entire galaxy before fading from view over several weeks or months. During this short interval, a supernova can radiate as much energy as the Sun could emit over its entire life span. A shock wave then sweeps up an expanding shell of gas and dust which we call a **supernova remnant**.

The **Crab Nebula** is the most famous supernova remnant. This supernova was noted on July 4, 1054 A.D. by Chinese astronomers as a new or "guest star," and was about four times brighter than Venus. According to the records, it was visible in daylight for 23 days and 653 days to the naked eye in the night sky. It is one of few historically observed supernovae in our Milky Way Galaxy.

Although this nebulous remnant was discovered by John Bevis in 1731, Charles Messier, the famous French astronomer and comet hunter, independently found it on August 28, 1758, when he was looking for comet Halley on its first predicted return, and first thought it was a comet. Of course, he soon recognized that it wasn't moving like a comet, and cataloged it on September 12, 1758. It was the discovery of this object which caused Charles Messier to begin the compilation of his now famous catalog, known today as the Messier Catalog. This is why we refer to the Crab Nebula as M1 (Messier Object 1). Although Messier's catalog was primarily compiled for preventing confusion of these objects with comets, M1 was again confused with comet Halley on the occasion of that comet's second predicted return in 1835.

This nebula was christened the "Crab Nebula" based on a drawing made by Lord Rosse about 1844 and the first photo of M1 was obtained in 1892 with a 20-inch telescope. In 1921, C.O. Lampland of Lowell Observatory, when comparing excellent photographs of the nebula obtained with their 42-inch reflector, found notable motions and changes, also in brightness, of individual components of the nebula, including dramatic changes of some patches near the central pair of stars.

This object has attracted so much interest that it has been remarked astronomers can be divided into two equally sized camps: Those who do work related to the Crab Nebula, and those who don't. The Crab Nebula, located in the constellation of Taurus “the Bull,” can be easily seen under clear dark skies, but can just as easily get lost under less favorable conditions. M1 is just visible as a dim patch looking through 7x50 or 10x50

binoculars. With a little more magnification, it is seen as a nebulous oval patch, surrounded by haze. In telescopes with 4-inch aperture, some detail in its shape becomes apparent, with some suggestion of mottled or streak structure in the inner part of the nebula. Many amateur astronomers can verify Messier's impression that M1 looks indeed similar to a faint comet without tail in smaller instruments. Only under excellent conditions and with larger telescopes, starting at about a 16-inch aperture, suggestions of the filaments and fine structure may become visible.

Come observe M1 yourself in one of the 14-inch telescopes while visiting the CPRC Community Observatory on Friday, Saturday and Sunday evenings when the skies are clear. The observatory is open to the public on the weekends during the hours of 7:30 PM – 9:30 PM from now until spring. For driving directions, closure notices and more observatory information go to: www.communityobservatory.com