

Reflector

Published by the Astronomical League

Vol. 65, No. 3

June 2013



Centaurus

Crux

IC 2602

Volans

Chamaeleon

LMC

SMC

**Youth & Astronomy—
A Special Section Part II**
2013 National Young Astronomer Awards
Deep-Sky Objects—Eleventh of a Series
ALCon 2013 Registration—Last Chance
Green Cosmic Mysteries

Formed by connecting lines between the three bright stars Deneb, Altair, and Vega, the Summer Triangle looms high overhead this time of year for Northern Hemisphere observers. This region of the sky contains a wealth of galactic and globular star clusters; emission, reflection, and planetary nebulae; bright stars; and of course the Milky Way. Thus, the Summer Triangle is a great starting point for exploring deep-space objects on a clear, dry, moonless summer night.

The best emission nebulae in the area reside in the constellation Cygnus. They include the Veil Nebula (see the June 2012 *Reflector*), the North America Nebula, the Pelican Nebula, and the Crescent Nebula. All of these nebulae are located within or adjacent to the Northern Cross asterism and are easy to find. This month, I want to introduce readers to a lesser-known nebula in Cygnus, IC 5146, located near the border with the constellation Lacerta.

Also known as the Cocoon Nebula, IC 5146 is a striking emission nebula 12 arcminutes in diameter. An open star cluster, Collinder 470, is embedded within the nebula. Both are located 4000 light-years away and span 15 light-years of space. Published magnitude estimates for IC 5146 range from 7 to 10. In reality, the cluster is probably magnitude 7 and the nebula is magnitude 10, but you are seeing both simultaneously.

One way to find the Cocoon Nebula is to star hop 9 degrees due east of Deneb to the 4th magnitude star Rho Cygni and then hop another 3.75 degrees northeast. Another way to find the Cocoon Nebula is to locate the stars 80 and 81 (Pi-1 and Pi-2) Cygni. These stars, magnitudes 4.7 and 4.3, are 2 degrees apart and are found 12 degrees east-northeast of Deneb. To find IC 5146 follow an

DEEP-SKY OBJECTS ELEVENTH OF A SERIES THE COCOON NEBULA

By Dr. James Dire, Kauai Educational Association for Science & Astronomy



imaginary line from 80 Cygni through 81 Cygni south two more degrees.

The Cocoon Nebula is a stellar nursery, similar to the Orion Nebula and the Carina Nebula (which contains Eta Carinae). The stars in Collinder 470 formed out of the gases within this giant molecular

cloud. Like most stellar nurseries, the Cocoon Nebula contains emission, reflection, and dark nebulae. Light from the hot young stars in the nebula scatters off of dust grains resulting in blue reflection nebulae. The nebula's gas is mostly hydrogen, which emits red light at 656.3 nm when

excited by the embedded stars' radiation. Thus, long-exposure images of IC 5146 show beautiful blue and red colors.

The accompanying image of IC 5146 was taken with a 190 mm f/5.3 Maksutov-Newtonian telescope with a Canon 30D camera. This two-hour exposure shows the brightest regions of the Cocoon Nebula in detail comparable to the view in an 8–12 inch telescope at 100x magnification. Note the dark lanes scattered throughout the center of the nebula. The image covers a region 40 by 30 arcminutes. Longer exposures show that the nebula extends throughout this field of view, but these regions are difficult to see visually.

The colors captured with the Canon 30D are subtle compared to images taken with astronomical CCD cameras. However, the human eye won't even perceive this much color when viewing the Cocoon Nebula in the telescope eyepiece.

The bright star to the lower left (southeast) of the nebula is SAO 51425 and is magnitude 7.5. To the upper left (north-east) is SAO 51438 at magnitude 7.6. And the brightest star to the lower right (southwest) of the nebula is SAO 51374, magnitude 8.3. The two brightest stars located "within" the nebula in my image both shine at magnitude 9.7. One of these two appears to be at the center of the nebula, where several dark lanes intersect. All five of these brighter stars are foreground objects located from 80 to 1000 light-years away. Most of the remaining stars appearing inside of the nebula are actually part of the embedded star cluster.

You may notice in the image or in a telescope the reduction in background Milky Way stars around the visible nebula and trailing off towards the northwest. This is a dark nebula known as Barnard 168, which extends from the Cocoon Nebula northwest for 1.75 degrees. ✨

New Advertising Representative—Mary Riley

Mary was introduced to astronomy early in life by her father, who was a high school science teacher and amateur astronomer. While growing up in Milwaukee, Wisconsin, her father routinely set up his telescope in the back yard on starry nights for family viewing. Over time, she learned her way around the night skies and developed a passion for astronomy. She also tagged along with her father to attend meetings and star parties hosted by the **Milwaukee Astronomical Society**, of which her father was a member. Mary holds degrees in cultural anthropology (PhD, Tulane University) and law (JD, Northern Illinois University) and



currently works as a legal consultant and freelance writer in Chicago. In past years, she has been a member of the Midlands Astronomy Club in Columbia, South Carolina, where she served two terms as treasurer. At present, she is a member of the **Chicago Astronomical Society**. She is thrilled to serve the Astronomical League by acting as volunteer advertising representative for the *Reflector*.