

# Reflector

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# DEEP-SKY OBJECTS

## THE ELEPHANT'S TRUNK NEBULA

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The 1,396th entry in John Dreyer's *Index Catalogue of Nebulae and Clusters of Stars* is associated with a galactic star cluster contained within a large region of faint nebulosity, and a smaller region within it called the Elephant's Trunk Nebula. In general, this entire region is referred to by the pachyderm proboscis phrase.

IC 1396 resides in the constellation Cepheus and is located 2,400 light-years from Earth. To find IC 1396, start at Alpha Cephei, a.k.a. Alderamin, and go five degrees southeast to the fourth-magnitude red star Mu Cephei. Mu Cephei goes by the Arabic name Erakis. It is also called Herschel's Garnet Star, after Sir William Herschel, who noted it was one of

the deepest-red-colored stars in the sky. It is very hard to mistake Erakis in the eyepiece! The center of IC 1396 is 1.5 degrees south of Erakis.

My image of IC 1396 was taken with a William Optics Star 71 mm f/4.9 apochromatic refractor using an SBIG STF-8300C CCD camera. The exposure was 220 minutes. The image spans three degrees left to right (east to west), capturing most of the nebula. I just missed capturing Herschel's Garnet Star in the field of view. It would be located just above the top (north) of this image field about 20 percent of the way from left to right, located in the outer region of this vast emission nebula.

It's virtually impossible to see this entire nebula at once in a telescope. Smaller scopes that provide a wide enough field of view lack the light gathering power to see the nebula in an

eyepiece. Larger reflectors, like my 14-inch Dob, can reveal the faint glow of the nebular gases, but the field of view captures only a small fraction of the entire nebula.

A magnitude 5.7 star, HR 8281, lies at the center of IC 1396. HR 8281 is a triple star that is easily resolved. The primary star, HR 8281 A, provides most of the light emitted by the system. The secondary (B) and tertiary (C) components are both magnitude 7.5 and lie 11 and 20 arcseconds away from A. HR 8281 A has two other components located 1.8 and 0.1 arcseconds from it that are too faint to be seen in amateur telescopes.

Another great star to check out in IC 1396 is the magnitude 7.4 star located 13 arcminutes northeast of HR 8281. It's the next brightest star to the upper

left of HR 8281 in the image. This star, known as SAO 33652, is a binary star with components magnitude 7.4 and 8.6 located 12.7 arcseconds apart.

The final multiple star system I will point out in the image, easily resolved in most telescopes, is located at the 10 o'clock position from HR 8281, about two-thirds of the way from HR 8281 to the edge of the image. The star, SAO 33737, is just at the top edge of a small, propeller-shaped dark region. This triple star has components of magnitude 9.6, 10.2, and 12.9. The magnitude 12.9 star is 6.9 arcseconds from the primary while the magnitude 10.2 star is 19.8 arcseconds from the primary.

On the right edge of the nebula is a magnitude 7.4 star known as V429 Cephei. The dark lane in the image to the left of V429, extending three-fourths of

the way to HR 8281, is the Elephant's Trunk Nebula. The left (east) edge of the trunk contains bright, hot, young stars, emission nebulae, reflection nebulae, and dark nebulae worth exploring with an 8-inch or larger telescope.

Other features that are an absolute must to check out in IC 1396 are the many dark nebulae. Probably the best is Barnard 161. This dark nebula is located 15 arcminutes north of SAO 33652. The nebula measures 5 by 2.5 arcminutes in size. The nebula is very dark. Myriad Milky Way stars surround the nebula, but none can be seen in this small patch of the sky.

Another notable dark nebula is Barnard 163,

located one degree south-southeast of HR 8281. Barnard 163 is slightly larger than Barnard 161. Its cold gas and dust does an equally good job of blocking light from stars behind it! The third dark nebula I want to point out in IC 1396 is Barnard 367, which lies 50 arcminutes east-southeast of HR 8281. Spanning 5 arcminutes, Barnard 367 is not quite as dark as the other two dark nebulae. However, it is still an impressive sight in a telescope.

Panning around this large Milky Way object with any telescope reveals the hundreds of stars formed within it, myriad double star systems, and an uncountable number of more distant suns. The glow of the nebula appears as a faint background between the stars that is not as dark as the interstellar space outside of this region. ☀

