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Photo release: **A Tantalising Veil**

10-Oct-2000: **This delicate Hubble Space Telescope image shows a tiny portion of the Cygnus loop, a supernova remnant in the constellation of Cygnus, the Swan. Measurements on this super-detailed image of a cosmic veil shows that the original supernova explosion took place only 5000 years ago.**

This delicate Hubble Space Telescope image shows a tiny portion of the Cygnus loop, a supernova remnant in the constellation of Cygnus, the Swan. Measurements on this super-detailed image of a cosmic veil shows that the original supernova explosion took place only 5000 years ago.

A gauzy remnant of an ancient supernova flies through space and is captured by cameras aboard the NASA/ESA Hubble Space Telescope, showing part of the famous Cygnus Loop in unprecedented detail.

The fascinating smoke-like wisps of gas in this Hubble image are a record of the enormous amounts of energy released as the fast-moving supernova explosion ploughs into its surroundings and creates a shock front. The rapid release of energy in the shock of the collision, when the supernova material smashes into the gas of the interstellar medium at a speed of more than 600,000 kilometres per hour, makes the gas glow. In this image, the motion of the shock front is upwards.

The Cygnus loop, also known as the Veil Nebula, is well-known to amateur astronomers as a challenging target for larger telescopes. It has a diameter of about 3 degrees (corresponding to 6 full moons). This spectacular nebula was created when a massive star ended its days in an immense supernova explosion. A bubble of dust and gas was expelled into space and has continued to expand outwards ever since.

The Cygnus Loop consists of two main arcs, designated NGC 6992/95 for the Eastern arc (to the left in the background image) and NGC 6960 for the Western arc (also called the Witch's Broom Nebula, to the right, close to the bright, magnitude 4, star 52 Cygni). The tiny area of the Hubble image is seen in the upper left-hand corner of the nebula, at the outer edge of one of the large filaments, just where the blast wave rams into the surrounding interstellar gas. We are seeing the shock front almost exactly edge-on, thus explaining its wispy, sheet-like appearance.

The image is a striking example of how processes that take place hundreds of light years away can sometimes resemble effects we see around us in our daily life. The image has

similarities with the pattern formed by the interplay of light and shadow on the bottom of a swimming pool (known as a caustic network), rising smoke or a ragged cirrus cloud seen in a summer sky.

By comparing this Hubble image with an old ground-based photograph from 1953, scientists have measured how far the shock front has actually moved. The result shows that the supernova remnant lies much closer to Earth than previously thought, at a distance of merely 1500 light years. This also implies that the explosion may have occurred only 5000 years ago and must then have been an awesome sight for early civilisations, even visible at daytime (with an estimated brightness of at least magnitude -8, corresponding to the crescent Moon).

Facts about the image

This image comes from the large archive of scientific observations performed with the Hubble Space Telescope. It was obtained with the WFPC2 instrument in November 1997 with an exposure time of 7400 seconds. The image shows light emitted by neutral hydrogen (656.3 nm) and measures 150 x 70 arc-seconds.

The ground-based image of the Cygnus Loop (shown in the background) measures 3 x 2 degrees and was taken with the Oschin Schmidt Telescope and scanned as part of the Digitized Sky Survey.

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Notes for editors
The Hubble Space Telescope is a project of international co-operation between NASA and ESA. The original Hubble image was obtained by William P. Blair and Ravi Sankrit from Johns Hopkins University, USA. See also their web page with images: http://violet.pha.jhu.edu/~wpb/cygloop.html Their distance measurements were published in Astronomical Journal, August 1999 (co-authors John Raymond, CfA, and Knox S. Long, STScI).

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