

## CYGNUS CONSTELLATION, the Swan

Cygnus is a northern constellation lying on the plane of the Milky Way, deriving its name from the Latinized Greek word for swan. The swan is one of the most recognizable constellations of the northern summer and autumn, it features a prominent asterism known as the Northern Cross (in contrast to the Southern Cross). Cygnus was among the 48 constellations listed by the 2nd century astronomer **Ptolemy**, and it remains one of the 88 modern constellations.

Cygnus contains *Deneb*, one of the brightest stars in the night sky and one corner of the Summer Triangle, as well as some notable X-ray sources and the giant stellar association of Cygnus OB2. One of the stars of this association, *NML Cygni*, is one of the largest stars currently known. The constellation is also home to Cygnus X-1, a distant X-ray binary containing a supergiant and unseen massive companion that was the first object widely held to be a black hole. Many star systems in Cygnus have known planets as a result of the Kepler Mission observing the patch around Cygnus.

**In addition, most of the eastern part of Cygnus is dominated by the Hercules–Corona Borealis Great Wall, a giant galaxy filament that is the largest known structure in the observable universe; covering most of the northern sky.**

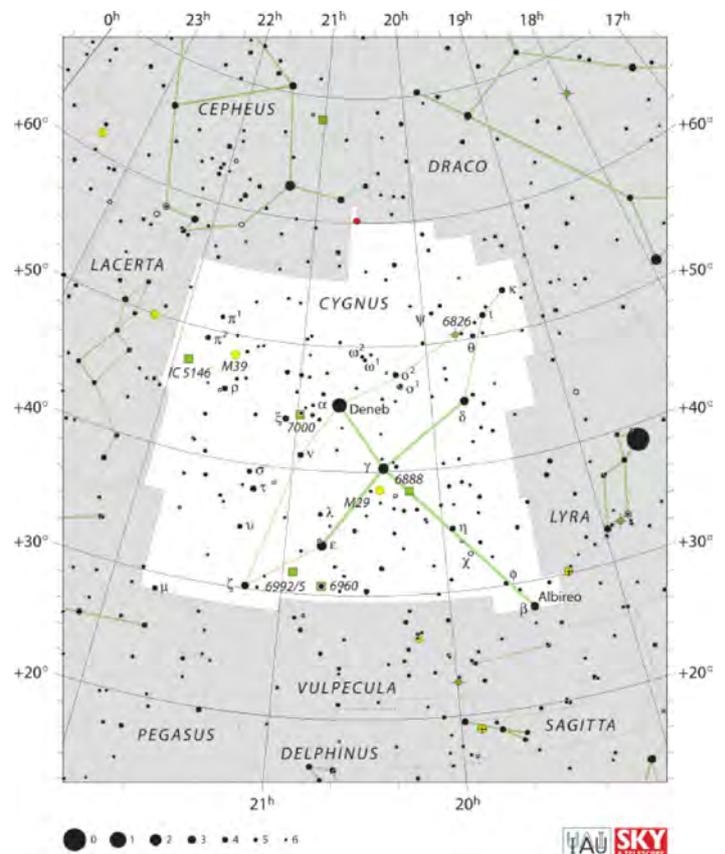
### MYTHOLOGY

In Greek mythology, Cygnus has been identified with several different legendary swans. (1) **Zeus disguised himself as a swan to seduce Leda, Spartan king Tyndareus's wife, who gave birth to the Gemini, Helen of Troy and Clytemnestra;** (2) Orpheus was transformed into a swan after his murder, and was said to have been placed in the sky next to his lyre (Lyra); and (3) the King Cygnus was transformed into a swan.

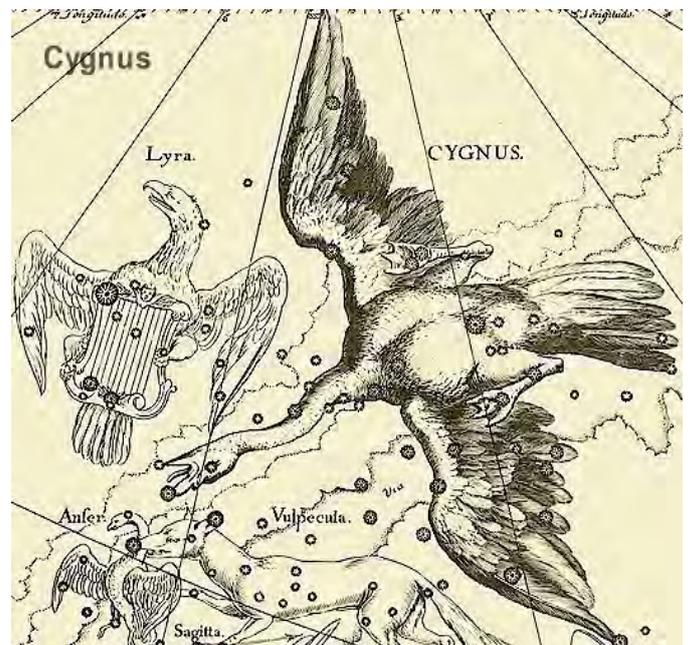
(4) The Greeks also associated this constellation with the tragic story of Phaethon, the son of Helios the sun god, who demanded to ride his father's sun chariot for a day. Phaethon, however, was unable to control the reins, forcing Zeus to destroy the chariot (and Phaethon) with a thunderbolt, causing it to plummet to the earth into the river Eridanus. According to the myth, Phaethon's brother, Cycnus, grieved bitterly and spent many days diving into the river to collect Phaethon's bones to give him a proper burial. The gods were so touched by Cycnus's devotion to his brother that they turned him into a swan and placed him among the stars.

**Together with other avian constellations near the summer solstice, Vultur cadens and Aquila, Cygnus may be a significant part of the origin of the myth of the Stymphalian Birds, one of The Twelve Labours of Hercules.**

We will talk more about the constellation Hercules and the famous hero's twelve labours of penance in our meeting on 12 November.



Great Wall, a giant galaxy filament that is the largest known structure in the observable universe



The mythographers tell us that the swan is Zeus in disguise, on his way to one of his innumerable love affairs

## CHARACTERISTICS

Cygnus is a very large constellation. Covering 804 square degrees and around 1.9% of the night sky, Cygnus ranks 16th of the 88 constellations in size. It is bordered by Cepheus to the north and east, Draco to the north and west, Lyra to the west, Vulpecula to the south, Pegasus to the southeast and Lacerta to the east. The three-letter abbreviation for the constellation, as adopted by the IAU in 1922, is 'Cyg'. The official constellation boundaries, as set by **Eugène Delporte** in 1930, are defined as a polygon of 28 segments. In the equatorial coordinate system, the right ascension coordinates of these borders lie between 19h 07.3m and 22h 02.3m, while the declination coordinates are between 27.73° and 61.36°. **Normally, Cygnus is depicted with Delta and Epsilon Cygni as its wings, Deneb as its tail, and Albireo as the tip of its beak.**

There are several asterisms in Cygnus. In the 17th-century German celestial cartographer **Johann Bayer's** star atlas the Uranometria, Alpha, Beta and Gamma Cygni form the pole of a cross, while Delta and Epsilon form the cross beam. The nova P Cygni was then considered to be the body of Christ. Bayer catalogued many stars in the constellation, giving them the Bayer designations from Alpha to Omega and then using lowercase Roman letters to g.

*Alpha Cygni*, called Deneb, is the brightest star in Cygnus. It is a white supergiant star of spectral type A2Iae that varies between magnitudes 1.21 and 1.29, one of the largest and most luminous A-class stars known. It is located about 3200 light-years away (**an A-type star is a main-sequence (hydrogen-burning) star of spectral type A and luminosity class V, to 10,000° hot . Their spectra is defined by strong hydrogen Balmer absorption lines). Its traditional name means "tail" and refers to its position in the constellation.**

*Beta Cygni*, designated Albireo, is a celebrated binary star among amateur astronomers for its contrasting hues. The primary is an orange-hued giant star of magnitude 3.1 and the secondary is a blue-green hued star of magnitude 5.1. The system is 380 light-years away and is divisible in large binoculars and all amateur telescopes.

*Gamma Cygni*, traditionally named Sadr, is a yellow-tinged supergiant star of magnitude 2.2, 1500 light-years away. Its traditional name means "breast" and refers to its position in the constellation.

**Delta Cygni** is another bright binary star in Cygnus, 171 light-years with a period of 800 years. The primary is a blue-white hued giant star of magnitude 2.9, and the secondary is a star of magnitude 6.6. The two components are divisible in a medium-sized amateur telescope.

*Epsilon Cygni* is Gienah, the fifth star in Cygnus above magnitude 3. It is an orange-hued giant star of magnitude 2.5, 72 light-years from Earth.

Located near *Eta Cygni* is the X-ray source Cygnus X-1, which is now thought to be caused by a black hole accreting matter in a binary star system. This was the first x-ray source widely believed to be a black hole.

There are several other dimmer double and binary stars in Cygnus. *61 Cygni* is a binary star 11.4 light-years from Earth with a period of 750 years. **61 Cygni is significant because Friedrich Wilhelm Bessel determined its parallax in 1838, the first star to have a known parallax.**

Because Cygnus is one of the constellations that the Kepler satellite surveyed in its search for extrasolar planets, there are about a hundred stars in Cygnus with known planets, the most of any constellation. One of the most notable systems is the Kepler-11 system, containing six transiting planets, all within a plane of approximately one degree. The Kepler-22 system is notable, in that its extrasolar planet is believed to be the first "Earth-twin" planet ever discovered.

## DEEP-SKY OBJECTS

The North America Nebula (NGC 7000) is one of its most well-known nebulae

Pelican Nebula – IC 5070 and IC 5067 is an emission nebula in Cygnus.

An open cluster NGC 6910, also called the Rocking Horse Cluster, possesses 16 stars within a diameter of 5 arcminutes visible in a small amateur instrument.

NGC 6992 (Eastern Veil Nebula) and NGC 6960 (Western Veil Nebula)

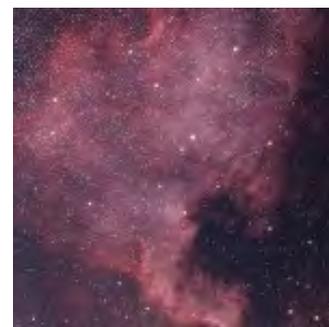
The Northern Coalsack Nebula, also called the Cygnus Rift, is a dark nebula located

in the Cygnus Milky Way.

In recent years, amateur astronomers have made some notable Cygnus discoveries.

The "Soap bubble nebula" (PN G75.5+1.7), near the Crescent nebula, was discovered on a digital image by Dave Jurasevich in 2007. In 2011, Austrian amateur Matthias Kronberger discovered a planetary nebula (Kronberger 61, now nicknamed "The Soccer Ball") on old survey photos, confirmed recently in images by the Gemini Observatory; both of these are likely too faint to be detected by eye in a small amateur scope.

The Fireworks Galaxy (NGC 6946) with more supernovae than in than in any other galaxy was already mentioned in our discussions on constellation Cepheus in the September meeting.



NGC7000 discovered by William Herschel in 1786.