

THE CONSTELLATION OPHIUCHUS, THE SERPENT BEARER

Ophiuchus is a large constellation located around the celestial equator. Its name is from the Greek "serpent-bearer", and it is commonly represented as a man grasping the snake that is represented by the constellation Serpens. Ophiuchus was one of the 48 constellations listed by the 2nd-century astronomer **Ptolemy**, and it remains one of the 88 modern constellations. It was formerly referred to as *Serpentarius* and *Anguitenens*.

Location

Ophiuchus is located between *Aquila*, *Serpens* and *Hercules*, northwest of the centre of the Milky Way. The southern part lies between *Scorpius* to the west and *Sagittarius* to the east. It is the 11th largest constellation in the sky, occupying an area of 948 square degrees. It is located opposite Orion in the sky. *Ophiuchus* is depicted as a man grasping a serpent; the interposition of his body divides the snake constellation *Serpens* into two parts, **Serpens Caput** and **Serpens Cauda**, which are nonetheless counted as one constellation.

MYTH

The association of the serpent (*Serpens*) with this constellation, Ophiuchus, may indicate the miraculous powers which are ascribed to snake-charmers. **Before medicine became a science the role of the physician and priest were combined in many cultures**, and existed in what we know today as the witch doctor, shaman, or medicine man, and the earliest snake charmers were traditional healers. **Ophiuchus is most frequently associated with the Greek mythical figure of Asclepius, son of the god Apollo**, who was said to be able to bring people back from the dead with his healing powers. Asclepius learned how to do this after seeing one snake bringing healing herbs to another. This happened when Glaucus, the son of King Minos of Crete, fell into a jar of honey and drowned. Asclepius saw a snake slithering toward his body and killed it. Then another snake came along and placed a herb on the first one, which miraculously brought the first snake back to life. Asclepius saw this and took the same herb and placed it on Glaucus' body. The king's son was miraculously resurrected.

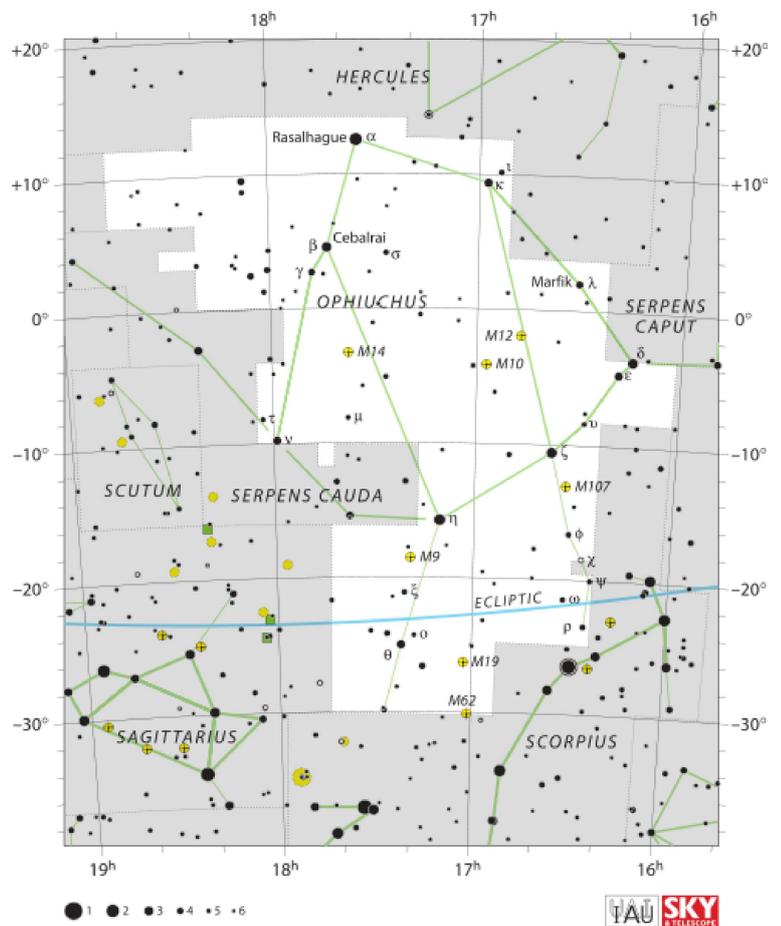
Asclepius was raised by Chiron, the wise centaur, associated with Centaurus constellation, who taught him the art of healing. In one of the myths, Asclepius was given the blood of the Gorgon Medusa by the goddess Athene. The Gorgon's blood from the veins on her left side was poison, but the blood from the veins on the right side was said to be able to bring people back to life. In another tale, Asclepius resurrected Theseus' son Hippolytus after the king's son was thrown from his chariot. In this version of the myth, Hippolytus is associated with the Auriga constellation, the charioteer.

Asclepius was eventually killed by Zeus because the god was worried that the human race would become immortal with Asclepius around to heal them. And Zeus' brother Hades, the god of the Underworld, was also concerned that **the flow of dead souls into his domain would dry up as a result of Asclepius' healing ability**. So, when Hades complained about this to Zeus, the thunder god killed the healer with a bolt of lightning. Zeus later placed Asclepius' image in the sky to honour his gift and good deeds. The healer became the constellation Ophiuchus, the Serpent Bearer.

There is no evidence of the constellation preceding the classical era, and in Babylonian astronomy a "Sitting Gods" constellation seems to have been located in the general area of Ophiuchus. However, **Gavin White** proposes that Ophiuchus may in fact be remotely descended from this Babylonian constellation, representing Nirah, a serpent-god who was sometimes depicted with his upper half human but with serpents for legs.

LITERATURE

John Milton used Ophiuchus as the vehicle for an epic simile in *Paradise Lost*, comparing Satan to a comet burning across the length of Ophiuchus: *'on th' other side / Incensed with indignation Satan stood / Unterrified, and like a comet burned / That fires the length of Ophiuchus huge / In th' arctic sky'*.



Notable features

This is **Johannes Kepler's** drawing depicting the location of the *stella nova* (new star) in the foot of Ophiuchus (**marked N**), known today as the remnant of Kepler's Supernova SN 1604. In October 1604, it was said a bright new evening star appeared in the sky, but Kepler did not believe it until he saw it himself. He began systematically observing the nova for over a year.



Kepler's Supernova 1604. Using NASA's Chandra X-ray Observatory, scientists have created this stunning new image of one of the youngest supernova remnants in the galaxy. It may help astronomers solve a long-standing mystery how a star's life can end catastrophically and for gauging the expansion of the universe.

Astrologically, the year 1603 marked the beginning of a fiery trigon, the start of the 800-year cycle of great conjunctions; astrologers associated the two previous such periods with the rise of Charlemagne (ca. 800 years earlier) and the birth of Christ (ca. 1600 years earlier), and thus expected events of great portent, especially regarding the emperor. It was in this context, and as the imperial mathematician and astrologer to the emperor, that Kepler described the new star two years later in his De Stella Nova. In it, Kepler addressed the star's astronomical properties while taking a sceptical approach to the many astrological interpretations then circulating. He noted its fading luminosity, speculated about its origin, and used the lack of observed parallax to argue that it was in the sphere of fixed stars, further undermining the doctrine of the immutability of the heavens (the idea accepted since Aristotle that the celestial spheres were perfect and unchanging).

List of stars in Ophiuchus

The brighter stars in Ophiuchus include *alpha Ophiuchi*, called *Ras Alhague* ("head of the serpent charmer"), at magnitude 2.07, and *eta Ophiuchi*, known as *Sabik* ("the preceding one"), at magnitude 2.43. Other bright stars in the constellation include *beta Ophiuchi*, *Celbalrai* ("the shepherd dog") and *lambda Ophiuchi*, or *Marfik* ("the elbow"). *Celbalrai* is slightly larger than the Sun but 63 times more luminous. It has an unconfirmed planetary companion in its orbit.

RS Ophiuchi is a recurrent novae, whose brightness increase at irregular intervals by hundreds of times in a period of just a few days. It is thought to be at the brink of becoming a type-1a supernova.

Barnard's Star, one of the nearest stars to the Solar System (the only stars closer are the *Alpha Centauri* binary star system and *Proxima Centauri* in the Centaurus constellation), lies in Ophiuchus. It is located to the left of β and just north of the V-shaped group of stars. Barnard's Star is a red dwarf with the stellar classification of M4Ve. It has a visual magnitude of 9.54 and is only 5.980 light years distant from Earth. It is the fourth closest known individual star to the Sun. The star is too faint to be seen without a telescope.

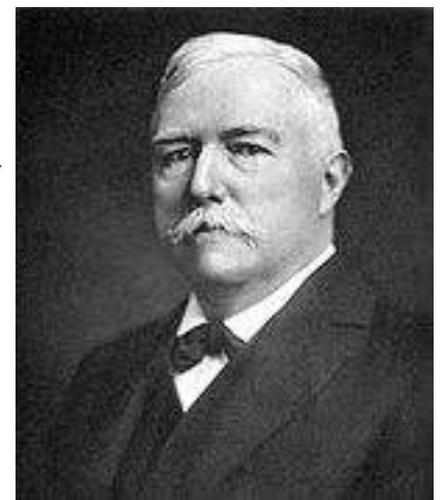
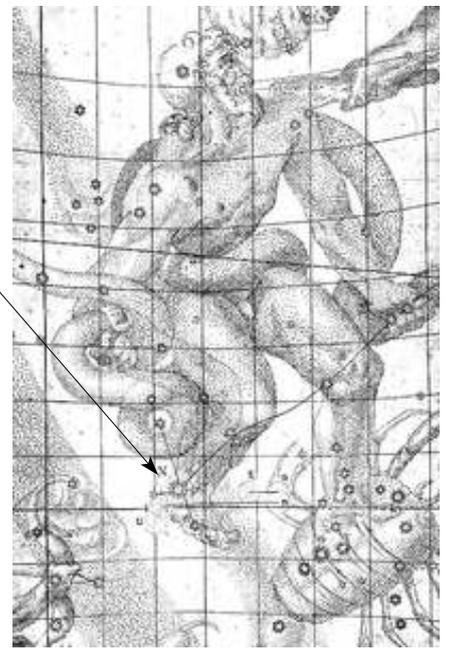
The star was named after the American astronomer **E. E. Barnard**, who was the first to measure the star's proper motion in 1916. **The star has the largest proper motion of any star relative to the Sun, 10.3 arcseconds per year.**

Around the year 9,800, the star will make its closest approach to the Sun and come within 3.75 light years. Barnard's Star is also the target for **Project Daedalus**, a study on unmanned travel to nearby stars. **Four meteor showers**



Barnard 68 is a large dark nebula, located 410 light-years from Earth. Despite its diameter of 0.4 light-years, Barnard 68 only has twice the mass of the Sun, making it both very diffuse and very cold - about 16 kelvins. Though it is currently stable, Barnard 68 will eventually collapse, inciting the process of star formation.

originate in this constellation: *the Ophiuchids*, *Northern May Ophiuchids*, the *Southern May Ophiuchids* and the *Theta Ophiuchids*.



Edward Emerson Barnard (1857 – 1923) was an American astronomer recognized as a gifted observer. He is best known for his discovery of Barnard's Star in 1916 and the Barnard 68 Dark Nebula, both named after him in his honour. Between 1881 and 1892 he discovered fifteen different comets, three of which were periodic, and codiscovered 2 other comets:

Deep-sky objects

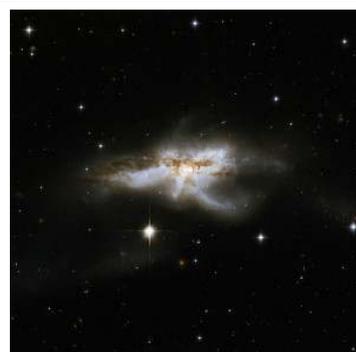
The Twin Jet Nebula (Minkowski's Butterfly) – Planetary Nebula – M2-9 is a striking example of a “butterfly” or a bipolar planetary nebula. Each side of it appears much like a pair of exhausts from jet engines. Indeed, because of the nebula's shape and the measured velocity of the gas, in excess of 200 miles per second, astronomers believe that the description as a super-super-sonic jet exhaust. M2-9 has an apparent visual magnitude of 14.7 and is approximately 2,100 light years distant from the solar system. It was discovered by the German-American astronomer **Rudolph Minkowski** in 1947. The star at the centre of the nebula is a binary system. The interaction of the two stars is what has created the nebula.



Zeta Ophiuchi – Like a ship plowing through cosmic seas, runaway star Zeta Ophiuchi produces the arcing interstellar bow wave or bow shock seen in this stunning infrared portrait. In the false-color view, bluish Zeta Oph, a star about 20 times more massive than the Sun, lies near the centre of the frame, moving toward the left at 24 kilometres per second. Its strong stellar wind precedes it, compressing and heating the dusty interstellar material and shaping the curved shock front. Zeta Ophiuchi, it is suspected, was once a member of a binary star system. **When its more massive companion exploded as a supernova Zeta Ophiuchi was flung out of the system.** About 460 light-years from us, **Zeta Ophiuchi is 65,000 times more luminous than the Sun** and would be one of the brightest stars in the sky if it weren't surrounded by obscuring dust. The image spans about 1.5 degrees or 12 light-years



The unusual galaxy merger remnant and starburst galaxy NGC 6240 is also in Ophiuchus. At a distance of 400 million light-years, this "butterfly-shaped" galaxy has two supermassive black holes 3,000 light-years apart. Confirmation of the fact that both nuclei contain black holes was obtained by spectra from the Chandra X-ray Observatory. **Astronomers estimate that the black holes will merge in another billion years.** The galactic merging process, which began about 30 million years ago, triggered dramatic star formation and sparked numerous supernova explosions generated by the orbiting black holes and the aftermath of the collision. The merger will complete in some tens to hundreds of millions of years.



Rho Ophiuchi – The amazing variety of different colours seen in this image represents different wavelengths of infrared light. The bright white nebula in the centre of the image is glowing due to heating from nearby stars, **resulting in what is called an emission nebula.** The same is true for most of the multi-hued gas prevalent throughout the entire image, including the bluish bow-shaped feature near the bottom right. The bright red area in the bottom right is light from the star in the centre – *Sigma Scorpii* – that is reflected off of the dust surrounding it, creating what **is called a reflection nebula.** And the much darker areas scattered throughout the image are pockets of cool dense gas that block out the background light. The bright pink objects just left of centre are young stellar objects. These baby stars are still enveloped in their own tiny compact nebulae. We can also see some of the oldest stars in our Milky Way Galaxy in two separate (and much more distant) **globular clusters.** The first cluster, M80, is on the far right edge of the image towards the top. The second, NGC 6144, is found close to the bottom edge near the centre. They both appear as small densely compacted groups of blue stars. Globular clusters such as these typically harbour some of the oldest stars known, born soon after the Universe formed 13 billion years ago. The small faint red dot at the 3 o'clock position is an entire galaxy far, far away known as PGC 090239.



Ophiuchus belongs to the Hercules family of constellations, along with *Aquila, Ara, Centaurus, Corona Australis, Corvus, Crater, Crux, Cygnus, Hercules, Hydra, Lupus, Lyra, Sagitta, Scutum, Sextans, Serpens, Triangulum Australe and Vulpecula.*