

Southern Constellations, Centaurus, the Centaur
 Centaurus is a bright constellation in the southern sky. One of the largest constellations, Centaurus was included among the 48 constellations listed by the 2nd century astronomer **Ptolemy**, and it remains one of the 88 modern constellations. In Greek mythology, Centaurus represents a centaur; a creature that is half man, half horse. **(Another constellation named after a centaur is Sagittarius in the zodiac.)**

Notable stars include *Alpha Centauri*, the nearest star system to our own Solar System, its neighbour in the sky, *Beta Centauri*, and *V766 Centauri* one of the largest stars yet discovered. The constellation also contains ***Omega Centauri*, the brightest globular cluster as visible from Earth and one of the largest known.**

Centaurus contains several very bright stars because of its position in the Milky Way; in addition, its alpha and beta stars are used to find the constellation *Crux*. **The constellation has 281 stars above magnitude 6.5, meaning that they are visible to the unaided eye, more than any other constellation.** *Alpha Centauri*, the closest star to the Sun, has a high proper motion; it will be a mere half-degree from *Beta Centauri* in approximately 4000 years.

The constellation Centaurus is depicted taking adjoining *Lupus* (the Greek *Therion* or wild animal) to *Ara*, the Altar, skewered on a pike as a sacrificial offering. *Alpha Centauri* is a triple star system that contains ***Proxima Centauri*, the nearest star to the Sun.**

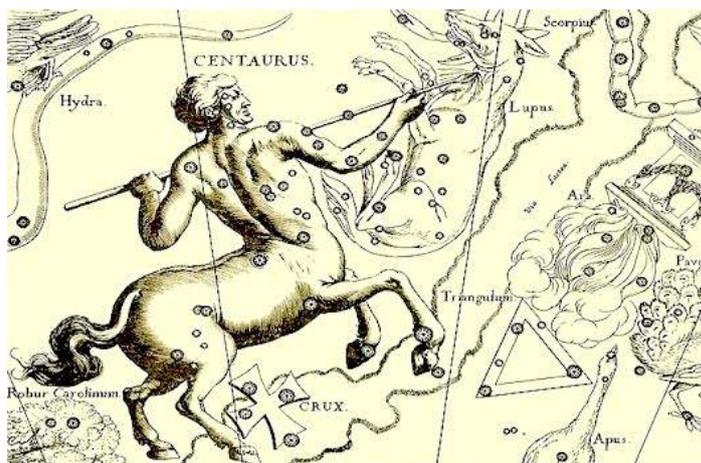
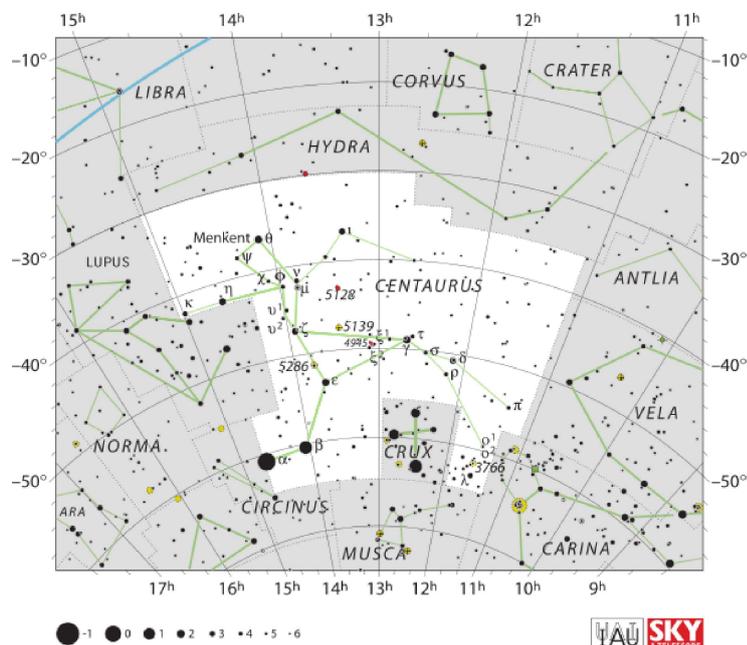
Traditionally called Rigil Kentaurus, **meaning "foot of the centaur"**, the system has an overall magnitude of -0.28 and is 4.4 light-years from Earth. The primary and secondary are both yellow-hued stars; the primary, is of magnitude -0.01 and the secondary is of magnitude 1.35. Proxima, the tertiary star, is a red dwarf of magnitude 11.0; it is almost 2 degrees away from the primary and secondary and has a period of approximately one million years. Also a flare star, Proxima has minutes-long outbursts where it brightens by over a magnitude. The primary and secondary have a period of 80 years and will be closest to each other as seen from Earth in 2037 and 2038.

In addition to *Alpha Centauri* (**the 3rd brightest star in the sky**), a second first magnitude star, *Beta Centauri*, is part of *Centaurus*. *Beta Centauri* (called Hadar), is a double star; the primary is a blue-hued giant star of magnitude 0.6, 525 light-years from Earth. The secondary is of magnitude 4.0 and has a very small separation. A bright binary star in *Centaurus* is *Gamma Centauri*, which appears to the naked eye at magnitude 2.2. The primary and secondary are both blue-white hued stars of magnitude 2.9; their period is 85 years.

Centaurus also has many dimmer double stars and binary stars. 3 Centauri is a double star with a blue-white hued primary of magnitude 4.6 and a secondary of magnitude 6.1. The primary is 298 light-years from Earth

Deep-sky objects

Centauri (NGC 5139), despite being listed as the constellation's "omega" star, is in fact a naked-eye globular cluster, located at a distance of 17,000 light-years with a diameter of 150 light-years. **It is the largest and brightest globular cluster in the Milky Way**, at ten times the size of the next-largest cluster, it has a magnitude of 3.7. It is also the most luminous globular cluster in the Milky Way, **at over one million solar luminosities.** *Omega Centauri* is classified as a Shapley





James Dunlop (1793–1848) was a Scottish astronomer, noted for his work in Australia. He first served as astronomer's assistant for Sir Thomas Brisbane at Paramatta, NSW. Later he became the Superintendent of the Paramatta Observatory. Dunlop was mostly a visual observer, who discovered and catalogued many new southern double stars and deep-sky objects.

horses and are depicted as having the torso of a human joined at the (human) waist to the horse's withers where the horse's neck would be. In earlier times a man on horseback was an uncommon sight, resembling at a distance a figure half man, half horse.

How Centaurs came to be:

Ixion (in Greek mythology king of the Lapiths, the most ancient tribe of Thessaly) fell in love with the goddess Hera and tried to rape her, but she reported his behaviour to Zeus, who decided to test his wife's testimony. For this purpose, the god made a Cloud Resembling Hera (this cloud was named *Nephele*), and laid it beside Ixion. The cloud *Nephele* gave birth to Centaurus, and when he consorted with the Magnesian Mares, the Centaurs were born. The Centaurs lived in the mountains of Thessaly and forests of Magnesia. Thessaly is a region of east-central Greece, and the Thessalians were renowned for their cavalry. **Poseidon** was said to have produced the first horse by striking the ground in Thessaly with his trident.

The word centaur might also be related to the word century. **Dromicrites** in his *Theologia* writes that Ixion first aspired to the glory of a kingdom in Greece, and that he assembled for his use a hundred horsemen, whence the hundred armed men were called Centaurs

During a battle the centaur, Chiron, was accidentally wounded by one of **Hercules'** arrows that had been treated with the blood of the *Hydra* (an adjacent constellation). To avoid a life of excruciating pain from this arrow's poison, Chiron gave up his immortality to *Prometheus* and died. Crux, the Cross, is a modern constellation that was once part of Centaurus. In this drawing of *Centaurus* taken from a picture by **Hyginus** (Roman, ca. A.D. 1, from *The New Patterns in the Sky*, **Staal**). Crux is placed on the hind feet of the Centaur. One of these hind feet may have been the place where Chiron was wounded, perhaps the left hind foot with the star Acrux.

Chiron was imagined as of mild and noble look, very different from the threatening aspect of the centaur *Sagittarius*; and **Saint Clement of Alexandria** wrote of him that he first led mortals to righteousness. As the wisest and most just of his generally lawless race he was beloved by Apollo and Diana, and from their teaching became proficient in botany and music, astronomy, divination, and medicine, and instructor of the most noted heroes in Grecian legend. **Matthew Arnold** wrote of him in *Empedocles on Etna*:

On Pelion, on the grassy ground, Chiron, the aged Centaur lay, the young Achilles standing by.

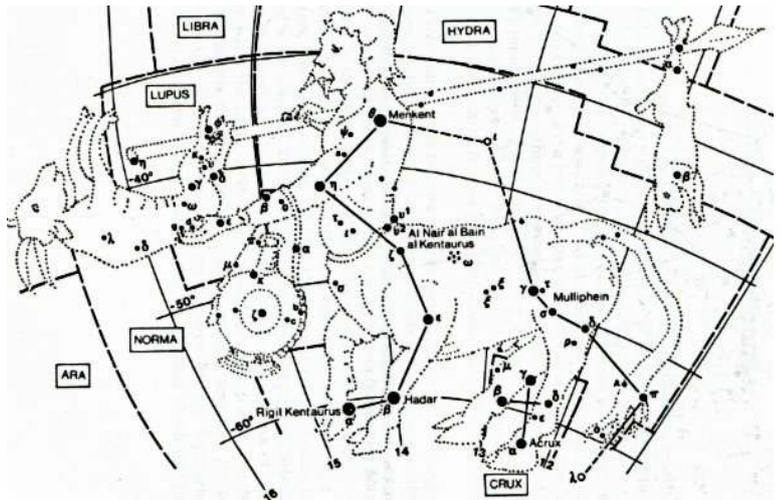
The Centaur taught him to explore the mountains where the glens are dry and the tired Centaurs come to rest, And where the soaking springs abound. ...He told him of the Gods, the stars, The tides.

Prometheus evidently inherited Chiron's astronomical attainments, as well as his immortality, for **Aeschylus**,

class VIII cluster, which means that its centre is loosely concentrated. It is also the only globular cluster to be designated with a Bayer letter. There are suspicions that *Omega Centauri* once was the core of a dwarf galaxy that had been cannibalised by the Milky Way. *Omega Centauri* was determined to be nonstellar in 1677 by the English astronomer **Edmond Halley**, although it was visible as a star to the ancients. Its status as a globular cluster was determined by **James Dunlop** in 1827. To the unaided eye, *Omega Centauri* appears fuzzy and is obviously non-circular; it is approximately half a degree in diameter, the same size as the full Moon.

The Greeks depicted the constellation as a centaur and gave it its current name. It was mentioned by **Eudoxus** in the 4th century BCE and **Aratus** in the 3rd century BCE. In the 2nd century AD, **Claudius Ptolemy** catalogued 37 stars in Centaurus. Large as it is now, in earlier times it was even larger, as the constellation *Lupus* was treated as an asterism within *Centaurus* and the **Southern Cross**, which is now regarded as a separate constellation, was treated by the ancients as a mere asterism formed of the stars composing the centaur's legs. Additionally, what is now the minor constellation *Circinus* was treated as undefined stars under the centaur's front hooves.

Centaurus represents the Centaurs who were a tribe of half-man, half-horse savages, living on the mountains of Thessaly. They were people who tamed



who thought him the founder of civilization and "full of the most devoted love for the human race," made him say in *Prometheus Bound*:

I instructed them to mark the stars, their rising, and, a harder science yet, their setting.

The conception of a centaur's figure with **Homer**, **Hesiod**, and even with **Berosos**, probably was of a perfect human form, **Pindar** being the first to describe it as semi-ferine, and since his day the human portion of the Centaur has been terminated at the waist and the hind quarters of a horse added. In some mediaeval Christian astronomy it typified Noah, but **Julius Schiller** changed the figure to Abraham with Isaac; and **Caesius** likened it to **Nebuchadrezzar** when "he did eat grass as oxen."

This is one of the largest constellations, more than 60° in length, its centre about 50° south of the star Spica below Hydra's tail; but **Aratos** located it entirely under the Scorpion and the Claws, an error that **Hipparchos** criticized. It shows in the latitude of New York City only a few of its components in the bust, of which *theta*, a variable 2nd-magnitude on the right shoulder, is visible in June about 12° above the horizon when on the meridian, and 27° southeast from *Spica*, with no other star of similar brightness in its vicinity. It was this that **Professor Klinkerfues** of Gottingen mentioned in his telegram to the Madras Observatory, on the 30th of November, 1872, in reference to the lost Biela comet which he thought had touched the earth three days previously and might be found in the direction of this star.

Centaurus is home to many variable stars. *R Centauri* is a Mira variable star with a minimum magnitude of 11.8 and a maximum magnitude of 5.3; it is 2100 light-years from Earth and has a period of 18 months. V810 Centauri is a semiregular variable.

BPM 37093 is a white dwarf star whose carbon atoms are thought to have formed a crystalline structure. Since diamond also consists of carbon arranged in a crystalline lattice (though of a different configuration), scientists have nicknamed this star "Lucy" after the Beatles song "Lucy in the Sky with Diamonds."

Centaurus is also home to open clusters. NGC 3766 is an open cluster 6300 light-years from Earth that is visible to the unaided eye. It contains approximately 100 stars, the brightest of which are 7th magnitude. NGC 5460 is another naked-eye open cluster, 2500 light-years from Earth, that has an overall magnitude of 6 and contains approximately 40 stars.

There is one bright planetary nebula in Centaurus, NGC 3918, also known as the Blue Planetary. It has an overall magnitude of 8.0 and a central star of magnitude 11.0; it is 2600 light-years from Earth. The Blue Planetary was discovered by **John Herschel** and named for its color's similarity to *Uranus*, though the nebula is three times larger than the planet.

Centaurus is rich in galaxies as well. NGC 4622 is a face-on spiral galaxy located 200 million light-years from Earth (redshift 0.0146). **Its spiral arms wind in both directions, which makes it nearly impossible for astronomers to determine the rotation of the galaxy.** Astronomers theorize that a collision with a smaller companion galaxy near the core of the main galaxy could have led to the unusual spiral structure. NGC 5253, a peculiar irregular galaxy, is located near the border with *Hydra* and M83, with which it likely had a close gravitational interaction 1-2 billion years ago. This may have sparked the galaxy's high rate of star formation, which continues today and contributes to its high surface brightness. NGC 5253 includes a large nebula and at least 12 large star clusters. In the eyepiece, it is a small galaxy of magnitude 10 with dimensions of 5 arcminutes by 2 arcminutes and a bright nucleus. NGC 4945 is a spiral galaxy seen edge-on from Earth, 13 million light-years away. It is visible with any amateur telescope, as well as binoculars under good conditions; it has been described as "**shaped like a candle flame**", being long and thin. In the eyepiece of a large telescope, its southeastern dust lane becomes visible. Another galaxy is NGC 5102, found by star-hopping from *Iota Centauri*. In the eyepiece, it appears as an elliptical object 9 arcminutes by 2.5 arcminutes tilted on a southwest-northeast axis.

One of the closest active galaxies to Earth is the Centaurus A galaxy, NGC 5128, at a distance of 11 million light-years (redshift 0.00183). It has a supermassive black hole at its core, which expels massive jets of matter that emit radio waves due to synchrotron radiation. Astronomers posit that its dust lanes, not common in elliptical galaxies, are due to a previous merger with another galaxy, probably a spiral galaxy. NGC 5128 appears in the optical spectrum as a fairly large elliptical galaxy with a prominent dust lane. Its overall magnitude is 7.0, and it has been seen under perfect conditions with the naked eye, making it one of the most distant objects visible to the unaided observer. While Centaurus now has a high southern latitude, at the dawn of civilization it was an equatorial constellation. **Precession has been slowly shifting it southward for millennia**, and it is now close to its maximal southern declination.