

## CORONA AUSTRALIS, THE SOUTHERN CROWN

*Corona Australis* is a constellation in the southern celestial hemisphere. Its Latin name means "southern crown", and it is the southern counterpart of Corona Borealis, the northern crown. **One of the 48 constellations listed by the 2nd-century astronomer Ptolemy, it remains one of the 88 modern constellations.** The Ancient Greeks saw **Corona Australis as a wreath rather than a crown** and associated it with Sagittarius or Centaurus. Other cultures have likened the pattern to a turtle, ostrich nest, a tent, or even a hut belonging to a rock hyrax (a shrewmouse; a small, well-furred, rotund animals with short tails).

Although fainter than its northern namesake, **the oval - or horseshoe-shaped pattern of its brighter stars renders it distinctive.** *Alpha* and *Beta Coronae Australis* are its two brightest stars with an apparent magnitude of around 4.1. *Epsilon Coronae Australis* is the brightest example of a *W Ursae Majoris* variable in the southern sky (an eclipsing contact binary). Lying alongside the Milky Way, **Corona Australis contains one of the closest star-forming regions to our Solar System** —a dusty dark nebula known as the Corona Australis Molecular Cloud, lying about 430 light years away. Within it are stars at the earliest stages of their lifespan. The variable stars R and TY *Coronae Australis* light up parts of the nebula, which varies in brightness accordingly.

*Corona Australis* is bordered by Sagittarius to the north, Scorpius to the west, Telescopium to the south, and Ara to the southwest. The three-letter abbreviation for the constellation, as adopted by the International Astronomical Union in 1922, is 'CrA'. The official constellation boundaries, as set by **Eugène Delporte** in 1930, are defined by a polygon of four segments.

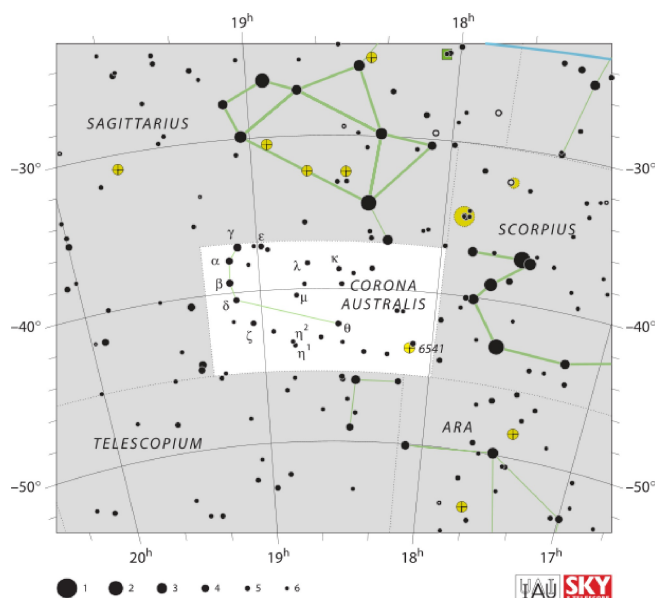
*Corona Australis* culminates at midnight around the 30th of June and ranks 80th in area. Only visible at latitudes south of 53° north, *Corona Australis* cannot be seen from the British Isles as it lies too far south, but it can be seen from southern Europe and readily from the southern United States.

### NOTABLE FEATURES

While not a bright constellation, Corona Australis is nonetheless distinctive due to its easily identifiable pattern of stars, which has been described as horseshoe-or oval-shaped. Though it has no stars brighter than magnitude 4, it still has 21 stars visible to the unaided eye (brighter than magnitude 5.5), making it the second-brightest constellation. **Nicolas Louis de Lacaille** used the Greek letters Alpha through to Lambda to label the most prominent eleven stars in the constellation, designating two stars as Eta and omitting Iota altogether. Mu Coronae Australis, a yellow star of spectral type G5.5III and apparent magnitude 5.21, was labelled by **Johann Elert Bode** and retained by **Benjamin Gould**, who deemed it bright enough to warrant naming.

**LIST OF STARS IN CORONA AUSTRALIS**

*Alfecca Meridiana* or Alpha CrA is the only star in the constellation to have received a name. The name combines the Arabic name of the constellation with the Latin for "middle". In Arabic, Alfecca means "break", and refers to the shape of both Corona Australis and Corona Borealis. Also called simply "Meridiana", it is a white main sequence star located 130 light years away from Earth, with an apparent magnitude of 4.10 and spectral type A2Va. A rapidly rotating star, it spins at almost 200 km per second at its equator, making a complete revolution in around 14 hours. Like the star Vega, it has excess infrared radiation, which indicates it may be ringed by a disk of dust. It is currently a main-sequence star, but will eventually evolve into a white



dwarf; it has a luminosity 31 times greater, and a radius and mass of 2.3 times that of the Sun.

*Beta Coronae Australis* is an orange giant 510 light years from Earth. Its spectral type is K0II, and it is of apparent magnitude 4.11. Since its formation, it has evolved from a B-type star to a K-type star. Its luminosity class places it as a bright giant; its luminosity is 730 times that of the Sun, designating it one of the highest-luminosity K0-type stars visible to the naked eye. 100 million years old, it has a radius of 43 solar radii and a mass of between 4.5 and 5 solar masses. Alpha and Beta are so similar as to be indistinguishable in brightness to the naked eye.

Some of the more prominent double stars include *Gamma Coronae Australis*—a pair of yellowish white stars 58 light years away from Earth, which orbit each other every 122 years. Widening since 1990, the two stars can be seen as separate with a 100 mm aperture telescope; they are separated by 1.3 arcseconds at an angle of 61 degrees. They have a combined visual magnitude of 4.2; each component is an F8V dwarf star with a magnitude of 5.01.

*Epsilon Coronae Australis* is an eclipsing binary belonging to a class of stars known as W Ursae Majoris variables. These star systems are known as contact binaries as the component stars are so close together they touch. Varying by a quarter of a magnitude around an average apparent magnitude of 4.83 every seven hours, the star system lies 98 light years away. Its spectral type is F4VFe-0.8+. At the southern end of the crown asterism are the stars Eta<sup>1</sup> and Eta<sup>2</sup> Coronae Australis, which form an optical double. Of magnitude 5.1 and 5.5, they are separable with the naked eye and are both white.

*Kappa Coronae Australis* is an easily resolved optical double—the components are of apparent magnitudes 5.7 and 6.3 and are 1700 and 490 light years away respectively. They appear at an angle of 359 degrees, separated by 21.6 arcseconds. Kappa<sup>2</sup> is actually the brighter of the pair and is more bluish white, with a spectral type of B9V, while Kappa<sup>1</sup> is of spectral type A0III.

Lying 202 light years away, *Lambda Coronae Australis* is a double splittable in small telescopes. The primary is a white star of spectral type A2Vn and magnitude of 5.1, while the companion star has a magnitude of 9.7. The two components are separated by 29.2 arcseconds at an angle of 214 degrees.

Zeta Coronae Australis is a rapidly rotating main sequence star with an apparent magnitude of 4.8, 221.7 light years from Earth. The star has blurred lines in its hydrogen spectrum due to its rotation. Its spectral type is B9V.

*Theta Coronae Australis* lies further to the west, a yellow giant of spectral type G8III and apparent magnitude 4.62. Corona Australis harbours RX J1856.5-3754, an isolated neutron star that is thought to lie 460 light years away, with a diameter of 14 km. It was once suspected to be a strange star, but this has been discounted.

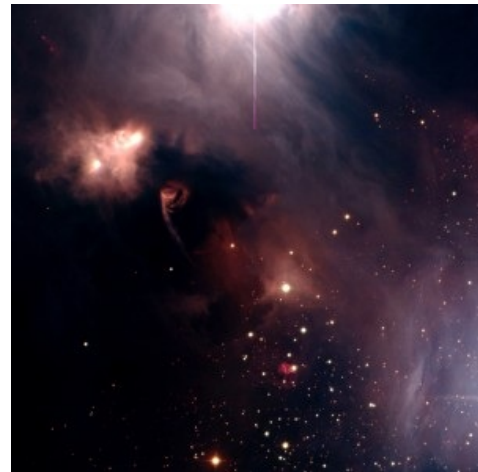
#### DEEP SKY OBJECTS

*R Coronae Australis* is an irregular variable star ranging from magnitudes 9.7 to 13.9. The light blue nebulosity seen in this picture is mostly due to the reflection of starlight off small dust particles. The prominent dark lane in the image from the centre to the bottom left is where the visible light emitted by the stars is completely absorbed by the dust. These objects can be detected using a camera that can detect infrared radiation.

In the north of the constellation is the Corona Australis Molecular Cloud, with many embedded reflection nebulae, a star-forming region of around 7000 Solar masses. **About 430 light years away, it is one of the closest star-forming regions to our solar system.** The related NGC 6726 and 6727 were first recorded by **Johann Friedrich Julius Schmidt** in 1865. The largest young stars in the region, *R*, *S*, *T Coronae Australis*, TY and *VV Coronae Australis*, are all ejecting jets of material which cause surrounding dust and gas to coalesce and form Herbig–Haro objects, many of which have been identified nearby (Herbig–Haro objects are patches of nebulosity where narrow jets of gas ejected by stars collide with clouds of gas and dust nearby at speeds of several hundred kilometres per second).

IC 1297 is a planetary nebula of apparent magnitude 10.7, which appears as a green-hued roundish object in higher-powered amateur instruments.

**Corona Australis was known to the Greeks as a wreath fallen off the centaur's head, which is how it is depicted on old star maps.** AK



The R Coronae Australis region imaged with the Wide Field Imager at ESO's La Silla Observatory

