

THE CONSTELLATION NORMA, THE CARPENTER SET SQUARE

Norma is a small and inconspicuous constellation in the southern hemisphere between Scorpius and Centaurus. Its name is Latin for normal, referring to a right angle, and is variously considered to represent a rule, a carpenter's square, a set square or a level.

It was created by **Abbé Nicolas Louis de Lacaille** in the middle of the 1750s, when he was measuring about 10,000 stars at the Cape of Good Hope. Originally named *l'Equerre et la Regle* in French, Norma represents a tool used in the Age of Exploration by carpenters on exploratory vessels. It has variously taken to represent either a level, a set square, a rule, or a carpenter's square.

FACTINOS

- Norma is the 74th constellation in size, occupying an area of 165 square degrees.
- It is located in the third quadrant of the southern hemisphere and can be seen at latitudes between +30° and -90°.
- The neighboring constellations are Ara, Circinus, Lupus, Scorpius and Triangulum Australe.
- Norma contains four stars with known planets and has no Messier objects.
- The brightest star in the constellation is Gamma-2 Normae, with an apparent visual magnitude of 4.02.
- There is one meteor shower associated with the constellation; the Gamma Normids.
- Norma belongs to the Lacaille family of constellations, along with **Antlia, Caelum, Circinus, Fornax, Horologium, Mensa, Microscopium, Octans, Pictor, Reticulum, Sculptor, and Telescopium.**

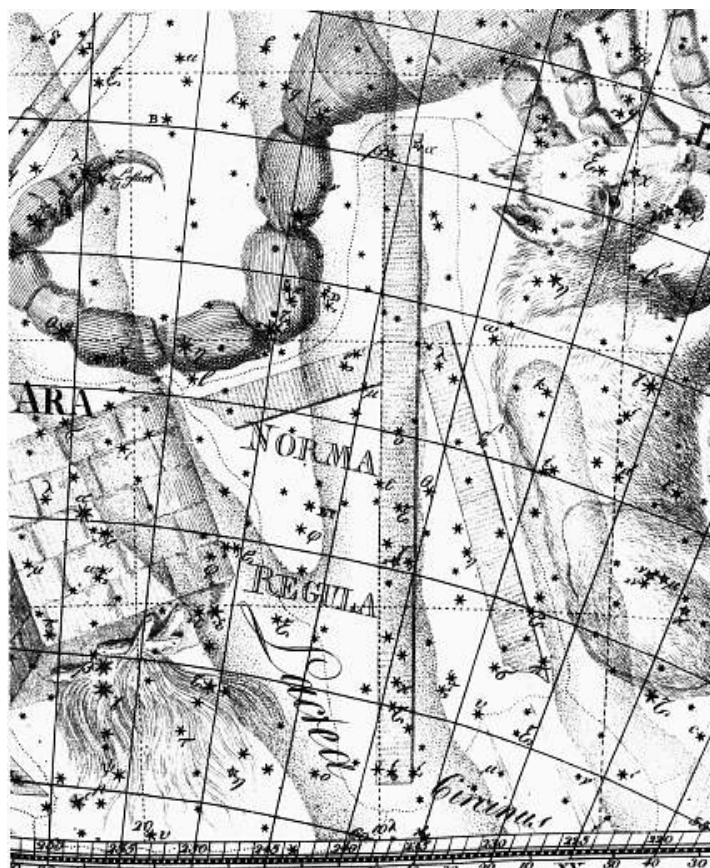
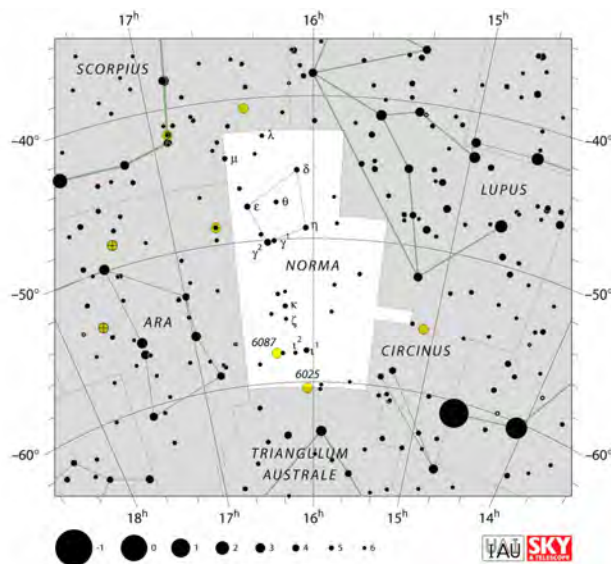
STORY

Norma constellation is not associated with any myths. Lacaille created the constellation out of faint stars between Lupus and Ara that had not been catalogued by **Ptolemy** and named it *l'Equerre et la Regle*, referring to a draughtsman's set-square and rule, which was later Latinized to *Norma et Regula*, and eventually shortened to Norma.

As the constellation boundaries have changed since the 18th century, Norma no longer has stars designated Alpha or Beta. The stars that were Alpha and Beta Normae in Lacaille's time now belong to Scorpius constellation and are designated N and H Scorpium.

Lacaille placed it next to another of his inventions, the compasses (*le Compas*, now known as Circinus), and the southern triangle (*Triangulum Australe*); this latter figure was an earlier invention of the Dutch navigators **Keyser and de Houtman** which Lacaille visualized as a builder's level, **thereby creating a trio of surveying and building instruments.** On the 1763 edition of the planisphere Lacaille Latinized and shortened the name of the constellation to Norma; others, though, preferred the fuller name *Norma et Regula*, as did **Bode** on his atlas of 1801.

In his widely quoted book 'Star Names, Their Lore and Meaning', the historian **R. H. Allen** called this constellation "the Level and Square". Allen said that the French edition of **Flamsteed's** star atlas showed it as *Niveau*, the level, but the alternative name "level" was actually applied to the southern triangle, *Triangulum Australe*. Allen's error has caused confusion ever since.



Norma, shown under the name *Norma et Regula* in the *Uranographia* of Johann Bode (1801). "Rule and Square" is a traditional English pub name.

MAJOR STARS IN NORMA

- *Gamma Normae* is an optical double star composed of Gamma-1 Normae and Gamma-2 Normae, two line-of-sight companions. Gamma-2 Normae, itself a close optical binary, is the brightest star in the constellation. It has the stellar classification of G8III, matching the spectrum of a yellow giant star. It has an apparent visual magnitude of 4.02 and is approximately 127 light years distant from Earth.
- *Epsilon Normae* is a binary star with the stellar classification of B4V, matching the spectrum of a blue-white main sequence dwarf. It has a visual magnitude of 4.53 and is approximately 400 light years distant from the Sun. The dimmer star in the system is itself a spectroscopic binary.
- *Iota-1 Normae* is a white subgiant star with the stellar classification of A7IV. It has an apparent visual magnitude of 4.63 and is about 140 light years distant from Earth. It is really a multiple star. It consists of a rapid binary star with an orbital period of 26.9 years and a third component that lies in the same line of sight but is only 55 light years distant from Earth. Components A and B have apparent magnitudes of 5.6 and 5.8, and component C, 8.75.
- *Eta Normae* is a yellow giant star belonging to the stellar class G8III. It has a visual magnitude of 4.65 and is about 218 light years distant from the Sun.
- *Delta Normae* is a white, A-class star about 123 light years from Earth. It has an apparent visual magnitude of 4.73.
- *Mu Normae* is a blue-white supergiant. It has the stellar classification of B0Ia and is 4,657.13 light years distant from the Sun. It has a visual magnitude of 4.914 and an absolute magnitude of -5.86, **which means that it is about 210,000 times more luminous than the Sun.** The star is a suspected variable of the Alpha Cygni type. Its magnitude varies from 4.87 to 4.98. The star has a mass 30 times solar and a radius 15.4 times that of the Sun. The star's estimated age is about 4 million years.
- *Kappa Normae* has the stellar classification of a yellow giant star, G8III. It has an apparent visual magnitude of 4.94 and is approximately 438 light years distant from the solar system.

DEEP SKY OBJECTS IN NORMA

Ant Nebula – This NASA/ESA Hubble Space Telescope image reveals the ant's body as a pair of fiery lobes protruding from a dying, Sun-like star. Though approaching the violence of an explosion, **the ejection of gas from the dying star at the center of Mz3 has intriguing symmetrical patterns unlike the chaotic patterns expected from an ordinary explosion.**

Scientists using the Hubble space telescope would like to understand how a spherical star can produce such prominent, non-spherical symmetries in the gas that it ejects. One possibility is that the central star of Mz3 has a closely orbiting companion. A second possibility is that its strong magnetic fields are wound up into complex shapes. **The nebula has an apparent magnitude of 13.8 and is approximately 8,000 light years distant from the solar system. It got the nickname the Ant Nebula because its shape resembles the head and thorax of an ant.** It was discovered by the American astronomer and astrophysicist **Donald Howard Menzel** in 1922.

Fine Ring Nebula – Planetary nebulae form when some dying stars, having expanded into a red giant phase, expel a shell of gas as they evolve into white dwarfs. Most planetary nebulae are either spherical or elliptical in shape, or bipolar (featuring two symmetric lobes of material). But the Fine Ring Nebula looks like an almost perfect circular ring. Astronomers believe that some of these more unusually shaped planetary nebulae are formed when the progenitor star is actually a binary system. The interaction between the primary star and its orbiting companion shapes the ejected material. The stellar object at the centre of the Fine Ring Nebula is indeed thought to be a binary system, orbiting with a period of 2.9 days. The Fine-Ring Planetary Nebula has a visual magnitude of 12.6 and was discovered by the American astronomer **Harlow Shapley** in 1936.



The Ant Nebula, or Menzel 3, is a bipolar planetary nebula in Norma



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