

## THE CONSTELLATION GRUS, THE CRANE

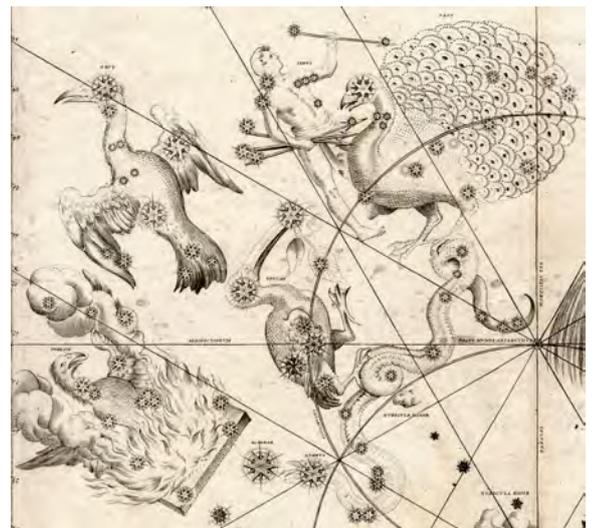
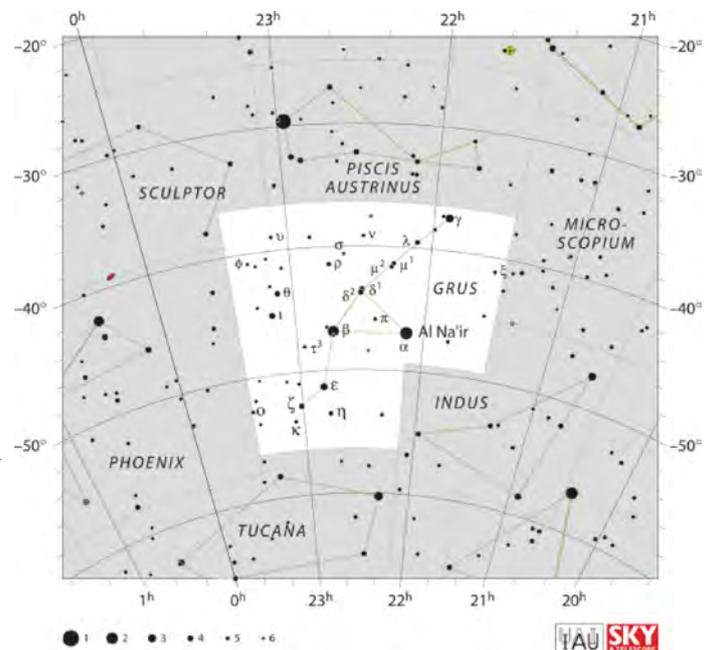
Grus is a constellation in the southern sky. Its name is Latin for the crane, a type of bird. It is one of twelve constellations conceived by **Petrus Plancius** from the observations of **Pieter Dirkszoon Keyser and Frederick de Houtman**. Grus first appeared on a 35-cm diameter celestial globe published in 1598 in Amsterdam by Plancius and **Jodocus Hondius** and was depicted in **Johann Bayer's** star atlas *Uranometria* of 1603. French explorer and astronomer **Nicolas Louis de Lacaille** gave Bayer designations to its stars in 1756, some of which had been previously considered part of the neighbouring constellation *Piscis Austrinus*. **The constellations Grus, Pavo, Phoenix and Tucana are collectively known as the "Southern Birds"**.

### THE STARS

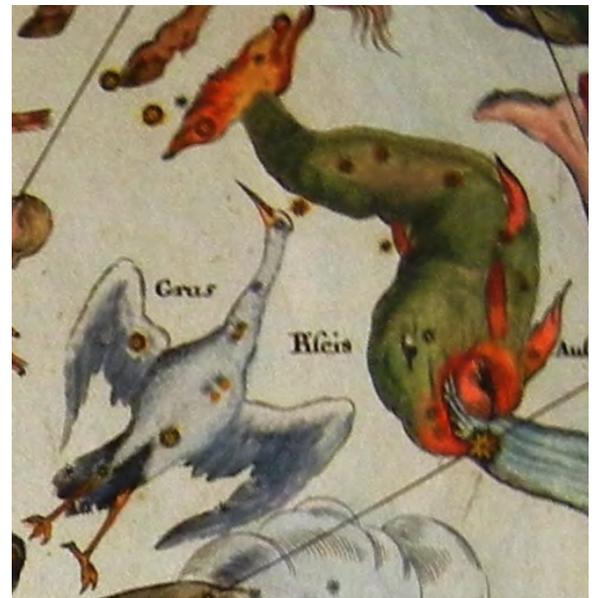
Keyser and de Houtman assigned twelve stars to the constellation. Although Bayer depicted Grus on his chart, he did not assign its stars Bayer designations. French explorer and astronomer Nicolas Louis de Lacaille labelled them Alpha to Phi in 1756 with some omissions. In 1879, American astronomer **Benjamin Gould** added Kappa, Nu, Omicron and Xi, which had all been catalogued by Lacaille but not given Bayer designations. *Alpha Gruis*, the constellation's brightest star marks the left wing. It is a blue-white star of spectral type B6V and apparent magnitude 1.7, around 101 light-years from Earth. Its traditional name, Alnair, means "the bright one" and refers to its status as the brightest star in Grus. Alnair is around 380 times as luminous and has over 3 times the diameter of the Sun.

*Beta Gruis*, lying 5 degrees west of Alnair denotes the Crane's heart, a red giant of spectral type M5III. It has a diameter of 0.8 astronomical units (AU) and if placed in the Solar System would extend to the orbit of Venus. It is located around 170 light-years from Earth. It is a variable star with a minimum magnitude of 2.3 and a maximum magnitude of 2.0. An imaginary line drawn from the Great Square of Pegasus through Fomalhaut will lead to Alnair and *Beta Gruis*.

*Gamma Gruis*, lying in the northwest corner of the constellation marks the crane's eye. It is a blue-white subgiant of spectral type B8III and magnitude 3.0 lying around 211 light-years from Earth. Also known as Al Dhanab, it has finished fusing its core hydrogen and has begun cooling and expanding, which will see it transform into a red giant. *Gamma Gruis* was originally seen as part of the fish's tail, before Bayer straightened the tail of *Piscis Austrinus* to make way for Grus in his *Uranometria*. **The stars were first defined as a separate constellation by the Dutch astronomer Petrus Plancius, who created the twelve new constellations based on the observations of the southern sky by the Dutch explorers Pieter Dirkszoon Keyser and Frederick de Houtman, who had sailed on the first Dutch trading expedition, known as the Eerste Schipvaart, to the East Indies.** De Houtman included it in his southern star catalog the same year under the Dutch name *Den Reygher*, "The Heron", however Bayer followed Plancius and Hondius in using Grus. **Six star systems have been found to have planets: the red dwarf Gliese 832 is one of the closest stars to Earth that has a planetary system.**



The "southern birds", as depicted in Johann Bayer's *Uranometria*



The constellations Grus and Piscis Austrinus, which once formed a single constellation, as depicted in *Atlas Coelestis* by **Johann Doppelmayr**, ca. 1742

## DEEP SKY OBJECTS

Planetary nebula IC 5148, also known as the Spare Tyre Nebula, a planetary nebula located around 1 degree west of *Lambda Gruis*. Around 3000 light-years distant, it is expanding at 50 kilometres a second, one of the fastest rates of expansion of all planetary nebulae

Northeast of *Theta Gruis* are four interacting galaxies known as the Grus Quartet. These galaxies are NGC 7552, NGC 7590, NGC 7599, and NGC 7582. The latter three galaxies occupy an area of sky only 10 arcminutes across and are sometimes referred to as the "Grus Triplet," although all four are part of a larger loose group of galaxies called the IC 1459 Grus Group. NGC 7552 and 7582 are exhibiting high starburst activity; this is thought to have arisen because of the tidal forces from interacting.

Located on the border of Grus with Piscis Austrinus, IC 1459 is a peculiar E3 giant elliptical galaxy. It has a fast counterrotating stellar core, and shells and ripples in its outer region. The galaxy has an apparent magnitude of 11.9 and is around 80 million light years distant. NGC 7424 is a barred spiral galaxy with an apparent magnitude of 10.4 located around 4 degrees west of the Grus Triplet. Approximately 37.5 million light years distant, **it is about 100,000 light years in diameter, has well defined spiral arms and is thought to resemble the Milky Way**. Two ultraluminous X-ray sources and one supernova have been observed in NGC 7424. SN 2001ig was discovered in 2001 and classified as a Type IIb supernova, one that initially showed a weak hydrogen line in its spectrum, but this emission later became undetectable and was replaced by lines of oxygen, magnesium and calcium, as well as other features that resembled the spectrum of a Type Ib supernova. A massive star of spectral type F, A or B is thought to be the surviving binary companion to SN 2001ig, which was believed to have been a Wolf-Rayet star.

Located near Alnair is NGC 7213, a face-on type 1 Seyfert galaxy located approximately 71.7 million light years from Earth. It has an apparent magnitude of 12.1. Appearing undisturbed in visible light, it shows signs of having undergone a collision or merger when viewed at longer wavelengths, with disturbed patterns of ionized hydrogen including a filament of gas around 64,000 light-years long. It is part of a group of ten galaxies.

NGC 7410 is a spiral galaxy discovered by British astronomer **John Herschel** during observations at the Cape of Good Hope in October 1834. The galaxy has a visual magnitude of 11.7 and is approximately 122 million light years distant from Earth

Grus is bordered by *Piscis Austrinus* to the north, Sculptor to the northeast, Phoenix to the east, Tucana to the south, Indus to the southwest, and Microscopium to the west. Covering 366 square degrees, it ranks 45th of the 88 modern constellations in size and covers 0.887% of the night sky. The three-letter abbreviation for the constellation, as adopted by the International Astronomical Union in 1922, is "Gru". The official constellation boundaries, as set by **Eugène Delporte** in 1930, are **defined as a polygon of 6 segments**. Grus is located too far south to be seen by observers in the British Isles and the northern United States, though it can be easily seen from Florida or California; the whole constellation is visible to observers south of latitude 33°N.

An alternative name for the constellation, *Phoenicopterus* (Latin "flamingo"), was used briefly during the early 17th century, seen in the 1605 work *Cosmographiae Generalis* by **Paul Merula** of Leiden University and a 1625 globe by Dutch globe maker **Pieter van den Keere**. Astronomer **Ian Ridpath** has reported the symbolism likely came from Plancius originally, who had worked with both of these people.

Cranes are noted for their elaborate courtship dances; humans on stilts copied the dance. "Cranes are the exotic dancers of the bird kingdom. **Their gyrations have been compared to the antics of fervent pioneer preachers leading their congregations**". When they fly, they follow a leader in formation like the Greek letter lambda, an upside down V shape. The crane was used as a symbol of the astronomer by the Ancient Egyptians.

**In Greek mythology the crane was sacred to Hermes**. The phrase "**the cranes of Ibycus**" became a proverb among the Greeks for the discovery of crime through divine intervention. It relates to the story of Ibycus, a Greek lyric poet, of the 6th century BC. While in the neighbourhood of Corinth, the poet was mortally wounded by robbers. As he lay dying he saw a flock of cranes flying overhead, and swore "Those cranes will avenge me." Shortly afterward the robbers were sitting in a theatre in Corinth and saw a flock of cranes flying by. One joked to his friend "there go the avengers of Ibycus" The remark was overheard and the robbers were arrested. AK



IC 5148, the spare-tyre nebula as imaged by the ESO Faint Object Spectrograph and Camera (EFOSC2) on the New Technology Telescope at La Silla