

CONSTELLATION VULPECULA, THE (LITTLE) FOX

Vulpecula is a faint constellation in the northern sky. Its name is Latin for "little fox", although it is commonly known simply as the fox. It was identified in the seventeenth century, and is located in the middle of the northern Summer Triangle (an asterism consisting of the bright stars **Deneb** in Cygnus (the Swan), **Vega** in Lyra (the Lyre) and **Altair** in Aquila (the Eagle)).

Vulpecula was introduced by the Polish astronomer **Johannes Hevelius** in the late 17th century. It is not associated with any figure in mythology. Hevelius originally named the constellation *Vulpecula cum ansere*, or *Vulpecula et Anser*, which means the little fox with the goose. The constellation was depicted as a fox holding a goose in its jaws. The stars were later separated to form two constellations, Anser and Vulpecula, and then merged back together into the present-day Vulpecula constellation. The goose was left out of the constellation's name, but instead the brightest star, Alpha Vulpeculae, carries the name Anser. It is one of the seven constellations created by Hevelius. The fox and the goose shown as 'Vulpec. & Anser' on the Atlas Coelestis of **John Flamsteed** (1729). The Fox and Goose is a traditional pub name in Britain.

STARS

There are no stars brighter than 4th magnitude in this constellation. The brightest star is:

Alpha Vulpeculae, a magnitude 4.44m red giant at a distance of 297 light-years. The star is an optical binary (separation of 413.7") that can be split using binoculars. The star also carries the traditional name Anser, which refers to the goose the little fox holds in its jaws.

23 Vulpeculae is the second brightest star in Vulpecula constellation. It has an apparent visual magnitude of 4.52 and is approximately 328 light years distant. It is a star in a binary system. It belongs to the spectral class K3III.

31 Vulpeculae is the third brightest star in the constellation. It has a visual magnitude of 4.59 and is 216.57 light years distant from the Sun. It is a variable star. It has the stellar classification G8III.

HD 189733 is a binary star located 0.3 degrees east of Messier 27 (the Dumbbell Nebula). The primary component is believed to be an orange dwarf with the stellar classification K1.5V, and the other star is a red dwarf. The stars have an apparent magnitude of 6.07 and 10.116 and have an orbital period of about 3,200 years. The system can easily be found with binoculars. In October 2005, an extrasolar planet, HD 189733 b, was confirmed to be orbiting the primary star. It is a hot Jupiter class planet with a close orbit to the orange dwarf. It was the first extrasolar planet to be discovered with carbon dioxide in its atmosphere.

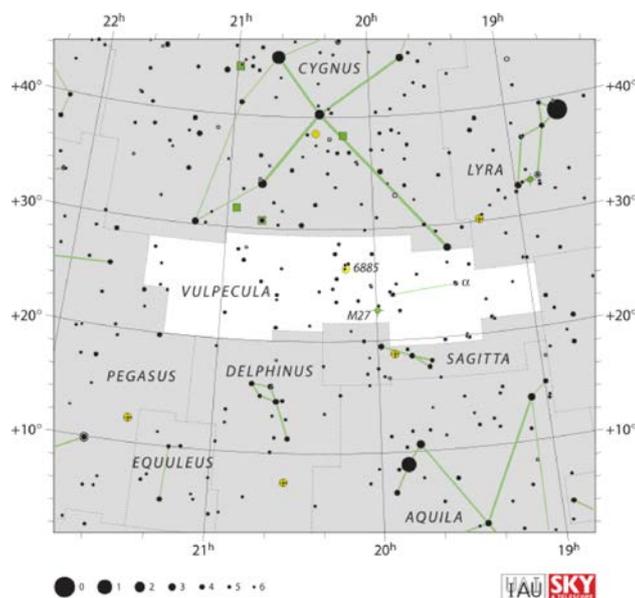
PSR B1919+21 was the first pulsar ever discovered. The name PSR B1919+21 comes from the word "pulsar" and the declination and right ascension at which it is located. British astrophysicist **Jocelyn Bell Burnell** and her thesis supervisor **Antony Hewish** discovered the pulsar in 1967, and Hewish shared the Nobel Prize in Physics for the discovery. Before they figured out what the nature of the signal was, Bell and Hewish had considered the possibility that they had picked up a signal from an extra-terrestrial civilization. Astrophysicist **Thomas Gold** and astronomer **Fred Hoyle** eventually identified these signals as rapidly rotating neutron stars that had very strong magnetic fields. The pulsar is 2,283.12 light years distant and has a period of 1.3373 seconds and a pulse width of 0.04 second.

PSR B1937+21 is the first millisecond pulsar ever discovered, located only a few degrees away from PSR B1919+21. It was discovered in 1982. **The pulsar has a rotational period of 1.557708 milliseconds, which means that it completes nearly 642 rotations per second.**

FACTS

Vulpecula is the 55th constellation in size, occupying an area of 268 square degrees. It has no meteor showers. The neighbouring constellations are Cygnus, Delphinus, Hercules, Lyra, Pegasus and Sagitta.

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



DEEP-SKY OBJECTS

Some well-known deep-sky objects can be found in Vulpecula.

The Dumbbell Nebula (M27), is a large, bright planetary nebula which was discovered by the French astronomer **Charles Messier** in 1764 as the very first object of its kind. It can be seen with good binoculars in a dark sky location, appearing as a dimly glowing disk approximately 6 arcminutes in diameter, or a quarter of the diameter of the full moon. A telescope reveals its double-lobed shape, similar to that of an hourglass. The planetary nebula was the first ever discovered by Charles Messier and is certainly the most impressive in the sky. It is also sometimes called the Apple Core Nebula.

Brocchi's Cluster (Collinder 399) is an asterism formerly thought to be an open cluster. It is also called "the Coathanger" because of its distinctive star pattern when viewed with binoculars or a low power telescope. It consists of ten stars of 5th magnitude and fainter and was first mentioned by the Arab astronomer **al-Sufi** in his *Book of the Fixed Stars*, written in AD 964. The asterism appears as a patch of light to the unaided eye and can easily be seen in binoculars.

The eastern part of Vulpecula is occupied by the **Hercules–Corona Borealis Great Wall**. It is a galaxy filament, with the length of 3,000 megaparsecs, making it the largest structure in the known universe.

NGC 7052 is an edge-on spiral galaxy visual magnitude of 13.4 in Vulpecula at a distance of 214 million light-years from Earth. It has a central dusty disk with a diameter of 3700 light-years; there is a supermassive black hole with a mass of 300 million solar masses in its nucleus. Astronomers surmise that the disk is the remnant of a smaller galaxy that merged with NGC 7052. Jets can be seen emanating from the galaxy, and it has very strong radio emissions. This means that it is also classified as a radio galaxy.

In the next several billion years, the disk will be swallowed by the galaxy's black hole, which is 100 times more massive than the disk itself.

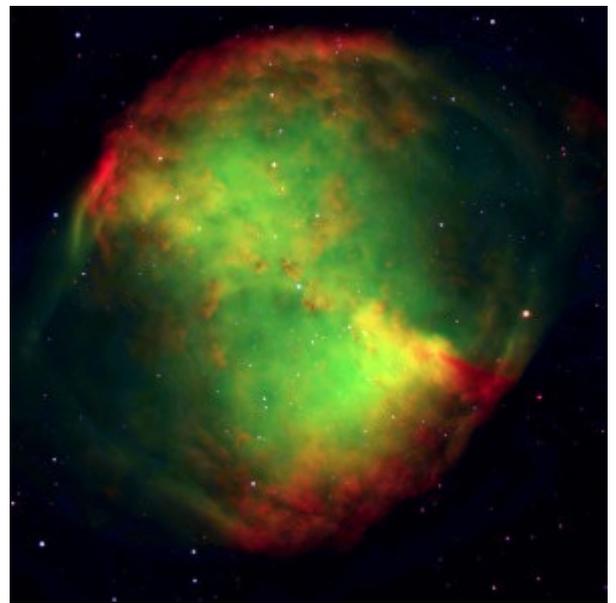
NGC 6820 is an emission nebula in Vulpecula. It surrounds the open cluster **NGC 6823**, located near Messier 27, the Dumbbell. The cluster is about 50 light years across and lies about 6,000 light years from Earth. The centre of NGC 6823 is believed to be two million years old and contains many young blue stars. The outer parts of the cluster that appear next to the pillars of the nebula are home to even younger stars.

Hen 2-437 is a bipolar nebula; the material spewed from the dying star has spread out into space, creating the two icy blue wings.

First identified by **Rudolph Minkowski** in 1946, Hen 2-437 was added to a catalogue of planetary nebula more than two decades later by astronomer and NASA astronaut **Karl Gordon Henize**. The Hubble Space Telescope has added this stunning photo of the nebula to its growing collection of stellar images.

Hen 2-437 is one of 3000 planetary nebula objects known to reside within the Milky Way. Planetary nebulae form when an aging low-mass star — such as the sun — reaches the final stages of life. The star swells to become a red giant, before casting off its gaseous outer layers into space. The star itself then slowly shrinks to form a white dwarf.

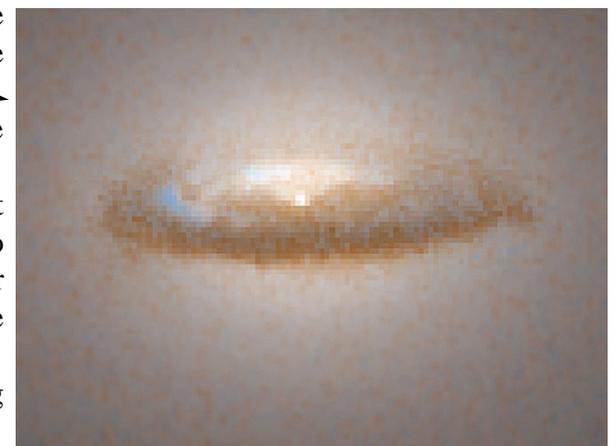
AK with Wikipedia Notes



The Dumbbell Nebula takes its name from the double-lobed structure, like a bar-bell. It consists of gas thrown off from a dying star



"The Coathanger"



Hubble image of the centre of NGC 7052



Planetary nebula Hen 2-437 is located in the constellation of Vulpecula