



Celestial Home of Stars

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In antiquity the Capricornus constellation was seen as a monster with the head and forelegs of a goat and the posterior of a fish. The creature could almost be compared to the so-called Mermaid but could also sometimes, in the case of Capricornus, refer to the Fishman.

The name 'Tropic of Capricornus' originates from the fact that when first ob-



Monument marking the tropic of Capricorn outside Polokwane, Limpopo province.



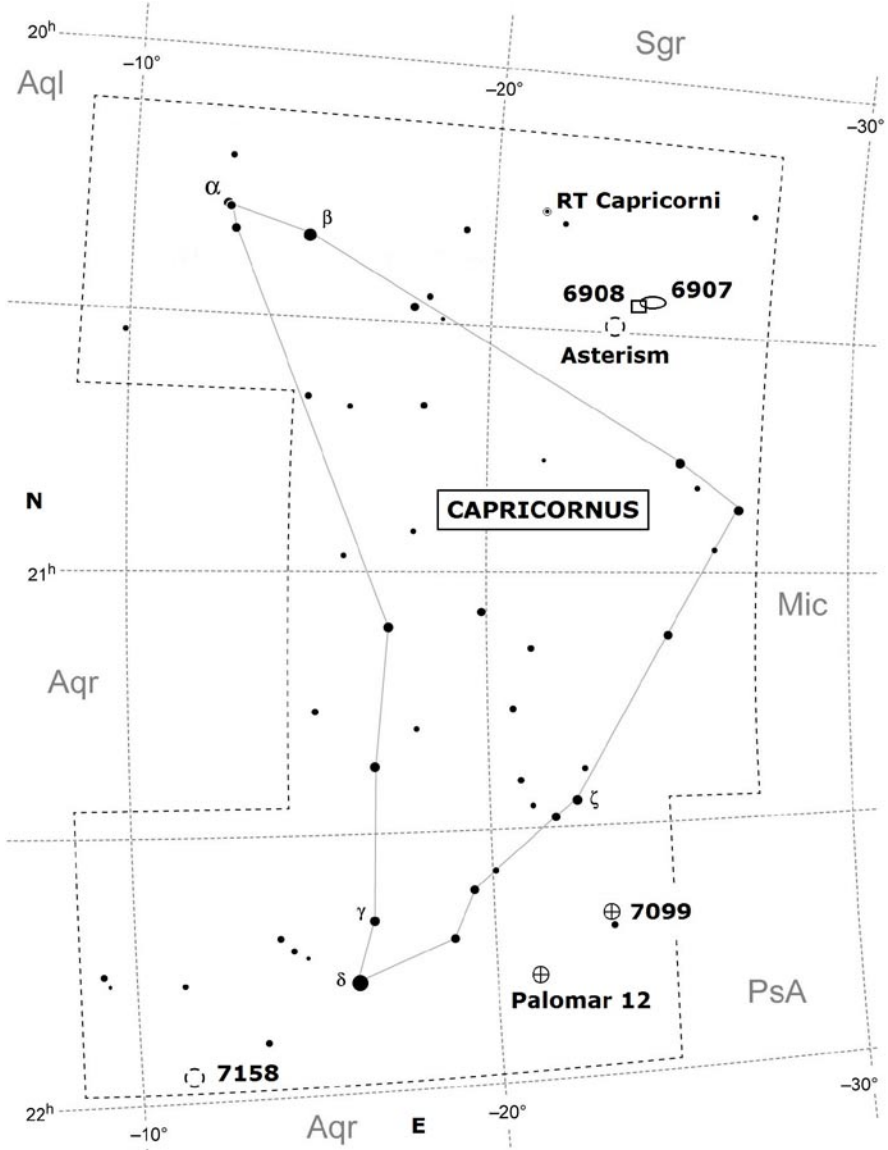
Image source: Stellarium.org

served towards the east it indicates the point of the winter solstice, this solstice at present being 33° to the west in the figure of Sagittarius.

The constellation is special to the author for two good reasons. Not only does she live right inside the old Tropic of Capricorn Circle, but the image also reflects a particular shape: it looks very much like a huge lopsided triangle, and special in the star composition. Heaven alone knows how anyone could see a sea goat with horns in that particular star pattern, but be that as it may ... We will carefully unravel the constellation, which holds a large number of bright stars to pleasure the eye.

The constellation occupies 414 square degrees of sky and is situated just east of Sagittarius, but sadly it is not rich in deep-sky objects. Still, it is an easily recognisable compilation, with several

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look-alike double stars and is, famously, a close neighbour to the centre of the Milky Way.

The lovely double star, alpha Capricorni, also the star closest to the Sagittarius boundary, is a wide, naked-eye



NGC 6907 Its misty glow represents a miniature Large Magellanic Cloud. Dale Liebenberg

double star. In fact, four companions are listed. Double star director Dave Blane indicate that Alpha Capricorni is an optical double star with components α^1 Cap and α^2 Cap having magnitudes 4.3 and 3.6 respectively. They have a separation of $381''$ at a position angle of 292° . α^1 is a G type super-giant and α^2 is a giant star of the same spectral class. Each component is in turn a multiple star, with α^1 having a magnitude 9.6 companion with separation of $46.9''$ at a position angle of 222° , which is unrelated, while α^2 has a magnitude 10.5 companion with separation $153''$ at a PA of 160° .

Another star, quite extraordinary in its own right, about halfway along the western boundary of the constellation, is **RT Capricorni**. It is a carbon star which glows with a lovely reddish colour that varies irregularly between magnitude 7 and 11.

Further towards the south-western corner of the constellation the galaxy **NGC 6907** displays a misty glow with an elongated shape in a north-east to south-west direction and strongly resembles a miniature Large Magellanic Cloud. The centre area shows a small star-like nucleus. Higher magnification reveals knotted texture on the surface

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with a small, barely visible arc-like patch embedded in the north-east listed as **NGC 6908** (see picture).

Just 15' east of **NGC 6907** is a lovely **Asterism** contains six colourful stars in a prominent north-south arrow shape, with the brightest star (HD 194412) at magnitude 8. It is quite prominent against a sparse star field.

An object that is questionable is **NGC 7158**, which forms a triangle towards the north-east from the stars magnitude 5 mu and magnitude 5.5 lambda Capricorni. This is one of those objects which is nowhere to be found, but which, on closer investigation, appears as a very faint string of three close stars between magnitude 9 and 11. Steve Coe, using a 13" f/5.6, notes: "Is given as a triple star in NGC 2000 catalogue. Sure enough, there is a triple with two members about 9th magnitude and one 11th at this location. They are separated by about 30 arc seconds in a straight line at 100X. This multiple star system must have been included in the NGC because of its appearance at low power this group is nebulous. It is marked as a galaxy on Uranometria 2000."

The rare globular cluster **Palomar 12** (named after the Palomar Observatory), situated relatively close to the Pisces Austrinus border, is around 60 000 light years distant. This globular cluster is estimated to be much younger than most of the globular clusters in our

Milky Way. Tom Polakis' motion studies suggest that Palomar 12 may have originated in the Sagittarius Dwarf Galaxy, but was probably later captured by the Milky Way.

Capricornus is home to the distinctive globular cluster **NGC 7099**, or Messier 30, also known as Bennett 128, which is situated about 3 degrees east of the magnitude 3.7 zeta Capricorni. Messier 30 were discovered by Charles Messier (1730–1817) on 3 August 1764 near the star 41 Capricorni. He devoted much of his life to searching the skies for comets and his notes indicate the object to be round, containing no stars and seen with difficulty in a good Gregorian 3 1/2-foot telescope.

With low power it might well resemble a comet, in line with the comment of the Reverend Thomas William Webb, a British astronomer, born 14 December 1807 and died 19 May 1885, though some sources give his year of birth as 1806. He was the only son of a clergyman, and was raised and educated by his father, his mother's having died while he was still a little child. However, the globular cluster grows gradually brighter towards a tiny, very dense and bright core. Careful observation reveals an image resembling an elongated north-south honeycomb covered with bees (see picture). With higher magnification faint stars mingle asterism-like at random, with two prominent strings extending north and north-west, one



M 30 Globular Cluster, or NGC 7099, is a comet-like cluster, that moves the opposite direction to the rotation of the galaxy, probably as the result of an intergalactic gravitational encounter. Dale Liebenberg

slightly longer, giving the impression of a pair of firefly antennae. The southeastern part of the globular is broken down in starlight and in a way cut off by a short string of four stars. Also to be seen is a double star towards the southern part. Messier 30 is a large globular cluster that can be easily spotted with binoculars and measures nearly 90 light years in diameter. It is a very special object – one to remember long after observed it.

In Philosophical Transaction 1814, William Herschel described it as a brilliant cluster, the stars of which become grad-

ually more compressed in the middle. John Herschel, son of William, observing with the 18-inch f/3 speculum at the Cape of Good Hope, records the object as “a globular cluster, bright, 4' long by 3' broad; all resolved into stars, gradually more compressed in the middle. In this accumulation of stars, plainly see the exertion of a central clustering power, which may reside in a central mass.”

Admiral William Henry Smyth, an English amateur, was moved to wild speculation about the object. “What an immensity of space is indicated. Such an arrange-

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ment is intended as a bungling sputter for a mere appendage to the speck of a world on which we dwell, to soften the darkness of its petty midnight."

Closer to home, a very realistic observation of Messier 30 by Auke Slotegraaf indicates the position as lying in south-eastern Capricorn, outside of the large delta-wing shape of the Sea Goat, in the direction of the star Fomalhaut. He further indicates M30's integrated magnitude as V=6.9, and it is plainly visible through binoculars as a bright round cometary glow, with a tight nucleus, accompanied by the pale yellow magnitude 5 star 41 Cap. Just 4' west-south-west of the nucleus of the cluster lies a magnitude 8 star. A small telescope shows it as a 3'-diameter glow, growing slowly brighter towards the centre, where it becomes suddenly much brighter, forming a definite, strongly condensed, nucleus. The brightest stars in M30 - its red giants - are between magnitude 12 and 13, so a small telescope will show a few individual stars. Larger telescopes bring the cluster up

to about 5' diameter, showing several more cluster members scattered across the background haze of unresolved stars. Two short rows of magnitude 12 stars, leading away from the compact nucleus, catch the eye: one pointing north, the other to the north-west.

M30 is almost 13 gigayears (Gyr) old and has a mass of about 80 000 suns. It lies 26 000 light years away from our Sun and moves in an orbit around our galaxy, which is opposite in direction to the rotation of the galaxy itself. This suggests that M30 was not formed as part of our Milky Way, but was, instead, accreted (gravitationally captured) when its own parent galaxy had a close encounter with our galaxy.

Allow me the opportunity to thank Dale Liebenberg for the excellent pictures he so gratefully contributes to the articles that are constantly share with the readers.

Don't avoid the fish-goat. Grab it by the horns and use them to penetrate the objects within its realm. ☆

Object	Type	RA (J2000.0)	Dec	Mag	Size
RT Capricorni	Carbon Star	20 ^h 17 ^m 2	-21°20	7 - 11	*
NGC 6908	Nebulosity	20 25 1	-24 48	14	0.5'x0.3'
NGC 6907	Galaxy	20 25 6	-24 49	11	3.2'x2.3'
Asterism	Star Group	20 26 7	-24 57	8	10'
NGC 7099, M 30	Globular Cluster	21 40 4	-23 11	6.9	9'
Palomar 12	Globular Cluster	21 46 6	-21 15	11.7	2.9'
NGC 7158	Unknown	21 57 4	-11 36	9.5	'x6'