



# THE STAR



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## **ASTRONOMICAL TERMS AND NAMES DEFINED:**

When reading the articles in the STAR, you will come across various terms and names of objects you may not be familiar with. Therefore, in each edition of the STAR, we will review terms as well as objects related to Astronomy and related technologies. These topics are presented on a level that the general public can appreciate.

### **ARCMINUTE**

A minute of arc (MOA), arcminute (arcmin) or minute arc is a unit of angular measurement equal to one-sixtieth ( $\frac{1}{60}$ ) of one degree. As one degree is  $\frac{1}{360}$  of a circle, one minute of arc is  $\frac{1}{21,600}$  of a circle (or, in radians,  $\frac{\pi}{10,800}$ ).

### **M11 and M26**

The Messier objects are a set of 110 astronomical objects catalogued by the French astronomer Charles Messier in his "Catalogue des Nébuleuses et des Amas d'Étoiles" ("Catalogue of Nebulae and Star Clusters").

Astronomical objects first listed by French astronomer Charles Messier in 1771.<sup>[1]</sup> Messier was a comet hunter, and was frustrated by objects which resembled but were not comets, so he compiled a list of them,<sup>[2]</sup> in collaboration with his assistant Pierre Méchain, to avoid wasting time on them. The number of objects in the lists he published reached 103, but a few more thought to have been observed by Messier have been added by other astronomers over the years.

A similar list had been published in 1654 by Giovanni Hodierna, but attracted attention only recently and was probably not known to Messier.

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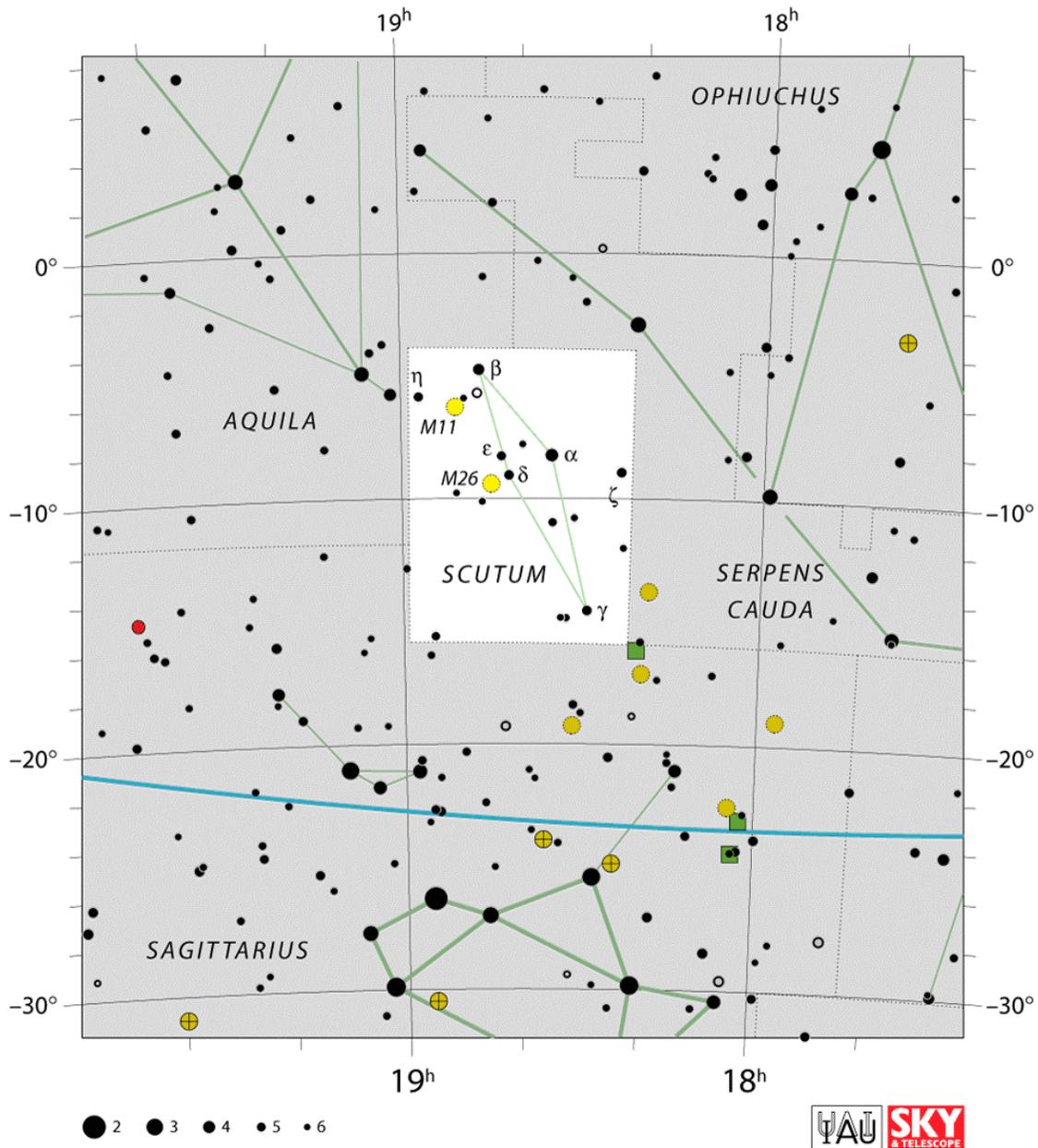
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# August Constellation

## Scutum



Bordering constellations: Aquila, Sagittarius, Serpens Cauda

Visible at latitudes between +80° and -90°.  
Best visible at 21:00 (9 p.m.) during the month of August.

Abbreviation	Sct
Genitive	Scuti
Pronunciation	/ˈskjuː təm/, genitive /ˈskjuː taɪ/
Symbolism	the Shield
Right ascension	18.7
Declination	-10
Family	Hercules
Quadrant	SQ4
Area	109 sq. deg. (84th)
Main stars	2
Bayer/Flamsteed stars	7
Stars with planets	1
Stars brighter than 3.00 <sup>m</sup>	0
Stars within 10.00 pc (32.62 ly)	0
Brightest star	α Scuti (3.85 <sup>m</sup> )
Nearest star	LHS 3398 (41.54 ly, 12.74 pc)
Messier objects	2
Meteor showers	June Scutids
Bordering constellations	Aquila Sagittarius Serpens Cauda
Visible at latitudes between +80° and -90°.	
Best visible at 21:00 (9 p.m.) during the month of August.	

**Scutum was named in 1684 by Polish astronomer Johannes Hevelius (Jan Heweliusz), who originally named it Scutum Sobiescianum (Shield of Sobieski) to commemorate the victory of the Christian forces led by Polish King John III Sobieski (Jan III Sobieski) in the Battle of Vienna in 1683. Later, the name was shortened to Scutum.**

**Five bright stars of Scutum (α Sct, β Sct, δ Sct, ε Sct and η Sct) were previously known as 1, 6, 2, 3, and 9 Aquilae respectively.**

**Coincidentally, the Chinese also associated these stars with battle armor, incorporating them into the larger asterism known as *Tien Pien*, i.e., the Heavenly Casque (or Helmet).**

## Notable features

### Stars

Scutum is not a bright constellation, with the brightest star, Alpha Scuti, at magnitude 3.85. But some stars are notable in the constellation. Beta Scuti is the second brightest at magnitude 4.22, followed by Delta Scuti at magnitude 4.72. Beta Scuti is a binary system, with the primary with a spectral type similar to the Sun, although it is 1,270 times brighter. Delta Scuti is a bluish white giant star, which is now coming at the direction of the Solar System. Within 1.3 million years it will come as close to 10 light years from Earth, and will be much brighter than Sirius by that time.

Scutum is also notable for having UY Scuti, a red supergiant pulsating variable star. At  $1,708 \pm 192$  solar radii, it is one of the largest stars currently known.

### Deep sky objects

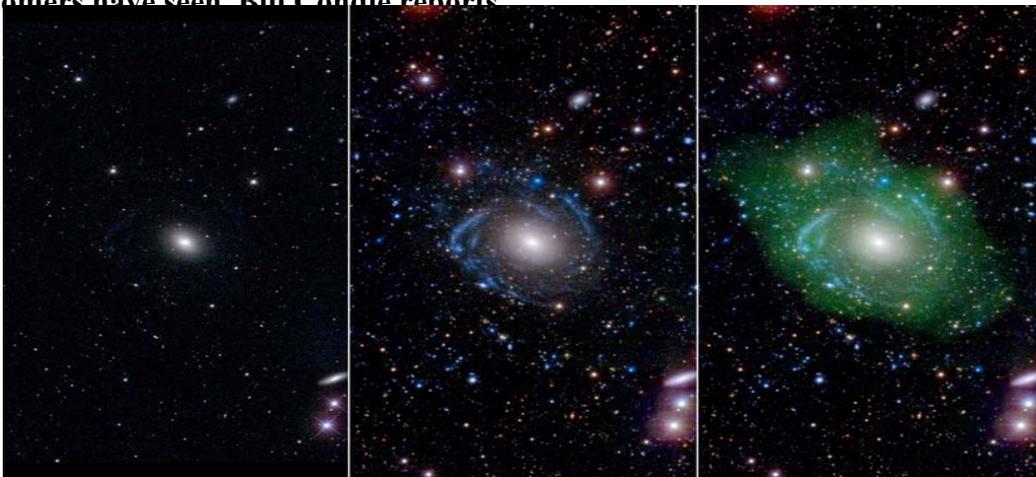
Although not a large constellation, Scutum contains several open clusters, as well as a globular cluster and a planetary nebula. The two best known deep sky objects in Scutum are **M11** (the Wild Duck Cluster) and the open cluster **M26** (NGC 6694). The globular cluster NGC 6712 and the planetary nebula IC 1295 can be found in the eastern part of the constellation, only 24 **arcminutes** apart.

The most prominent open cluster in Scutum is the Wild Duck Cluster, M11. It was named by William Henry Smyth in 1844 for its resemblance in the eyepiece to a flock of ducks in flight. The cluster, 6200 light-years from Earth and 20 light-years in diameter, contains approximately 3000 stars, making it a particularly rich cluster. It is 220 million years old

## Bizarre giant galaxy found in quiet corner of the universe

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A galaxy 'built in reverse' with youngest stars on the inside is unlike anything astronomers have seen. Bill Condie reports



*In optical light, UGC 1382 appears to be a simple elliptical galaxy (left). When astronomers incorporated ultraviolet and deep optical data (centre) they began to see spiral arms, and when that was combined with a view of low-density hydrogen gas (shown in green at right), scientists discovered that UGC 1382 is gigantic.*

*Credit: NASA/JPL/Caltech/SDSS/NRAO/L. Hagen and M. Seibert*

Scientists have been taken by surprise to discover that a galaxy they thought was tiny and conventional is, in fact, enormous and bizarre – and quite unlike anything they have seen before.

At about 718,000 light-years across, UGC 1382 is more than seven times wider than the Milky Way – 10 times larger than was previously thought. But that isn't the strange part.

Whereas most galaxies have the oldest stars closer to the centre, this one is the reverse.

“The centre of UGC 1382 is actually younger than the spiral disc surrounding it,” says Mark Seibert of the Observatories of the Carnegie Institution for Science, in California.

“It's old on the outside and young on the inside. This is like finding a tree whose inner growth rings are younger than the outer rings.”

Seibert and Lea Hagen of Pennsylvania State University found the galaxy by accident while they were looking for stars forming in run-of-the-mill elliptical galaxies – of which they thought UGC 1382 was one.

But when they started looking more closely at images in ultraviolet light through data from NASA's Galaxy Evolution Explorer (GALEX), they were amazed to see a vast expanse of stars that shouldn't have been there.

“We saw spiral arms extending far outside this galaxy, which no one had noticed before, and which elliptical galaxies should not have,” said Hagen, lead author of a study to be published in the *Astrophysical Journal*.

“That put us on an expedition to find out what this galaxy is and how it formed.”

Hagen and Seibert then looked at data of the galaxy from a range of different telescopes – the Sloan Digital Sky Survey, the Two Micron All-Sky Survey (2MASS), NASA's Wide-field Infrared Survey Explorer (WISE), the National Radio Astronomy Observatory's Very Large Array and Carnegie's du Pont Telescope at Las Campanas Observatory.

Slowly a new model of this mysterious galaxy emerged.

**At 250 million light-years away, UGC 1382 turns out to be one of the three largest isolated disc galaxies ever discovered – a rotating disc where stars are slow to form because of the low-density gas that it is made up of.**

**But the biggest surprise was how the relative ages of the galaxy's components appear backwards.**

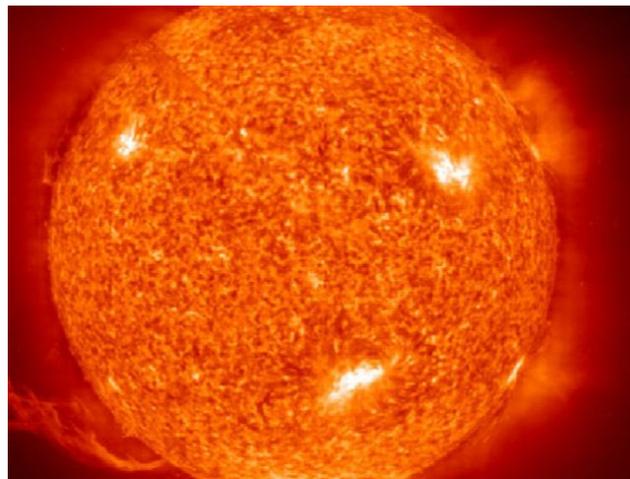
**The study suggests that this may be because UGC 1382 has been cobbled together with two distinct parts of the galaxy evolving independently before merging. That has resulted in a huge structure, but not a very stable one.**

**“It is so delicate that a slight nudge from a neighbor would cause it to disintegrate,” says Seibert.**

**He says it was only able to form and survive because it lies in a quiet part of the universe, making it very rare. More galaxies like this may exist, but research is needed to look for them, the study suggests.**

**“By understanding this galaxy, we can get clues to how galaxies form on a larger scale, and uncover more galactic neighborhood surprises,” Hagen says.**

The sun is losing its spots — and here’s why that’s a bad thing for all of us.



The sun at it’s best.



**And, the sun at its worst.**

**The sun is losing its spots, and it's certainly something that we shouldn't take lightly. According to news.com.au, our fireball has gone blank for the second time this month, leading Meteorologist Paul Dorian to believe that the next solar minimum and there will be an increasing number of spotless days over the next few years. This matters because the amount of sun spots reportedly is approaching affects our climate.**

**So, let's start with solar minimum. What is it exactly? Well, NASA explains it to be when the sun's natural solar cycle shows the lowest amount of sunspots. You see, when at its best, the sun's surface is covered in visible dark blemishes, or sunspots. The sun goes through a natural solar cycle approximately every 11 years, and each cycle is marked by the increase and decrease of sunspots – with the highest number of sunspots in any given solar cycle being the “solar maximum” and the lowest number being “solar minimum.”**

**Why at its best?**

**“During Solar Max, huge sunspots and intense solar flares are a daily occurrence. Auroras appear in Florida. Radiation storms knock out satellites. Radio blackouts frustrate CB radio as well. The last such episode took place in the years around 2000-2001,” says NASA.**

**NASA goes on to explain that “during solar minimum, the opposite occurs. Solar flares are almost non-existent while whole weeks go by without a single, tiny sunspot to break the monotony of the blank sun. This is what we are experiencing now.”**

**So... why we should care? Well, Dorian breaks down all of the sun-related deets to us in his report, published just a few days ago. “The blankness will stretch for just a few days at a time, then it'll continue for weeks at a time, and finally it should last for months at a time when the sunspot cycle reaches its nadir,” says Dorian, leading a lot of us to believe that the next mini ice age is on its way.**

## Look up! Record Perseid meteor shower on way.



In a spectacle that should add a new dimension to the idea of summer fireworks, the annual Perseid meteor shower is ramping up, and this year should be one for the record books.

The first shooting stars — actually, shooting debris — are already whizzing overhead, and by the time the shower peaks between Aug. 11 and Aug. 13, astronomers predict at least 200 meteors per hour will be visible, thanks to a rare gravitational alignment.

The Perseid meteors originate from the Comet Swift-Tuttle, which is little more than a chunk of ice and dust about six miles wide. Swift-Tuttle's orbit brings it close to earth, although there is no danger of impact — at least for the next 2,000 years. When it loops through the inner solar system every few hundred years, it is warmed by the sun and partially melts, leaving a stream of wreckage scattered in its wake that remains in the system.

Each year, Earth passes through this trail. As the tiny pieces skid into the upper atmosphere, they generate heat and friction that result in the brilliant trails of light we call meteors.

The other planets, particularly Jupiter and Saturn, also cross paths with the litter left behind by the comet. Their gravity pushes the particles in different directions and leads to variation in the amount of debris Earth encounters.

Occasionally, the force of the giant planets focuses the trail and pushes it closer to Earth in what astronomers call an outburst. As a result, this year's shower is predicted to have more than double the number of meteors.

**“The predictions are very good, but it’s not a guarantee,” said Bob Bonadurer, director of the Daniel M. Soref Planetarium at the Milwaukee Public Museum. “It’s not like a solar eclipse where we know down to the second when it will happen. We’re talking about tiny grains of dust. It’s amazing they can predict it.”**

**The majority of meteors will be seen flying out of the constellation Perseus where the radiant, or point in the sky where the meteors appear to fall from, is located. To find it, viewers should look to the northeast sky near the brighter, W-shaped constellation Cassiopeia.**

**According to Bonadurer, the best viewing conditions are in rural areas away from the glow of streetlights. If you can’t get out of the city, darker places like parks and golf courses offer the best chance of seeing fainter meteors.**

**“You don’t need anything, just a blanket and some bug spray,” Bonadurer said. “No telescope, just look up.”**

**Early morning sky watchers will be rewarded with a dark backdrop for meteors. On Aug. 12, the waxing gibbous moon, which will be about 70% illuminated, will set by 1 a.m. As a bonus, the radiant will be directly overhead in the moonless hours before dawn.**

**Those wishing for more convenient viewing conditions should check out the sky in the days leading up to the peak when the moon will set earlier and be less full. Meteors will continue to streak across the sky through Aug. 24, but the number tends to fall off quickly once peak occurs.**

**“Traditionally, the Perseids are the best meteor shower of the year,” Bonadurer said. “Even if the predictions for double are wrong, it’s definitely worth checking out.”**

### **LENDING LIBRARY BOOK REVIEW**

**The Hunt for Vulcan by Thomas Levenson.**

**And how about Albert Einstein Destroying a Planet, discovering Relativity and deciphered the Universe. The story of the forgotten planet. The author tells us where it came from, how it vanished, and why its spirit lingers on. Along the way, you will learn how science works – when it succeeds as well as when it fails.**

### **PUBLIC NIGHTS AT MCAO:**

**For a list of all Mount Cuba Astronomical Observatory Public Night and Family Night. Please visit [mountcuba.org](http://mountcuba.org) on the web.**

## **Star Parties**

**August 6, 2016 8:00 pm - 10:30 pm**  
**Star Party at Delaware Museum of Natural History**

**August 12, 2016**  
**Telescope Night at Woodside Creamery**

**September 9, 2016**  
**Telescope Night at Woodside Creamery**

**All above are from Dusk to Closing.**

**September 17, 2016 7:30 pm - 9:00 pm**  
**Introduction to the Night Sky at Bellevue State Park**

**Bellevue State Park offers an evening of stargazing as DAS shows constellations and gives an introduction to observing the night sky. Equipment will be available, or you may bring your own. Red-filtered lights only please. No fee for this program. Call the Park to pre-register 302-761-6963. Meet in the Hunter Barn parking lot.**