

## Perseids - The Legendary Shower

The Perseids are probably the best known meteor shower for observers and the public alike.

These are fast meteors, at about 59 km per second (342,000 mph), and often leave **nice** trains behind them. There usually are many bright Perseids, so even from a less than perfect sky location, an observer should see a respectable number of meteors. For the best effect though, try to get out into the country, away from the light pollution of streetlights. You will see many more meteors for every extra little bit of dark sky.

The Zenithal Hourly Rate (ZHR) at the peak is about 110 meteors per hour, calculated as being visible with the unaided eye, **if** an observer is out under a dark country sky, and if the radiant, the area in the sky where the meteors seem to come from, is directly overhead. This makes it one of the two best of the annual showers (the other being the December Geminids).

The Perseid meteor shower is usually considered to have two peaks - a very broad peak, stretching over 3-5 days, and a sharper peak (or peaks) around the time usually given for the maximum. For meteor scatter operation, it is usually worth while to make schedules during the morning hours August 10-13. Their generally high level of ionization make them especially good for MS communications (and also very pretty to watch). They are circumpolar for those in the mid-northern latitudes (i.e., their radiant never sets), reaching a minimum altitude about 1730 local time. They generally are not very good for north-south paths, but can be **very** good for NW-SE and NE-SW headings. The radiant is too high for good E-W paths, but possible. **It has often been noted that operating for maximum "efficiency" or "effectivity" (i.e., operating at the most suitable time for a given direction) is much more important during the Perseids than trying to catch the peak!** OH5IY's [MS-Soft program](#) can help you with your planning. (There is a simple DOS program, TMSP ("The Meteor Scatter Predictor") on the [Accessory Page](#) that can also help).

The Perseids have been observed for at least 2000 years, as the stream has a very stable, highly inclined orbit which protects it from strong planetary perturbations. Its parent comet, P. Swift-Tuttle, had been seen only in 1862 until it returned in 1992. In spite of predictions of increased activity, in 1991 the Perseids caught many by surprise when it suddenly surged with an outburst in the order of 500 per hour. The next several years produced **great showers**, with a new very sharp and large peak at an unexpected time. Many hams made contact after contact in the largest meteor showers since the 1966 Leonids storm!

For many years a number of Hams (and a small handful of visual observers) have said that the Perseids occasionally appear in pairs or in small groups. The meteor experts always said that this was only an illusion caused by the random time of arrival of individual meteors, which would of course occasionally cause several to appear at about the same time. However, following the discovery of the tightly bunched dust trails of the Leonids shower, and with more and more experienced visual observers reporting groupings of the Perseids (sometimes when observers in other locations were reporting almost no meteors at that same time), some of those involved with meteor science have begun to rethink the possibility of pairing or grouping of the Perseids and perhaps some other showers.

These famous meteors appear to radiate from the legendary constellation of Perseus. In ancient Greek mythology, Perseus was a hero. His mother was Danae - a human. His father was the god Zeus, the son of Saturn and Rhea of the race of Titans, who were the children of Earth and Heaven, which sprang from Chaos. There was a prophesy that Perseus would slay his own grandfather, so mother and son were locked in a wooden chest and thrown into the ocean. The chest surfaced and floated to the island of Seriphus, where Perseus grew up. The king of the island, Polydectes, started to fall in love with Danae, and decided to try to get Perseus out of the way. He asked him to go slay the famous female monster Medusa, a Gorgon whose

gaze turned men to stone.

It wasn't Medusa's fault that she was a fearsome Gorgon. She had once been a beautiful mortal. Poseidon, Zeus' brother, had seduced her inside a temple of Athena. Athena, the goddess of both war and wisdom, was so enraged that she changed Medusa into a monster, with her beautiful hair becoming a squirming mass of snakes.

Perseus took off to slay her, outfitted with winged sandals from Hermes, the messenger god; a sword of diamond from Hephaestus, the god of fire and the forge; and a magical helmet to make him invisible, from Hades, god of the underworld. He accomplished the feat of slaying Medusa without directly looking at her by using her reflection in his shield. The blood from the unfortunate Medusa's severed head, upon hitting the earth, created the great winged horse Pegasus, who was caught and tamed by Minerva and presented as a gift to the Muses, the daughters of Zeus and Mnemosyne. The Muses presided over literature, art and science.

On Perseus' way home, he came upon the princess Andromeda, daughter of King Cepheus, chained to a rock as a sacrifice to the sea monster Cetus because of the vainful boasting of her mother, Queen Cassiopeia. Perseus rescued the fair maiden and married her, then turned her intended husband, her uncle Phineus, to stone using the head of Medusa. After further exploits, he gave the severed Gorgon head to Athena, who placed it in the center of her shield.

At a later time, Perseus, while attending a funeral in Thessaly, accidentally killed his own grandfather as prophecy had predicted. Perseus and Andromeda had a daughter whom they named Gorgophone, and a number of sons, including Perses, who is considered to be the father of all Persians. His granddaughter Alcena would bear a son named Hercules. In the end, Perseus, Andromeda, King Cepheus, Queen Cassiopeia, the great winged horse Pegasus, and the sea monster Cetus were all given places in the stars - and you can see these constellations in your star maps for summer! The star beta Perseus, known as Algol, the Demon Star, is named after Medusa - it fades and brightens every 2.87 days, and was the first eclipsing variable star ever discovered.

The famous Perseid meteor shower has been observed for about 2000 years, with the first known information on these meteors coming from the far east. In early Europe, the Perseids came to be known as the "tears of St. Lawrence." Mark Littmann has a wonderful article on the history of the Perseids on the Sky and Telescope website and writes: "Saint Lawrence was tortured and killed in Rome on August 10, 258 during the reign of the anti-Christian emperor Valerian... Citing Quetelet, 'a superstition has 'for ages' existed among the Catholics of some parts of England and Germany that the burning tears of St. Lawrence are seen in the sky on the night of the 10th of August; this day being the anniversary of his martyrdom.'"

Because the orbit of the Perseid meteoroid particles is tilted so much in relation to the plane of our own solar system, the Perseids have stayed fairly similar in characteristics since ancient times, and have not been changed much by the influence of our large planets such as Jupiter. It was Schiaparelli, the astronomer most noted for observing so-called "canali" on Mars, who discovered that the Perseid meteors were related to Comet 1862 III, also known as 109/P Swift-Tuttle. This was the first proven association between a comet and a meteor shower.

The parent comet itself, 109/P Swift-Tuttle, was discovered in July of 1862 by both Lewis Swift of Marathon, New York and Horace Tuttle of Harvard Observatory, Massachusetts. It was about magnitude 7.5 at discovery and brightened to about magnitude 2 by early September, which is about the same brightness as the stars in the Big Dipper. It sported a tail of between 25 and 30 degrees long, and was quite impressive! By length comparison, the pointer stars of the Big Dipper are about 5 degrees apart. The comet comes around to

our part of the solar system about every 120 years and was seen most recently in the mid 1990's. In November of 1992, it brightened to about magnitude 5.0.

The magnitude or brightness of the meteors themselves is interesting as well. Studies by Hruska and Ceplecha in the 1950's indicated that the Perseids generally seem to be brighter before the date of maximum activity than afterwards, but that some periods of brighter or fainter meteors do occur. This tends to indicate some filamentary structure in the Perseid meteoroid stream. In other words, we encounter clumps of brighter or fainter meteors as the earth passes through different layers of long-ago debris shed by Comet Swift-Tuttle.

This is a wonderful meteor shower to observe visually and also a wonderful shower to try taking photos of. Traditionally, it has been difficult to photograph meteors as they can occur in any part of the sky, and being fast, are hard to register on your film. With the Perseid shower, there are a lot of bright meteors and there are hundreds of them over the course of the night in a dark sky. This increases the chances of capturing some on film. You will need a camera that you can take time exposures with, usually about 10-20 minutes in length, a cable release to keep the shutter open, and a tripod or something to steady your camera if you are resting it on a solid surface. Set the camera to wide open, ie. the smallest f-stop that you have, or close to it, and set the focus to infinity. You should use fast film of some sort, ASA 400 or higher, regardless of whether you wish to use black and white, or color film.

In legend or in reality, Perseids are fascinating. We study the meteoroid stream - and we dream about the ancient myths that spawned the constellation the meteors come from in the sky!