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Reflector

THE BLUE PLANET

REPORT FROM STELLAFANE

PERSPECTIVE ON APOLLO

HOW TO GAIN AND RETAIN NEW MEMBERS

Night Sky Network program, you can schedule your upcoming event to the NSN's calendar and it will be automatically cross-posted as an International Observe the Moon Night event – just make sure that "Moon" is in the title and that the event is public. If October 5 is inconvenient, you can host an event any date between September 28 and October 13. The times, dates, and locations of public events will appear on the International Observe the Moon Night event map; private events can also be registered and will appear on the map without specific information.

If you prefer to visit rather than host, and want to attend an event, or even drop in on several events, you can check out the map to find one near you. Or you can mark your observing spot on the map as an individual lunar observer. Please share your takes, photos, and experiences using *#ObserveTheMoon* on social media. Find everything you need to know on the official International Observe the Moon Night website, *moon.nasa.gov/observe.*

—David Prosper and Andrea Jones

Deep-Sky Objects

THE BEST STAR CLUSTER IN PEGASUS

One of the most recognizable constellations in the autumn evening sky is Pegasus. It is located far from the Milky Way and high above Polaris when it transits, and its main stars are easy to see, even with moderate light pollution. The constellation's most notable asterism is the Great Square, formed by the stars Markab, Sheat, Algenib, and Alpheratz. Alpheratz is technically part of the constellation Andromeda, but some older star charts give Alpheratz the dual designation of Alpha Andromedae and Delta Pegasi.

Pegasus doesn't contain a plethora of bright deep-space objects. Almost all of the 319 New General Catalog (NGC) objects in the constellation are galaxies. Of those, only 15 are brighter than magnitude 12, and only one is brighter than magnitude 10. That outlier is NGC 7331, the Deer Lick Galaxy, a decent magnitude 9.5 spiral. Many of the remaining galaxies are brighter than magnitude 15. So anyone with a 14-inch or larger telescope in dark skies can score many of them, including the famous Stephan's Quintet.

There are three open clusters in Pegasus, all loosely scattered and unimpressive. However, there is one very impressive globular cluster in Pegasus that more than makes up for the constellation's lack of open clusters – M15.

The French astronomer Jean-Dominique Maraldi discovered M15 in 1746 while searching for the de Chéseaux comet. His countryman Charles Messier independently found M15 in 1764 and added it to his now-famous catalog.

M15 is easy to find. Start at the magnitude 3.5 star Baham (Theta Pegasi) and go 7.5 degrees northwest to the magnitude 2.4 star Enif (Epsilon Pegasi). Continue in the same direction another four degrees to M15. A side note: although Enif is given the designation Epsilon Pegasi, it is actually the brightest star in the constellation. For most constellations, the bright stars are labeled in descending order of brightness: Alpha (the brightest), Beta (the next brightest), Gamma, Delta, and so on. Enif is a tenth of a magnitude brighter than Alpha Pegasi, also called Markab. This assumes you ignore "Delta Pegasi," which is brighter than all of them, but really isn't in Pegasus. It's a confusing constellation!

M15 is a beautiful star cluster and is one of the richer and more compact globulars. The cluster's integrated magnitude is 6.2 and it has a diameter of 18 arcminutes. It can be spied in binoculars but will require a 3- to 4-inch telescope with good magnification to begin to resolve the individual stars. An 8-inch telescope will resolve it into countless stars and reveal its intense brilliant central core.

M15 contains scores of RR Lyrae class variable stars. These stars enable M15's distance to be determined fairly accurately. The cluster lies 33,600 light-years away. This distance shows the true diameter of the cluster to be 175 light-years. Approximately 100,000 stars reside in that spherical region of space, with a brightness equivalent to 360,000 Suns. The cluster also contains the first planetary nebula discovered in a globular star cluster, Pease 1. The nebula was discovered by Francis Pease in 1927 using a photographic plate made with the 100-inch telescope at Mt. Wilson.

My image of M15 was taken with an 8-inch f/6.4 Ritchey–Chrétien reflector using an SBIG ST-2000XCM CCD camera. The exposure was 30 minutes. In the image, north is up and east to the left. The image spans 25 arcminutes in right ascension, and most of the stars in the image belong to the globular cluster. The brightest star in the image (with the diffraction spikes) is a magnitude 7.6 foreground star, SAO 107179, located approximately 200 light-years away. The faintest stars in the image are magnitude 17.

The yellow arrow points to the almost-resolved planetary nebula Pease 1, estimated magnitude 15.5. It can be imaged with an 8-inch telescope using narrowband filters or seen in a 14-inch telescope under dark skies with an O-III nebula filter, but it takes a 32-inch telescope to resolve any detail in the nebula! All telescope and binocular owners should visit M15 this fall. Those with large light buckets will enjoy the challenge of capturing its planetary nebula!

—Dr. James R. Dire
Kauai Educational Association for Science and Astronomy

Wanderers in the Neighborhood

THE BLUE PLANET

With the demotion of Pluto to a dwarf planet, Neptune once again became the most distant planet from the Sun in our Solar System. The color of this blue planet is not due to liquid water like on the Earth, but from trace amounts of methane and other substances in its hydrogen and helium atmosphere. Neptune is the Solar System's third most massive planet after Jupiter and Saturn. These three, along with Neptune's neighbor Uranus, make up the local population of gas giant planets.

Neptune is the densest of all the gas giants. Its mass of 17 times the mass of Earth is just slightly more than that of similar Uranus. The gravitational pull of Neptune's higher mass causes its atmosphere to be more compressed than that of Uranus, making Neptune physically smaller than its twin. →