

Reflector

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DEEP-SKY OBJECTS

PTOLEMY'S CLUSTER

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The summer Milky Way blazes overhead for northern hemisphere observers, paving a path from Scorpius in the south to Cassiopeia endlessly circling the North Star. Dark molecular clouds break up numerous unresolved star fields. Scattered about are bright emission nebulae and galactic and globular star clusters. The brightest region of the Milky Way lies in the constellation Sagittarius, host to the galactic center.

Just to the right of Sagittarius's Teapot asterism is a bright star cloud not quite resolved by the unaided eye. This splendid star cluster is known as M7 or NGC 6475. M7 is a large open star cluster lying within a dense, concentrated patch of the Milky Way. The cluster contains 80 stars spanning 1.3 degrees. The cluster's brightest stars are in the center, with zigzagging star chains radiating outward. Its integrated magnitude is 3.3, easily seen at a dark observing site.

M7 was described by Ptolemy in the year 130 AD as a "little cloud following the stinger of Scorpius." Claudius Ptolemaeus, as he was called in Latin, was an Alexandrian mathematician and astronomer who did detailed calculations to describe the orbits of the Sun, Moon, and planets in a geocentric solar system. He required 80 circles to explain all observations of these bodies, including retrograde motion and varying brightness. The Ptolemaic model stood until the Renaissance and the works of Copernicus and Galileo. To this day, M7 is still called Ptolemy's Cluster.

Many astronomers after Ptolemy included M7 in

astronomical catalogs. These include Hodierna, Halley, and de Lacaille. Of course, Charles Messier made it the seventh entry in his catalog.

The brightest star in Ptolemy's cluster is a magnitude 5.6 yellow giant, HR 6658,

surface temperature estimated to be 14,600 K (our Sun's temperature is about 5,780 K).

M7 is thought to be 800 to 1000 light-years away, roughly half the distance to M6, its neighboring cluster in the tail of Scorpius. M7 has a



located on the southwest side of the cluster's core. HR 6658 is a binary star with the yellow giant's companion shining at magnitude 7.9, located 0.6 arcsecond away. The second brightest star in M7 lies on the northwest edge of the cluster, one-half degree from the center. This star is HR 6648, a magnitude 5.8 yellow giant. The third brightest star lies on the west side of the cluster, 20 arcminutes from the center. This is a blue-white star, V957 Scorpii, shining at magnitude 5.9. V957 varies slightly in magnitude from 5.87 to 5.92. It is the hottest main sequence star in the cluster, with a

diameter of 18 to 25 light-years. The cluster's mass is equal to 2500 suns. The cluster and our solar system are moving towards each other at 14 kilometers per second. The stars in M7 are thought to be 200 million years old—mere infants on the cosmic time scale.

The globular star cluster NGC 6453 lies on the northwest edge of M7. While M7 is easily resolved in binoculars, NGC 6453 is not. It is best viewed with at least a 6- to 8-inch piece of glass. A short focal length instrument with a low-power eyepiece will show M7 and NGC 6453 simultaneously. I

can easily capture both in my 6-inch f/6 TPO Newtonian with a 31 mm TeleVue Nagler eyepiece. Zooming in on NGC 6453 with my 14-inch f/6 Dob, I am able to resolve uncountable stars in the globular cluster.

NGC 6453 shines at magnitude 10 and has a diameter of 21.5 arcminutes. The cluster lies more than 30 times farther away than M7. Because the cluster is a background object to this rich Milky Way star field, it is visually difficult to tell whether stars on the outer edges of the cluster are true

cluster members or foreground Milky Way stars. All the gas and dust scattered throughout the plane of our galaxy dims the light from NGC 6453 considerably. NGC 6453 would appear much brighter if located at the same distance away, but above or below the galactic plane.

The accompanying image of M7 was taken with a Stellarvue SV102 f/7.9 apochromatic refractor with a TeleVue 0.8x field flattener/focal reducer. The mount

was an Orion Atlas German equatorial. I used an SBIG ST-2000XCM CCD camera and the exposure was 50 minutes. North is up and west is to the right. I placed the center of Ptolemy's Cluster on the left side of the field of view to capture NGC 6453 on the right edge of the image near the top. The star cut in half along the top of the image in HR 6648.

Ptolemy's Cluster is a spectacular object to view in any size of instrument due to the contrast of the bright stars with the background Milky Way star clouds and dark nebulae. Finding NGC 6453 in the same field of view is icing on the cake! ☀