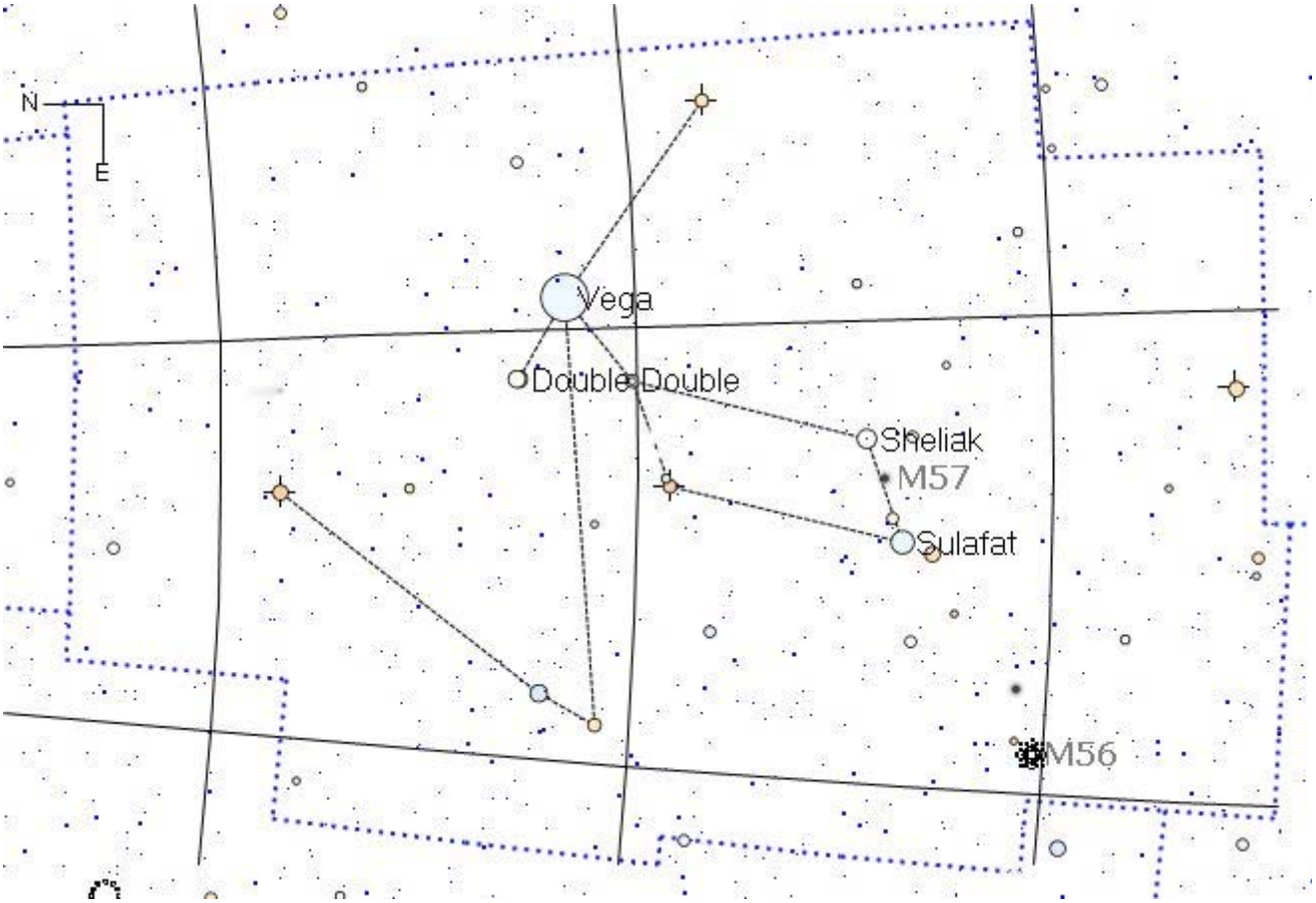
Small Wonders: Lyra

A Monthly Beginners Guide to the Night Sky

by Tom Trusock



Widefield Chart

Target List	Vega	Bright White Star
	Kappa	Bright Yellow Star
	Double Double	Multiple Star
	Delta	Colorful Multiple Star
	M57	Planetary Nebula
	M56	Globular Cluster
Challenge Object	NGC6765	Planetary Nebul

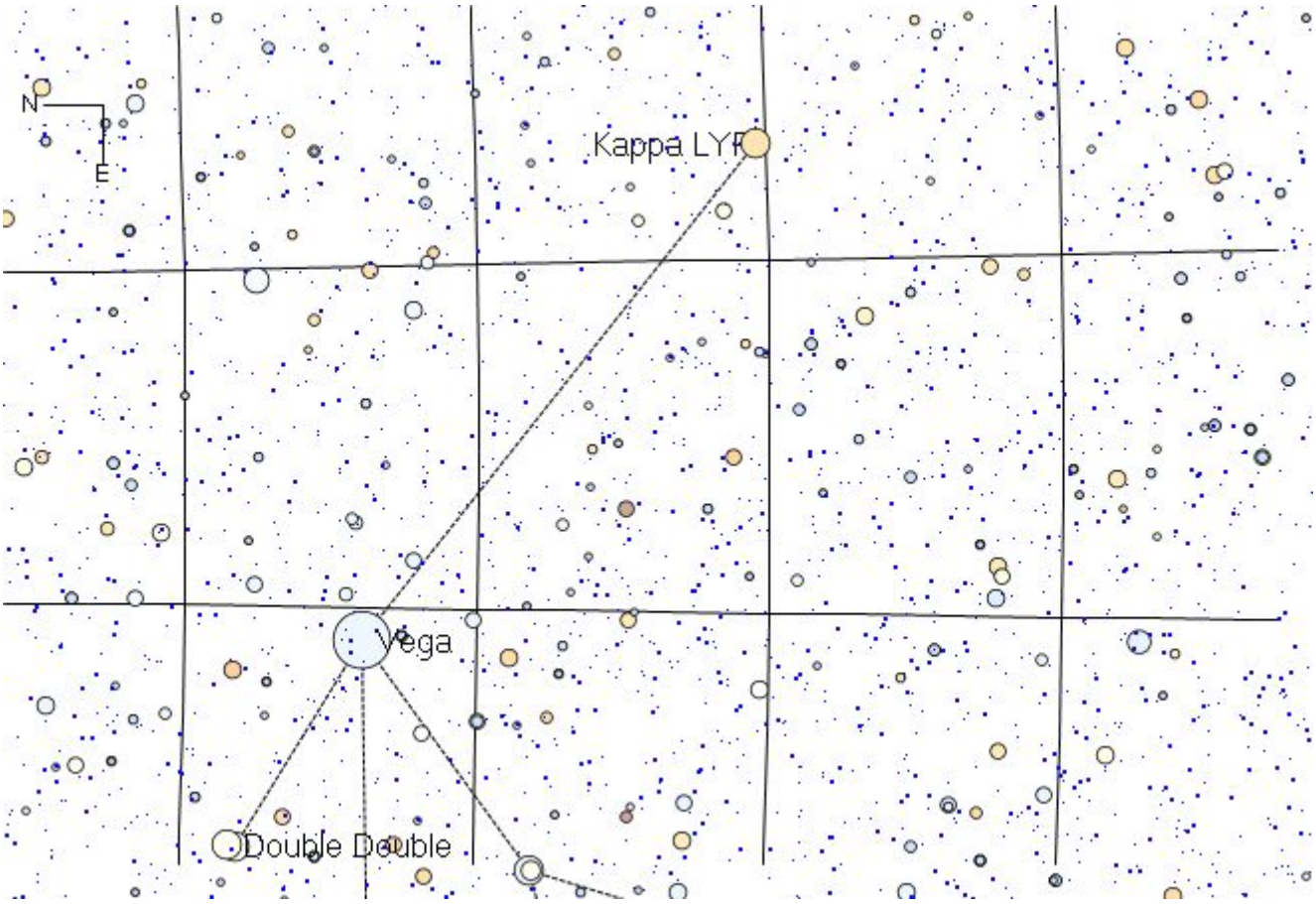
Lyra, like most constellations, has been many things to many people over the years. Today we see it as the Lyre. A stringed instrument similar to a harp that had been given to Orpheus - the musician of Jason's intrepid band of Argonauts. On older star maps you may see Lyra represented as a tortoise or a vulture. Lyra is home to the 5th brightest star in the night sky - Vega, a pure white gem which radiates from the top of the Lyre. Vega, along with Deneb in Cygnus, and Altair in Aquilia forms one

of the most well known asterisms (a recognizable grouping of stars) in the summer sky - the summer triangle.

Vega, Kappa and the Double Double

We'll start with the most recognizable star in the constellation. One of the few “Movie Stars” actually found in the heavens, and listed at magnitude .03, Vega is outshined only by Sirius, Canopus, Alpha Centauri and Arcturus. Due to precession (the wobbling of the earth along its axis), Vega was the North Star some 14,000 years ago, and will be again in the distant future. For tonight lets just take a look at the pure white color of the star.

If you are using a refractor, Vega is a perfect test of color correction. An achromat will show Vega surrounded by yellow/green and/or purple, while in a true apochromat it will be a pure white. This “false color” is due to the design of the refractor, and referred to as chromatic aberration. Don't get to distressed if your scope is less than perfect. Most are. Additionally, there are other factors in addition to the telescopes optics that induce false color. You might even see a touch of false color in your reflector on occasion!

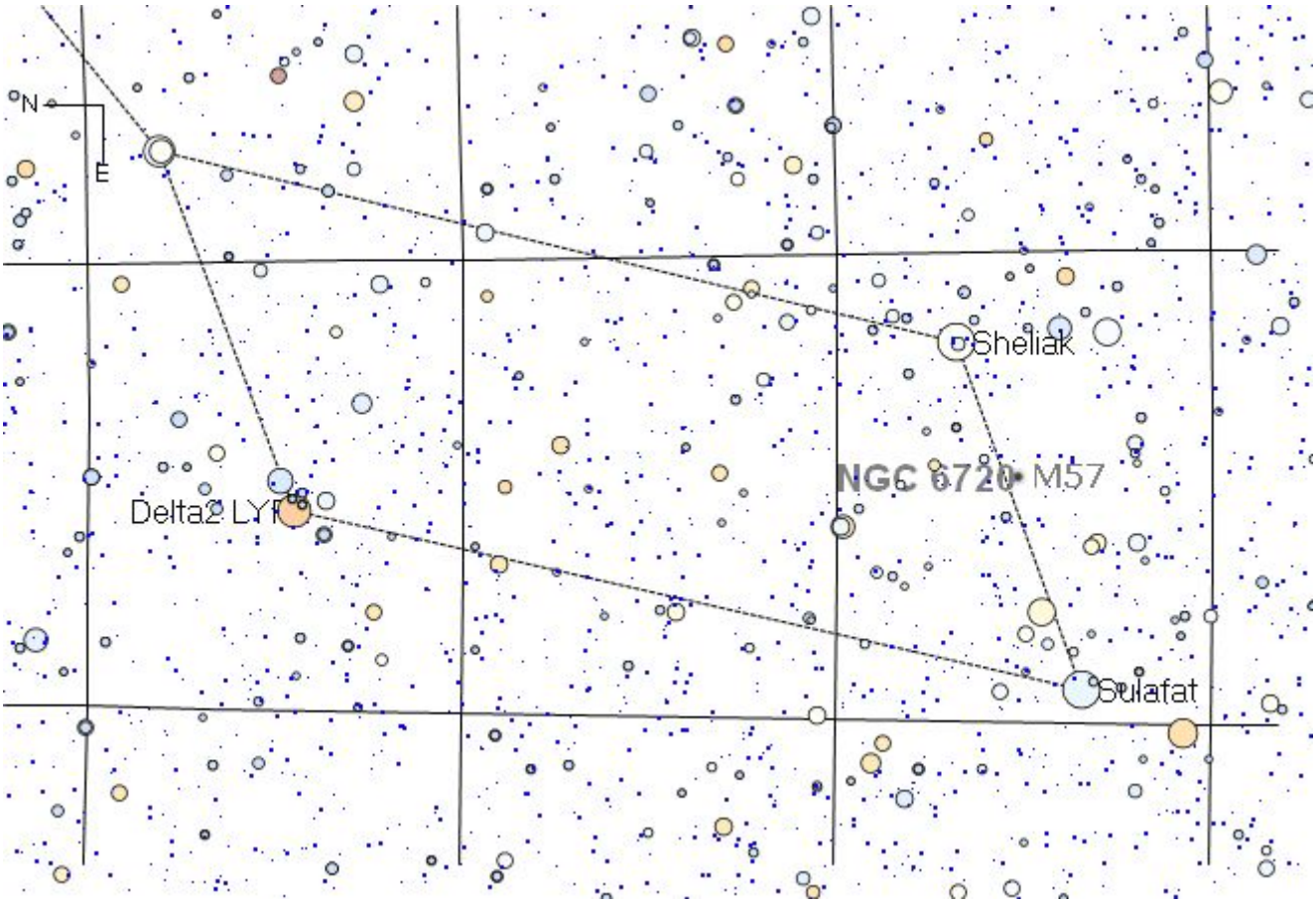


Kappa, Vega and the Double Double Finder Chart

Next lets take a quick trip five degrees WSW to the 4.33 magnitude pale yellow Kappa Lyra. In binoculars or a wide field scope, you might be able to fit both Vega and Kappa in the same field of view. Take a moment to contrast the colors between these two stellar bodies. Kappa is spectral class K which means it gives off a deep yellow orange color and burns at a temperature of 3950 to 5250 Kelvin. (Some of you who weren't nodding off in your high school physics courses may remember the memory aid designed to help you remember the spectral types: **O B**e **A F**ine **G**irl **K**iss **M**e **R**ight **N**ow. **S**mack!) Vega is spectral class A which is characterized by its white color, and at it's surface temperature of 7100 - 9500k, it burns much hotter than Kappa.

Now lets hop down to the Epsilon Lyra - the Double Double (E1- m5.6/m6.02, E2 - m5.14/m5.37). This is a classic summer target for small scopes. As its name implies, it's a wide double star whose components are also doubles! Many amateurs use the Double Double as a test for their scopes and eyes by seeing just how low a power will split the Epsilon into it's components. The wider pair is easy, the close a bit tougher. My personal best is 66x, and I've heard reliable reports of folks splitting them at 57x, although 80+ is a bit more common. How low can you go?

Delta Lyr

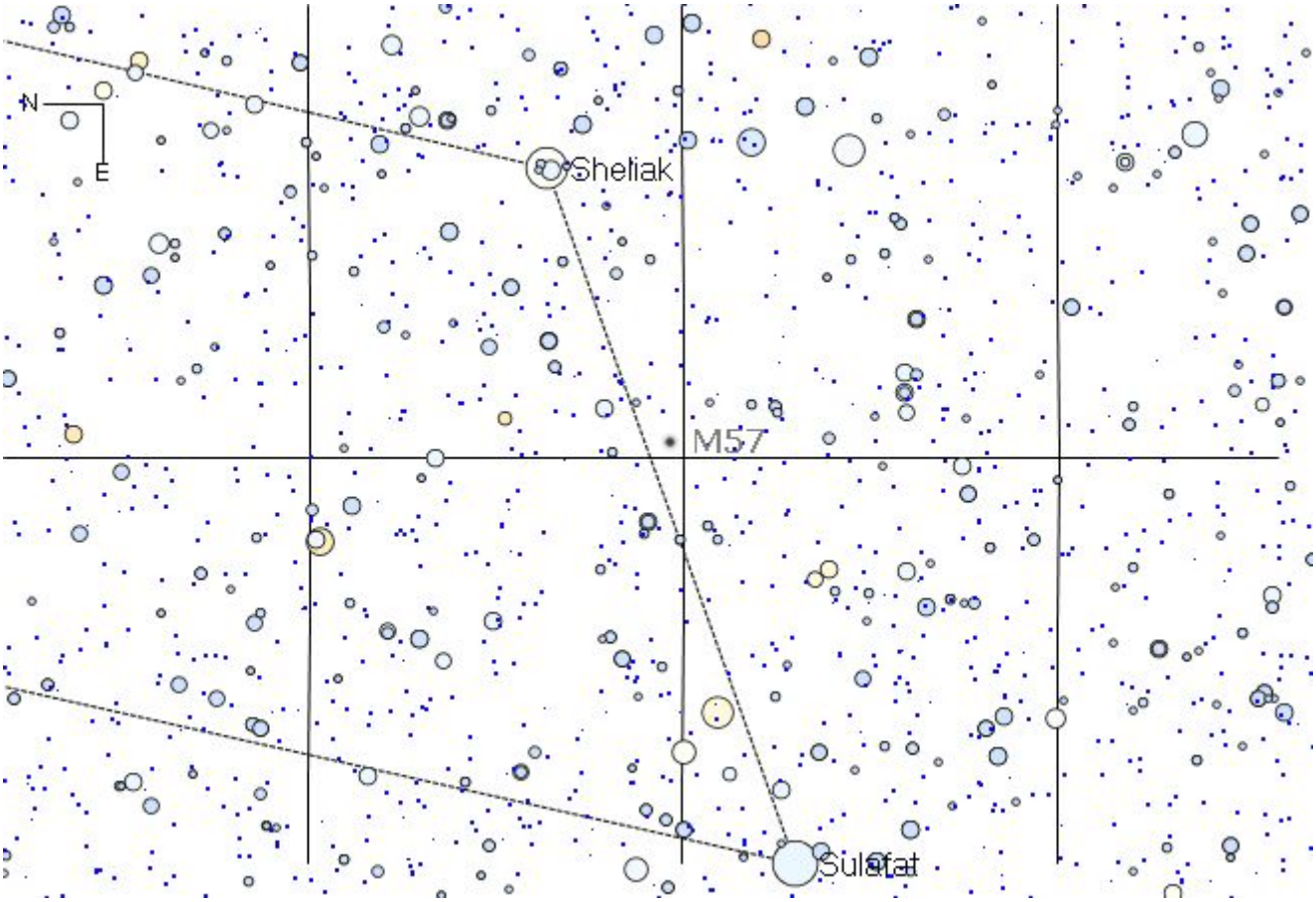


Delta Lyra Finder Chart

Now continue counter-clockwise around the constellation and take a gaze at the colored multiple Delta Lyra. Here's a nice contrasting pair for small scopes and binoculars. Delta 1 (m5 / spectral class B) appears as a pale orange while Delta 2 (m4.5 / spectral class M) is a pale blue-white. Take a close look at Delta 2, and you will see it too has a faint (11+ m) companion - two of them in fact!

And while you are in the area, you might as well keep an eye out for the sparse open cluster (15 or so stars, mag 4-10) Stephenson 1. Can you spot it?

M57 - The Ring Nebula



M57 Finder Chart

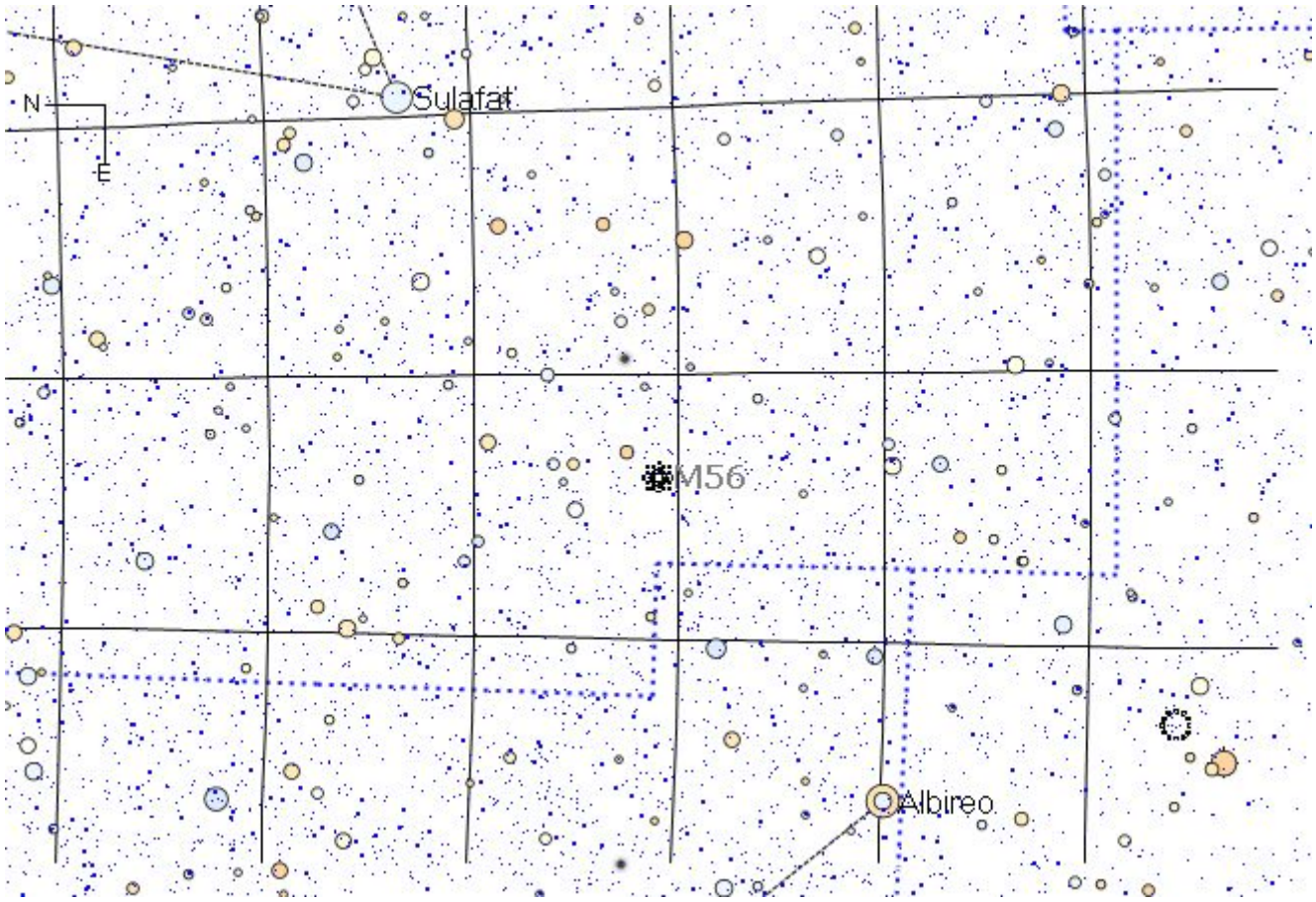
Continuing around the constellation, our next stop is a true showpiece of the night sky - NGC6720, better known as M57 (m9.7) - the Ring Nebula.

M57 was discovered in January 1779 by Antoine Darquier de Pellepoix. The Ring was the second planetary nebula to be discovered - the first being M27. According to the SEDS website, Charles Messier found and cataloged M57 only days after Darquier. Messier described it as "a dull nebula, but perfectly outlined; as large as Jupiter and looks like a fading planet." Hence Messier was the one who gave rise to the name "Planetary Nebula".

Although I've caught the Ring in 15x70 binoculars, it really takes a small telescope and moderate magnifications (80x-120) to fully appreciate the structure. Even smaller scopes show its distinct ring like structure. Like most planetary nebulae M57 has a very high surface brightness and takes magnification well. So pump up the power while you are in the area and see if, and how, the appearance changes.

Another challenge for amateurs is trying to dig out the central star in this summer showpiece. Although it's listed at somewhere around 14th mag, it's actually often a good deal more difficult to pull out than one would think. While there is some speculation as to the variability of the central star, most astronomers feel that the haze in the central ring structure serves to deaden contrast and further limit the magnitude. The smallest scope I've seen the central star in is a 10" f7.5 while using what’s typically an absurdly high power of 700x. By now, you've heard that most astronomers use low power - and that's generally the case for most observing. However there are times and places to break that rule, depending on seeing and your target. Planetary Nebulae are one such target. Try some magnification - You might be surprised at the results!

M56



M56 Finder Chart

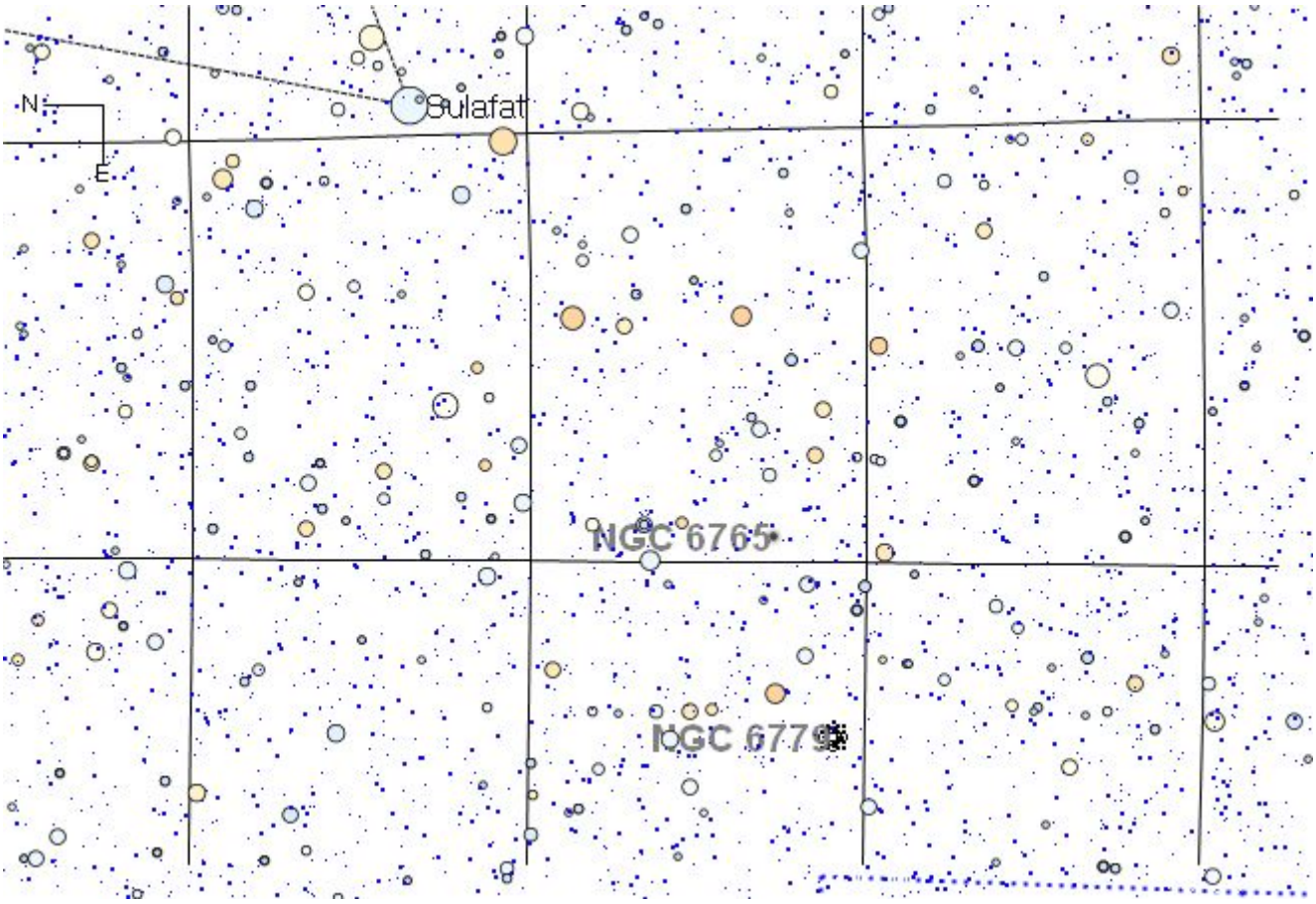
M56 (also cataloged as NGC 6770) is the next target on the tour, located about 1/2 way between Sulafat (Gamma Lyra) and Albireo (Beta Cygni).

Discovered by Messier on January 23, 1779 he described it as a "nebula without stars". Many years later, most amateurs would tell you that's certainly not the case. While it's not a showpiece globular like M5 or M13, M56 certainly makes a nice addition to Lyra, and it's the only other Messier object located in the constellation.

At magnitude 8, M56 is a rather easy binocular catch if you know where to look, but it's really at its best in a telescope. It's relatively high surface brightness means that it can withstand power fairly well, so use a moderate to high power (150x-200x) in your attempts to resolve the cluster. If you have access to different size telescopes, this might be a good object to experiment and see the effects of aperture. What's the smallest scope that begins to resolve the cluster? At what power do the stars begin to stand out?

As you increase magnification, look for an appearance of granularity on the outer edges, and for the arms and core to appear to break into individual stars. In 8" and larger scopes, this globular is a superb sight.

Challenge Object: NGC6765



NGC6765 Finder Chart

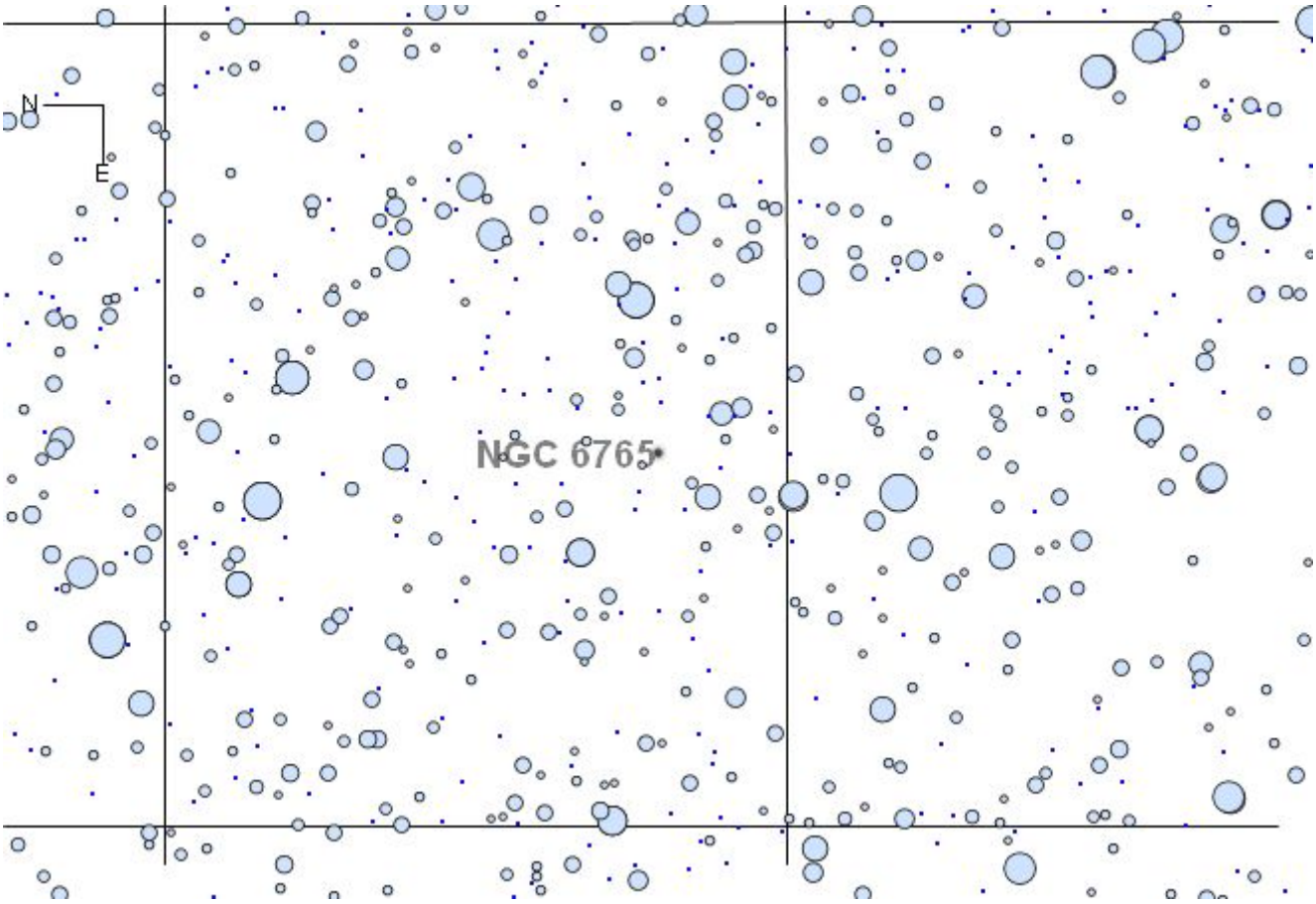
And finally here's a challenge for someone who is looking to push their equipment, site and skills a bit harder; NGC6765.

Classed as a planetary by Rudolph Minkowski in 1946, this small faint nebula is found 1/4 of the way between M56 (NGC 6779) and Sulafat (Gamma Lyra) and can be a difficult catch in an 8" scope under decent skies. It's listed as being somewhere around mag12.9 (take all magnitude listings with a grain of salt when determining the visibility of an object) and has a central star of 16th magnitude. Reports state that it's somewhat elongated along the NE-SW axis and has a 14th magnitude star just to the NE.

It's tiny and faint so use high magnifications and an OIII or UHC filter (if available) to

enhance the contrast and increase the chances of picking it up. For those who might not know what these filters are; basically they are specialized filters designed to let only certain wavelengths through to the eyepiece and thus helps to cut out extraneous and unwanted light. Planetary Nebula are especially responsive to OIII filters, but if you have a small scope you may wish to consider a UHC filter instead.

Another trick when going after faint objects: when you've identified the field and suspect the object but can't quite pick it up, try tapping the side of the telescope to induce a very slight motion. Quite often this will help pop a very faint target into visibility.
Use the eyepiece chart below to correctly identify the field. The faintest stars listed are around magnitude 15-16, while the brightest on the chart are around magnitude 10.



NGC6765 Eyepiece Chart

If you catch this one, give yourself a hand - you deserve it!

Additional Reading:

More information on stellar spectra:

SPECTRA
http://www.astro.uiuc.edu/~kaler/sow/spectra.html

Just how deep CAN that telescope see?

Photometry of M57 Field Stars By Brian Skiff
http://c3po.cochise.cc.az.us/astro/deepsky02.htm

More detailed information about the Messier objects is available at:

SEDS: Students for the Exploration and Development of Space
http://www.seds.org/

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Please indicate if I can cite your observations in future columns.