

Binocular Universe:

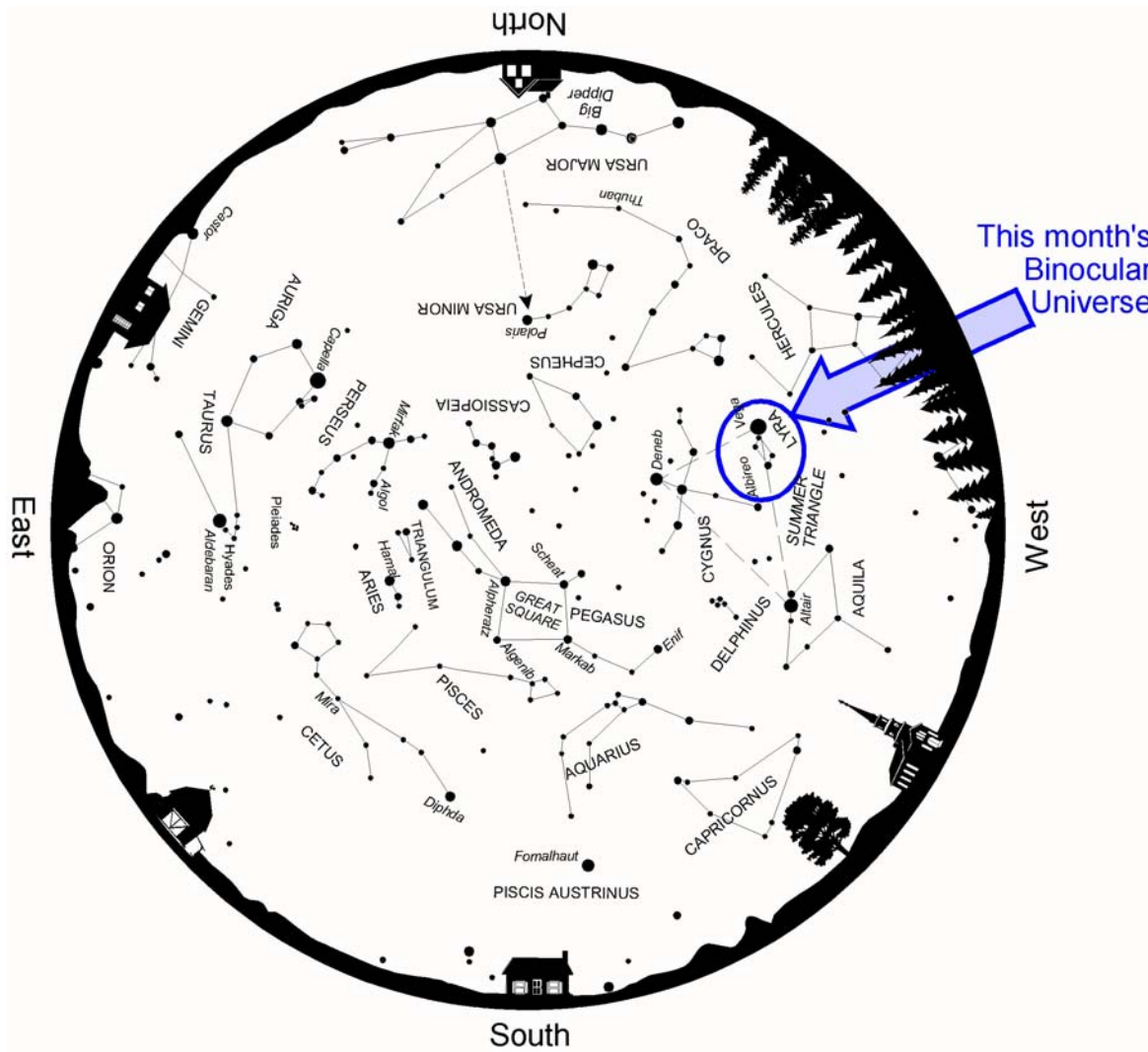
Lyre, Lyre

October 2012

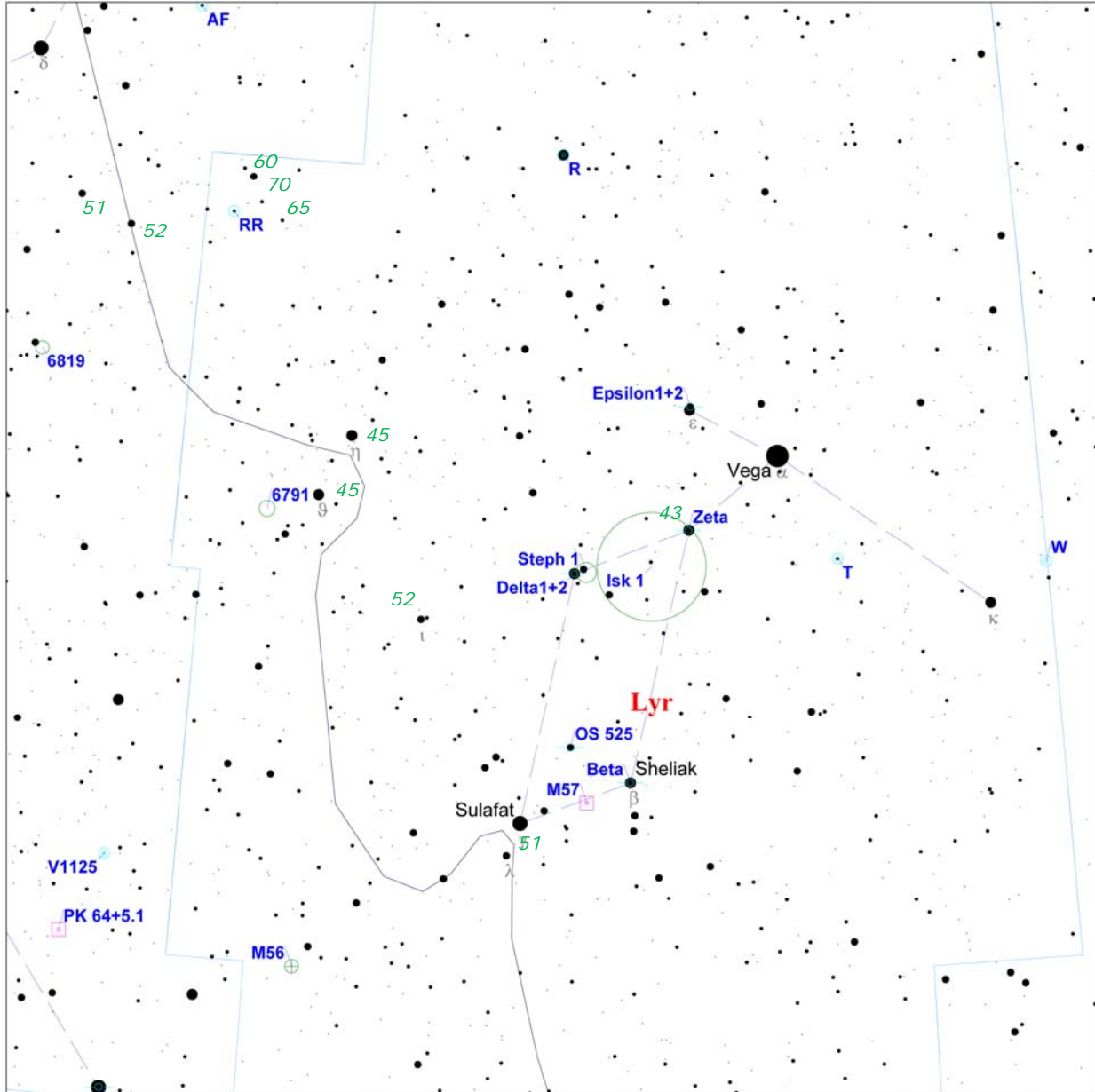
Phil Harrington



The brilliant stellar sapphire **Vega** sparkles high in the west this month. Famous as the fifth brightest star in the entire night sky, Vega is so dazzling that it punches through even the most severe light pollution. You simply can't miss it!



Above: Summer star map adapted from the author's book, [Star Watch](#).



Touring the Universe Through Binoculars Atlas
RA: 18h 56m, Dec: 37d 19m, FOV: 17d, Mag: 8.5

- ≤ 1.2
- 1.2 - 2.4
- 2.4 - 3.6
- 3.6 - 4.9
- 4.9 - 6.1
- 6.1 - 7.3
- > 7.3

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- ⊕ Double Star

- ☿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♇ Pluto
- ☼ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

Above: Finder chart for this month's *Binocular Universe*.
 Chart adapted from [Touring the Universe through Binoculars Atlas \(TUBA\)](#)

The next chance you get, take a look at Vega through your binoculars. As you are enjoying its blue-white luster, consider that the light you are seeing is only 25 years old. Twenty-five light years works out to be 147 trillion miles. That's just a town or two away on the cosmic distance scale. We're practically neighbors.

Vega's constellation of Lyra symbolizes the lyre, or harp, owned by the mythological musician Orpheus. Vega marks a portion of the harp's handle, while four fainter stars in a parallelogram frame its body. Light pollution may hide those four stars, so if you can't make them out by eye, try using your binoculars instead. Each is well worth a closer look.

For instance, there is more to 3rd-magnitude **Sheliak** (Beta [β] Lyrae), at the parallelogram's southwestern corner, than just a faint star. Sheliak is actually an eclipsing binary that is perfect for binocular study. Over the course of just under 13 days, an unseen companion star causes Sheliak to flicker from magnitude 3.3 to 4.3. Use the chart here to monitor the changes in appearance. By comparing Sheliak's brightness to that of nearby stars that do not vary, can you confirm its 13-day cycle?

The most photographed planetary nebula of all, **M57**, the Ring Nebula, lies along the southern edge of the harp's parallelogram. To spot it, look midway between Sheliak and Sulafat (Gamma [γ] Lyrae) for three very faint stars that create a tiny right triangle. The star at the right angle is actually the Ring. Although it takes at least 50x to make out the classic smoke-ring shape, I've seen M57 as a faint star-like point through binoculars as small as 7x35s. Give this challenge a try tonight and let me know if you are successful. I would be interested in finding out just how small a pair of binoculars will uncover M57.

Now scan southeast of Sulafat, toward the star Albireo in Cygnus, and pause about halfway in between. There, you'll find a conspicuous asterism of stars shaped like a number 7. If you look just to the 7's southeast, you should also spot a faint smudge that doesn't quite look like a star. That's the globular cluster **M56**. Although 100,000 stars make up M56, the cluster is much too far away to be resolved through binoculars. That task requires at least a 6-inch aperture.

Even the smallest pocket binoculars, however, will reveal **Delta (δ) Lyrae**, at the parallelogram's northeastern corner, as two close-set stars. In fact, some sharp-eyed stargazers don't need any optical aid at all to see them. The brighter star in the pair, 4.3-magnitude Delta-2, looks orangish, while 5.6-magnitude Delta-1 is bluish-white.

The two Delta stars belong to a scattered open cluster nicknamed, appropriately, the Delta Lyrae Cluster and cataloged as **Stephenson 1**. Fifteen stars belong to Stephenson 1, though most are too faint for binoculars. Although both Deltas are members of the cluster, they are not a true binary system. Studies suggest that Delta-1 lies about 1,200 light years away, while Delta-2 is about 200 light years closer to us.

The next stop on our tour is **Epsilon (ϵ) Lyrae**. Look for it just to the northeast of Vega. If you have sharp vision, you may also be able to split Epsilon into two stars

with eye alone. The stars are separated by 3.5 arc-minutes, which is near the naked eye's resolution limit. Of course, with binoculars, Epsilon is easy to resolve into two points of light. The northernmost of the pair is labeled Epsilon-1, while the southern member is Epsilon-2.



Left: Open cluster Stephenson 1 as portrayed through the author's 16x70 binoculars.

North is up.

This system is also known as the Double-Double, as Epsilon-1 and Epsilon-2 are each close-set pairs of stars. Unfortunately, it takes at least 80x to see all four Epsilon affiliates. Even though we can see only two stars in binoculars, the added beauty of gleaming Vega to the southwest and Zeta Lyrae to the southeast create a very pretty binocular scene.

But wait, there's more! **Zeta (ζ) Lyrae** is actually a challenging double star for binocular viewing. Zeta is composed of 4th- and 6th-magnitude suns separated by about 44 arc-seconds. The fainter companion lies due south of the brighter star. I can just make out both through my 10x50 binoculars, while the added oomph of my 16x70s cleaning resolves them. Both impress me as shining pure white. How about you?

Earlier, we discussed how Sheliak (Beta [β] Lyrae) is a fun variable star to monitor through binoculars. If you are a devout variable-star fan, then you may already know about **R Lyrae**. R is a type-M red semi-regular star that fluctuates between magnitudes 4.0 and 5.0 over the course of 50 days. Look for it in the northern part of the constellation, about 6° northwest of Vega.

We also have **RR Lyrae** tucked just inside Lyra's northern border. With great precision, this star rises to magnitude 7.1, falls to magnitude 8.1, and then brightens back up again in just 13 hours, 36 minutes. RR Lyrae heads up a class of variable stars that are also known as "cluster variables," since many are found

within globular clusters. RR Lyrae stars are well known for their period-luminosity relationship. By studying the magnitude variations of RR Lyrae stars versus their periods of variability, astronomers can calculate the stars' true luminosities. By knowing both the luminosity and apparent magnitude, the distance to the star can be calculated.

All three variables are shown on the finder chart above, along with several suitable comparison stars that can be used to judge each variable's magnitude value. The visual magnitude of each comparison star is shown in *italicized green* type, with the decimal point omitted to avoid confusing it for a faint star. For instance, the number **43** next to Zeta Lyrae at the parallelogram's northwestern corner indicates that Zeta shines at a constant visual magnitude 4.3.

These and other targets within this month's Binocular Universe are listed in the table below.

Object	Con	Type	R.A. (2000)	Dec	Mag	Size/Sep/ Period	Notes
AF	Cyg	Vr	19 30.2	+46 9	7.4-9.4p	94.1 days	Semi-Regular
Beta	Cyg	**	19 30.7	+27 58	3.1,5.1	34"	*TUB page 139* 54°(1967);12540;Albireo
V1125	Cyg	Vr	19 31.8	+31 52	9.0-9.9p		Irregular
PK 64+5.1	Cyg	PN	19 34.8	+30 31	9.6p	8"	Campbell's Star
6819	Cyg	OC	19 41.3	+40 11	7.3	5'	
W	Lyr	Vr	18 14.9	+36 40	7.3-13.0	196.54 days	Long Period Variable
T	Lyr	Vr	18 32.3	+37 0	7.8-9.6		Irregular
Epsilon1+2	Lyr	**	18 44.3	+39 40	5.0,5.2	208"	*TUB page 173* 173°(1955);11635;Double-
Zeta	Lyr	**	18 44.8	+37 36	4.3,5.9	44"	*TUB page 173* 150°(1955);11639
Isk 1	Lyr	OC	18 48	+37 0		110'	
Beta	Lyr	**	18 50.1	+33 22	3.3v,8.6	46"	*TUB page 173* 149°(1955);11745;A=mag 3.3-
Steph 1	Lyr	OC	18 53.5	+36 55	3.8	20'	*TUB page 174* Delta Lyr cluster
M57	Lyr	PN	18 53.6	+33 2	9.7	70"x150"	*TUB page 174* Ring Nebula NGC 6720
Delta1+2	Lyr	**	18 54.5	+36 54	5.6,4.5	630"	Optical
OS 525	Lyr	**	18 54.9	+33 58	6.0,7.7	45"	350°(1935);11834
R	Lyr	Vr	18 55.3	+43 57	3.9-5.0	46.0 days	*TUB page 174* Semi-Regular
M56	Lyr	GC	19 16.6	+30 11	8.2	7'	*TUB page 174* NGC 6779
6791	Lyr	OC	19 20.7	+37 51	9.5	16'	
RR	Lyr	Vr	19 25.5	+42 47	7.1-8.1	0.567 day	*TUB page 175* RR Lyrae prototype

Next month, we will join the crew of the Starship Enterprise for more deep-sky adventures. Till then, remember my mantra: Two eyes are better than one.



About the Author:

Phil Harrington has written 9 books on astronomy, including [Star Ware](#), [Star Watch](#), and his latest, [Cosmic Challenge](#). Visit his web site, www.philharrington.net, for more information.

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