



ASTRONOMICAL LEAGUE

A FEDERATION OF ASTRONOMICAL SOCIETIES
A NON-PROFIT ORGANIZATION

- ★ *To promote the science of astronomy;*
- ★ *By fostering astronomical education;*
- ★ *By providing incentives for astronomical observation and research;*
- ★ *By assisting communication among amateur astronomical societies.*



AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

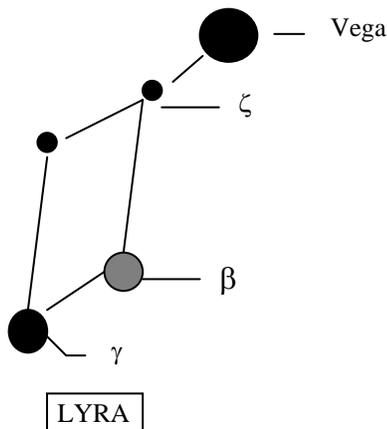
ASTRO NOTES

Produced by the Astronomical League
In cooperation with AAVSO

Note 27: Observing Variable Stars – Beta Lyrae

The constellation Lyra is located overhead for mid-northern latitudes in the pre-midnight hours from late spring to late fall. While Lyra is most known for the Ring Nebula, some astronomers consider the eclipsing binary (double) star β Lyrae a far more interesting object. β Lyr was discovered by John Goodricke in 1784. Goodricke was a deaf astronomer who also discovered the variability of δ Cephei and the periodic nature of Algol's variability. Goodricke's career was cut short in 1786 when he died at age 21 after a short illness. The well-known, late astronomer Otto Struve also studied β Lyr extensively.

β Lyr is both a double star and an eclipsing variable star. "Variable" means the star's brightness changes as the two stars circle each other in orbits around a common center. When one star passes in front of (eclipses) the other, the light we see becomes fainter. Then when the eclipsing star moves out of the way, the light brightens because we can see both stars again.



Here is a chart of Lyra that will help you find β Lyr. Vega is the brightest star in the Summer Triangle. By locating Vega, you will locate Lyra. After you have found Vega, identify ζ (Zeta) Lyr, β Lyr, and γ (Gamma) Lyr. They are much fainter than Vega, so look carefully. You won't find them if you are near bright lights. After you have identified these stars, you can follow β Lyr's brightness changes. Plan to observe each night for about two weeks and make notes of what β Lyr looks like. Here's how to estimate the brightness. Call γ Lyr "A" and call ζ Lyr "E." When β Lyr is brightest (and it will be bright most of the time) it will be as bright as γ Lyr, so write down that it is an "A." Also, note the date and time. You now have a scientific astronomical record! If β Lyr is as faint as ζ Lyr, call it an "E" and make your record. But what if it is somewhere in between γ Lyr and ζ Lyr? Well if β Lyr is half way between, call it a "C." If it is closer to γ Lyr, call it a "B" and if it is closer to ζ Lyr, call it a "D."

You can graph your results by putting "A" through "E" on the vertical axis and the dates of your observations on the horizontal axis. Put "A" at the top and the earliest date on the left. Plot the observations, connect the points, and you will have a "Light Curve." β Lyr's period is roughly 13 days.

The next page contains the AAVSO finder chart for β Lyr. It can be used to make actual numeric estimates of β Lyr's magnitude. It includes R Lyr; observe it too. If this interests you, try reading *Observe and Understand Variable Stars* and the *Especially for New Observers* page on www.aavso.org.

bet Lyr

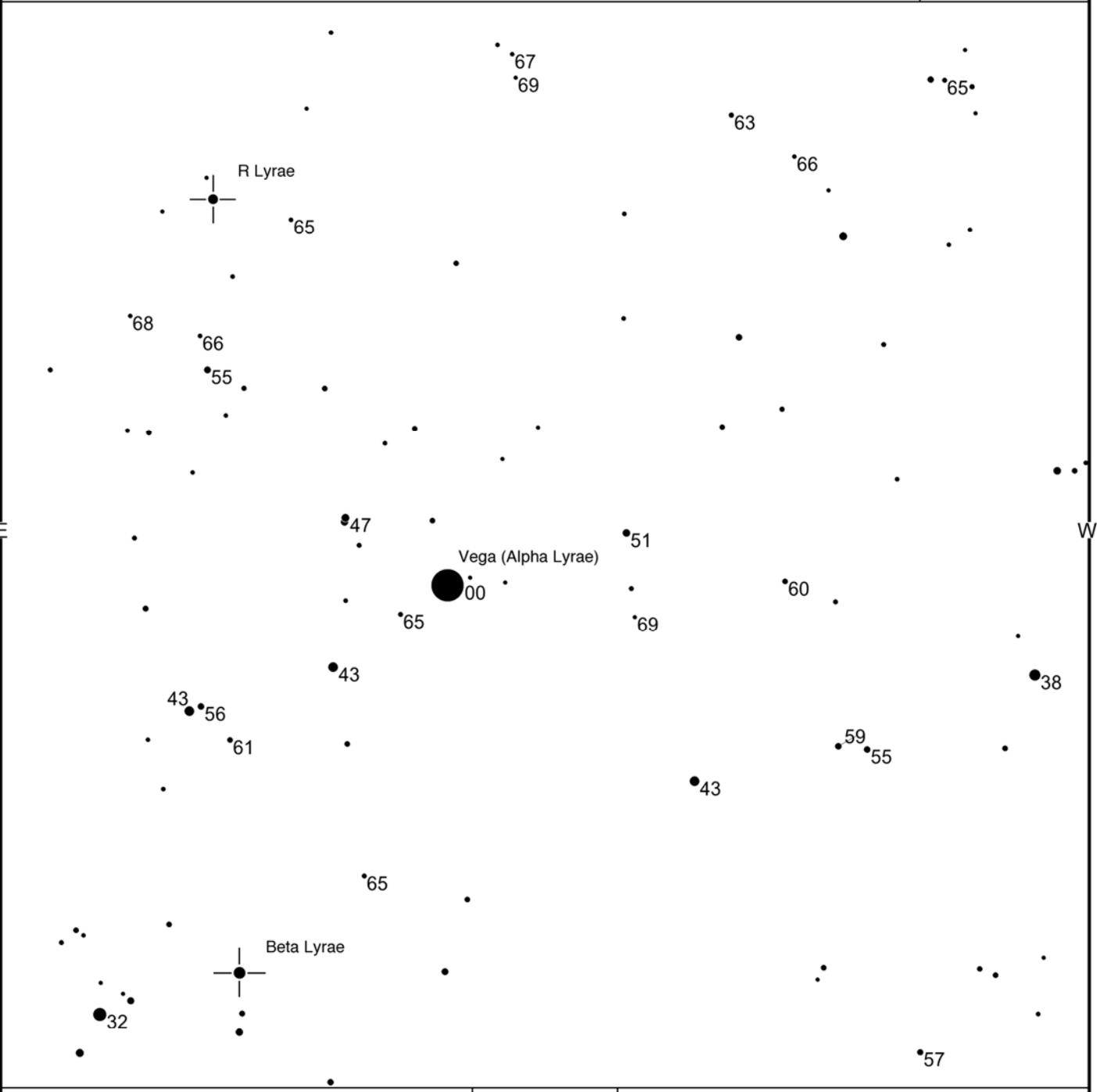
Magn: 3.25-4.36
Period: 12.913834
Type: EB
Spec: B8II-IIIep

Beta Lyrae & R Lyrae

Beta: (2000) 18:50:04.80 +33:21:46.0
R: (2000) 18:55:20.10 +43:56:46.0

AAVSO Chart

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Special Chart produced for the Astronomical League

<http://www.aavso.org/observing/charts/vsp/>

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Chart courtesy of AAVSO
Note: Decimals in magnitude numbers have been omitted (45=4.5).
Additional charts available through www.aavso.org