

Another Observing Challenge for Skyscrapers: Variable Star Delta Cephei

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Jim Hendrickson suggested the idea and Steve Siok supported it, so here it is – another challenge for Skyscrapers members to develop their observing skills in the arena of variable star observing. The first focus would be to observe Delta Cephei (the prototype of this class of pulsating stars) to determine its light curve. The tools needed for this task are: your unaided eyes, some determination, and the charts provided below. A pair of low-power binoculars might be helpful in some cases.

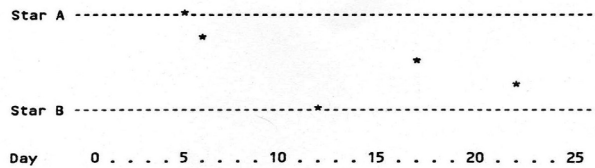
Delta Cepheid variables are stars of roughly the same temperature which pulsate radially (becoming uniformly larger and smaller) according to the size of the star, larger stars pulsating slower than smaller stars. The cause of this pulsation has been found to be the instability of the shell of helium deep inside the star. The link between luminosity (actual brightness) and pulsation period allows astronomers to use these stars as standard beacons of brightness useful in calibrating the distances of clusters and galaxies containing these stars out to vast distances. It was Henrietta Leavitt at Harvard who discovered this valuable tool, and Edwin Hubble who found Cepheids in the Andromeda Galaxy and beyond. The estimated size of the universe quickly ballooned to a more accurate figure.

By joining in this challenge you can hone your own observing skills, create increased solidarity within our astro-society; all the while re-creating one of the great discoveries of the twentieth century.

I wish you clear skies and the determination to participate in this friendly challenge. I will participate by bringing my own data results to the January and February meetings.

Here's how to get started:

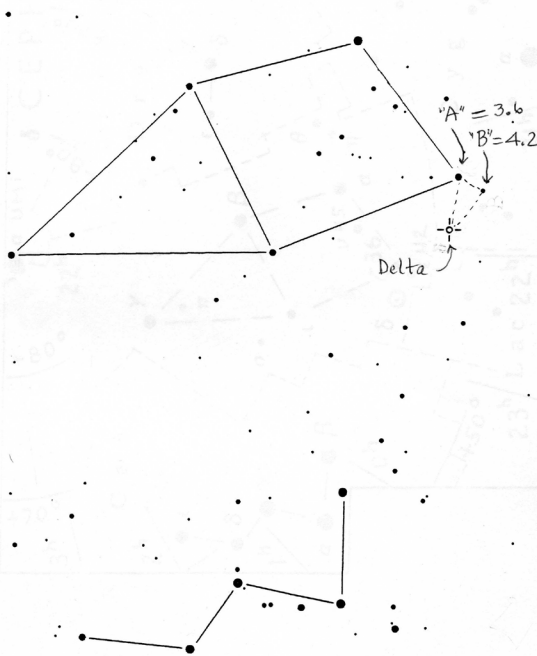
Step 1: Learn to identify the constellation Cepheus (above the "W" of Cassiopeia) and the little triangle of stars at the base of the house-shaped pentagon. The peak of the little triangle is the target star Delta, and the two stars at the base of the triangle are the two conveniently placed comparison stars we can call A (mag 3.6) and B (mag 4.2) for this project.



Step 2: Study this sample data sheet and the hypothetical points which have been entered to show that:

- on the 5th of the month Delta appears equal to Star A.
- on the 6th Delta appears a bit dimmer than Star A.
- on the 12th Delta appears as dim as Star B.
- on the 17th Delta appears mid-way between A and B
- on the 22nd Delta appears noticeably brighter than B

Step 3: Make your own actual visual estimates of Delta Cephei for a month or more and enter them in the blank data form below. Try to make an estimate on every clear night of the month for greatest data density. Bring your results to a Skyscrapers meeting for comparison with the data of other observers.



Delta Cephei: Month of _____

*A -----

*B -----

Day 0 5 10 15 20 25 30

Delta Cephei: Month of _____

*A -----

*B -----

Day 0 5 10 15 20 25 30