Stella: Our Sun's Sister

By Clark M. Thomas

Stars such as our own (Sol) do not appear from nothing in the past. Each new star has had a gassy/dusty stellar nursery. Unlike human families, stars don't have just one or two siblings. They typically have dozens or hundreds that form from chemically rich clouds. Such a cloud of gas and enriched dust 4.5 billion years ago was our birth nursery.

New stellar families express themselves thereafter as star clusters, mostly as open clusters that don't have a large amount of gravitational cohesiveness, due to their small numbers. After some millions of years the siblings wander away from each other following interactions with other gas clouds, and even interactions with dark matter. Only a very few open stellar families survive beyond a billion years.

Several of the Big Dipper stars are included in the nearest open cluster. Because it is so close to us it doesn't look to us like a cluster. Slightly farther away is the Hyades cluster. Farther still is the visually tighter Pleiades, which is notable for the gas we can see therein. See this link:
http://www.peripatus.gen.nz/Astronomy/OpeClu.html

Globular clusters, many of which are ten billion years old, are among the more ancient structures in our visible universe. Because of their much larger populations, globular clusters have plenty of cohesive gravity to maintain their ball shape. Some of the largest even host small black holes.

The universe's very earliest dust clouds were all low in metallicity. That simplicity made it impossible to form planets such as ours, and certainly impossible to support life. Those phenomena awaited later generations of dust clouds enriched by supernovae which had created complex and heavy atoms. After nine billion years the universe had birth clouds rich enough in atoms we would need to build life.

A lot of moving about has happened in the last 4.5 billion years. Where have all our stellar relatives gone? There are two ways to track them down. First, we can now track in reverse stars over billions of years as they orbited the core of our Milky Way. Second, each birth cloud has its own "finger print" of trace chemicals. In our cloud's case we are looking in candidate stellar spectra for rare barium and yttrium.

Drum roll, please.... And the winning candidate is a visual magnitude 6.5 star in Hercules, HD162826. Not a pretty name for a pretty star in our family. Astronomers should come up with a better name. I propose we call her "Stella," in honor of Stella Kowalski, in *A Streetcar Named Desire*.

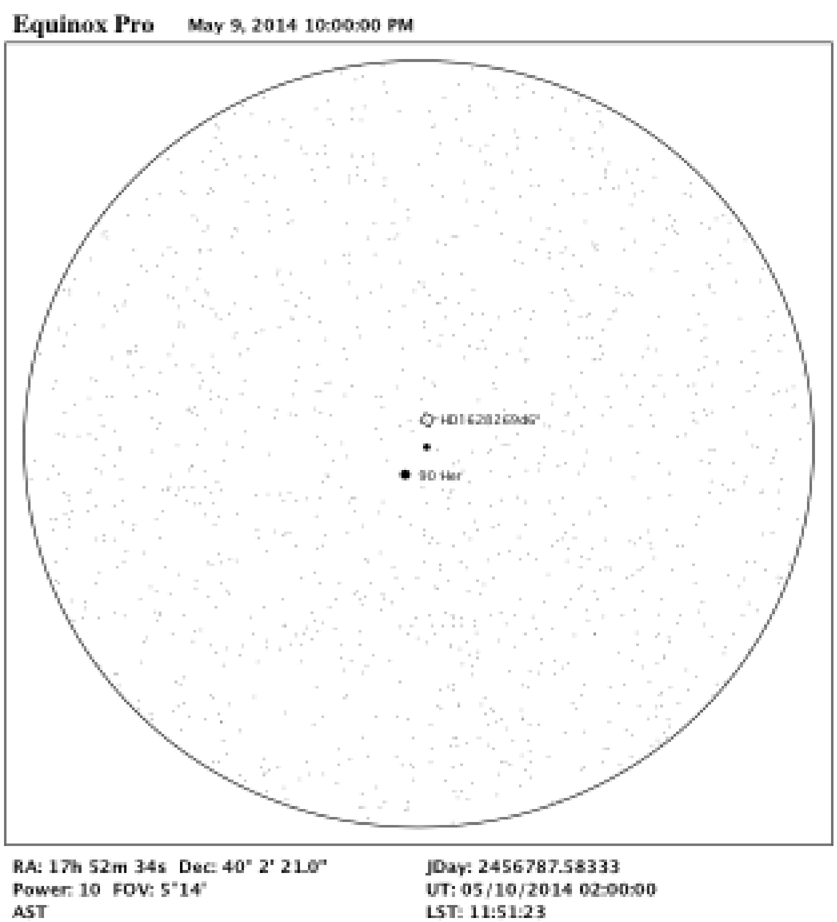
Although there are other family stars in our galaxy, Stella is exciting because it is nearby, and only 15% more massive than Sol, and because it has the same metallicity that our solar system sports. Astronomers have not found any "hot Jupiters" near it, and the hunt is just beginning for Earth-sized rocky planets in its Goldilocks zone. It's 110 light years away, so we won't be going there any time soon. Nevertheless, we can see it now, just with binoculars:

The primary source article for this essay is http://news.discovery.com/space/astronomy/our-suns-long-lost-stellar-sister-found-140509.htm

This *Discovery* article has a finder map of sorts for binoculars. As with most such finder maps, it is a worthless tease. That's because you can look for this star, and *not* distinguish Stella from similarly bright nearby stars.

Therefore, starting with the article-supplied map of this region of Hercules, I have prepared for you a representation of what you would see with a pair of binoculars at 10 power. Note that Stella is in the center (shown as the diamond), and it is *slightly less bright* than its two visually close companions, all three forming an arc.

Note too that this orientation is only rotationally accurate for this calendar date and time, as circumpolar stars appear to move around Polaris, the north star. This rotation rule applies whether you are using your naked eye, binoculars, or any telescope. However, the visual relationship of the three stars to each other does not change, even though their collective orientation rotates.



The second image below is what you would see with a Newtonian telescope at 56 power. This type of scope reverses north and south, and also east and west, due to the path light takes inside the instrument. Binoculars, as shown above, show the same "normal" relationship that the naked eye sees.