nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

Intelligent individuals learn from every thing and every one; average people, from their experiences. The stupid already have all the answers.

Socrates

CLUB EVENTS ON HOLD UNTIL FURTHER NOTICE

Volume 40 Number 6 ***nightwatch*** **June 2020**

Here is an article from SpaceX explaining the structure and orientation of their Starlink satellites as well as their efforts to mitigate the effect that their satellites have on astronomical observations.

https://www.spacex.com/news/2020/04/28/starlink-update

Claire Stover

Ray and Irene Magdziarz donated Ray's astronomy gear to the club last March. We are beginning to go through the material and sort it. Right now, we can offer the following issues of Sky and Telescope from the past. Condition of all is good, occasional scuffing and light wear. These are really interesting magazines from the beginnings and heyday of the U.S. space program. First come, first served. Contact Ludd Trozpek at ltrozpek@hotmail.com

1958: Jul, Aug, Oct, Nov, Dec. 5 issues. $10

1959: Mar, Apr, Jul, Sep, Oct, Dec. 6 issues. $12

1960: Feb, Mar, May, Sep. 4 issues. $8

1962: All except Sep and Oct 10 issues. $16

1963: All except Jan, Feb, Apr, May, Jul. 7 issues. $12

1964: All except Apr, Jun, Aug, Sep, Nov. 7 issues. $12

1969: Complete year. 12 issues. Apollo 11. $25

1970: Complete year. 12 issues. $20

1971: Complete year. 12 issues. $20

We are offering these first to readers of Nightwatch. After a month or so, we will offer them on Cloudy Nights classified. More material and goodies will be made available in the months ahead.

Ludd Trozpek

PVAA Officers and Board

Officers

President ….....	Mathew Wedel	909-767-9851
Vice President ..	Joe Hillberg	909-949-3650
Secretary	Ken Elchert	626-541-8679
Treasurer	Gary Thompson	909-935-5509
VP Facilities	Jeff Felton	909-622-6726

Board

Jim Bridgewater (2018).....	909-599-7123
Richard Wismer(2018)	
Ron Hoekwater (2019).....	909-706-7453
Jay Zacks (2019) …….	

Directors

Membership / Publicity....	Gary Thompson ..	909-935-5509
Outreach	Jeff Schroeder	909-758-1840
Programs	Ron Hoekwater	909-391-1943

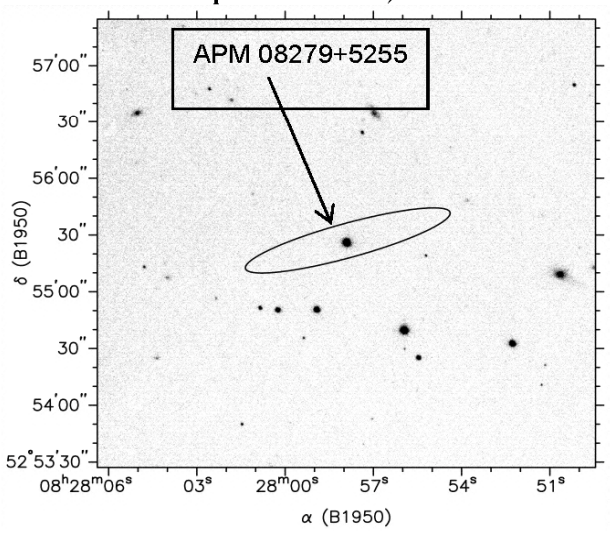
The Brightest Object in the Universe

In early 1999, Sky and Telescope published a small announcement of the discovery of a previously unknown quasar in the constellation of Lynx. The astronomers stumbled on this unusual object while doing an automatic search for carbon stars. They identified this target as being a quasar (quasi-stellar object) by noting its very large red shift (3.87). In our ever-expanding universe, this would put it far outside our own galaxy – in fact, something like 12 billion light years away. The kicker here, though, was its apparent brightness of magnitude 15.2. While this is very dim to the casual observer (about 10,000 times dimmer than the dimmest star that can be seen with the naked eye) it is many times brighter than a typical quasar would be at a distance of 12 billion light years. This quasar, now known as APM 08279+5255, is thought to be the intrinsically brightest and most energetic object in the known universe. I tucked this information away for future reference, not knowing when, if ever, it would become relevant to my amateur astronomy activities.

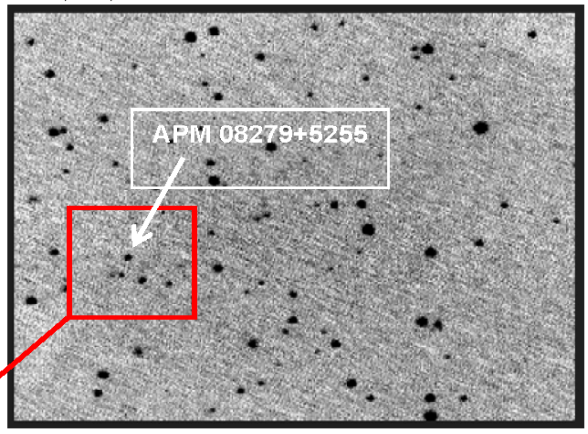
In early 2002, I looped back around to APM 08279+5255. It was a cold night in February at my mountain cabin and I had the 10-inch scope on its tripod on the south deck with the ST-6 camera mounted at prime focus. I did a quick alignment and pointed to where I expected to find the quasar. I tweaked the focus to get decent star images and took a few images at various exposure times. It was close to midnight and really cold, so I shut everything down, covered it up and went in to get warm. I'd been keeping the fire going so Julie and I wouldn't freeze. We decided to wait until the morning to see what we had. I was mentally prepared to go back out the next night if things had gone wrong.

Using the image from the discovery paper as a guide (below, left) I searched one of my four-minute images looking for a pattern of stars that matched up. It took a few minutes but then Julie, looking over my shoulder, spotted it. I was really happy to get it on the first try. When I got home from this outing, I e-mailed my image to Rodrigo Ibata, one of the original discoverers. I had contacted him some time ago to ask a couple of questions which he had kindly answered and he had encouraged me to give it a try. I wanted him to know that his time had not been wasted.

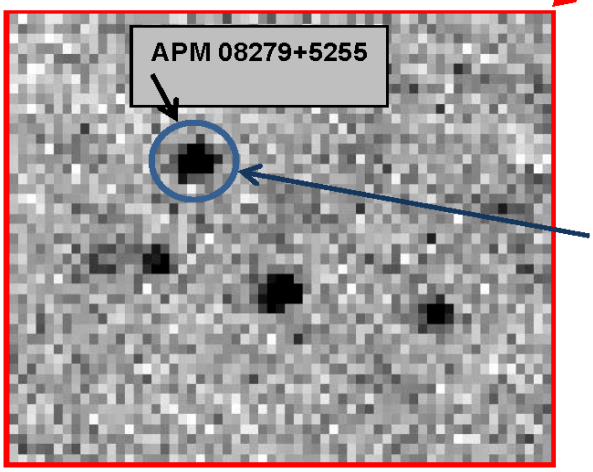
Follow-up image taken with one meter telescope at La Palma, Chili in 1998.



Note: All images are "inverted" from normal sky view, i.e., black-on-white.



My 240 second image containing APM 08270+5255. The red box covers the same area as the discovery image to the left (4 arc-minutes square)



Since its discovery in 1998, APM 08279+5255 has been studied by hundreds of astronomers around the world with every kind of telescope and in wavelengths from microwaves to infrared. Its energy output is equivalent to 1000 trillion suns, its water content sufficient to fill the earth's oceans 100 trillion times, the mass of its black hole that of 23 billion suns. And yet, from 12 billion light years away, its light has left just a small smudge on my image.

The pixels inside the blue circle represent the light captured by my telescope and camera from the distant quasar. During my four minute exposure, about 330,000 photons from the quasar entered my telescope and were focused on the CCD detector. I've become very fond of those photons, thinking of them as my own. I love the thought that this ancient light had been on its way to me for twelve billion years, its long journey finally ending as it entered my telescope on that very cold February night.

Don Rea 2020

NASA Night Sky Notes June 2020

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Summer Triangle Corner: Vega

David Prosper and Vivian White

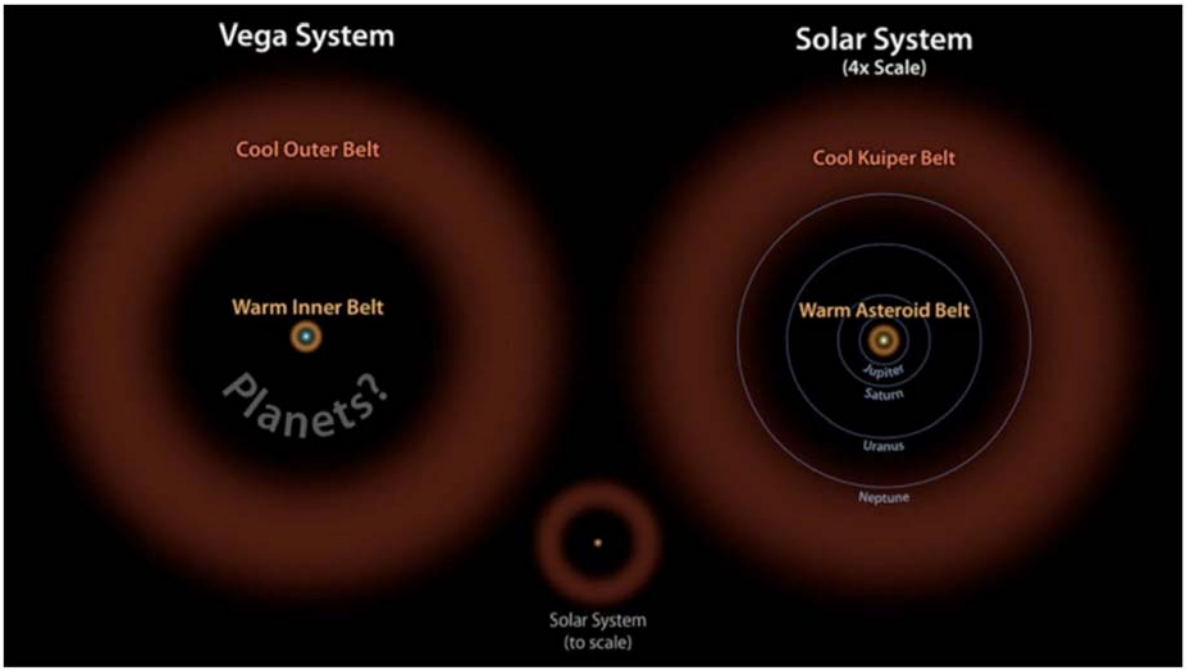
If you live in the Northern Hemisphere and look up during June evenings, you'll see the brilliant star **Vega** shining overhead. Did you know that Vega is one of the most studied stars in our skies? As one of the brightest summer stars, Vega has fascinated astronomers for thousands of years.

Vega is the brightest star in the small Greek constellation of Lyra, the harp. It's also one of the three points of the large "Summer Triangle" asterism, making Vega one of the easiest stars to find for novice stargazers. Ancient humans from 14,000 years ago likely knew Vega for another reason: it was the Earth's northern pole star! Compare Vega's current position with that of the current north star, Polaris, and you can see how much the Earth's tilt changes over thousands of years. This slow movement is called **precession**, and in 12,000 years Vega will return to the northern pole star position. Bright Vega has been observed closely since the beginning of modern astronomy and even helped to set the standard for the current magnitude scale used to categorize the brightness of stars. Polaris and Vega have something else in common, besides being once and future pole stars: their brightness varies over time, making them **variable stars**. Variable stars' light can change for many different reasons. Dust, smaller stars, or even planets may block the light we see from the star. Or the star itself might be unstable with active sunspots, expansions, or eruptions changing its brightness. Most stars are so far away that we only record the change in light, and can't see their surface.

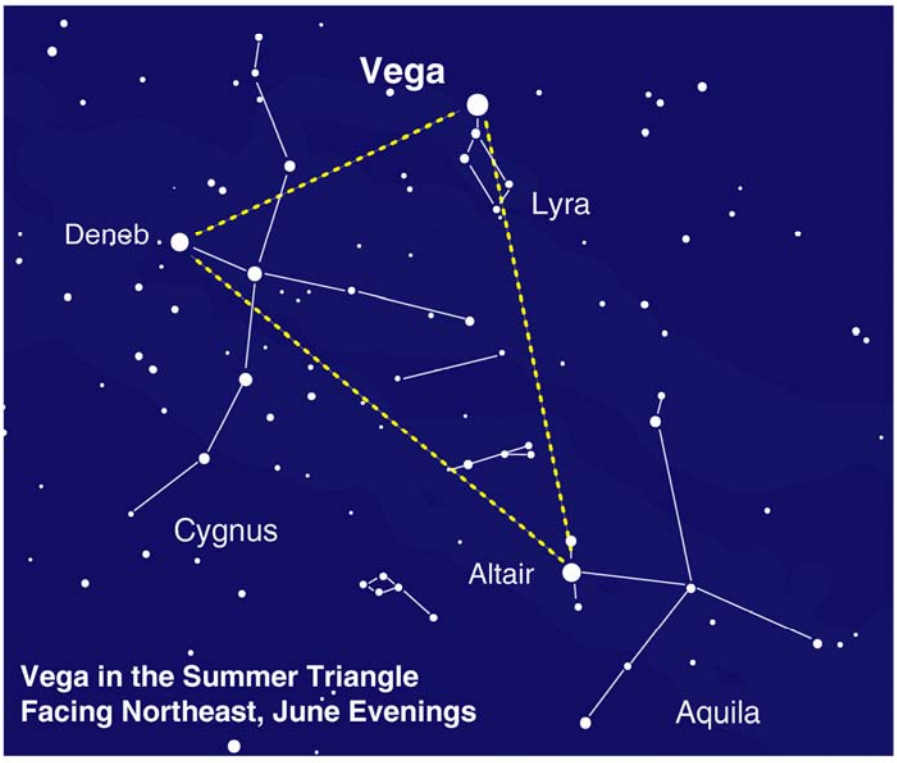
NASA's TESS satellite has ultra-sensitive light sensors primed to look for the tiny dimming of starlight caused by transits of extrasolar planets.Their sensitivity also allowed TESS to observe much smaller pulsations in a certain type of variable star's light than previously observed. These observations **of Delta Scuti** variable stars will help astronomers model their complex interiors and make sense of their distinct, seemingly chaotic, pulsations. This is a major contribution towards the field of astroseismology: the study of stellar interiors via observations of how sound waves "sing" as they travel through stars. The findings may help settle the debate over what kind of variable star Vega is. Find more details on this research, including a sonification demo that lets you "hear" the heartbeat of one of these stars, at: bit.ly/DeltaScutiTESS

Interested in learning more about variable stars? Want to observe their changing brightness? Check out the website for the American Association of Variable Star Observers (AAVSO) at aavso.org. You can also find the latest news about Vega and other fascinating stars at nasa.gov.

NASA Night Sky Notes June 2020



Vega possesses two debris fields, similar to our own solar system's asteroid and Kuiper belts. Astronomers continue to hunt for planets orbiting Vega, but as of May 2020 none have been confirmed. More info: bit.ly/VegaSystem Credit: NASA/JPL-Caltech



Can you spot Vega? You may need to look straight up to find it, especially if observing after midnight.