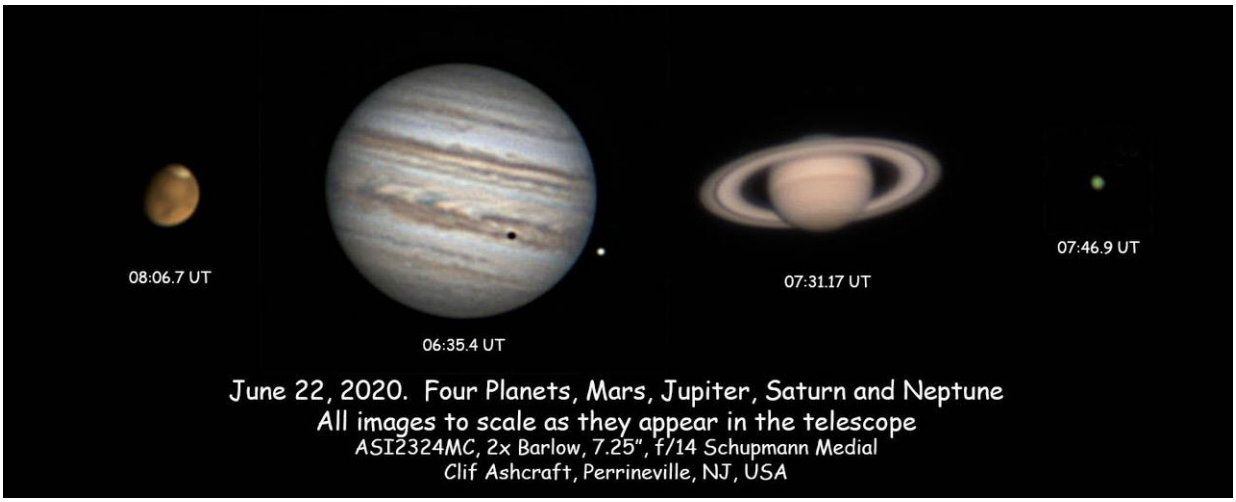
AAI Research Committee Report for June 2020

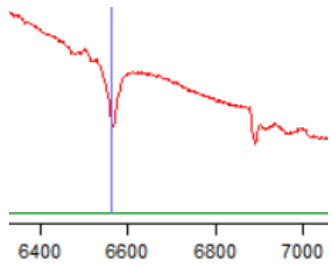
Although the Sperry 24" telescope is still off-limits due to the COVID-19 pandemic, some personal telescopes have been used successfully.

Solar System: In the pre-dawn hours Clif Ashcraft has imaged Jupiter and Saturn multiple times, and also Mars, *and even Neptune*.

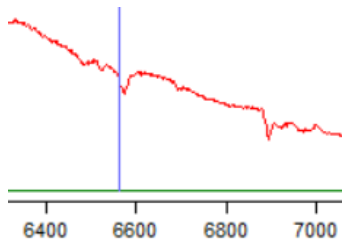


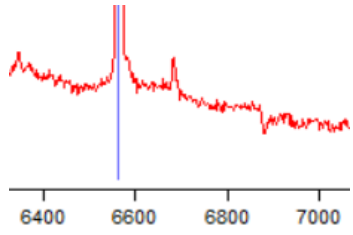
He reports that the Juno spacecraft in orbit around Jupiter has found that its atmosphere varies spatially in richness of water especially in the cloudy equatorial zone. Oxygen at 1% is the third most abundant element after hydrogen and helium. Clif also provided a star chart showing how Jupiter and its retinue of moons is passing in front of distant Pluto this month.

Stars: Steve Lowe took *spectra of Vega, Spica, and P Cygni*. These stars are hotter than our sun and show an interesting effect of quantum mechanics. At Vega's surface temperature of 9600 Kelvin a hydrogen atom's electron is easily excited from the second atomic level so shows an absorption line (dip) at wavelength 6563 Angstroms (red), but a helium atom's electron cannot do this because it is more tightly bound to its nucleus. However, at Spica's temperature of



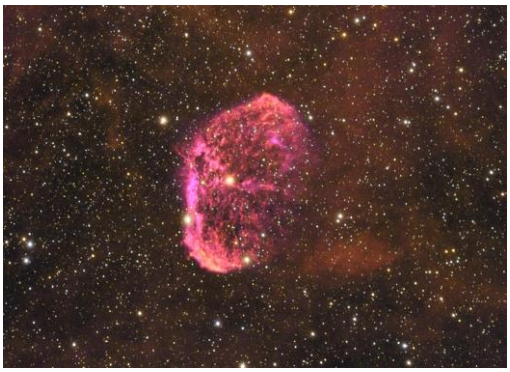
22000 Kelvin the helium atom *can* be excited, so shows a small dip at 6678 Angstroms (also red). The star P Cygni is also hot enough (19000 Kelvin) to excite helium, but it has an additional effect because this star is vigorously throwing gas off its surface. This changes the star's absorption lines (dips) to emission lines (peaks). There is a reassuring spectral line at 6867 Angstroms. This is due to oxygen molecules in the Earth's own atmosphere, and is *always* an absorption (dip), showing that we can breathe easily.





Bobby Marinov reported that the apparent position of Proxima Centauri is different as seen from Earth and from the New Horizons

spacecraft. The spacecraft is now 45 AU from the Sun, way beyond Pluto, so sees this parallax effect clearly. Pretty cool.



Deep Space: Bobby Marinov imaged two gas clouds in Cygnus, the Pelican nebula (IC5070 for 2 hours) and the *Crescent Nebula (NGC6888*, for 6 hours). They are examples of two different stages in the lives of stars, birth and death, since the Pelican is a star forming region while the Crescent is an ejected planetary nebula.

Presentations: Steve Lowe gave a Friday@Home talk on "Spectroscopy with a C8 Celestron HD using the ALPY 600" on June 12. In suburban New Jersey he has been limited to stars brighter than magnitude 6. He has been particularly successful observing hot stars such as Wolf-Rayet stars which are blowing off gas from their surfaces at a tremendous rate. One of them is the central star in the Crescent Nebula. A handful of them are located along the Milky Way in Cygnus, convenient for summertime observing.

Other: On June 5 Stan Honda's "Dragon over Central Park" won him another Astronomy Picture Of the Day from NASA. (https://apod.nasa.gov/apod/ap200605.html) Several club members had also seen the Dragon Crew Capsule chasing the International Space Station across the twilight sky after it was launched by SpaceX earlier on May 30. This is the first time in a decade that astronauts have been launched from the USA rather than from Russia. It was a proud moment.
Bobby Marinov provided a link to an interesting video of original footage of the Apollo 11 launch. https://youtu.be/xdxzMPi19sU
Mark Zdziarski has been experimenting with EAA (Electronic Assisted Astronomy) for outreach from his home with a C8 telescope and gotten some nice quick shots of the Moon, the Ring Nebula, and several globular clusters.

John Kozimbo recommended the Rutgers Geology Museum's YouTube series "Ask a Geologist" which has interesting episodes on meteorites, impact cratering, the Moon, and the formation of the Earth.
He also supplied a timely cartoon by Rhymes with Orange.

Respectfully submitted, Mary Lou West, Research Chair