THE OBSERVER

The Newsletter of Central Valley Astronomers of Fresno January-February 2020

The Orion Nebula, M42- The Jewel of the Winter Sky

(See other great, but lesser known, objects in Orion at the end of this issue)

Image-NASA

"The solar system is an insignificant bunch of dust...it also happens to be where we live.."

-Gene Shoemaker(1928-1997), planetary geologist

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Central Valley Astronomers

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Other Wonderful Winter Sky Objects

M41, an open cluster in Canis Major-often passed up because M42 comes right after it in Messier's catalogue

M35 in Gemini is well known, but NGC 2158, a beautiful little globular cluster next to it, is often overlooked

Number of exoplanets found as December 2019- 4,151

How many more are out there?

Tens of thousands? Hundreds of thousands?

Profiles in Astronomy

William Lassell 1799-1880

William Lassell was born and raised in Bolton, Lancastershire, England, and attended local schools there. After his father died, he was apprenticed to a merchant, and afterward became a successful beer brewer. He made enough money in the beer business to pursue his main interest in astronomy, and ended up building his own observatory in Liverpool with its centerpiece a 24" reflector. He later built a 48" reflector on the island of Malta(because of its better weather) but abandoned it when he returned to England after several years. He eventually moved, and took the 24" with him, to Maidenhead in southeast England, where he died in 1880.

Lassell's reputation is based on his discovery of several planetary moons. In 1846, only a few weeks after the discovery of Neptune, he discovered Neptune's largest moon, Triton. In 1848, he discovered Hyperion, one of the larger moons of Saturn, and in 1851, he found two of Uranus's moons, Ariel and Umbriel. In addition to his accomplishments, he was president of the Royal Astronomical Society, and was awarded its gold medal in 1849 for his discoveries. He was also a member of the Royal Society and was awarded its gold medal as well. A crater on the Moon, an asteroid, and a ring of Neptune are named after him. At the University of Liverpool, the Lassell Prize is given annually to the top student in physics and astronomy.

The Maria Mitchell Observatory

The Maria Mitchell Observatory is actually two facilities, both of which are managed by the Maria Mitchell Association, which was founded in 1908 to honor Nantucket Island's most famous scientist. The main building is on Vestal Street in Nantucket(the town) which houses the offices of the Maria Mitchell Association as well as the administrative facilities for the observatory. This was the original observatory which had as its centerpiece a 7.5" Alvyn Clark refractor. Today, the refractor has been moved(see below), and a 17" reflector, installed in 2008, has taken its place.

The second facility is known as the Loines Observatory, and is about a mile away from the Vestal Street building. It was built in 1968 for only one telescope, and was expanded in 1998 to house a second device. Today it houses the 7.5" Alyvn Clark refractor, and a 24" Richey-Chretian reflector, which became operational in 2006. The Alvyn Clark telescope is now used only for public starwatching events; the Association has an active program of public education and outreach. The 17" on Vestal Street and the 24" at Loines are used for scientific research. Undergraduate and graduate students can apply for summer internships to use the two reflectors; the internship program is funded by the National Science foundation.

Top-the Vestal Street Observatory and Maria Mitchell Association offices
Bottom-the Loines Observatory

CVA's 2020 Calendar of Events

Monthly meetings at CSUF EE-191 starting at 7pm
January 11
February 8
March 7
April 11
May 9
June 6
August 29
October 3
November 7
December 5

Eastman Lake Starwatches-at the parking lot above the boat launch ramp on the east side of the lake
January 25
February 22
March 21
April 18
April 25
May 23
June 20
July 18
August 15
September 19
October 17
November 14
December 12

Millerton Lake-at the boat launch ramp on the Madera County(west) side of the lake
June 13
July 11
August 8

Courtright Reservoir
June 19-21
July 17-19
August 14-16

RiverPark-in the open area between Victoria's Secret and the Edwards(old Imax) Theater
February 29-remember, 2020 is a Leap Year
April 4
May 2
May 30
June 27
July 25
August 22
September 26
October 24
November 21

Special Events-
Solar viewing at Downing Planetarium-CSUF
April 18 9am to 1pm

Annual Board Meeting
CSUF Room EE-191
August 1
2pm-4pm

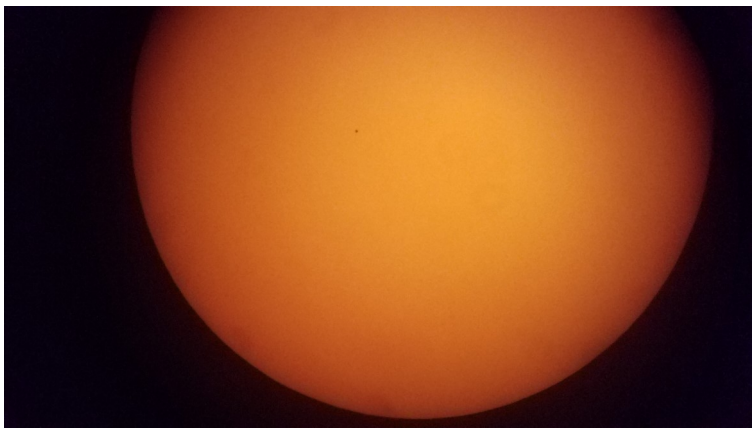
Other events and dates may be added if necessary

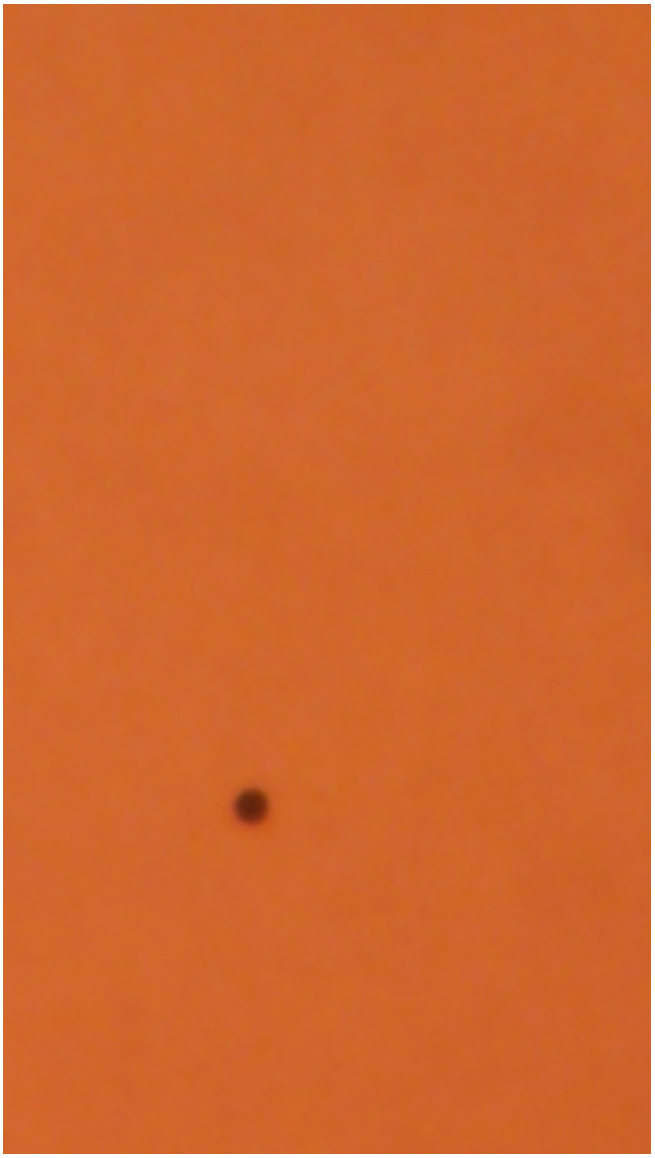
Astronomy Short-

The two Voyager spacecraft, which are now in their 41st year of operation, and have traveled well beyond the influence of the solar system, have had a storied history. They were conceived in the late 1950s, when a group of scientists realized, that, in the late 1970s, the outer planets would be in orbital configuration for a craft to achieve a "grand tour," flying by all of them. Originally four spacecraft were planned, but budget cuts reduced them to two. Also, Voyager was not the original name-it was Nomad. Voyager 1 was actually launched after Voyager 2 because its trajectory was different: it would take a 90° turn after Saturn and travel almost perpendicular to the plane of the solar system(this was so it could fly by several of Saturn's moons). Voyager 2 was the only one to fly by Uranus and Neptune. Today, NASA hopes to keep in touch with the two spacecraft for at least ten to fifteen more years.

Images of the Mercury Transit on November 11, 2019 by Brian Bellis

Brian told me that he took these images with his smartphone!-the editor





What's New in Space

Boeing's Starliner Lands Successfully after Aborted Mission

Boeing's Starliner, in its first unmanned mission, landed on Sunday, December 22, after an aborted flight that lasted only two days, instead of the scheduled eight. Starliner was launched without problems on December 20, but about forty minutes into the flight, when it was supposed to make a burn to put it into an orbit to rendezvous and dock with the International Space Station, it failed to do so. Ground controllers quickly identified the problem as a timer clock that had been wrongly programed, and sent commands to the spacecraft to correct it. But, in a stroke of bad luck, at the same time there was a communications gap with the craft, and by the time the command was in place, it had already used up most of its burn fuel and was unable to go into the correct orbit. Program managers decided to keep Starliner in orbit for two more days to run various tests and maneuvers on it; they were all successful, and the craft landed at White Sands, New Mexico, early in the morning on December 22. Both NASA and Boeing emphasized that if astronauts had been aboard, they would have been in no danger, and, in fact, would have been able to adjust the timer and make the correct engine burn themselves. After the landing, NASA and Boeing officials said that all other aspects of the flight went well and it may be possible to skip a second unmanned test flight, and make the next Starliner mission a crewed one, possibly as early as March or April 2020. The first astronaut crew that will fly aboard Starliner watched it land at White Sands; they named it Calypso, in honor of undersea explorer Jacques Cousteau's scientific research ship. Right-Starliner at White Sands shortly after touchdown; officials emphasized that it made a "pinpoint landing" using inflatable air bags.

Nevertheless, the mission was a major setback for Boeing, coming on the heels of critical problems with its 737 Max commercial jetliner(On December 23, Boeing's board of directors fired CEO Dennis Muilenberg, citing dissatisfaction with the way he was handling the company. Starliner's aborted flight may have been the final straw). In October 2019, NASA chief administrator Jim Brindenstein made it very clear to both Boeing and Space-X that the space agency wants the Starliner and Dragon V2 spacecraft operational by the summer of 2020; both craft are almost three years behind schedule, forcing NASA to purchase seats(at $86 million each) aboard Russian Soyuz spacecraft, now into 2021. Brindenstein and NASA have become increasingly frustrated by the slow pace of development, seemingly endless delays, and cost overruns by both companies in manned spaceflight. On the other hand, both Boeing and Space-X have criticized NASA for its excessive regulations and paperwork, which they say have been a major contributor to the delays. More delays notwithstanding, both Dragon V2 and Starliner will be flying with Americans aboard by July 2020.

Astronomy (bad) Joke

Question-What's a light year?
Answer-a regular year, but with fewer calories

From astronomytrek.com

Five Lesser Known, but Worth Seeing, Objects in Orion

Orion is one of the best known constellations in the winter sky, and some of its objects, such as M42 and the Horsehead Nebula, are standards for amateur astronomers. But it also has several other little known and overlooked objects that are worth viewing as well.

NGC 2194-This is an open cluster, first seen by William Herschel in 1784. It has about 150 stars, and is estimated to be 10,000 light years from Earth. It has an apparent magnitude of 8.5.

NGC 2022-A planetary nebula about 8,100 light years from Earth. It has an apparent magnitude of 12.4, and its small central star is magnitude 14.7.

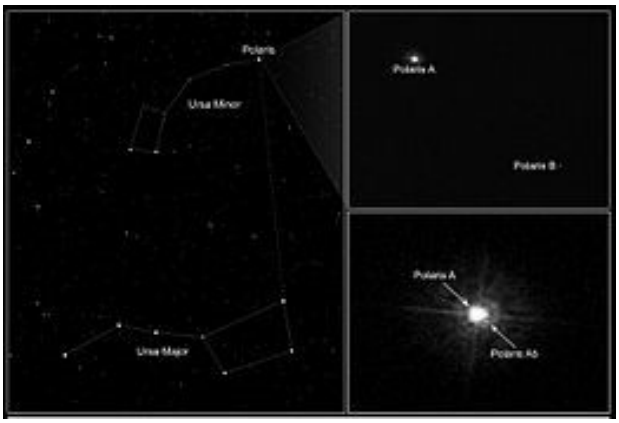
NGC 2112-Another open cluster in Orion with about 200 stars. It is approximately 3,050 light years from Earth, and has an apparent magnitude of 9.1.

NGC 2169-Herschel also discovered this open cluster in 1784. It is actually two small clusters, which together appear to form the number 37, hence its nickname, the "37 Cluster." 2169 is about 3,600 light years from Earth, and has an apparent magnitude of 5.9.

J320-The "J' is for Robert Jonckheere(1888-1974) a French astronomer who studied and cataloged over 3,000 double stars. He originally found J320 in 1912 and classified it as a double star, then returned to it in 1916 with a larger telescope and realized it was a planetary nebula, in fact a multiple-lobed nebula known as a poly-polar. It has an apparent magnitude of 12.8, and its central star is magnitude 14.4.

Star Stories

Polaris



Polaris (A Urase Minoris) has the distinction of being the "North Star," only abut half a degree from true north, that is, almost directly above Earth's North Pole. But it was not always the North Star, and in several thousand years will have moved a good distance from it. But, for this age, it's a good and reliable navigational marker, and will be for at least a while.

Polaris is actually a triple star system. The main star, known as Polaris Aa, is a Cepheid variable, an F7 yellowish star about five times the mass of our Sun. It has an apparent magnitude of 2. Orbiting it is Polaris Ab, an F6 dwarf star with an apparent magnitude of 9.2. Polaris Ab is estimated to be about eighteen astronomical units away from Polaris Aa. The third star is Polaris B, which was discovered by William Herschel in 1779, and is about 2,400 astronomical units from the Aa and Ab system. It is an F3 main sequence star with an apparent magnitude of 8.7. The absolute magnitude of the Aa and Ab system is -3.6, and the absolute magnitude of B is 3.1. The most recent measurements put the Polaris system as being about 430 light years from Earth.

Like almost all stars, Polaris has a proper motion; it is actually moving away from its position above the Earth's north pole, and will be replaced by Gamma Cephei in about 20,000 years, and then by Deneb in about 70,000 years. It has even moved since ancient times. Calculations show that around 3,000 BC the star closest to the geographic north pole was Thuban, in the constellation Draco, and even Polaris's companion star in Ursa Minor, Kochab, was closer to the north pole than it was. So, Polaris is currently having its day in the sun(or the stars, relatively speaking) and will eventually move on.

Polaris got its name from Latin; early European scholars called it *polaris stella*, the "polar star." The ancient Norse referred to it as the Lode Star, their guiding star when they went on sea voyages. To the Anglo-Saxons, it was the "ship-star," again, a reference to it being used as a guide star while at sea. The ancient people of the Sahara of North Africa referred to it as the "star of the desert," giving it the same qualities for navigating the expanses of the desert sands.

From the *Observer* Archives

"Thanks to Dr. Ron Nelson who called me on the night of Sunday, March 12, 1989, at just before midnight. He told me about a beautiful aurora. I went outside with my eyes still blinded by the TV screen light. When Jeanette and I looked up, we were shocked to see the brilliance of it in spite of not having dark-adapted eyes. I believe he called some others. I called two persons and reached one. Several others reported on having seen the aurora on one or two dates. This is rather novel for around our latitude. Look for more of the same the rest of this year and next year during the sunspot maximum. It should be a good one this time."

from Clarence Funk, CVA president and *Observer* editor

***The Observer*, April 1989**

We never know what beauty and wonder the nighttime skies will bring-the editor