August 2017 Volume 25 Number 8 Forsyth Astronomical Society

YOUNG ASTRONOMERS NEWSLETTER

BIGGEST ASTRONOMY NEWS FOR AUGUST 2017

Sky watchers should arrange their schedules for August 21, 2017 when the United States will experience a transcontinental sweep of the moon's shadow. It will be a Total Solar Eclipse that begins in the morning on the Oregon coast and speeds to the southeast and exits the U.S. near Charleston, S.C. around 3 pm.

It is a very unique and unforgettable event. To see the total coverage of the Sun, North Carolinians will have to go to the extreme western tip of their state, or more simply, drive a short distance straight south into South Carolina. Winston Salem viewers will see about 95% coverage of the Sun from their location.

A map showing the band of totality is given in the June issue of this newsletter, and it will be well published in magazines and newspapers.

Be ready by 1:30pm with your solar glasses. Never look at the Sun without protection (sunglasses are unsafe to use).

IS THE MARTIAN SURFACE STERILE?

Various landers and rovers that analyzed the Martian soil have found ionic perchlorates in relative abundance. The perchlorate ion, ClO_4^-, is toxic to living things that we are familiar with here on Earth. (it is medically administered in small doses to treat hyperthyroidism and it is used in fireworks and as a rocket fuel).

A study by Jennifer Wadsworth and Charles Cockell of U.K. Centre for Astrobiology at the University of Edinburgh was conducted in which they ran simulation experiments that attempted to duplicate conditions on Mars' surface. They irradiated (ultraviolet wavelengths) samples of a bacterium in the presence of magnesium perchlorate, and found that the bacteria lost all viability after just 30 seconds. Without the perchlorate, 60 seconds of irradiation was needed to accomplish the same degree of biodegradation.

The light atmosphere on Mars allows more of the Sun's ultraviolet rays to cause biological damage. Also, there may be biocidal transformations aided by Martian iron minerals, the perchlorates as well as hydrogen peroxide initiated by the high energy radiation.

All three components (perchlorate, iron mineral and hydrogen peroxide) were combined in some experiments and the irradiation of the bacteria under such conditions resulted in even higher loss of cell viability.

So, can this explain why we have not yet found living organisms or bio-molecules on Mars? What does this portend for future human colonization of Mars? Further exploration and sample retrieval will be needed to better prepare us for such encounters. [https://www.nature.com/articles. Scientific Reports **7** (2017)].

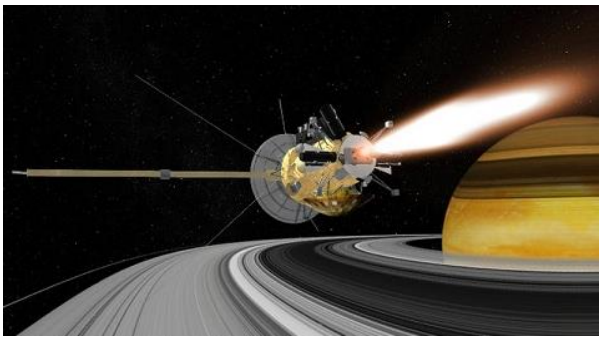
SPACE PROBE CASSINI WILL MAKE A SUICIDAL DIVE INTO SATURN IN SEPTEMBER

The Cassini spacecraft is scheduled to end its 13-year mission on September 15. The double probe, Cassini-Huygens reached Saturn in 2004, after which the Huygens probe was released to perform a slow descent onto Saturn's moon, Titan.

That amazing feat was followed by extensive exploration by Cassini of Saturn's moons and rings. Data was accumulated about the ringed planet's gravitational and magnetic fields,

radiation belts and atmosphere. Two moons were discovered (Methone and Pallene).

Early this year, Cassini's orbit was altered so that it could follow a polar orbit and eventually dive inside the inner rings. Now, the probe is skimming the upper clouds of Saturn and is poised to plunge into the planet on September 15. Fine work at a distance of 900 million miles by NASA, the European Space Agency and, of course, the Cassini probe. [https://Saturn.jpl.nasa.gov/science/overview].



(NASA illustration of Cassini near Saturn)

ASTRONOMERS HAVE HIGH EXPECTATIONS FOR THE JAMES WEBB SPACE TELESCOPE.

If final assembly and testing stays on schedule, NASA expects to launch the James Webb Space Telescope in October 2018 using the European Space Agency Ariane 5 rocket and its launch facility in French Guiana. It is hoped that the JWST will give us information about the early Universe; when stars and galaxies first started to form after the Big Bang, about 13.8 billion years ago. At such early times and distances, the heavenly bodies are rapidly expanding and producing red shifts that require telescopes that are sensitive to the infrared region of the spectrum. This puts such objects out of the detection range of the Hubble Space Telescope.

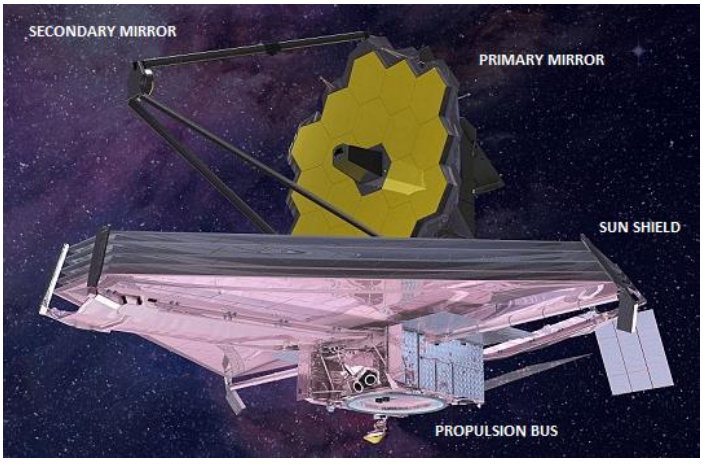
The JWST will be parked at a Lagrange point, a gravitationally balanced spot, some 930,000 miles from Earth. This makes use of the Earth as a protective shield against heat radiating from the Sun. In addition, the space telescope will sit on a large sun shield that will keep the sensitive instruments below 50 Kelvin temperature.

On board will be a combination of four cameras and spectrometers that are sensitive to infrared wavelengths from 0.6 to 28 micrometers. These were built by the Canadian Space Agency and the European Space Agency.

The telescope mirror with a diameter of 6.5 meters (21 ft.) will be considerably larger than Hubble's 2.4 m (7.9 ft.). It will be a segmented mirror consisting of a beryllium base coated with gold. This will give JWST unprecedented resolution and sensitivity.

The heavens will be scanned for early stars and galaxies as well as exoplanets. The use of infrared allows the telescope to see through dust clouds which puts ground-based telescopes at a disadvantage. Infrared spectroscopy can also be used to study atmospheres on exoplanets.

The large mirror and heat shield will be folded up in order to fit into the Arianes rocket and then unfurled once the telescope reaches its destination at the L2 point. [Amer. Scientist, Mar. – Apr. 2017; https://www.space.com/34593].



FOR LARGE PICTURE GO TO GOOGLE JWST IMAGES

AUGUST BIRTHDAYS: Roger Penrose (Eng.), b. Aug. 8, 1931. Mathematician – astrophysicist. Made contributions in developing theories of spacetime, description of the event horizon around black holes, star collapse, quantum mechanics, artificial intelligence and physics of consciousness.

MOON PHASES IN AUGUST: Full: Mon., Aug. 7; **Last Qtr.:** Tues., Aug. 15; **New:** Mon., Aug. 21; **First Qtr.:** Tues., Aug. 29.

PLANETS IN AUGUST: Venus dominates the eastern early morning sky at magnitude – 4.0. Off in the west, right after sunset, **Jupiter** (mag. -1.9) stays up until about 11 p.m. In mid-evening, straight south, you'll see **Saturn** just above Scorpius and Sagittarius. **Mercury** is too close to the Sun, and is barely visible early in the month. **Mars** is behind the Sun and won't appear until next month, before dawn.

PERSEID METEOR SHOWER will peak around August 12. But the sky will be bleached out by a ¾ full Moon.

Check the June issue of the Newsletter for a sky map. See archived newsletters on the FAS website.

Additional notes regarding the total solar eclipse on August 21: All who have witnessed a total eclipse say that there is no comparison with a partial eclipse. It's like day and night! The August issue of Astronomy magazine shows that at totality, one should be able to see nighttime objects like the planets Mars, Jupiter and Venus, as well as prominent stars Betelgeuse, Arcturus, Spica, and Arcturus.
The Kaleideum (formerly SciWorks) gift shop is temporarily out of solar glasses. But more have been ordered and should be in, in a few days.
There will be Kaleideum personnel in the parking lot to interact with the public and help enjoy the eclipse. Things should start getting interesting around 1 p.m.
Let's hope that it isn't a cloudy day!!

ERUDITE TWINKLE, TWINKLE LITTLE STAR

(author unknown)

Scintillate, scintillate globule vivific,
How I ponder thy nature specific.
Distantly poised in the ether capacious,
Closely resembling a gem carbonaceous.

Forsyth Astronomical Society website: http://www.fas37.org Kaleideum phone: 336-767-6730 Ext. 1000

The Forsyth Astronomical Society meets at 7:30 p.m. the fourth Tuesday of the month at Kaleideum. Visitors are welcome.

Bob Patsiga, editor