SIRIUS ASTRONOMER

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The Newsletter of the Orange County Astronomers

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M32, a dwarf elliptical galaxy and satellite of the Andromeda Galaxy, appears in this photograph at top center along with Andromeda itself. Eventually, billions of years in the future, Andromeda will absorb M32, possibly resulting in a new system of globular clusters for the larger galaxy (although agreement on this outcome is not necessarily universal). This image by John Castillo was obtained from OCA's Anza site during October-November 2013.

OCA CLUB MEETING

The free and open club meeting will be held December 13 at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. This month, Dr. Jeffrey Rich of the Carnegie Institution for Science will present "The Elements and Astronomy"

NEXT MEETINGS: ,January 10, February 14

STAR PARTIES

The Black Star Canyon site will open on December 28. The Anza site will be open on December 28. Members are encouraged to check the website calendar for the latest updates on star parties and other events.

Please check the website calendar for the outreach events this month! Volunteers are always welcome!

You are also reminded to check the web site frequently for updates to the calendar of events and other club news.

COMING UP

The next session of the Beginners Class will be held at the Heritage Museum of Orange County at 3101 West Harvard Street in Santa Ana on December 6. The following class will be held February 7.

GOTO SIG: TBA
Astro-Imagers SIG: Dec. 17, Jan. 14
Remote Telescopes: TBA
Astrophysics SIG: Dec. 20, Jan. 17
Dark Sky Group: TBA

AstroSpace Update

December 2013

Gathered by Don Lynn from NASA and other sources

Tilted exoplanets – Using data from the Kepler space telescope, a team of astronomers has discovered a distant planetary system, dubbed Kepler-56, with multiple planets orbiting at a severe tilt to the equator of their host star. Such tilted orbits had been found in planetary systems featuring a hot Jupiter (large planet very close to its star), and the tilt had been blamed on perturbation by the hot Jupiter. But the Kepler-56 has no hot Jupiter, only a large planet much more distant than 2 inner tilted planets. So that distant planet is being blamed for the tilt. Normally planet formation would occur in a disk orbiting in the plane of its star's equator, so orbital tilt would have to be the result of forces applied after formation. Kepler-56 (the star) is more than 4 times the diameter of our Sun, its mass is 30% greater than the Sun, and it lies about 3000 light-years away.

Baffling exoplanet – Kepler-78b, newly found, is a planet that shouldn't exist. It orbits its star extremely closely, taking only 8.5 hours, where it could not have possibly formed. In fact, when it formed, its star was likely expanded engulfing this region. Astronomers cannot explain how it could have moved so close after forming farther away without falling into its star. Actually, it will fall into its star according to calculations, but not for about 3 billion years. This is due to gravitational tides that slowly tighten the orbit. The planet is 20% larger in diameter than the Earth and 70% more massive, resulting in a density quite similar to our planet. This suggests an Earth-like composition of iron and rock. 78b orbits a Sun-like G-type star located 400 light-years away in Cygnus.

More Kepler results have been announced: 833 new planet candidates (to be verified by other telescopes), which include 10 roughly the size of Earth (less than twice its size) orbiting in their star's habitable zone, the range where surface temperature would allow liquid water; statistical analysis showing most stars in our galaxy have at least 1 planet; another analysis that shows 22% of Sun-like stars have planets in the habitable zone. Statistically, 1 Sun-like star with a planet in its habitable zone should exist within 12 light-years of us (that's extremely close), though Kepler would not find it, since it observed only a small portion of the sky and was able to detect only those planets whose orbital tilt happens to allow them to pass in front of their star from the Earth's point of view. The announcing team of astronomers cautioned that Earth-size planets in the habitable zone are not necessarily hospitable to life. 3538 planet candidates have been announced in the years since Kepler started operating. Though the telescope recently failed, there is still a year of observations to be searched for planet candidates.

Free-floating exoplanet – A team of astronomers has discovered a young planet that is not orbiting a star. This planet, known as PSO J318.5-22, is just 80 light-years away and has a mass about 6 times that of Jupiter. Only a handful of planets have been directly imaged, and this is the only one without a star; all the other imaged planets orbit young stars. The newly discovered planet was 1st found by the Pan-STARRS 1 telescope on Maui while searching for brown dwarf stars. Further observations by other Hawaiian telescopes established that it was a planet, not a brown dwarf, and measured its distance and motion. It apparently came from the Beta Pictoris group of stars, which formed only about 12 million years ago, so that is probably the planet's age, which is consistent with the planet's properties.

Exoasteroid – Astronomers have found at a white dwarf star the remnants of a shattered asteroid that contained huge amounts of water (about 26%). The extreme gravity of the white dwarf is believed to have shredded the asteroid. Planets and asteroids form at the same time, so the presence of the asteroid implies the star probably has planets. The presence of the water suggests that any such planets could acquire water by asteroid collision, like the Earth is believed to have acquired its oceans.

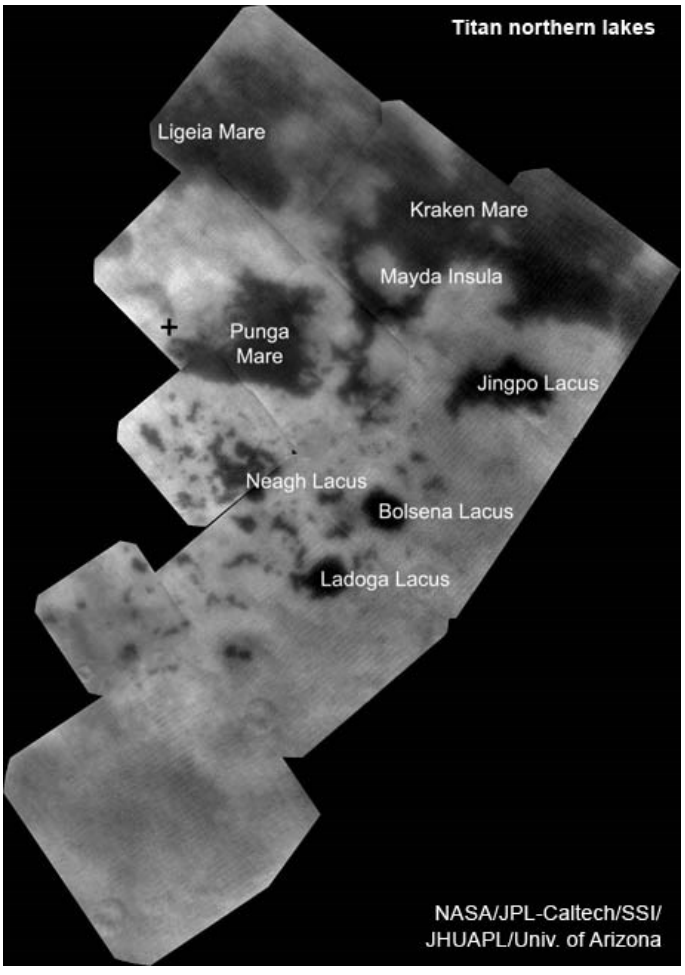
Curiosity (Mars rover) has analyzed the Martian atmosphere and found the ratio of 2 isotopes of argon, argon-36 and argon-38, to be 4.2. This agrees with the ratio found in air bubbles trapped in meteorites thought to have come from Mars, reconfirming that is indeed where they came from. This also supports that the red planet has lost much of its atmosphere to space. Such loss works more efficiently on lighter isotopes, changing the ratio between them. The solar system formed with an argon ratio of 5.5, as measurements of the Sun and Jupiter show. Since argon is inert, it is the best evidence yet of the Martian atmosphere loss; isotope ratios of

non-inert elements, such as oxygen or carbon, could be influenced by chemical processes, though past measurements of those other elements also support major loss of atmosphere.

Asteroid tails – Astronomers viewing our asteroid belt with the Hubble Space Telescope have seen for the 1st time an asteroid with 6 comet-like tails radiating like spokes on a wheel. The tails are made up of dust, and the structure of them was observed to change dramatically in just days as it belched out more dust. Astronomers described the changes as looking like a lawn sprinkler. A tail of dust has been seen before on another asteroid, and it was caused by a collision. But in the new case, where the dust keeps coming, it has to be from another cause. It is believed that this asteroid was spun up by the Sun's radiation pressure to the point where it is flying apart. Analysis of images showed that it has been ejecting dust periodically for at least 5 months. About 100-1000 tons of dust have been observed thrown off, a small fraction of its mass. The nucleus is estimated at 1400 feet (430 m) across. Further observations will be made to see if the dust leaves in the equatorial plane, supporting the spin-apart theory, and to measure its spin rate. There are many asteroids with orbits similar to this one, implying they are all fragments of a larger asteroid that broke up in a collision roughly 200 million years ago.

Vesta (asteroid) – Further analysis of data from the Dawn spacecraft's visit to Vesta shows that the mineral olivine is scattered mostly around the northern parts. It had been expected that olivine would be found in the southern area, because the mineral is found in diogenite meteorites, which are believed to have been pounded off the southern polar area of Vesta by a long-ago huge impact. What this means is that Vesta's history was far more complex than expected.

Cassini (Saturn mission) has imaged the liquid methane/ethane lakes of far northern Titan in infrared, to penetrate the haze. Factors that allow better imaging of this area include the change of seasons that increase lighting, better weather there lately, and the spacecraft's higher trajectory over the pole. Scientists hope to explain why nearly all the lakes on Titan lie at these high northern latitudes. Bright areas seen in the new images suggest the location might be due to unique terrain there. Titan's lakes have very distinctive shapes: rounded cookie-cutter silhouettes and steep sides. The new data suggests that parts of the lakes may have evaporated and left behind material deposited on the flats that was once dissolved in the liquid, perhaps particles that were once atmospheric haze.



GRAIL (lunar gravity mapping mission) – Further analysis of GRAIL data has shed light on the differences between the front and back side of the Moon. Since the 1st pictures were taken of the back side by spacecraft (it is never visible from Earth), it has been known that the back is nearly devoid of lunar "seas", the lava-filled impact basins seen on our side. GRAIL data showed that both sides were hit by similar numbers of impacts, but the thinner crust on the front side resulted in far more volcanic activity (billions of years ago). Because much of the results of impacts on the front side were covered by lava, the far side holds the better record of the impact history. The GRAIL data will probably be used to recalculate the impactor size, timing and severity of the "late heavy bombardment", the period when so many impacts occurred about 4 billion years ago.

Sun's corona (outer atmosphere) – Scientists found evidence that magnetic waves in a polar coronal hole contain enough energy to heat the Sun's corona. It has long been a mystery how the Sun's corona is heated to more than 100 times the temperature of the Sun's surface. This observation may have solved this mystery. The new data came from a spectrograph on the Japanese solar space telescope Hinode. This is the 1st time that sufficient energy has been found in any process that could heat the corona.

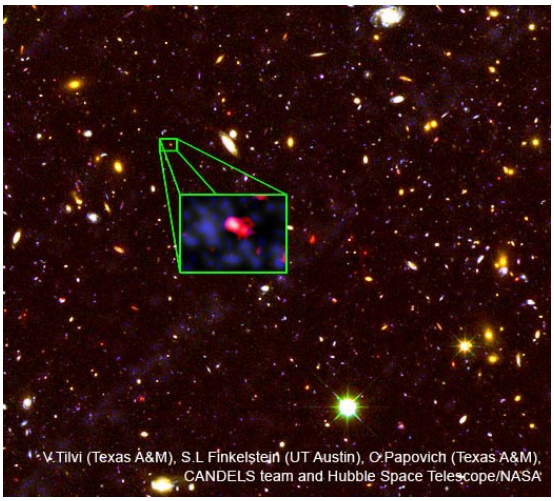
Gas cloud – Astronomers studying images of the Westerlund 1 super star cluster have spotted clouds of glowing hydrogen around one of the stars, a red supergiant known as W26. Such glowing clouds around massive stars are rare, and even rarer around a red supergiant; this is the 1st around such a star. W26 is too cool to make the gas glow; the astronomers speculate that the source may be either hot blue stars elsewhere in the cluster, or possibly a faint but hot companion to W26. The star will eventually explode as a supernova. The gas clouds surrounding it are similar to the nebula surrounding supernova SN1987A, so studying W26 may shed light on this process.

Gas cloud with magnetic field – Radiotelescope observations of the Smith Cloud, a gigantic streamer of hydrogen gas that is on a collision course with the Milky Way, discovered a magnetic field deep in the cloud, which may protect it during its plunge into the disk of our galaxy. Calculations have shown that clouds like the Smith Cloud, and there are hundred of them around our galaxy alone, should be destroyed during passage through a galaxy by the million-degree upper atmosphere surrounding the galaxy. Yet the Smith Cloud has apparently already survived a previous pass through the Milky Way. Further, other clouds have been seen to penetrate galaxies fairly intact and supply fresh fuel for new generations of stars. So the magnetic field discovery apparently solves this mystery. Of course this brings up another question: such clouds appear to form without strong magnetic fields, so how did the Smith Cloud acquire its field? Since the Smith Cloud is devoid of stars, it must be observed by very sensitive radiotelescopes, which can see hydrogen gas.

X-ray light echoes – A new study shows that the Milky Way's supermassive black hole had at least 2 major outbursts in the last few centuries. This was determined by observing X-ray light that has bounced (echoed) off gas clouds, and thus arrived a few centuries later than light taking a direct path. The echoes had areas that persisted for 2 different time periods, indicating they came from 2 different outbursts. Such outbursts are caused by clumps of material falling into the black hole. During the outbursts at least 1 million times the strength of X-rays was produced compared to currently.

ALMA (submillimeter wavelength radiotelescope array in Chile) - 2 teams of astronomers have used ALMA to focus on jets from the huge black holes at the centers of galaxies. One team obtained the best view yet of the molecular gas around a nearby quiet black hole (in NGC 1433), and the other caught an unexpected glimpse of the base of a powerful jet close to the black hole in a very distant galaxy (PKS 1830-211). The radio light from the distant jet had passed a massive intervening galaxy and was gravitationally lensed into a double image. The team looked to see if the bright jet was seen by other telescopes, and found it was captured by the Fermi Gamma-ray Space Telescope. PKS 1830-211 has a redshift of 2.5, meaning that its light traveled about 11 billion years to reach us.

ALMA also observed the coldest known place in the Universe, the Boomerang Nebula. Rapid expansion of the gas in this nebula has cooled it to about 1 degree above absolute zero. The ALMA observations showed its true shape, which differed from that seen by ground-based visible-light and Hubble Space Telescope observations. Ground-based observations had shown a lop-sided shape that has been described as a boomerang. Hubble observations show a bow-tie shape. ALMA's superior resolution traced the distribution of carbon monoxide molecules, which glow brightly at ALMA's radio wavelengths. Astronomers were able to detect the double-lobe structure that is seen by Hubble, and then farther out a cloud of cold gas that is roughly round. A dense lane of millimeter-sized dust grains was discovered surrounding the star, which causes the bow-tie shape by blocking some of the visible light. The nebula is located about 5000 light-years away in Centaurus, and is a relatively young planetary nebula. The central star is not yet hot enough to emit sufficient ultraviolet radiation to cause the nebula to glow, so it is seen by reflected starlight.



Most distant galaxy – A galaxy known as z8_GND_5296 is now the most distant one known whose distance is based on a spectrum, considered the most reliable distance indicator. It formed about 700 million years after the Big Bang, and its light has spent the next 13 billion years to reach us. It was found to be forming stars at more than 100 times the rate that our Milky Way does now. Its redshift is 7.51, determined by the shift of Lyman alpha hydrogen spectral lines. Interestingly

the galaxy is relatively rich in heavier elements (beyond helium), indicating the galaxy had already experienced several generations of star birth and death by supernova in order to generate and spread those heavier elements. The study observed 43 distant galaxies, but only this one had measurable Lyman alpha lines. There are several known galaxies with more distant estimates, but those were made without a spectrum.

iPTF, an upgrade of the Palomar Transient Factory (PTF), discovered a rare type Ib supernova, whose progenitor star was then found in archived Hubble images. Its color, brightness, size and mass-loss history match that of a Wolf-Rayet star, supporting a theory that this type of star becomes a type Ib supernova. For further proof, astronomers will wait for the supernova to fade, then reimage the area to see if the star seen in the Hubble images has indeed disappeared, destroyed by the supernova. Wolf-Rayet stars are 10 times as massive and thousands of times brighter than our Sun, and have lost their hydrogen envelope by means of strong stellar winds. The Palomar Transient Factory has since 2008 been using a huge CCD system on the Palomar 48-inch telescope to repeatedly image huge portions of the sky, and has discovered over 2000 supernovas.

iPTF also located the visible-light afterglow of a gamma-ray burst (GRB), by imaging a huge portion of the sky indicated by the low-resolution Fermi gamma-ray space telescope. This is the 1st time that a GRB's position has been found precisely using optical telescopes alone. Ground-based telescopes around the world then monitored the afterglow for days as it faded away, and recorded the emergence of a supernova 5 days later. A redshift measurement showed the GRB was relatively nearby and intrinsically faint, liberating only about 1/1000 as much energy as the most energetic GRBs. Typically the supernova that is believed to cause one type of GRB is seen only for nearby GRBs.

Comet impact – A team of scientists has analyzed a black pebble found in the Sahara and has concluded that it is a piece of a comet nucleus. It was found in a large area littered with yellow silica glass. Some of that glass was used in ancient Egyptian jewelry. The new study indicates that both the glass and the black pebble are the result of a comet striking Earth about 28 million years ago, exploding, and heating up the sand beneath it until it melted into glass. The impact produced microscopic diamonds in the pebble. Pieces of comet are much rarer than meteorites.

Chelyabinsk (meteoroid explosion last February) – Further analysis of data and eyewitness accounts from Chelyabinsk, Russia, has yielded these conclusions: The impact speed was 42,500 mph (68,400 km/h); the meteor fragmented into pieces, peaking at 19 miles (30 km) above the surface; the meteor appeared brighter than the Sun, even for people 62 miles (100 km) away; Many pieces of the meteor vaporized before reaching Earth, but 9,000-13,000 pounds (4,000-6,000 kg) fell to the ground; the meteoroid broke up easily because it contained veins of weaker material that formed during a collision with another meteoroid several billion years ago. In some other meteorites, veins from collisions are stronger than surrounding material, but in the Chelyabinsk case, the veins were weaker. A ½-ton meteorite, from the fireball, was dragged up from Lake Chebarkul. The rock was spotted in September, but it has taken several attempts to bring it to the surface.

Hubble, Spitzer and Chandra (space telescopes) are teaming up to look deeper into the Universe than ever before. They should be able to uncover galaxies that are as much as 100 times fainter than what they typically see by aiming at 6 massive galaxy clusters, which gravitationally lens objects behind, brightening and magnifying them. The program is called The Frontier Fields. The 1st cluster is Abell 2744, also known as Pandora's Galaxy Cluster. The giant cluster appears to be the result of the pile-up of at least 4 separate smaller galaxy clusters that took place over a span of 350 million years. Hubble and Spitzer observations will be combined to measure the galaxies' distances and masses. Chandra will image in X-rays to help determine the mass of the foreground galaxy clusters and so measure their gravitational lensing power. High-resolution Hubble data will be used to trace the distribution of dark matter by its lensing effects.

MOM (Mars Orbiter Mission), also known as Mangalyaan (which means simply Mars craft, in Hindi), lifted off November 5 atop an Indian PSLV rocket. It successfully reached a low orbit, but the 1st of 6 boost burns to raise the orbit and head off to Mars shut off early. It is believed that scheduling another rocket firing can correct this problem. MOM is scheduled arrive at the red planet next September for several months of study of the Martian atmosphere, particularly looking for methane, and the surface minerals. Only 3

other entities have sent successful missions to Mars: the U.S., Russia, and the European Space Agency (Japan's Nozomi probe was to enter Mars orbit in December 2003 but was unable to complete its mission due to solar flare damage).

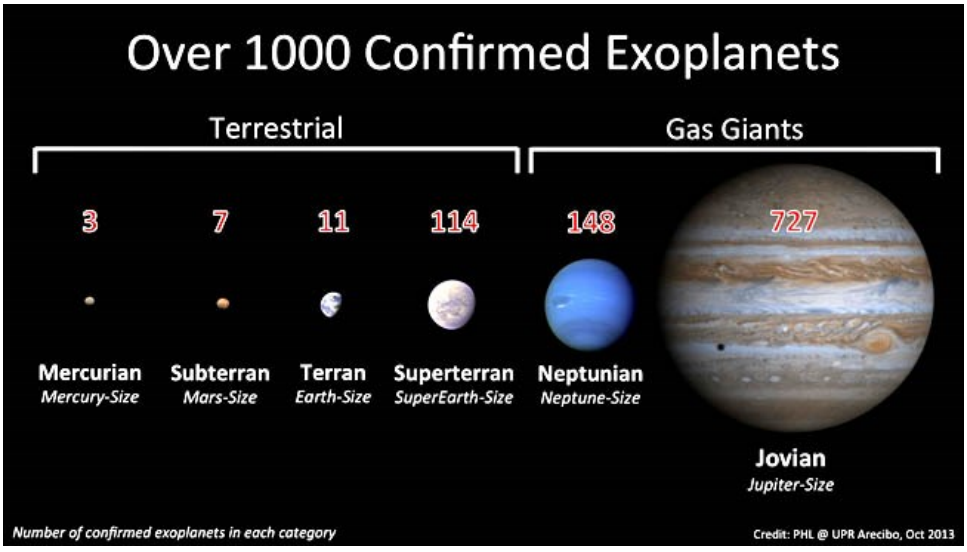
Maven, NASA's next mission to Mars, is scheduled for November 18 launch, also to arrive at the red planet next September, and also to study its atmosphere. Scientists working on MOM and Maven plan to collaborate. They hope to answer where and how all the water and carbon dioxide on early Mars went.

ISS-RapidScat (ocean wind instrument) is being built for launch to the International Space Station (ISS) next spring mostly out of spare parts left from the QuikSCAT satellite, which measured surface winds above the oceans for a decade until its failure in 2009. It is a scatterometer, which uses microwaves to measure ocean roughness caused by winds. ISS-RapidScat is getting a free ride to the station, and will be mounted on the outside. It will cost only $26 million, as opposed to an estimated $400 million to build and launch a replacement QuikSCAT satellite. Riding on ISS has its complications: engineers had to design ISS-RapidScat so that it avoids broadcasting microwaves into other parts of ISS, particularly the nearby docking port.

Scott Carpenter (NASA)

Scott Carpenter, one of the original 7 astronauts, has died at age 88 after suffering a stroke. Of those 7, only John Glenn remains alive. Carpenter was the 6th person to fly in space, the 4th American in space, and the 2nd American to orbit Earth. His flight in a Mercury spacecraft ended with a targeting mishap, from a mechanical failure, that took the Aurora 7 spacecraft about 250 miles (400 km) off course, delaying recovery of the astronaut and space capsule for hours. He never flew another space mission, apparently due to a motorbike accident that left him with restricted arm mobility. He later participated in the SEALAB experiment, living under the ocean, and advocated for the environment.

Instant AstroSpace Updates



1000 exoplanets – One of the official lists of confirmed exoplanets has now exceeded 1000 entries in over 750 planetary systems. The 1st verified exoplanet was discovered orbiting a pulsar only 21 years ago, followed 2 years later by the 1st planet orbiting an ordinary star.

Astronauts going to ISS on a Russian Soyuz rocket took the **Olympic torch** (apparently not lit, for safety reasons) to the space station, and returned it to Earth with returning astronauts, as part of the Olympic torch relay that will finish at the stadium for the winter games in Soichi, Russia.

Lunar Laser Communication Demonstration (LLCD) has used a laser beam to transmit data from the LADEE spacecraft orbiting the Moon at a record-breaking rate of 622 megabits per second, the 1st test of laser communication from beyond low Earth orbit.

The team of astronomers who recently discovered 2 black holes in globular cluster M22 have found another **black hole** in M62, implying black holes might be common in globulars, even though they have been rarely found as yet.

GOCE (European satellite to map Earth's gravity) has fallen back to Earth over the South Atlantic Ocean, without any reports of damage, though about a quarter of it was calculated to be able to survive the searing re-entry. Its mission had ended and this was expected.

Tests made during a 3-month observation run show that the **LUX**, a detector buried a mile underground that theoretically should detect WIMPs (proposed dark matter particles), show that it is the most sensitive dark-matter detector yet, but it still has not found anything. Observations and equipment improvements will continue.

A computer simulation of planetary system formation about a carbon-rich star shows that such have very little water, so **carbon planets** probably have no oceans.

A team of astronomers using the Sub-Millimeter radiotelescope on Mt. Graham, Arizona, has completed the largest-ever **survey of dense gas clouds** in the Milky Way, where stars are born, containing over 6000 clouds. Dust in the clouds prevents observation in visible light.

In early October an **asteroid**, dubbed 2013 TV135, was discovered to have passed weeks before fairly close to Earth, and it was moving such that it would come extremely close in 2032; but further observation appears to show that it will miss us.

FOR SALE

Celestron super C-8, Meade heavy tripod with Celestron wedge, clock drives, 11 eyepieces, Parks filters, camera and ocular adaptors and other accessories, Burhams Celestial Handbook, Sky Atlas 2000, and books, all in five hard cases. $1000 O/B/O. email carlberg@ix.netcom.com for complete inventory. Contact David Carlberg at 714-842-5619

Celestron NexStar 5, barely used. $1400 o/b/o. Contact Carol at ccbopper@hotmail.com

Non-computerized C6 SGT including tube, mount (never used), Telrad finder, 25 mm eyepiece, focal reducer and case for the tube. Contact Michael Mirjahangir at 714-319-3103

Meade ETX-125C with accessories (tripod, carrying case, Autostar system, heat/dew cover, etc.) $500 o/b/o. Email SRFROGN@aol.com with copy to startraveler68@yahoo.com for details.

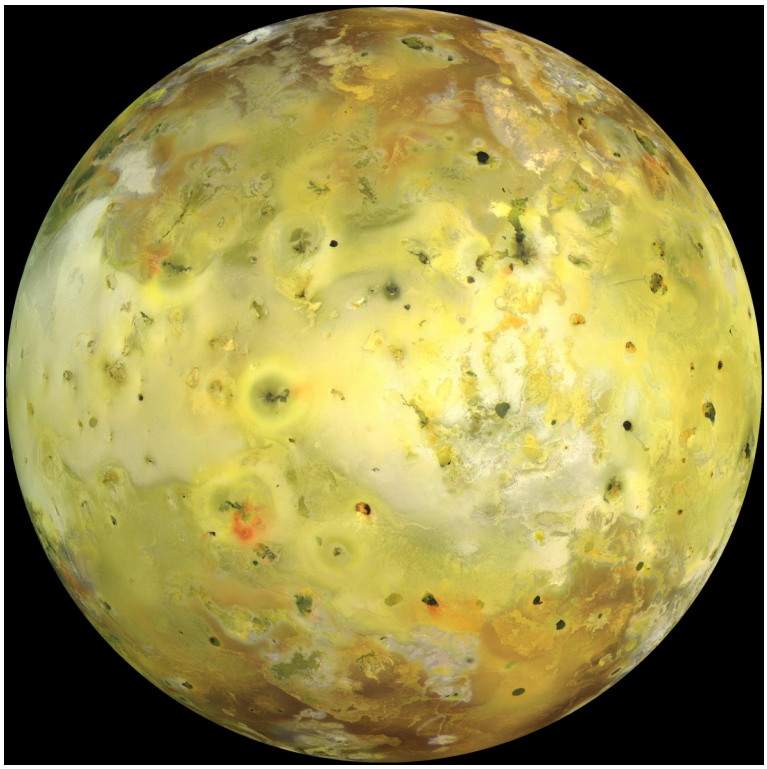
Skywatcher 100ED f/9 refractor with Celestron CG-4 mount. Scope comes with a hard case, 8X50mm finder, 2-inch dielectric diagonal, 2 LET eyepieces, and 4-inch Baader solar filter. CG-4 mount has motors for both RA and DEC. Optical tube can be sold separate. $600 o/b/o. Contact Val at 949-382-1869.

Celestron 90mm Maksutov Sky Prodigy with all attachments. $300. Contact Val at 949-382-1869.

Meade LX90 10" ACF, f/10, with Autostar; GPS; Smartfinder; Telrad finder; 6.7 and 40 mm eyepieces and 8X50 ViewFinder. $1700. Contact Don Rader at dgrconsult@roadrunner.com or 714-996-5138.

The most volcanically active place is out-of-this-world!

By Dr. Ethan Siegel



Io. Image credit: NASA / JPL-Caltech, via the Galileo spacecraft.

Volcanoes are some of the most powerful and destructive natural phenomena, yet they're a vital part of shaping the planetary landscape of worlds small and large. Here on Earth, the largest of the rocky bodies in our Solar System, there's a tremendous source of heat coming from our planet's interior, from a mix of gravitational contraction and heavy, radioactive elements decaying. Our planet consistently outputs a tremendous amount of energy from this process, nearly three times the global power production from all sources of fuel. Because the surface-area-to-mass ratio of our planet (like all large rocky worlds) is small, that energy has a hard time escaping, building-up and releasing sporadically in catastrophic events: volcanoes and earthquakes!

Yet volcanoes occur on worlds that you might never expect, like the tiny moon Io, orbiting Jupiter. With just 1.5% the mass of Earth despite being more than one quarter of the Earth's diameter, Io seems like an unlikely candidate for volcanoes, as 4.5 billion years is more than enough time for it to have cooled and become stable. Yet Io is anything but stable, as an abundance of volcanic eruptions were predicted before we ever got a chance to view it up close. When the Voyager 1 spacecraft visited, it found no impact craters on Io, but instead hundreds of volcanic calderas, including actual eruptions with plumes 300 kilometers high! Subsequently, Voyager 2, Galileo, and a myriad of telescope observations found that these eruptions change rapidly on Io's surface.

Where does the energy for all this come from? From the combined tidal forces exerted by Jupiter and the outer Jovian moons. On Earth, the gravity from the Sun and Moon causes the ocean tides to raise-and-lower by one-to-two meters, on average, far too small to cause any heating. Io has no oceans, yet the tidal forces acting on it cause the world itself to stretch and bend by an astonishing **100 meters** at a time! This causes not only cracking and fissures, but also heats up the interior of the planet, the same way that rapidly bending a piece of metal back-and-forth causes it to heat up internally. When a path to the surface opens up, that internal heat escapes through quiescent lava flows and catastrophic volcanic eruptions! The hottest spots on Io's surface reach 1,200 °C (2,000 °F); compared to the average surface temperature of 110 Kelvin (-163 °C / -261 °F), Io is home to the most extreme temperature differences from location-to-location outside of the Sun.

Just by orbiting where it does, Io gets distorted, heats up, and erupts, making it the most volcanically active world in the entire Solar System! Other moons around gas giants have spectacular eruptions, too (like Enceladus around Saturn), but no world has its surface shaped by volcanic activity quite like Jupiter's innermost moon, Io!

Learn more about Galileo's mission to Jupiter: http://solarsystem.nasa.gov/galileo/. Kids can explore the many volcanoes of our solar system using the Space Place's Space Volcano Explorer: http://spaceplace.nasa.gov/volcanoes.

The Bishop Observatory—Some History (Part 2 of a series; Part 1 may be found in the June 2013 issue)
By Larry Adkins
Rancho Santiago College District
Santa Ana, California
(reprinted from OCA Website)

Lemon Heights Nights 1930 - 1940

Bishop Observatory in Lemon Heights circa 1925-1930 (photo by Edward W. Cochems (c) Ronald Sand)

Clearly, Mrs. Tessmann was able to make arrangements with Clyde Bishop's widow for the continued use of the observatory on a regular basis for college astronomy classes. There are a number of references in ***El Don*** to student field trips to Lemon Heights beginning in 1930 and continuing for the next ten years[14]. These articles indicate that trips were made on a weekly basis. During this period Mrs. Bishop remarried and became Mrs. Anna Bishop Tubbs. It is not known how much, if any, involvement Mrs. Tubbs had with the observatory. Usually when an observatory field trip is discussed in ***El Don***, mention is made of "telescope manager Walter J. Ferris", indicating that he, not Mrs. Tubbs, was in charge of the instrument during visits by astronomy classes.

I have not been able to find the exact relationship Walter Ferris had with the college, but Michael Saladyga, librarian at the American Association of Variable Star Observers (AAVSO), has located records from the late twenties and early thirties which confirm that Mr. Ferris was a variable star observer who used the Bishop telescope for his observations[15]. He submitted 66 variable star observations (mostly of the long period Mira type) to AAVSO headquarters between 1929 and 1931, and although his membership application stated that he planned to work with both his own 8-inch reflecting telescope as well as with the Clark refractor, it appears that in fact all of his reports were done with the Clark. Mr. Ferris' AAVSO membership file lists his profession as "Estimator", but he apparently had some official connection to SAC, because in his observing reports after 1930 he always adds the phrase "*with Santa Ana Junior College*" after his name. Further, it is clear from both the press accounts mentioned above and the notes he included in some of these reports, that helping students use the telescope was part of his regular activities at the observatory.

Three short notes which Mr. Ferris attached to his observing reports provide a glimpse of the Bishop Observatory in operation during this period. In October, 1930 he reported "*Stars of Mag 13.0 or over are too much for this instrument and location. While on a hill some 6-1/2 miles from my home it is only about 7 miles from the coast and the air is often heavy with moisture and seeing poor*." (This coastal marine layer is still a problem for astronomers in the area, although it has been supplanted in seriousness by urban light pollution.) A note in January of 1931 clearly indicates that by this time student use of the telescope was quite heavy: "*...It has been a busy time with classes at the telescope every clear available night and I had my hands full..*" Does it sound like he is not entirely enjoying this? Finally in his report for November/December 1931 he has this to say: "*Sorry I could not do more this last summer but there has been many conflicting things which hindered besides the cloudy weather. I have the Junior College students at the observatory one night each week. The observatory is the property of Mrs. John Tubbs who has made it available to the Junior College and myself. It is about 7-1/2 miles from town (I would be able to do more if it was at home.).*" I venture to guess that a modern amateur would consider a first class observatory 7-1/2 miles from home to be virtually in the backyard, but at the time, along winding country roads, I don't doubt that it seemed more distant and certainly more inconvenient.

Walter Ferris maintained his membership in the AAVSO until 1938, but there is no record of further observing reports after 1931. He was still associated with the telescope after it moved to Santa Ana in 1940, but seems not to have been as much involved with supervising students as he was a decade earlier. Victor Alleman, Santa Ana College distinguished alumnus and benefactor, recalls field trips to Lemon Heights with Mrs. Tessmann when he was a student in the late thirties, but has no recollection of Walter Ferris[16]. Mr. Alleman remembers how the students would carpool for the evening drive up into the hills which were then separated from Santa Ana by a sea of citrus groves. At the observatory Mrs. Tessmann would supervise while students would observe and take notes. The pictures below show two such groups of students at the observatory in 1937 and 1939, respectively.

Students at Bishop Observatory, Lemon Heights in 1937

Class at Lemon Heights 1939. Jennie Tessmann on right in

"Not as cross as I look" — Jennie L. Tessmann

Mrs. Tessmann's position as astronomy instructor at a junior college was unusual for the times. Very few junior colleges of that era even taught astronomy, let alone had regular access to a high quality instrument like the Bishop observatory's 8" Clark refractor. In a few articles from the period there are hints (unconfirmed) that she used the telescope for spectroscopy in personal research projects[17] . Clearly, however, she used the observatory primarily to instruct her classes. She was well liked by the students, though she tended to be aloof. She signed a candid photograph of herself in Victor Alleman's 1941 yearbook with the cryptic inscription: *"Not as cross as I look. Jennie L. Tessmann"*[18] . According to Mr. Alleman, "That was about as warm as she got." Well, it was a more formal era in academe. I doubt that any of her students ever called her "Jennie".

Santa Ana High School 1940 - 1955

Mrs. Tubbs died in February of 1940 and specified in her will that the 8" Clark telescope be given to Santa Ana College "for the benefit of its astronomy classes"[19] . The only requirements asked of the college were that observatory be removed from the Lemon Heights location within six months after the close of probate and that the college assume liability for any damage to the property arising from the removal process. Santa Ana College president D. K. Hammond was happy to accept the gift and the conditions. The article in the ***Santa Ana Register*** which announced the bequest to the college acknowledged Mrs. Tessmann's role in establishing the observatory. In that same article President Hammond stated that "some heights, above the fog, probably would be sought for a location" after the college took possession. However, no doubt due to time and budget constraints, any immediate plan to relocate to a remote site was obviously abandoned, because by August of 1940, an observatory to house the telescope was under construction on the campus of Santa Ana High School[20].

Photographs are from **El Don**, **Del Ano**, and **El Vivaz** (SAC student publications), **Ariel** (Santa Ana High School yearbook), The **Santa Ana Register**, Western Woman, The **Tustin Historical Society**, **Historical Panoramics of Orange County**, and **Larry Adkins**

References

14. "Young Astronomer[s] Use Bishop Telescope", El Don, April 30,1930; also ref. 11
15. Michael Saladyga, observing archives of the American Association of Variable Star Observers (private communication).
16. Victor Alleman, private communication.
17. "Jennie Lasby Tessmann", The Western Woman, Vol. IX #10, 1939
18. Victor Alleman's 1941 Del Ano yearbook, p. 192
19. "Tubbs $95,000 Estate Willed", Santa Ana Register, February 27, 1940, p. 5
20. "Willed to the Junior College", El Don August 4, 1940.

Statement of Steve Short, Candidate for OCA Trustee

Thank you for having elected me to be on your OCA governing Board for the past eight years. I have tried my best to see that our funds are spent wisely and fairly so all members benefit. I am very proud to represent each and every one of you and I am always open for suggestions.

You won't see me out at Anza often as I try to help out at the Palomar Mountain ETS (Explore the Stars) events on those nights and must run the Black Star Canyon star parties for our club. But I am in tune with all the Anza activity and continue to support the new development of pads and observatories along with maintenance and improvements for our existing equipment, including the Kuhn telescope, observatory and the Anza House.

You will also see me at various public outreach events, when my schedule permits and I help out at the Beginners and Astrophysics classes. I have attended some of the AstroImagers meetings so am familiar with those members and that side of the club. I also have headed up getting the Loaner Scope program back in operation.

I would be honored if you would elect me to another term so I can continue to help guide the club down a path of growth and improvements. I am particularly interested to see that club membership grows and member satisfaction remains high. Thank you for your vote of confidence!

Comet ISON appears in one of the last amateur images taken of it prior to perihelion on November 28, 2013. ISON was an unusually active comet and appears to have broken up as it made its close approach to the Sun. Although fragments large enough to be observable from Earth may have survived, we still have another 87 years in which to find another 'Comet of the Century'. Many thanks to Michael Daughtry for giving us one last good look of ISON, seen here on November 21, just one week prior to its demise!

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