July-August
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Issue 5

The Observer

The Newsletter of Central Valley Astronomers of Fresno

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CVA Calendar

November 3-CVA meeting at Fresno State=7pm

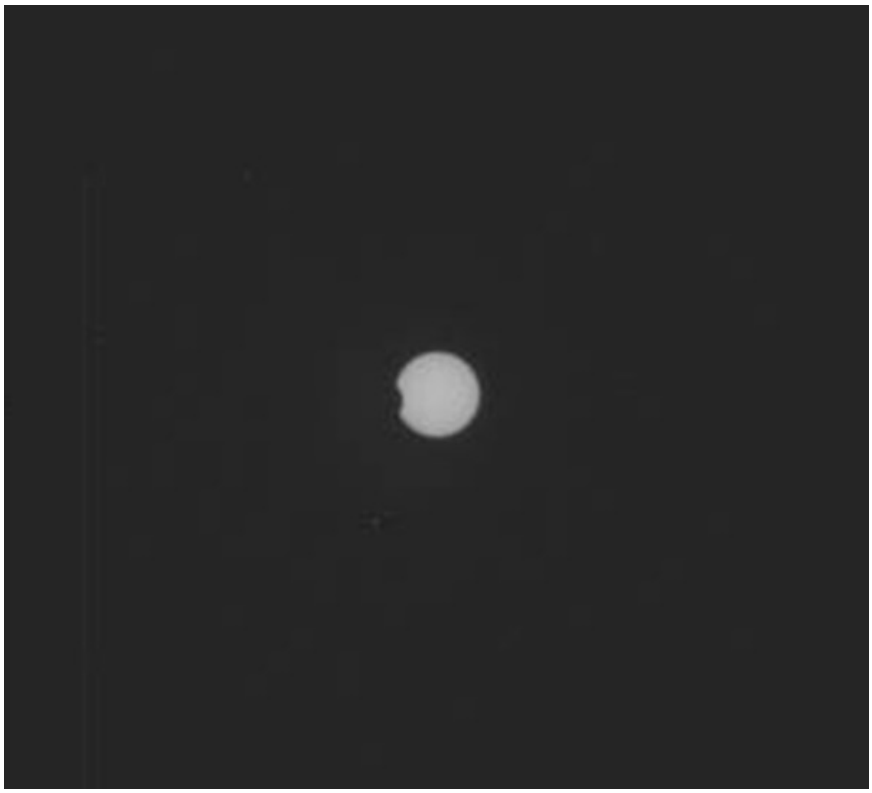
November 10-Starwatch at Eastman Lake

November 17-Public starwatch at Riverpark

December 1-Star party at Eastman Lake, weather permititng

December 15-CVA meeting at Fresno State 7pm

December 21-Winter Solstice, and the world is supposed to come to an end-Not!



A Transit from Mars

Mars Curiosity has not only been taking images of the Martian surface, but every now and then points its cameras towards the sky. On September 13, it caught this image of the moon Phobos starting a transit of the Sun(the moon's shadow is on the left center side of the Sun). Scientists expect to see many more of these Martian transits during Curiosity's lifetime.

Images from NASA/JPL

Quote of the Month-

The moving Moon went up the sky,
And nowhere did abide;
Softly she was going up,
And a star or two beside.
Samuel Taylor Coleridge- *The Rime of the Ancient Mariner*

November 13-New Moon | November 28 Full Moon | December 13 New Moon | December 28 Full Moon

Merry Christmas and Happy New Year to all!

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The Observer is the newsletter of the Central Valley Astronomers of Fresno

To all CVA Members- Remember the December Meeting- Officer elections for 2013, plus Show-and Tell Night Saturday, December 15 at 7pm, Room EE191, Fresno State

The Great Galaxy in Andromeda, M31, one of the many beautiful objects in the Fall sky.

Image from nasa.gov

Johann Heinrich von Madler 1794-1874

Von Madler was born and raised in Germany. At 19, he was orphaned with three younger sisters, and, to help care for them, worked first as a private tutor, then took a job with Wilhelm Beer, a wealthy financier, in 1824.

Beer was himself an avid amateur astronomer, and Madler helped him to set up an observatory, primarily to study Mars. In 1830, the two men produced the first fairly accurate map of the planet, and later that year, determined that Mars' rotational period was 24 hours 20 minutes, off by only 13 seconds. A few years later, they made an even more accurate calculation that was off by only 1.5 seconds.

In 1834, Madler and Beer produced and published the first accurate map of the Moon. Based on this accomplishment, Johann Encke(of Encke Comet fame) offered Madler a position at the Berlin Observatory. He worked there until 1840, when he became director of the Dorpat Observatory in Estonia. At Dorpat, Madler made double stars his specialty; he also made extremely precise calculations concerning proper motion of stars. As well, during his years at Dorpat, he calculated the tropical, or solar, year, with a high degree of precision. This later achievement, although little known, brought him fame and recognition throughout the scientific world.

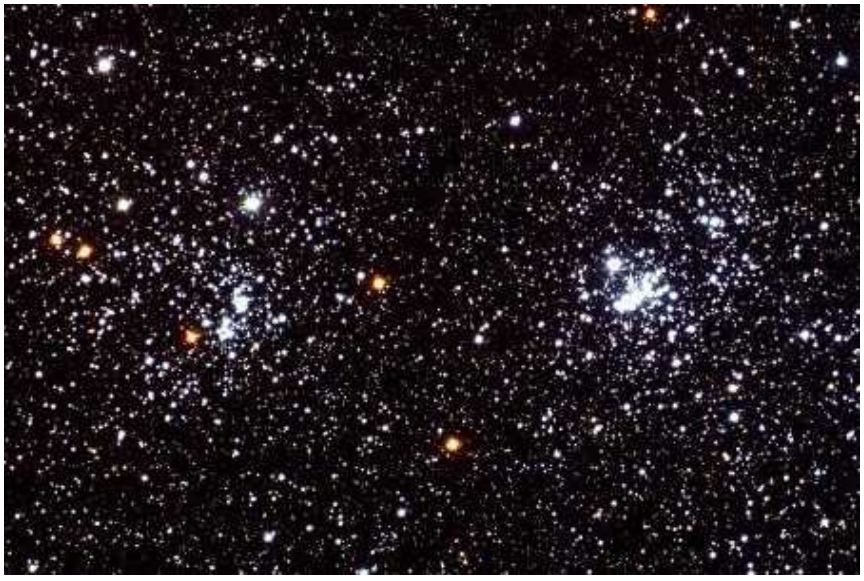
In 1865, Madler retired from the Dorpat Observatory, and moved back to Germany, where he lived quietly until his death. Craters on both the Moon and Mars are named after him.

CVA Telescope Raffle Winner Tries Out Her New Instrument

At the September meeting at Eastman Lake, Alyssa McGee, the winner of the Dobsonian telescope, was officially awarded her prize, and got to try it out. On a beautiful Saturday evening. Along with the telescope, Alyssa and her parents were given membership in CVA. The raffle was held at the public starwatch at RiverPark on August 25; it was very successful all around. Much congratulations to Alyssa and all the others who won prizes that night!

Another one(or two) of the beautiful objects in the Fall skies-the Double Cluster in Perseus-NGC 869 and NGC 884

Image from NOAO/AURA/NSF



This was one of the first objects I saw through a telescope many years ago-and it's always been one of my favorites-the editor

CVA Calendar November-December 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Day of the Dead in Mexico	2	3 CVA Meeting Rm EE 191 Fresno State 7pm
4 Daylight Savings Time ends	5	6 Election Day	7	8	9	10 CVA star party at Eastman Lake
11 Veterans' Day Tycho's supernova observed-1572	12 Voyager 1 flies past Saturn-1980	13 Mariner 9 becomes first spacecraft to orbit Mars-1971 New Moon 	14	15	16	17 CVA Public star party at Riverpark Peak of Leonid Meteor Shower
18	19	20	21	22 Thanksgiving	23	24
25	26	27	28 Full Moon 	29	30	Dec 1 CVA Star party at Eastman Lake-weather permitting
2 Galileo uses his refractor telescope for the first time to view the Moon-1609	3	4	5	6	7	8
9	10	11	12	13 New Moon 	14 Mariner 2-first spacecraft to fly by another planet-Venus-1962	15 Venera 7 lands on Venus-first spacecraft to transmit from the surface of another planet-1970 CVA meeting 7pm EE191 Fresno State
16	17	18	19	20 Carl Sagan dies-1996	21 Winter Solstice-and the world will probably not come to an end	22
23	24 First humans to orbit another planetary body-Apollo 8 orbits the Moon-1968	25 Christmas Day	26 Boxing Day in Canada and England Kwanzaa	27	28 New Moon 	29
30	31 New Year's Eve	Jan 1, 2013 New Year's Day	2	3	4	5

What's New in Space

The Saturn Family of Rockets

Some time ago, I was talking about the moon program with a few CVA colleagues. Discussion got around to the Saturn 5 rocket and how well it worked, especially in comparison to the shuttle rockets, which killed 14 astronauts. I let my anger at NASA get out- "What's wrong with NASA? It threw away the best rocket ever built. Why does it think that it has to reinvent the wheel every time a new program comes along? After all, look at the Russians. They've used the same basic rocket(the R-7) for almost 60 years, and it's just gotten better with time. Why can't NASA get it right?" This outburst led me in trying to find out how and why the Saturn was developed, and why NASA ended up tossing it on the junk heap. This is the first of a multi-part article on the Saturn rockets.

The Saturn rocket and its inevitable record was due to the vision of one man, Wehner Von Braun, an expatriate German who, as a boy, dreamed of going to Mars, shot off his first rocket at age 13, and while Hitler order him to build a rocket that could bomb New York, his real unspoken goal was to perfect one that could take spacecraft to the Moon and Mars. Without him, the Saturn 5 and the entire Moon landing program probably would have never gotten off the ground.

Von Braun and his team of V-2 experts came to the U.S. after World War II, and began designing and building rockets for the Army. Eventually, they settled in Huntsville, Alabama, at the Redstone Army Arsenal, where most of them would stay for the rest of their careers. In the mid 1950s, Von Braun and his team designed and built the Redstone and Jupiter rockets, the latter being used to launch America's first satellite in 1958. They also designed and built several smaller sub-orbital rockets.

As early as 1956. Von Braun was thinking of a "Super Jupiter" rocket that could put large payloads into space, even though there was no real space program at the time. The design would be based on the Jupiter rocket, but would have as many as eight main first stage rocket engines delivering up to 1.5 million pounds of thrust. The Russian Sputnik 1 launch in October 1957 gave a new urgency to their plans, and by late 1958, the design had been finished. It was given the name of Saturn, which was the next planet after Jupiter. When Von Braun's group was transferred to the newly formed NASA in 1959, critics jokingly called it "cluster's last stand." Work on the Saturn began, and the first rocket was ready for launch in 1961.

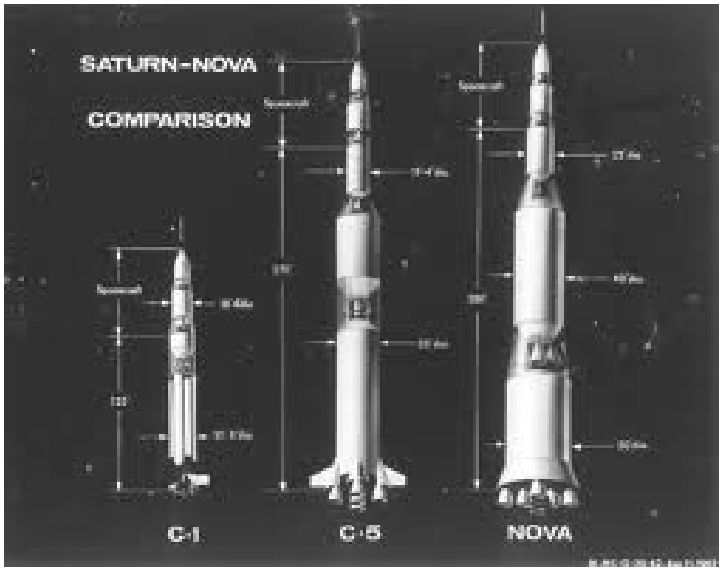
In 1959, NASA, realizing that the newly initiated space race would require an incredibly powerful booster rocket, contracted with North American Aviation to design and build an engine that could generate 1.5 million pounds of thrust on liftoff. This would eventually become known at the F-1 engine, and one of them alone would have as much power as the entire Saturn rocket. This, it was known, would be the engine that would be used to send humans into space, and to the Moon and beyond. The F-1 design was completed by 1961, and building of the engines began.

In the meantime, President John F. Kennedy announced that the U.S., would put a man on the Moon by 1970, and the immediate question was how could it be done, and what kind of rocket would be needed. Initial discussions in NASA pointed to a direct assent scenario-that is, a manned craft would be launched form Earth, fly directly on the moon, and then return without any intervening steps. To accomplish this, NASA would need a huge rocket with as much at 10-12 million pounds of thrust. The initial designs of such a rocket in 1961 would use eight of the F-1 engines in its first stage; it was given the name of Nova, and would be 2-3 times larger than any rocket then in existence. However, its sheer size and complexity assured that it would be horribly expensive, and probably not be ready for manned flights for many years. As one NASA engineer said later, "If we had depended on the Nova, we would have been waiting for twelve to fifteen years."

While Von Braun and his Huntsville group were proceeding with the Saturn, including a successful first launch(as one observer said, "It looked like a real Moon rocket." Right-the first Saturn launch on October 27, 1961.), the debate over how to land men on the Moon went on. At one point, the proposal was made to launch a series of Saturns carrying components for the moon craft, where they could be assembled, and then another Saturn second stage to provide the boost out of Earth orbit to the Moon-what was known as EOR-

-Earth Orbital Rendezvous.. This was eventually discarded as too risky; one failure would doom the whole mission. Finally, in 1962, NASA engineer John Humbolt came up with the idea of LOR-Lunar Orbital Rendezvous. In this, a single large rocket would launch both a manned "Mother" spacecraft, and also a smaller lunar lander. They would be briefly put into Earth orbit, then the same rocket would launch them to the moon. They would enter lunar orbit, separate, and the lander would fly down to the surface. Afterwards, it would blast off from the moon, rendezvous with the mother craft, and then be discarded while the manned craft returned to Earth. The great advantage to this plan was the weight saving; a smaller, less powerful, and presumably less expensive, rocket than the Nova could be used.

Von Braun and his group, which had been involved in the LOR discussions, immediately realized that the rocket for this proposal could easily be a modified larger version of their Saturn. Von Braun originally favored the direct assent method using the Nova, but now switched his loyalties to the LOR proposal. He and his team had already perfected the Saturn, which they now called the Saturn 1, and were building the Saturn 1B, a more powerful version of the same rocket. In late 1962, they started plans for a Moon rocket based on the Saturn design, and by early 1963 had finished them. What they came up with was the Saturn 5(5 for the 5 F-1 engines that would be used in the first stage), a huge three stage rocket that was powerful enough for the proposed LOR missions. The upper stages would use the Saturn 1 upper stages and engines, known as the J-1, which used liquid hydrogen instead of kerosene, a huge savings in weight. They lobbied the proposal to NASA's high command during the spring and summer of 1963, and in the fall, the space agency agreed. It would go with LOR, not direct assent and the Nova, and Von Braun's Saturn 5 would be the rocket that would take America to the Moon.



Right-A comparison of the Saturn 1, the Saturn 5, and the Nova. The Nova was only slightly taller than the Saturn 5, but larger and more powerful, as well as more time consuming to build-and far more expensive. Eventually, the Nova was abandoned, and NASA went with the Saturn 5 as the rocket that would carry astronauts to the moon and back. The Saturn family of rockets would ultimately consist of the 1, the 1B, and the 5.

SS2 Not yet Ready for Manned Flights

On October 20, Richard Branson, the head of Virgin Galactic, said that the first manned operational commercial flight of SS2 would probably not take place until at least the end of 2013, and possibly not until 2014. He cited the delays due to testing and FFA certification, both of which are taking much longer than expected. This is frustrating many of the would-be space travelers, who have been waiting for years for their sub-orbital trips above the Earth. Over 300 people have paid up to $250,000 for a 90 minute ride into space, which includes five minutes of weightlessness at the top of SS2's arc, about 70 miles above the Earth's surface. Branson said that he, too, is frustrated by the delays, but that all new engineering endeavors need time to work through all the bugs, and hopefully things will go much smoother in 2013. Rumors have it that Branson will be one of the passengers for the first commercial flight, along with Dick Rutan, the designer of SS2, and head of the company that built the spacecraft and its mother ship, named WhiteKnight2. Also rumored to be on the manifest list for the first flight is famed physicist Stephan Hawking.

Branson and Virgin Galactic had hoped to have several years' head stgart in the commercial spaceflight business., but the delays mean that by the time SS2 makes its first flight, other commercial craft, such as Sierra-Nevada's Dreamchaser, and Jeff Bezo's Shephard I will also be ready for manned flights.

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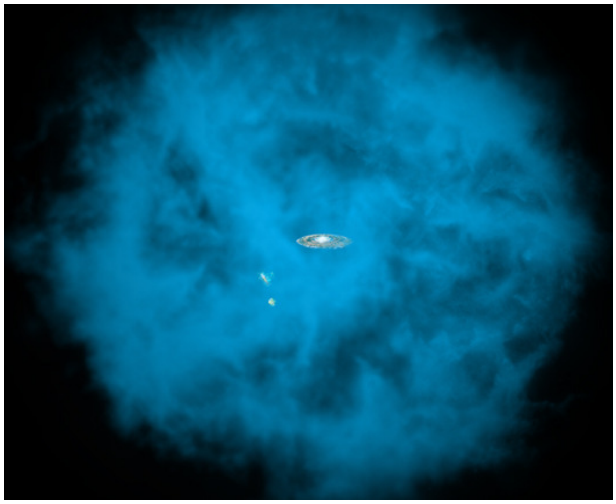
Chandra X-Ray Telescope Reveals that the Milky Way Is Inside a Huge Gas Cloud



Astronomers have used NASA's Chandra X-ray Observatory to find evidence our Milky Way Galaxy is embedded in an enormous halo of hot gas that extends for hundreds of thousands of light years. The estimated mass of the halo is comparable to the mass of all the stars in the galaxy.

If the size and mass of this gas halo is confirmed, it also could be an explanation for what is known as the "missing baryon" problem for the galaxy. Baryons are particles, such as protons and neutrons, that make up more than 99.9 percent of the mass of atoms found in the cosmos. Measurements of extremely distant gas halos and galaxies indicate the baryonic matter present when the universe was only a few billion years old represented about one-sixth the mass and density of the existing unobservable, or dark, matter. In the current epoch, about 10 billion years later, a census of the baryons present in stars and gas in our galaxy and nearby galaxies shows at least half the baryons are unaccounted for.

In a recent study, a team of five astronomers used data from Chandra, the European Space Agency's XMM-Newton space observatory and Japan's Suzaku satellite to set limits on the temperature, extent and mass of the hot gas halo. Chandra observed eight bright X-ray sources located far beyond the galaxy at distances of hundreds of millions of light-years. The data revealed X-rays from these distant sources are absorbed selectively by oxygen ions in the vicinity of the galaxy. The scientists determined the temperature of the absorbing halo is between 1 million and 2.5 million kelvins, or a few hundred times hotter than the surface of the sun.

Other studies have shown that the Milky Way and other galaxies are embedded in warm gas with temperatures between 100,000 and 1 million kelvins. Studies have indicated the presence of a hotter gas with a temperature greater than 1 million kelvins. This new research provides evidence the hot gas halo enveloping the Milky Way is much more massive than the warm gas halo.

"We know the gas is around the galaxy, and we know how hot it is," said Anjali Gupta, lead author of The Astrophysical Journal Letters paper describing the research. "The big question is, how large is the halo, and how massive is it?"

To begin to answer this question, the authors supplemented Chandra data on the amount of absorption produced by the oxygen ions with XMM-Newton and Suzaku data on the X-rays emitted by the gas halo. They concluded that the mass of the gas is equivalent to the mass in more than 10 billion suns, perhaps as large as 60 billion suns.

"Our work shows that, for reasonable values of parameters and with reasonable assumptions, the Chandra observations imply a huge reservoir of hot gas around the Milky Way," said co-author Smita Mathur of Ohio State University in Columbus. "It may extend for a few hundred thousand light-years around the Milky Way or it may extend farther into the surrounding local group of galaxies. Either way, its mass appears to be very large."

The estimated mass depends on factors such as the amount of oxygen relative to hydrogen, which is the dominant element in the gas. Nevertheless, the estimation represents an important step in solving the case of the missing baryons, a mystery that has puzzled astronomers for more than a decade.

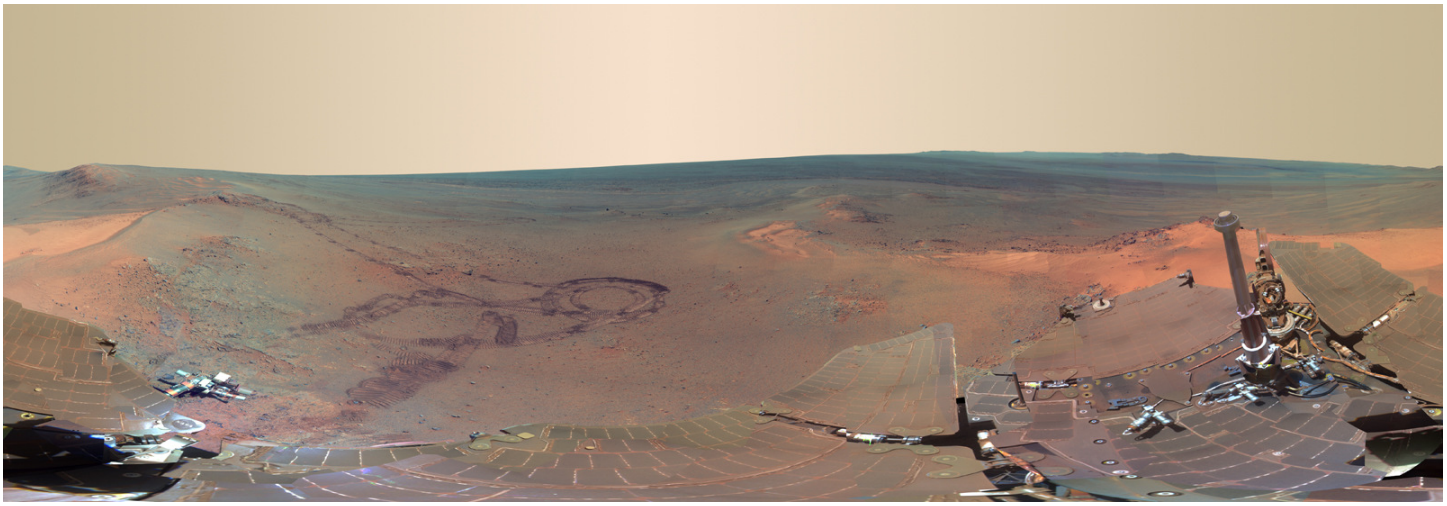
Although there are uncertainties, the work by Gupta and colleagues provides the best evidence yet that the galaxy's missing baryons have been hiding in a halo of million-kelvin gas that envelopes the galaxy. The estimated density of this halo is so low that similar halos around other galaxies would have escaped detection.

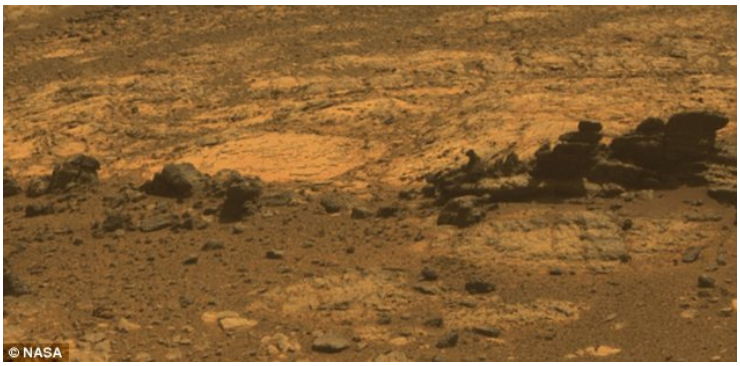
Article and image from nasa.gov

Number of Extra-Solar Planets found as of October 2012-843
How Many More Are Out There?

While Curiosity Makes the Headlines, Opportunity Still Goes Quietly about its Job

Mars Curiosity may be the showhorse these days, but Mars Opportunity is still the workhorse. Opportunity, which has been operational on the Martian surface for eight years and heading into its ninth, continues to crank out one stunning discovery after another, as well as images which have boggled the minds of the scientists and engineers back on Earth. The doughty rover is still in good shape, and engineers now believe that it can continue for the next three to five years, barring any unforeseen breakdowns or other accidents. Below is a series of recent images by Opportunity; it has taken over 173,000 since it landed on Mars and began its mission in 2004. Each one has given humanity a new, and often ethereal, look at the Red Planet.





Above-a composite panorama put together from 825 images, showing parts of the rover, its tracks in the dirt, and the Martian surface and horizon. Taken in September 2012.

Above-a ridge of rock particles which probably eroded from a larger formation. Taken in September 2012

Right-Raw images taken by Opportunity in October 2012

All images from NASA/JPL

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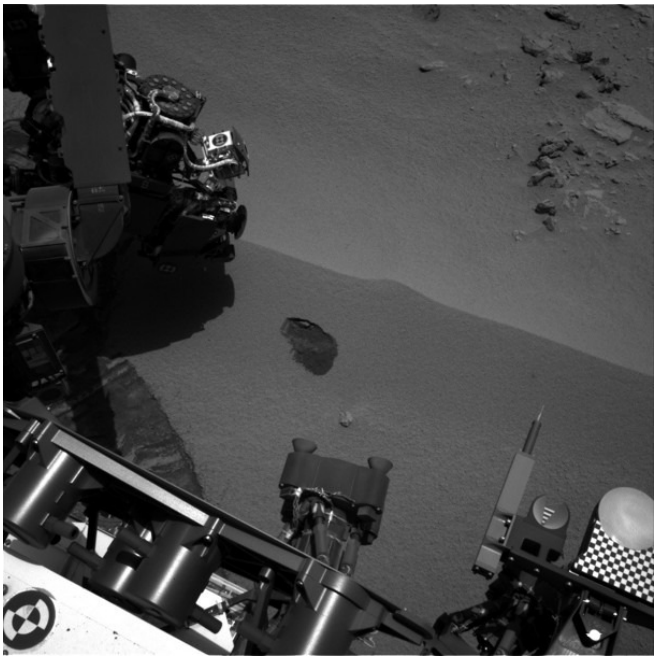
Deadline for articles submission for the January-February 2013 issue

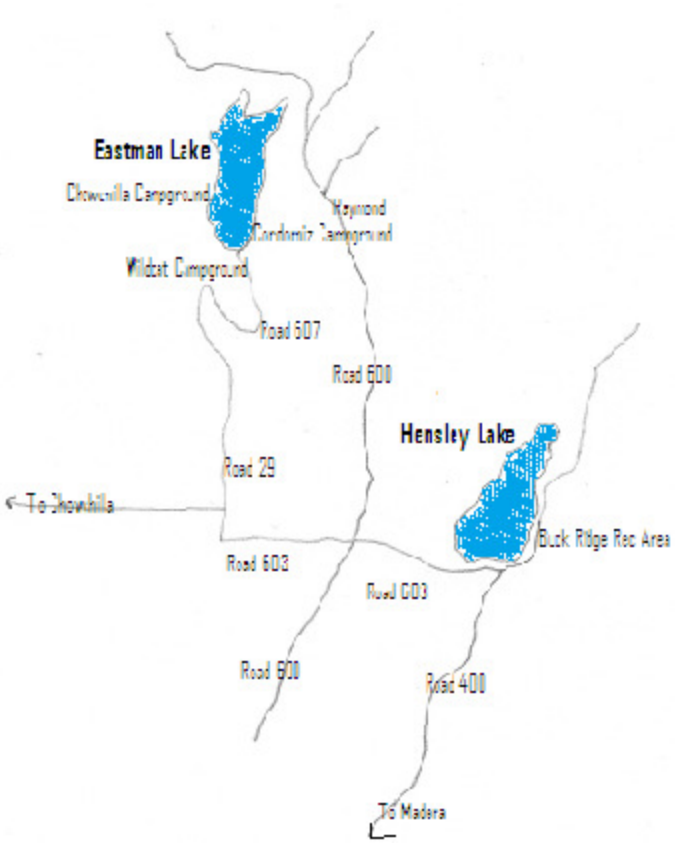
December 20

Please submit articles in Microsoft Word format



Curiosity Goes Digging for Martian Treasure

Mars Curiosity took a scoop of Martian soil as it advances on its way around Gustav Crater. This is the first of many samples it will stop and take, as evidence that Mars once had vast amounts of water. Curiosity has been on the Martian surface over two months now, and scientists are finding surprises every day of its mission. The Curiosity mission is expected to last two (Earth) years, but if the endurance of Mars Spirit and Opportunity are any indication, it may well go on much longer than that.



To Hensley and Eastman Lakes-Star party sites. The Eastman Lake starwatching site is at the boat ramp at the end of Road 29, just past the Cardinez campground.

Newton, Einstein, and Many Others, May Have Been Autistic

As neuroscience and medicine have progressed, Many experts now believe that famous figures in history may have become famous at least partially because they had a form of Autism. Asperger's Syndrome is a type of Autism where the person is intellectually advanced, but shows few or no social skills. Authorities now strongly think that Newton was a prime candidate for Asperger's: he was reclusive, quiet, solitary, and obviously brilliant. They are saying much the same thing about Albert Einstein. Biographers note that he did not mix well with society, barely communicated with his two wives(his second was to his cousin, and was pretty much a marriage of convenience), and was aloof to his children. Autism experts now believe that many other accomplished people may have had Asperger's as well, among them Thomas Jefferson, Ludwig von Beethoven, Wolfgang Mozart, Ernest Hemingway, and more recently, Bill Gates.