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Martian Chronicles

Newsletter of the Museum Astronomical Resource Society
Volume 18, Number 11
November 2002

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UPCOMING EVENTS

NOVEMBER 2002

- Sat. 11/02, SPAC Star Party, from dusk until dawn, at Hickory Hill (possible, call SPAC to confirm)
- Fri. 11/08, 7:30 p.m. - Monthly Meeting at MOSI, Program: Presentation by Frances Ferguson
- Sat. 11/09, evening - MOSI SkyWatch
- Sat. 11/16, evening - MARS SkyWatch at MOSI
- Sat. 11/23, evening - MARS SkyWatch at MOSI
- Sat. 11/30, SPAC Star Party, from dusk until dawn, at Hickory Hill (possible, call SPAC to confirm)

MOSI SkyWatch: Observing sessions are normally held on the Saturday evening nearest the First Quarter Moon and the two Saturday evenings following. SkyWatch sessions are held at MOSI. Call to check on any schedule changes. The Saunders Planetarium: 813-987-6360; MOSI Information Desk: 813-987-6012

DECEMBER 2002

- Sat. 12/07, SPAC Star Party, from dusk until dawn, at Hickory Hill (possible, call SPAC to confirm)
- Fri. 12/13, 7:30 p.m. - Monthly Meeting at MOSI, Annual Holiday Party and Election of Club Officers
- Sat. 12/14, evening - MOSI SkyWatch
- Sat. 12/21, evening - MARS SkyWatch at MOSI
- Sat. 12/28, evening - MARS SkyWatch at MOSI
- Sat. 01/04, SPAC Star Party, from dusk until dawn, at Hickory Hill (possible, call SPAC to confirm)

SPAC Star Parties: Hosted by the St. Petersburg Astronomy Club (SPAC). Held on the Saturday evenings nearest the new moon, at Hickory Hill near Brooksville. For more information call the SPAC hotline: 813-792-0721

FIRST LIGHT

Hello, friends.

Here is your November newsletter. The **On the Record** section in this issue features a list of the duties of the club officers, which will be elected for the 2003 year at the December meeting. I encourage you to read this section carefully and consider how you may contribute to the club in the coming year.

Clear Skies,

Jimmy Thomas

Martian Chronicles, November 2002

page 1

MARTIAN HAPPENINGS

NOVEMBER MEETING

At the November 8 meeting we will be treated to a presentation by Frances Ferguson, who has been preparing material for the last several months. Unfortunately, the subject of this presentation was not available at the time of this writing. However, I am certain from caliber of Frances' previous presentations that we are in for a wonderful time. I encourage you to come out and enjoy this evening with me.

DECEMBER MEETING

At the December 13 meeting we will hold our annual club Christmas potluck party. Please bring your favorite holiday goodie for all to enjoy. If you cannot bring a goodie, please come and enjoy those brought by others. We will also hold our annual club elections. For more on the elections, read the On the Record section in this newsletter. In addition, we will also enjoy a show of our choosing in MOSI's Saunders Planetarium. I hope to see you at the meeting/party/elections.

NOVEMBER SKYWATCH DATES

The SkyWatch dates for November are the evenings of November 9, 16 and 23. MOSI and MARS will participate on the evening of November 9 and MARS will host the SkyWatch events on November 16 and 23. A volunteer sign-up sheet for these dates will be passed around at the November 8 meeting. To avoid public disappointment, MARS-only SkyWatch dates will be cancelled if the sign-up sheet does not indicate support on those nights by at least two volunteers and at least one telescope.

DECEMBER SKYWATCH DATES

The SkyWatch dates for December are the evenings of December 14, 21 and 28. MOSI and MARS will participate on the evening of December 14 and MARS will host the SkyWatch events on December 21 and 28. To avoid public disappointment, MARS-only SkyWatch dates will be cancelled if the sign-up sheet does not indicate support on those nights by at least two volunteers and at least one telescope.

WHAT PRESENTATIONS DO YOU WANT TO SEE?

Do you have a particular astronomical topic that you would like to learn more about? Get studying! We need presentations for our monthly meetings and our best ones come from enthusiastic and knowledgeable members. Why not start right now? Decide on a topic, schedule yourself for a particular month, and then get to work. You can do it. And we all will benefit.

ON THE RECORD by Jimmy Thomas, President

MARS will hold elections for the various club duties at the December meeting. The club has never stood on formality, so in typical M.A.R.S. fashion, the responsibilities are emphasized over the title. Two people may share a duty, but they must coordinate their actions in order to fulfill the responsibilities of the duty to which they are elected. One person may perform more than one duty, but no one should try to burden themselves with too many tasks. The persons elected will be expected to perform their duties from January through December of the coming year. The responsibilities are as follows:

Running the Meetings and Coordinating the other Responsibilities (President) - This person makes sure that each meeting runs smoothly and stays on track most of the time. This person also works with the other officers in the performance of their duties.

Scheduling Club Programs (Vice President) - This person schedules programs for the monthly meetings and arranges speakers on the various program subjects. This person presides over the monthly meetings if the president is not available.

Treasurer - This person collects the money given to the club and controls the distribution of these funds for club expenses such as the newsletter, the club telescope, the club library, and other items. The club has no bank account, so special provisions are made to secure the funds. The specifics of these provisions will be discussed with the individual elected. In addition to their role as treasurer, this person presides over the monthly meetings, or designates someone to preside, if the president and vice president are not available.

Recording the Minutes (Secretary) - This person writes down the events of each meeting and presents them, either electronically or in printed form, to the newsletter editor for publication in the next club newsletter. In this way the membership may review and discuss them. These minutes not only provide continuity to the meeting. They are required by MOSI, our club sponsor, to track the activity of the club.

Acquiring New Members - At public events this person is not tied to a telescope, but rather is free to circulate. They answer questions about the club and channel back information on those wishing to subscribe to the newsletter or join the club. This is a very low-tech job, great for technophobes.

Organizing Outside Activities - This is the person who can answer the question, "What does your club offer?" The Saturday evening SkyWatch sessions and the dates of the Hickory Hill star parties fall into this person's bailiwick, but there is much more. This person researches and generates club interest in events such as meteor showers, lunar and solar eclipses, comet passings (and crashes), the annual Astronomy Day, and other similar events. Once enough members are committed to support a particular event, this person must then coordinate with MOSI to get permission for and allow scheduling of the event on MOSI property. This person may also designate other club members to coordinate a specific club event. M.A.R.S. Events may be held away from MOSI property as long as they do not conflict with a similar event being held simultaneously by MOSI. After all, they are our sponsor and deserve and expect our support.

Astronomy Day Chairperson - This person coordinates the annual Astronomy Day activities. They encourage club participation and work with MOSI to requisition the necessary materials. Astronomy Day will be Saturday, May 10 this coming year.

Editing and Distributing the Newsletter - This person or persons publish the newsletters and mail them to the members.

Club Librarian - This person controls the borrowing of library material and designates someone to perform this duty in their place if they are not able to attend a club meeting.

Again, the voting will be held at the December meeting. All paying members have a vote. If you cannot attend, be sure to contact a current officer and make your wishes known. Remember that this is your club. The more put into it, the more you get out of it. Please consider how you can help M.A.R.S. to grow in the coming year.

CONSTELLATION OF THE MONTH by Craig MacDougal

Cassiopeia

Ah! We are now into the cool days of November. Well, it's cool by Florida standards. Astronomically speaking, lots of good things happen in November. First of all, as the cold (or cool) fronts come through, the humidity drops. This greatly improves the transparency of the air. Obviously that means that we can see dimmer objects, but that also means that the light pollution is diminished since there are less particles to reflect all those photons that leak out of street lights back into our faces. Consequently, the fall and winter skies can look impressive even from the heart of the "BIG CITY". The second nice thing that becomes apparent in November is that the days are getting shorter, and the nights longer. Those of you that like to go to the beach probably don't like that as much, but remember I'm speaking astronomically at the moment. More night means more observing time before we have to go to bed. Or, for you real die-hards out there, more observing time before sunrise. A related nice thing that happens (and my personal favorite): Daylight Savings Time goes away! Since astronomical events are usually listed in Universal Time (Greenwich Mean Time, or Zulu Time), my limited brain capacity has trouble remembering the conversion (whether we are in EDT or EST.) So I said all that to say this: This month go out at 9:00 (instead of 9:30) and face north. A little more than half way up the sky, and a bit to the right (east) You will see five stars that form an "M". As you can see from the illustration, it looks sort of like a football lineman fell on it a couple of times. This is **CASSIOPEIA**, (kas-ee-o-PEE-e) the queen. These five stars represent the queen sitting on her throne, fussing with her hair. It's a relatively big constellation; You can just cover it up with your outstretched hand (fingers together). Cassiopeia is a very good constellation to know. Because it's close to the north celestial pole, it's above the horizon a lot, just like the Big Dipper (Ursa Major). Furthermore, it's opposite the Big Dipper across the pole. That means that one or the other is visible at all times (and sometimes both). You can use these constellations as starting points for learning all the other patterns in the sky. If you enjoy the mythology that's associated with the constellations, then Cassiopeia is a particularly good starting point because all the players in her story are visible in the sky at the same time. She's a queen, right? Her husband, Cepheus is right beside her to the west. It seems her vanity upset the sea-gods, so the sea-gods sent a sea-monster (Cetus, about half way up in the south east) to be a pest. To appease the monster, the king and queen chained their daughter (Andromeda, just a little east of straight up) to a rock on the coast. (Nice people, eh?) Our hero Perseus (on the other side of Cassiopeia from Cepheus) comes to the rescue riding the winged horse Pegasus (straight up, beside Andromeda). So get out there and find Cassiopeia, and you will be opening a vast and ancient book written with the stars in the sky.

METEOR SHOWERS by James M. Thomas

Northern Taurids

This is one of two showers visible in the fall and winter that originate from the constellation Taurus. Both of these showers appear to be caused by Periodic Comet Encke. The other shower is called the Southern Taurid shower. The Northern Taurid meteors are visible from October 15 through December 1 with the peak on November 1. The shower has a moderate rate of 5 per hour. The coordinate for the radiant of the Northern Taurid shower is RA 03hrs 44min, +22°.

Southern Taurids

This is one of two showers visible in the fall and winter that originate from the constellation Taurus. Both of these showers appear to be caused by Periodic Comet Encke. The other shower is called the Northern Taurid shower. The Southern Taurid meteors are visible from September 15 through December 15 with the peak on November 3. The average rate ranges from 5 to 15 per hour. The coordinate for the radiant of the Southern Taurid shower is RA 03hrs 44min, +14°.

Leonids

Meteors from this shower may be visible from Nov. 15 through Nov. 20 with the peak on Nov. 19. Leonid meteors have a bluish-green tint. This shower is caused by Periodic Comet Tempel-Tuttle. This comet returns to the inner solar system every 32.9 years. This shower is sometimes a veritable storm of meteors in the years surrounding the comet's return. This last occurred in 1966, when up to 40 meteors per second were seen for about an hour! Comet Tempel-Tuttle's return in 1999 has observers hopeful for another storm. The best chances to see a storm are in the early morning hours during the days surrounding the peak (Nov. 18, 19, 20). The meteors will appear to originate from a point in the constellation of Leo (RA 10 hrs 08 min, Dec +22°).

Observing Meteors

Meteors are best viewed from a dark-sky location. Observers in for the duration of the evening, or at least for several hours, should bring along a few things: a sleeping bag or blankets for warmth, a recliner or lawn chair, a hot beverage to help cut the chill, and binoculars to view the smoke trails of just-past meteors.

November 2, 1917 – The 100-inch Telescope on Mount Wilson saw “First Light.”

November 2, 1957 – The Soviet satellite Sputnik 2 was launched into Earth orbit with the dog Laika.

November 3, 1973 - Mariner 10 was launched on its fly-by mission to Venus and Mercury. Mariner 10 passed Venus on February 5, 1974, and passed Mercury on March 29. This mission marked the first time that the gravity of one planet (Venus) was used to propel a spacecraft toward another (Mercury).

November 5, 1601 - A storm of Leonid meteors was observed. One observer reported that the "stars became like rain." The storm occurred 465 days after the passing of parent comet P/Tempel-Tuttle.

November 7, 1967 – The U.S. lander Surveyor 6 was launched toward the Moon.

November 7, 1996 - The Mars Global Surveyor spacecraft was launched toward the planet Mars. It entered orbit of the Red Planet on September 11, 1997 and began a 2-year mapping survey of the entire Martian surface. Included in its achievements were the discovery of magnetism on the planet and observations of the Martian moon Phobos.

November 8, 1968 - The spacecraft Pioneer 10 was launched into a solar orbit. It performed six experiments and transmitted data on the Sun's radiation.

November 8, 1982 – The space rock later named the Wethersfield Meteorite fell through the roof of a house.

November 8, 1984 - The Space Shuttle *Discovery* was launched (STS-51-A) with astronauts Frederick Hauck, David M. Walker, Dr. Anna L. Fisher, Joseph Allen, and Dale Gardner. The crew performed the first satellite retrieval, repair and re-deploy mission. The returned safely to Earth on November 16.

November 9, 1967 – The U.S. mission Apollo 4 was launched into Earth orbit, the first launch of a Saturn V rocket.

November 10, 1970 - The Soviet spacecraft Luna 17 was launched toward the Moon. It soft-landed on the Sea of Rains on November 17. On this mission Lunokhod 1 was used, marking the first use of a self-propelled robotic vehicle. The mission transmitted television photos of the surface, performed lunar soil analysis, as well as other experiments.

November 11, 1572 – Astronomer Tycho Brahe discovered a supernova, known as Supernova 1572.

November 11, 1966 - A Titan rocket launched the Gemini 12 spacecraft with astronauts James A. Lovell and Edwin W. "Buzz" Aldrin Jr. This was the final Gemini mission, which included a 5-1/2-hour EVA (extravehicular activity, or spacewalk). The flight last 94 hours 34 minutes. The crew returned safely to earth on November 15.

November 11, 1982 - The Space Shuttle *Columbia* was launched (STS-5) with astronauts Vance Brand, Robert Overmyer, William Lenoir, and Joseph Allen. This was the first four-person crew to fly in space. The crew returned safely to Earth on November 16.

November 12, 1799 - A strong Leonid meteor storm was seen across the western hemisphere. German scientist Friedrich Heinrich Alexander von Humboldt (1769-1859) and his companion Bonpland were in Venezuela at the time at made note of the event. The actual hourly meteor rate of the shower is not known.

November 12, 1981 - The Space Shuttle *Columbia* was launched (STS-2) with astronauts John H. Engle and Richard H. Truly. This was the second flight of *Columbia*, making it the first reuse of a space shuttle. This was also the first shuttle mission with a scientific payload. The crew returned safely to Earth on November 14.

November 12, 1995 - The Space Shuttle *Atlantis* was launched (STS-75) with astronauts Kenneth D. Cameron, James D. Halsell Jr., Chris Hadfield, Jerry L. Ross, and William S. McArthur Jr. The crew performed the second docking of a Space Shuttle with the Russian space station *Mir* on November 15. They connected a 15-foot, Russian-made, permanent docking tunnel to *Mir* for use on future Space Shuttle missions. They also brought two new solar-powered panels for *Mir* as well as supplies and scientific equipment. The U.S. and Russian astronauts spent three days together aboard *Mir* conducting experiments. *Atlantis* un-docked from *Mir* on November 18 and returned to Earth on November 20.

November 12-13, 1833 - North America witnessed a great Leonid meteor storm, though it was not yet known by that name. One observer from the U.S. reported that the "stars descended like snow." Witnesses later recalled 1833 to their families as "the year the stars fell." The meteors fell at an approximate rate of 100,000 per hour. This event initiated the first serious study of meteor showers. Immediately after the shower, Professors Olmsted and Twining of then Yale College called attention to the fact that the meteors all radiated from the same point in the sky, indicating that they were all part of a swarm moving in the same orbital path. Later, Professor Hubert Anson Newton (1830-1896), also of Yale College, calculated that the orbit had a period of 33 years and used records to trace appearances of the shower as far back as AD 902. He then successfully predicted the appearance of the 1866 Leonid shower. (The 1833 Leonid storm occurred 308 days after the passing of parent comet P/Tempel-Tuttle.)

There is historical evidence that Abraham Lincoln (1809-1865) witnessed the Leonid meteor storm of 1833 as a young man of 24. According to cross-referenced records and personal journals, Lincoln was apparently in New Salem, Illinois staying at the Rutledge Tavern, a log cabin then owned by Henry Onstot, a cooper by trade (bucket and barrel maker) and member of the Cumberland Presbyterian Church. Lincoln recounted the story in the presence of American writer Walt Whitman (1819-1892) who was a frequent guest of the Lincoln White House. Whitman later published the story in his book *Specimen Days & Collect*, published 1882. When asked by another White House guest whether the Union would survive the ongoing Civil War, Whitman noted that Lincoln, ever the story-teller, replied with this story. *"When I was a young man in Illinois," said he, "I boarded for a time with a Deacon of the Presbyterian church. One night I was roused from my sleep by a rap at the door, & I heard the Deacon's voice exclaiming 'Arise, Abraham, the day of judgement has come!' I sprang from my bed & rushed to the window, and saw the stars falling in great showers! But looking back of them in the heavens I saw all the grand old constellations with which I was so well acquainted, fixed and true in their places. Gentlemen, the world did not come to an end then, nor will the Union now."*

November 13, 1867 - A storm of Leonid meteors was observed. The maximum took place over North America with a bright Moon in the sky. Meteors fell at an approximate rate of 3,600 per hour. The storm occurred 664 days after the passing of parent comet P/Temple-Tuttle.

November 13, 1868 - A storm of Leonid meteors was observed. Meteors fell at an approximate rate of 1,500 per hour. The storm occurred 1,030 days after the passing of parent comet P/Temple-Tuttle.

November 13, 1978 - the U.S. satellite HEAO 2 was launched into Earth orbit. HEAO 2 examined selected X-ray astronomical sources in detail with the largest X-ray telescope ever made.

November 14, 1866 - A storm of Leonid meteors was observed. The maximum took place over Europe around 1:10 UT. Meteors fell at an approximate rate of 5,000 per hour. The storm was notable in that H. A. Newton of then Yale College predicted that the Leonid storm would occur this year based upon orbital calculations and occurrences of storms in previous years. (The 1866 Leonid storm occurred 299 days after the passing of parent comet P/Temple-Tuttle.)

November 14, 1969 - A Saturn V rocket launched Apollo 12 mission with astronauts Charles "Pete" Conrad Jr., Richard F. Gordon Jr. and Alan L. Bean. Conrad and Bean made the second manned moon landing on November 18. During their stay they performed 15 hours 30 minutes of extravehicular activity (or moonwalks) which included examination of the Surveyor 3 spacecraft, which was within walking distance of their landing site, 183 meters (600 feet). They collected 74.7 pounds of lunar samples and stayed on the surface for a total of 31 hours 31 minutes. The crew returned safely to Earth on November 24.

November 15, 1940 - An Andromedid meteor shower was observed with meteors falling at the rate of about 30 per hour. This was one of the last years in which Andromedid meteors were observed in any strength.

November 16, 1492 - A meteorite weighing about 260 pounds fell at Ensisheim in Alsace about noon. It buried itself to a depth of 5 feet. The impact was witnessed by a child.

November 16, 1973 - A Saturn 1B rocket launched Skylab 4, the final mission of the Skylab program. Astronauts Gerald P. Carr, Edward G. Gibson and William Pogue spent nearly three months in space aboard the Skylab space station. The crew obtained medical data on themselves for use in extending the duration of human space flight. The crew performed four EVAs (or spacewalks) for a total of 44 hours 40 minutes. This marked the longest space mission to date, for 84 days, 1 hour, 16 minutes. They returned safely to Earth, with a splashdown in the Pacific Ocean, on February 8, 1974.

November 17, 1865 - A Leonid meteor shower was seen with many colorful fireballs. This shower was the prelude to the great meteor storm the following year.

November 17, 1966 - The peak of the annual Leonid meteor shower became a meteor storm that was best observed by the western U.S. and eastern Siberia. It was estimated that over 150,000 meteors were observed per hour, averaging approximately 41 meteors per second. During one 40-minute period, over 1,000 meteors per minute were observed. The average magnitude of the trails was 1.5 or 2. Some of the brighter meteor trails lasted for more than a minute. The storm occurred 561 days after the passing of parent comet P/Temple-Tuttle.

November 17-18, 1997 - A Leonid meteor storm was observed. The meteor rate was estimated over 100 per hour. The storm occurred 108 days after the passing of parent comet P/Temple-Tuttle.

November 17, 1998 - A Leonid meteor shower was observed with many colorful fireballs, peaking at a rate of over 450 fireballs per hour around 5:00 UT. The observed colors included violet, red, blue, and green. The "regular" meteors peaked, later, around 17:00 UT, at a rate of 150 per hour. The shower began over Europe and finished over North America. It was suggested that this Leonid shower, like the one in 1865, was prelude to a Leonid storm the following year. The storm occurred 257 days after the passing of parent comet P/Temple-Tuttle.

November 19, 1996 - The Space Shuttle *Columbia* was launched (STS-80) with astronauts Kenneth D. Cockrell, Kent V. Rominger, Tamara E. Jernigan, Thomas D. Jones, and Dr. F. Story Musgrave. This was the longest-duration shuttle flight to date and Musgrave, at age 61, was the oldest astronaut in space to date and the first to fly on all five space shuttles. Two free-flying science satellites were deployed and later retrieved during the mission -- an ultraviolet telescope and the Wake Shield (semiconductor processing) Facility. A jammed airlock hatch canceled two scheduled EVAs (or spacewalks). The crew returned safely to Earth on December 7.

November 19, 1998 - The Space Shuttle *Columbia* was launched with astronauts Kevin R. Kregel, Steven W. Lindsey, Takao Doi (of Japan), Winston E. Scott, Kalpana Chawla, and Leonid K. Kadenyuk (of the Ukraine). On November 21 the crew deployed the Spartan Martian Chronicles, November 2002

solar-observation satellite. Following its malfunction, it was retrieved during an EVA (or spacewalk) on November 24. A second EVA was performed on December 3 to test space station assembly tools and techniques. Astronauts Doi and Scott marked up a total EVA time of 12 hours, 44 minutes. The crew returned safely to Earth on December 5.

November 23, 1892 - A fairly strong Andromedid meteor shower was observed.

November 24, 1899 - An Andromedid meteor shower was observed with meteors falling at a rate of 200 per hour.

November 26, 1985 - The Space Shuttle *Atlantis* was launched (STS-61-B) with astronauts Brewster Shaw Jr., Bryan D. O'Connor, Sherwood C. Spring, Mary L. Cleave, Jerry L. Ross, C. Walker, and Rodolfo Neri (of Mexico). Neri became the first Mexican in space. The crew performed tests in assembling space structures. The crew returned safely to Earth on December 3.

November 27, 1886 - An iron meteorite fell near Mazapil in northern Mexico. Because the meteorite fell on the maximum date of the Andromedid meteor shower, it was suggested that the meteor was a fragment from Periodic Comet Biela, the parent comet of the Andromedid shower.

November 27, 1872 - A storm of Andromedid meteors fell over western Europe. It was recorded that the meteors fell at the rate of several thousand per hour. The peak of the shower had actually been calculated by Weiss, D'Arrest and Galle for November 28.

November 27, 1885 - An Andromedid meteor storm fell over Europe. The meteors appeared to fall at the rate of 75,000 per hour, though counting was virtually impossible.

November 27, 1886 - A shower of Andromedid meteors fell. On this same day an iron meteorite fell near Mazapil in northern Mexico. It was suggested that the meteorite was a fragment from the Andromedid shower, and therefore a fragment of Periodic Comet Biela, the parent comet of the shower.

November 28, 1964 - An Atlas-Agena rocket launched the U.S. spacecraft Mariner 4 on its fly-by mission of the planet Mars. Mariner 4 passed behind Mars on July 14, 1965. Its closest approach to the surface was 9,846 kilometers (6,118 miles). Mariner 4 transmitted back 22 television pictures of the surface. The results of its occultation experiment (the study of its transmissions it passed behind Mars and then out again) showed there was an extremely thin Martian atmosphere (5-10 millibars) of carbon dioxide. Mariner 4's images revealed the Martian surface to be extensively cratered.

November 28, 1983 - The Space Shuttle *Columbia* was launched (STS-9) with astronauts John W. Young, Brewster Shaw Jr., Robert Parker, Owen K. Garriott, Byron Lichtenberg, and Ulf Merbold. This was the first six-person crew to fly in space. This was also the first Spacelab mission of the space shuttle program. The crew returned safely to Earth on December 8.

November 30, 1953 - A meteorite crashed through the living room ceiling of Mrs. Hewlett Hodges of Sylocuga, Alabama. Mrs. Hodges received a grazing blow on the hip, but was not seriously injured. A revealing photograph of the bruise was circulated in the newspapers.

PUBLICATION INFORMATION

Martian Chronicles is published monthly by the Museum Astronomical Resource Society (also known as the MARS Astronomy Club) to provide club news and other items of interest to its members. MARS is sponsored by the Museum of Science and Industry (MOSI), Tampa, Florida. Annual club membership dues are \$15.00, which may be paid to any officer at club-sponsored events or mailed to the **CLUB MEMBERSHIP/RENEWAL ADDRESS** listed below. Make checks payable to Jerry Scalzo, our club treasurer. Newsletters are available to nonmembers by requesting a complimentary trial issue. Please send all inquiries, comments and newsletter contributions to the address below. The deadline for submitted contributions is the 15th of the month prior to the next issue. Contributions may be delayed in publication due to available space.

NEWSLETTER EDITION DETAILS

Martian Chronicles, November 2002, Vol. 18, No. 11
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