



## Crepuscular Rays at Bryce Canyon - Jane Houston Jones

A few weeks ago Mojo and I toured some of our great Western National Parks and Forests and participated in their public star parties. To us, there is nothing better than when sidewalk astronomy collides with National Park dark skies. Here is a view we saw as we were setting up our telescopes on the last night of the Bryce Canyon National Park Astronomy Festival. Crepuscular Rays!

Crepuscular rays are rays of sunlight that appear to radiate from a single point in the sky. These rays, which stream through gaps in clouds, are diverging columns of sunlit air separated by darker cloud-shadowed regions. Dust, small aerosols and moisture droplets scatter light to make the sun's rays visible and cloud and moun-

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### Upcoming Star Parties

<b>Club Party</b>	<b>Jul 7</b>	<b>Dillingham</b>
<b>Public Party</b>	<b>Jul 14</b>	<b>Dillingham</b>
<b>Public Party</b>	<b>Jul 21</b>	<b>Kahala/Waikele</b>
<b>Club Party</b>	<b>Aug 11</b>	<b>Dillingham</b>
<b>Public Party</b>	<b>Aug 4</b>	<b>Dillingham</b>
<b>Public Party</b>	<b>Aug 18</b>	<b>Kahala/Waikele</b>
<b>Club Party</b>	<b>Sep 8</b>	<b>Dillingham</b>

### Upcoming Events:

- The next meeting is at 7:30 p.m. on **Tuesday, July 3<sup>rd</sup>** at the Bishop Museum.
- Bishop Museum's next planetarium show with **Barry Peckham** is Friday, **July 6<sup>th</sup>** at 7:00 pm.

## President's Message

I was on the Big Island recently, so I decided to try to find Vesta. It was reported that this asteroid would be visible without optical aid in late May and early June, getting as bright as magnitude 5.4. It had passed that point by the time I started looking for it, but I decided to test my eyesight and the sky conditions. Alas, I didn't even have binoculars with me, and I failed to spot Vesta, but I did enjoy the hunt.

I had a star chart and knew where to look for it between the brighter stars of Ophiuchus and Scorpius. I didn't know that part of the sky well enough to notice a 5th magnitude intruder like Vesta without consulting a chart, so I made several trips in and out of the house over a couple of nights learning the patterns of the less prominent stars in the area.

I don't know if it was my old eyes, the fact that I didn't spend enough time to get truly dark adapted, or if the atmosphere wasn't the best it gets, but the faintest star I'm sure I saw was magnitude 4.9. Vesta was 5.4 at its brightest, so would probably have been just out of my reach anyway.

When I returned to Oahu, I checked the area again with binoculars. I found a point of light that didn't show up on my charts, and a few days later it seemed to have moved, so I think my hunt was ultimately successful.

Whether or not I found what I was looking for, the search itself was a reward. I spent some time looking intently at a part of the sky that I didn't know well, and now I know it better. So much of astronomy is like that. We go looking for something in the sky and run into lots of other interesting things on the way. The journey is never-ending, for the journey itself is the destination. So go out and find something you weren't looking for.

Chris

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**Planets Close To the Moon**

Times are Hawaii Standard Time

**Other Events of Interest**

Times are Hawaii Standard Time

- July 3, 11h, M 1.2° SSE of Neptune (140° from sun in morning sky)
- July 5, 09h, M 1.7° NNW of Uranus (115° from sun in morning sky)
- July 9, 01h, M 5.9° NNW of Mars (66° from sun in morning sky)
- July 12, 18h, M 8.6° N of Mercury (18° from sun in morning sky)
- July 16, 13h, M 0.18° SE of Saturn (30° from sun in evening sky)
- July 17, 02h, M 2.4° NNE of Venus (37° from sun in evening sky)
- July 25, 06h, M 5.7° S of Jupiter (128° from sun in evening sky)
- July 30, 16h, M 1.2° SSE of Neptune (167° from sun in morning sky)

- June 30, 22h, Venus 0.66° SSW of Venus (43° from sun in evening sky)  
(Closest planet-planet appulse this year)
- July 2, Noon, Midpoint of the year
- July 6, 14h, Earth at Aphelion  
(Farthest from sun, 1.01671 au)
- July 14, 02:04h, Moon New
- July 17, 07h, Venus Brightest – Magnitude -4.5
- July 20, 05h, Mercury at greatest elongation  
(20.3° west of the sun in morning sky)
- July 29, 14:49h, Moon Full

**Planets in July**

<p> <b>Mercury</b> has a good morning apparition in July – look for it a few days before and after July 18.</p>	<p> <b>Venus</b> reaches greatest brightness on July 14 (Mag -4.5), but during the month it quickly falls toward the sun</p>	<p> <b>Mars</b> rises about 1:00 am at magnitude +0.6.</p>
<p> <b>Jupiter</b> is very well placed for evening viewing in July, shining brightly in the SE after sunset.</p>	<p> <b>Saturn</b> low in the evening sky, with a close approach to Venus the last day of June and the first day of July.</p>	<p> <b>Uranus</b> rises about midnight. Can be viewed between Neptune and Mars in the predawn sky.</p>
<p> <b>Neptune</b> rises before midnight and can be viewed in the early morning hours.</p>	<p> Dwarf Planet <b>Pluto</b> was at opposition last month so will well placed for viewing in the late evening.</p>	<p> Dwarf Planet <b>Ceres</b> can be viewed in the predawn hours near Mars. At magnitude 8.1 it should be fairly easy to find. Ephemeris on the Internet.</p>

President Chris Peterson called the June 5, 2007 meeting of the Hawaiian Astronomical Society to order at 7:35 p.m. The meeting was held at the Atherton Halau of the Bishop Museum. In attendance were thirty-three members and two visitors.

As the planet Mercury is at opposition today, the general membership adjourned to the great lawn of the Bishop Museum to view it. Members also view the planet Jupiter (also at opposition), and the Southern Cross. This month is a favorable planetary viewing month, with Mercury, Venus, Saturn, and Jupiter in the night sky.

Hawaii Space Lecture Series- Chris Peterson informed the members that there will be no lecture of The Hawaii Space Lecture Series for the month of June. The Hawaii Space Lecture Series will resume in July during "Space Week", at the NASA Pacific Regional Planetary Data Center, room 544 of the POST Bldg, at the University of Hawaii. University of Hawaii planetary scientist Jeff Taylor will be the featured lecturer at that time. For further information you can go to <http://www.higp.hawaii.edu/prpdc>.

International Sidewalk Astronomy Night- John Gallagher showed the night sky to his neighbors by setting up his 10" Dobsonian for solar viewing at Geiger Park in Ewa.

Chris reported on the American Astronomical Society Conference beginning Sunday, May 27th, at the Hawaii Convention Center. "The Astro-Zone Honolulu," a public event kicks off the 5-day conference. We did not have a table set up during the public event.

**Passing** – Former member, Mary Miller, passed away recently. Mary's father was Louis Miller who was an active member with the Bishop Museum Planetarium and Observatory.

**Farewell** – Steve Huffman, former At-Large HAS Board member, spoke briefly, saying that after much reflection, he and Becky have decided to move to Oregon. We all wish Steve and Becky a fond farewell.

**Star Party Report** – Forrest Luke reported that we have no school star parties scheduled during the summer months.

**Newcomers** – Chris Peterson welcomed our guests Wilfred Wong and Michael Jobber.

**Night Sky Network** – Night Sky coordinator, John Gallagher thanked those members who had been at the May General Membership meeting. Their input contributed to the review and testing of the "Searching for Life in the Solar System" Toolkit from NASA. Our evaluation report has been sent off to the Planetary Society of the Pacific that coordinates the development and testing of teaching materials.

**Guest Speaker** – Dr. David Blewett, scientist with "Novosol", a Honolulu Tech firm and contributing scientist on the European Space Agency's "Messenger Mission" to Mercury gave a presentation on the mission. Dr. Blewett enumerated the characteristics of the smallest planet of the solar system; it's 88-day orbital period, 59 "Earth" day rotational rate, axial tilt, density, and known composition. He spoke about Mercury's weak magnetic field and how that may indicate the composition of its core.

*(Continued on page 5)*

The Mars robotic rovers, Spirit and Opportunity, are equipped with RATs, or Rock Abrasion Tools. Their purpose is to abrade the surface patina off the Mars rocks so that the alpha x-ray spectrometer can analyze the minerals inside the rocks, rather than just on the surface.

But future robotic missions to Mars will be asked to go even further below the surface. Scrapers and corers will gather rock samples of substantial size, that, in order to be analyzed by a spectrometer, will need to be crushed into a fine powder.

lower jaw), rocks are crushed between the two plates. The jaw opening is larger toward the top and smaller towards the bottom. So when larger rocks are crushed near the top, the pieces fall down into the narrower part of the jaw, where they are crushed again. This process repeats until the rock particles are small enough to fall through a slit where the two plates are closest.

Engineers have tested the Mars Rock Crusher with Earth rocks similar to those expected to be found on Mars. One kind of rock is hematite. The



Crushing rocks on Mars? Now there's a problem that brings to mind a multitude of possible approaches: Whack them with a large hammer? Squeeze them until they explode? How about just chewing them up? It was with this latter metaphor that the planetary instrument engineers struck pay dirt—so to speak.

Thanks to NASA's Planetary Instrument Definition and Development Program, a small group of NASA engineers came up with the Mars Rock Crusher. Only six inches tall, it can chew the hardest rocks into a powder.

The Mars Rock Crusher has two metal plates that work sort of like our jaws. One plate stays still, while the other plate moves. Rocks are dropped into the jaw between the two plates. As one plate moves in and out (like a

rusty iron in hematite and other rocks help give Mars its nickname "The Red Planet." Another kind of rock is magnetite, so-called because it is magnetic. Rocks made by volcanoes are called basalts. Some of the volcanoes on Mars may have produced basalts with a lot of a mineral called olivine. We call those olivine basalts, and the Rock Crusher chews them up nicely too.

Visit [www.jpl.nasa.gov/](http://www.jpl.nasa.gov/) technology to read the latest about other NASA technologies for exploring other planets and improving life on this one.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

**Bryce** (Continued from page 1)  
tain shadowed air dark by comparison. Various airborne compounds like smoke particles scatter the sunlight and make these rays visible. The rea-

Although the Sun's rays strike the Earth almost parallel to one another, we see them appear to come from a point because of perspective - at a distance, parallel lines seem to con-



son we see the light so defined is because of diffraction, reflection and scattering.

Crepuscular rays are near-parallel, but appear to diverge because of linear perspective. They often occur when objects such as mountain peaks or clouds partially shadow the sun's rays like a cloud cover.

**Minutes** (Continued from page 4)

Dr. Blewett discussed the different ways in which earthbound scientists have studied Mercury, and how the “Messenger Mission” to Mars will use new technologies to further our knowledge of the planet closest to the

verge, like railway lines disappearing over the horizon.

We also saw the anticrepuscular beams in the East. These rays appear to converge towards the antisolar point - the point in the sky directly opposite the sun. But I was so taken with the view of the moon and Venus in the crepuscular rays that I forgot to take that other picture!

Sun. Dr. Blewett also spoke briefly about the two “Messenger” flybys in January and October of 2008.

Respectfully Submitted,  
Gretchen West

**HAS Financial Report as of June 15, 2007**

Initial Balance: .....	\$5,243.47
Receipts:	
Donations .....	45.00
Dues Received.....	191.00
Magazine Payments.....	99.90
Telescope Fee .....	20.00
Total Income:.....	<b>\$375.90</b>
Expenses:	
Astronews.....	112.87
Magazine Subscriptions.....	134.95
Refreshments .....	7.69
Postage .....	2.79
Error Correction .....	.48
Total Expenses: .....	<b>\$234.45</b>
Ending Balance: .....	<b>\$5,383.96</b>

This month nine new members joined the club. They are **Gregory, Rowena, Orion, Carina** and **Magellan McCartney; Mark Slovak; Andrew Leskowitz** along with **Melinda** and **Adelina Manaut**. The club tips its collective hat to the Pearl Harbor Elementary School; **Mark Slovak** and **Lenore Hansen-Stafford** for their donations. Thanks those renewing. Clear skies to all!

Meteor Log—July 2007

by Mike Morrow

July is full of very minor shower, but is a bit spiced up by early Perseid activity. Moonlight messes up the minor showers late in the month. Sporadic rates are improving.

Friday the 13th, **July Phoenicids**. Radiant 02h08m -43 deg.  
 Rates run from 1 to about 6 an hour. This is mainly a southern hemisphere shower but we have seen some from Hawaii. The Moon is new and makes this year very favorable. The radiant is just south of the bright star Achernar (alpha Eridani). On occasion rates have been higher than 6 or so an hour.

Saturday the 28th, **Southern Delta Aquarids**. Radiant 22h36m -16deg.  
 This shower may reach about 15 meteor an hour. The Moon will be very bad for this shower.

If you are interested in observing meteors contact Tom Giguere on Oahu at 672-6677 or write to: Mike Morrow, P.O. Box 6692, Ocean View, Hawaii 96737

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HAS members Barry Peckham and Mojo & Jane Hous-  
ton Jones with John Dobson at the Bryce Canyon  
Astronomy Festival (these t-shirts sure look familiar).