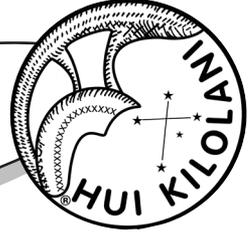


The Astronews



Volume 61, Issue 12

December 2013

www.hawastsoc.org

Holiday Potluck Update



Planning to attend the Club Holiday Potluck and looking for ideas? Here's an overview of what we need:

So far we have,

- 1 - chicken dish
- 1 - lasagna
- 1 - casserole
- 1 - crab salad
- 1 - pasta salad
- 1 - veggie platter
- 1 - sweet potato dish
- 1 - fried rish dish

****AND LOTS OF DESSERT!****

See you then!



Editor

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Upcoming Events:

- ☆The next meeting is 7:30PM on **Tues., Dec 3** at the Bishop Museum.
- ☆Bishop Museum's next evening planetarium shows are every Saturday of the month at 8:00 p.m.
www.bishopmuseum.org/calendar
- ☆The next Board Meeting is **Sun., Dec 1** at 3:30 p.m. at the POST building at UH.



Notices:



**NSN
News**

DID YOU KNOW? Members of the Night Sky Network (NSN) can get more information on events posted to the Calendar published in the ASTRONEWS by clicking on the event when signed in to the NSN. This applies to “private” events such as school star parties and teleconferences. You do not need to be signed to check “public” events.

Clear Nights,
John G.



THE PACIFIC AVIATION MUSEUM IS LOOKING FOR VOLUNTEERS FOR THEIR ANNUAL PUBLIC EVENT.

[As of this date, HAS is not certain whether the Club will participate with a booth, but if you are interested please volunteer individually.]

Discover Your Future in Aviation is now in its 5th year! Scheduled for Saturday, March 29, 2014 from 10am to 4pm, this exciting day of fun and learning introduces young people to the possibilities in aviation. Come share your experience and expertise with young people in our community. Individuals and organizations involved in aviation ---past and present--- are invited to participate. There is no cost for exhibitors. (General volunteers are also needed.) As the date gets closer, I will send you more information on how to reserve your space at this event.

If you are interested in more information about participating or volunteering at any of the events at the Museum, please contact me by email april.emerson@pacificaviationmuseum.org or by phone (757) 615-3143.

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The **Astronews** is a monthly newsletter of the Hawaiian Astronomical Society. Some of the contents may be copyrighted. We request that authors and artists be given credit for their work. Contributions are welcome. Send them to the Editor via email. The deadline is the 16th of each month. We are not responsible for unsolicited artwork.

At a recent star party, someone asked me what the most interesting thing was that I'd ever viewed through my telescope. After a few moments of consideration, I settled on Jupiter just after the impact of the fragment of Comet Shoemaker-Levy 9 in 1994 that was best timed for observing in Hawaii. I remember that before the impacts, observers were advised to study Jupiter carefully for weeks ahead of the impact so that they might be able to recognize the subtle changes that the impacts might produce. As it turned out, someone looking through a telescope for the first time might have said, "What's that big bull's-eye on Jupiter?" The concentric dark and light circles were that obvious.

One reason I like observing planets is because some of them show changes from time to time. I doubt that I'll ever see another sight like that, though. What view do you remember best?

At the same star party, someone asked, "Why do we refer to something in the sky as the Milky Way if we're in the Milky Way galaxy? How can we see it 'out there' if we're inside it?" I usually use a Frisbee analogy to explain that, describing our position in the Frisbee and explaining the different results of looking parallel and perpendicularly to the disk. The explanation didn't seem to be getting through, though.

After I left (isn't that always the way!) I thought of another analogy that might work better. A Frisbee, after all, is solid, not much like the real Milky Way. Something with many particles might be better to use in an analogy. A straight stretch of highway works.

Imagine that you're driving in the fast lane. Ahead of you and behind you are a large number of individual cars, merging in the distance into an indistinguishable mass of taillights or headlights. If you look to the right or left, however, you see only a few cars. To make the analogy three dimensional, think of where H-1 is directly above Nimitz Highway or Wai'ale'ale Avenue. Then imagine that there are many more levels and that they're transparent. Now you have a dense band of cars above, below, in front, and in back of you and only a few to the right and left. You're in the traffic, but you see the traffic. Do you have a better analogy?

Chris



Star Party Report

by Sue Girard

Dillingham Public Star Party - Nov. 23, 2013

Our November Pubic Star Party started out on a good note with breezy trade winds promising to blow away the few clouds that were in the sky. Quite a few members showed up early and about 15 or so visitors came as well. Venus was the show case after the Sun set and the sky cleared nicely. We took folks on our usual sky tours and, since many were first timers, they were very thrilled with the views through the various scopes. There were a number of satellites visible and unfortunately, we missed a nice bright iridium flare in the southern sky due to a few clouds. We also noticed quite a few meteors including one that was rather bright.

As the evening progressed, the clouds got more numerous and started to blot out most of the sky. The Milky Way wasn't very bright even when the sky was clear, so observing conditions weren't the best. About half of our members and most of the visitors left at 8:30pm, but the rest of us stayed to see if conditions would improve. We ended up leaving at 10:30pm.

Sue



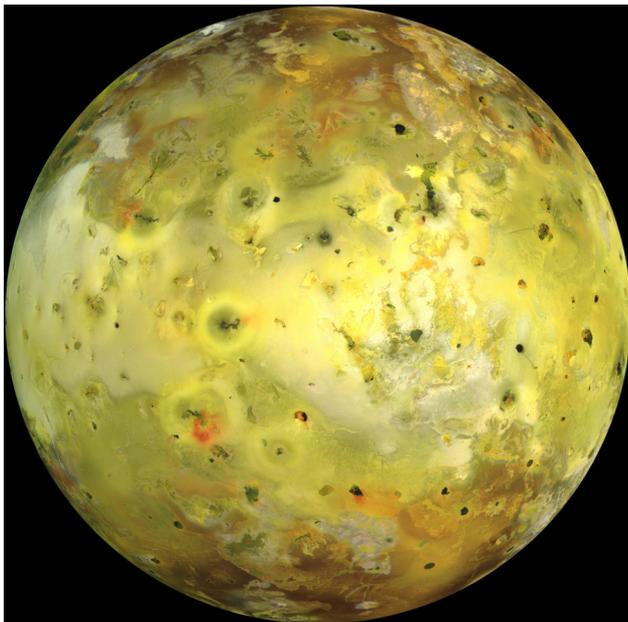
The most volcanically active place is out-of-this-world!

By Dr. Ethan Siegel

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,

(Continued on page 9)



Io might seem like an unlikely place to find volcanoes. Yet when Voyager 1 visited this tiny moon of Jupiter, it found hundreds of volcanic calderas and an active eruption reaching 300 kilometers into space!

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

The Phoenicids (PHO), which has a radiant south of the constellation Cetus, is an unusual shower. Clearly, the zenith hourly rate is low but comments mention that it has reached 100. That was back in 1956 so it's unlikely that we'll have an outburst this year. This shower is thought to be periodic, but a predicted return in 2011 failed to materialize. What intrigues me about this shower is the very low velocity of the individual shower members. At 18 km/sec, the meteors are as slow as any shower during the year.

This year we have a problem viewing the Geminids (GEM) due to the bright Moon. The peak falls on the 14th, but the full moon falls just three days later. Although this is one of the best showers of the year it will be difficult to see any but the brightest meteors.

MOON PHASES

New Moon *First Quarter* *Full Moon* *Last Quarter*
Dec 3 **Dec 9** **Dec 17** **Dec 25**

Shower	Activity	Max Date	λ 2000	Radiant α	δ	V_{∞} km/s	<i>r</i>	ZHR
Phoenicides (PHO)	11/28 - 12/09	Dec 06	254.25°	18°	- 53°	18	2.8	Var
Puppis/Velides (PUP)	12/01 - 12/15	(Dec 7)	(255°)	123°	- 45°	40	2.9	10
Monocerotids (MON)	11/27 - 12/17	Dec 09	257°	100°	+08°	42	3.0	2
α -Hydrids (HYD)	12/03 - 12/15	Dec 12	260°	127°	+02°	58	3.0	3
Geminds (GEM)	12/04 - 12/17	Dec 14	262.2°	112°	+33°	35	2.6	120
Coma Berebicides (COM)	12/12 - 12/23	De 16	264°	175°	+18°	65	3.0	3
Dec. Leonis Minorids (DLM)	12/05 - 02/04	Dec 19	268°	161°	+30°	64	3.0	5
Ursids (URS)	12/17 - 12/26	Dec 22	270.7°	217°	+76°	33	3.0	10

Good luck with the meteors and don't forget to check out Comet Ison!
Tom Giguere, 808-782-1408, Thomas.giguere@yahoo.com
Mike Morrow, PO Box 6692, Ocean View, HI 96737

Planets Close To the Moon

Times are Hawaii Standard Time

- Dec 1, 13h, M 0.53° NE of Mercury**
(15° from sun in morning sky)
- Dec 5, 12h, M 7.5° N of Venus**
(40° from sun in evening sky)
- Dec 8, 05h, M 5.4° NNW of Neptune**
(76° from sun in evening sky)
- Dec 10, 18h, M 3.3° NNW of Uranus**
(109° from sun in evening sky)
- Dec 18, 18h, M 5.0° SSW of Jupiter**
(150° from sun in morning sky)
- Dec 25, 14h, M 4.4° SSW of Mars**
(85° from sun in morning sky)
- Dec 28, 14h, M 0.98° SSW of Saturn**
(47° from sun in morning sky)

Other Events of Interest

Times are Hawaii Standard Time

- Dec 2, 14:21h, Moon new**
- Dec 9, 16h, Venus brightest**
(Magnitude -4.7)
- Dec 13, Geminid meteors**
(Unfavorable year for this major shower)
- Dec 16, 23:28h, Moon full**
- Dec 21, 07:11h, Winter Solstice**
(18° from the sun in morning sky)
- Dec 26, 12h, Comet Ison closest to earth**
(Distance = 0.426 a.u.)
- Dec 28, 20h, Mercury at superior conj. with sun** (Passes into evening sky)

 Mercury Mercury is visible in the morning twilight early in December	 Venus Shines brightly in the west after sunset. Reaches maximum brightness on Dec 9.	 Mars Mars rises after midnight and is brightening rapidly, reaching mag. 0.8 by month's end..
 Jupiter Jupiter is approaching opposition early next month and is in the sky most of the night.	 Saturn Saturn is visible in the morning sky in the pre-dawn hours.	 Uranus Uranus is near the meridian at sunset and can be observed during the evening.
 Neptune Neptune can be viewed in the southwest in the early evening hours..	 Dwarf Planet Pluto Too close to the sun for easy viewing in December.	 Comet Ison Low in the evening twilight during the first 2 weeks of Dec. then rises rapidly in the pre-dawn morning sky late in the month. Brightness is unpredictable.

GREENWICH

There are many historical sites in England, and we visited many of them on a trip in September 2012. Some of the most impressive for these HAS members were not surprisingly related to astronomy.

Starting in London, we took the train to nearby Greenwich Park overlooking the Thames. Our objective was to visit the Royal Observatory, home of the Prime Meridian and origin of Greenwich Mean Time. Crowd barriers from the recently held Olympic Games had caused obstructions in the normal park walkways, so it was a challenge to find our way from the entrance of the park near the impressive edifices of the Royal Naval College uphill to the Observatory.

After a good mile hike on a busy street just outside the park border we finally found our way to the Observatory grounds. Had we started earlier in the day, we might have caught a show at the curiously shaped Peter Harrison Planetarium, but it had already closed. Further down the path was the John Flamsteed House, a large building topped with a conspicuous dome with a red ball perched on what resembles a weather vane. The ball is still dropped daily at 1PM, used in the past to synchronize chronometers on the ships in the harbor. Approaching the building, a couple of outdoor exhibits caught our eyes. A small manicured garden had what at first appearance to be a drinking well, but with peculiarly short walls.

This turned out to be Flamsteed's "observing well", built to accommodate his underground 100-foot telescope. The walls of the well were a replica, and the hole in the ground no longer existed, but close by was another important relic: a section from Herschel's giant 40-foot telescope, at its time a wonder of the world. That telescope came from Herschel's home in Slough (rhymes with "now") but neither the great telescope nor his home there remain.

At the end of the garden was the entrance to the Flamsteed House and the Meridian Courtyard. People were queuing to pay the \$12 entrance fee with a 45-minute wait to have the opportunity to stand on the Prime Meridian (0-degrees Longitude) represented by a metal strip running through the brick courtyard. Straddling the strip, they could pose to have their photo snapped with one foot in the Eastern Hemisphere and one in the Western Hemisphere. We passed up the chance and instead took a few photos from outside the courtyard gates. The fee also allowed admission to the "Time and Longitude" gallery where Harrison's famous seafaring timepieces are displayed, including the winner of the Longitude Prize, his "H4" clock.

WILLIAM HERSCHEL'S HOME AT BATH

Our next stop was the quaint city of Bath, built over the ancient Roman hot springs, and also famous as the home of author Jane Austen. We were lucky to find lodging, as we had inadvertently arrived the day before the start of the Jane Austen Festival weekend. We spent a few hours underground in the fascinating Roman baths museum.

Above ground, we admired the flower-filled arcades and the honey-colored limestone Georgian architecture. Just a few blocks from the Roman baths was William Herschel's residence, now preserved as the "Herschel Museum of Astronomy." Set amongst a row of townhomes, not the elegant side of town in its day, for Herschel had come to Bath as a musician. The main and upper floors of the house display his domestic life as a composer, performer and music teacher. But it was here in Bath that he cultivated his avocation in amateur astronomy, and earned fame as the discoverer of Uranus.

(Continued on page 9)

Hawaiian Astronomical Society

Event Calendar

List View		Past Events		< December 2013 >		Upcoming Events		Add/Log Event	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
1		2 7:30 PM Club Meeting	3 	4	5	6 5:20 PM Public Star Party(G) 5:20 PM Public Star Party(K) Sunset: 5:51 PM	7		
8	9 	10	11	12	13	14 Sunset: 5:53 PM	15	16	17
15	16	17 	18	19	20	21 5:35 PM Public Star Party(D) Sunset: 5:56 PM	22	23	24
22	23	24	25 Christmas Day	26	27	28 5:20 PM Club Star Party (D) Sunset: 6:00 PM	29	30	31
			1	2	3	4			

<<Upcoming Star Parties>>

- Kahala/Ewa Party Dec 07**
- Public Party-Dillingham Dec 21 (Girard)**
- Club Only-Dillingham Dec 28 (Galloway)**

.....



Upcoming School Star Parties



**No School Star Parties until 2014
Happy Holidays!**



(Space Place continued from page 4)

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>. ☆

.....
(Astrotourism continued from page 7)

He brought his sister Caroline from Germany to assist him in his daily housekeeping, but she eventually became his primary assistant with his observations. William had to make his telescopes himself, and turned parts of the basement into his workshop. The workshop is well-preserved, and holds much of his mirror-making equipment, including the forge for his "specula" (an alloy of copper and tin) mirrors.

Caroline recorded in her diary a near-disaster from a spill in the forge: "Both my brothers and the caster and his men were obliged to run out of opposite doors, for the stone flooring flew about in all directions as high as the ceiling." The cracks in the flagstone flooring were underfoot as we browsed past his forge, workbench with mirror-grinding machinery which William invented, and long wooden angular measurement tools.

A plaque in the garden up from the basement commemorates where he discovered Uranus in 1781. A replica of the handsome wooden-cased F14 seven-foot long reflecting telescope he used to make the discovery sits in the museum admission room. Downstairs, a small theater showed a video about the Herschels, and a display case held several books by former Hawaii resident Stephen O'Meara. His book "Herschel 400 Observing Guide" acknowledged the contributions of Caroline Herschel in discovering and cataloguing numerous nebulae and clusters. The brother and sister catalogued over 2500 objects in their lifetimes.

STONEHENGE

After visiting the impressive Gothic Cathedral in Salisbury, we headed out on the back roads using our GPS but mostly following the many tour buses to one of the must-see attractions in England: Stonehenge. The area surrounding Stonehenge is

Treasurer's Report

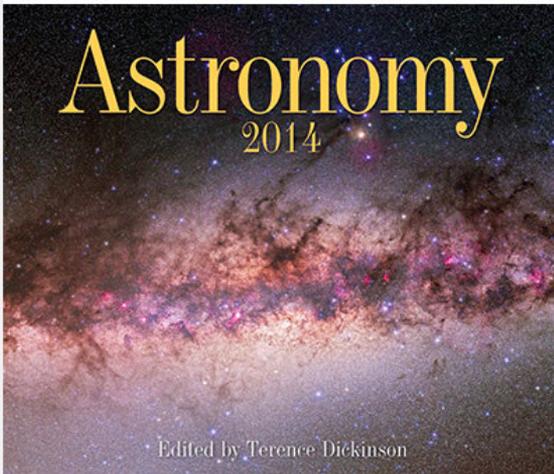
by April Lew

HAS Financial Report for the month ending as of Nov. 15, 2013

Initial Balance:	\$3,980.22
<i>Receipts:</i>	
Calendars	19.50
Dues Received	232.00
Donations	35.00
Magazine Payments	100.95
Total Income:	\$387.45
<i>Expenses:</i>	
Astronews	59.03
Annual Fee	3.50
S&T Sub	32.95
Total Expenses:	\$95.48
Final Balance	\$4272.19

Welcome new members *David and Janice de la Vega* and renewing members *Nancy Ali and the Brown Family (Jeff, Rebecca, Caden and Gavin)*.

Please note: Board Member *April Lew* has taken over the secretarial duties from outgoing Board Secretary *Jim MacDonald*. Mahalo Jim, for your dedicated service to the Hawaiian Astronomical Society over the years!



**ASTRONOMY
CALENDARS
PICKUP**



Those of you who ordered 2014 astronomical calendars can pick up your orders from *April Lew* at this month's meeting

(Astrotourism continued from page 9)

still relatively empty of visual intrusions. The parking area is on the other side of the highway but fortunately before we clumsily attempted to cross four lanes of traffic we spotted the underground tunnel leading to the ticket gate.

We experienced the first raindrops of our trip here, but the gray skies gave the monument more of an imposing character. Passing through the entrance turnstiles you are given an audio device that is programmed to various numbered stops along the circular route surrounding the complex. With only a rudimentary understanding about the ruins, we took the time to listen at each signpost and realized how much more there was to take in. First off, the “henge” is not a stone structure but an earthen ditch/mound. So the first structure that was made for the complex around 3150 B.C. was simply a circular ring of earth, and much of this has nearly eroded away. Concentric circular structures were then built inside each other over the ensuing 1500 years. There were white circles painted on the ground marking the 56 “Aubrey Circle” postholes thought to contain a wooden platform. Inside of this, around 2600 B.C. the “Sarsen Circle” was erected. Sarsen is a sandstone harder than granite, and each of the thirty 50-ton upright stones was quarried and transported from a site 20 miles to the north!

The stones had to be carefully erected to compensate for the fact that the site was not level. An inner circle of trilithons (a shaped group of two uprights and top piece) originally consisted of “bluestones” thought to be brought in all the way from Wales, 135 miles distant. Most of the bluestones were later replaced with sarsens.

Friendly guides along the way in their waterproof clothing were more than patient in answering our questions and pointing out things that we would not have otherwise noticed. Julie was one of these, and she showed us where some of the stones had been repaired of damage caused by hundreds of years of visitors and guides chipping off chunks for souvenirs. She also had us notice graffiti carved in the stones dating from the Roman Empire.

Mortise and tenon joints that hold the top crosspiece lintels to the upright stones were easier to see in the toppled stones and were features we hadn’t imagined from the pictures we had in our minds of a much simpler construction. She also showed us lichen that covered some of the stones of a type only found at two locations in the world: Stonehenge and Greenland. We had heard that the pathways had been moved quite far from the stones, but at some points we felt quite close up to them so were not disappointed in the views.

Near the end of the circuit tour, the famous “Heel Stone” aligns the monument with a processional avenue which could be seen to extend far into the distance. Scholars believe that marking the Winter solstice was more important to the ancient peoples than the Summer solstice. Modern times though find throngs of revelers, sometimes twenty thousand or more, gathering to view the first Summer sunrise from the site. We were happy to be there on a day less crowded.

Joanne had to restrain herself at the gift shop, but did manage to pick up a few fridge magnets and a small but quite informative book entitled “Stonehenge: Temple of Ancient Britain” by Robin Heath [Wooden Books Ltd.], which I used for much of the history stated in this article.

FAQs about our visit to Stonehenge:

- 1) Did we feel any weird vibes? Answer: No
- 2) Was there a powerful aura? Answer: Yes, but only because it felt like we reached back through the ages to connect with other Astrogeeks from five thousand years ago.

John (and Joanne)



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This new view of Comet C/2012 S1 (ISON) was taken with the TRAPPIST national telescope at ESO's La Silla Observatory on the morning of Nov. 15, 2013. The robotic telescope is operated from a control room in Liège, Belgium.

Credit: TRAPPIST/E. Jehin/ESO

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