



John Gallagher - Creating Club & Community Value

.As I am sure you all know, the IAU will be holding its annual meeting this year here in Hawai'i. (<http://astronomy2015.org/>). Although it is not open to the general public, it is great to know that Hawai'i is a world class center for research in astronomy. Many of the faculty at the IFA have provided the club with very stimulating and often highly entertaining talks. I am sure that I speak for most all club members that we owe them a great debt of gratitude. Our club president, Chris Peterson, is on the faculty at UH Manoa as an astronomy professor. His generosity in helping to make the club work together as well as his contributions of great knowledge at club meetings is appreciated by all who have attended the club meetings.

Gretchen West mentions in her minutes that John Gallagher will be stepping down as the school star party coordinator. The value of a club is measured by how much we can share our time and talents. John has been absolutely superlative in that respect. Please consider stepping up to this opportunity to keep HAS as excellent as the larger astronomy community here in Hawai'i!

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Upcoming Events:

- The next meeting is on Tuesday, Aug. 4th at the Bishop Museum 7:30 PM.
- Bishop Museum's planetarium shows are every Saturday of the month at 8:00 PM www.bishopmuseum.org/calendar
- The next Board meeting is Sun., Aug. 2 at 3:30 PM in POST building at UH.

President's Message August 2015

Success! New Horizons safely flew past Pluto on July 14th and is in the long process of sending back all the data it collected. Compressed versions will be sent over the next few months, but then the data will be sent again uncompressed. The whole process will take 16 months.

The images that have been returned so far have matched the greatest expectations for what we would see. Pluto and Charon are dynamic worlds with varied landscapes and some relatively recent, perhaps even ongoing, geologic activity. There are mountain ranges several thousand feet high and large expanses of terrain with no visible craters on Pluto. Charon has a deep canyon with a large mound in it.

What forces are responsible for these features? My guess is that part of the answer involves a dynamic similar to that which is responsible for the volcanoes on Io and the subsurface ocean on Europa. The outer Galilean satellites of Jupiter pull the inner ones out of their circular orbits and cause libration to occur. Jupiter's intense gravity squeezes these moons, and that generates enough heat to melt sulfur on Io and keep Europa's ocean liquid.

Pluto and Charon's orbits around their common center of gravity may be eccentric enough that they generate internal heat in each other in a similar way. With only a 6 1/2 – day orbit, there would be frequent pulses of heat introduced. It wouldn't take much from each orbit to add up to a significant amount. I suspect someone is doing the calculations right now, or will when the shape of the orbits is determined precisely enough.

Of course, there may be some other reason entirely. This is exactly why we explore. We always find surprises when we visit a new place, and the data provide

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Hawaiian Astronomical Society
P.O. Box 17671
Honolulu, Hawaii 96817

President

Chris Peterson

956-3131

chrisp@higp.hawaii.edu

Vice President

Peter Besenbruch

peter@besenbruch.info

Secretary

Gretchen West

282-1892

gwest002@hawaii.rr.com

Treasurer

April Lew

734-2705

stardustlounge@hotmail.com

Board Members-at-Large

Otis A. Wikman

otisann49@gmail.com

Andy Strobe

The **Astronews Editor**

Charles Rykken

astronewseditor@gmail.com

HAS Webmasters

Peter Besenbruch

peter@besenbruch.info

Harry Zisko

harryz@pobox.com

School Star Party Coordinator

John Gallagher

gallaghej002@hawaii.rr.com

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Planets Close To the Moon

Times are Hawaii Standard Time

Aug 2 04h, M 2.8° NNW of Neptune
(150° from sun in morning sky)
Aug 4, 23h, M 0.98° SSE of Uranus
(112° from sun in morning sky)
Aug 12, 17h, M 5.5° S of Mars
(17° from sun in morning sky)
Aug 16, 03h, M 1.9° SSW of Mercury
(21° from sun in evening sky)
Aug 22, 09h, M 2.6° NNE of Saturn
(89° from sun in evening sky)
Aug 29 13h, M 2.8° NNW of Neptune
(177° from sun in midnight sky)

Venus and Jupiter are closer than 15° from the sun when near the moon in August.

Other Events of Interest

Times are Hawaii Standard Time

Aug 6, 20h, Mercury 0.96° NNE of Jupiter
(15° from sun in evening sky)
Aug 12, Perseid Meteors - Favorable
Aug 14, 04:53h, New Moon
Aug 15, 09, Venus at inferior conj. with sun
(Passes into morning sky)
Aug 26, 12h, Jupiter at conjunction with sun
(Passes into morning sky)
Aug 29, 08:35h, Full Moon

Planets in August

Mercury ♿ can be seen in the evening dusk all month, but it is a poor apparition for northern observers. View it very close to Jupiter on Aug 6.	Venus ♀ passes in front of the sun on Aug 15, so is too close to the sun for viewing this month	Mars ♂ is still too close to the sun to be easily observed in Aug.
Jupiter ♃ reaches conjunction with sun on Aug 26. Look for it very close to Mercury in the evening dusk on Aug 6.	Saturn ♄ is near the meridian at sunset and can be viewed in the evening sky.	Uranus ♅ is in the eastern sky before dawn. Will be better placed for viewing later in the year.
Neptune ♆ rises before midnight and is visible in the morning sky.	1-Ceres (Dwarf Planet) ♁ reached opposition in June at magnitude +7.2, so is visible in the evening.	2-Pallas (Asteroid) ♁ Also reached opposition in June at magnitude +9.4, so may still be viewed in the evening sky.

President Chris Peterson called the July 7, 2015 meeting of the Hawaiian Astronomical Society to order at 7:36 p.m. The meeting was held in Planetarium, on the grounds of the Bishop Museum, Honolulu, Hawaii. There were twenty-six members and five visitors in attendance.

Notes- The New Horizons Mission to Pluto was the first topic under discussion at this month's meeting. Despite a temporary shutdown communications were finally reestablished. Although some images were lost during the down time, later images more than made up for it. Chris provided members with the latest images from NASA. Features on Pluto's surface have engendered nicknames such as "the Whale" and "the Heart". As the resolution of the pictures become more complete, NASA and the world will have huge amounts of data to pore over and ponder for some time.

For additional information regarding the mission you might try the NASA site for the New Horizons Mission.

The Dawn Mission – NASA's Dawn mission to Ceres has lowered its orbit. The spacecraft is transmitting pictures, with more to come later as the craft draws nearer.

The Rosetta Mission – The ten-year Rosetta mission endeavors to catch the comet "67P/Churyumov-Gerasimenko" and answer some of our questions about comets, their composition, and movements. The mission lander had plopped itself down on the surface in such a way that mission control lost contact with it. As it continues to approach the sun, it is hoped that the increase in sunlight will wake up the somnolent space probe and help to reestablish communications with the orbiter and mission control.

Stepping Down- - We are sorry to report that John Gallagher, who has volunteered for and shouldered the responsibility of organizing the school star parties for the last seven years, will be stepping down as star party coordinator. John took over the task after the death of Forrest Luke, and has handled it with great aplomb. John will relinquish the job after training his replacement. We are looking for someone who is willing to give up some of their time to help coordinate our outreach activities with schools and youth groups. If you think you might be interested, contact John Gallagher or one of the H.A.S. Board members.

John also reports that Wahiawa Elementary is looking for an astronomer to help out during the After-school program for one hour per week for 10 weeks from August through November.

If you're interested in Dinner- Some of our members have, in years past, gathered at Kenny's Restaurant to the Kamehameha Shopping Center for a pre-meeting chat and dinner. Unfortunately, Kenny's recently closed its doors for good on July 5, 2015. The Dillingham Boulevard location

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AUGUST

SUNDAY

2015

FIRST DAY OF WEEK

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	01
02 sunset: 19:10	03	04 7:30 PM Club Meeting	05 8:00 PM Globe at Night	06 8:00 PM Globe at Night	07 8:00 PM Globe at Night	08 6:45 PM Club Star Party (D) (Private) 8:00 PM Globe at Night
09 8:00 PM Globe at Night sunset: 19:06	10 8:00 PM Globe at Night	11 8:00 PM Globe at Night	12 8:00 PM Globe at Night	13 8:00 PM Globe at Night	14 8:00 PM Globe at Night	15 6:45 PM Public Star Party (D)
16 sunset: 19:01	17	18	19	20	21	22 6:45 PM Public Star Party(G) 6:45 PM Public Star Party(K)
23 sunset: 18:55	24	25	26	27	28	29
30 sunset: 18:49	31	01	02	03	04	05

< < **Upcoming Star Parties** > >
Public Party-Dillingham Aug. 15 (C. Rykken)
Public Party Geiger Aug. 22
Public Party Kahala Aug. 22

Upcoming School Star Parties

		No School Star Parties for August
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President's Report (Continued from page 2)

puzzles that require us to find solutions that explain what we see. Sometimes this involves a mechanism we hadn't thought of before.

The story of Pluto is just beginning to be written. It is exciting and a privilege to watch as its secrets are revealed.

Chris Peterson

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of Zippy's has been adopted for the time being as the location of the next pre-meeting dinner group. So if you're interested, that's where we'll be.

Lacy Veach Day of Discovery – President Chris Peterson reported that the club will take part in the upcoming annual Lacy Veach Day of Discovery at Punahou School. It will take place during October 31, 2015. Gretchen West will have a sign up page at the next general membership meeting, as we need to have a working list to give to the event coordinator. Please sign up, come, have fun and help us in our outreach to the community of O'ahu.

Laptop Purchase – H.A.S. is considering purchasing a laptop for use at the Bishop Museum. We will have further discussion of the propose purchase at the next H.A.S. meeting.

Star Light Reserve Committee – Barry Peckham reported on the last Star-Light Reserve Committee. Barry reported to the general membership meeting that this is possibly the last meeting of the committee, as it was not re-financed by the Hawaii State Legislature for the next legislative session. The meeting lasted 3 hours. Richard Wainscoat, who spoke to the club at the June meeting, chaired it. It is hoped that the committee will be reinstated during the next legislative session and resume discussions and writing legislation to combat out of control light pollution across O'ahu and the rest of the state.

Dillingham Reminder – The H.A.S. Board members would like to remind all members and visitors to Dillingham Airfield star gazing events that we must strictly adhere to the 15 mph rules on site. Please help us by driving at the listed speed limit.

This Month's Speaker - Jessica Lu, from the University of Hawaii's Institute for Astronomy, joined us at this months meeting to talk to us about star formation. Ms. Lu spoke to us of the center of our Milky Way Galaxy, an unusual and extreme stellar nursery. She spoke of astronomers' use of the infrared portion of the electromagnetic spectrum to see and understand the make up of the Milky Way with different eyes. Along with use of infrared, Ms. Lu directed our attention to the use of adaptive optics to help in observing super massive black holes and their effect on stars in nearby neighborhoods.

TMT – There was a short explanation and discussion of the events occurring on Mauna Kea in the past few weeks.

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Throughout the past few months, Venus and Jupiter have been consistently the brightest two objects visible in the night sky (besides the moon) appearing in the west shortly after sunset. Jupiter is the largest and most massive planet in the solar system, yet Venus is the planet that comes closest to our world. On June 30th, Venus and Jupiter made their closest approach to one another as seen from Earth—a conjunction—coming within just 0.4° of one another, making this the closest conjunction of these two worlds in over 2,000 years.

And yet throughout all this time, and especially notable near its closest approach, Venus far outshines Jupiter by 2.7 astronomical magnitudes, or a factor of 12 in apparent brightness. You might initially think that Venus's proximity to Earth would explain this, as a cursory check would seem to show. On June 30th Venus was 0.5 astronomical units (AU) away from Earth, while Jupiter was six AU away. This appears to be exactly the factor of 12 that you need.

Only this doesn't explain things at all! Brightness falls off as the inverse square of the distance, meaning that if all things were equal, Venus ought to seem not 12 but 144 times brighter than Jupiter. There are three factors in play that set things back on the right path: size, albedo, and illumination. Jupiter is 11.6 times the diameter of Venus, meaning that despite the great difference in distance, the two worlds spanned almost exactly the same angular diameter in the sky on the date of the conjunction. Moreover, while Venus is covered in thick, sulfuric acid clouds, Jupiter is a reflective, cloudy world, too. All told, Venus possesses only a somewhat greater visual geometric albedo (or amount of reflected visible light) than Jupiter: 67 percent and 52 percent, respectively. Finally, while Venus and Jupiter both reflect sunlight toward Earth, Jupiter is

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The Planetarium – Joanne tickled our fancies with another great talk about the sky above us here in Hawaii. Her ability to manipulate the planetarium's two different mechanisms provides those of us who look up to enjoy another great time under the (almost) stars. Thanks Joanne.

Mahalo – As there was no further business, the meeting was adjourned at 9:37 p.m. Refreshments were served in the rotunda.

Respectfully Submitted,

Gretchen West

H.A.S. Secretary

Meteor showers are produced by dust and sand-sized particles from comets and asteroids that collide with the Earth's atmosphere as it travels in its orbit. Occasionally a pebble or boulder-sized object is swept up and we are treated to a bolide or fireball. More rarely, a large object finds its way through the atmosphere. This occurred about 15 million years ago (14.91 –15.02 ma; Rochelle *et al.*) in Bavaria (southern Germany) in the case of the Ries meteor and crater. No remnants of the meteor remain, however the large crater is evident if you know what to look for. Ries is a large circular depression interpreted as a meteor impact crater formed in the Miocene. The original inner crater rim had an estimated diameter of 12-13 kilometers, an outer "structural" rim of ~25 km, and a depth of the true crater of ~800 meters. Figure 1 is a geologic map of the area around Nördlingen and shows the distinct circular crater pattern in the rock types.

I was fortunate to join the LROC (Lunar Reconnaissance Orbiter Camera) expedition to the Ries crater to observe the impact products in late July 2015. It was truly amazing to see the effects of a 1.2 - 1.5 km projectile and the resulting crater on the Earth. The present floor of the crater has been filled with sediments and other erosional products, but is still 100 to 150 m below the uplifted surrounding rim. The town of Nördlingen actually lies within the crater (Figure 2), which is where the team stayed for the duration of the expe-

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First Quarter	Full Moon	Last Quarter	New Moon
August 22	August 29	August 7	August 14

Shower	Activi- ty	Maximum		Radiant		V _∞	r	ZHR
		Date	λ☉	α	δ			
Perse- ids (PER)	7/17→ 8/24	(Aug 13)	140°	48°	+58°	59	2.2	100
K- Cygnids (KCG)	8/3→ 8/25	(Aug 18)	145°	286°	+59°	25	3.0	3

If you would like to discuss meteors or meteor craters give a shout! For more info contact: Tom Giguere, 808-782-1408, Thomas.giguere@yahoo.com; Mike Morrow, PO Box 6692, Ocean View, HI 96737.

Treasurer's Report

by April Lew

[pHAS Financial Report June 16, 2015 to July 15, 2015			
Beginning Balance	1,869.45		
Income:			
	Dues Received	338.00	
	Donation	4.00	
	Telescope rental	26.00	
	Sky & Telescope subscription order	98.95	
	Astronomy subscription order	68.00	
Total Income	534.85		
Expenses:			
	July Astronews printing & mailing	144.05	
	Stamps	19.80	
	Sky & Telescope subscription	98.95	
	Astronomy subscription	68.00	
Total Expenses			330.80
Ending Balance			2735.10

We welcome 21 new members this month. They are **Brycen K-Tobias and Blast Tobias, J. R. Gillette, Lehualani and Adrian Kanoa, and Kaianna Nahina, Karl R., Antonija, Gabrijela, and Karl K. Sandbo, Larry R. and Irma Sandbo, David and Joan Mihal, Jason and Sharon McMillon, Iris van der Zander, Sean Moroney, Evelyn Nesteruk, Patti Gallagher-Jones, and Hub Grosswendt**

Many thanks to those renewing their membership (Sapavith, Susan, Selena, and Shawna Vanaprucks donation, Tom and Betsy Giguere, Andy and Hiroko Stroble, Mark, Cheryl, Lura, and David Loopert). As a reminder, please check your membership anniversary date listed on the Astronews address label. Clear skies to all!

dition. In actuality, the crater itself is much eroded to the point where the crater shape and morphology is not easily recognizable. To the layman and generations of Romans and Bavarians, the area appears as a beautiful valley. It was not until 1960 that Eugene Shoemaker (and Edward C. T. Chao), a pioneer in the field of impact cratering, identified clear signs that Ries was an impact crater. Previously, Werner and Stutzer had suggested that Ries was an impact crater, but the consensus of the principal investigators was that Ries had been formed by a volcanic explosion. Dr. Shoemaker specialized in the geology of impacts and noted high pressure shocked minerals such as Coesite, Stishovite, high-pressure quartz, and diamonds. Shattercones were also abundant (so abundant I was able to retrieve many samples from a farmer's field in the vicinity of the nearby smaller Steinham crater, see Figure 3).

Subsequently, Gene joined the Apollo team with the purpose of educating the astronauts for the lunar missions and preparing them in lunar geology concepts. This

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always in the full (or almost full) phase, while Venus (on June 30th) appeared as a thick crescent.

All told, it's a combination of these four factors—distance, size, albedo, and the phase-determined illuminated area—that determine how bright a planet appears to us, and all four need to be taken into account to explain our observations.

Don't fret if you missed the Venus-Jupiter conjunction; three more big, bright, close ones are coming up later this year in the eastern pre-dawn sky: Mars-Jupiter on October 17, Venus-Jupiter on October 26, and Venus-Mars on November 3.

Keep watching the skies, and enjoy the spectacular dance of the planets!



Image credit: E. Siegel, using the free software Stellarium (L); Wikimedia Commons user TimothyBoocock, under a c.c.-share alike 3.0 license (R). The June 30th conjunction (L) saw Venus and Jupiter pass within 0.4° of one another, yet Venus always appears much brighter (R), as it did in this image from an earlier conjunction

would aide them in understanding what they observe in the rocks that they might encounter and would help in selecting the most representative samples to bring back to earth. Figure 4 shows field training for the Apollo 14 crew (Shepard, Mitchell) and its back up crew (Cernan, Engle) at the Ries and Steinham craters in August 1970. The people of Nördlingen are proud of their crater, its uniqueness and the role that it played in the Apollo missions. There are astronaut pictures in shops and restaurants around town and also in the 500 year old church tower at the center of town. The church is built almost exclusively out of the unique stone quarried nearby and is called Suevite. Suevite is a polymict impact breccia containing melt particles and is generated during the impact. I suppose that this is one church that is closer to the heavens than the builders ever imagined!

**Map section of the Geologic Map
1 : 100 000**

- Alluvial deposits
- Sedimentary coverage
- Sedimentary water-ls
- Basalts
- Basic Ultramylonites
- Gneisses
- Maficites
- Granite
- Limest.
- Quartzite

Shaded surface, actually with
absence of mass involvement

Chert

0 5 10 km

An aerial photograph of a walled city, likely a historical site. The city is characterized by a dense cluster of buildings with red-tiled roofs, enclosed within a visible wall. The surrounding area includes green fields and other urban developments.

Gene Cernan

Ed Mitchell

Alan Shepard

Joe Engle

Mike McEwen

Dieter Stoffler

Wolf von Egelhardt

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**H.A.S.
P.O. Box 17671
Honolulu, HI 96817**



This image, released for Hubble's 17th anniversary, shows a region of star birth and death in the Carina Nebula. The nebula contains at least a dozen brilliant stars that are 50 to 100 times the mass of our Sun.
Credit for Hubble Image: NASA, ESA, N. Smith (University of California, Berkeley), and The Hubble Heritage Team (STScI/AURA)