NIGHTFALL

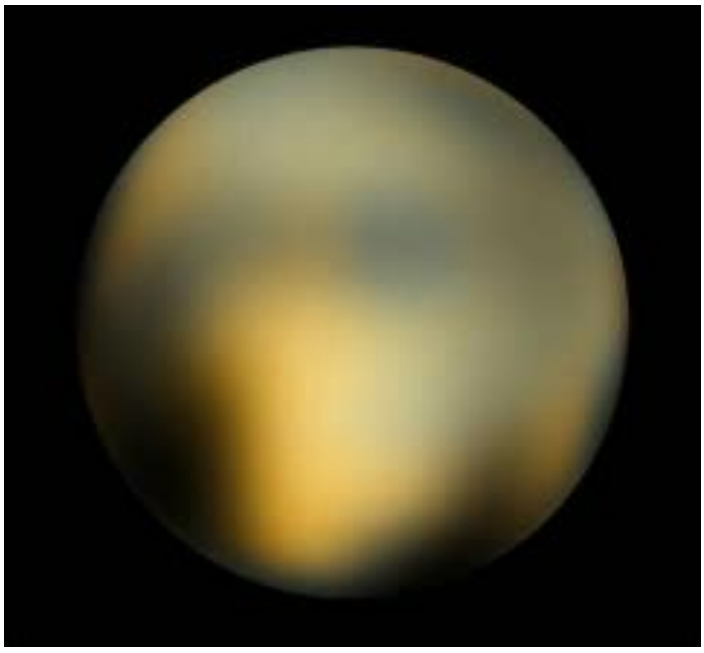
A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

AUGUST 2015

PRESIDENT'S NOTES

DAVID ROEMER

It's August, time to catch up on our reading and wade through the latest data pouring in from the various space probes, because we probably won't be able to look at anything except the underside of storm clouds. If it does clear we have the summer Milky Way up all night, the Perseids peaking around the 11th and 12th , and towards the end of the month, the 29th, we will have not just a full Moon but a super-moon. The Moon will be full at its closest approach to the Earth and may look slightly larger and brighter than usual. If we don't get to see it this time, relax, it is only the first of three super-moons this year. In fact, the super-moon in September will also have the added special effect of being eclipsed.



PLUTO BEFORE
Hubble image of Pluto from February 2010. Credit: NASA/ESA/M. Buie/Southwest Research Institute

As for the data streams returning to us from space probes, the New Horizons probe data is still trickling in from dwarf planet Pluto and its little band of misfit moons. Below are portions of the discovery plates No doubt, there will be new discoveries with each packet of data received, giving us better images, and better understanding of this little world.

PLUTO AFTER
Credits: NASA/APL/SwRI

Notice the new look for the newsletter, we hope so. If the pictures seem a little small not to worry, just zoom in on them, they should take up to a 300 zoom. Lastly, if you have been keeping up with the conversations on the Yahoo Haclist you know we are getting our website revamped, thanks to Ken Kirchner, and adding content to our Facebook page, thanks to Burt Kelher. Our main concern is to build these sites to better serve our membership, with clear up-to-date information and give the club a solid professional appearance to the outside world, which it surely deserves. As always, our Yahoo group will remain the core conduit for in-club conversation and notices.

THE AUGUST 2015 MEETING

The next meeting of the Huachuca Astronomy Club will be Friday, August 28, 2015 at 7 PM in the community room of the Student Union Building at Cochise College, 901 N. Colombo Avenue, Sierra Vista. Our guest speaker will be Dr. Vishnu Reddy from the Planetary Science Institute in Tucson, Arizona. His talk is titled:

"What are the Bright Spots on Dwarf Planet Ceres?"

The Framing Cameras (FC) onboard NASA's Dawn spacecraft have started the mapping phase of the dwarf planet Ceres with seven color filters and one clear panchromatic filter after capture in March 2015. During the approach phase, several high albedo spots associated with impact craters were observed on Ceres. The most prominent of these is a cluster of spots inside an 80-km impact crater called Occator. I will present some preliminary results on Framing Camera color observations of the bright spots on Ceres in an effort to characterize compositional properties.

The meeting is FREE and open to the public. A door prize will be awarded but you must be present to win.

Dr. Reddy's research focuses on asteroids, meteors, and meteorites in the Solar System. Some asteroids are perturbed from their orbits in the Main Asteroid Belt to become near-Earth objects (NEOs), which have the potential to impact the Earth and cause catastrophic damage to life and property. A majority of this thesis work was done using the NASA Infrared Telescope Facility on Mauna Kea, Hawaii. Prior to graduate school, he participated in an astrometric survey as an amateur astronomer discovering 23 new Main Belt asteroids and improving orbits of 1000s of other asteroids. Currently, Dr Reddy's primary focus is surface composition of asteroids. Dr Reddy is also member of the Framing Camera (FC) team on NASA's Dawn mission to asteroids Vesta and Ceres. Dr Reddy received his PhD in Earth System Science from the University of North Dakota, Grand Forks, with the thesis "Mineralogical Survey of Near-Earth Asteroid Population: Implications for Impact Hazard Assessment and Sustainability of Life on Earth."

Asteroid (8068) Vishnureddy was named by the International Astronomical Union after Dr. Reddy.

Planetary Nebula Anniversary

Ted Forte

Two hundred and fifty years ago, on July 12, 1764, Charles Messier noted a "nebula without star" in Vulpecula that became the 27th entry in his famous catalog. The true nature of objects like the Dumbbell Nebula remained unknown for another 150 years.

We call these objects Planetary Nebulae (PNe), a term that was coined by Sir William Herschel. Herschel described the object we now call NGC 7009 (The Saturn Nebula) as being "planetary" and the name stuck, applied to all of the objects that he listed as class IV in his classification scheme. Herschel and many of his contemporaries assumed that these nebulae were composed of stars that were just too distant to be resolved.

It wasn't until William Huggins discovered something rather odd in the spectrum of NGC 6543 (The Cat's Eye Nebula) that the true nature of these objects began to be understood. What Higgins uncovered in the spectrum of these objects was that they did not display the continuous spectrum with superimposed absorption lines produced by stars and by nebulae composed of stars. Instead, the spectrum of the Cat's Eye and similar objects were composed of a small number of emission lines with one very bright line dominating the spectrum at 500.7 nanometers (5007 Angstroms).

It was hypothesized that an unknown element dubbed Nebulium was responsible for the line. After all, a puzzling aspect of the solar spectrum had just led to the identification of the element helium. Nevertheless, Nebulium was never isolated. Early in the 20th century, Henry Norris Russell offered an explanation for the odd emission line. It was produced by doubly ionized oxygen (OIII, spoken oh-three) and could only be the result of recombination in a very rarefied gas. From that time on, the term planetary nebula was applied to a host of objects with bright emission at 5007 Angstroms.

Classifying the objects by this emission line resulted in the grouping of many visually dissimilar objects into the planetary nebula class. Astronomers have struggled to explain the varied morphology of these objects ever since.

In minimalist terms, a planetary nebula is a hot degenerate star surrounded by a circumstellar cloud of ionized gas. They are now understood to be a late stage in the life of low and intermediate mass stars of between .8 and 8 solar masses. The visible planetary nebula phase lasts for about 10,000 years from the end of the second ascent red giant phase (the asymptotic giant branch) to the resulting white dwarf.

Visually, planetary nebulae constitute some of the most beautiful and exotic objects in the sky. More than any other class of object, they display vivid colors and interesting shapes both on the detector plate and in the eyepiece. That's why they are my personal favorite class of object, and why I worked to create an Astronomical League observing program dedicated to observing them.

(See https://www.astroleague.org/al/obsclubs/planetarynebula/planetneb1.html)

In 2013, I posted 12 articles on Haclist, one each month, detailing the objects on the Planetary Nebula Observing Program that were well placed each month. A document containing all twelve of those posts can be found in the files section of the Haclist for anyone interested. A few of the included comments are specific to 2013 but overall the essay is relevant anytime. Look for the file titled: "Obs PNe each month".

Order your RASC Handbooks and Astronomy Calendars

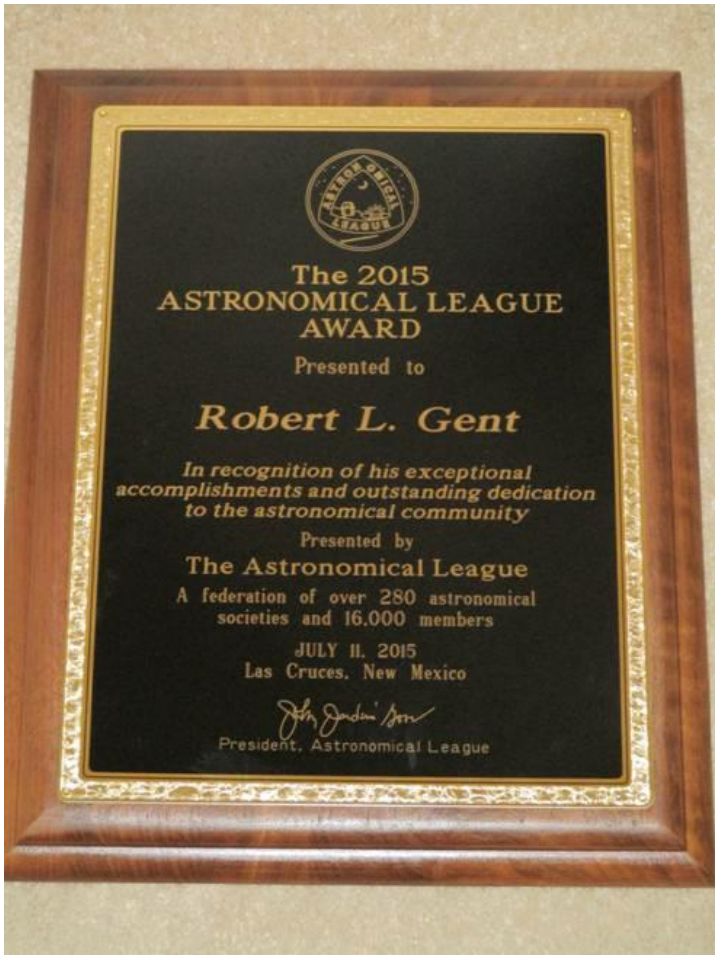
Orders are now being taken for the 2016 RASC Observer's Handbooks and the 2016 Astronomy magazine Deep Space Wonders Calendars. Ted Forte will be taking orders at the next couple of meetings (starting with the August meeting).

Based on last year's costs the RASC Handbooks will be approximately $22.25 per copy (regular price $27.95). Please plan to pay for the handbooks when you sign up to get them. The cost may be adjusted later; we'll collect or refund the difference in price when the books are delivered.

The club price for the Astronomy magazine's 2016 Deep Space Wonders calendars will be $6.50 each (regular $12.95). Please pay when signing up for them.

Congratulations to Bob Gent!

Bob Gent was honored with the 2015 Astronomical League Award at ALCON in Las Cruces, NM.



Dine under the Stars (DUTS) tickets are now available.

Ted will have them at the August meeting. Tickets are $40 adult, $25 student, and $15 Child under 12. PLEASE LET TED KNOW IN ADVANCE OF YOU NEED STUDENT OR CHILD TICKETS. Dine under the Stars is the annual scholarship fundraiser for the University South Foundation, which owns the Patterson Observatory. The date for DUTS is Saturday, October 3. The event is held adjacent to the Patterson Observatory.

On The Brightness of Venus

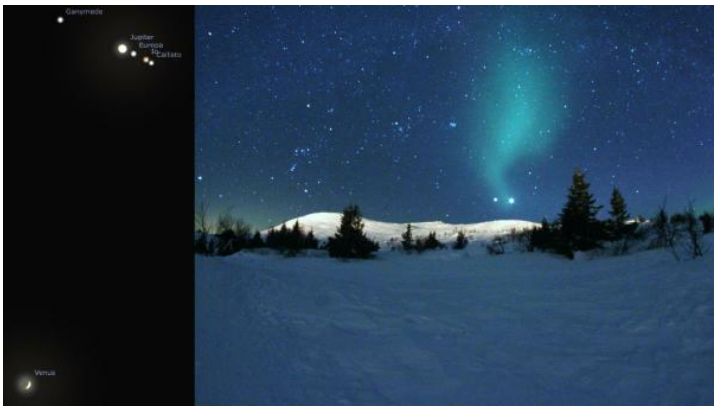
An Astronomy Club Article

Ethan Siegel

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.

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



Venus-Jupiter Conjunction
Image credit: E. Siegel, using the free software Stellarium (L); Wikimedia Commons user Timothy Boocock, under a c.c.-share alike 3.0 license (R). The June 30th conjunction (L)

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.

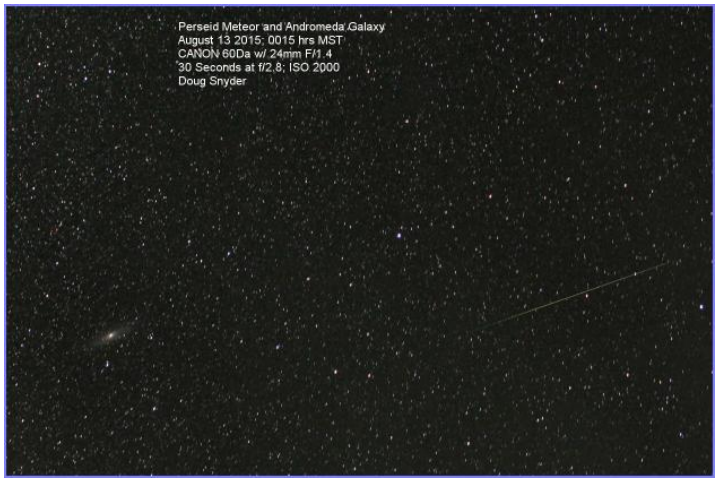
Keep watching the skies, and enjoy the spectacular dance of the planets!

Welcome Our New Members

Keith Mullen of Palominas rejoined the club at the July meeting. Keith operates the RepoGazer Observatory. Welcome back Keith, we are glad you joined!

Pictures by HAC Members

Moon and Venus
by Ed Erbeck Jr.



Perseid Meteor and Andromeda Galaxy
by Doug Snyder

Perseid
by Jay LeBlanc

WantAds

8" Celestron Nex Star

In good condition with all original accessories. Please contact Mae at, maechilds2014@aol.com

Meade Starfinder 8" Reflector Telescope

Will sell at a very reasonable price. Includes Telrad Finder, Filters, and additional Lenses.

Please contact Mr. Jim Moses at (520) 803-0913 or at email <jjmoses2@gmail.com>

Celestron Celestar 8" SC Deluxe

$1200.00 Will also sell pieces individually

Contact Rhonda and Terry Taylor at (520) 366-2378 or by email at <twrl2@yahoo.com>

Older Optical Guidance Systems 12.5" f/9 Ritchey-Chretian telescope

Very good Paul Jones ceramic optics, Robofocus secondary focuser, will include Takahashi collimating telescope. See images taken with scope are Mshadephotography.com.

Contact Mike J. Shade at mshade@q.com

Celestron 8" OTA with additional Hyperstar III Optics

from Starizona. Both for $1000.00
Contact Max Mirot at galiloeo@yahoo.co

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For more information on products and contact information, their websites are:

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HAC Calendar of Events for Aug-Sep 2015

SU	MO	TU	WE	TH	FR	SA
2 August	3	4	5	6 10:03 pm	7	8
9	10	11 Perseid meteors	12 Perseid meteors	13 Business at Twilight: Patterson Perseid meteors	14 10:53AM Perseid meteors	15
16	17	18 Astronomer Exchange Program (Tentative)	19 Astronomer Exchange Program (Tentative)	20	21	22 3:31PM
23	24	25	26	27	28 HAC Meeting Student Union Building 7P Vishnu Reddy PSI	29 2:35 PM
30	31 Neptune at Opposition	1 September	2	3	4 Girl Scout Astro Night Patterson	5 5:54AM
6	7	8	9	10	11	12 Member Star Party
13 2:41AM	14	15	16	17 Patterson Public Night 7PM	18	19
20	21 4:59AM	22 Astronomy for the Curious Class Patterson	23	24	25	26
27 10:50PM	28	29 Astronomy for the Curious Class Patterson	30	1 October	2	3 DINE UNDER THE STARS
4 5:06PM	5	6 Astronomy for the Curious Class Patterson	7	8	9	

All event times local Arizona Time.
Members please join Haclist to keep up to date with all of the Huachuca Astronomy Club events
Send an email: haclist-subscribe@yahoogroups.com