NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

DECEMBER 2015

PRESIDENT'S NOTES

COUNTDOWN TO 2016

As the Christmas song droning in my head goes "Baby it's cold outside" and, I might add, finally clear outside. So, as we enter the New Year of 2016, we have some skyward objects to gaze at during these cold nights. Comet Catalina, almost naked eye, is rushing northward on its way out of the solar system, never to return. While it is hovering at about magnitude 6, it doesn't appear that it will get much brighter, although as it gets higher in the sky and further from the light of dawn there is a chance we will get a good view of this comet in binoculars and small telescopes. Catalina sports two tails widely separated from each other. One a dust and debris tail, the other made of energized gases. By New Year's Eve morning, the comet will be nearing the apparent position of the star Arcturus, a bright star to use as a reference point in finding the comet.

Jump ahead to January 17, 2016, and Comet Catalina will pass closest to Earth, some 68 million miles. Not very, close at all. It will be hundreds of times farther than the moon's distance, so we won't be getting a close-up look at the comet. Some estimates indicate the nucleus of Comet Catalina ranges between 4 and 20 kilometers in diameter. It is all good-byes from there as the comet bullets out of the inner solar system.

If you can't sleep or you decide to get up before Catalina rises, we have the supreme planet Jupiter rising around 10pm and transiting around 4am just in time to begin looking for the comet, placing it in a great position for viewing and imaging. Jupiter is always changing. The Galilean moons dance about at different speeds and distances, eclipsing, transiting and casting shadows on the gas planet, so there is always a show. Below these spinning moons, the upper atmosphere of Jupiter, made up mostly of hydrogen and helium, visible to use in even small telescopes, always exceeds expectations. Lightly colored zones and relatively dark belts rub against one another sheering off whirlpools of colorful gases larger than Earth's diameter. Many of these, most in fact, disappear rather rapidly. These storms arise and recede in days, weeks, or months. However, one such storm "The [Great] Red Spot" and the lighter clouds around it have endured for over 350 years. Nevertheless, don't wait that long to look at Jupiter. Make a resolution to start visiting Jupiter often beginning this New Year.

THE ZONES AND BELTS OF JUPITER

"Jupiter at a glance" by ESA/Hubble. Licensed under CC BY 3.0 via Commons - https://commons.wikimedia.org/wiki/File:Jupiter_at_a_glance.jpg#/media/File:Jupiter_at_a_glance.jpg

WELCOME OUR NEW MEMBERS

Tiko Kotolashvili joined HAC at the November meeting. Tiko is an exchange student from the Republic of Georgia and will be here through most of 2016. She is very interested in logging volunteer hours with the club. James and Opal Knowles joined the club in December. Welcome! We are glad you joined.

NEXT MEETING

There will be no regular meeting in December. The next meeting is on Friday, January 15, 2016 at 7PM in the community room of the Student Union Building, Cochise College, Sierra Vista campus. Our speaker will be Danielle Adams who will deliver a talk entitled "Two Deserts One Sky". We will treat Danielle to dinner at the Outback Steak House before the meeting (5PM). Please RSVP to Ted Forte [tedforte511@gmail.com] if you would like to join us for dinner.

NEXT PATTERSON NIGHT

We will hold our next public night at the Patterson Observatory on Thursday, January 14. Doors open to the public at 6PM. All HAC members are invited and encouraged to participate in these fun public observing sessions. Come out and get more involved – you'll enjoy yourself. You don't need to bring a telescope (unless you want to), just bring your love of the night sky and your willingness to share it.

2016 DUES DUE

Most HAC memberships expire each December. If you have paid your HAC dues for 2016 thank you! If you are not sure, please contact Ted Forte. There are three ways to

pay your dues: visit www.hacastronomy.com and scroll down to the Pay Pal donate button to pay your dues with your credit card or Pay Pal account. You can mail your dues check to PO Box 922, Sierra Vista AZ 85636. And, of course, you can pay your dues by cash or check in person at a meeting or event. Dues are $25 for regular individual membership, $35 family, $20 military, $25 military family, and $10 student.

HAC Swap Meet and Astro Sale

Mark your calendars, check your closets and dust off those old eyepieces – HAC will hold an Astro Gear Swap Meet at the Patterson Observatory on Saturday, March 26 starting at 1PM. We will advertise this event and it will be open to the public. Members are invited to bring items for sale or swap. You are also encouraged to bring your scope if you need any help with it. And, oh yeah, bring your checkbook – there will be toys to buy!

Beginning Astros Group

By MaryFrances Clinton

A fairly informal group is forming to share knowledge and enjoyment of the sky-full of naked-eye constellations and planets as they constantly change through the hours of the night and are gradually new in each next season. We'll start by locating the winter constellations of Orion and Taurus rising in the northeast, then moving west across Auriga, and Perseus and on to Cassiopeia and Cepheus in the Milky Way. Moving into the center of this arc of old and new friends, we'll look straight overhead to find The Great Square of Pegasus and from there, follow Andromeda's trail of stars back toward Cassiopeia and Perseus. We'll even try to find the dim winter constellations of Pisces and Aquarius curling around Pegasus.

As we find each of these constellations, we can pull out binoculars to look closer at the blur of galaxy in the middle of Orion's dagger, the lacy blur of Pleiades shepherd sisters at the shoulder of Taurus the Bull and the Hyades group surrounding Aldebran, the Bull's red eye. And of course, we'll find Andromeda's galaxy. We'll also search the Window of the Great Square to count galaxies beyond our galaxy. Even after all that, the amazing river of Milky Way stars may be the most spectacular thrill of the night for anyone never before pointing binoculars in that direction.

Our initial plan is to meet in Scott and Sylvia Conklin's back yard mid-week after the New Year's holiday, taking advantage of that last dark week of the moon's cycle and making our best weather guess by then for clear skies. Scott will set up various chapters of the excellent series of videos about the constellations and other sky watching information Rick Burke offered for our use. We can get there early enough to watch one chapter before we go outside, then come in to warm up with another chapter after all that sky looking and pointing.

We'll definitely have fun just among ourselves getting acquainted with all that sky we can take back home with us to enjoy some more of in our own backyards. But some of us may also want to share that enjoyment with folks during the Patterson Public Nights by pointing out those constellations we found together to folks waiting to see the greater details in the telescopes our members have set up. I've done that kind of pointing myself during several of the Patterson Public Nights over the last year, including sharing my binoculars with folks to look through – when I remember to bring them. It's fun sharing knowledge with people who may have never before identified the Big Dipper. Interestingly, since we're at such low latitudes here in Arizona, the Big Dipper won't rise until a couple hours after our Patterson nights have ended at this north-most-facing point or our orbital year. However, the Big Dipper will be there in all its glory, rising earlier each night through the next winter months and on into the summer. We can then use its stars to show folks how to find not only the North Star, but the constellations of Leo, Bootes and Virgo as well. However, even now without the Big Dipper, there is a "secret" clue to finding the North Star we'll be able to see together at our first meeting.

Contact me, MaryFrances, at clintonx@theriver.com if you'd like to be included in notices about when (and as needed, where) this informal group will gather for our shared Astros adventures and pleasures of Night Sky Looking and Pointing.

Space Place Article *December 2015*

Our Solar System Is Almost Normal, But Not Quite

By Ethan Siegel

It was just over 20 years ago that the very first exoplanet was found and confirmed to be orbiting a star not so different from our own sun. Fast forward to the present day, and the stellar wobble method, wherein the gravitational tug of a planet perturbs a star's motion, has been surpassed in success by the transit method, wherein a planet transits across the disk of its parent star, blocking a portion of its light in a periodic fashion. Thanks to these methods and NASA's Kepler spacecraft, we've identified many thousands of candidate planets, with nearly 2,000 of them having been confirmed, and their masses and densities measured.

The gas giants found in our solar system actually turn out to be remarkably typical: Jupiter-mass planets are very common, with less-massive and more-massive giants both extremely common. Saturn—the least dense world in our solar system—is actually of a fairly typical density for a gas giant world. It turns out that there are many planets out there with Saturn's density or less. The rocky worlds are a little harder to quantify, because our methods and missions are much better at finding higher-mass planets than low-mass ones. Nevertheless, the lowest mass planets found are comparable to Earth and Venus, and range from just as dense to slightly less dense. We also find that we fall right into the middle of the "bell curve" for how old planetary systems are: we're definitely typical in that regard.

But, there are a few big surprises, which is to say there are three major ways our solar system is an outlier among the planets we've observed:

- All our solar system's planets are significantly farther out than the average distance for exoplanets around their stars. More than half of the planets we've discovered are closer to their star than

Mercury is to ours, which might be a selection effect (closer planets are easier to find), but it might indicate a way our star is unusual: being devoid of very close-in planets.

- All eight of our solar system's planets' orbits are highly circular, with even the eccentric Mars and Mercury only having a few percent deviation from a perfect circle. But most exoplanets have significant eccentricities, which could indicate something unusual about us.

- And finally, one of the most common classes of exoplanet—a super-Earth or mini-Neptune, with 1.5-to-10 times the mass of Earth—is completely missing from our solar system.
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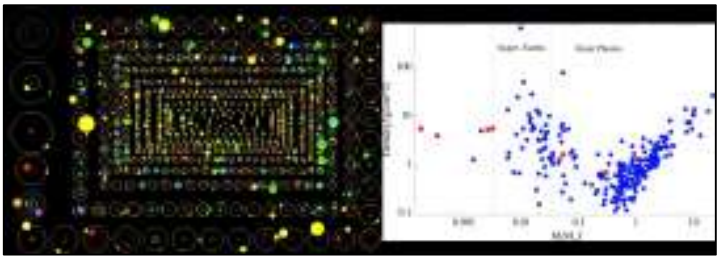
Until we develop the technology to probe for lower-mass planets at even greater distances around other star systems, we won't truly know for certain how unusual we really are!



Images credit: NASA / Kepler Dan Fabricky (L), of a selection of the known Kepler exoplanets; Rebecca G. Martin and Mario Livio (2015) ApJ 810, 105 (R), of 287 confirmed exoplanets relative to our eight solar system planets.

Want Ads

FOR SALE: Meade Starfinder 8" Reflector Telescope

I will sell at a very reasonable price. Included are: a Telrad Finder, Filters, and additional Lenses.

Contact Mr. Jim Moses at (520) 803-0913 or by email jjmoses2@gmail.com

FOR SALE: Celestron Celestar 8 inch S/C Deluxe - $1200.

Will also sell pieces individually

Contact Rhonda and Terry Taylor at (520) 366-2378 or by email at twrl2@yahoo.com. Or See Craigslist at http://sierravista.craigslist.org/bar/4523742100.html

FOR SALE: 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. Some of the images through the scope are at Mshadephotography.com.

Contact Mike J. Shade at mshade@q.com

FOR SALE: 8" Celestron Nex Star

The scope is in good condition and with all original accessories.

Contact Mae Childs at maechilds2014@aol.com

FOR SALE: Celestron 8" OTA

Comes with additional Hyperstar III Optics from Starizona. Both for 1000.00

Contact Max Mirot at galiloeo@yahoo.com

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HAC Dec/Jan Calendar of Events

SU	MO	TU	WE	TH	FR	SA
13  Geminid Meteors	**14** 5PM  Geminid Meteors	**15** Geminid Meteors	**16** HACBOD Mtg	**17** 6:00PM Patterson Public night	**18** **HAC Party!** **10:14 AM**  Mimosa Pizza	**19**
20	**21** Winter Solstice	**22**	**23**	**24**	**25** **6:11 AM** 	**26**  Begins
27	**28** Mercury at greatest eastern elong	**29**	**30**	**31** 	**1 Jan 2016** 	**2** **12:30AM**
3 Mars 1.5^0 S of Moon Quadrantid Meteors	**4** Quadrantid Meteors	**5**	**6**	**7** Lowell Middle School (Warren Ball park Bisbee)	**8** Venus and Saturn .09º apart	**9** **8:31PM** Member Star Party
10	**11**	**12**	**13**	**14** Patterson Public Night 6PM	**15** HAC Meeting Student Union Danielle Adams	**16** **6:26PM**
17	**18**	**19**	**20**	**21**	**22**	**23** **8:46PM**
24	**25**	**26**	**27** Jupiter 1.4ºN of moon	**28**	**29**	**30**
31	**1 Feb**	**2** 	**3**	**4**	**5**	**6**
7	**8** **9:39AM** 5:30P Stem Night Coronado K-8 School	**9**	**10**	**11** Patterson Public Night 6:30PM	**12**	

All event times MST. Join Haclist to keep up to date with all of the Huachuca Astronomy Club events
Send an email to: haclist-subscribe@yahoogroups.com