Nightfall

Monthly publication of the Huachuca Astronomy Club

OCTOBER 2014

President's Notes

Ah, October, what a wonderful time to bring out the scope into the cool *dry* air. It isn't often I enjoy viewing during the glare of the full moon, but on the 8th we have an arranged test of a special planet-wide lunar filter that will give us added time to enjoy deep sky viewing. Of course, some of you may take this time to actually look at the shadowed satellite as well, and that's ok. The *Royal Astronomical Society of Canada Observer's Handbook* (2014) has a nice section on the lunar filter test that they are referring to as a *Total Lunar Eclipse*. In that section they have a delightful little table (page 133, Table 3) giving immersion and emersion times for 25 clearly defined lunar craters. My plan is to be watching the changing scene around the massive crater Copernicus, the nearby Carpathian Mountains, and on out into the Sea of Storms to the rayed crater Kepler. If you are scanning through the area be sure to wave.

Later in the month, we have a couple of other out-of-the-ordinary astronomical occurrences. On the 23rd we have a partial solar eclipse. I repeat this will be a partial solar eclipse; only about a third of the sun's disk will be blocked, so with an appropriate solar filter we will be witness to a crescent sun. Still, that's pretty cool, and there will be bragging possibilities, as the eclipse won't be visible from the east coast and much of the rest of the country will probably be cloudy. Our club will be stationed at the Sierra Vista Public Library for public viewing. Stop by if you can, we will have both white light and hydrogen-alpha filtered scope for your viewing pleasure. Spread the word!

The last occurrence I'd like to point out is much subtler than the blinding sun or the flat disk of the full moon. The Zodiacal Light should be visible in the pre-twilight morning sky for about two weeks starting around the 20th. I had never seen the light (so to speak) before moving to Sierra Vista (and I had tried). Composed of interplanetary dust, the light forms an arching dome of reflected light in the east that extends well up into the otherwise dark sky. The times I have seen it, the light could be observed over 60 degrees up along the ecliptic. It has the appearance of the Milky Way in brightness, but it is uniform, not blotchy. Some refer to it as a false dawn, and that is an apt description. Start your exploration about a half an hour before true astronomical twilight, look quick and drink it in because the zodiacal light is memorable, but fleeting.

New Member Corner

We welcome several new members this month. Glen Gary of Sierra Vista, Ken Klein of Benson who will be the resident astronomer at the Butterfield RV resort and observatory, Bob Norquist of Hereford, Jim and Liz Reese of Sierra Vista, Marcelle Skubna of Sierra Vista, Kevin Sopuch of Sierra Vista and Eugene Zastera of Sierra Vista all joined in September. Welcome to the club! We are glad you joined.

Special offer from SLOOH (from Ted Forte): Slooh is a *Community Observatory* with telescopes on the Canary Islands and in Chile that Slooh members can use remotely . As a special promotion, you can get a 90 day trial subscription to SLOOH by making a $30 donation to HAC. Go here: http://mbsy.co/slooh/12472135 and then click on "Astronomy Club Special Offer".
This is a new program and it may have some glitches so please let me know if you decide to do this. I am supposed to get an email notification from Slooh when a HAC member uses this link and at the end of the month I should get a check made out to the club. ($29.95 for anyone that signs up). If anyone does this, I'd like to track this independently to make sure it's working as designed.
I've not used Slooh myself but I allow imagers to use Slooh to complete the Planetary Nebula Imaging Program and two people have done that so far. It works. Go to http://www.slooh.com/ to see what it's all about.

Get your order in: Ted Forte is taking orders for 2015 RASC Handbooks ($20 each) and the 2015 Astronomy Magazine Calendars ($6.50 each). He will be placing the order after the October meeting. Please sign up at the meeting or let me know by email if you want to get in on these reduced prices. You may email him off list at tedforte51 at gmail dot com.

The following members have signed up for RASC Handbooks: Forte, Kepple, Ubing, Johnson, Kelher, Snyder, Sanner, Gent (2), Hoover, Roemer (2), Whitesell, Duncan, Kreech, Gray and Grue.

The following members have signed up for calendars: Forte, Kepple, Kelher, Snyder (2) Gundy(2), Creech, Norquist, Raymond (2), Lund and Grue.

If you have not already paid for your order, please pay at the October meeting. You may also mail your payment to HAC, PO Box 922, Sierra Vista AZ 85636

See a description of the RASC handbooks here: http://www.rasc.ca/observers-handbook

The Astronomy Magazine calendar is described here: http://www.kalmbachstore.com/68176.html

Ted is also taking orders for the special club offer from Skyhound to get discounts on the observing software, **Sky Tools 3**. Members can get a 25% discount if just two people order through the club. The discounts increase up to 50% for larger orders. Let Ted know if you are interested. See http://www.skyhound.com/club_discounts.html for details of the offer.

HAC Memberships expire in December
It's not too early to start thinking about renewing your membership in the **Huachuca Astronomy Club.**
Individual: $25 Family $35 Military $20($25 family) Student $10
Don't miss out on all the great benefits of belonging. Fellowship, fun, stars, tours, observing programs, star parties, discounts, engaging speakers, and so much more. Stay a part of it all. Renew your membership, participate, enjoy. And while you're at it, think about serving as an officer of the club or member of the board: **ELECTIONS IN NOVEMBER** for the 2015 slate of club leaders!

Please remember HAC when shopping at Amazon

When members shop at Amazon.com through the link on www.hacastronomy.com (our club homepage) we receive a donation from Amazon equal to 4% of the sale amount. Remember, you must first go to the HAC website and click on the link to Amazon.

The Telescope Clinic A Success!

Ted Forte

How many times have we heard it? People tell us about a telescope at home that languishes in storage because they were unable to make good use of it. Whether they bought it for a child, a spouse or for themselves, they gave it a few tries, failed to have fun with it, and then stuffed it into the back of a closet.

That's what led HAC president David Roemer and the board of directors to plan a ***telescope clinic*** for the September meeting. What better way to liberate some neglected telescopes, make some new friends and create a positive impact on our community?

We invited would-be observers to bring in their telescopes for some individual help. It was also our chance to present the factors to consider when buying that first telescope in plenty of time for the holiday season. Choosing the wrong telescope is very often the death of a budding interest, so a little knowledge here can go a long way.

Once we decided on the format for the meeting, it turned out to be a simple thing to put together. HAC has such a wealth of expertise, ready-made to share, that it didn't take much planning. All we needed to do was get the invitation out to the telescope-challenged public and project a welcoming environment. In addition to all the usual sources, newspapers *Sierra Vista Herald*, *Mountain View News*, *The Scout* and local radio station KKYZ, we enlisted the help of the Sierra Vista Visitors Center who got us on the city website and had fliers posted in the Oscar Yrun center and the library. The Mall at Sierra Vista also posted the announcement for us. The *Herald* printed David's announcement about the clinic as a "Letter to the Editor" and the event was mentioned in my "Backyard Astronomer" column. The word got out.

When the big night arrived, David started the meeting with a short presentation on telescopes - the different types, how they work, and what important factors to consider when choosing a telescope. Rob Shernick described a small telescope that he made from scratch on a shoestring budget; food for thought for the DIY crowd.

We had a few telescopes that members brought in for demonstration purposes and they gathered little groups of guests around them as they demonstrated the pros and cons of the different types

of mounts and optical types. Bert Kelher, John Welter, Nancy Hannaford and Rick Burke all had telescopes to display and explain.

But the real work went on as members paired up with guests needing help who brought in their telescopes. We had guests bring in everything from a department store 60mm refractor to a 10-inch Newtonian on a serious GEM. It could not have worked better. There seemed to be at least one club member for every guest who brought a telescope and our members rose to the challenges with exceptional aplomb. I saw David, Glen Sanner, Bob Gent, Ray Perger, Chris Ubing, Ken Duncan, Gary Grue and Cindy Lund helping people and I'm sure there were others who escaped my attention. We spotted mirrors, collimated scopes, tightened tripods and walked people through star alignments. I think everyone left happy, confident, and more proficient.

Susan Raymond, Marcelle Skubna, Glenn Gray, Ken Klein, Kevin Sopuch and Bob Norquist joined the club - the biggest single night gain in membership in quite some time.

We offered a special door prize too. Doug Snyder donated a homemade binocular chair complete with 15 x 70 binoculars. With a little sprucing up, it became quite a nice prize. It was won by a family that had pre-teen kids so it worked out just great.

It is important to put your best foot forward at events like this and HAC really stepped up. It could not have been a success without the effort of many, many members. While they couldn't make the meeting, Katherine Zellerbach and Bill Howard sent refreshments - just the touch needed to project the right atmosphere for our guests.

This is not something that we would do very often; maybe every other year or so but it was well worth the effort that went into it. The clinic fostered a lot of good will, I think, and it attracted some new members, which is always a good thing.

After we started advertising the event, someone directed a comment to our website contact link. He said that he had attended a meeting once and asked a member about a problem he was having with his new telescope. He evidently got a condescending and unhelpful response. Sometimes members forget that we were all beginners once. Happily, he decided to give us another try and attended the clinic. Toward the end of this meeting he came up to me to say how impressed he was with the event, how helpful everyone was, and how much he had learned. He said he'll be using that telescope now. That's a pretty good verdict.

Astronomy Day

Ted Forte

Public attendance was a little light, but the sky was perfect and we had a great brunch of astronomers, at least a dozen strong, to celebrate National Astronomy Day at the Patterson observatory. Only 18 people visited during the daytime session including the photographer and reporter from the Herald. Yet, those that came had a good time and received a lot of special attention. Some even took home a souvenir photo compliments of Doug Snyder. And one lady, with a department store refractor got the help she needed from Bert Kelher.

The nighttime session was much more active. About 30 guests viewed the moon, Saturn, and a host of deep sky objects through the telescopes.

Our book sale transferred a few volumes to better homes than the ignoble boxes they've been living in. We collected $108 for the club coffers. We also had an impromptu awards ceremony in which Bob Kepple received his Astronomical League Local Galaxy Group program award. Congratulations Bob!

I hope I don't miss anyone, but here goes: HAC members enjoying astronomy day at Patterson included: Rick Burke, Tom Creech, Ken Duncan, Ted Forte, Bob Gent, Gary Grue, Bob Hoover, Bert Kelher, Bob Kepple, Ken Kirchner, Glen Sanner and Doug Snyder. (Apologies to anyone I missed).

Disappearing Sky

Brian Valencia

Arizona is one of the best places in the world to see the stars but its stargazing nights might be numbered.

Light pollution primarily from Phoenix is degrading the night skies, diminishing the visibility of the heavens that has fueled a multimillion-dollar astronomy industry. Arizona's clear weather, dry climate and high mountains make the state ripe for observatories. The state boasts 30 of them, mostly around Flagstaff and Tucson.

The problem occurs when telescopes are pointed in the direction of Phoenix, which can project light for hundreds of miles in every direction and can be seen by observatories as far as Kitt Peak. Phoenix casts more light because of its sheer size but the lighting is denser than in a city like Tucson or Flagstaff, which have strict lighting ordinances.

City lights lower the visibility of the universe by casting a yellow glow over the stars.

"When we point the telescope in that direction in the atmosphere above a major metropolitan area, the background, the light that's scattered in our own atmosphere, starts to overwhelm some faint astronomical source that's behind that," says Grant Williams, director at the Observatory. "From the prospective of the observatories, we're interested in good outdoor lighting, and when outdoor lighting is done properly it benefits everybody."

The International Dark-Sky Association founded in Tucson in 1988 is dedicated to educating the public and help draft ordinances for cities. Currently the IDA is working with Malibu, California, on drafting a lighting ordinance.

"There has been really a greater attention here to make sure they are doing the right thing on outdoor lighting," says Scott Kardel, the association's acting executive director.

For decades, counties and municipalities in southern and northern Arizona have been preserving the skies by passing city light ordinances; Pima County adopted the first outdoor lighting code in 1972. Phoenix has fallen behind because no major observatories are in the area and the city is more concerned with promoting business.

Flagstaff produces around 2,500 lumens per capita without sports lighting where as Phoenix produces 3,200 lumens per capita. The difference is in the strict lighting codes Flagstaff has adopted over the years.

The astronomy industry brings Arizona around $250 million annually and more than 3,000 jobs. The state has also made an investment around $1 billion in the astronomy industry.

Other states like Hawaii compete with Arizona for astronomy tourism and related businesses. Flagstaff is in the running for the Cherenkov Telescope Array or CTA, an array to measure gamma rays in the universe. It would be one of the flagship ground-based observatories and would be a $130 million investment according to Jeff Hall, Director at Lowell Observatory. The decision to place the CTA in Flagstaff could be severely impacted by the sky glow from Phoenix according to Williams.

The millions of dollars a year the astronomy industry brings to Arizona also comes from public tourism.
"You'll realize our eyeballs are terrible," says Adam Block, public observing manager at the SkyCenter, which has the 32-inch Schulman telescope, the biggest publicly dedicated telescope in the country.

Block has met people from as far away as Estonia who have come here to view our skies.

The SkyCenter, along with other observatories, allow the public to get their hands on powerful telescopes. The SkyCenter charges anywhere from $30 to $60 to see what it is like to be an astronomer.

This article originally appeared in the Sierra Vista Herald
The author can be contacted at 'bvalencia@email.arizona.edu'

Twinkle, twinkle, variable star

By Dr. Ethan Siegel

As bright and steady as they appear, the stars in our sky won't shine forever. The steady brilliance of these sources of light is powered by a tumultuous interior, where nuclear processes fuse light elements and isotopes into heavier ones. Because the heavier nuclei up to iron (Fe), have a greater binding energies-per-nucleon, each reaction results in a slight reduction of the star's mass, converting it into energy via Einstein's famous equation relating changes in mass and energy output, $E = mc^2$. Over timescales of tens of thousands of years, that energy migrates to the star's photosphere, where it's emitted out into the universe as starlight.

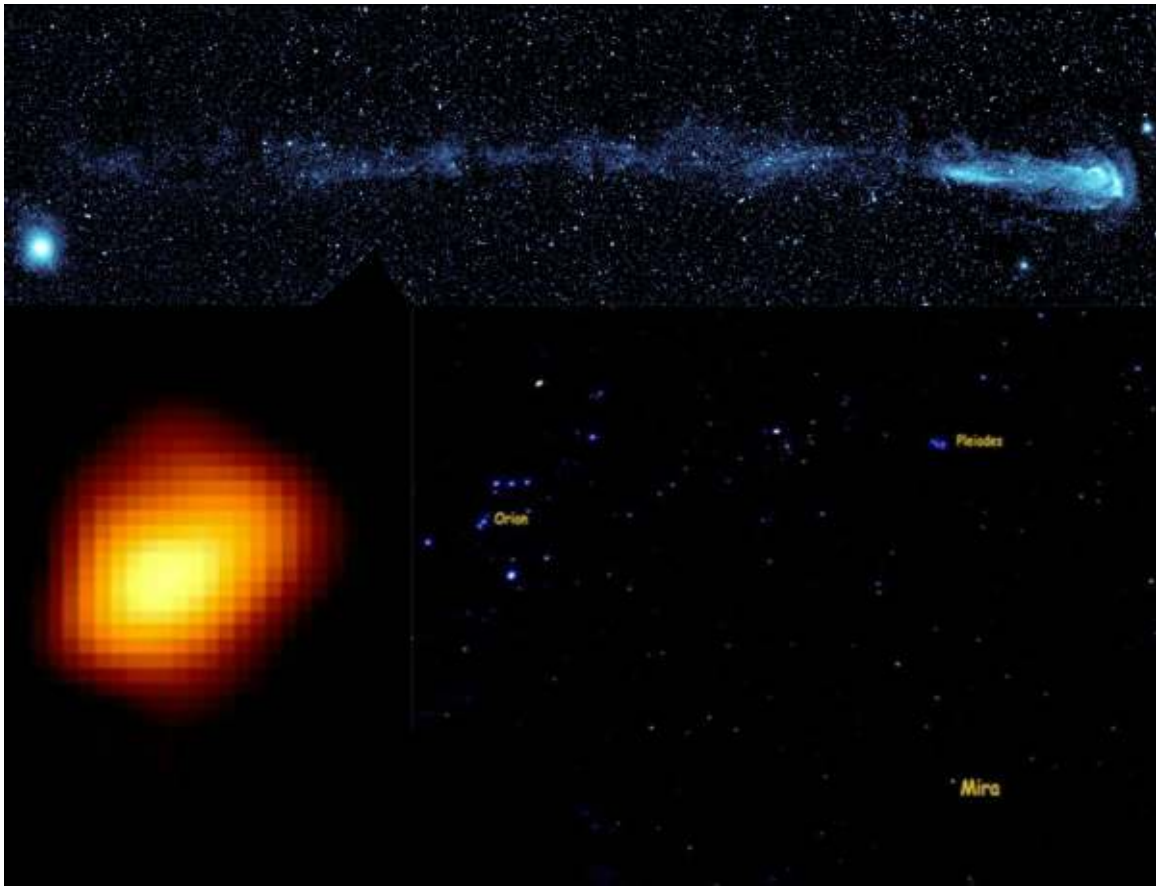
There's only a finite amount of fuel in there, and when stars run out, the interior contracts and heats up, often enabling heavier elements to burn at even higher temperatures, and causing sun-like stars to grow into red giants. Even though the cores of both hydrogen-burning and helium-burning stars have consistent, steady energy outputs, our sun's overall brightness varies by just ~0.1%, while red giants can have their brightness's vary by factors of thousands or more over the course of a single year! In fact, the first periodic or pulsating variable star ever discovered—Mira (omicron Ceti)—behaves exactly in this way.

There are many types of variable stars, including Cepheids, RR Lyrae, cataclysmic variables and more, but it's the Mira-type variables that give us a glimpse into our Sun's likely future. In general, the cores of stars burn through their fuel in a very consistent fashion, but in the case of pulsating variable stars the outer layers of stellar atmospheres vary. Initially heating up and expanding, they overshoot equilibrium, reach a maximum size, cool, then often forming neutral molecules that behave as light-blocking dust, with the dust then falling back to the star, ionizing and starting the whole process over again. This temporarily neutral dust absorbs the visible light from the star and re-emits it, but as infrared radiation, which is invisible to our eyes. In the case of Mira (and many red giants), it's Titanium Monoxide (TiO) that causes it to dim so severely, from a maximum magnitude of +2 or +3 (clearly visible to the naked eye) to a minimum of +9 or +10, requiring a telescope (and an experienced observer) to find!

Visible in the constellation of Cetus during the fall-and-winter from the Northern Hemisphere, Mira is presently at magnitude +7 and headed towards its minimum, but will reach its maximum brightness again in May of next year and every 332 days thereafter. Shockingly, Mira contains a huge, 13 light-year-long tail -- visible only in the UV -- that it leaves as it rockets through the interstellar medium at 130 km/sec! Look for it in your skies all winter long, and contribute your results to the AAVSO (American Association of Variable Star Observers) International Database to help study its long-term behavior!

Check out some cool images and simulated animations of Mira here:
http://www.nasa.gov/mission_pages/galex/20070815/v.html

Kids can learn all about Mira at NASA's Space Place:
http://spaceplace.nasa.gov/mira/en/



Images credit: NASA's Galaxy Evolution Explorer (GALEX) spacecraft, of Mira and its tail in UV light (top); Margarita Karovska (Harvard-Smithsonian CfA) / NASA's Hubble Space Telescope image of Mira, with the distortions revealing the presence of a binary companion (lower left); public domain image of Orion, the Pleiades and Mira (near maximum brightness) by Brocken Inaglory of Wikimedia Commons under CC-BY-SA-3.0 (lower right).

NASA's Space Place is a website about space and Earth science targeting upper-elementary aged children. The site includes informative articles, hands-on activities, and interactive web games. In addition to its content geared toward children, there are resources for parents and educators. There is a companion Spanish language site. Space Place is produced by a team at the Jet Propulsion Laboratory. The HAC is a *Space Place Astronomy Club Partner* and the Patterson Observatory is a *Space Place Community Partner.*

spaceplace.nasa.gov/

2014 Summer Observations

Cindy Lund

This is the second edition of my seasonal observation notes.

I went to only one star party in June, and none in July or August. However, I did check out the HAC sponsored telescope from the Sierra Vista Public Library, so I used it to do some observing between the monsoon rains. Even with this limited opportunity for observation, I saw a wide variety of objects. I saw the stars Arcturus and Vega, the double star Albireo, the Globular Clusters, M4, M13 (Hercules Cluster) and NGC 5139 (Omega Centauri) as well as the galaxies M81 (Bode's Galaxy) and M82 (Cigar Galaxy). I also saw the planets Mars and Saturn.

I enjoyed making all of these observations, but I especially enjoyed the challenge of finding objects on my own with the library telescope.

June 5, 2014 at Patterson Observatory		
M13 Hercules Globular Cluster	Globular Cluster	Mostly saw the core, since the outer parts were quite faint.
M81 Bode's Galaxy	Spiral Galaxy	Seen in same field as M82, on right side of field. Appeared as a line, with a dust lane running across.
M82 Cigar Galaxy	Irregular Galaxy	Seen in same field as M81, on left side of field. Appeared as a very thin lens shape, with nebulosity around it.
NGC 5139 Omega Centauri	Globular Cluster	Large bright core about half of the object's diameter. The outer parts were much fainter. Could not make out individual stars.
M4	Globular Cluster	Small core, only one-fourth the diameter of the object.
Albireo	Double Star	Two bright stars, one yellow orange, one pure blue. The yellow orange star is brighter.
Vega	Star (Blue Main Sequence)	Blue to white in color. Very bright.
Mars	Planet (inner)	Small disk. Orange Red in color. No details visible.
Saturn	Planet, Gas Giant	Yellow with a bright brown horizontal stripe just above the equator. Rings open, with the top side visible, covering the bottom of Saturn. Cassini gap visible about two-thirds of the way to the outside of the rings.
Moons of Saturn	Moons of Saturn	Both seen on the right side of Saturn. One appeared near Saturn, the other appeared father away. The farther one was quite bright.

July 18 at my house in Canyon de Flores, with the Sierra Vista Library (HAC) Telescope		
Albireo	Double Star	Stars clearly distinct, even at 24mm. Blue star was bright royal blue. Orange star bright orange and brighter than the blue star. The separation between the stars was about the same as the apparent size of Saturn and its rings.
Saturn	Planet, Gas Giant	Clearly Saturn. Yellow and brown. Rings clear and distinct from main body. Did not look for moons.

July 23 at my house in Canyon de Flores, with the Sierra Vista Library (HAC) Telescope		
Arcturus	Star	Yellow Orange star, much brighter than the other nearby stars.
M4	Globular Cluster	Faint round fuzzy. Core did not appear distinct. Instead, the nebula gradually grew fainter from the center out.
M13 Hercules Globular Cluster	Globular Cluster	Brighter than M4. Round disk of nebulosity. One-half core by diameter. Could not see individual stars.
Mars	Planet (inner)	Orange disk. No features visible.
Saturn	Planet, Gas Giant	Rings clear and distinct from main body. Rings same color as main body. Did not look for moons.

Doug Snyder Took this photo of HAC members on Astronomy Day:

Huachuca Astronomy Club – Board of Directors

Officers:

President: David Roemer Vice President: Chris Ubing

Secretary: Ted Forte Treasurer: Ted Forte

Members at Large:

Bob Hoover Wayne Johnson

Gary Grue Bert Kelher

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Our sponsors: Please support our sponsors, ***Farpoint and Starizona***. They have been keeping us supplied in door prizes for some years. If you have not contacted them lately, please consider this. They have a lot of great astronomical products that we all need. For more information on products and contact information, their websites are:

http://www.farpointastro.com/
http://starizona.com/

FOR SALE: Mirror Blank. 13 7/8" diameter by 4 1/2" thick. Pyrex Glass with no scratches or bubbles. Very Rare - Perfect for doing a large binocular. $75.00
Contact Rob Shernick at (520) 458-6790 or by email at nuvolari_p3@q.com

FOR SALE: Meade Starfinder 8" Reflector Telescope. Will Sell at a very reasonable price. Included are a Telrad Finder, Filters, and additional Lenses.
Please contact Mr. Jim Moses at (520) 803-0913 or at 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 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 image through the scope are at Mshadephotography.com.
Contact Mike J. Shade at mshade@q.com

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2014–Astronomically Handy Sky Calendar from Doug Snyder & the H.A.C.–2014

ARIZONA Observers SKY EVENTS Calendar for 2014 –All Times shown are MOUNTAIN STANDARD TIME*

JULY 2014

HIGHLITE: Due to Monsoons, no scheduled observing events

03 Th Earth at aphelion,1700 hrs.; 1.016 AU
04 Fr Pluto at opposition, 0100 hrs.; mag. 14.1, distance 32.5 AU
05 Sa ☽ First Quarter Moon 0500 hrs.
07 Mo Saturn within 1.5° of 76% Moon; 2030 hrs.
11 Fr **HAC Meeting,** Cochise College, 7 pm
12 Sa ○ Full Moon 0426 hrs.
12 Sa Mercury G_Elong. W. (21°); morning 'star' in East, mag. +0.4; reaches mag. 0.0 on July 15
18 Fr ☾ Last Quarter Moon 1909 hrs.
26 Sa ● **NEW MOON** 1543 hrs.
29 Tu **Delta Aquarids** Meteor Shower Pk. at 0200 hrs.; rate may approach 20 per hour, some persistent trains.
30 We Alpha Capricornids Meteors– weak, slow moving, but yellowish fireballs can be photogenic; best rate of 5/hour?

July (first-half): C/2012 K1; evening hrs. in LEO; mag 7?

AUGUST 2014

HIGHLITE: Monsoon Season; Choose your own Highlite !

03 Su ☽ First Quarter Moon 1751 hrs.
08 Fr **HAC Meeting,** Cochise College, 7 pm
10 Su ○ Full Moon 1110 hrs; **largest** of 2014
12>13 Tu>We Perseid Meteor Shower Pk. at 1700 hrs. on the 12th; v. unfavorable due to strong moonlight; rates can be high as 90/hour under dark skies
17 Su **Conjunction:** Venus/Jupiter within 1.0° and close to Beehive cluster; 0500 hrs.; But very low in the ENE skies; closest planet-planet conjunction of 2014
17 Su ☾ Last Quarter Moon 0527 hrs.
24 Su Comet Siding Spring (C/2013 A1) at opposition, 1800 hrs.; may collide with MARS in mid-October !
25 Mo ● **NEW MOON** 0714 hrs.
29 Fr Neptune at opposition, 0800 hrs.; mag. +7.8; distance 29 AU; size 2.4"
31 Su Moon/Saturn/Mars within 5° circle; Moon will be at about 35%; 2000 hrs.

SEPTEMBER 2014

HIGHLITE: Comet Possibilities

01 Mo Aurigid Meteor Shower; peak after midnight of Aug. 31 and into morning of Sept.01; fast and many are bright ; low hourly rate (5) but may outburst
02 Tu ☽ First Quarter Moon 0412 hrs.
08 Mo ○ Full Moon 1839 hrs; Harvest Moon
12 Fr **HAC Meeting,** Cochise College, 7 pm
15 Mo ☾ Last Quarter Moon 1906 hrs.
20 Sa **Kartchner Caverns/HAC S.P.,** dusk
21 Su Zodiacal Light in east before morning twilight for next two weeks
22 Mo **Autumnal Equinox** 1929 hrs.
23 Tu ● **NEW MOON** 2315 hrs.
25 Th **HAC** Public S.P.; P.O.; SS@1813 hrs.
27 Sa **Saturn** within 2° of 14% Moon, low in the WSW, 2000 hrs.

Comet Possibilities for September 2014
C/2013 A1:v.low in S., early evening;9/17>9/30 (Siding Spring); encounter MARS on 10/19
C/2012 K1: low in E., early morning; 9/1>9/30
C/2013 V5: low in E., morning; 9/1>9/13

OCTOBER 2014

HIGHLITES: MARS & COMET; 1 LUNAR ECLIPSE & 1 SOLAR ECLIPSE IN SAME MONTH !

01 We ☽ First Quarter Moon 1233 hrs.
04 Sa **NATIONAL ASTRONOMY DAY** **HAC** opens Patterson Observatory for Public Exhibits and Viewing
07 Tu Uranus at opposition, 1400 hrs.
08 We ○ Full Moon 0351 hrs.
08 We **TOTAL LUNAR ECLIPSE** Start: 0117hrs., End: shortly after moonset at 0630 hrs.; Totality: 0328 h. to 0423 hrs.
09 Th Draconids Meteor Shower; unfavorable due to bright Moonlight
10 Fr S. Taurids Meteor Shower; Pk. 0500h.
10 Fr **HAC Meeting,** Cochise College, 7 pm
15 We ☾ Last Quarter Moon 1213 hrs.
19 Su **Comet Siding Spring** (C/2013 A1) **Close** Encounter/Graze with **MARS!**
20 Mo Zodiacal Light in East before morning twilight for next two weeks
21 Tu **Orionid Meteor Shower**; v. favorable; Swift, some bright, rate about 20+/hr.
23 Th ● **NEW MOON** 1457 hrs.
23 Th Partial **Solar ECLIPSE,** Start:1430 hrs. End: 1648 hrs.; max: 1543 hrs.(29.3%) **HAC** viewing at S.V. City Library, 1 pm
25 Sa **HAC** Member S.P.
30 Th **HAC** Public S.P.; P.O.; SS@1733
30 Th ☽ First Quarter Moon 1949 hrs.

NOVEMBER 2014

HIGHLITE: METEORS & FIREBALLS

01 Sa Mercury at G_Elong. W.(19°), 0600 hrs.; **best** morning apparition of 2014, east
06 Th C/2012 K1 (PanSTARRS) at (2nd) opposition, 2000 hrs., in Pictor; possibly will or will have brightened to mag. 6
06 Th ○ Full Moon 1523 hrs.
11 Tu North Taurids Meteor Shower; rate of about 5/hr; waning 77% moon & bright
14 Fr **HAC Meeting,** Cochise College, 7 pm
14 Fr ☾ Last Quarter Moon 0816 hrs.
17>18 Mo>Tu **Leonid Meteor Shower** Peak at 1500 hrs on 17th; view pm hrs on 17th into am hours on 18th; about 20% moon; fast meteors & bright; a good number leave persistent 'trails' ; no 'storm' has been predicted, but do you remember 2001? Some of us do. WOW.
20 Th **HAC** Public S.P.; P.O.; SS@1720 hrs.
22 Sa ● **NEW MOON** 0532 hrs.
22 Sa **HAC** Member S.P.
29 Sa ☽ First Quarter Moon 0306 hrs.

Comet Of The Month—An Observing and Imaging Challenge for C/2012 K1 (PanSTARRS)
Throughout November, this comet will remain VERY low near our southern horizon and reside in these constellations: Pictor, Dorado, Phoenix, Reticulum, Horologium, and Eridanus, but may reach mag. 6 this month. Close encounter with Globular Cluster NGC1261 on 11/13; good luck!

DECEMBER 2014

HIGHLITE: GEMINID METEOR SHOWER

06 Sa ○ Full Moon 0527 hrs.
12 Fr **HAC Meeting,** Cochise College, 7 pm
13 Sa **Geminid** Meteor Shower Pk. Favorable Year, but with 50% moon; Pk. 0500 hrs. Saturday am; hourly rate can be as high as 120/hr.; mostly bright, few leaving 'trains';12/14 (Sunday) morning activity is possible also; Parent body is asteroid 3200 Phaethon (1.5 year orbit); radiant is near Castor
14 Su ☾ Last Quarter Moon 0551 hrs.
15 Mo **Dbl. Shadow Transit**, J. ; 2312 hrs. (Europa & Io); Note: At 0025 hrs. on 12/16, **both** Europa & Io will be in the process of transiting Jupiter! See 'em?
18 Th **HAC** Public S.P.; P.O.; SS@1721 hrs.
20 Sa **HAC** Member S.P.
21 Su Winter Solstice, 1603 hrs.
21 Su ● **NEW MOON** 1836 hrs..
22 Mo Ursids Meteor Shower Pk. 1300 hrs.; good date, but poor peak timing; (favors northern Asia); radiant is near β Ursa Minor (Kokab); rate is about 10/hour; faint, with a few fireballs. Parent comet is 8P Tuttle
25 Th *MERRY CHRISTMAS TO ALL !*
28 Su ☽ First Quarter Moon 1132 hrs.
28 Su Conjunction of Moon and Uranus; 2245 hrs.; less than 1.0° apart; first quarter Moon and mag. 5.8 Uranus

HAPPY NEW YEAR !

*Times/Dates= ARIZONA Mountain STANDARD Time (NO DST; UT-7hrs); **updates/ details,** see: www.hacastronomy.com or http://skycalendar.blackskies.org;
Abbr: Tr=Transit; Pk=Peak; Merc=Mercury; E=East W=West; S=South; N=North; J, Jup.=Jupiter; V=Venus; v. = very; "=arc seconds; SS=SunSet; S.P.=Star Party; h., hrs.=hours (24 hour time system); MP=Minor Planet; MS=Moon Set; MR=Moon Rise; wks=weeks; Lt=Light; pm=evening; @=at; Pub.=Public ; NEA= **N**ear **E**arth **A**steroid; am=morning; mag.=magnitude; **meteor dates reflect predicted Peak Morning, but Moon may still be present; P.O.=Patterson Observatory; ; dbl=double; I=Io; Eu=Europa; G=Ganymede; C=Callisto; UT=Universal Time; **bold text=**possibly a promising/worthy event, activity or object; G_Elong=Greatest Elongation; AU=Astronomical Unit(93 million miles); °= degrees; *compiler*: **Doug Snyder**(C/2002 E2, MP15512,starhaven@me.com); V1.1.2014