Nightfall

Monthly publication of the Huachuca Astronomy Club

February 2014

President's Notes

Digital Sign Saga Continues

We need to keep up the fight against light pollution and lighted signage. We have one of our best leading the fight. Bob Gent has been a tireless advocate for our cause, but we cannot leave him to fight alone. We need to start showing ourselves at planning meetings and letting our feelings and concerns be known.

February Meeting a Special Treat

Our February meeting, to be held on the 14th (Valentine's Day), will have a different format than we have become accustomed to. It will be the first of our member nights where you and I will have the opportunity to tell what we have been doing and show some of the clever equipment we are using to enjoy the hobby. Maybe you got a shiny new toy for Christmas. Maybe you got time over the holidays to try out that filter or eyepiece you got at the Science and Astronomy Expo back in November. This would be a great time to tell us what you think of these things. Whatever it is, it doesn't have to be completely original, clever, or incredibly expensive; just something you find interesting or even perplexing! Just sharing what you've been viewing or drawing, or a simple method for finding a good collimation on your scope, or even a new website or app that you've found useful. This will be a time to speak out.

Your presentation doesn't need to be long or professionally presented either. No, you don't need a polished PowerPoint show or a memorized speech. But you might want to bring in the thing-a-ma-bob or an image or three to share. And that image doesn't need to be a good image either. If you are having a persistent problem in your images, take a couple of images that showcase the problem and a couple shots of your rig as you are using it and bring them in, you'll get the combined brain power of the club to help you to a solution. Think of it as an AA or Astronomical Anonymous meeting, a time to share triumphs and trip ups.

New Members Corner

We would like to welcome Richard (Rick) Burke of Sierra Vista who joined HAC at the January meeting.

Please Renew Your Membership

Among other benefits, membership in the Huachuca Astronomy Club entitles you to discounts on Astronomy and Sky & Telescope magazines and membership in the Astronomical League. League members receive the quarterly Reflector magazine and are eligible to participate in the league's observing programs. Your dues however, do more than make you a member of our fine club. Your dues also support organizations like the International Dark Sky Association that is fighting to preserve our dark skies. They enable us to offer a scholarship to a deserving student each year. Your dues go into the production of new member packets that help to initiate new astronomers into our hobby. They purchase items that will help to inspire the next generation of scientists like the solar glasses we just ordered to augment our Astronomy Day and solar eclipse activities. And, your dues help us to show our appreciation to the quality speakers who enliven our monthly meetings by offering our out of town guests a dinner on us.

The on-going battle over lighted digital signs illustrates another important aspect to HAC membership. Clout. Numbers give us a louder voice in the halls of the city administration. So if you are wondering if HAC membership is worth the price of admission, consider what your membership adds to the debate. I would not only ask you to stay with us and renew your membership, I would ask you to consider recruiting a friend or two to join as well. We need your continued support to win this fight. I hope we can count on you.

Congratulations are in order for Bob Hoover

Bob earned Messier certificate # 2652 dated 10 December 2013. To earn the Messier honorary level award an observer has to independently locate, observe, and describe all of the Messier objects without the use of electronic aids (no Go-To allowed). This is a significant accomplishment as those of you that have earned this award know full well.

Bob has also submitted his logs for the first level of the Outreach Award. And it's about time! As our Outreach Coordinator, Bob has been leading the charge on outreach for more than a year and certainly has enough hours for the Stellar and perhaps Master level awards. This first level requires that you perform and record at least five two-hour (minimum) outreach events. Outreach is critical, I think, to the survival of our hobby. It is through outreach that we inspire young people to take an interest and it is through outreach that we educate our neighbors about the wonders of the night sky and the scourge that is light pollution. And if you have given it a try, I'm sure you'll agree that outreach is the most satisfying and rewarding activity we do as amateur astronomers. If you've not tried your hand at it, there are plenty of opportunities coming up. Come on out and have some fun.

Congratulations Bob!

Let's Observe Mars

by Ted Forte

Mars becomes a good telescopic target about every two years. In an opposition cycle lasting 15.8 years, Mars has three or four *Aphelic* oppositions and three consecutive *Perihelic* oppositions. The names refer to the coincidence of opposition with the shortest or longest distances from Earth. Of course Mars' largest possible angular size occurs when opposition and perihelion occur simultaneously (or as nearly simultaneous as possible) as happened in 2003. This year's apparition will be aphelic. An apparition begins as soon as the planet emerges from the glare of the sun at conjunction, and continues until it is lost again many months later. Conjunction last occurred on April 18, 2013. Mars reached its highest point in our sky on December 17, 2013 and has been moving south since then.

Mars begins retrograde motion on March 1, 2014 and will appear to move backward (westerly) against the backdrop of stars in the constellation of Virgo until May 20, 2014. Opposition, which occurs on April 8th, does not coincide with Mars' closest approach which occurs on April 14.

By March 1st, Mars will be a respectable 12 arc seconds in apparent angular size. It is about 9 arc seconds right now. At closest approach, Mars will be a disk of 15 seconds diameter. Around opposition the planet transits near midnight and it will be more than 50 degrees in altitude. This is not a particularly favorable opposition, but certainly decent enough to make for great observing. It'll be just a "nudge" from the rich galaxy hunting grounds in Virgo, so there is no excuse for not looking in.

Once you have Mars in your sights, you'll want to get oriented so that you can identify the features you detect. First you must know the longitude of the central meridian (CM) for the time of your observation. That will tell you which side of the planet you are viewing. You'll also want to be aware of which pole is tilted toward you and how the planet's axis is tilted, clockwise or counter-clockwise. On April 14, Mars' North Pole will be tilted toward us and the planet's axis will appear to be rotated counter-clockwise. Most planetarium programs will give you the longitude of the central meridian which you can then match to any of the many Mars maps that are available on the web.

Martian longitude increases to the west, it rotates in the same direction as Earth. So if you had a correct view, features would move from left to right. Most likely however, your telescope has a north-up view which is mirror reversed (SCT or refractor with star diagonal) or a south up view that is not (typical reflector). Both of these orientations will cause Martian features to appear to move from right to left. A Martian day is 24 hours and 37 minutes so if you are observing at the same time each night you'll notice a tiny change from day to day.

Mars' orbit is more eccentric than Earth's so its seasons are less equal in length; they can vary by as much as 52 days. The changing seasons bring dramatic changes to the polar ice caps and the clouds that develop over the poles. This is perhaps the most interesting and transient of the Martian features to observe. But there is also a possibility of detecting Martian craters and even catching the profile of the sunlit slope of Olympus Mons as it bisects the phase terminator. The Mars observer will also be tasked with separating real features from optical effects - an interesting and challenging activity even today. While no one will report canals or other evidence of advanced civilizations, you will be fooled by a number of illusions that have tantalized Mars observers throughout history and that will be fun to examine first hand.

So I'd like to invite all of you to make your Mars observations as the planet passes through opposition and post your impressions on HACLIST. What features can you identify? What observing techniques work best? Imagers should please post their results too - the Red Planet has always been quite photogenic. Will planet-wide dust storms obscure the view? Only time will tell if the God of War will reveal himself.

Surprising Young Stars in the Oldest Places in the Universe

By Dr. Ethan Siegel

Littered among the stars in our night sky are the famed deep-sky objects. These range from extended spiral and elliptical galaxies millions or even *billions* of light years away to the star clusters, nebulae, and stellar remnants strewn throughout our own galaxy. But there's an intermediate class of objects, too: the *globular star clusters*, self-contained clusters of stars found in spherically-distributed halos around each galaxy.

Back before there were any stars or galaxies in the universe, it was an expanding, cooling sea of matter and radiation containing regions where the matter was slightly more dense in some places than others. While gravity worked to pull more and more matter into these places, the pressure from radiation pushed back, preventing the gravitational collapse of gas clouds below a certain mass. In the young universe, this meant no clouds smaller than around a few hundred thousand times the mass of our Sun could collapse. This coincides with a globular cluster's typical mass, and their stars are some of the oldest in the universe!

These compact, spherical collections of stars are all less than 100 light-years in radius, but typically have around 100,000 stars inside them, making them nearly 100 times denser than our neighborhood of the Milky Way! The vast majority of globular clusters have extremely few heavy elements (heavier than helium), as little as 1% of what we find in our Sun. There's a good reason for this: our Sun is only 4.5 billion years old and has seen many generations of stars live-and-die, while globular clusters (and the stars inside of them) are often *over 13 billion years old*, or more than 90% the age of the universe! When you look inside one of these cosmic collections, you're looking at some of the oldest stellar swarms in the known universe.

Yet when you look at a high-resolution image of these relics from the early universe, you'll find a sprinkling of hot, massive, apparently *young* blue stars! Is there a stellar fountain of youth inside? Kind of! These massive stellar swarms are so dense -- especially towards the center -- that mergers, mass siphoning and collisions between stars are quite common. When two long-lived, low-mass stars interact in these ways, they produce a hotter, bluer star that will be *much* shorter lived, known as a *blue straggler star*. First discovered by Allan Sandage in 1953, these young-looking stars arise thanks to stellar cannibalism. So enjoy the brightest and bluest stars in these globular clusters, found right alongside the oldest known stars in the universe!

Learn about a recent globular cluster discovery here: http://www.nasa.gov/press/2013/september/hubble-uncovers-largest-known-group-of-star-clusters-clues-to-dark-matter.

Kids can learn more about how stars work by listening to The Space Place's own Dr. Marc: http://spaceplace.nasa.gov/podcasts/en/#stars.

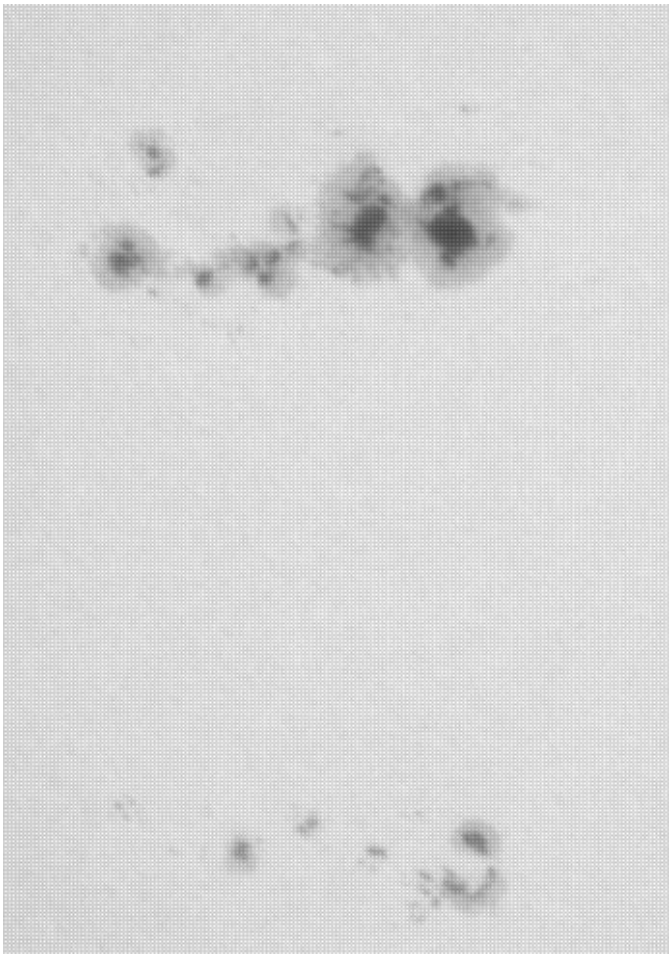
Globular Cluster NGC 6397. Credit: ESA & Francesco Ferraro (Bologna Astronomical Observatory) / NASA, Hubble Space Telescope, WFPC2.

Recent Astrophotography by HAC Members

Supernova 2014J in M82 by Rick Burke

Supernova 2014J in M82 by Rich Swanson

Twin Sunspots by Paul



Twin Sunspots by Paul - Close up

Sad new from Wayne (aka Mr. Galaxy)

Sad to hear that the irascible old man of amateur telescope making and popularizer of using those scopes, John Dobson, passed away at the ripe, young age of 98. He was a fascinating personality who was a favorite guest of talk show host Johnny Carson (an amateur astronomer himself). I was fortunate to know John fairly well from his many trips to the Los Angeles area and arranged for him to give talks at a few astronomy clubs around the area on his view of the "Apparitional Universe". He had an interesting presentation style where he would begin his talk with, "Any questions?". Of course, no one knew what to ask so he just started with his spiel. At some point during his talk he would also throw flyers out into the audience which advertised his series of talks being given at the Vedanta Society (he was a former Buddhist monk, but a physicist by training) where he stayed in LA. I made it a point (along with many other amateurs) to attend his 90th birthday celebration in San Francisco.

Astronomy Equipment For Sale

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:
Meade. LX 8 inch. LX 200 Schmidt - Cassegrain Telescope.
Tripod - field mount
JMI. Hard Case
Viewfinder. 8x50
No. 1812 Electronic DC Adapter. Meade
Piggyback Bracket. Meade
Bubble Level
AC Adapter. Input 120v AC. Output 18 VDC @ 2 Amps
Fused Hookup Cord. 50 ft
Eyepiece Holder
T - adapter
No. 07217 #928 45 degree erect image Diagonal Prism. 1.25"
No. 07202 #918A Diagonal Prism. 1.25 "
Ultra bright Green laser pointer
No. 07182 Eyepiece Holder. 1.25"
Meade Super Phossl 9.7 mm Multi Coated eyepiece
Meade Ultra Wide Angle 4.7 mm Multi coated eyepiece
Meade Super Phossl 26mm Multi Coated eyepiece
Meade 2x TeleNegative. Multi Coated eyepiece
Meade 12.5 mm Multi Coated eyepiece
Meade 07531 N D 96 (0.9). Eyepiece Filter 1.25 inch
Meade T-PK-AF. Ring
TeleVue 17mm Nagler Type 4
Red Lens Flashlight
Meade AutoStar Controller
ProMaster Luggage Bag - Wheels 16x20 inch. Padded for the above.
Please Contact Darrell Goar by email <dgoar13017@aol.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 listed are MOUNTAIN STANDARD

JANUARY 2014

HIGHLITES:

Quadrantid Meteors
Jupiter at Opposition

01 We ● **NEW MOON** 0414 hrs. (MST)
03 Fr **QUADRANTIDS** Meteor Shower very favorable; view after midnight; radiant near constellation Bootes; possible hourly rate of up to 120
04 Sa Earth at perihelion 0500hrs.; 0.983 A.U.
04 Sa **HAC** Member Star Party (S.P.)
05 Su JUPITER AT OPPOSITION 1400 hrs.; Mag. –2.7 distance=4.2 AU size=47″
07 Tu ☽ First Quarter Moon 2040 hrs.
09 Th **HAC** Public S.P.; P.O.;SS@ 1735 hrs.
10 Fr **HAC Meeting,** Cochise College 7pm
15 We ○ Full Moon 2153 hrs.; smallest of 2014
23 Th ☾ Last Quarter Moon 2220 hr
25 Sa Saturn 1.2° north of Moon, 0535 hrs.
30 Th ● **NEW MOON** 1439 hrs.; lunation 1127
31 Fr Mercury G_ Elong. East (18☒0300 h., view as 'evening' star in western sky 1/2 hour after sunset; mag. –0.7

Jupiter's Galilean Moons—January 2014
There are no double-transit events this month, but satellite Callisto has four encounters with its mother planet (local dates and times):
1/11:1944 hrs. Occultation Disappearance
1/12: 0044 hrs. Eclipse Reappearance
1/20: 0438 hrs. Transit Ingress
1/28: 1854 hrs. Eclipse Reappearance
Note:**HAC=H**uachuca **A**stronomy **C**lub

FEBRUARY 2014

HIGHLITES:

Venus at its brightest,
Callisto's Shadow on Jupiter

01 Sa **HAC** Member S.P.
06 Th ☽ First Quarter Moon 1221 hrs.
Double Shadow Transit, Jupiter; 0323 hrs. (Europa & Callisto); rare
HAC Public S.P.; P.O.;SS@ 1800 hrs.
07 Fr Alpha Centaurid Meteors, Pk. 2305 hrs. Radiant point in southern hemisphere
11 Tu Venus greatest magnitude: -4.6, 1600h.
14 Fr ○ Full Moon 1654 hrs.
HAC Meeting, Cochise College 7pm
15 Sa Venus at greatest illumination, mag.-4.9; morning 'star' in southeast sky
17 Mo Zodiacal Light in the west for next two weeks following evening twilight
19 We Spica (star) within 2.5° of Moon,0500 h.
22 Sa ☾ Last Quarter Moon 1016 hrs.
26 We Venus within 6° of Moon, 0500 hrs.

Long Period Variable Stars– Feb. 2014
Verify with www.aavso.org ;listed are stars brighter than mag. 8 at max.: period in days (d);date is predicted epoch max.

0228-13;U Cet;7.5>12.6;235d;Feb.10
1811+36;W Lyr;7.9>12.2;196d;Feb.17
1901+08;R Aql;6.1>11.5;267d; Feb.15
2044-05;T Aqr;7.7>13.1;202d; Feb. 04

MARCH 2014

HIGHLITES:

Kartchner Caverns S.P.(22)
Messier Marathon?(29)

01 Sa ● **NEW MOON** 0100 hrs.
01 Sa **HAC** Member S.P.
06 Th **HAC** Public S.P.; P.O.; SS@1823 hrs.
08 Sa ☽ First Quarter Moon 0628 hrs.
14 Fr Mercury G_Elong. W. (28°); morning 'star' in twilight to the east
14 Fr **HAC Meeting,** Cochise College 7pm
16 Su ○ Full Moon 1010 hrs.
18 Tu Zodiacal Light in the west for next two two weeks following evening twilight
20 Th **Vernal Equinox** 0957 hrs.
21 Fr Saturn close (north) to Moon
22 Sa **Kartchner Caverns S.P. ;**1830 hrs.
23 Su ☾ Last Quarter Moon 1847 hrs.
29 Sa **HAC Messier Marathon**-Proposed This date 110 objects should be visible
30 Su ● **NEW MOON** 1146 hrs.

Possible Favorable Periodic Comets—Reaching Perihelion March 2014
Obtain elements/ephemerides at www.minorplanetcenter.net; listed dates/times are in UT (to retain MPC accuracy)
P/2007 H3 (Garradd); Mar 01.23;1.8 AU
P/2008 A2 (LINEAR); Mar 03.40; 1.3 AU
52P (Harrington-Abell); Mar 07.54; 1.8 AU
290P/1998 U3(Jager); Mar 12.57; 2.15 AU
117P/Helin-Roman-Alu; Mar 27.16; 3.0 AU

APRIL 2014

*HIGHLITE: **Total Lunar Eclipse (1 of 2 in 2014)***

03 Th **HAC** Public S.P.; P.O.; SS@1841 hrs.
07 Mo ☽ First Quarter Moon 0132 hrs.
08 Tu MARS at opposition, 1400 hrs.
09 We Comet 124P (Mrkos) at perihelion 0738 hrs.; perihelion distance 1.6 AU
11 Fr **HAC Meeting,** Cochise College 7pm
12 Sa Asteroid 4 Vesta at opposition 2200hrs.
14 Mo Mars closest approach, 0600 hrs.; 0.62 AU from Earth, mag. –1.5; Size:15.2 arc-seconds
14>15 (Mo>Tu): **Total Lunar Eclipse** 2157 hrs. (14th) to 0337 h.(15th) Total from 0010h. to 0124h. (15th)
15 Tu ○ Full Moon 0043 hrs.
17 Th Saturn close (north) to Moon, 0000h.
22 Tu ☾ Last Quarter Moon 0053 hrs.
23 We **Lyrid Meteor Shower,** Pk. 1045 h.; some 46% moon; view on 23rd am
26 Sa **HAC** Member S.P.
28 Tu ● **NEW MOON** 2315 hrs.

MAY 2014

*HIGHLITE: **Astronomy Day & Saturn at opposition, May 10***

01 Th **HAC** Public S.P.; P.O.; SS@1900 hrs.
1 Th Mercury @ perihelion; evening star, mag. –1.6; view WNW at dusk
6 Tu **Eta Aquarid Meteor Shower**, Pk@ 0100 hrs.;40% Moon; rate 60+?
06 Tu ☽ First Quarter Moon 2016 hrs.
09 Fr **HAC Meeting,** Cochise College 7pm
10 Sa **NATIONAL ASTRONOMY DAY** (**HAC** event at Sierra Vista City Library)
10 Sa **Saturn** at opposition, 1100 hrs.; mag. +0.1, 8.9 AU from Earth, total size of 42.4″ (planet itself 18.7″)
14 We ○ Full Moon 1217 hrs.
21 We ☾ Last Quarter Moon 0600 hrs.
24 Sa **NEW** Meteor Shower? Predicted strong peak from Midnight to 0100 on am of 24th; radiant in Camelopardalis; from Comet 209P/LINEAR; best of 2014?
28 We ● **NEW MOON** 1141 hrs.
31 Sa **HAC** Member S.P.

JUNE 2014

HIGHLITE:

Venus/Moon Conjunction
(photo-op?)

05 Th **HAC** Public S.P.; P.O.;SS@1923 hrs.
☽ First Quarter Moon 1340 hrs.
12 Th ○ Full Moon 2112 hrs.
13 Fr **HAC Meeting,** Cochise College 7pm
19 Th ☾ Last Quarter Moon 1140 hrs.
21 Sa **Summer Solstice** 0351 hrs.
24 Tu Conjunction of crescent 7% Moon and Venus; 0518 to ENE
27 Fr June Bootids Meteor Shower; overhead to dawn on 27th; may show outburst
27 Fr ● **NEW MOON** 0109 hrs.
28 Sa **HAC** Member S.P.

Long Period Variable Stars–June 2014
Verify with www.aavso.org ;listed are stars brighter than mag. 8 at max.: period in days (d);date is predicted epoch max.

1946+32; x Cyg; 5.2>13.4; 407d; Jun 24
1432+27; R Boo; 7.2>12.3; 223d; Jun 21

*Times/Dates= ARIZONA Mountain STANDARD Time (MST; 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/noteworthy 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

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