NIGHTFALL
Huachuca Astronomy Club of Southeastern Arizona

# August 2012

**President's Notes**

**Next Meeting:** **Our next meeting will be Friday, August 3, at 7 pm in room 1105 of the Science Building at Cochise College. Please take note that this is a change from our regular meeting place! We will be presenting plans on observing exciting events such as the Perseids Meteor Shower on August 11-12, and the Occultation of Venus as the moon passes by on the afternoon of August 13. In addition, we are inviting past presidents and officers of HAC to give brief updates about the history of HAC.**

**The monsoons are in high gear:** **Since July 1 at our place, we've received almost five inches of rain on the eastern side of the Huachuca Mountains. It's a good thing we have not planned any observing sessions because we've had so many cloudy nights. On a positive note, the observing action picks up in September when the rains and clouds hopefully subside.**

**Upcoming events:** **Dine under the Stars at the University South Foundation's Patterson Observatory is scheduled for September 8. This is a big fundraiser for the University of Arizona South Foundation and income is used to support scholarships among other activities.**

**Star Night at Kartchner caverns State Park:** **Our next Star Night at Kartchner Caverns is Saturday September 15, and we will have a guest speaker from National Parks who specializes in astronomy and archeology. The next Patterson Observatory public night is September 20. We hope to see you at these activities.**

**HAC annual Picnic:** **The 30th anniversary HAC picnic will be at Glen and Deanna's place on Saturday, October 13. Stay tuned for more details on this gala event.**

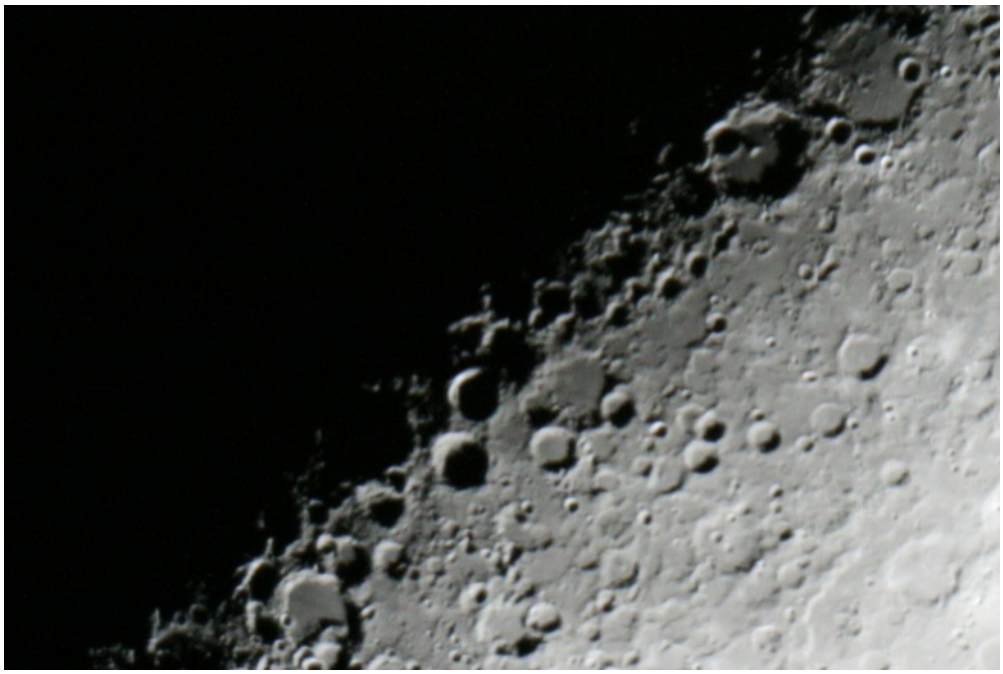
**Audubon Research Ranch:** **We are also planning an astronomy night with a talk and telescopes at the Audubon Society's Research Ranch near Elgin on Oct 20. If you would like to bring a telescope and need directions, please let me know at RLGent@cox.net.**

**Return to Douglas:** **Yes, it's a long drive to Paul Huber Middle School in Douglas, but last year's star party extravaganza was so exciting, we are doing it again. This event is planned on Tuesday evening October 23. Last year we had about 300 students, teachers, parents, and friends, so we will need a lot of help again this year.**

**HAC Meeting Schedule for 2013:** **We will be meeting on the fourth Friday of the month next year. That's generally closest to the full moon. Again, we will meet in the Community Room of the Student Union at Cochise College on the following dates: Jan 25, Feb 22, March 22, April 26, May 24, June 28, July 26, August 23, Sept 27, Oct 25, and Nov 22. The fourth Friday of December is too close to Christmas, so instead of a regular meeting, we will hold a party on December 14 -- location TBD.**

**A few photos:** **Here's an 18 second shot of the Orion Nebula taken with HyperStar on the C11 last winter. That's an 18 second exposure with a satellite passing through the field.**

**Purbach's Cross:** **This photo was taken using the C11 last November. Past President Wayne Johnson posted a message to the HAC-List, and I walked out to the observatory. Sure enough there it was. There is always some new wonder of the night sky to discover.**



**Clear skies and bright stars,**

**Bob Gent**
**President, Huachuca Astronomy Club**

# BOOK REVIEW

Cindy Lund

Discoverers of the Universe: William and Caroline Herschel
By Michael Hoskin

I found *Discoverers of the Universe: William and Caroline Herschel* to be a worthwhile read. I learned many things about William, Caroline, their lives, and their discoveries.

When William Herschel discovered Uranus, he was still an amateur astronomer. He was very dedicated, having cast his own mirrors and made his own telescopes, but I got the impression that he would have fit in our Huachuca Astronomy club as a very enthusiastic member. After he discovered Uranus, he became "Astronomer to His Majesty". Again he was like a dedicated member of the club, in that he hosted "Star Parties", but instead of showing astronomical objects to the general public, he showed them to King George III and his family.

I had thought that William and Caroline were the only siblings in the Herschel family. Actually they were two of ten siblings, six of which survived to adulthood. William was the fourth (third surviving). Caroline, twelve years younger, was the eighth, (fifth surviving).

The Herschels were from Hanover, but William moved to Bath, England. Before, he had been an Army bandsman.

Caroline could have been a singer. She did a few performances and was offered an opportunity to perform in Birmingham but she decided to stay with William. According to Hoskin, "Her decision had trivial consequences for the history of music; the consequences for the history of astronomy would be immense."

Caroline discovered at least eight comets. Hoskin argues she may have discovered a ninth. She also discovered two nebulae in one night, although Messier had actually already found one of them. This made William realize that there were many nebulae left to be discovered.

To discover the nebulae, William and Caroline conducted sweeps of the sky with a telescope that was 20 feet long. It was a very complex process. William kept his reflector facing south and let the sky's rotation bring regions of the sky into view. A work man raised and lowered the telescope as needed. Caroline sat at a desk near a window and recorded William's findings, so that his eyes could stay dark adapted. She also organized a catalog of stars by angular distance from the North Pole, so that she could tell William which stars would come in to view next and would know which star he referred to when he described a nebula's position.
William and Caroline discovered 2,510 nebulae and star clusters.

William observed that some star clusters were tightly packed, while others were more scattered. He theorized that star clusters gradually collapse under their own gravity, and that the tightly packed star clusters were older. Hoskin said that this was a big deal. William saw the universe as changing, dynamic, unlike the clockwork universe of Newton. William also speculated on whether all nebulae were actually star clusters, but some could not be resolved into individual stars. In addition, William believed that all planets had life, which was a sort of religious conviction.

To test if all nebulae were star clusters, William built a telescope that was 40 feet long and almost five feet in diameter. While the tube was still on the ground, William and Caroline threw a dinner party for some musical friends. After dinner, they all went into the tube and sang "God save the King". Many people walked through the tube, even King George III.

The 40 foot telescope succeeded all too quickly. William saw the central star in a planetary nebula, and so found that there really was true nebulosity.

Eventually William and Caroline quit doing their sweeps. Caroline moves out of William's house in 1797, which made it much harder for them to conduct the sweeps. William's son, John Herschel, completed his father and aunt's work. He became the only astronomer to ever complete a sweep of the entire sky with a major telescope. John completed the Sweeps in 1838. , but did not get his results published until July 1848. By that time Caroline was 97. Hoskin said she had lived so long so she could see the publication. She died a few months later.

# *SKY-CALENDAR UPDATE FOR AUGUST 2012*

Doug Snyder

*A Busy Month! – Meteors, Moon Shadows, Venus Daylight Occultation, and More!*

*Note: Unless otherwise noted, all dates and times are shown in Arizona's* ***Mountain Standard Time*** *– NOT* ***in Universal Time (U.T.) nor in Eastern Time (E.T.). MST is behind UT by 7 hours.***

**August 1 (Wednesday)**: First of two August Full Moons, 8:28 pm; this one sometimes called the Sturgeon Moon. A 2nd full moon (sometimes referred to as "a blue moon") occurs on Friday, 8/31.

**August 6 (Monday):** Double Shadow Transit, Jupiter: moons **Ganymede** & Io; starting at 1:07 am; difficult, as Jupiter rises in the northeast a just few minutes earlier! The shadow of Ganymede egresses the disc of the planet at 1:38 am, and the event ends as Io's shadow departs at 3:15 am.

**August 11/12 (Saturday/Sunday): Perseid Meteors!** This is the most famous meteor shower. View during the dark hours of Saturday, 8/11, into the morning twilight hours of 8/12 (Sunday). Some predict the peak to be near 5 am on Sunday. The radiant will be just north of the bright star Mirfak (α Per [alpha Persei]) in Perseus. A waning crescent moon will rise after 1 am, but should not interfere significantly. These meteors are generally fast, sometimes bright, and often leave persistent trains. This shower has been observed for centuries and is associated with the comet **109P/Swift-Tuttle.** The shower is considered active from July 17 through August 24 of each year. Try and take pictures!

**August 13 (Monday):** Double Shadow Transit, Jupiter; moons Io & **Ganymede**; starting at 3:47 am; this is a good one as Io's shadow starts across the planet's disc at 3 am, followed by Ganymede's shadow at 3:47; Io's shadow egresses during morning twilight (5:09 am).

**August 13: Daylight occultation of Venus by the Moon! :** On this day of the occultation, the Moon will be a 15% illuminated waning crescent in the west and at an altitude of about 28 degrees. Venus will present a 49% disc at a size of about 24 arcseconds; the disappearance of Venus will occur at about 1:47 pm; the position angle (PA) of Venus relative to the moon will be around 122° (per IOTA) at disappearance. Venus will reappear at 2:52 pm at a PA of 270°, and the Moon will set at 4:12 pm.

**August 17 (Friday): New Moon:** 8:55 am; start of lunation 1109

**August 22 (Wednesday):** (00:18) Double Shadow Transit, Jupiter's moons Io & Europa; at 18 minutes past midnight on 8/22, Europa's shadow will ingress on to the disc of Jupiter; Io's shadow will already be visible on the disc. The double shadow transit will last until about 1:34 am when Io's shadow will egress the disc of Jupiter, leaving Europa's 'lone' shadow moving across the disc.

**August 24 (Friday):** Neptune at opposition : 6 am; magnitude: 7.8, size: 2.4", distance:29 AU

**August 29 (Wednesday):** Double Shadow Transit, Jupiter's moons Io & Europa; the DST starts at 2:58 am when Europa's shadow ingresses onto the disc of Jupiter; Io's shadow is already visible on the disc. This DST will last until 3:24 am at which time, the shadow of Io will egress Jupiter's disc. During a portion of this DST, the 'GRS' (Great Red Spot), now not quite so 'Great', will also be in view on Jupiter.

**August 31 (Friday):** Full Moon (sometimes called the "Blue Moon"); 6:58 am.

*Reminder: There are ALWAYS exciting and unusual sky phenomena happening in our visible universe whether WE know it or see it; make your discovery tonight! These updates are just a fraction of observable sky events! THANK YOU & CLEAR SKIES UNTIL NEXT MONTH – Doug (starhaven@palominas.com)*

# A Big Dark-Sky Giveaway

Enter the International Dark-Sky Association's Dark-sky Giveaway for an astronomically grand prize— a set of eight TeleVue Ethos eyepieces valued at $5,665, generously donated by Televue Optics. To enter this contest, you must be an IDA member before the entry closeout date of August 31, 2012. If you are not a member, joining is easy and the cost of a one-year membership is only $35.00. To join or renew your membership, visit www.darksky.org and select the "Join" tab at the top of the webpage. You can also join by calling the IDA office at (520) 293-3198. Entering to win is also a breeze. Visit darksky.org/giveaway where you can fill out the entry form online and read the official rules.


Your membership in IDA is critical in helping fight light pollution, and it helps to support IDA's many programs. Through the International Dark Sky Places program, IDA and its partners certify locations with exceptional nightscapes as International Dark Sky Communities, International Dark Sky Parks, and International Dark Sky Reserves. The Dark Sky Parks and Protected Area Program currently works with national parks to help them utilize quality outdoor lighting. IDA's new Suburban Outreach Sites project partners with astronomy clubs to establish accessible programs for kids and their parents. These programs help IDA to engage communities and to raise awareness and ultimately "to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting." IDA members make a big difference in their communities and around the world.

Make sure you enter the Dark-Sky Giveaway by the deadline and good luck! The winner will be announced at the Pacific Astronomy and Telescope Show in September 2012, but you do not need to attend PATS to win.

Bob Gent
Past president, IDA Board of Directors

**HAC Officers and Board of Directors:**
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www.hacastronomy.com -- A great place to visit!

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# 2012—ARIZONA's Astronomically Handy Sky Calendar from Doug Snyder—2012

## ARIZONA SKY PHENOMENA Calendar—All Times shown are MOUNTAIN STANDARD TIME*

### January 2012
**HIGHLITE: Shadow Transits on Jup.**
01 Su New Year's Day; HNY2012 !
03 Tu Dbl. Shadow Tr., 2327hrs.,G&Eu
**Quadrantid** Meteors Pk@2400h. view a.m. of 4th**; an 80% moon sets just after 0300 hrs.
09 Mo ○ Full Moon 0031 hrs.
10 Tu Dbl.Shadow Tr., 2326hrs., Eu&G
11 We Comet P/2006 T1(Levy); mag.7?; perihelion@2343 hrs, 1.0074AU
16 Mo Spica 2°N. of Moon, 0100 hrs.
☾ Last Quarter Moon 0209 hrs.
21 Sa Mars at mag.-0.3, size 10.7″
23 Mo ● **NEW MOON** 0040 hrs.
30 Mo ☽ First Quarter Moon 2110 hrs.

### February 2012
**HIGHLITE: C/2009 P1 Garradd**
03 Fr **Comet Garradd,** 0.5° from M92 Globular in Hercules, 3am
07 Tu ○ Full Moon 1454 hrs.
09 Th Venus 0.3° N. of Uranus, pm; mag. –4.1 & +5.9; size: 16″, 3.4″; eyepiece recommended
10 Fr Zodiacal Lt. in W., pm, next 2 weeks; after twilight.
14 Tu ☾ Last Quarter Moon 1005 hrs.
21 Tu ● **NEW MOON** 1535 hrs.
25 Sa Venus 3° S. of waxing Moon
26 Su Jup. 4° S. of Moon, pm
29 We ☽ First Quarter Moon 1822 hrs.
Leap-day: 2012 has 366 days

### March 2012
**HIGHLITE: Planetary Arrangements**
03 Sa Mars @**opposition**, 1335 hrs., size at 13.9″, mag. –1.2
05 Mo Mars closest to Earth, 1000hrs
Merc. evening planet in W., 7″
08 Th ○ Full Moon 0239 hrs.
10 Sa Zodiacal Lt. in W., pm, next 2 weeks; after twilight
14 We ☾ Last Quarter Moon 1826 hrs.
19 Mo Vernal **Equinox**, 2214 hrs.
22 Th ●**NEW MOON** 0738 hrs.
Dbl. Shadow Tr., 1935hrs., I&G
27 Tu Venus G_Elong. E., 46°, in western sky after sunset
30 Fr ☽ First Quarter Moon 1241 hrs.

### April 2012
**HIGHLITES: Saturn, Lyrid Meteors**
03 Tu **Venus** 0.5° S. of M45 (Pleiades) in early evening, western skies
06 Fr ○ Full Moon 1219 hrs.
13 Fr ☾ Last Quarter Moon 0350 hrs.
15 Su **Saturn@ opposition**, 1100hrs
18 We Merc. morning planet in E., 8″
21 Sa ● **NEW MOON** 0019 hrs.
**Lyrid Meteors,** Pk 2200hrs.
28 Sa **Astronomy Day #1 2012**
29 Su ☽ First Quarter Moon 0259 hrs
30 Mo Venus at brightest mag., –4.7

### May 2012
**HIGHLITE: Annular Solar Eclipse**
05 Sa η-Aquarid Meteors; unfavorable year due to moon; pk.1200hrs.
○ Full Moon 2036 hrs.; largest in 2012
12 Sa ☾ Last Quarter Moon 1447 hrs.
20 Su ● **NEW MOON** 1648 hrs.
**Annular Solar Eclipse;** best Arizona site: near city of Page; low altitude Sun; starts at 1724 hrs., max. at 1834 hrs.
28 Mo ☽ First Quarter Moon 1317 hrs.

### June 2012
**HIGHLITE: Solar Transit of Venus**
04 Mo Partial Lunar Eclipse; penumbra starts 0148 hrs.; partial at 0259 hrs; partial ends 0506 hrs
○ Full Moon 0412 hrs.
05 Tu **Transit of Venus**; start at 1510 hrs.; still in progress at sunset at 1916 hrs.
11 Mo ☾ Last Quarter Moon 0342 hrs.
19 Tu ● **NEW MOON** 0803 hrs.
20 We Summer Solstice, 1607 hrs.
26 Tu ☽ First Quarter Moon 2031 hrs.

### July 2012
**HIGHLITE: Jupiter's Morning Light**
01 Su Merc., west sky, pm twilight, mag. +0.4, size 8.1″
03 Tu ○ Full Moon 1152 hrs.
10 Tu ☾ Last Quarter Moon 1849 hrs.
12 Th Venus, am, brightest mag., -4.7
14 Sa Comet 96P/Machholz, Perihelion
18 We ● **NEW MOON** 2125 hrs.
21 Sa Dbl.Shadow Tr., 0354hrs, Eu & I
26 Th ☽ First Quarter Moon 0157 hrs.
28 Sa Dbl.Shadow Tr., 0446hrs, Eu & I
29 Su S. δ– Aquarid meteors Pk. in am, unfavorable year, 78%Moon
30 Mo Jupiter, am, size 36″, mag. –2.1

### August 2012
**HIGHLITE: Perseid Meteor Shower**
01 We ○ Full Moon 2028 hrs.
09 Th ☾ Last Quarter Moon 1156 hrs.
12 Su **PERSEID** Meteors: **favorable!** View pm 11th & am 12th
13 Mo Dbl.Shadow Tr., 0348hrs., I & G
**Occultation of Venus by the Moon; near 1340 hrs.**
16 Th Merc. morning planet in E., 8″
17 Fr ● **NEW MOON** 0855 hrs.
24 Fr Neptune @ Opposition,0600h. mag.+7.8, size 2.3″, 29AU
☽ First Quarter Moon 0654 hrs.
31 Fr ○ Full Moon (**2nd**) 0659 hrs.

### September 2012
**HIGHLITE: Northern Lights in AZ ?**
08 Sa ☾ Last Quarter Moon 0616 hrs.
12 We Epsilon (ε) Eridanids Meteors peak near 0600hrs; favorable
14 Fr Zodiacal Lt. in E., am, next 2 weeks before twilight
15 Sa ● **NEW MOON** 1911 hrs
**Alert For** aurora activity before, during & after Equinox
22 Sa **Autumn Equinox** 0749 hrs.
☽ First Quarter Moon 1241 hrs.
29 Sa Uranus @ opposition, 0000hrs. mag. +5.7, size 3.7″, distance 19.1 AU from Earth
○ Full Moon 1241 hrs.

### October 2012
**HIGHLITE: Meteor Showers (3)**
03 We Venus/Regulus Appulse—one of the best for 2012; E., 0500hrs
08 Mo ☾ Last Quarter Moon 0034hrs
Draconids Meteors: 0300 to dawn
10 We **S. Taurids** Meteors: favorable!
13 Sa Zodiacal Lt., E., am, next 2 wks.
15 Mo ● **NEW MOON** 0503 hrs.
21 Su **Orionids** Meteors: v. favorable!
☽ First Quarter Moon 2033 hrs.
29 Mo ○ Full Moon 1250 hrs.

### November 2012
**HIGHLITE: LEONID Meteor Shower**
06 Tu ☾ Last Quarter Moon,1736hrs.
12 Mo **N. Taurids** Meteors, 0400h.
13 Tu ● **NEW MOON** 1509 hrs.
17 Sa **Leonid Meteors!** First of 2 Pks., 0200hrs.; v. favorable
19 Mo 2nd **Leonid** pk. possible 2400h.
20 Tu ☽ First Quarter Moon 0732 hrs.
27 Tu Venus/Saturn Conjunction! E., am, 0630hrs., 0.6° separation
28 We ○ Full Moon 0747 hrs.

### December 2012
**HIGHLITE: GEMINID Meteor Shower**
02 Su JUPITER @ Opposition, 1900 h.
04 Tu Merc. morning planet in E., 7.4″
06 Th ☾ Last Quarter Moon 0832 hrs.
13 Th ● **NEW MOON** 0142 hrs.
**GEMINIDS Pk:** 0500 hrs.; Very Favorable for 2012
19 We ☽ First Quarter Moon 2220 hrs.
21 Th Solstice (Winter) 0412 hrs.
22 Fr **Ursid** Meteors Pk., 0100 hrs.
28 Fr ○ Full Moon 0322 hrs.

*Times/Dates= ARIZONA MountainStandardTime (UT-7hrs), NO DST; **updates/ details,** see**:** http://skycalendar.blackskies.org;
**Abbr**: Tr=Transit; Pk=Peak; Merc=Mercury; E=East W=West; S=South; N=North; J, Jup.=Jupiter; V=Venus; "=arc seconds; h., hrs.=hours (24 hour time system); MP=Minor Planet; MS=Moon Set; wks=weeks; Lt=Light; pm=evening; v.= very am=morning; mag.=magnitude; **meteor shower dates reflect predicted Peak Morning, but Moon may still be present; I=Io; Eu=Europa; G=Ganymede; C=Callisto; UT=Universal Time; **bold text=**possibly a promising/worthy event or activity; G_Elong=Greatest Elongation; dbl= double; AU=Astronomical Unit; *compiler*: Doug Snyder (C/2002 E2, MP15512); V2.0.2012