NIGHTFALL
Huachuca Astronomy Club of Southeastern Arizona

June 2012

President's Notes:

The next meeting of the Huachuca Astronomy Club will be held at Cochise College on Friday, June 1, 2012 at 7 pm. This meeting will be held in the community room of the Student Union building. The guest speaker will be Dr. Constance Walker from the National Optical Astronomy Observatory. Dr Walker is trained as an astronomer and now serves as a science education specialist. She conducts professional development for educators, and she develops curricula and kits for informal and formal science education programs. In addition, she convenes conference sessions and workshops for students and teachers. She is on the Board of Directors for the Astronomical Society of the Pacific and the International Dark-Sky Association (IDA). Last year, she won IDA's Hoag-Robinson award for bringing dark skies awareness to the public and directs the international light pollution tracking campaign, GLOBE at Night.

My wife, Terrie, and I observed the annular eclipse from Page, and we photographed it from very close to the centerline. The weather was really good with clear skies and little wind. We observed it with nearly 100 other astronomers/photographers from Wahweap View in Glen Canyon National Recreation Area. The viewpoint was great with a panorama in all directions. Since the moon was near apogee, it was too small to cover the entire sun, so it was an "annular" eclipse.

We brought up two scopes, a Meade 6600 and a Celestron C8, both on clock drive equatorials. Lunt Solar Systems (CEO Andy Lunt and staffers) were there with one of their big gun H-alpha scopes, and it was very impressive. I visited them several times to watch the progression of prominences. There were also several large sunspots to keep those with Mylar filters interested. We had quite a few of our local Huachuca Astronomy Club members who made the near 500 mile drive from Sierra Vista to Page. The chief park ranger said she thought about 600 people in total visited the viewpoint to watch the eclipse. We had US, French, German, and Japanese tour groups stop by.

Our next adventure is the Venus Transit. Please join us in Veteran's Memorial Park in Sierra Vista on June 5. The transit external ingress begins about 3:05 pm, so we all need to be set up by then. Hope to see you there!

Cheers and clear skies,

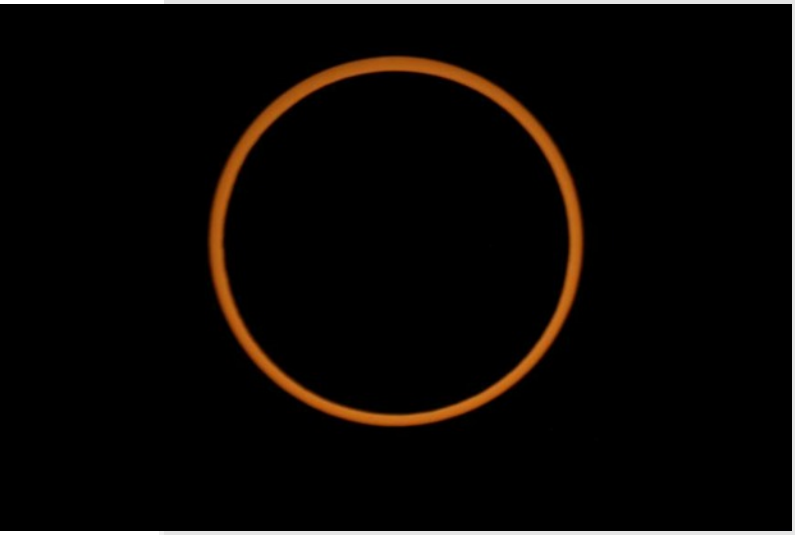
Bob Gent

President, Huachuca Astronomy Club

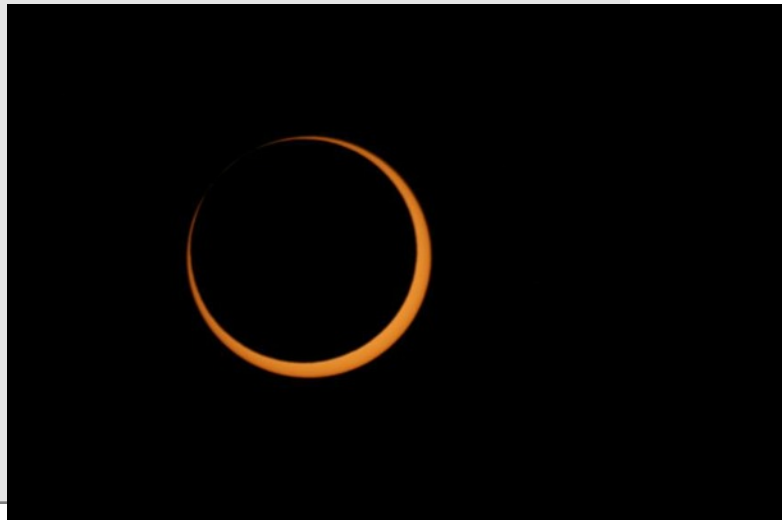
Bob Gent's Eclipse Photos

Early set-up time (my scopes on far right and center) as we just arrived.
That's Lake Powell in the background.

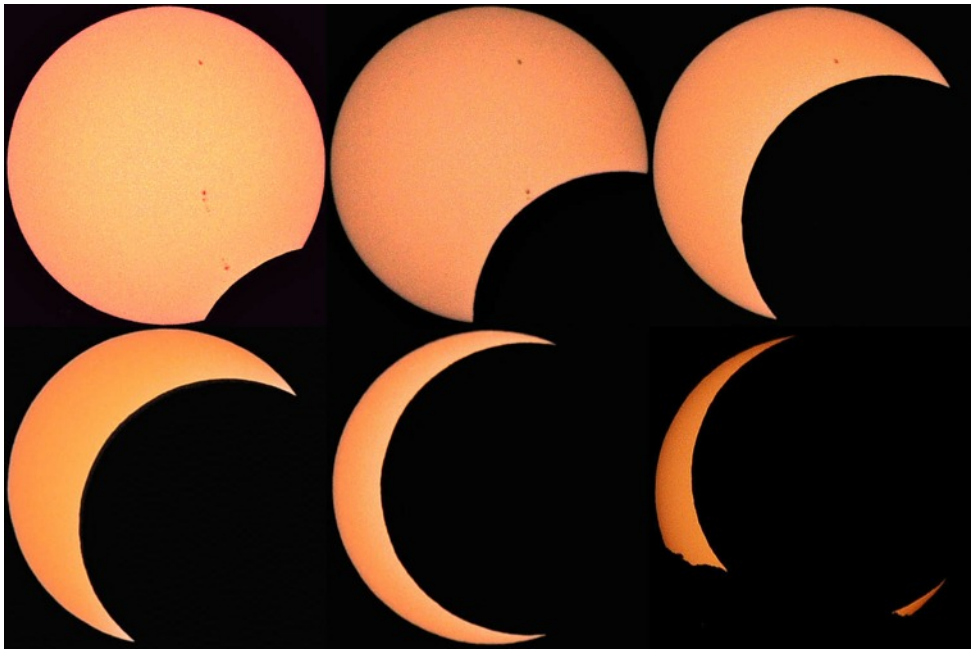
Dead Center!



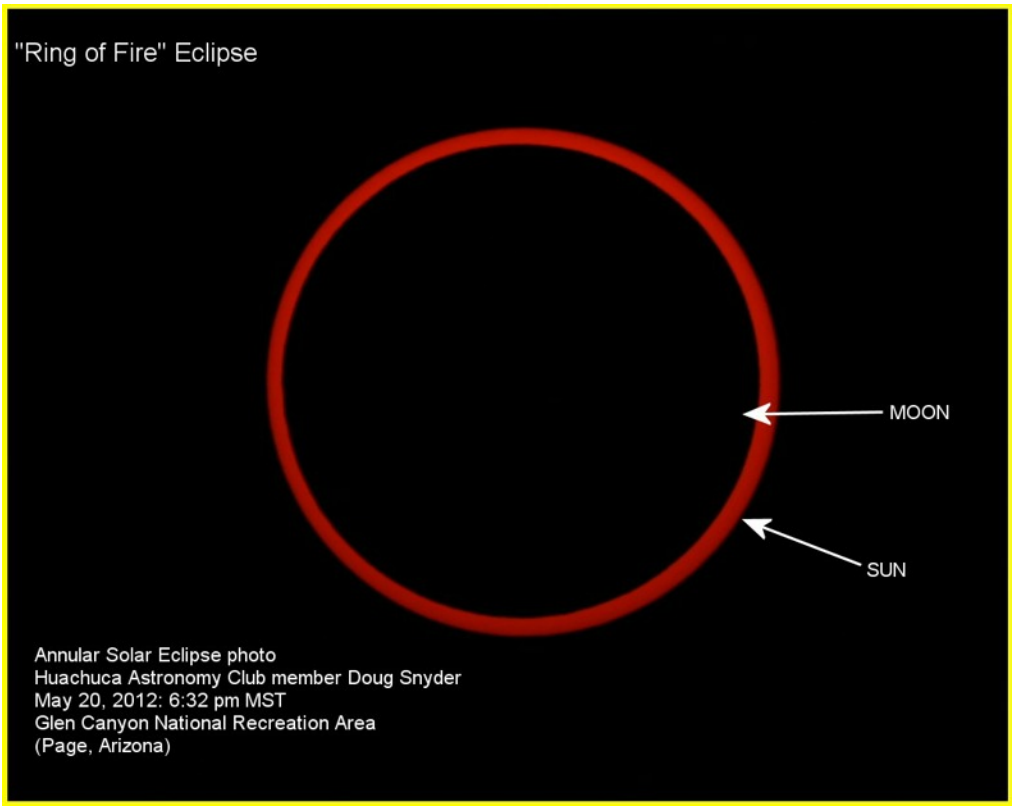
The end of annularity



More Eclipse Photos



Edward Erbeck stayed Home and took these images with his Nikon D90 with a 70-300mm zoom set to its Max of 300mm. He used a 20+ year old Orion Visual Filter off of his Celestron First Scope 80. The first image was taken ~5 minutes past first contact and the last was taken ~1 minute past local max as the sun set into the Dragoon Mountains.



Doug Snyder took this picture at Page, Arizona

Wayne’s Eclipse Report

I just got back from our eclipse trip to Page, AZ, ride-sharing (thanks Dave and Gloria Butler!) with several fellow members of the Huachuca Astronomy Club (HAC) from the town of Sierra Vista, AZ. It's been a very long time since I've been up to that part of northern AZ, but Page and Lake Powell is a nice area with lots of scenic vistas. We were there for a couple days and I wasn't thinking much beyond eclipse activities (some nice talks and star parties planned by the National Parks Service and manned by a number of amateur astronomy volunteers) or else I would have done some touring of the local environs. A few of our fellow travelers were more on the ball and took tours of the local slot canyons and boat tours. Fortunately, on our way up to Page, we did stop off at one of the vistas of the Colorado River and enjoyed it very much.

The eclipse was very interesting to witness and there were about 3-400 people enjoying the spectacle with us. The weather was very pleasant and we were far enough away from the big fires in Arizona so that we weren't bothered by any smoke. The folks from Lunt Instruments had a nice 152mm apo-refractor with one of their H-alpha filters incorporated into the telescope. I noted very nice views of surface detail on the solar disk and a nice loop prominence along with several other prominences around the perimeter. There were at least 50 observers with cameras and telescopes scattered around the Wahweap Outlook which was one of the areas monitored by the Parks Service to keep the crowds semi-controlled. It seemed to work. Buses from the visitor center brought about 5 loads of passengers up to the site well before annularity. I was concerned the buses would be operating during the event and raising a lot of dust, but they stopped running about half an hour before annularity, much to the chagrin of a group of teenagers who thought they would leave early. They actually stuck around and seemed to enjoy the spectacle, but they were on the first bus to leave.

I brought a pair of 20x100 binoculars to view the annular and I'm glad I did. I had to make a pair of 3.5-inch solar filters at close to the last moment since the filters I ordered from Thousand Oaks weren't delivered in time and it looks like they won't even make it for the Venus Transit. Thanks to John Gross for giving me some of his film and thanks to those who offered me some of theirs. The view was excellent and I had great white light views of the number of sunspot groups visible on the surface and watched as the moon occulted each one. I had enough magnification to be able to see the edge of the Moon's irregularities which was to be important at the 2nd and 4th contacts when the Baily's Beads phenomenon would manifest itself. Of course, since I needed to leave the filters in place the Beads appeared as fine brushes as the lunar and solar surfaces interacted. It's a quick phenomenon and I wasn't able to record it, but I wasn't really set up for photography. I held my little Kodak (supposedly) Easy Share camera behind the eyepiece and surprisingly got a few decent shots when there wasn't any time pressure. The buses started taking the impatient teenagers and others back to the visitor's center and we left around 7:15pm as the sun was setting and the moon had mostly departed the sun's surface. As we were driving into Page we noticed that the partially eclipsed sun was disappearing behind a mountain ridge and pulled off the road to witness the sunset. We thought it looked like a shark fin - a very cool sight! One thing to note about Page, though, is that the town rolls up its sidewalks at 7pm and we had to settle for a Mexican restaurant, not our first choice, but, fortunately, the food was pretty good.

I was happy with our eclipse trip even though it was "only" an annular. We had a good group to travel with, the weather was perfect, and no equipment failure. What more can you ask for? Anyway, now it's time to get ready for the Venus transit. Let's hope for similar results!

Clear skies,
Wayne (aka Mr. Galaxy)

Solar Eclipse Report

Cindy Lund

While several club members drove up to Page to see the full annular Eclipse, I stayed in Sierra Vista where the eclipse was only partial. Still, the views were incredible.

I went to Veterans Memorial Park to observe the eclipse, where HAC members had set up telescopes and were handing out eclipse sunglasses. I got to the park before the eclipse started and stayed until the eclipse reached maximum coverage. There were several telescopes set up to observe the eclipse. I looked through one every 10 minutes to take notes on how the eclipse was progressing. I was able to see sunspots with the telescopes and watch as they disappeared behind the moon.

I brought my young friend Lizzie, age 10 and her friend Shaid, age 13. I let them observe the sun with my eclipse sunglasses as well as using the telescopes. They waxed poetic, coming up with lots of similes for the sun as it was more and more covered by the moon. At 5:40 Shaid said, "It looks like Pac Man" and "It looks like a cookie that got bit." Lizzie said "It looks like someone took a bite out of an apple" but Shaid thought the sun looked more like an orange. By 6:15 Lizzie thought the sun looked like a banana. At 6:22 Shaid thought the sun looked like the crescent moon or like an egg yolk in a cracked egg shell. Shaid also said the sun looked like a cashew, while Lizzie compared it to a croissant. As I took Lizzie and Shaid home, they continued to view the sun with my eclipse sunglasses. By that time the sun had turned in the sky. Lizzie wrote in my note book that the sun "looks like a smile".

Even though I did not go up to Paige, I was still able to see the eclipse. Although I did not see the ring of fire, I did see most of the sun covered by the moon. In addition, I was able to take Lizzie and Shaid to see the eclipse, which they otherwise would not have taken the opportunity to observe.

Star Party at Brown Canyon Ranch

Cindy Lund

On April 21, the Huachuca Astronomy Club had its first Star Party at Brown Canyon Ranch. Tommy Neyhart, a care taker for the ranch, as well as an astronomer, hosted the event.

Five telescopes were set up behind the Ranch House. There were glow sticks to mark the way to the scopes. None of the scopes was more than 10 inches, and one was only 4 inches. Nonetheless, the views were amazing. It was a good time to observe the planets, since Venus, Mars, and Saturn were easily visible. Jupiter was briefly visible after sunset. One woman was very impressed with Saturn, which she had never seen through a telescope before. There were a lot of first time observers at Brown Canyon Ranch that night.

The highlight of the night was when Tom got out his laser pointer and gave everyone a tour of the night sky. He pointed out lots of constellations including the Big and Little Dippers, Draco, Cassiopeia, Boötes, Leo, Virgo, Cancer, Heracles, Canis Major, Gemini and Taurus, and Orion. He was very enthusiastic as always. When he got to Orion, he had his audience look at the belt and see that the star on the right was a bit smaller and not quite in the same line as the others. He then said that the three pyramids in Giza also have one that is a bit smaller and not in line. According to Tom, the Egyptians were trying to create heaven on earth.

Overall, the night was a success. The first time observers learned quite a bit. Hopefully they will return for future star parties.

My Favorite Summer Objects

Cindy Lund

Summertime and the observing is … actually rather difficult due to the monsoons. Still, I have done some observations in the summer, mostly in June. My favorite summer object is the Swan Nebula. I also like Albireo, the Ring Nebula, and the Hercules Cluster. There are other summer objects that I have not observed recently and would very much like to see again, including the Lagoon Nebula and the Butterfly Cluster.

M17, the Swan Nebula: Right Ascension: $18^h\ 20^m\ 26^s$, Declination: -16° 10′ 36″

M17 is a reflection nebula, also known as the Omega Nebula, but I find it looks very much like a swan. M17 consists of a bright rectangle and a slightly dimmer hook below. The rectangle forms the swan's body, and the hook forms the swan's head and short neck. (The swan is upside down.) I like its unique shape: not a circle or ellipse like so many objects. It's also very bright so the swan is easily apparent.

Albireo: Right Ascension: $19^h\ 30^m\ 43.0^s$, Declination: $^+$27° 57' 33"

Albireo is a beautiful double star with stunning color contrast. One star is yellow-orange and the other is blue. The yellow-orange one is bigger and brighter than the blue one. I like seeing color in the night sky and Albireo has two bright beautiful colors. When I looked up Albireo, I learned that it is the star at the head of Cygnus, the swan and is also known as Beta Cygni, even though it is only the fifth brightest star in Cygnus.

M57, the Ring Nebula Right Ascension: $18^h\ 53^m\ 35.079^s$, Declination: +33° 01′ 45.03″

This planetary nebula looks like a smoke ring in the sky. It consists of a gray disk surrounded by a white ring. I like planetary nebulae; they're like a star's swan song. While many planetary nebulae have distinct shapes, the Ring Nebula is a simple ring. However, it is bright and unmistakable. It's lovely in its simplicity.

M13 the Hercules Cluster: Right Ascension: $16^h\ 41^m\ 41.24^s$, Declination: +36° 27′ 35.5″

All Globular clusters look similar, but M13 is one of the brightest. It has so many stars that it looks like shattered glass. M13 has a large, bright, dense core. The stars get less dense the further they are from the center. The outer stars have reminded me of dew drops on a spider's web.

06/22/2006 at unknown site		
Object	What it is	Observations
M4	Globular Cluster	
M5	Globular Cluster	
M29 Butterfly Nebula	Planetary Nebula	Very faint fuzzy line
M17 Swan Nebula	Refection Nebula	Swan on its side very bright
M27 Dumbbell Nebula	Planetary Nebula	Football sat on by a sumo wrestler
M51 Whirlpool Galaxy	Spiral Galaxy	Could see Spiral Structure
NGC 5195	Companion to WP G	Fuzzy disk on WP G lower left
Jupiter	Planet, Gas Giant	Disk with strips (horizontal) no Red Spot
3 Galilean Moons	moons of Jupiter	3 dots, 1 on Jupiter's left 2 on right

06/09/2007 at Junk Bond Observatory		
Object	What it is	Descriptions and Observations
M6 Butterfly cluster	Star Cluster	Lots of little stars making butterfly outline
M7 Ptolemy Cluster	Emission nebula	Check mark. Main part bold marquise shape
M8 Lagoon nebula	Emission nebula	flat fuzzy ellipse on top of more round ellipse
M11 Wild Duck Cluster	Open Cluster	Looked like a globular cluster
M51 Whirlpool Galaxy	Spiral Galaxy	Spiral Structure clear. Large disk.
NGC 5195 (aka M51b)	Companion to WP G	Small disk, WP G upper right, 1/4 its size
B86 Ink spot	Dark Nebula	small, very black area in sky
NGC 6520	Star Cluster	lots of stars next to the dark spot.
M57 Ring Nebula	Planetary Nebula	White disk, brighter ring on outer 1/3 of radius
Jupiter	Planet, Gas Giant	Bright white disk, Horizontal bands barely visible
3 Galilean Moons	moons of Jupiter	3 bright dots all on J right, one very close

06/25/2007 at unknown site		
Object	What it is	Descriptions and Observations
M104 Sombrero Galaxy	Spiral Galaxy	Dark lane w/ bright dot and fuzzy flat dome to right of center
M4	Globular Cluster	Spread out Prominent bar of stars from 1:00 - 7:00
Albireo	Double Star	bright yellow dot left, bright blue dot right (far apart)
NGC 6543 Cat's eye Nebula	Planetary Nebula	Bright turquoise oval, small white spot in center
M17 Swan Nebula	Refection Nebula	
Epsilon Lyrae (Double double)	Double Star ea. Double Star	
Jupiter	Planet, Gas Giant	bright disk, with bands bright one above equator.
4 Galilean Moons	moons of Jupiter	2 on right close, one on left close, on one left far.

08/11/2007 at Junk Bond Observatory		
Object	What it is	Descriptions and Observations
M20 Trifid Nebula	Diffuse Nebula	Bright white area with dark thick T at 45 deg angle (dark Neb)
M17 Swan Nebula	Refection Nebula	Swan facing right, brightest in the belly, lighter in head and neck
M13 Hercules Globular Cluster	Globular Cluster	very bright large center
M57 Ring Nebula	Planetary Nebula	White ring around gray disk, center star going in and out
M51 Whirlpool Galaxy	Spiral Galaxy	Just saw fuzzy white area with 2 bright dots
M7 Ptolemy Cluster	Open Cluster	Saw with naked eye. fuzzy patch near Milky Way
M8 Lagoon nebula	Emission nebula	Saw with naked eye. fuzzy patch near Milky Way
M31 Andromeda Galaxy	Spiral Galaxy	Saw with naked eye. Like fuzzy star
False Comet	Star and open clusters	Saw with naked Eye, it did look like a comet

06/07/2008 at RepoGazer Observatory		
Object	What it is	Descriptions and Observations
M57 Ring Nebula	Planetary Nebula	Gray squashed disk. Outer 1/2 light, bright, middle darker
NGC 5139 Omega Centauri	Globular Cluster? Galaxy?	Prominent core. More diffuse towards the outside.
M13 Hercules Cluster	Globular Cluster	Core not so pronounced; more evenly distributed
M104 Sombrero Galaxy	Spiral Galaxy	Bright line underneath dark line. Bright line has a dip in center
Centaurus A	Lenticular Galaxy	Disk with thick black line across it. Line above center
Saturn	Planet (Gas Giant)	Small disk, rings vertical, near edge on. 1/3 ring, 1/3 disk 1/3 ring

06/11/2010 at Junk Bond Observatory		
Object	What it is	Descriptions and Observations
M13 Hercules Globular Cluster	Globular Cluster	Sparkly, brighter core 1/3 by diameter, outer part dewdrops on spider web
M57 Ring Nebula	Planetary Nebula	Bright gray ring around dimmer gray disk, slightly elliptical, ring thicker & a bit fuzzy at major axis ends
M51 Whirlpool Galaxy	Spiral Galaxy	Star-like bright core, spiral structure, arms same thickness as spaces between
Companion to M51	Galaxy	Small fuzzy disk with tiny bright core, 1/4 size of M51
NGC 5139 Omega Centauri	Globular Cluster	2/3 core by diameter, very bright & dense, cotton ball that was tugged all around
Saturn	Planet, Gas Giant	Yellow brown disk, w/ light brown strips aligned w/ rings. Rings almost edge on
2 of Saturn's Moons	Large moons of Saturn	Titan bright, far below Saturn another much closer on same side
Venus	Planet (Inner)	Eye-watering bright, small disk, slightly gibbous phase

06/18/2010 at Patterson Observatory		
Object	What it is	Descriptions and Observations
M13 Hercules Globular Cluster	Globular Cluster	Inner 1/4 very dense core, outer part sparser and irregular, approx round
M3	Globular Cluster	Small, bright dense core, 1/4 of diameter, rest much dimmer
M57 Ring Nebula	Planetary Nebula	Light gray ring around dark gray disk, ring slightly diffuse on outside
M5	Globular Cluster	Elliptical core noticeable but not especially prominent
Porrima (Gamma Virginis)	Double Star	White ellipse about twice as long as high. Could not separate the stars
Albireo	Double Star	One orange star and one light blue star. Orange star slightly brighter
Saturn	Planet, Gas Giant	Light brown disk with stripes, golden rings, each side of rings 1/2 of Sat. dia.
Venus	Planet (Inner)	Now about at "3rd quarter" phase, (a bit fuller) like a D
Moon	Earth's Satellite	Dark patch "sea" near edge, bright crater below "sea" ridge going \ left of crater

SKY-CALENDAR UPDATE FOR JUNE 2012

Doug Snyder

Note: Unless otherwise noted, all dates and times are shown in Arizona's Mountain Standard Time – NOT in Universal Time (U.T.). MST is behind UT by 7 hours.

June 4 (Monday): Partial LUNAR Eclipse; here are our local circumstances, and this eclipse starts very early during the morning hours of June 4. Also, moonset will occur before the entire eclipse is completed. The 'penumbra' phase of the eclipse will begin at 1:48 am; this will be complete at about 3 am when the 'umbra' phase of this lunar eclipse will begin (3:03 am). Maximum eclipse will occur at 4:03 am and the eclipse 'magnitude' will be 0.3705 (37% of Moon diameter immersed in the umbra shadow). This umbra phase will end at 5:06 am and the Moon will SET at close to 5:23 am while the 'disappearing' penumbra phase is still in progress. While we will not view the end of the eclipse at our location in southern Arizona, the end of the eclipse will take place at 6:18 am; remember, all times here are Mountain Standard Time.

June 5 (Tuesday): **Transit of Venus across the face of the Sun!**
This is remarkable! If you were not able to witness the previous transit of Venus on June 8, 2004 or even the one before that (December 6, 1882), then Mr. Dude or Ms Dude-ette, you certainly can't miss the one this month! You will not have another opportunity until December 11, 2117, and who knows where you might be by then? We all have a pretty good idea. You might make it to the next transit of Mercury, which if I recall correctly, occurs on May 9, 2016 – we'll look for you!

The Venus daytime transit this June conveniently begins mid-afternoon here in Arizona! You'll need properly filtered eye protection to view the event – Don't look directly at the Sun! **First Contact** of the planet with the disc of the Sun is at **3:06 pm** and cheers will definitely erupt from the gathered masses. Approximately sixteen minutes later, at **3:22 pm, Second Contact** will occur- and another cheer!. At that time, here in Arizona, the Sun will have an apparent altitude of 48 degrees. The apparent 'sizes' of these two celestial objects will be approximately 31 arc-minutes for the Sun, and 1 arc-minute for Venus. You might also want to know that the transit will still be in progress here when the Sun sets! That event (sunset) occurs right about 7:19 pm, depending on your local horizon of course. If you were able to follow the transit to its completion, 'Fourth (and final) Contact' would occur around 9:49 pm MST.
EMBRACE THE UNIVERSE AND ALL IT SUCCEEDS TO BRING TO OUR AMAZEMENT!
The Huachuca Astronomy Club of Southeastern Arizona will, of course, be hosting a Venus Transit observing event at a city park in the city of Sierra Vista. At Veteran's Memorial Park, from about 2 pm until 8 pm; solar filtered telescopes and personal 'eclipse glasses' will be available, but in limited supply.

June 20 (Wednesday): Summer Solstice – the beginning of summer in the northern hemisphere. This occurs at 4:07 pm.

June 27 (Wednesday): The "**June Bootids**" Meteor Shower (possibly quite productive in 2012); active from June 22 to July 2; parent comet is Comet 7P/Pons-Winnecke. With a waxing gibbous moon setting right around midnight or shortly thereafter, it should be quite favorable to observe this potentially active shower after midnight and until morning twilight. The observed meteors are 'unmistakably slow', and the radiant point, although not exactly defined, lies in the northern region of the constellation Bootes.

Sky Calendar for 2012 – Arizona sky phenomena; be sure you have a copy for the remainder of the year. If not included with this newsletter, download a PDF version from http://skycalendar.blackskies.org/

Remember: There are ALWAYS exciting and unusual sky phenomena happening in our 'grand universe' whether WE know it or see it; CAN you discover it? These updates are just a fraction of observable sky events!
THANK YOU & CLEAR SKIES UNTIL NEXT MONTH – Doug

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www.hacastronomy.com -- A great place to visit!

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