Nightfall

Monthly publication of the Huachuca Astronomy Club

March 2013

President's Notes

Next Meeting: The next meeting of the Huachuca Astronomy Club will be on Friday, March 22 at the Cochise College student union building at 7 PM in Sierra Vista, AZ. The guest speaker will be Dr. Janine Pforr, Postdoctoral Research Associate at the National Optical Astronomy Observatory in Tucson, Arizona. In addition, we will be awarding the final volume of the signed Night Sky Observer's Guide, volume three as a door prize. This meeting is free of charge and open to the general public. For more information, visit www.hacastronomy.org.

HAC Outreach: We have a number of public and private astronomy outreach events on the horizon. Our Outreach coordinator, Bob Hoover, is coordinating these events and we are going to need help at several events.

Member Star Parties: The next Member Star Party is at the Kepple's on April 6. Stay tuned for more details.

Kartchner Caverns Star Night: For the past three years, our club has been supporting "star nights" at Kartchner Caverns, and the next event is planned for March 16. Dr. Tim Hunter will be the guest speaker at Kartchner Caverns star night starting at 5:30 PM in the Discovery Center. His talk will include a discussion and photographs of wonders of the night sky and preservation of our heritage of dark skies.

Dr. Hunter has been an amateur astronomer since 1950. He built and operates the Grasslands Observatory near Sonoita, Arizona. In 1987, Dr. Tim Hunter and Dr. David Crawford founded the International Dark-Sky Association, Inc., to promote quality outdoor lighting and combat the effects of light pollution. At present, he is the chair of the board of trustees for the Planetary Science Institute and president of the board of directors of the International Dark-Sky Association. In addition, he is a Professor in the Department of Radiology in the College of Medicine at the University of Arizona.

On the afternoon of March 16, there will be solar observing, and this will be followed by the theater program. Starting at about 6:30 PM we will have telescopes set up in the bus parking area for public viewing of the night sky. We hope to see you there!

Public Nights at the Patterson: The next Patterson Observatory public nights are Thursday, March 14, April 18, May 16, and June 13. All of these events start shortly after sunset, and as always, we appreciate your help. Again this year, we will not be holding any events during July or August due to monsoons.

International Astronomy Day: We will be hosting a big event at the Sierra Vista Library on Saturday, April 20, 2013. Please mark your calendars.

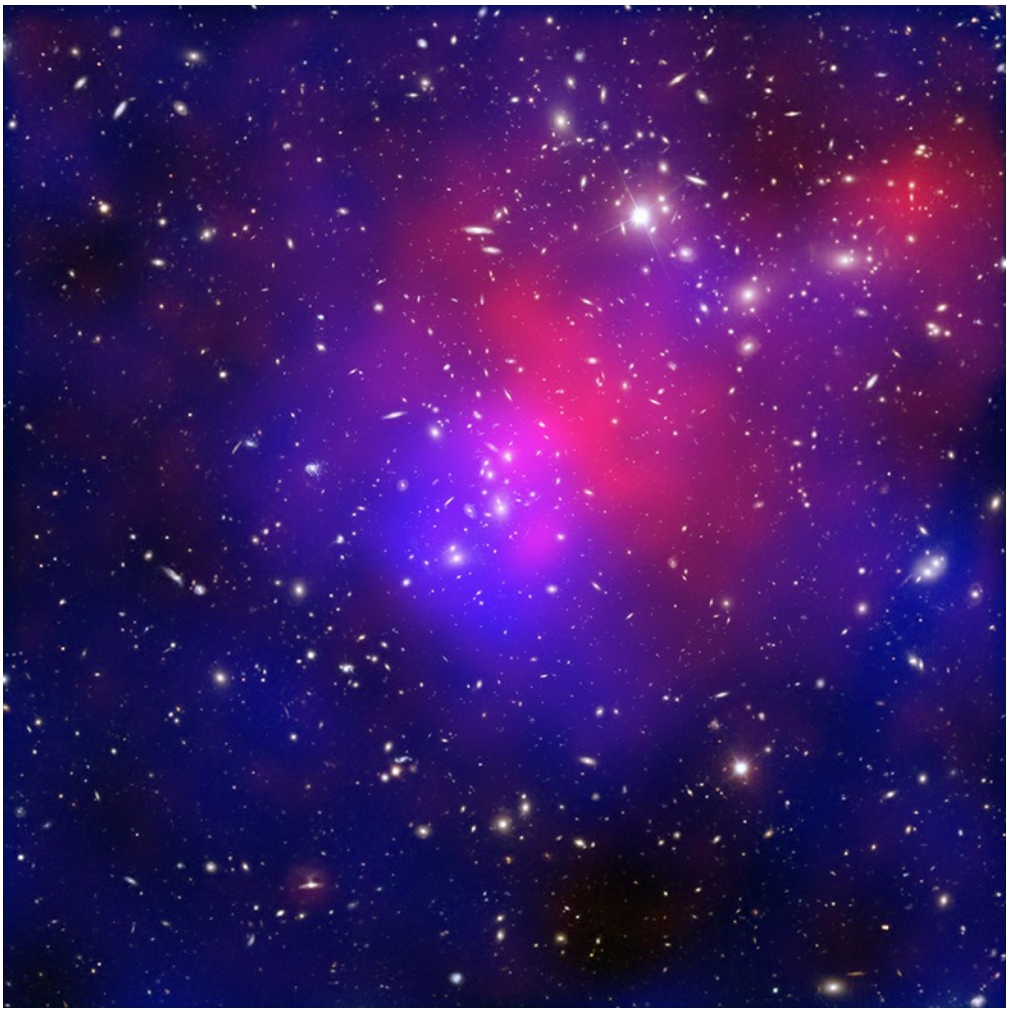
Support from Amazon: Our club continues to receive funds from Amazon.com. A percentage of every Amazon sale that passes through our website is automatically donated back to our club. If you plan any online shopping, please use the "Amazon" link.

Clear skies and bright stars,

Bob Gent
President, Huachuca Astronomy Club

New Members Corner

We would like to welcome our newest members. Maureen McBride, Martin McKinley, Wendell Perry, Steve & Lauvon White, Jackie Zandrews, Jacred Hiltner, and Suzanna Pricer have all recently joined HAC. We welcome back Jim Savarese and also welcome our 2013 scholarship winner, Tressa Machin, who has earned a complimentary membership. Welcome to the Club! We are glad you joined.



Clusters of galaxies collide in this composite image of "Pandora's Cluster." Data (in red) from NASA's Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory's Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe. Photo courtesy of NASA Space Place

Circumpolar Stars and Constellations

By Tommy Newhart
Edited by Doug Synder

As seen from most latitudes in North America, there are several constellations that never set, including Ursa Major, Ursa Minor, Draco, Cepheus, and Cassiopeia. They are referred to as *Circumpolar*, meaning they circle the North Celestial Pole and never disappear behind the northern horizon. But regardless of the latitude where you are viewing the night sky, you can determine which constellations and/or stars are Circumpolar for you.

As a youngster, my first astronomy book was published by Golden Books. It confidently referred to the above five constellations as Circumpolar. Living in a southern suburb of Los Angeles (latitude 34º), I was confused and somewhat disappointed when parts of some of those constellations set below my northern horizon.

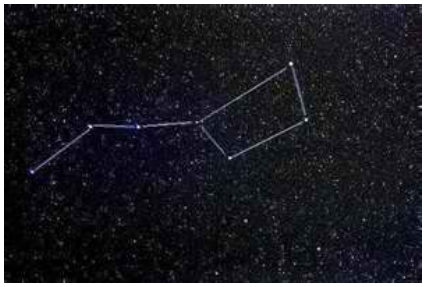
During our last outing at Kartchner Caverns, I was asked by a young budding astronomer, "What stars and constellations never set here in Sierra Vista?"

Circumpolar Stars and Constellations for Sierra Vista

As was discussed in a previous essay (*Astronomy's Most Important Shape*), Polaris, the North Star, is the same amount of degrees over the northern horizon as the latitude of the observer (31.5º here in Sierra Vista). So any star within a circle having a radius of 31.5º, with Polaris at the center and the circumference touching the northern horizon, would always circle around Polaris, above the northern horizon, and never set.

Since the declination of a star is measured from the Celestial Equator (declination 0º) and not from the North Celestial Pole (declination 90º), where Polaris closely resides, a star with a declination greater than 58.5º (90º - 31.5º = 58.5º) would always travel above the northern horizon and never experience setting. Conversely, stars with declinations less than 58.5º would at some point during the year disappear behind a horizon.

As an example, of the seven major stars in the of constellation Ursa Major, and within the asterism known as the Big Dipper, only one, Alpha Ursa Majoris, called Dubhe (pronounced DUE-BAY), the most northern pointer star, never sets here in Sierra Vista. The other six stars, at some point during the year, will set below the horizon. A good and convenient time to see this is in September, about 10:00 p.m., when the Big Dipper is low in the northern sky. At its lowest point, the horizon cuts halfway between the two pointer stars, Dubhe and Merak. Soon after, rotating counterclockwise, Merak rises, followed by the remaining stars of the famous constellation.



*Ursa Major (*asterism *Big Dipper) aligned with the declination lines.*

Here is a table that illustrates the most prominent stars of the Big Dipper. Those with declinations greater than 58.5º never set here in Sierra Vista. Note the declinations of each and the number of degrees they are from 58.5º. Only Alpha Ursa Majoris never sets.

Star/Common Name	*Position in Big Dipper*	*Dec.*	*+/-*
Alpha/Dubhe	Upper right star of the bowl.	61.8º	3.3º
Delta/Megrez	Upper left star of the bowl.	57.0º	-1.5º
Beta/Merak	Lower right star of the bowl.	56.4º	-2.1º
Epsilon/Alioth	First star in the handle.	56.0º	-2.5º
Zeta/Mizar	Middle star of the handle.	54.9º	-3.6º
Gamma/Phad	Lower left star of the bowl.	53.7º	-4.3º
Eta/Alkaid	Last star in the handle.	49.3º	-8.6º

Other Circumpolar Examples

What is the most southerly latitude where the entire asterism of the Big Dipper can be seen as a Circumpolar constellation?

From the above table, the most southerly star in the Big Dipper is Eta Ursa Majoris with a declination of 49.3º. An observer must be viewing from a latitude where all stars north of declination 49.3º can be seen. Anyone observing from latitude 40.7º (90º - 49.3º = 40.7º = 40º 42'), or north, would see the Big Dipper as Circumpolar. A n y o n e located south of latitude 40º 42', would see at least one star in the Big Dipper (Eta Ursa Majoris) set below the horizon. Those in Salt Lake City, Utah (latitude 40º 45'), would see the Big Dipper as Circumpolar, while observers in Peoria, Illinois (latitude 40º 40'), and Sierra Vista (latitude 31º 30'), would not.

Here are the five major stars of Cygnus, the Northern Cross, shown in descending order of declination:

Star/Common Name	*Dec.*
Alpha/Deneb	45.3º
Delta/Rukh	45.1º
Gamma/Sadr	40.3º
Epsilon/Gienah	34.0º
Beta/Albireo	28.0º

At what latitude are the above five major stars in Cygnus first seen as Circumpolar?

Beta Cygni (Albireo) is the most southerly star in the constellation. At latitude 62.0º (90º - 28.0º = 62.0º = 62º 00'), the entire constellation of Cygnus becomes Circumpolar.

Circumpolar Constellations of Sierra Vista

For a constellation to be considered Circumpolar, its entire contents must never set below the northern horizon. Here in Sierra Vista, only Ursa Minor, asterism the Little Dipper, and Cepheus, the King, are Circumpolar Constellations. Ursa Major, asterism the Big Dipper, and Cassiopeia come close, as does Draco. The latter has the majority of his contents within the Circumpolar Circle, but the upper length of the Dragon to his head, disqualifies him.

Map of the Yukon Territory.

Faro, Yukon Territory (latitude 62º 12'), residents would see Cygnus as Circumpolar while those in the Yukon Territory's largest city, Whitehorse (latitude 60º 43'), would not.

Star trails taken from the North Pole.

A good friend of mine in Roseburg, Oregon (latitude 43º 13') drives a restored Chevy Vega, one that he has painstakingly brought back to life. His other hobby is astronomy, and understandably, his favorite star is Vega (Alpha Lyrae). He once asked me, "Where would I have to relocate to so Vega is always in my night sky?"

A Chevy Vega.

Since Vega's declination is 38º 47', latitude 51º 13' (90º - 38º 47' = 51º 13') and all points north, is where my friend would have to relocate so Vega is always in his night sky. Wanting to stay within the confines of the continential United States, he was disappointed that he would have to move to a location in Canada, north of the 49th parallel. As of this past Christmas, his home is still in Roseburg, Oregon!

Circumpolar Stars and Constellations from the North Pole

From the North Pole, the Northern Hemisphere stars and constellations, those that lie north of the Celestial Equator (0º), are all in your night sky, and revolve around Polaris (which is directly overhead!) in a counterclockwise direction, and never set. Your list of Circumpolar constellations is extensive and would include everything in the Northern Hemisphere. Gemini, Pegasus, Leo, Bootes, Hercules, and Aquila, constellations that we here in Sierra Vista see set, would all be Circumpolar. Everything north of 0º declination would be Circumpolar.

Star trails taken from the Equator.

Circumpolar Stars and Constellations from the Equator

At the Equator (0º declination), the situation would be dramatically opposite. Polaris, very close to the Celestial North Pole, would be touching your northern horizon. The Celestial South Pole would be on your southern horizon. The stars would rise perpendicular to the horizon, move above you, and set, as though you were in the middle of a giant slow-moving tube. Nothing would be Circumpolar except Polaris, which would remain fixed on your northern horizon.

Lights Out!

On the two equinoxes of the year, the Vernal (occuring in March) and Autumnal (taking place in September), the Sun is situated directly on the Celestial Equator and rises straight up from the horizon and sets straight down. Here in Sierra Vista where the Sun sets at an angle, darkness comes on gradually. But on the Equator, when the Sun disappears behind the western horizon, it is only minutes until it's lights out!

From the Various Latitudes of the Northern Hemisphere

As you move your viewing location from the North Pole (90º) to the Equator (0º), the table on the next page shows the declination (second column) where any constellation and/or star north of the declination shown will never set below your northern horizon (Sierra Vista's latitude is highlighted). Note that when you add the degrees latitude plus the degrees declination, the result is 90º.

Latitude	*Dec.*	*Latitude*	*Dec.*
90°	0°	44°	46°
89°	1°	43°	47°
88°	2°	42°	48°
87°	3°	41°	49°
86°	4°	40°	50°
85°	5°	39°	51°
84°	6°	38°	52°
83°	7°	37°	53°
82°	8°	36°	54°
81°	9°	35°	55°
80°	10°	34°	56°
79°	11°	33°	57°
78°	12°	32°	58°
77°	13°	31.5°	58.5°
76°	14°	31°	59°
75°	15°	30°	60°
74°	16°	29°	61°
73°	17°	28°	62°
72°	18°	27°	63°
71°	19°	26°	64°
70°	20°	25°	65°
69°	21°	24°	66°
68°	22°	23°	67°
67°	23°	22°	68°
66°	24°	21°	69°
65°	25°	20°	70°
64°	26°	19°	71°
63°	27°	18°	72°
62°	28°	17°	73°
61°	29°	16°	74°
60°	30°	15°	75°
59°	31°	14°	76°
58°	32°	13°	77°
57°	33°	12°	78°
56°	34°	11°	79°
55°	35°	10°	80°
54°	36°	9°	81°
53°	37°	8°	82°
52°	38°	7°	83°
51°	39°	6°	84°
50°	40°	5°	85°
49°	41°	4°	86°
48°	42°	3°	87°
47°	43°	2°	88°
46°	44°	1°	89°
45°	45°	0°	90°

Summary

As part of an overall interest in the night sky, knowing what stars and constellations are Circumpolar from your location, those that are always in the sky and never set, add yet another dynamic to your observing.

By first knowing that your latitude on Earth (31.5° here in Sierra Vista) is the same as the angle that Polaris makes with the northern horizon (31.5°), you can visualize how stars and constellations that lie within a circle having a radius of 31.5° never set below the horizon. Therefore, stars with declinations greater than 58.5° (90° - 31.5°) are Circumpolar.

At the North Pole, every star and constellation in the northern hemisphere is Circumpolar. At the Equator, only the star Polaris, on the northern horizon, is Circumpolar.

For all other latitudes, stars that are Circumpolar can be found by subtracting your latitude from 90°. Stars that have declinations greater than that will never set over your northern horizon.

Tommy Neyhart
Caretaker, Brown Canyon
Ranch (520) 258-9045
tikiney@yahoo.com

Edited by:
Mr. Doug Snyder
Huachuca Astronomy Club
Palominas Starhaven
Observatory P.O. Box 981
Palominas, Arizona 85615
Co-Discover of Comet Snyder-
Murakami (C/2002 E2)

2012 to 2013 Observations

Cindy Lund

I have been editing the HAC newsletter for a year now. My first edition was the March 2012 one. Over that past year I shared my observations made during each of the four seasons and my favorite objects to observe in each season. However, since I wrote my lists of observations at the beginning of each season, I did not include the observations I made over the past year. Therefore, I am listing them here.

I went to nine Star Parties and Astronomy Nights. Four were at Patterson, two at Discover Observatory West, and one each at Brown Canyon Ranch, Kartchner Caverns, and Desert Coyote Observatory.

I observed Jupiter and its moons, Saturn and Titan, Mars, Venus and the Moon. I also saw the comet C/2012 S1 (ISON). I saw eight different galaxies: Andromeda Galaxy and its companion galaxies M32 and M110 as well as M33 (Triangulum), M65, M66, M82 (Cigar Galaxy), and M104 (Sombrero Galaxy). I saw eleven different nebulae: M8 (Lagoon Nebula), M17 (Swan Nebula), M27 (Dumbbell Nebula), M42 (Orion Nebula), M57 (Ring Nebula), M97 (Owl Nebula), NGC 2237 (Rosette Nebula), and NGC 7662 (Blue Snowball), NGC 2261 (Hubble's Variable Nebula), NGC 2359 (Thor's Helmet), and NGC 2438. I observed seventeen different star clusters: The globular clusters M3, M13 (Hercules Cluster), M22, M71, and M92, and also the open clusters M6 (Butterfly Cluster), M11 (Wild Duck Cluster), M35, M38, M44 (Beehive Cluster), M45 (Pleiades), M46, M47, NGC 2158, NGC 2169, NGC 2244, NGC 6603, and NGC 869 (1/2 of Double Cluster). I also observed the pseudo star cluster M24 (Sagittarius Star Cloud) once. I observed four individual stars. Three were multiple stars, including the binary stars Alberio and Almack, the triple star Beta Monocerotis, and the septuple star Sigma Orionis. The fourth was R. Leporis, a variable star.

My observing notes follow:

April 21, 2012 at Brown Canyon Ranch		
M42 Orion Nebula	Diffuse Nebula	Thick smoky C around a tiny group of stars, "smoke" then went off in other directions
M3	Globular Cluster	1/3 very dense core, stars so packed it seemed pure white. Rest less dense
M44 Beehive Cluster	Open Cluster	Noticed equilateral triangle of stars. Other stars scattered in and around. No notable core
M46	Open Cluster	Seemed to have short lines of stars going out from center, no notable core
NGC 2438	Planetary Nebula	Small thick gray ring, somewhat off center in M46
M65	Spiral Galaxy	Saw in same field as M66, to the left and a bit above. Looked like a thin bow tie on its side. Bright dot core, then short wisps going up and down
M66	Spiral Galaxy	Looked like another thin bow tie on its side. Bright dot core, then short wisps going up and down, a bit brighter than M65
M13 Hercules Cluster	Globular Cluster	1/2 dense core (by diameter) then got gradually thinner further from center
M104 Sombrero Galaxy	Spiral Galaxy	Small dim horizontal line, bright dot core and dimmer sides
Venus	Planet (Inner)	Yellow white crescent. Like moon at waning crescent phase. About 1/6 of disk illuminated

Jupiter	Planet, Gas Giant	Saw very close to horizon, sky not yet dark, Strips were blurred but could still be made out
2 Galilean Moons	moons of Jupiter	1 one left side, 1 on right
Mars	Planet, Inner	Small red disk. A bit on the red-orange side. No polar ice caps visible.
Saturn	Planet, Gas Giant	Golden yellow disk and rings. Saw gaps between planet and rings. Rings tilted downward, so I saw top side of rings
Titan	moon of Saturn	Small dot to the left of Saturn, in line with the rings

June 21, 2012 Patterson Observatory		
M57 Ring Nebula	Planetary Nebula	Tiny smoke ring
Earth's Moon	Moon	Mare cut in half by terminator, 2 craters w/ central peaks near terminator above mare
Saturn	Planet, Gas Giant	Yellow brown disk and rings Rings seemed to have tiny gap about 2/3 of the way out
Mars	Planet (Inner)	Small red disk, darker red streak in upper hemisphere, polar ice caps barely visible

September 15, 2012 Kartchner Caverns		
M31 Andromeda Galaxy	Spiral Galaxy	Elliptical fuzzy disk (2x as long as high), with small bright dot core in center, and what looked like horizontal stripes radiating from the core to the edge (=·=)
M57 Ring Nebula	Planetary Nebula	Light gray disk on inside, darker gray ring on outside, outer ring slightly elliptical. Slight fuzziness on outer edge
M110 Satellite of M31	Dwarf spheroidal galaxy	Rectangular fuzzy patch, brightest in center, dimmer further out, 3 to 1 length to width ratio
M92	Globular Cluster	Dense core, around that an elliptical area of less dense stars, around that an irregular area of still less dense stars
M6 Butterfly cluster	Open Cluster	Small stars made a connect-the-dots upside down butterfly. Also, lots of other stars in and around the butterfly
M13 Hercules Globular Cluster	Globular Cluster	Huge, sparkly, beautiful. Large core making up 1/2 of it, then got less dense further out
M8 Lagoon nebula	Emission nebula	C shaped fuzzy patch with dark lane cutting at the side of the C, like C| very faint fuzziness after dark lane. Bunch of stars (Star Cluster?) above the C, about the same size as the C, a bit like c*|
Alberio	Double Star	Bright blue star on left and larger, brighter yellow star on right.

September 20, 2012 Patterson Observatory		
M13 Hercules Cluster	Globular Cluster	Lots of tiny stars, core about 1/2, noticed some triangle shaped dark areas outside the core
M27 Dumbbell Nebula	Planetary Nebula	Faint horizontal oval, with indentations in the middle like a butterfly, darker in the center
NGC 869 (1/2 of Double Cluster)	Open Cluster	2 bright stars, one surrounded by less bright stars in a pyramid or skyscraper shape, the other more isolated. Dark gap beneath, then two small groups of about 6 stars each.

Earth's Moon	Moon	Lots of mares and craters. Had the Messier craters shown to me, two tiny craters next to each other. The right one had a tail formed by ejecta.·· -- Saw pair of larger craters so close they overlapped, like œ and a large crater with central peak on terminator.

October 13, 2012 Discovery Observatory West		
M17 Swan Nebula	Refection Nebula	Looked just like a swan with a short neck, upright, facing left, extra bright patch on front of 'wing' (center left of rectangle 'body')
M24 Sagittarius Star Cloud	Pseudo-Cluster of Stars	Filled field of view, hundreds of stars, in evenly distributed clumps of 3 or 4, no core, a few brighter stars
NGC 6603	Open Cluster	Faint fuzzy in center on M24
M22	Globular Cluster	Elliptical shaped, tilted \, core is inner quarter
M31 Andromeda Galaxy	Spiral Galaxy	Elliptical, 1/2 as wide as high, tilted /. Bright dot core. Dark lane underneath ellipse.
M110 (Sat. of Andromeda)	Dwarf spheroidal galaxy	Saw in same field as M31, small rectangular fuzzy patch to right of M31, only partly in view
M32 (Sat. of Andromeda)	Elliptical Galaxy	Saw in same field as M31, small round fuzzy patch to the right of M31, had core.
M11 Wild Duck Cluster	Open Cluster	Looked like a globular cluster. Had a couple dark patches, each about 1/8 size of cluster
M27 Dumbbell Nebula	Planetary Nebula	Like an apple with a large bite out of each side. Bright in center, dimmer vertical ellipses on each side
M57 Ring Nebula	Planetary Nebula	Like a smoke ring, bright gray on outer half, dark gray inner half
M33 Triangulum Galaxy	Spiral Galaxy	Very faint, but filled field of view. Dark lane, quarter circle arc, in upper left quadrant. Core a bit brighter than the rest
M71	Globular Cluster	Wedge shaped triangle full of stars, saw lots of other stars around it
C/2012 S1 (ISON)	Comet	Tiny, but distinct comet shape, with short faint tail and bright head

January 12, 2013 Discovery Observatory West		
M38	Open Cluster	Spidery, seemed to have lines of stars, small core
NGC 2169	Open Cluster	Looked like just like an angular 37, but the star that makes the upper bar of the 7 is faint
M42 Orion Nebula	Diffuse Nebula	Nebulosity like a pair of wings. Like ⁀⁀, but thicker, 1/3 as high as wide. Trapezuim in disk of nebulosity just below wings, a bit right of center. Three equally spaced stars in a vertical line above and left of the Trapezium, going through the wings, a bit left of center
???	???	Faint disk of nebulosity. 2 bright stars in center, like a dark ghost, the two stars as eyes.
M35	Open Cluster	Large core, lots of stars, Stars got thinner further out NGC 2158 in same field
NGC 2158	Open Cluster	Tiny cluster seemed to be a nebula. Faint irregular Nebulosity below and left of M35
M31 Andromeda Galaxy	Spiral Galaxy	Football shaped nebulosity. Small bright core, dimmer ring around it, then still dimmer further from the center

M32 Satellite of M31	Dwarf spheroidal galaxy	Saw in same field as M31 (barely fit), Small disk of nebulosity with a bright core. To the right of M31, slightly above M31's center like () *
NGC 2237 Rosette Nebula	Emission Nebula	Faint ring of Nebulosity around NCG 2244. Same width all around, same width as width of hole in center. Nebulosity irregular, like a cloud, Had to move the telescope to see it all
NGC 2244	Open Cluster	In center of Rosette. Several stars. Vertical ellipse shape. Stars bright
M45 Pleiades	Open Cluster	Several bright blue stars with bits of nebulosity around them. Also other dimmer stars without nebulosity. Noticed a thin triangle of dimmer stars pointing right
Jupiter	Planet, Gas Giant	2 brown strips oriented vertically. One just right of the equator, other farther to the left
4 Galilean Moons	moons of Jupiter	One was ingressing, and just visible at about 5 o'clock on Jupiter. 2 more beneath Jupiter, 1 above, farther from Jupiter than others

January 17, 2013 at Patterson Observatory		
NGC 869 (1/2 of Double Cluster)	Open Cluster	Noticed patterns of stars within the cluster. Near the center was a group of stars in a D shape, with a bright star to the left vertically centered on the D like · ↄ Also saw a backwards S of stars about twice as big as the D to the left of the D and the bright star
Almack	Binary Star	Orange star and blue star, Orange twice as bright as blue. Orange to the left and slightly below blue. Reminded me of Albireo.
M31 Andromeda Galaxy	Spiral Galaxy	Faint fuzzy. Shaped like a wide shallow bowl or 1/2 a football Small core a bit below top. Would be central if full ellipse were visible ·‿ . Dust lane at the top, above the core, caused loss of nebulosity
Beta Monocerotis	Triple Star	All stars same brightness. 2 nearly touching in diagonal, 3rd left of lower like . .·
Sigma Orionis	Septuple Star	4 stars in an arc like a dome top. ⌒3rd from left brighter than 1st 2, 4th faint. Below the arc, 3 more stars in a thin triangle pointing left. Same brightness as 1st 2 stars in arc
NGC 7662 Blue Snowball	Planetary Nebula	Fuzzy round gray disk. A bit of blue tint to the gray. No notable core
Jupiter	Planet, Gas Giant	Saw on a screen. 2 thin horizontal brown bands equidistant from the equator. Shadow of moon at 5:00
4 Galilean Moons	moons of Jupiter	2 above Jupiter, the nearer a bit right of the farther, 1 below, fairly close. Last unseen, but casting a shadow on Jupiter

February 9, 2013 at Desert Coyote Observatory		
M82 Cigar Galaxy	Irregular Galaxy	Aptly named. Thin gray vertical ellipse with thin black dust lane going across the center, the short way, to form the cigar band.
NGC 2261 Hubble's Variable Nebula	Variable Nebula	Looked like a comet. Equilateral triangle of nebulosity with star at one corner. Nebulosity gradually got dimmer further from the star
NGC 2245	Reflection Nebula	Saw horizontal rectangle of four stars, upper left star had a small triangle of nebulosity going up and away from the rectangle
NGC 2237 Rosette Nebula	Emission Nebula	Irregular ring of dark gray nebulosity. About same thickness all around. Some areas brighter than others. Stars visible through it.

NGC 2244	Open Cluster	Several bright stars (about 15) and many fainter stars.
M97 Owl Nebula	Planetary Nebula	Round gray disk with well-defined edge. Two darker patches like eyes or eye sockets
NGC 2359 Thor's Helmet	Emission Nebula	Round clear bubble with very 3D appearance. Star in lower center. 2 Trails of nebulosity formed the helmet's horns, but were Oriented like the top of the helmet was tilted to 8:00. Horns pointed towards each other. Fuzzy patch of nebulosity to the right of the helmet

February 13, 2013 at Patterson Observatory		
NGC 7662 Blue Snowball	Planetary Nebula	Small gray fuzzy disk. Very slight blue tint. Seemed a bit brighter near the bottom.
R. Leporis	Variable Star	Very bright red, brightness and size similar to other stars in field, but much redder
Jupiter	Planet, Gas Giant	Light yellow disk, 2 dark brown stripes one just above the equator, the other just below. A fainter, light brown strip just above the upper dark strip
4 Galilean Moons	moons of Jupiter	All on right side of Jupiter, 3 close together, 1 much farther out. Closest fainter than others, 2nd closest bit below others

ARIZONA SKY-CALENDAR UPDATE FOR MARCH 2013

by Doug Snyder (C/2002 E2)

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.**

March HighLite: optional MM at the Blue Marvel Observatory (Gary Grue) and Member Star Party. Another MM, and MSP date has been set for Saturday, April 6, at Bob & Barb Kepple's observatory in Palominas, which is named: Desert Starlight Observatory (DSO).

Update on March astronomical events:

Comet Pan-STARRS (C/2011 L4): As of the last day of February, this comet is still only visible from the southern hemisphere. But in early March, it should become visible for folks in the northern hemisphere low in the western skies after evening twilight. On March 5, it will reach its perigee point (closest to Earth) at just over 1 AU (Astronomical Unit), and on March 10 (UT) it will pass closest to the Sun (perihelion) at around 0.30 AU! If it survives that milestone, it should be quite visible for northern observers from March 12 to March 17. Also in early March, it MAY reach magnitude -0.2 and then begin to fade. Many questions still have to be answered about its perihelion passage. Both Sky & Telescope magazine and Astronomy magazine have more articles on this comet, and on their websites.

Comet Lemmon (C/2012 F6): The comet is currently coursing its way on the Tucana the Toucan constellation. Not visible in the northern hemisphere - unfortunately.

Monday, March 11 (1251 hours, MST): New Moon, start of Lunation #1116

Thursday, March 14: Public Astronomy Night at Patterson Observatory in Sierra Vista" Sunset is at 6:29 pm; Come on out and observe or assist!

Saturday, March 16: BIG Astronomy Night at Kartchner Caverns State Park; this gets underway in the afternoon with Solar Viewing, but there is also an 'astro' talk in the early evening, and great dark sky viewing in the evening! Bring the family and a telescope and join other members of the HAC and other clubs, out under the stars.

Sunday, March 17: The Moon and Jupiter get close (about 1.4 degrees) around 7pm. This should be a pretty sight.

Wednesday, March 20: Vernal Equinox, 4:02 am (0402 hrs. MST); Spring starts in the northern hemisphere.

Friday, March 22: The HAC monthly meeting, starts at 7 pm; at Cochise College.

A free star map for March, 2013 can be downloaded at http://www.skymaps.com/downloads.html

From Dave Mitsky's great blog (found at "Cloudy Nights Telescope Reviews"): "Saturn retrogrades through Libra this month. The tilt angle of its rings during March is 19 degrees. Its equatorial diameter is 18.3 arc seconds at midmonth. Saturn rises at 11:00 p.m. local time and transits the meridian at 4:00 a.m. local time at midmonth. The waning gibbous Moon passes three degrees south of the Ringed Planet during daylight on March 2 and March 29. Click on http://www.curtrenz.com/saturn for a wealth of information on Saturn. Eight-magnitude Titan is positioned north of Saturn on the nights of March 12 and March 28 and south of the planet on March 4 and March 20. Iapetus is nine arc minutes from Saturn when it reaches greatest western elongation on March 13."

As Always, the night sky is so magnificent to explore and to discover. How many of the 88 constellations can you remember to name - and view? Comments and suggestions always welcome!

Until next month - Clear Skies, Doug Snyder

Huachuca Astronomy Club – Board of Directors

Officers: President: Bob Gent Vice President: Kim Rogalski

Secretary: Ted Forte Treasurer: Bob Kepple

Members at Large:

Bob Hoover Doug Snyder

Ken Kirchner Duke Glishke

Past President: Wayne Johnson

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

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: 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>

How to contact the Nightfall editor, Cindy Lund:

Email: alund@juno.com
Phone 520-456-4817 Mail:
3666 Via El Soreno
Sierra Vista, AZ, 85650

2013—ARIZONA's Astronomically Handy Sky Calendar from Doug Snyder & the H.A.C.—2013

ARIZONA Observers SKY EVENTS Calendar for 2013 —All Times shown are MOUNTAIN STANDARD TIME*

January 2013

HIGHLITE1: Moon & Jupiter on 21st
HL2(month):**Saturn's Rings open to 18°**
Note: **HAC** = **H**uachuca **A**stronomy **C**lub

03 Th Quadrantids Meteor Shower - unfavorable year due to Moon light! 04 Fr ☾ Last Quarter Moon 2058 hrs.
11 Fr ● **NEW MOON** 1244 hrs.(lunation#1114)
12 Sa **HAC** Member **S**tar **P**arty (S.P.)
17 Th **HAC** Pub. S.P.;P.O.; SS@1743h.
18 Fr ☽ First Quarter Moon 1645 hrs.
21 Mo MOON & Jupiter v. close, 2000h
25 Fr **HAC Meeting**, Cochise College, 1900 hrs
26 Sa ○ Full Moon, 2138 hrs.
29 Tu Zodiacal Lt. in W., pm, next two weeks after evening twilight.

February 2013

HIGHLITE: Merc. & Mars close on Feb. 8th

03 Su ☾ Last Quarter Moon 0656 hrs.
09 Sa **HAC** Member **S**tar **P**arty (S.P.)
10 Su ● **NEW MOON** 0020 hrs.
14 Th **HAC** Pub. S.P.; P.O.; SS@1808hrs. 15 Fr **NEA** 2012 DA14; to mag.12 in evening hrs.; size= 57meters; visit spaceweather.com
16 Sa Merc. evening planet in W., 7°
17 Su ☽ First Quarter Moon 1331 hrs. 22 Fr **HAC Meeting,** Cochise College
25 Mo ○ Full Moon 1326 hrs.
27 We Zodiacal Lt. in W., pm, next two weeks after evening twilight

March 2013

HIGHLITE: Messier Marathon S.P. 04 Mo ☾ Last Quarter Moon 1453 hrs. 09 Sa **HAC Messier Marathon S.P.**
09 Sa **Comet Pan-Starrs** (C/2011 L4); 2100hrs, at Perihelion—Mag. 0?
11 Mo ● **NEW MOON** 1251 hrs.
14 Th **HAC** Pub. S.P.; P.O.; SS@1829h.
16 Sa **KartchnerCavernsStatePark**SP.
17 Su Moon&Jup. close;1900hrs; 1.4°
19 Tu ☽ First Quarter Moon 1027 hrs.
20 We **Vernal Equinox**, 0402 hrs.
22 Fr **HAC Meeting,** Cochise College
27 We ○ Full Moon 0227 hrs.
31 Su Merc. morning planet in E. size 9" Easter Sunday

April 2013

HIGHLITE: Saturn Opposition, 4/28
HL2: Comet Pan-Starrs (early in month & bright?)

02 Tu ☾ Last Quarter Moon, 2137 hrs. 06 Sa **HAC** Member S.P.
10 We ● **NEW MOON** 0235 hrs.
14 Su Jupiter within 4° of crescent Moon
18 Th ☽ First Quarter Moon 0531 hrs. Th **HAC** Pub. S.P.; P.O.; SS@1852h.
20 Sa **ASTRONOMY DAY—Global**
22 Mo Lyrid Meteors—v. unfavorable due to moonlight; peak 0400?
25 Th ○ Full Moon, 1257 hrs.
26 Fr **HAC Meeting,** Cochise College
28 Su Saturn at **Opposition,** 0100 hrs. mag. +0.1, size 18.8", 8.82 AU

May 2013

HIGHLITE: Merc., Venus, Jup. Conjunction! 02 Th ☾ Last Quarter Moon, 0414 hrs.
05 & 06 Su & Mo **η Aquarid Meteors**; favorable; pk@4am each morning; possibly 40 per hr.
09 Th ● **NEW MOON** 1728 hrs.
11 Sa **HAC** Member S.P.
16 Th **HAC** Pub. S.P.; P.O.; SS@1912hrs.
17 Fr ☽ First Quarter Moon 2134 hrs.
24 Fr ○ Full Moon, 2125 hrs. very shallow penumbral Lunar Eclipse, 1.5%; mostly undetectable, starts at 2053hrs.
24 Fr **HAC Meeting,** Cochise College
24-29 Planetary Conjunction, **best** of 2013;evening twilight line up of Merc.,Venus,Jup.;26th is !!
31 Fr ☾ Last Quarter Moon, 1158 hrs.

June 2013

HIGHLITE: [redacted](Gamma) Delphinids?

04 Tu Venus in **M35**, pm, low in NW
08 Sa ● **NEW MOON** 0856 hrs. **HAC** Member S.P.
11 Tu **Meteors-[redacted]**Del.; 0100-dawn? v. favorable year, activity is ??
12 We Merc. G. Elong. 24°, pm planet
13 Th **HAC** Pub. S.P.; P.O.; SS@1927hrs.
16 Su ☽ First Quarter Moon 1024 hrs. 20 Th Merc. 2° S. of Venus, pm
20 Th Summer **Solstice** 2204 hrs. 23 Su ○ Full Moon,0432h.largest of 2013 28 Fr **HAC Meeting,** Cochise College
29 Sa ☾ Last Quarter Moon, 2153 hrs.

July 2013

HIGHLITE: Mars, Jup., Merc., am, E., July **22nd**

01 Mo Pluto at Opposition,1800 hrs.
06 Fr Moon/Mars close; . low in E.,0430h.
08 Mo ● **NEW MOON** 0014 hrs.
15 Mo ☽ First Quarter Moon 2018 hrs.
22 Mo ○ Full Moon, 1116 hrs.
26 Fr **HAC Meeting,** Cochise College
29 Mo ☾ Last Quarter Moon, 1043 hrs.
29-30 Mo-Tu: **Meteors:** Delta(δ)Aquarids; am hrs.; favorable year

August 2013

HIGHLITE1: Perseid Meteor Shower
HL2: Moon/Planet pairings, am! & pm during month

06 Tu ● **NEW MOON** 1451 hrs
11-13 Su-Tu; **Perseids**; Pk. am of 12th; fast, bright
14 We ☽ First Quarter Moon 0356 hrs.
20 Tu ○ Full Moon, 1845 hrs.
23 Fr **HAC Meeting,** Cochise College
26 Mo **Neptune** at Opposition, 1900 hrs.
28 We ☾ Last Quarter Moon, 0235 hrs.

September 2013

HIGHLITE: Moon&Venus close, pm, 8th

03 Tu Zodiacal Lt. in E., am, next two weeks before twilight.
05 Th ● **NEW MOON** 0436 hrs.
12 Th ☽ First Quarter Moon 1008 hrs. **HAC** Public S.P., P.O.;SS@1830hrs.
19 Th ○ Full Moon (Harvest), 0413 hrs.
22 Su Fall **Equinox**,1344 h. (Aurora?)
26 Th ☾ Last Quarter Moon, 2055 hrs.
27 Fr **HAC Meeting,** Cochise College

October 2013

HIGHLITE: Jup. Dbl Shadow Transits (3) 17th, 18th, 26th; details online

03 Th Zodiacal Lt. in E.,am, next two wks. **Uranus** at Opposition, 0700 hrs.
04 Fr ● **NEW MOON** 1734 hrs. **HAC** Member S.P.
05 Sa **Kartchner Caverns StatePark** S.P.
10 Th **HAC** Public S.P., P.O.;SS@1755hrs.
11 Fr ☽ First Quarter Moon 0402 hrs.
12 Sa **Astronomy Day** (Autumn)
18 Fr ○ Full Moon,1638h.; Lunar eclipse @MR
25 Fr **HAC Meeting,** Cochise College
26 Sa ☾ Last Quarter Moon, 1640 hrs.

November 2013

HIGHLITE: Comet ISON (C/2012 S1) !!!! ??? 01 Fr Venus G. Elong. E.(47°),0100hrs., **pm** planet
02 Sa **HAC** Member S.P. Jup., dbl. Shadow Tr., 0414hrs., I & Eu;
03 Su ● **NEW MOON** 0550 hrs.
05 Tu S. Taurid meteors Pk., 0400 hrs.; favorable;
07 Th **HAC** Public S.P., P.O.; SS@1727 hrs.
09 Sa ☽ First Quarter Moon 2257 hrs.
17 Su ○ Full Moon, 0816 hrs.; Merc. **am** planet 22 Fr **HAC Meeting,** Cochise College
25 Mo ☾ Last Quarter Moon, 1228 hrs.
28 Th **Comet ISON**, **Perihelion** @ 1600hrs.
30 Sa **HAC** Member S.P. (for **December**)

December 2013

HIGHLITE: Comet ISON ??? !!!!

02 Mo ● **NEW MOON** 1722 hrs.
06 Fr Venus@greatest illumination, mag. -4.9, 26% illuminated, size 41" 09 Mo ☽ First Quarter Moon 1008 hrs. 12 Th **HAC** Public S.P., P.O.;SS@1714h. 13 Fr Geminid Meteors Pk. 2300h., fair? 14 Sa **HAC Meeting/XMAS Party** 17 Tu○ Full Moon,0413h.(smallest 2013)
21 Sa Winter **Solstice,** 1011 hrs.
22 Su Ursid Meteors Pk., 0700 hrs.
25 We ☾ Last Quarter Moon, 0648 hrs.
26 Th **C/ISON:** closest to Earth, 0300h.

*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; ;
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; dbl= double; AU=Astronomical Unit; °= degrees; *compiler*: **Doug Snyder** (C/2002 E2, MP15512); V1.1.2013