

January 2006

# The Voyager

East Valley Astronomy Club

Volume 20 Issue 1



## From the Desk of the President

by Steven Aggas, 2006 EVAC President

Happy New Year everyone!

2005 has been an outstanding year in many regards, but now it's on to bigger and better things for EVAC. I'm glad I decided to continue as EVAC's President and hope to keep things on a positive roll. Unfortunately I will not be able to attend the January meeting as I will be out of the country but Silvio, our new VP, will lead the meeting.

On a different note, since my wife Lori got me a new

primary mirror and secondary for Christmas, I'm sorry to say it may be cloudy for quite some time and apologize profusely in advance. I will keep you all posted on the progress of the telescope construction at future meetings.

As our speaker for the January General Assembly meeting (postponed from October 2005) we will have Dr. Bill Hartmann. Dr. Hartmann has a PhD in astronomy from the University of Arizona, is the lead author of the current theory about the origin of the moon, and

the first winner of Carl Sagan Medal from American Astronomical Society for popular writing and artwork about astronomy. He is also the recipient of a medal from European Geophysical Society for work on Mars. An asteroid is also named after him for his work on planet origins and evolution.

Join us at the Southeast Regional Library (Gilbert Public Library) on Friday, January 20<sup>th</sup> at 7:30PM. The GPL is located at the Southeast corner of Greenfield and Guadalupe Roads.

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## January Events:

- Public Star Party in Gilbert - January 13
- January Meeting at Southeast Regional Library - January 20
- Local Star Party at Boyce Thompson - January 21
- Zaharis Elementary School Science Fair - January 27
- Deep Sky Star Party at Vekol Road - January 28

## The Backyard Astronomer

Targets for January and February by Bill Dellenges

One light year = 6 trillion miles. One Astronomical Unit = 93 million miles

**Saturn:** The ringed planet reaches opposition on January 27 in Cancer very near M44, the Beehive Cluster. Distance: 766 million miles. The rings are tilted at 18 degrees to us. You will need to wait a few hours after sunset for it to climb high enough in the night sky to observe.

**Star color comparison: Betelgeuse vs. Rigel.**

Red supergiant Betelgeuse is big (600 times the size of our Sun) but cool (3,000K) compared to the sun's 5800K temperature, while blue-white supergiant Rigel is 46 times bigger than the sun and hot (12,000K). Rigel is one of the brightest stars in the Galaxy with a luminosity of 57,000 suns.

**Double stars: Mesarthim** in Aries is 160 light years away, has companion star in orbit about it 380 Astro-

nomical Units distant (Sep. 7.6", Mags 4.6, 4.6.). **Beta Monocerotis**, triple star system 470 light years away (Sep. AB 7.4", AC 9.9", BC 2.8", Mags 4.5, 5.2, 5.6) .

**Open Star Clusters: M45, the Pleiades or "Seven Sisters"**, a cluster of 200 stars 400 light years away in Taurus. **M35**, beautiful open star cluster, 2,800 light years away, in Gemini. Look for NGC

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# The Backyard Astronomer

(Continued from page 1)

2158, a faint open star cluster  $\frac{1}{2}$  degree southwest of M35.

**Nebulae: M42**, the famous Orion Nebula, a cloud of hydrogen gas and dust 1600 light years away. A star-forming region. Best example of an “emission nebula” in the northern skies. Enough gas in it to create 10,000 Suns. Actually visible to naked eye in the “Sword of Orion”. Note quadruple star system, the “**Trapezium**” at center of nebula.

**Planetary Nebula: N.G.C. 2392**, a dead star in Gemini. 3,000 light

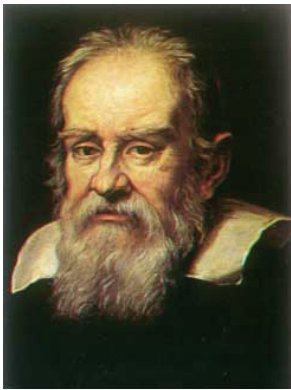
years away. The star has shed its outer envelope (the nebula) leaving behind a white dwarf star (density = 1 ton per square inch). The sun will die this way in 5 billion years.

**Supernova remnant: M1, the “Crab Nebula”**. Another dead star-different demise however. Chinese saw this star explode in 1054 A.D. Could be seen at daytime for a month. These large stars don’t bother with a Planetary Nebula end as above, they simply implode violently when they run out of fuel-**Ka-Boom!** Leaves behind a Neutron star (density = 100 million tons for square inch) or sometimes a Black Hole

(density infinite).

**Galaxy: M31, the Great Andromeda Galaxy**. Our nearest galactic neighbor 2.5 million light years away, similar in nature and size to our Milky Way Galaxy. A system of 100 billion stars, a 100,000 light years in diameter. In a dark sky it can just be glimpsed by the naked eye.

**Galaxy: M82**, an edge on galaxy 10 million light years away in Ursa Major (Big Dipper).



Galileo Galilei discovered the four largest moons of Jupiter in 1610:  
Io, Callisto and Europa on January 7  
Ganymede on January 13



☾ First Quarter Moon on January 6 at 11:56

● Full Moon on January 14 at 02:49

☾ Last Quarter Moon on January 22 at 08:14

○ New Moon on January 29 at 07:15

# 2006: A Year of Sky Events

## by Joe Orman

Photo Pages: <http://pages.prodigy.net/pam.orman/JoeHome.html>

Mark your calendar for these interesting alignments, conjunctions, occultations & meteor showers in the year 2006. Times are calculated for Phoenix, Arizona; other locations may differ. Most will be easy to see with the unaided eye, some very challenging -- take a look! Constructive comments and corrections welcome. This list may be copied and distributed for non-commercial use, but it must be credited to Joe Orman.

**January 8** (evening): Mars 4 degrees to right of gibbous Moon, high in ESE after sunset.

**January 9** (evening): Gibbous Moon partially occults star cluster Pleiades, very high in E after sunset.

**January 23-February 12** (nights): Saturn less than 1 degree from Beehive star cluster (M44).

**January 25** (morning): Bright star Antares 0.6 degrees above crescent Moon, in SE before sunrise (occultation for Central America).

**February 5-6** (night): Mars 3 degrees to lower right of first-quarter Moon, Pleiades star cluster (M45) 3 degrees to upper left of Moon, near zenith after sunset. Moon occults Pleiades as they set in WNW about 2:00 a.m.

**February 14-19** (evenings): Mars 2 degrees from Pleiades star cluster (M45), near zenith after sunset.

**February 17** (evening): Bright star Spica 1 degree above gibbous Moon, rising in E about 10:30 p.m. (occultation in eastern North America).

**March 5-6** (night): Mars 5 degrees to upper left of first-quarter Moon, Pleiades star cluster 6 degrees to lower right, high in WSW after sunset. Mars 3 degrees to lower left of Moon as they set in WNW about 1:00 a.m.

**March 10** (evening): Saturn 5 degrees to upper right of gibbous Moon, high in E after sunset. Much-dimmer Beehive star cluster between Saturn and Moon.

**March 17** (morning): Bright star Spica 0.3 degrees above gibbous Moon, high in SW before sunrise (occultation in Hawaii).

**March 20** Spring equinox (11:26 a.m. MST). Sunrise straight east (6:32 a.m., azimuth 89.5 degrees), sunset straight west (6:40 p.m., azimuth 270.7 degrees). Always use proper eye protection when viewing the sun.

**March 27** (morning): Mercury 4 degrees to upper left of crescent Moon, very low in E before sunrise.

**April 1** (evening): Crescent Moon 0.5 degrees above Pleiades star cluster (M45), in W after sunset (occultation for eastern North America).

**April 6** (evening): First-quarter Moon, Saturn and much-dimmer Beehive star cluster make 3-degree equilateral triangle, near zenith after sunset.

**April 16** (evening): Bright star Antares 0.5 degrees to left of gibbous Moon, rising about 10:30 p.m. in SE.

**April 24** (morning): Venus 2 degrees to upper left of crescent Moon, low in E before sunrise.

**May 3-4** (night): Saturn 6 degrees to left of first-quarter Moon, high in W after sunset. Much-dimmer Beehive star cluster 3 degrees to upper right of Saturn. Saturn 3 degrees to left of Moon as they set in WNW about 1:00 a.m.

**May 24** (morning): Venus 5 degrees to right of crescent Moon, low in E before sunrise.

**May 30** (evening): Mars 3 degrees to left of crescent Moon, in W after sunset.

**May 31** (evening): Saturn 3 degrees below crescent Moon, in W after sunset. Much-dimmer Beehive star cluster 1 degree to upper right of Saturn, Mars to lower right.

**June 1-7** (evenings): Saturn less than 1 degree from Beehive star cluster (M44), in W after sunset.

**June 11-12** (night): Major lunar standstill: full Moon stays low above southern horizon, only 27 degrees above S horizon as it transits at 1:00 a.m.

**June 15** (evening): Mars 1 degree to right of Saturn, Beehive star cluster (M44) less than 1 degree to right of Mars, Mercury to lower right, in W after sunset. Mars 0.6 degrees to upper right of Saturn on June 17.

**June 22** (morning): Venus 7 degrees below crescent Moon, Pleiades star cluster (M45) 7 degrees to lower left of Moon, in ENE before sunrise. Venus 7 degrees to right of crescent Moon on June 23.

**June 27** (evening): Mars, Saturn, Beehive star cluster (M44), crescent Moon and Mercury in line within 15 degrees, low in W after

# 2006: A Year of Sky Events

*(Continued from page 3)*

sunset. Moon 1 degrees above Mars on June 28.

**June 29** (evening): Bright star Regulus 2 degrees to left of crescent Moon, high in W after sunset. Mars, Saturn and Mercury to lower right.

**July 7-8** (night): Bright star Antares 2 degrees to left of gibbous Moon, in S after sunset. Antares less than 1 degree to upper right of Moon as they set in SW around 2:30 a.m.

**July 19-20** (night): Crescent Moon just leaving Pleiades star cluster (M45) as they rise in ENE around 1:00 a.m., Pleiades 2 degrees to upper right of Moon in E before sunrise (occultation for eastern North America).

**July 21-22** (evenings): Bright star Regulus less than 1 degree to lower left of Mars, low in W after sunset.

**July 31** (evening): Bright star Spica 2 degrees to upper right of crescent Moon, in SW after sunset (occultation for South America).

**August 7-10** (mornings): Mercury 2 degrees below Venus, low in ENE before sunrise.

**August 22** (morning): Venus 5 degrees to upper right of thin crescent Moon, Saturn 2 degrees to lower right of Moon, very low in ENE before sunrise.

**August 26** (morning): Saturn 0.5 degree below Venus, low in ENE before sunrise. Saturn 0.5 degree above Venus on August 27.

**August 31** (evening): Bright star Antares 1 degree to upper right of first-quarter Moon, in SSW after sunset.

**September 22** Fall equinox (9:03 p.m. MST). Sunset straight west (6:25 p.m., azimuth 270.6 degrees), sunrise straight east on

**September 23** (6:17 a.m., azimuth 89.6 degrees). Always use proper eye protection when viewing the sun.

**October 9** (evening): Gibbous Moon occults Pleiades star cluster (M45). Rise in ENE about 8:00 p.m., occultation from about 8:30 p.m. to 11:00 p.m.

**October 16** (morning): Saturn 2 degrees to lower right of crescent Moon, high in E before sunrise.

**November 8** (daytime): Mercury transits the sun, entire 5-hour transit visible from 12:12 p.m. (high in S) to 5:05 p.m. (low in WSW). Sunset 5:30 p.m.

**November 13** (morning): Bright star Regulus 1 degree to lower right of last-quarter Moon, Saturn 5 degrees to upper right, very high in SE before sunrise.

**November 17 - 18** (night): Leonids meteor shower. Just-before-new Moon rising about 5 a.m. will not interfere. Shower radiates from constellation Leo, which rises in E about midnight. Best time to look between midnight and dawn. Typical rate 20 meteors per hour, some years much higher. Nights of November 16 - 17 and 18 - 19 may also be good.

**December 3** (evening): Full Moon occults Pleiades star cluster (M45) in E after sunset, occultation from about 6:00 to 8:00 p.m.

**December 4-5** (night): Major lunar standstill: full Moon passes nearly overhead, only 6 degrees away from zenith at about 12:30 a.m.

**December 9** (morning): Mercury, Mars and Jupiter form triangle within 1.5 degrees, very low in SE before sunrise. Mercury 0.2 degrees above Jupiter on December 10. Mars 0.8 degrees to lower right of Jupiter on December 11.

**December 10** (morning): Saturn 1 degree to lower right of gibbous Moon, bright star Regulus 5 degrees to left, very high in SW before sunrise.

**December 13 - 14** (night): Geminids meteor shower. Just-past-last-quarter Moon rising about 2 a.m. will interfere somewhat. Shower radiates from Castor in constellation Gemini, which rises in NE around 7 p.m. and is near zenith in early morning hours. Best time to look between 9 p.m. and moonrise. Typical rate 60 meteors per hour.

**December 15** (morning): Bright star Spica 1 degree to upper left of crescent Moon, rising in E about 3 a.m. (occultation in South America).

**December 18** (morning): Grazing occultation of magnitude 3.0 star pi Scorpii by thin crescent Moon, very low in SE before sunrise. Jupiter and Mars 8 degrees to left.

**December 31** (morning): Gibbous Moon within 1 degree of Pleiades before they set in WNW about 4:45 a.m. (occultation for north-western North America)



# January's Guest Speaker : Dr. William K. Hartmann

Dr. William K. Hartmann is known internationally as a scientist, writer, and painter. His research involves the origin and evolution of planets and planetary surfaces, and the small bodies of the solar system. Bill Hartmann earned his PhD in astronomy from the University of Arizona. He is the lead author of the current theory about the origin of the moon and has the distinction of being the first winner of the Carl Sagan Medal from American Astronomical Society for popular writing and artwork about astronomy.

Dr. Hartmann is also the recipient of a medal from the European Geophysical Society for his work on Mars. An asteroid was named after him for his work on planet origins and evolution.

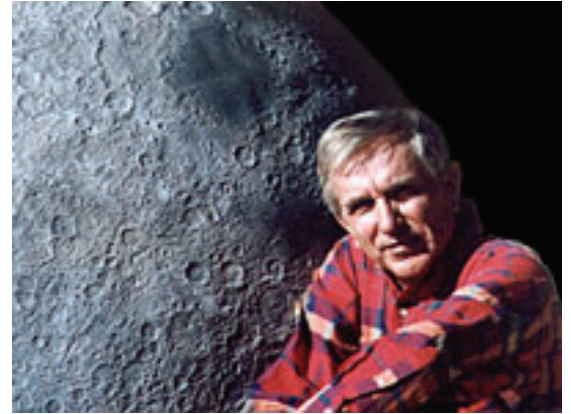
Some of Dr. Hartmann's books will be available for purchase at the meeting.

New edition of *Grand Tour: A Traveler's Guide to the Solar System*

*A Traveler's Guide to Mars*

*Mars Underground* (Science fiction novel about Mars)

*Cities of Gold* (Historical novel about southern Arizona, Sonora, and the Coronado expedition of 1540, first European exploration of Arizona). Modern story set in Arizona, intertwined with a story of real Spanish characters set in 1539-40.



## Daytime Astronomy by Silvio Jaconelli

It was Saturday afternoon around 2pm when I decided to walk over to the lake with a couple of pairs of binoculars. I like to watch airplanes flying overhead, as well as look at the ducks in the lake – my idea of fun!

From the night before I knew that Venus was approximately 2 hours east of the Sun, so I tried to find it in a pair of 7x35 very wide angle binoculars that used to belong to Don Wrigley; these binoculars have a field of view of over 10 degrees and are unbeatable for giving panoramic views of the sky – the smaller constellations in their entirety can fit in the field of view. Back to Venus - two hours of Right Ascension is approximately 30 degrees, so after a quick measurement I scanned the sky, and after 5 minutes sure enough – it was there. It did not look like much – just a light blob against a deep blue sky, but as plain as day (pun intended!).

I took careful note of its position in the sky and then turned to my Canon 12x36 IS binoculars – wow! The images in these binoculars are sharp to begin with – Canon makes great optics – and the image stabilization

really enhances the object being viewed. (Let me digress for a moment – handholding binoculars with high power leads to the 'shakes' which makes resolving fine detail impossible; the image stabilization of the Canon IS binoculars greatly reduces the 'shakes' allowing far more detail to be seen.) Now the edge of the planet was crystal sharp, and the phasing was so obvious; a great view of the planet at 12 power. The fact that the planet is approaching inferior conjunction greatly helped – the angular size of Venus gets huge the closer it gets to inferior conjunction. I checked the stats later - the angular size was 40 arc seconds and the planet's disc was 35% illuminated.

I then used a nearby palm tree as reference point to see if I could see Venus with the naked eye. As I panned up the tree trunk with the Canons I was amazed to see a huge but very slender crescent in the field of view – a HUGE but much more slender version of the image of Venus that I had just been observing. It was the Moon!!!! It was around 20 degrees east of the Sun, putting it around 35

hours old. It was just the faintest sliver – again a fine tribute to the Canon's optical quality – and only about a quarter of the rim was visible. Another wow!!! Unfortunately, no surface detail was visible. Now that I knew where to look, it was again easily visible to the naked eye, but the phase was so slender and the lack of contrast versus the background sky was so low that it would have been nearly impossible to notice it naked eye if you were not specifically looking for it.

Now back to Venus. Yep – using the palm tree as a guidepost, there was Venus with the naked eye. I always enjoy trying to spot Venus with the naked eye in the middle of the day, and I have had great success in doing this. It's really fun – try it. All you need is a good pair of binoculars and an estimate of the angular separation between Venus and the Sun. Remember that 15 degrees equals one hour of Right Ascension. The planet is really easy once you know where to look. The problem is that the human

(Continued on page 8)

# Classified Advertisements

## Antares 14mm W70 Eyepieces

Wide angle eyepiece featuring 70° AFOV and long (13-17mm) eye relief in an aluminum body with a wide rubber grip ring. Rubber eyeguard folds back for use with eyeglasses. Barrels are threaded for standard 1¼" filters and have a lock screw safety recess. Multicoated optics, blackened barrels, with top and bottom caps. I have two available. These sell for \$49 each new. I will sell one for \$30 or both for \$55.



**Peter Argenziano 480-633-7479**  
[news@eastvalleyastronomy.org](mailto:news@eastvalleyastronomy.org)

## Telescope For Sale

16" f/5 Dobsonian with a John Hall mirror (Pegasus Optics). Equipped with a Novak mirror cell, spider and diagonal holder; 2" Meade rack and pinion focuser and a University Optics 11x80 finder scope.

\$1200 OBO

Contact Bob Erdmann at [bobe@ngcic.org](mailto:bobe@ngcic.org)



## 16" f4.5 Meade Starfinder Eq. Mount

Optics remounted into a new tube, built by Pierre Schwarr with a JMI focuser. Includes 7, 12.5, 17, 20, and 32mm eyepieces plus 2.8 Klee Barlow, laser collimator and an Olympus OM1 camera.

Many extras! I have \$5200 invested in this telescope package, but will sell for \$2000

**Dave Rainey 602-980-0582**  
[drainey7@cox.net](mailto:drainey7@cox.net)

## Eyepieces for Sale

16mm Nagler Type II.....	\$150
13mm Nagler.....	\$150
9mm Nagler.....	\$125
7mm Nagler.....	\$125
4.8mm Nagler.....	\$125
40mm Plossl 1.25".....	\$60
32mm Wide Field 2".....	\$125
Barlow 2" 2x.....	\$50
1.25" UHC filter.....	\$40

Even though these are older designs and some of the barrels are worn, there is still plenty of good observing to do with these eyepieces.

Steve Coe at 602-789-7786 or [stevecoe@ngcic.org](mailto:stevecoe@ngcic.org)

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Advertisements for astronomical equipment or services will be accepted from current EVAC members only. Ads will be published as space permits and may be edited. Ads should consist of a brief text description and must include a current member name and phone number. You may include your email address if you wish. Ads will be published until canceled (as space allows), so please inform the editor when your item has sold.

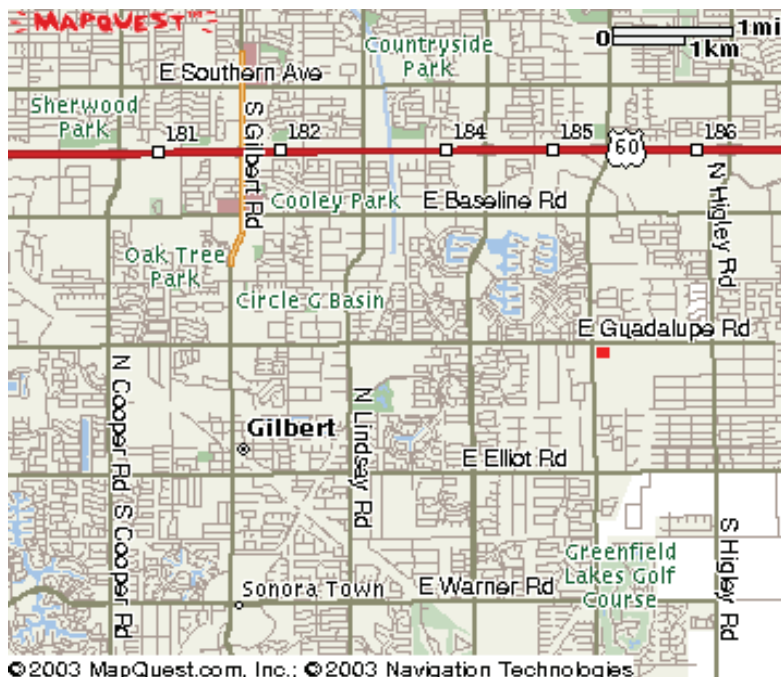
Ads should be emailed to: [news@eastvalleyastronomy.org](mailto:news@eastvalleyastronomy.org)

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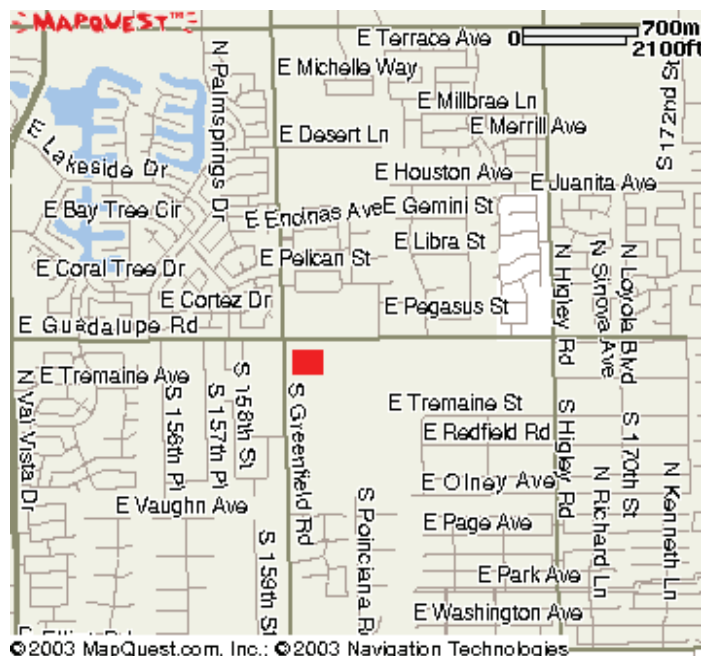
**[www.starizona.com](http://www.starizona.com)**



The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month, at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Rd., on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30pm.

Visitors are always welcome!



## 2006 Meeting Dates

**January 20**

**February 17**

**March 17**

**April 21**

**May 19**

**June 16**

**July 21**

**August 18**

**September 15**

**October 20**

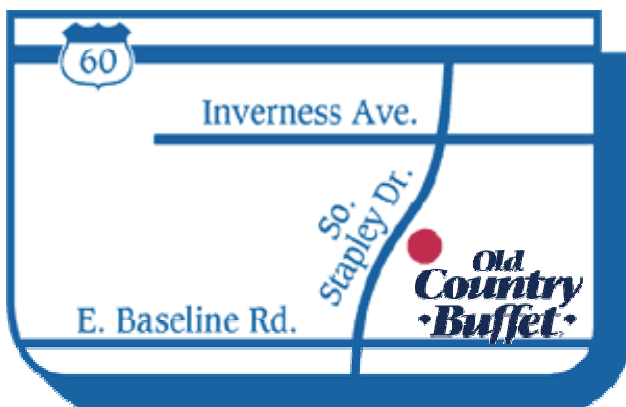
**November 17**

**December 15**

### Southeast Regional Library

775 N. Greenfield Road

Gilbert, AZ 85234



All are welcome to attend the pre-meeting dinner at 5:30 PM. We meet at **Old Country Buffet**, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, (near the Walmart Supercenter) just south of US 60.

**Old Country Buffet 1855 S. Stapley Drive in Mesa**



# January 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>
<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>
<b>29</b>	<b>30</b>	<b>31</b>				

## Schedule of Events

- *January 13 - Public Star Party at Riparian Preserve in Gilbert*
- *January 20 - General Meeting at Southeast Regional Library in Gilbert*
- *January 21 - Local Star Party at Boyce Thompson Arboretum State Park*
- *January 27 - Zaharis Elementary School Science Fair*
- *January 28 - Deep Sky Star Party at Vekol Road*

## Daytime Astronomy

(Continued from page 5)

eye is designed to home in on only a few degrees of field, so to see something as small as Venus you need to focus on a circle that is only a few degrees in diameter – everything outside this field will be out of focus or not picked up by the eye to any degree of materiality. That's why binoculars really help – they cut down on the field of view that you are looking at, as well as gathering at least 20 times the light of the naked eye making the object so much brighter. Once you know where to look, you end up wondering why you were not able to see it immediately! Back to Venus – I must have spent a solid 15 minutes just absorbing the tiny sharp crescent.....

Being this fired up, I decided to look for sun spots Well, this was a third big wow!!! There were two very large sun spot groups right in the meridian, with a third but very much smaller group trailing the first pair. Then on the very rim was a fourth group of sun spots. There was more –

granulation was plainly visible, as was a hint of plage around the sun spots on the rim. Granulation is the dimpled appearance of the Sun's disk due to the welling up of the Sun's material from it's interior (think of boiling oatmeal!), while plage is the bright areas close to sun spot groups. And the limb darkening was very obvious – this is caused by the Sun's light at the edge of the disk having to travel through a thicker layer of the Sun's atmosphere very similar to our very own terrestrial atmospheric extinction. Caution – proper filtration is essential for solar observing otherwise serious eye damage can result – if you are not sure what you are doing, do NOT try it.

Well, the airplanes and ducks just had to wait until another day – I had a great observing session right in the middle part of the day!

P.S. I checked the sky at 6pm that evening. The view was spectacular – the Moon was in Sagittarius and was a very slender crescent with the dark side visible to the naked eye; and there was a faint glow all the way

around entire rim of the disk. Surface features on the dark side were easily visible through the Canon's. To make up for missing my airplane spotting earlier in the day, an America West 737 flew through the field of view right across the Moon's disk - I wondered if that was Sam Herchak - a good observing buddy of mine who is a pilot with America West. Venus was dazzling in the sky about 10 degrees away; opposition was 17 hours later but they were still close enough to provide a very satisfying pairing. The image of Venus through the Canon's was poor – there was just so much flaring and the image was far too bright – the contrast between the target and the sky was so great that I was blinded by the light. Having the bright daytime sky as a backdrop is the best time to view Venus. And this applies to most very bright objects - the only time that I've seen banding on Jupiter with binoculars was during bright twilight. Besides, the seeing always seems better during twilight probably due to thermal equilibrium factors.



# East Valley Astronomy Club -- 2006 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

**IMPORTANT:** All memberships expire on December 31 of each year.

Select one of the following:

- ☐ New Member ☐ Renewal ☐ Change of Address

**New Member Dues** (dues are prorated, select according to the month you are joining the club):

- |   |   |
|---|---|
| <input type="checkbox"/> <b>\$30.00 Individual</b> January through March  | <input type="checkbox"/> <b>\$22.50 Individual</b> April through June       |
| <input type="checkbox"/> <b>\$35.00 Family</b> January through March      | <input type="checkbox"/> <b>\$26.25 Family</b> April through June           |
| <input type="checkbox"/> <b>\$15.00 Individual</b> July through September | <input type="checkbox"/> <b>\$37.50 Individual</b> October through December |
| <input type="checkbox"/> <b>\$17.50 Family</b> July through September     | <input type="checkbox"/> <b>\$43.75 Family</b> October through December     |
- Includes dues for the following year*

**Renewal** (current members only):

- ☐ **\$30.00 Individual** ☐ **\$35.00 Family**

**Magazine Subscriptions** (include renewal notices):

- ☐ **\$34.00** Astronomy ☐ **\$33.00** Sky & Telescope

**Name Badges:**

- ☐ **\$10.00** Each (including postage) Quantity: \_\_\_\_\_

Name to imprint: \_\_\_\_\_

**Total amount enclosed:**

*Please make check or money order payable to EVAC*

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City, State, Zip:

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URL:

**How would you like to receive your monthly newsletter? (choose one option):**

- ☐ Electronic delivery (PDF) *Included with membership* ☐ US Mail **Please add \$10 to the total payment**

**Areas of Interest** (check all that apply):

- |  |   |
|--|---|
| <input type="checkbox"/> General Observing   | <input type="checkbox"/> Cosmology        |
| <input type="checkbox"/> Lunar Observing     | <input type="checkbox"/> Telescope Making |
| <input type="checkbox"/> Planetary Observing | <input type="checkbox"/> Astrophotography |
| <input type="checkbox"/> Deep Sky Observing  | <input type="checkbox"/> Other            |

**Please describe your astronomy equipment:**

Would you be interested in attending a beginner's workshop? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club?

**PO Box 2202  
Mesa, AZ 85214-2202  
www.eastvalleyastronomy.org**

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

# Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC") I hereby affirm that my family and I agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

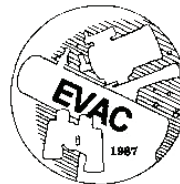
My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

\_\_\_\_\_  
*Please print name here*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Please sign name here*



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## A New View of the Andromeda Galaxy

by Dr. Tony Phillips and Patrick L. Barry

This is a good time of year to see the Andromeda galaxy. When the sun sets and the sky fades to black, Andromeda materializes high in the eastern sky. You can find it with your unaided eye. At first glance, it looks like a very dim, fuzzy comet, wider than the full moon. Upon closer inspection through a backyard telescope—wow! It's a beautiful spiral galaxy.

At a distance of “only” 2 million light-years, Andromeda is the nearest big galaxy to the Milky Way, and astronomers know it better than any other. The swirling shape of Andromeda is utterly familiar.

Not anymore. A space telescope named GALEX has captured a new and different view of Andromeda. According to GALEX, Andromeda is not a spiral but a ring.

GALEX is the “Galaxy Evolution Explorer,” an ultraviolet telescope launched by NASA in 2003. Its mission is to learn how galaxies are born and how they change with age. GALEX's ability to see ultraviolet (UV) light is crucial; UV radiation comes from newborn stars, so UV images of galaxies reveal star birth—the central process of galaxy evolution.

GALEX's sensitivity to UV is why Andromeda looks different. To the human eye (or to an ordinary visible-light telescope), Andromeda remains its usual self: a vast whirlpool of stars, all ages and all sizes. To GALEX, Andromeda is defined by its youngest, hottest stars. They are concentrated in the galaxy's core and scattered around a vast ring some 150,000 light years in diameter. It's utterly *unfamiliar*.

“Looking at familiar galaxies with a new wavelength, UV, allows us to get a better understanding of the proc-

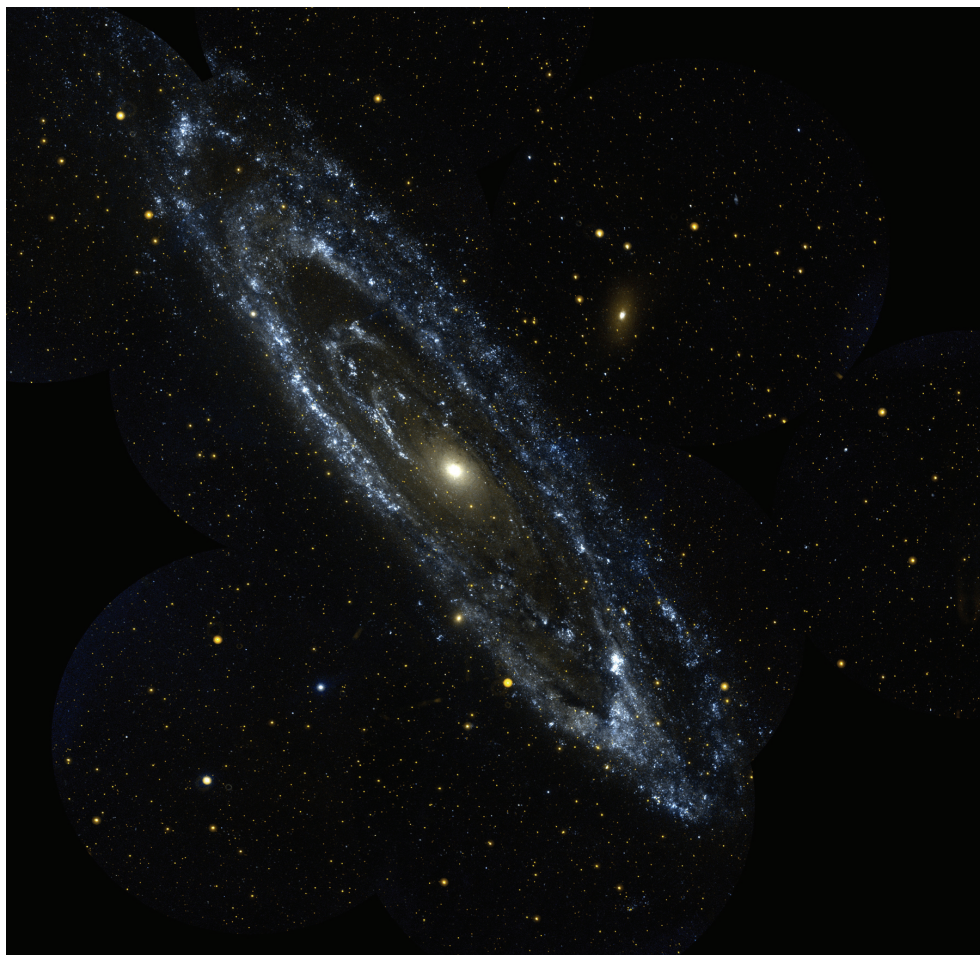
esses affecting their evolution,” says Samuel Boissier, a member of the GALEX team at the Observatories of the Carnegie Institution of Washington.

Beyond Andromeda lies a whole universe of galaxies—spirals, ellipticals and irregulars, giants and dwarfs, each with its own surprising patterns of star formation. To discover those patterns, GALEX has imaged hundreds of nearby galaxies. Only a few, such as Andromeda, have been analyzed in complete detail. “We still have a lot of work to do,” says Bois-

sier, enthusiastically.

GALEX has photographed an even greater number of distant galaxies—“some as far away as 10 billion light-years,” Boissier adds—to measure how the rate of new star formation has changed over the universe's long history. Contained in those terabytes of data is our universe's “life story.” Unraveling it will keep scientists busy for years to come.

For more about GALEX, visit [www.galex.caltech.edu](http://www.galex.caltech.edu). Kids can see how to make a galactic art project at [space-place.nasa.gov/en/kids/galex/art.shtml](http://space-place.nasa.gov/en/kids/galex/art.shtml).



*The GALEX telescope took this UV image of the Andromeda galaxy (M31), revealing a surprising shape not apparent in visible light.*

# If it's Clear...

by *Fulton Wright, Jr.*  
*Prescott Astronomy Club*

January 2006

Shamelessly stolen information from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find info. When gauging distances, remember that the Moon is 1/2 a degree or 30 arc minutes in diameter. All times are Mountain Standard Time unless otherwise noted.

Mars is moving away, going from 12" to 9" in angular size this month. At least it is well placed for observation in the early evening.

On Sunday, January 1, about 6:00 PM, you can see the Moon and Venus, with about the same slim crescent phase, low in the southwest. If you have REALLY sharp eyes, you might be able to make out the shape of Venus with your unaided eyes, but binoculars or a small (3") telescope will make life easier. During the next 2 weeks Venus will sink lower and become a thinner crescent each

night. Happy New Year.

On Monday, January 2, around 3:00 AM (ugh) you can watch 3 of Jupiter's satellites disappear. At 2:58 Io goes into Jupiter's shadow. At 3:17 Europa goes in front of Jupiter.

At 3:32 Callisto goes in front of Jupiter. While all this is happening, Ganymede is sailing by, south of the planet.

On Tuesday, January 3, before morning twilight (about 6:15

AM) you might see some Quadrantid meteors. The radiant lies about half way between Polaris and Arcturus. With luck you will see one a minute.

On Monday, January 9, from 4:00 AM (ugh) to 4:55 AM, you can observe a couple of shadows (from Europa and Callisto) on Jupiter. At 4:51 AM you can also see Io eclipsed by Jupiter's shadow.

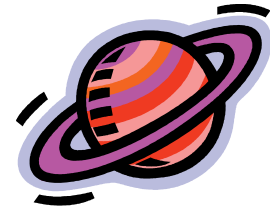
On Monday, January 9, at 7:05 PM,

you can see the Moon occult a 4th magnitude star. With binoculars or a small (3") telescope look for one of the Pleiades near the north limb of the Moon. The disappearance occurs on the dark limb, very near the terminator. The star's reappearance at 7:45 PM will be harder to observe because it happens on the bright limb.

On Saturday, January 14, at 6:02 PM (20 minutes after sunset), the full Moon rises, so forget the faint fuzzes for tonight.

On Sunday, January 29, the Moon is new so you have all night to search for faint fuzzes.

On Tuesday, January 31, Saturn is about 1/2 degree from the Beehive cluster. It has been sneaking up on the cluster all month. Look for them low in the east-northeast after sunset. Binoculars will help you see the cluster.



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## Special Announcement

Over the past several years EVAC has operated relatively flat financially, with gross income only slightly exceeding expenses each year. Each of the last few cabinets have wrestled with this dilemma of trying to keep expenses in check while still providing value to the membership. It's not an easy task in an era of ever-increasing costs.

Last fall the Board of Directors approved two proposals to restructure the dues assessed for membership. These proposals were ratified by the members in attendance at the October general meeting, according to voting guidelines established in the club's by-laws. Each took effect on January 1, 2006.

The first proposal established two classes of membership:

Individual membership with annual dues of \$30

Family membership with annual dues of \$35

Both memberships will be prorated quarterly, as has been our policy in the past.

All memberships will continue to expire on December 31.

The second proposal levied a \$10 annual surcharge to those members who elect to have the monthly newsletter mailed to them. In essence, this allows for a 50/50 split of the actual expense between the club and the member. Each newsletter costs about \$1.60 to print and mail, which equates to \$19.20 per year.

It is never an easy decision to raise the cost of membership, and EVAC was able to delay its first increase until its nineteenth year of existence. In addition to our existing expenses, we are projecting increases related to rental fees for property storage, increased guest speaker honorariums, improving the All-Arizona Star Party, and establishing educational programs at the Riparian-Rotary Observatory.

The governing body of EVAC is committed to continuous improvement and thanks you for your support.





## Kid's Corner

### A Cool Sun for Cool Music?

In the 17th century (1644 to 1737) lived a violin maker named Antonio Stradivari. His workshop was in Cremona, Italy. He made hundreds of violins, many of which are still played today. They are prized for their rich and beautiful sound, especially in the hands of master violinists.

No one has since been able to make a violin that sounds quite like a Stradivarius (a violin made by Stradivari). Just how did Stradivari make such wonderful violins? No one knows for sure, but one new idea makes a lot of sense.

Violins are made from wood. The best violins are made from very hard, dense wood. The best wood comes from trees that have grown very slowly, laying down a thin ring of dense new growth each year. Long winters and cool summers make for slow tree growth. During about 1560-1850, which included the time Stradivari made his violins, Europe (including Italy) experienced a "Little Ice Age." It was so cold that normally free-flowing rivers and canals froze over.

Stradivari used the hard, dense wood from the spruce trees growing during this time in a nearby forest to make his violins.

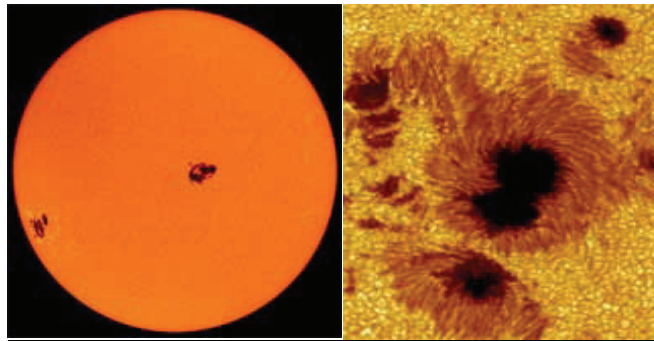
But why did Europe get so much colder than normal during these years? Only recently did scientists make the connection and figure out the most likely answer.

Astronomers have been studying the Sun for hundreds of years.

Using very special dark filters and lenses, they have studied the most obvious feature on the Sun: Sunspots.

Sunspots are areas of particularly strong magnetic forces on the Sun's surface. They appear darker than their surroundings because they are cooler. Even so, scientists have discovered that when there are lots of sunspots, the Sun is actually putting out MORE energy than when there are fewer sunspots. Sunspot activity occurs in cycles of about 11 years. But during about 1645 to 1715, hardly any sunspots were seen! From the time sunspot records were first kept until now, such a "solar rest period" has not been seen. It was during this period that Europe experienced the "Little Ice Age." It was during this time that Stradivari came along and made possibly the best violins ever from the slow-growing trees of his chilly era.

So, that is how the Sun of 300 years ago made beautiful music that we can still hear today!



*Through special DARK filters, sunspots may look like the picture on the left. The sunspot groups are as big as the giant planet Jupiter! On the right is a closeup of some other sunspots. The larger sunspot on the right is bigger than Earth! (Images courtesy SOHO (NASA & ESA) and the Royal Swedish Academy of Sciences.)*

**OF COURSE, THEY NEVER  
LOOKED AT THE SUN DIRECTLY  
AND NEITHER SHOULD YOU!**

### What are Black Holes Anyway?

Here on Earth, gravity is what makes things fall down, rather than just float away, when you let go of them. Gravity is what you are measuring when you step on a scale to weigh yourself. Your weight is the amount of force that Earth's gravity exerts on you. The more matter your body contains, the more you weigh. Likewise, the more matter an object has, the stronger its gravity.

The gravity of a black hole is so strong that not even light can escape. Even if a bright star is shining right next to a black hole, you cannot see the black hole. Instead of reflecting the light as other objects do, the black hole just swallows the starlight forever. Any matter that gets too close to a black

hole gets swallowed up as well.

There are at least two kinds of black holes.

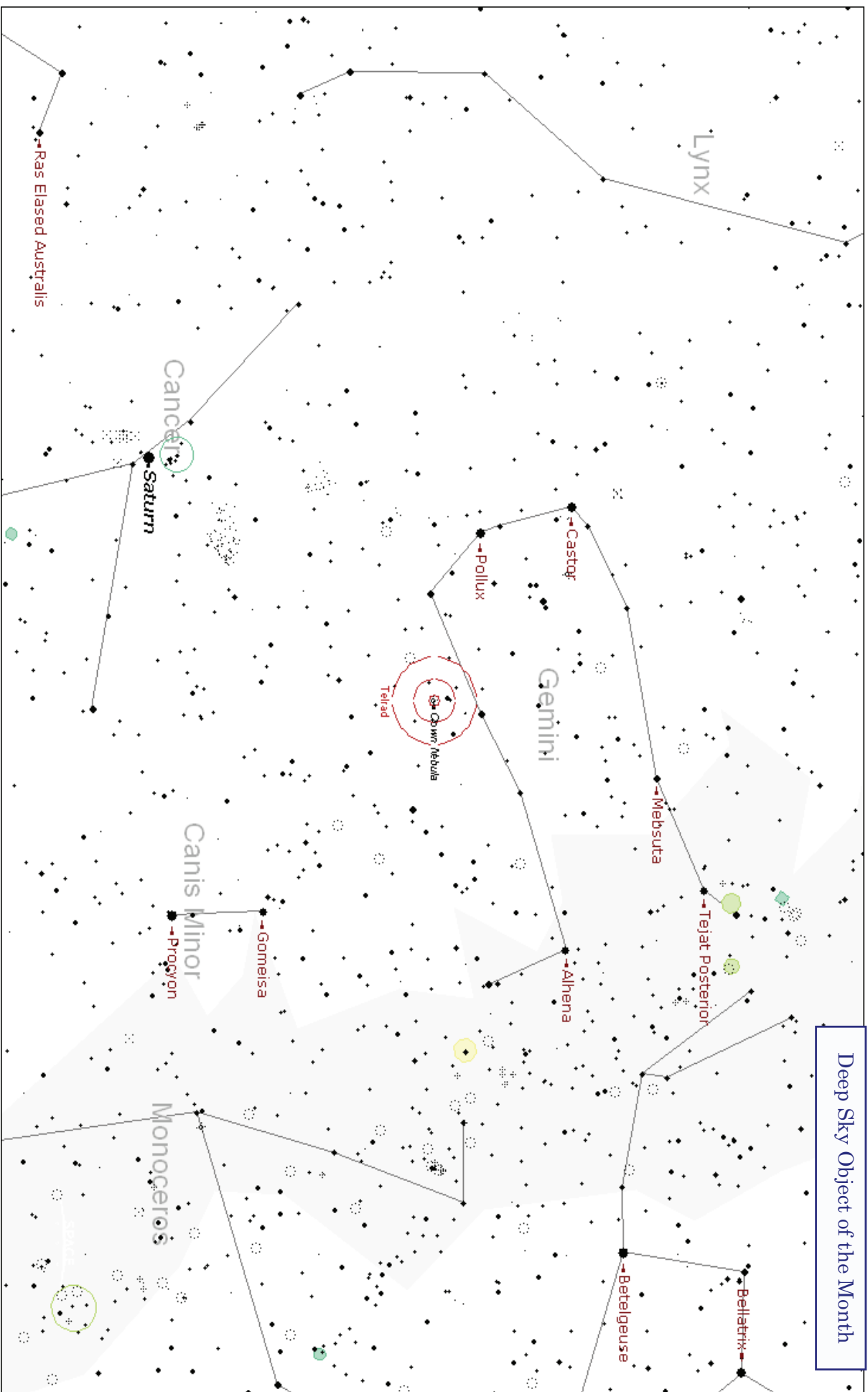
One kind is called a stellar-mass black hole. You can think of it as a "one-big-star" black hole. This type of black hole forms when a big star burns up all its fuel and explodes (called a supernova). Then what's left collapses into a supercompact object—a black hole. Stars must contain quite a bit more matter than our Sun for this to happen. So our Sun, and most stars, will never become black holes.

Stellar-mass black holes are only a few tens of kilometers across—maybe about 40 miles. Just imagine. Our Sun is so huge that about one million Earths would fit inside it. A star with enough

matter to become a black hole contains maybe 10 times as much matter as the Sun. Now imagine a star with that much matter, shrinking into a space no farther across than the distance you can drive a car in less than one hour!

A black hole with all the mass of Earth would be about the size of a fingernail!

Another kind of black hole is called a supermassive black hole. You can think of this type as a "million-big-star" black hole, because it contains as much matter as one million to 100 million Suns! Astronomers think that supermassive black holes are lurking at the centers of galaxies, including our own Milky Way galaxy. They don't know yet how these humongous black holes are formed.



NGC 2392 (aka Eskimo or Clown Face Nebula) Planetary Nebula in Gemini

Magnitude: 9.9      Size: 20"      Distance: 3,400 light years

RA 07h 29m 10.8s	Dec +20° 54' 42"	Magnitude of Central Star: 10.5
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# Comfortably Braving the Elements

How many times this winter have your observing sessions been cut short because you were too cold to stay outside any longer? With a little advance planning this inconvenience can become a thing of the past.

First, invest in a medium-sized duffel bag. This bag, once packed, should remain with all the other accoutrements taken with you on stargazing outings. The only time items should be removed from the bag are when they are being used in the field or when they are being laundered.

Let's start at the top: your head. A simple stocking hat is all that's needed. It is important that your chosen headwear has the ability to also cover your ears. For the coldest of nights, some may also appreciate the extra protection of a balaclava.

Next up is what's underneath, namely thermal underwear. Some prefer a separate top and bottom, while others opt for a union suit. A variety of fabrics are available: cotton, silk, wool, and assorted synthetics. Choose a comfortable fabric in a weight suited to your observing climate. Best advice is don't skimp here.

For trousers many prefer regular blue jeans. For a little extra protection perhaps flannel lined jeans

would suit you better. For the ultimate comfort consider a pair of snowboarding pants.

The upper torso is best dealt with in layers. This allows for maximum flexibility in warmth and mobility. On top of the thermal underwear you can add a turtleneck, a sweat-shirt, a light jacket, an insulated vest, a medium jacket, and/or a parka. Again, choose what suits your observing climate.

Many stargazers like the convenience of coveralls, so don't overlook this option if you find them appealing.

A scarf is an item that many appreciate having packed in their bag. It doesn't get used every time out, but you'll certainly appreciate having it when needed.

Many an observer has forgotten about their hands when it comes to equipping their bag. Ideally, you should have two pair of gloves. One lighter pair, perhaps ½-finger rag wool gloves and a pair of heavy, insulated gloves for the really cold nights.

Once your feet get cold, the night is usually over. When it comes to socks there are more choices than any other single item in this bag. The chosen socks should be high

enough to extend beyond the top of your chosen footwear. A smorgasbord of fabric choices, colors and weights awaits you.

The final element of this kit is the only item that may not fit into the bag itself: boots. As stated earlier, nothing can chase you home as quickly as cold feet. Since stargazing is a largely sedentary hobby, the boots worn don't have to offer much in terms of mobility. Warmth is of prime consideration. To this end boots worn by snowmobilers are ideal. Most have removable linings so they may be used when it's not too cold... or during the briskest of nights.

That's about it... now get out there and enjoy those winter constellations... in style and comfort!



Coming in February... our guest speaker will be Ted Bowell, principal investigator of the Lowell Observatory Near-Earth-Object Search (LONEOS). His topic will be 'Searching for Near-Earth Asteroids - Now and in the Future'.

## Star Party Disclaimer

*The East Valley Astronomy Club (EVAC) is not responsible for the property or liability of any star party participant, nor will the club be held liable for their actions or possessions. EVAC is not responsible for any vehicular damage, theft, or mechanical difficulties that may occur while attending a star party. EVAC strongly recommends adherence to the doctrine of 'safety in numbers' when it comes to remote observing sites. In the interest of safety it is recommended that you don't go to remote sites alone and that someone knows where you have gone each time you go out observing.*

The Voyager is published monthly by the East Valley Astronomy Club and made available electronically (PDF) the first week of the month. Printed copies are available at the monthly meeting.

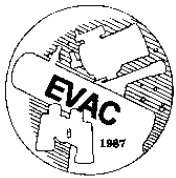
Please send your contributions, tips, suggestions and comments to the Editor (Peter Argenziano) at:

news@eastvalleyastronomy.org

Contributions may be edited.

**[www.eastvalleyastronomy.org](http://www.eastvalleyastronomy.org)**

**Keep Looking Up!**



East Valley Astronomy Club

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