

# The **ASTERISM**

*as' ter ism ~ a recognizable pattern of stars*  
*con stel la' tion ~ an internationally designated area of the sky*

Volume XXIV No. 4

December 2012

## What's Inside...

[General Membership Meeting](#) Pg 2

[New Members](#) Pg 2

[Stewart's Skybox](#) Pg 3

[Contacts](#) Pg 5

[Theatre <sup>IN</sup> THE Sky](#) Pg 6

**Note: Use bookmark panel in Adobe Reader.**

## HAPPY HOLIDAYS!!

The month of December marks the club's first time participation in the Trailside Nature and Science Center's Christmas Tree Competition. The club earned a 2<sup>nd</sup> place finish. Our tree and gifts got to the homes of needy residences of Union County. The month also marks the club's outreach to the Hispanic community with an all Spanish presentation on astronomy. Thank you to all who helped in those activities.



### **DON'T THROW THAT OUT!**

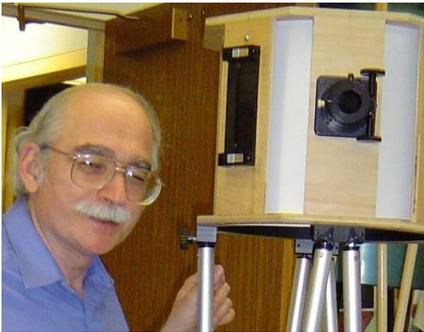
In anticipation of crafting decorations for AAI's entry in the 2013 Holiday Tree Decorating Contest, please SAVE and donate to AAI your used/left-over/excess:

- Holiday Greeting Cards (non-photo);
- Foil or holographic wrapping paper; and
- Small gift boxes (jewelry/gift-card/CD-sized).

Please flatten and roll any used foil/holographic wrapping paper.

The 2012 gift donation box will re-appear in the Sperry classroom during Friday public nights through January to receive your paper contributions.

Thank you for your participation!



**The Mayan & Other  
Doomsday Prophecies**  
Alan P. Witzgall,  
NJAA,  
Vice President

the reaction of the public to the current "doomsday scares" that the media has blown out of proportion, and intends in this presentation to set the record straight on the Mayan calendar scare and other possible 'end of the world' scenarios, and have a little fun in the process!

**PLEASE JOIN US!!!**

Alan P. Witzgall is a long-time member of AAI and is currently our Recording Secretary and chair of our Instrument Qualification Committee. He is a graduate of Kean University and is a senior optician in precision optics. He has become concerned with

**New Members**

Amateur Astronomers, Inc. welcomes **Jeffrey Cavorley** and **Marissa Computaro** of Staten Island, **Scott Fulloon** of Secaucus, **Michael Gironda** of Metuchen, **Sean Mahoney** of Roselle Park, **Jonathan Neiss** of Union, **Laurie Pine** of Union, and **Marc Seidenstein** of Jackson.

We hope you enjoy using Sperry Observatory, know that as a member other opportunities are available such as seminars, lectures, training, observing, and research all at no or minimal cost. Our Qualified Observer course is a great place to start. It is equivalent to a college-level introduction to Astronomy, and it includes hands-on training on our 24-inch reflecting telescope. For all opportunities check the **Club Activities** section of the website.

Irene Greenstein, Membership Chair

**MEMBER ONLY STAR PARTY  
JENNY JUMP STATE PARK  
HOPE, NJ  
SATURDAY JAN 12, 7:30PM**

**STAR PARTY  
SPERRY OBSERVATORY  
FRIDAY JANUARY 4  
at 7:30 p.m.**

This month is when the world is supposed to end. At least that is what a number of people who know next to nothing about the Mayans and other ancient civilizations claim is predicted by said cultures. Then you have environmentalists who claim that humanity is "destroying the planet". This column will prove that planets are rather difficult to destroy.

There is no conceivable way that human technology can physically destroy the planet. In fact, all the technological means of destroying planets from the Doomsday Machine of "Star Trek" to the Zindi weapon of "Star Trek: Enterprise" are imaginary and not based on real science. But can forces of nature destroy a planet?

## **Black Holes**

At the center of our galaxy is a supermassive black hole weighing in at about four million times the mass of the Sun. Some claims about the end of the world have it that the solar system will get into an alignment with the center of the galaxy and that this would lead to catastrophe. This is absurd. Our solar system is about 28,000 light years from the center of the galaxy. At that distance, no conceivable alignment would have any effect on the solar system. In fact, stars much closer to the center than we are orbit in a perfectly normal manner. Only objects within several light years of the central black hole feel its effects. Recent observations of stars within a light year or so of the central black hole indicate that they orbit in very elliptical orbits at high velocities. So, the gravity of the central black hole poses no threat to us.

However, there is another way for the central black hole of a galaxy to make its presence felt. Quasars are galaxies where the black hole is pulling in large quantities of matter in the form of gas, dust, and stars. This material forms an accretion disk around the black hole and some of it is caught in the strong local magnetic field and shot away in high-speed jets. In most cases, this takes place early in a galaxy's history and the black hole exhausts this supply of matter quickly, settling into a relatively quiet state.

But what if the central black hole of the Milky Way began to pull in enough matter to return to its quasar youth? Sir Fred Hoyle used this scenario in his science fiction story "The Inferno". In it, the revived quasar of the Milky Way becomes a second Sun as seen from Earth and wreaks havoc on the

planet except in areas where the galactic center never rises about the horizon. However, Hoyle got a few things wrong. First of all, quasars are not equally bright in all directions as the energy is preferentially beamed perpendicular to the accretion disk, so the jets would be shooting away from the plane of the galactic disk. Also, there is the matter of interstellar dust. At visible wavelengths, the dust in the galactic plane greatly reduces the distance we can see by dimming starlight. That is why the galactic center can only be studied via radio or infrared light. Even if the central black hole became active again, the worst-case scenario would have it dimmed to less than the brightness of a full Moon.

So the central black hole of the galaxy is not a threat. But what about a stellar mass black hole wandering through space? While this cannot be absolutely ruled out, it is extremely unlikely. That is because the space between the stars is extremely vast and a solar system presents a very small target. On top of that, the minimum mass of a stellar mass black hole is 3.2 solar masses and its gravity would make its presence known way in advance if one was ever approaching. But it should be remembered that our solar system has been around for five billion years and this hasn't happened plus astronomers have never observed a rogue black hole entering any star system.

## **Going Rogue**

Another scenario is that of a rogue star, brown dwarf, or planet entering our star system and either disrupting the orbits of the planets or hitting something. This was the basis of "When Worlds Collide". While this idea has a little scientific support with studies of extrasolar planetary systems and planet formation indicating that planets can be ejected from systems to roam interstellar space, it must again be pointed out that our solar system presents a tiny target in the vastness of space.

## **The Cloud**

Some folks who talk about the imminent end of the world bring up something called "the dark rift" and claim that the solar system is headed right for it, resulting in dire consequences. This dark rift is likely based on the prominent band of dust clouds that can be seen silhouetted against a large stretch of the

(Continued on Page 4)

Milky Way. While these appear dark and dense (they do obscure the stars on the other side of them), all is not as it seems. The actual density of a typical interstellar dust cloud is less than that of the space outside the International Space Station. The appearance is caused by the large size of the clouds. Even though the gas and dust are quite thin, when a cloud is light years in size, it adds up and that explains why the clouds appear dark.

Interestingly enough, Sir Fred Hoyle wrote a story, "The Black Cloud", about an interstellar cloud that reaches the solar system and threatens life on Earth. This premise might sound familiar since "The Black Cloud" was likely a major inspiration for "Star Trek: The Motion Picture".

Fortunately, in reality, an interstellar dust cloud would pose little if any threat. Besides being too thin to attenuate sunlight over the Earth-Sun distance, the Sun emits a solar wind of particles. This solar wind, as well as the pressure of sunlight itself, would greatly affect the microscopic particles of such a cloud and would likely make it even thinner. Therefore, this is not worth worrying about. Besides, there are no interstellar clouds in our path for the foreseeable future.

## Here Comes The Sun

In addition to hazards from outside the solar system, the 2012 crowd points to threats within our solar system. The Sun is frequently cited as a potential menace. In the movie "2012", the Sun emits an intense stream of neutrinos that overheat the interior of the Earth leading to lots of seismic shenanigans. This is nonsense. First of all, the Sun emits large quantities of neutrinos all the time. These do indeed pass into the Earth's interior – and promptly exit out the other side without doing anything. Due to their neutral charge, neutrinos do not interact with matter except when one of them strikes a subatomic particle – a rare event.

But there is one potential threat that is real. The Sun gives off flares and coronal mass ejections from time to time. The most powerful one of these recorded was in 1859. It caused auroras that could be seen as far south as Cuba and induced currents in telegraph lines that resulted in damage to those systems. A far weaker one in 1989 damaged transformers in Quebec and plunged a huge area of the province into a blackout. But these are not world ending.

Astronomers have noted that there are some stars that have truly enormous flares that would make the 1859 event look quite puny. Some of the 2012 crowd claim that one of these monster flares would be the agent of destruction. Again, this idea was touched on in science fiction. Larry Niven wrote a story titled "An Inconstant Moon" where the day side of Earth was devastated by an enormous solar flare. The only inkling people on the night side had that something was amiss with the Sun was that the Moon appeared exceptionally bright. But could that really happen?

The answer is no. In the years since, it has been learned that these monstrous flares occur on very young stars and on some red dwarf stars. The Sun does not fall into either category. So, solar flares will not destroy us all.

However, a powerful solar disturbance could wreak havoc with technology by inducing massive currents in long distance power lines that would blow out the large transformers used to send electricity around the grid. If you thought a power outage of a few days was bad, imagine one that lasts for months or longer. Fortunately, the Sun is under continuous surveillance and we would have enough warning that power companies can take steps to protect their equipment.

## Sudden Impact

Then there is that old chestnut that the world could be done in by cosmic impact. While it is possible to destroy a planet by a cosmic impact, the impactor would need to be extremely large. This does indeed take place during the creation of a solar system, but, by the time the system is established, just about all the planet-destroying impactors have either hit what they were going to hit, fell into the central star, or were ejected out of the system. Though there are still some very large asteroids in our solar system, all of them are in orbits that do not threaten Earth. As for the asteroids that do come near Earth, none of them could destroy the planet completely. The larger ones could cause mass extinctions much like what happened 65 million years ago. Somewhat smaller ones could wipe out civilization or at least countries. Most near Earth objects are small rubble piles that would likely break apart upon close approach to Earth. The resulting fragments would have little, if any, catastrophic effect.

## Don't Dread the 21<sup>st</sup>

As this article demonstrates, nothing of any astronomical or global consequence will happen on December 21<sup>st</sup>. The world will continue for a very long time to come. As for how the world really ends in the distant future, that will be covered in a future article.

☆☆☆

## EMAIL CONTACTS

[president@asterism.org](mailto:president@asterism.org)

President of AAI

[editor@asterism.org](mailto:editor@asterism.org)

Editor of *The Asterism*

Joe Ascione & Janyce Wilson, Editors  
*Deadline for submissions to each month's newsletter is the first Friday of that month.*

[membership@asterism.org](mailto:membership@asterism.org)

AAI Membership Chair

[trustees@asterism.org](mailto:trustees@asterism.org)

All three Trustees of AAI

[ray@asterism.org](mailto:ray@asterism.org)

Ray Shapp for the website

[exec@asterism.org](mailto:exec@asterism.org)

Executive Committee plus  
 Trustees

[QOs@asterism.org](mailto:QOs@asterism.org)

All Qualified Observers

[info@asterism.org](mailto:info@asterism.org)

AAI president, corresponding secretary,  
 and computer services chair

[research@asterism.org](mailto:research@asterism.org)

Research Committee

[technical@asterism.org](mailto:technical@asterism.org)

Technical Committee

## MEMBERSHIP DUES

Regular Membership:	\$21
Sustaining Membership:	\$31
Sponsoring Membership:	\$46
Family Membership:	\$5
First Time Application Fee:	\$3
<i>Sky &amp; Telescope:</i>	\$32.95
<i>Astronomy</i> subscription:	\$34

(Subscription renewals to *S&T* can be done directly. See "Membership-Dues" on website for details.)

*AAI Dues can be paid in person to our Membership Chair, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111*

## DOME DUTY

Dec	29	Team C
Jan	4	Team D
Jan	11	Team E
Jan	18	Team A
Jan	25	Team B

## FRIDAYS AT SPERRY

**Dec 28, 2012**

**Highlights of the Sky for 2013**

Alan P. Witzgall

**Jan 4, 2012**

**Space Missions Briefing**

Bill Whitehead

**What's Up? A Down to Earth**

**Sky Guide** Kathy Vaccari

**Jan 11, 2012**

**Getting the Most From Your New Telescope/Binocular**

Michelle Tofel and Alan P. Witzgall

**Jan 25, 2012**

**Solar Observing and Imaging**

Helder Jacinto

*All schedules above were accurate at time of publication. Please check [www.asterism.org](http://www.asterism.org) for latest information (click on "Club Activities")*

☆☆☆

The next **General Membership Meeting** is the third **Friday, January 18, 2012**. Our speaker is Dr. Alexander Tchekhovskoy, his topic is Getting the Most Out of a Black Hole.

**Please join us.**

# Theater<sup>in</sup>the Sky

by Ron Ruemmler

January 2013 belongs to **Jupiter**. The Giant Planet was at its closest and brightest at opposition last month, but is now more conveniently placed, reaching maximum height due south around 8:30 PM. **Jupiter** spends all winter in the head of Taurus, the Bull, just a few degrees above Aldebaran. Be sure to follow the Winter Hexagon clockwise from Aldebaran down through Rigel at Orion's foot, to Sirius at the bottom, then up through Procyon and Castor, the Gemini twins, to Capella at the top.

The **Moon** is seldom alone this month, finding all the planets widely spaced around the sky. None of these conjunctions is really close except the one with **Jupiter**, which is actually occulted for observers in central South America. Only **Mercury** is invisibly close to the **Sun**.

Winter sunsets are getting later at the same rate that **Mars** is moving toward the **Sun**, so the Red Planet persistently sets around 6:40 PM until it leaves the evening sky the middle of April. **Venus** is leaving the morning sky slowly passing beyond the **Sun** as Spring begins. Just **Saturn** is improving this month as it now rises an hour or two after midnight.

The banner event for 2013 is expected to be Comet ISON (proper name: C/2012 S1 ISON), discovered photographically September 21, 2012 by Vitali Nevski and

Artyom Novichonok of the International Scientific Optical Network in Russia. If you have access to a huge telescope you might like to try to spot this +16 magnitude object as it passes half a degree below Castor on the 15th. By late November it may become the brightest comet in living memory

## January (times are PM unless noted)

1 Tue 6:20 AM	Regulus directly above <b>Moon</b>
2 Wed 12:00 AM	Perihelion; <b>Earth</b> closest to the <b>Sun</b> (91,402,500 miles)
4 Fri 7:20 AM	Latest sunrise
4 Fri 10:58	Last Quarter <b>Moon</b>
5 Sat 6:20 AM	Spica left of very fat crescent <b>Moon</b>
7 Mon 6:20 AM	Binocular double star Zubenelgenubi between <b>Moon</b> and <b>Saturn</b>
10 Thu 5:00 AM	<b>Moon</b> at perigee; closest to the <b>Earth</b>
10 Thu 6:40 AM	Very thin crescent <b>Moon</b> upper left of Venus
11 Fri 2:44	New <b>Moon</b>
13 Sun 5:50	Dim <b>Mars</b> far below thin crescent <b>Moon</b>
14 Mon 5:50	<b>Neptune</b> below crescent <b>Moon</b> (telescope)
15 Tue 11:00	Comet ISON passes 0.5 degree below Castor (large telescope)
16 Wed 6:20	<b>Uranus</b> left of crescent <b>Moon</b> (binoculars)
18 Fri 4:00 AM	<b>Mercury</b> at superior conjunction behind the <b>Sun</b>
18 Fri 6:45	First Quarter <b>Moon</b>
21 Mon 6:45	<b>Jupiter</b> left of gibbous <b>Moon</b> and above Aldebaran
26 Sat 11:38	Full <b>Moon</b>
28 Mon 8:30	Regulus upper left of <b>Moon</b>

