SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late) December

19 **General Meeting and Holiday Party** at 8 p.m.

21 Winter begins at 9:47 a.m. PST

January

8 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA

8 Houge Park star party. Sunset 5:07 p.m., 30% moon rises 2:36 a.m. Star party hours: 7:00 until 10:00.

9 Dark Sky weekend. Sunset 5:08 p.m., 22% moon rises 3:39 a.m.

16 Dark Sky weekend. Sunset 5:15 p.m., 3% moon sets 6:52 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

22 Houge Park star party. Sunset 5:22 p.m., 49% moon sets 12:44 a.m. Star party hours: 7:00 until 10:00.

30 **General Meeting** at 8 p.m. Our speaker is Dr. Peter Jenniskins, speaking on "Catch a Fallen Star", his recovery of pieces of a freshly-fallen meteor.

February

5 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA

5 Houge Park star party. Sunset 5:37 p.m., 47% moon rises 1:31 a.m. Star party hours: 7:00 until 10:00.

6 Dark Sky weekend. Sunset 5:38 p.m., 37% moon rises 2:33 a.m.

13 Dark Sky weekend. Sunset 5:45 p.m., No moon, really. Henry Coe Park's "Astronomy" lot has been reserved.

19 Houge Park star party. Sunset 5:52 p.m., 32% moon sets 11:28 p.m. Star party hours: 7:00 until 10:00.

27 **General Meeting** at 8 p.m. Our speaker is Rogelio Bernal Andreo, speaking on astrophotography from local skies.

The Board of Directors meets before each general meeting at 6:30 p.m. All are welcome to attend.

24 hour news and information hotline:
(408) 559-1221
http://www.sjaa.net

2012: Point by Point

Paul Kohlmiller

The predictions of the demise of the world have been many and varied. They have also all been wrong. Still, people seem to want to believe the end is near. Why? When I was a student, the end of the world sounded like a great excuse for not doing my homework. The failures of the predictions made at those times have left me somewhat skeptical. Further, it occurs to me that it is much more profitable to oppose these predictions. If they come true, who is going to be able to tell me "told you so." Not only that, but anyone else skipping homework is probably not going to be taking my job.

So there must be some other reason for people to believe we are all doomed. I think for some people it makes them seem special. Hey, after 4 billion years of Earth history, a million years of human evolution, 50,000 years of homo sapiens, several thousand years of written human history, you must be special if you happen to be alive when everything goes dead. I guess.

But the 100% failure rate of destructive deductions means that we are not likely to be so special. Still it seems to fall to astronomers to explain why the latest predictions fit into the same category: 100% wrong.

The latest predicted date for our sudden disappearance is December 21, 2012. There are reasons for this date. There have been reasons for all previous predictions. Let's look at some of these reasons.

1. The Mayan Calendar says so. What the Mayan calendar actually does is it shows a cycle ending December 21, 2012. Remember Y2K. That was our calendar ending a cycle (and beginning a new one) on January 1, 2000. But Mayans, they still do exist you know, don't think their own calendar is predicting the end of the world. See Anthony Aveni's book "The End of Time: The Maya Mystery of 2012." or see http://www.post-gazette.com/pg/09317/1013051-60.stm

2. Nibiru is coming. In 2003, the world was supposed to end because of a rogue planet called Nibiru. When that failed the planet took a 9 year non-victory lap. Along the way it picked up friends like the dwarf planet Eris, a Pluto-like object that was recently discovered. Suffice it to say that any planet with malevolent 2012 intentions would have been spotted by

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2012: Point by Point
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amateur astronomers a long time ago. But for more details on why Nibiru is a total myth see the first link on page 6 under "More 2012 Links".

3. Galactic alignment. The biggest lies work best if they have some truth to them. On December 21, 2012, if you look from the Earth toward the Sun you will be looking near the center of the universe. You may also get temporary spots on your eye from looking at the Sun so stop that. But this "alignment" shouldn't come as a shock. Sagittarius is one of the zodiacal constellations and that means the Sun passes through it. Sagittarius is also the location of the galactic center, just follow the "smoke" that rises from the teapot. So that "alignment" occurs every year during the current epoch. Nothing special about the alignment in 2012. Now, it turns out that sometimes this alignment is a bit closer than others but even those most interested admit that 1999 was the best of these alignments. See http://www.gaiamind.org/whynot2012.htm

4. Brown Dwarfs. It might be that large rogue planets would be spotted but what about the brown dwarf. Aren't they too dark to see? Well, they are dark in their current locations but what about one heading for us? Well, a brown dwarf is many times larger than Jupiter. And if it was inside of our solar system, it would be extremely bright just from the reflected sun light. Furthermore, that much mass would have gravitational effects that we would have noted long ago. Last June, a two-part miniseries called "Impact" looked at this possibility and talked about how a piece of a brown dwarf could hit the moon. They said that it would incredibly dense matter but how could that be?! A brown dwarf is only dense because it has so much mass. If it broke into pieces, it wouldn't have anywhere near the same mass. But the star of the show, Natasha Henstridge explains it this way "... there happens to be a brown dwarf, which is sort of like a meteor". Okay, science isn't her thing.

5. NASA is trying to hide this. Notice how NASA is NOT hiding 99942 Apophis. This is an asteroid that will come closer to Earth than the satellite that brings your TV signal. And we know a date, Friday the 13th, April 2029. There is still a chance it could hit the earth in 2036. There is no data being hidden, see Wikipedia. NASA knows that it could get unlimited funding for decades if the danger was clear enough. So why aren't the doomsayers worried about 2029 or 2036? Are they trying to hide something? No, they'll be back. After the money-making opportunities of 2012 have passed (probably on the morning of December 22, 2012), the show will move down the road just like the snake oil salesmen of old did when the available clientele have caught on. Of course, there will be intermediate dates between 2012 and 2029 - just wait and see.

What's Up for December? The Orion Nebula!

Jane Houston Jones

My last What's Up podcast of 2009's International Year of Astronomy features The Orion Nebula. It takes the listener/viewer from Galileo's sketch of the Trapezium stars, on to Christian Huygens' first detailed sketch of the nebula itself and on to studies by the Hubble Telescope.

You can find it here on the Solar System Exploration archive page: http://solarsystem.nasa.gov/news/whatsup-archive.cfm

On the JPLnews Youtube channel: http://www.youtube.com/profile?user=JPLnews#g/u

On the NASA podcast page: http://www.nasa.gov/multimedia/podcasting/whatsup_index.html

Each month in 2009 the podcast series explores the first observation of a celestial object honoring the IYA 400 years of telescopic observations theme. Here is a brief recap [from each written transcript] of the podcast series - the animations in each podcast show and explain these first observations, telling a great story spanning from the present back to prehistoric times! If you'd like any of the components (artwork, old sketches, current images, etc.) just let me know!

January 2009 - Four hundred years ago, Galileo first observed the phases of Venus through a telescope. The prevailing belief was that the sun and planets revolved around the Earth. The phases looked similar to what he saw on Earth's Moon each month.

February 2009 - Galileo's famous observations of the moon from 1609 were the first to be published and publicized in 1610. [good lunar phase animation]

March 2009 - When Galileo aimed his telescopes at Saturn in 1610 he wasn't sure what he was seeing. He thought the rings were "handles" or large moons on either side of the planet. A few years later in 1612, he was astounded that the "handles" he previously observed had disappeared! And in 1616, the handles were back, but they looked different. This time he saw two half-circles on either side of the round globe of Saturn.

April 2009 - In 1845, Ireland's Third Earl of Ross, William Parsons, used his huge telescope at Birr Castle in the center of Ireland to observe and sketch the spiral structure of the Whirlpool Galaxy.

May 2009 - Galileo and Englishman Thomas Harriott both observed the sun and sunspots in 1610, but they weren't the first. Chinese and Korean astronomers wrote about sunspots almost three thousand years ago. John of Worcester, who

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Just another speck

Akkana Peck

Mars is at opposition at the end of January! So Mars season is in full swing now and continues for the next few months.

But before you get too excited, I have to caution you: this opposition is about as small as they come. Mars is near aphelion, its farthest point from the sun, and the closest we'll get to it, on January 27, will still be 61.7 million miles (.66 AU) away. That means Mars will grow to 14.11" (that's arcseconds) at its biggest.

For comparison, in the close opposition of 2003 Mars grew to 25.1", almost as big as Jupiter, since it was only (only!) 34.6 million miles away. If you're a fan of the songs at SymphonyofScience.com, you might say the planet is "just another speck."

But I don't mean to sound too discouraging. 14.11" isn't that much smaller than Saturn's disk, and only 2" smaller than the 2007 Mars opposition. We should still be able to see plenty of detail. And the good news is that it transits high, 75°. So if you get a steady night, dust off those short eyepieces and barlows and throw all the power you've got at Mars. I've gotten some great Mars views during past winter oppositions even when the planet's disk was small.

Mars keeps its northern hemisphere tilted toward us during this pass. Right now, it's spring in Mars' northern regions, which is good news for us: it means the dust storms which plague some Martian oppositions shouldn't be a problem this time, since the dust storms usually don't kick up until summer.

What can you see? Well, during the actual opposition on the 27th, Mars will have its "boring side" pointed toward us: the Tharsis plateau, with its three volcanoes, as well as the even bigger volcano, nearby Olympus Mons.

You'd think the biggest volcano in the solar system would be something to see, wouldn't you? But unfortunately, to observers on Earth it's almost invisible. What you might see is a white or faintly bluish haze around the middle of Mars's disk — orographic clouds created by wind flowing up the slopes of the volcanoes, just as Mount Hamilton often has clouds near it when the rest of San Jose is clear. Blue or green filters are said to aid in seeing orographic clouds on Mars, but personally I don't usually find they help much. Try 'em if you've got 'em, otherwise don't worry about it.

If you start early in the evening of the 27th, before 7pm, you should be able to see dark areas on the eastern limb — Acidalium and Niliacus Lacus in the north (don't you love Mars nomenclature? I sure do!) and Erythraeum in the south.

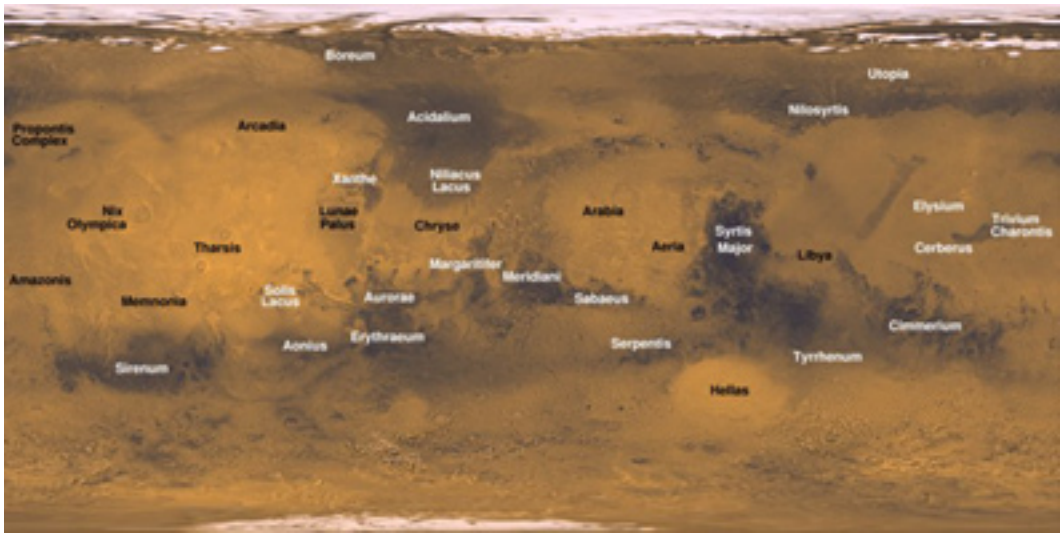
As the evening progresses, those areas rotate away and Tharsis rotates in, but you should be able to see some darkness on the southern limb of the planet — Sirenum and Aonius — and you may be able to make out the slightly darker smudge of Arcadia in the north.

Mars' day is 37 minutes longer than ours. So the feature you look at tonight will be in the same place on Mars 37 minutes later than it was tonight. In the days following opposition, Acidalium, Niliacus Lacus and Erythraeum will be visible progressively later, while the hours just after sunset will offer a peek at Sinus Sabaeus and Sinus Meridiani.

But I'll talk more about those features next month. For now, just work on seeing anything at all on Mars. Our small red neighbor is subtle at the best of times, and seeing detail takes practice. I find it takes me a few weeks each opposition before I'm seeing much detail on Mars.

And take breaks now and then — there are a few other things to look at too. Saturn is visible in January's late evening skies, rising around 10 p.m. That means it doesn't transit until the wee hours of the morning, but when it does it's a bit over 50° up. We should have a good view over the next few months. The rings are tilted about 5°.

Uranus is visible in the early parts of the evening, but catch it as soon as it gets dark, before it gets any lower. Neptune and Pluto are already too low to catch, as are Jupiter, Venus, and Mercury.



A Cosmic Crash

Patrick Barry and Dr. Tony Phillips

Two small planets hurtle toward each other at 22,000 miles per hour. They're on a collision course. With unimaginable force, they smash into each other in a flash of light, blasting streams of molten rock far out into space.

This cataclysmic scene has happened countless times in countless solar systems. In fact, scientists think that such collisions could have created Earth's moon, tilted Uranus on its side, set Venus spinning backward, and sheared the crust off Mercury.

But witnessing such a short-lived collision while pointing your telescope in just the right direction would be a tremendous stroke of luck. Well, astronomers using NASA's Spitzer space telescope recently got lucky.

"It's unusual to catch such a collision in the act, that's for sure," said Geoffrey Bryden, an astronomer specializing in extrasolar planet formation at NASA's Jet Propulsion Laboratory and a member of the science team that made the discovery.

When Bryden and his colleagues pointed Spitzer at a star 100 light-years away called HD 172555, they noticed something strange. Patterns in the spectrum of light coming from nearby the star showed distinctive signs of silicon monoxide gas — huge amounts of it — as well as a kind of volcanic rock called tektite.

It was like discovering the wreckage from a cosmic car crash. The silicon monoxide was produced as the high-speed collision literally vaporized huge volumes of rock, which is made largely of silicon and oxygen. The impact also blasted molten lava far out into space, where it later cooled to form chunks of tektite.

Based on the amount of silicon monoxide and tektites, Bryden's team calculated that the colliding planetary bodies must have had a combined mass more than twice that of Earth's moon. The collision probably happened between 1,000 and 100,000 years ago — a blink of an eye in cosmic terms.

The scientists used the Spitzer space telescope because, unlike normal telescopes, Spitzer detects light at invisible, infrared wavelengths.

"Spitzer wavelengths are the best wavelengths to identify types of rock," Bryden says. "You can pin down which type of rock, dust, or gas you're looking at."

Bryden says the discovery provides further evidence that planet-altering collisions are more common in other star systems than people once thought. The "crash-bang" processes at work in our own solar system may indeed be universal. If so, Spitzer has a front row seat on a truly smashing show.

See Spitzer Space Telescope's brand new Web site at http://spitzer.caltech.

Artist's rendering of cosmic collision involving two objects whose combined mass was at least twice that of our Moon. Discovered using the Spitzer Space Telescope in the planetary system of a star called HD 172555 100 light-years away.

edu/. Kids can learn about infrared light and see beautiful Spitzer images by playing the new Spitzer Concentration game at http://spaceplace.jpl.nasa.gov/en/kids/spitzer/concentration.

This artist's concept shows a celestial body about the size of our moon slamming at great speed into a body the size of Mercury. NASA's Spitzer Space Telescope found evidence that a high-speed collision of this sort occurred a few thousand years ago around a young star, called HD 172555, still in the early stages of planet formation. The star is about 100 light-years from Earth.

Spitzer detected the signatures of vaporized and melted rock, in addition to rubble, all flung out from the giant impact. Further evidence from the infrared telescope shows that these two bodies must have been traveling at a velocity relative to each other of at least 10 kilometers per second (about 22,400 miles per hour).

As the bodies slammed into each other, a huge flash of light would have been emitted. Rocky surfaces were vaporized and melted, and hot matter was sprayed everywhere. Spitzer detected the vaporized rock in the form of silicon monoxide gas, and the melted rock as a glassy substance called obsidian. On Earth, silica can be found around volcanoes in black glassy rocks called obsidian, and around meteor craters in small rocks called tektites.

Shock waves from the collision would have traveled through the planet, throwing rocky rubble into space. Spitzer also detected the signatures of this rubble.

In the end, the larger planet is left skinned, stripped of its outer layers. The core of the smaller body and most of its surface were absorbed by the larger one. This merging of rocky bodies is how planets like Earth are thought to form.

Astronomers say a similar type of event stripped Mercury of its crust early on in the formation of our solar system, flinging the removed material away from Mercury, out into space and into the sun. Our moon was also formed by this type of high-speed impact: a body the size of Mars is thought to have slammed into a young Earth about 30 to 100 million years after the sun formed. The sun is now 4.5 billion years old. According to this theory, the resulting molten rock, vapor and shattered debris mixed with debris from Earth to form a ring around our planet. Over time, this debris coalesced to make the moon.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

What's Up
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was an English monk, made the earliest existing drawing of sunspots in 1128.

June 2009 - It's [the Hercules Cluster] called M-13 because this object is the 13th of Charles Messier's 1764 catalog of celestial objects. But he wasn't the discoverer of this cluster! M-13 was discovered half a century earlier by Edmund Halley.

July 2009 - The Milky Way - Ptolemy had identified the six brightest stars in the Pleiades, but Galileo saw 36 stars through his telescope. Through the next two centuries, astronomers used bigger and bigger telescopes to study and map the Milky Way galaxy.

August 2009 - Have you ever wondered what makes these cosmic fireworks? Meteor showers are just the debris of a passing comet or sometimes the debris from a fragmented asteroid. [good meteor viewing animation]

September - Jupiter also has four large satellites, three of which are larger than our own moon. These four moons were discovered by Galileo 400 years ago. You can see them yourself with a small telescope or even binoculars, and watch them move around the planet just as Galileo did!

October 2009 - Astronomers have observed the Andromeda galaxy for over a thousand years. Persian astronomer Al-Sufi was the first to record and sketch his observations of what he called "the little cloud". In 964 he published this observation and many others in his "Book of Fixed Stars". Simon Marius first viewed the galaxy through a telescope in 1612.

November 2009 - In 1758, Charles Messier was scanning the skies for comet Halley. He noticed a whitish light, shaped like the flame of a candle in the constellation Taurus. M1, the Crab nebula became the first entry in his catalogue of 110 comet-like objects. 700 years earlier, a "guest star" was visible in the summer sky of 1054. Ancient astronomers in both the old and new worlds documented a new bright star in the daytime sky. It was a supernova in the constellation Taurus and was visible with the unaided eye for nearly two years.

December 2009 - This is the final month of International Year of Astronomy. But that shouldn't stop you from looking up next year. This month's target is in one of the most-recognizable constellations: Orion.

January 2010 will be all about Mars opposition, first observations and the spacecraft studying this fascinating world! Here's to looking at What's Up in 2010!

The Last Month In Astronomy

11-DEC-2009 ***Big, Big Black Holes*** Want to find a very big black hole? Look at the center of galaxies. 4 new super-massive black holes have been found all at the center of galaxies. These galaxies have "Active Galactic Nuclei", that is, the centers of these galaxies are very active and they emits vast amounts of energy. This energy shows up as jets of energy that shoot out perpendicular to their galactic planes. To study the infrared spectrum in sufficient detail for these AGN requires a telescope with a diameter of 100 meters. Well, that's not possible. Instead, the light from two infrared telescopes almost 100 meters apart (Keck) are combined thus creating a long-baseline interferometer. http://www.sciencedaily.com/releases/2009/12/091210173609.htm

10-DEC-2009 ***Spirit Still Stuck*** The Mars Rover Spirit has a rear wheel that seems to have stopped working. In its current configuration including its tilt, Spirit might not survive the next winter season. Southern Mars next winter solstice is May 13, 2010. http://www.jpl.nasa.gov/news/news.cfm?release=2009-191

08-DEC-2009 ***MRO almost working*** The Mars Reconnaissance Orbiter has been taken out of "safe mode". A number of software files have been uploaded to the MRO that should prevent future outages. In 2009 there have been 4 events causing the MRO to go into safe mode. http://www.jpl.nasa.gov/news/news.cfm?release=2009-186

08-DEC-2009 ***Methane on Mars*** About a year ago, scientists noted concentrations of methane on Mars that made little sense. First, if the source is not biological, it should break down over time. If it doesn't break down, it should by now have spread out over the planet and no discernible concentrations should be found. So why do we see these? One possibility is that the methane comes from meteorites. However, this possibility appears to be very unlikely because meteorites would not release enough methane. According to Mark Sephton "The list of possible sources of methane gas is getting smaller and, excitingly, extraterrestrial life still remains an option." http://www.sciencedaily.com/releases/2009/12/091208132349.htm

07-DEC-2009 ***Phil Plait Moves On*** Dr. Phil Plait, best known for the website BadAstronomy.com, is making another career move. Last August he was named the new president of the James Randi Educational Foundation (JREF) and as of 1/1/2010 he will be leaving that position. Phil Plait is moving on to something having to do with astronomy and television. http://www.randi.org/site/index.php/jref-news/797-james-randi-educational-foundation-names-new-president.html

04-Dec-2009 ***LHC cranks up*** After 20 years development, and a start that was nothing more than a fizzle, and a year of repairs the Large Hadron Collider has started productive work. The initial work is using relatively low-energy collisions but that energy will be gradually increased and, with a bit of luck, the LHC will be at full power in 2010. http://www.astronomy.com/asy/default.aspx?c=a&id=8868

27-NOV-2009 ***Shuttle Success*** The last shuttle mission of 2009 was completed on November 27. One item installed on the last mission is the Automatic Identification System. The AIS is being used to demonstrate the ability to track ocean traffic. For the year, the shuttle completed 5 missions including STS-125 which repaired the Hubble Space Telescope. It was the most productive year for the shuttle since the Columbia disaster in 2003. Currently, only 5 more missions are planned for the shuttle but this is subject to change. http://www.sciencedaily.com/releases/2009/12/091208132349.htm

14-NOV-2009 ***The Moon is Alive!*** NASA announced that the LCROSS mission not only found water in the crater Cabeus but it caused 25 gallons of the stuff to be displaced by the impactor. "The moon is alive" according to Anthony Colaprete, the chief scientist for LCROSS. Although this was just one mission, the odds are that there is quite a bit of water in these cold, dark craters that never see sunlight and that might be as cold as -360 degrees Fahrenheit. The water may come from asteroids or it may even be formed on the moon when hydrogen, pushed along by the solar winds, reacts with oxygen locked up in the lunar regolith. Weeks earlier, the Indian spacecraft Chandrayaan 1 found microscopic films of water over large areas of the moon. While this water is insignificant for future space travelers, it does show that water will not instantly sublime when it is mixed in with lunar soils. http://www.latimes.com/news/nationworld/nation/la-sci-moon14-2009nov14,0,2036369.story

13-NOV-2009 ***O2 on Earths?*** Oxygen has been found on two earth-sized bodies. Unfortunately, they aren't planets. They are stars, white dwarfs, located 200-400 light years away. Stellar models suggested that stars around 7 times the mass of the Sun would consume hydrogen, then helium and then carbon. They would consume oxygen if they were more massive but they don't have enough mass that would generate the pressures and temperatures needed to cause oxygen molecules to fuse. Thus the star grows cold while possessing an oxygen-rich "atmosphere". Dr. Boris Gansicke said "These surface abundances of oxygen imply that these are white dwarfs displaying their bare oxygen-neon cores, and that they may have descended from the most massive progenitor stars in that class." http://www.sciencedaily.com/releases/2009/11/091112141309.htm

It Must Be Astronomical ...

Loaners

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. For more information please see the loaner program web page: http://www.sjaa.net/loaners

More 2012 Links

If you want to get more information about the 2012 Doomsday Hoax, then the best source is David Morrison. If you are a member of the ASP then you probably saw his article in Astronomy Beat or you know how to find it. If you are not a member, this link will help. http://www.csicop.org/si/show/myth_of_nibiru_and_the_end_of_the_world_in_2012/

This film clip of Neil deGrasse Tyson is wonderful. http://fora.tv/2009/02/04/Neil_deGrasse_Tyson_Plu-to_Files#Neil_deGrasse_Tyson_World_Will_Not_End_in_2012

Dr. Phil Plait has more info on the whole Nibiru cult. http://www.badastronomy.com/bad/misc/planetx/

If you know someone truly confused by data from the IRAS satellite that "showed" a tenth planet, please point them to http://spider.ipac.caltech.edu/staff/tchester/iras/no_tenth_planet_yet.htm

Elections 2010

The elections for the SJAA board are held at the general meeting in February. The following members are up for election: Robert Armstrong, Grag Claytor, Kevin Roberts, Rob Jaworski. After the board members are elected in February, offices are elected at the March board meeting.

"But the fact that some geniuses were laughed at does not imply that all who are laughed at are geniuses. They laughed at Columbus, they laughed at Fulton, they laughed at the Wright Brothers. But they also laughed at Bozo the Clown." - Carl Sagan

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