

The **ASTERISM**

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

Volume XXIII No. 5

January 2012

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Note: Use bookmark panel in Adobe Reader.

LOVEJOY'S CLOSE ENCOUNTER

Comet Lovejoy (C/2011 W3) was not expected to survive its [close encounter with the Sun](#). But it did!. This image [from a coronagraph](#) onboard the sun-staring SOHO spacecraft identifies the still [inbound](#) remnants of the tail, with the brilliant head or coma [emerging from](#) the solar glare on December 16. The Sun's position is behind an occulting disk. Comet Lovejoy's coma is so bright it saturates the camera's pixels creating the horizontal streaks. Based on their orbits, [sungrazer comets](#) are thought to belong to the Kreutz family of comets, created by successive break ups from a single large parent comet that passed very near the Sun in the twelfth century. Most have been discovered with SOHO's cameras, but unlike many sungrazers, this one was first spotted by Australian [astronomer Terry Lovejoy](#) from an earth-based observatory. Comet Lovejoy is estimated to have come within 120,000 kilometers of the Sun's surface and *likely had* a large cometary nucleus to have survived its intense [perihelion passage](#). Remarkable videos of the encounter from the Solar Dynamics Observatory [can be found here](#).

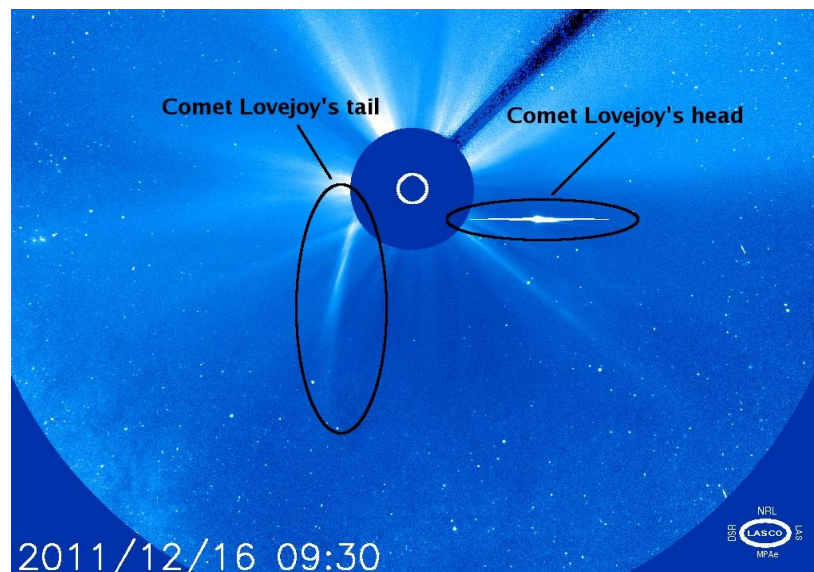


Illustration courtesy [LASCO](#), SOHO Consortium, NRL, ESA, NASA

GENERAL MEMBERSHIP MEETING

JANUARY 20, 2012

MAIN LECTURE HALL - UCC CAMPUS

8:00 p.m.



**Dr. Carlton Pryor, Rutgers University,
Department of Astronomy and Physics**

growing rapidly, but this field of research is still very young. Dr. Pryor will describe how common extrasolar planets are thought to be. He will describe the kinds of planets and planetary systems that have been found so far. Dr. Pryor will end his talk by describing how Earth-like planets that could support life as we know it are likely be found in the next few decades. He is currently a Professor of Astronomy at Rutgers having received his B.S. at Caltech and his M.A. and Ph.D. in Astronomy at Harvard.

The Search for Extrasolar Planets

We now know of many more planets orbiting other stars than we do planets in our own solar system. The number of known extrasolar planets is

Please join us!

No New Members For The Month of January

Amateur Astronomers, Inc. had no new members for the month of January. It is important to our organization that new members join and partake in the activities of the organization.

We hope you enjoy using Sperry Observatory and all the opportunities available to you the public but 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 this and other opportunities, check the **Club Activities** section of the website.

Again, welcome to AAI!

Irene Greenstein, Membership Chair

OBSERVER'S BOX

PLANET	DIRECTION	TIME LOCATION
MERCURY		BEHIND SUN
VENUS	S. WEST	SUNSET CAPRICORN
MARS	EAST	VIRGO 9:30PM
JUPITER	HIGH S. EAST	PISCES
SATURN	EAST	12:30AM VIRGO
URANUS	HIGH S	PISCES
NEPTUNE	S. WEST	AQUARIUS
METEORS	LYRIDS	4 /21-23

ANYONE INTERESTED IN SUBMITTING ARTICLES FOR THIS PUBLICATION PLEASE SEND THEM TO THE EDITOR@ASTERISM.ORG ARTICLES SHOULD BE SUBMITTED BY THE FIRST FRIDAY OF THE MONTH.

Stewart's Skybox

by Stewart Meyers

When we last left the space station story back in November, the third and final manned mission to Skylab had concluded after 84 days. The story now continues.

What Goes Up...

When the last mission left Skylab, it was thought that it would only be a temporary hiatus. The plan called for the space shuttle (see last month's column) to be built and operational by the late 1970s and Skylab would continue to serve as a space station, being serviced by the shuttle. But that was not to be.

Two forces conspired against that plan, one human, the other not. As is all too frequent with major projects, the shuttle ran into major delays and changes in plans. The earlier estimate for when it would be operational turned out to be far too optimistic and the date moved further and further away. However, that complication alone would not necessarily have been fatal to the Skylab plan.

The other factor, well beyond human control, certainly was. As the 1970s were drawing to a close, the Sun was fairly active as it headed toward solar maximum (1980 to 1981). The increase in solar energy output added extra heat to the Earth's upper atmosphere, causing it to expand slightly. In turn, that expansion somewhat increased the near-vacuum density of gas at low Earth orbit. Though it was still almost a vacuum, that density change increased the drag on satellites in low Earth orbit, such as Skylab. With the added drag, Skylab's orbit decayed faster than was initially expected.

At the time, there was a debate about whether NASA should send a small booster stage to dock with Skylab and raise the orbit. However, the debate got nowhere and Skylab was doomed. The impending fall of Skylab caused some commotion, though mostly of the amused variety. Skylab did reenter the atmosphere on July 11th, 1979 and mostly burned up over the ocean with a few pieces of debris hitting uninhabited areas of Australia, causing some news, but no damage.

Thinking Too Big

Around the time Skylab was facing its demise, a different kind of space station was being envisioned. Inspired by the energy crises of 1970s and

concerned with American dependence of fossil fuels from foreign countries, Gerard K. O'Neill, of the Institute for Advanced Studies in Princeton thought he had found the solution to the energy issue. Postulating that the only inexhaustible source of energy in the solar system is the Sun, he believed that solar energy was the answer. However, the problem with solar energy was (and still is) that it cannot be generated on the Earth's surface at night or in inclement weather. O'Neill realized that if one could put solar cells in space, they would be in continuous sunlight and would generate power continuously. The energy could then be sent to Earth via microwaves.

O'Neill's proposed solar power stations would have been huge and could not be launched from Earth. However, O'Neill suggested that the power stations could be built in space using material mined from the Moon. In order to mine the moon, assemble the stations, and maintain them, a large number of workers would be required. These workers would be housed in truly gargantuan space stations that O'Neill called "space settlements." O'Neill's space settlements would have been even larger than the enormous stations proposed by J.D. Bernal (see the November 2011 Skybox column). O'Neill's constructs would have been wheel-shaped with living space in a large cylinder around the outer edge. Since the stations would rotate, centrifugal effects would generate a gravity-like force in that area. Residue from processing lunar material would be put on the sides of the habitation area to provide radiation shielding. The center would be where spacecraft would dock with the settlement. Mirrors reflecting light into the habitation area would allow simulation of day and night.

Many people were interested in O'Neil's concept. The late Isaac Asimov wrote a short story, published in the National Geographic, endorsing the space settlement idea. Certain science fiction writers were inspired and/or commissioned to produce stories popularizing the idea, some of which stories even became required reading in some schools.

(Continued on following page)

However, one important group was unimpressed. When the government evaluated the potential cost of the O'Neill plan, politicians were appalled. In fact, the government became so hostile to the idea of solar power from space that in the 1970's it could not even be discussed in government circles.

Freedom

Some years after Skylab fell out of orbit, and after O'Neill's grandiose station idea fizzled, it became apparent that the United States needed a space station. In 1984, Ronald Reagan proposed a modular space station that he called "Freedom". The initial plan called for a station with two long support trusses (the "double keel") with a series of modules attached to them as well as solar power panels and radiators. When the design specifications were published in 1987, politicians were upset at the cost and demanded that changes be made. The double keel concept was scrapped and the station was scaled back. When it became apparent that the initial frequency of shuttle launches was far too optimistic, the design was scaled back further. Questions soon arose about whether the new design had adequate resources to support its mission. In addition, politicians were still concerned about the high costs. In 1989, the United States decided to look for international partners such as Japan and Canada to join in the project and share some of the expense. As the United States was reluctant to give other countries much say in the station, those plans fell through.

The weight of all the budgetary arguments and other bickering doomed the program by 1990, though there was some effort made to revive it in 1991. But the experience of Freedom did teach some lessons that would be used in the future.

Back in the USSR

During the 1980s, the Soviets continued with the Salyut series of space stations, each one building on the experience of its predecessors with the final one, Salyut 7, proving the feasibility of adding modules onto existing space stations. By 1986, even though Salyut 7 was still in orbit, the Soviets felt they were ready to make the next step.

The new station would carry a new name: Mir, which means "peace" in Russian. The name was intended to symbolize a more peaceful attitude by the Soviet government. The first part of Mir to be launched was the core module in 1986. Other modules were launched and docked to the core module in 1987, 1989, and 1990, adding to the scientific capabilities and improving the life support functions of the station.

Salyut 7 fell out of orbit in 1991 but that was not the only thing to fall that year. As a result of the collapse of communism in 1989, the Soviet Union officially broke apart in 1991. Interestingly enough, there was a crew that went up to Mir before the breakup of the U.S.S.R. and came down after. In essence, they went up as Soviets and returned as Russians.

With the failure of plans for Freedom and a desire to support Russia in its new non-communist existence, then U.S. President George H.W. Bush signed an agreement with then Russian Federation President Boris Yeltsin to cooperate on space ventures in 1992. One part of this plan called for astronauts to visit Mir and use the shuttle to support those joint operations.

To support the joint missions, a module named Spektr was added to the station in 1995. While it had an airlock and some science gear, it would also serve as living quarters for astronauts. Also, that year saw the addition of a docking port in support of the shuttle. The final module went up in 1996 and carried Earth observation equipment.

In 1997, a Progress cargo capsule collided with the Spektr module, severely damaging it. This marked the beginning of Mir's decline. The station experienced a number of problems over the next year. By 1998, serious thought was given to eventually deorbiting Mir and preparations were made. In 2000, there was a campaign to turn Mir over to private ownership, but that fell through. After the final manned mission in April of 2000 to prepare the station for its end, the station entered the Earth's atmosphere and burned up on March 23rd, 2001.

The International Space Station

As Mir was nearing its end, its successor, the International Space Station, was being built. The Russians launched the first module of the station, Zarya, in November of 1998. It was soon followed by the Unity module, which NASA sent up via shuttle. In July of 2000, the Russians launched the Zvezda module. This module contained life support equipment and other equipment, rendering the station habitable. Modules continued to be added until 2011, when the ISS was declared completed.

Station Accomplished

Getting back to the question that prompted this series of columns, the ISS has achieved a number of scientific accomplishments. One major area of research was the effect of microgravity on living things. While most of this work is geared towards life

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ASK THE Skywatcher

Dr. Alberto Guzman

Why are the stars so brilliant in the winter?

Answer: Most of them are bright because they are close. We are in their part of the galaxy.

We are not in the center of our galaxy. It would be impossible: With the center's high star density, the radiation level is too high to allow development of life. Instead, we are out on the fringe. We reside in one of the Milky Way's spiral arms, sometimes called the "Orion Arm." When we look at Orion, we are looking into our galactic neighborhood.

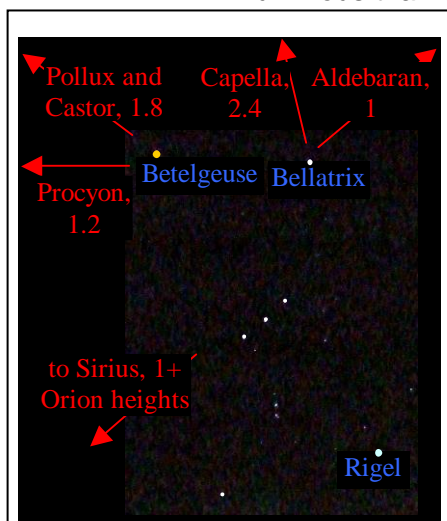
Go out on a mid-January evening. Halfway up the southeast sky, you see the unmistakable form of Orion. The figure here centers on a photo showing the Hunter as he looks at 8 pm around Jan 20. The figure identifies (in blue) the three brightest stars of the constellation, and has arrows pointing to six very bright nearby stars in a big arc. The pointers also give distance to those stars in "Orion heights," roughly 15°. All six of those stars are among the 18 closest to Earth. They make a poor excuse for a hexagon, but if you count the Twins as a single and add Rigel, then you have a decent "Winter Hexagon" asterism, with Betelgeuse in the interior.

Sirius shines brightest in our sky, but not because it is all that bright. It is the third closest of the well-known stars. If you moved it away to the distance of Pollux, it would shine 1/15 as bright, about 70% of the brightness of Pollux.

The distance of Pollux is not that great; Pollux is eighth closest. But the distance is just past the standard used to measure real brightness ("intrinsic luminosity.") **Absolute magnitude** is how a star would look at a distance of 10 parsecs (about 33 light years; see the [March 2011 Asterism](#).) Pollux shows us magnitude 1.14. At 10 parsecs, it would be mag 1.06, *still* 17th brightest. The other twin, Castor, is

more than half again as far. It is actually multiple stars, but the combination is 15th closest, 23rd brightest, and twice as luminous as Sirius.

Look at similar numbers for the others. The "smaller Dog's" bright Procyon is fourth closest and eighth brightest, but has about 1/3 the luminosity of Sirius. Capella, the brilliant one north of Orion, is (combined) sixth brightest, with six times the luminosity of the Dog Star. Aldebaran, the eye of the Bull, is 18th closest, 13th brightest, and a little more luminous than Capella.



Stars near Orion. Photo and drawing: A. Guzman

Oddly, it is the stars of Orion that are distant. Bellatrix (27th brightest) looks 1/16 as bright as Sirius because it is 28 times as far. It is 50 times as luminous. Betelgeuse (ninth) is at least 50 times as far, seemingly 1/6 as bright, actually over 400 times brighter. (It is also *huge*. An appropriately big article is [here](#).) Rigel (seventh) is luminous beyond belief. At 90 times the distance of Sirius, it shines about 1/6 as bright. That implies more than 1300 times the luminosity. If you put Sirius at those distances, it would be invisible. If you brought Rigel to the distance of Sirius, it would shine at about mag -9. That

would make it 500 times as bright as *Jupiter*, which you can see high in the southwest (rightward from Orion). That part of the sky is *not* our galactic neighborhood; it is fairly poor in bright stars.

[Fred Schaaf addresses this question in the *Northern Hemisphere's Sky* column, *Sky and Telescope*, January 2012, page 40. There, the focus is on the magnitudes, not the closeness.]

☆☆☆

Astronomy Highlights for 2012

A Look Ahead to the New Year's Best Events

by Alan P. Witzgall

As part of AAI's Fridays @ Sperry series of open house presentations on December 30th, 2011 I gave an outline of noteworthy astronomical events anticipated for the upcoming year 2012. After the talk Brian McGuiness suggested that the presentation could serve as a year long reference if posted to this newsletter and the website. In deference to Brian's wisdom, here follows a summary of my presentation which can also be found at AAI's website at <http://www.asterism.org/clubact/Future%20Sights-the%20article%20REV01.pdf>.

On January 4th, 2012, the **Quadrantid meteors** are best seen after 3 am, (after the 77% illuminated Moon sets). You can expect 30 to 50 meteors per hour from a dark sky site. Then, on **January 31th**, Near Earth Object asteroid **433 Eros** flies by our planet at a range of 16.6 million miles from Earth. Eros reaches opposition on January 31st, and will be at about magnitude 8.3, so a telescope will be needed to view it. It will be highest in the constellation Sextans about 1:30 am. Look at the February issue of Sky & Telescope for a finder chart. The last time **433 Eros** made a close approach to Earth was in January of 1975, when it all but occulted the bright star Kappa Geminorum as seen from Cranford. It was only 14 million miles away at that time. The next close approach won't be until **2052**, so check this out this year!

We have a quiet time in February, but look to the west all month to watch the Moon, Mercury and Venus do a celestial dance. Venus and the Moon make a striking site in the west on **February 25th**. Photo op, anyone?

It is a rather poor presentation of the Red Planet, but **Mars is at opposition March 3rd**. The planet is about 60 million miles away from Earth, with the disc only 13.9 arc seconds across, so get out and view this mysterious world now and through May. Using a red filter will bring out the contrasts of the dark markings. If you find a magenta filter, you should be able to see the markings as well as the clouds in Mars' atmosphere at the same time.

Looking back to the west, don't miss **Jupiter and Venus 3 degrees apart March 15th**, and the **Moon** gets into the act **March 25-26th**.

After you file your taxes, **Saturn** puts on a show at **Opposition April 15th** with the rings open at about 14 degrees to our line of sight. Using a light blue filters will tease out details in the rings, and an orange filter highlights the ball of the planet. The storm that has raged for the past two years is still active, and awaits the inspection of a webcam.

This year AAI will celebrate **Astronomy Day 2012** at the Trailside Science & Nature Center in Mountainside, NJ on **April 21st**. Check our website (www.asterism.org) for more details later in the year.

In addition, the **Lyrid meteors** peak at that time. This should be an especially good year to view this shower, as the Moon is at New Phase. Expect 30 to 70 meteors per hour.

On **May 20th**, near sunset you will be able to see an annular solar eclipse, the viewing is in California or parts of the American Southwest. Go to www.mreclipse.com for more details as to the path of the Moon's shadow. Be warned: The Sun's bright photosphere will NOT be completely covered, so you will need a solar filter throughout the eclipse!

A big event for this year will be the **Transit of Venus**, this is the second viewing in our lives but will not be seen again for two generations until **December, 2117!** You will need a solar filter to safely view the event, or project it through a refractor telescope or half a binoculars onto a white card. (**Do not project the image through a reflector or Cassegrain telescope, as the heat of the Sun could crack the secondary mirror!**) From New Jersey, the Sun sets before more than half the transit takes place, edging onto the disc around 5:20 pm EDT. Go to Hawai'i and you will see most of the passing of Venus before the Sun, starting around 2 pm local time. The best place of all to view this transit is Australia, where the entire event can be seen. (I am available as an on-site transit consultant, as well as an astronomical southern sky guide there; just take me along with you!) Maps and timings of events can be found at to www.mreclipse.com/transits.

July gives us another break in the action, but don't miss **Mercury** at its best for 2012 in the early evening western sky, **June 27-July 9th**.

(Continued on the following page)

Astronomy Highlights for 2012
 A Look Ahead to the New Year's Best Events

Continued from previous page

by Alan P. Witzgall

One of the most anticipated annual events is the **Perseid meteor shower on Aug. 12-13, 2012**. Despite the 25% illuminated crescent Moon, it should still be a pretty event. By the way, if you haven't viewed the waning crescent Moon, this time would be a great opportunity! You will notice it's a darker crescent than the evening view. To see the meteors, get to a dark sky site after 3 A.M. and watch halfway up the northeastern sky.

A major event in space exploration this year is the **August 6th arrival of Curiosity on the surface of Mars**. If all goes well, the one-ton robotic geologist will be safely lowered to the sands of Mars via a 'sky crane', and will begin a 687 sol mission to analyze the rocks, soils and atmosphere looking for signs of current or ancient life – and do some good old-fashioned geology to boot!

In August, many AAI members, trek north to just outside the little town of Springfield, Vermont to attend the **Stellafane Telescope Makers Convention**. This year's event runs **August 16-19, 2012**. The campsite can accommodate quite a few amateur astronomers and telescope makers, but I strongly recommend you pre-register on the website for the Springfield Telescope Makers at www.stellafane.org when they accept reservations in late May. This upcoming convention will be my 39th consecutive attendance, and Bonnie's 31st. We've seen many changes up there, most for the better. Although the camping is a bit primitive, I rarely hear any complaints from conventioners (especially after they see the dark night sky), and lately, a few giggles!

(Continued on next page)

Stewart's Skybox

(Continued from page 4)

by Stewart Meyers

support on long duration space flight, one of the bigger discoveries from this work was that some bacteria became more virulent in microgravity than they are on Earth. Determining out how that happens might be medically useful back here on Earth.

Another innovation from the ISS is in ultrasound technology. Due to the size and power restrictions on the station, conventional medical ultrasound is not practical and other diagnostic equipment is even more impractical. After experience with an ultrasound unit on the ISS, a new one was built that is even smaller and easier to use. That device is expected to have broad applications in medicine, especially in remote areas.

While not exactly scientific, the ISS and its need for supplies have been a major impetus for the development of commercial spaceflight such as SpaceX's Dragon capsule and Orbital Space Science Corporation's Cygnus cargo capsule.

Other areas have benefited as well. As can be seen, contrary to critics such as Michio Kaku, the ISS has been of some benefit to science.

MEMBER ONLY STAR PARTY
JENNY JUMP STATE PARK
HOPE, NJ
SATURDAY 7:00PM
JANUARY 21, 2012
FEBRUARY 24, 2012

Editor's note: Dr. Michio Kaku is an American born theoretical physicist of Japanese decent, who graduated *summa cum laude* from Harvard University with a B.S., and pursued his studies at the U. of Cal, Berkeley. He had a lectureship at Princeton University and New York University. He presently holds the Henry Semat Chair in Theoretical Physics at the City College of New York and is a regular television and radio personality. If you are further interested in the Russian space program, one of our previous guest lecturers, Robert Zimmerman wrote "Leaving Earth", a text, if not available in our library, can be borrowed from me after I finish reading it.
 JAA

Astronomy Highlights for 2012

A Look Ahead to the New Year's Best Events

Continued from previous page

by Alan P. Witzgall

On **August 24th**, you'll need a telescope to view **Neptune** as it **reaches opposition**, but to see it this year is a special event. Why? Because this year marks the start of its second orbit around the Sun since its discovery in September of 1846! As it is, the planet's discovery had a lot of intrigue and heated international rivalries back then. The 2.4 arc-second disc is tiny, but it's well worth the effort. A large telescope may also show its largest moon, Triton

The planet that sparked the search for Neptune, **Uranus, reaches opposition September 29th**. At magnitude +5.6, it's a reach for the unaided eye to see anywhere but in very dark rural skies. Use binoculars to locate this first of the historically discovered planets. A telescope will reveal its 3.5 arc-second diameter disc. A larger instrument should show at least 2 of its 18 moons.

The **Orionid meteors** peak on **Oct. 21-22nd**. Again, this is a good year for these fleeting 'shooting stars', with the first quarter moon setting just after midnight, but get to a rural locale to really appreciate the 30 to 50 meteors per hour.

On **November 14th, 2012**, the **Australian total solar eclipse just after sunrise**. I suggest that you arrange to make entrance to the Island Continent via the international airport at Cairns, and then drive north to the centerline. Again, see the charts and times for this event at www.mreclipse.com for more details. Again I am available for on-site consultant on the eclipse and a guide for the southern hemisphere skies, just take me along.

Even though the **Leonid meteor shower peaks Nov. 17-18**, it's not a particularly strong shower, with a maximum of only 20 to 30 meteors per hour, it's a good year for viewing, as the waxing crescent Moon hits the horizon by 10 pm. Once more the mantra

sounds: get away to a rural viewing site to see them well.

The last planet to reach prime viewing, **Jupiter, stands at opposition on Dec. 2nd**. I suggest you use a light blue to blue filter (a Wratten #80 A or a #38) to enhance the contrast of details on the cloud decks of the planet. Webcamers should be aware that the rapid rotation of the planet limits how many frames you can capture without encountering placement of feature problems; I keep below 300 frames at 15 per second. at f/30 on the 10-inch refractor at Sperry.

One of the best meteor showers for the year, the **Geminids, peak Dec. 13-14**. Associated with asteroid 3200 Phaeton, this shower starts as early as 10 pm EST. The Moon is at new phase that evening. If the weather cooperates, there's no excuse to miss it this year.

This summary concludes with a double header - **dual oppositions of asteroids 1Ceres & 4Vesta at their brightest**. Earlier this year, the **Dawn spacecraft** left **4Vesta** on a path that will bring it to **1Ceres** in **February 2015**. **4Vesta reaches opposition** at magnitude +6.2 on **December 9th**, and **1Ceres** follows at magnitude +8.3 on **December 18th**. Finder charts for these miniworlds can be found at the Sky & Telescope website.

In closing this article, I leave you with the following quote from a medical scientist of the last century, Hans Seyle, who said:

"...the true scientist never loses the faculty of amazement. It is the essence of humanity's being.."

This year we have a lot of amazement in store!!

Al W.



STAR PARTY SPERRY OBSERVATORY FRIDAY JANUARY 27, and FEBRUARY 24 at 7:30 p.m.

These observation sessions bring AAI members and the public together to view a wide variety of celestial objects with club and member telescopes, when lunar glare is minimal.

PLEASE JOIN US

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MEMBERSHIP DUES

Regular Membership:	\$21
Sustaining Membership:	\$31
Sponsoring Membership:	\$46
Family Membership:	\$5
First Time Application Fee:	\$3
<i>Sky & 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 Membership Chair or Treasurer, or by mail to: AAI, PO Box 111, Garwood, NJ 07027-0111

DOME DUTY

Jan 27	Team E
Feb 3	Team A
Feb 10	Team B
Feb 17	Team C

FRIDAYS AT SPERRY

January 27, 2012

The Temperature of Space

Dr. Dale Gary

February 3, 2012

Space Missions Briefing

Bill Whitehead

What's Up? A Down to Earth Sky

Guide Kathy Vaccari

February 10, 2012

Update on New Horizons

Missions Helder Jacinto

February 24, 2012

Supernova! 25 Years After

Sn1987a by Al Witzgall

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



The next **General Membership Meeting** is the third **Friday, February 20, 2012**. The guest speaker is **Dr. Hyan Benaroya**, of Rutgers University he will speak on **Turning Dust into Gold-Building a Future on the Moon and Mars**.
PLEASE JOIN US

Theaterⁱⁿthe Sky

by Ron Ruemmler

February 2012 is exciting for planet-watchers. All five classic planets are easily visible in the evening sky by the end of the month, moving into position for a truly spectacular March.

The wonderful convergence of **Venus** and **Jupiter** is now nearing the home stretch. The two brightest planets begin the month 40 degrees apart and reach a spread of only 12 degrees by month's end. Find them fairly high in the southwest about two hours after sunset.

Mercury is lost behind the **Sun** for the first half of February but then it jumps up into the western sky, reaching maximum brightness on the 27th. This is the Speedy Planet's best evening appearance of 2012.

Look for it far to the lower right of **Venus**. If you spot it, let your imagination wander to the point midway between **Mercury** and **Venus** where **Uranus** is hiding in evening twilight. **Neptune** passes beyond the **Sun** and is unobservable all month.

Saturn is still classified as a morning object, but it rises before midnight all month. Its rings are leveling off slightly, yet the overall brightness is still increasing since the **Earth** is moving almost directly toward the planet.

Mars reaches opposition from the **Sun** just after the beginning of March, but it essentially reaches its maximum brightness of minus 1.2 magnitude at the end of February.

Look high in the southeast anytime before midnight.

During the last week of the month, the crescent **Moon** passes near **Mercury**, **Uranus**, **Venus**, and **Jupiter** on consecutive evenings. Leap-day prevents February from being a month without a First Quarter **Moon**.

February Sky Calendar (times are PM unless noted)

7 Tue	4:00 AM	Mercury passes beyond the Sun into the evening sky
7 Tue	4:54	Full Moon
9 Thu	8:00	Uranus 0.3 degrees ↓ Venus (telescopic)
9 Thu	10:00	Moon lower right of Mars
13 Mon	5:00 AM	Moon lower left of Saturn
14 Tue	12:04	Last Quarter Moon
19 Sun	4:00	Neptune passes beyond the Sun into the morning sky
21 Tue	5:35	New Moon
23 Thu	6:30	Very thin crescent Moon ↑ right of Mercury
24 Fri	7:00	Thin crescent Moon ↑ right of Uranus
25 Sat	7:30	Crescent Moon ↑ right of Venus
26 Sun	7:30	Crescent Moon right of Jupiter
27 Mon	7:30	Crescent Moon above Jupiter
29 Wed	8:21	First Quarter Moon

