COWICHAN VALLEY STARFINDERS ASTRONOMY CLUB

Clear Skies

Volume 13, Issue 4 August 2008

Web: www.starfinders.ca
President: president@starfinders.ca
Editor: newsletter@starfinders.ca

Categories

Quick Links

Greetings!

Welcome to the Cowichan Valley StarFinders Astronomy club's "Clear Skies" monthly newsletter and a special welcome to all our newest members.

Thanks to all the volunteers who helped make our 13th Annual Island Star Party (ISP) a success.
Congratulations to:

- Bill Weir for getting over 25 objects in the Observers Challenge.
- Timothy Henderson and Paul Henderson for their homemade Refractor Telescopes "Starry Wonder" and "White Comet".
- Raffle winners: Malcome Scrimger (Sky Scout), John McDonald (Binoculars) and Kelvin McCulloch (Telescope).
- Grand Prize winners: Joseph Jourdain - 16-48X65 Acutor Field Scope donated by Pacific Telescope and Alex Schmid - 20X80 Skymaster Binoculars donated by Celestron Telescope.

There are so many more individuals who made the ISP a success, for more details see the "Minutes" section.

For our newest members heres a quick list of the benefits of membership:

- Access to the societies two telescopes;
- Monthly meetings with engaging speakers;
- Notification when the monthly newsletter is posted to the website;
- Access to the CVSF listserve whose primary use is to instigate impromptu observing sessions; and,
- An opportunity to socialize and talk about what we all hold so dear… astronomy.

Check out our website for more details http://www.starfinders.ca/index.htm

Many thanks to this month's contributers: Moe Raven, Norm Willey and Bryon Thompson

Freda Eckstein

"Shoot for the moon. Even if you miss, you'll land among the stars". ~Les Brown

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Meeting Highlights

Meetings are held on the **4th Wednesday** of each month at the home of Bryon and Freda. See the website for a map or follow these directions.

Island Hwy, Mill Bay
Turn on Frayne Rd towards ocean (Serious Coffee is on the corner)
Turn right on Huckleberry Rd
3rd house on the left across from Springbank road and Mail boxes.
Look for the STAR sign
Please park on Huckleberry or Springbank Rd's.
Call Brian 743-6633 if you need directions

Our August meeting will be held at 7:30 on WEDNESDAY August 27th.
Hope to see you all there.

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Minutes - Island Star Party Review

By Freda Eckstein

Dispite the mixed bag of weather we had this year, our annual Island Star Party came off with a bang! We didn't mind too much about gettting a little bit wet and the clouds did part enough for the observers challenge and scavenger hunt which were a great asset to this years party. The first Astronomical Jam brought out the musicians and kept the crowd entertained. The raffle table was hoppin', selling tickets for the Sky Scout, Binoculars and Telescope. The door prizes were, as usual, fanominal (thanks to the generosity of our sponsors). The guest speakers were informative, inspirational and thought provoking. Our topics included: "The Exploration of Mars", "Astophotography with any Camera – Simple or Advanced", A Cosmic View from the Milky Way", "The Stargazers" and "Astronomy 101". We continued to have the ever popular Telescope walk and brought back the Telescope Awards. And of course our MC did a fantastic job keeping us on time and entertaining us throughout the weekend. So all in all what a great Party!

We sold 155 raffle tickets and 6 Tee-shirts and received 52 membership forms (up from last year) for a total of 97 members (79 adults, 18 kids). We also welcome32 new members to the club.

Below is a listing of everyone who made this year's Island Star Party such a great success (if I have missed anyone, please forgive me)
ISP Planning Committee: Brian Robilliard, Bryon Thompson, Ed Nicholas, Gail & Pete Robertson, Paul Randall, Christina Martens, Gerry Rozma, Freda Eckstein, Mo Raven, Ed Maxfield.
Lecturers: Chris Gainor, John McDonald, John Nemy, Carol Legate, Bryon Thompson, Malcome Scrimger (slide show of RASC conference)
Sponsors/Media: Skywatcher/Pacific Telescope, Sky Instruments/Antares, Island Eyepiece and Science Emporium, Celestron Telescope, Olivon Optics, William Optics, Genoa Bay Café, Robert Deane (private donation), Ed Maxfield (private donation), John Nemy (private donation), Debra Little (private donation), Anonymous Telescope donation, RASC Victoria , Shaw Daily, Cowichan Newsleader and The Citizen.
Food: Brenda's Kitchen
Tee-Shirts: Shauna Meade
Photographers: Moe Raven, Freda Eckstein, Paul Randall and Ed Nicholas
Registration, Raffle, Door Prizes: Robert Deane, Dave Polster, Marilyn Rummel, Trudy and Marvin Thorgeirson, Freda Eckstein, Bryon Thompson, Ed Taje, Martha Aquero, Lauren Robilliard, Ed Maxfield, Ed Nicholas, Nancy Kirshfelt, Jamie Nicholas, Mo Raven, Paul Randall, Christina Martens, Gerry Rozma.

And finally thanks to everyone who attended, despite the weather, to make our 13th Island Star Party such a success.

For more information about upcoming meetings go to Starfinders Meetings

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Upcoming Events

August 16th - CVSF Public Outreach – Sidewalk Astronomy:
Our Club will be hosting another public outreach session complete with solar and regular telescopes and club info at the Downtown Duncan Farmers Market on Saturday August 16th between 9:00 am to 1:00 pm. Volunteers are always needed to interact with the public and provide club information. Even if you could put in an hour let us know by emailing Bryon Thompson or calling 743-2412 .
RASCals Star Party – August 29-31
Our friends the RASCals are at it again. They are hosting the seventh annual RASCals Star Party on August 29-31, 2008 at the Victoria Fish and Game Association on Holker Rd (on top of the Malahat), for more details see their website at http://victoria.rasc.ca/events/StarParty/Default.htm

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Web News

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Cool Pics

Want to show off your latest pics? Well here's your chance; email the editor at My Cool Pics and we will try to post them in the next edition of "Clear Skies".

Below is this month's cool pic taken by Norm Willey. Norm explains "I took this image at the start of a motorcycle trip, intending to get an image of my loaded bike at our meeting point. I was early so I snapped a couple of shots of the bike, against the early morning mist in the background field. What I did not realize I got in the sky was what appears to be a fireball in the process of breaking up. Didn't see this until I downloaded the images after the trip".

The details: Date/time: Tuesday June 8/08 ~5:10am PDT (+/- 5 min)
View: looking SSE from about 10km north of Duncan, BC, on Vancouver Island
Camera: Olympus C3020 (an "old" point & shoot digital), no zoom, flash used, hand-held.

Go to Skynews Magazine to see Norm's photo posted as #347 Photo of the week. Congratulations Norm.

Check out our Photo gallery on the website where you can find pics from the Island Star Party (ISP). Quick link is http://starfinders.ca/photos.htm

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Featured Articles

Articles

RETURN TO CATEGORIES

1. What Hit Siberia 100 years Ago?
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5. Sunlight Makes Asteroids Binary System
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7. Rare Star-making Galaxy Found
8. A Single Boulder May Prove that Antartica and North America Were Connected

What Hit Siberia 100 Years Ago? Tunguska Event Still Puzzles Scientists- July 1/08 Credit ScienceDaily.

The year is 1908, and it's just after seven in the morning. A man is sitting on the front porch of a trading post at Vanavara in Siberia. Little does he know, in a few moments, he will be hurled from his chair and the heat will be so intense he will feel as though his shirt is on fire. That's how the Tunguska event felt 40 miles from ground zero.

June 30, 2008, is the 100th anniversary of that ferocious impact near the Podkamennaya Tunguska River in remote Siberia--and after 100 years, scientists are still talking about it. "If you want to start a conversation with anyone in the asteroid business all you have to say is Tunguska," says Don Yeomans, manager of the Near-Earth Object Office at NASA's Jet Propulsion Laboratory. "It is the only entry of a large meteoroid we have in the modern era with first-hand accounts."

While the impact occurred in '08, the first scientific expedition to the area would have to wait for 19 years. In 1921, Leonid Kulik, the chief curator for the meteorite collection of the St. Petersburg museum led an expedition to Tunguska. But the harsh conditions of the Siberian outback thwarted his team's attempt to reach the area of the blast. In 1927, a new expedition, again lead by Kulik, reached its goal. "At first, the locals were reluctant to tell Kulik about the event," said Yeomans. "They believed the blast was a visitation by the god Ogdy, who had cursed the area by smashing trees and killing animals."

While testimonials may have at first been difficult to obtain, there was plenty of evidence lying around. Eight hundred square miles of remote forest had been ripped asunder. Eighty million trees were on their sides, lying in a radial pattern.

"Those trees acted as markers, pointing directly away from the blast's epicenter," said Yeomans. "Later, when the team arrived at ground zero, they found the trees there standing upright – but their limbs and bark had been stripped away. They looked like a forest of telephone poles." Such debranching requires fast moving shock waves that break off a tree's branches before the branches can transfer the impact momentum to the tree's stem. Thirty seven years after the Tunguska blast, branchless trees would be found at the site of another massive explosion – Hiroshima, Japan.

Kulik's expeditions (he traveled to Tunguska on three separate occasions) did finally get some of the locals to talk. One was the man based at the Vanara trading post who witnessed the heat blast as he was launched from his chair. His account: Suddenly in the north sky… the sky was split in two, and high above the forest the whole northern part of the sky appeared covered with fire… At that moment there was a bang in the sky and a mighty crash… The crash was followed by a noise like stones falling from the sky, or of guns firing. The earth trembled.

The massive explosion packed a wallop. The resulting seismic shockwave registered with sensitive barometers as far away as England. Dense clouds formed over the region at high altitudes which reflected sunlight from beyond the horizon.

Night skies glowed, and reports came in that people who lived as far away as Asia could read newspapers outdoors as late as midnight. Locally, hundreds of reindeer, the livelihood of local herders, were killed, but there was no direct evidence that any person perished in the blast. "A century later some still debate the cause and come up with different scenarios that could have caused the explosion," said Yeomans. "But the generally agreed upon theory is that on the morning of June 30, 1908, a large space rock, about 120 feet across, entered the atmosphere of Siberia and then detonated in the sky."

It is estimated the asteroid entered Earth's atmosphere traveling at a speed of about 33,500 miles per hour. During its quick plunge, the 220-million-pound space rock heated the air surrounding it to 44,500 degrees Fahrenheit. At 7:17 a.m. (local Siberia time), at a height of about 28,000 feet, the combination of pressure and heat caused the asteroid to fragment and annihilate itself, producing a fireball and releasing energy equivalent to about 185 Hiroshima bombs. "That is why there is no impact crater," said Yeomans. "The great majority of the asteroid is consumed in the explosion."

Yeomans and his colleagues at JPL's Near-Earth Object Office are tasked with plotting the orbits of present-day comets and asteroids that cross Earth's path, and could be potentially hazardous to our planet. Yeomans estimates that, on average, a Tunguska-sized asteroid will enter Earth's atmosphere once every 300 years. "From a scientific point of view, I think about Tunguska all the time," he admits. Putting it all in perspective, however, "the thought of another Tunguska does not keep me up at night."

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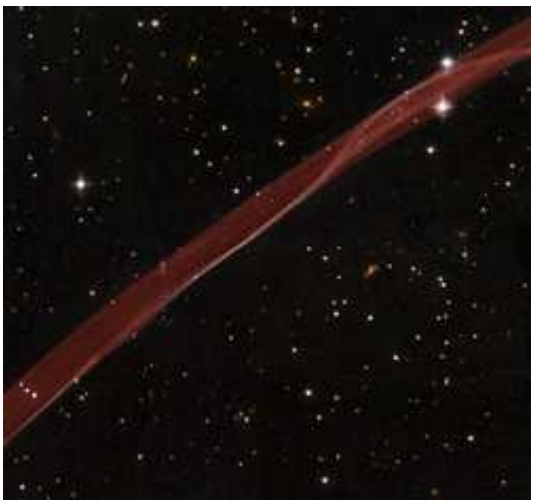
Hubble sees celestial fireworks- July 1/08 Credit Space Telescope Science Institute.

A delicate ribbon of gas floats eerily in our galaxy. A contrail from an alien spaceship? A jet from a black-hole? Actually this image, taken by NASA's Hubble Space Telescope, is a very thin section of a supernova remnant caused by a stellar explosion that occurred more than 1,000 years ago.



On or around May 1, 1006 A.D., observers from Africa to Europe to the Far East witnessed and recorded the arrival of light from what is now called SN 1006, a tremendous supernova explosion caused by the final death throes of a white dwarf star nearly 7,000 light-years away. The supernova was probably the brightest star ever seen by humans, and surpassed Venus as the brightest object in the night time sky, only to be surpassed by the Moon. It was visible even during the day for weeks, and remained visible to the naked eye for at least two and a half years before fading away.

It wasn't until the mid-1960s that radio astronomers first detected a nearly circular ring of material at the recorded position of the supernova. The ring was almost 30 arcminutes across, the same angular diameter as the full moon. The size of the remnant implied that the blast wave from the supernova had expanded at nearly 20 million miles per hour over the nearly 1,000 years since the explosion occurred.

In 1976, the first detection of exceedingly faint optical emission of the supernova remnant was reported, but only for a filament located on the northwest edge of the radio ring. A tiny portion of this filament is revealed in detail by the Hubble observation. The twisting ribbon of light seen by Hubble corresponds to locations

where the expanding blast wave from the supernova is now sweeping into very tenuous surrounding gas.

The hydrogen gas heated by this fast shock wave emits radiation in visible light. Hence, the optical emission provides astronomers with a detailed "snapshot" of the actual position and geometry of the shock front at any given time. Bright edges within the ribbon correspond to places where the shock wave is seen exactly edge on to our line of sight.

Today we know that SN 1006 has a diameter of nearly 60 light-years, and it is still expanding at roughly 6 million miles per hour. Even at this tremendous speed, however, it takes observations typically separated by years to see significant outward motion of the shock wave against the grid of background stars. In the Hubble image as displayed, the supernova would have occurred far off the lower right corner of the image, and the motion would be toward the upper left.

SN 1006 resides within our Milky Way Galaxy. Located more than 14° off the plane of the galaxy's disk, there is relatively little confusion with other foreground and background objects in the field when trying to study this object. In the Hubble image, many background galaxies (orange extended objects) far off in the distant universe can be seen dotting the image. Most of the white dots are foreground or background stars in our Milky Way galaxy.

This image is a composite of hydrogen-light observations taken with Hubble's Advanced Camera for Surveys in February 2006 and Wide Field Planetary Camera 2 observations in blue, yellow-green, and near-infrared light taken in April 2008. The supernova remnant, visible only in the hydrogen-light filter was assigned a red hue in the Heritage color image.

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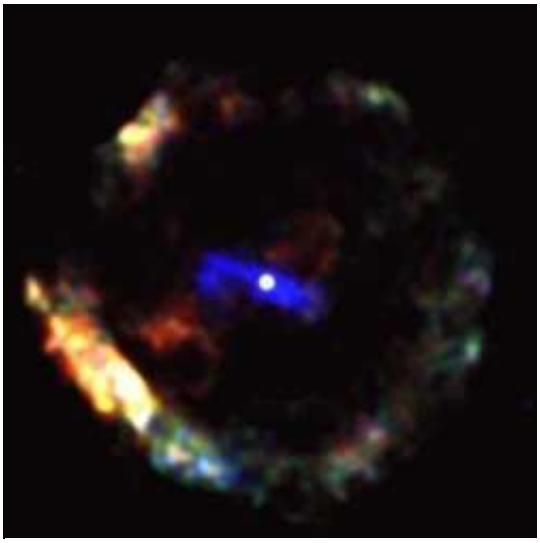
Einstein gives a thumbs-up– July 3/08 Credit National Radio Astronomy Observatory



This image from the Chandra X-ray Observatory shows a pulsar at the center of a supernova remnant called G11.2-0.3. *NASA/McGill/V. Kaspi et al*

Taking advantage of a unique cosmic coincidence, astronomers have measured an effect predicted by Albert Einstein's theory of general relativity in the extremely strong gravity of a pair of superdense neutron stars. The new data indicate that the famed physicist's 93-year-old theory has passed yet another test.

The scientists used the National Science Foundation's Robert C. Byrd Green Bank Telescope (GBT) to make a 4-year study of a double-star system unlike any other known in the universe. The system is a pair of neutron stars, both of which are seen as pulsars that emit lighthouse-like beams of radio waves.

"Of about 1,700 known pulsars, this is the only case where two pulsars are in orbit around each other," says Rene Breton, a graduate student at McGill University in Montreal, Canada. In addition, the stars' orbital plane is aligned nearly perfectly with their line of sight to Earth, so that one passes behind a doughnut-shaped region of ionized gas surrounding the other, eclipsing the signal from the pulsar in back. "Those eclipses are the key to making a measurement that could never be done before," says Breton.

Einstein's 1915 theory of predicted that, in a close system of two very massive objects, such as neutron stars, one object's gravitational tug, along with an effect of its spinning around its axis, should cause the spin axis of the other to wobble, or precess. Studies of other pulsars in binary systems had indicated that such wobbling occurred, but could not produce precise measurements of the amount of wobbling. "Measuring the amount of wobbling is what tests the details of Einstein's theory and gives a benchmark that any alternative gravitational theories must meet," says Scott Ransom of the National Radio Astronomy Observatory.

The eclipses allowed the astronomers to pin down the geometry of the double-pulsar system and track changes in the orientation of the spin axis of one of them. As one pulsar's spin axis slowly moved, the pattern of signal blockages as the other passed behind it also changed. The signal from the pulsar in back is absorbed by the ionized gas in the other's magnetosphere.

Pulsars, first discovered in 1967, are the "corpses" of massive stars that have exploded as supernovae. What is left after the explosion is a superdense neutron star that packs more than the mass of our Sun into the size of an average city. Beams of radio waves stream outward from the poles of the star's intense magnetic field and sweep around as the star rotates, as often as hundreds of times a second. The pair of pulsars studied with the GBT is about 1,700 light-years from Earth. The average distance between the two is only about twice the distance from the Earth to the Moon. The two orbit each other in just under 2.5 hours.

"A system like this, with two very massive objects very close to each other, is precisely the kind of extreme 'cosmic laboratory' needed to test Einstein's prediction," says Victoria Kaspi, leader of McGill University's Pulsar Group.

Theories of gravity don't differ significantly in "ordinary" regions of space such as our own solar system. In regions of extremely strong gravity fields, such as near a pair of close, massive objects, however, differences are expected to show up. In the binary-pulsar study, general relativity passed the test provided by such an extreme environment, the scientists said.

"It's not quite right to say that we have now 'proven' general relativity," Breton says. "However, so far, Einstein's theory has passed all the tests that have been conducted, including ours."

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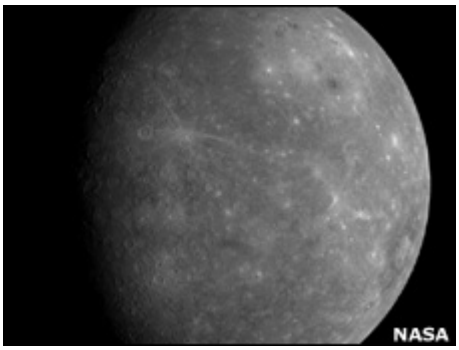
Smallest planet shrinks in size – July 4/08 Credit BBC News



The smallest planet in the Solar System has become even smaller, studies by the Messenger spacecraft have shown.

Data from a flyby of Mercury in January 2008 show the planet has contracted by more than one mile (1.5km) in diameter over its geological history.

Scientists believe the shrinkage is due to the planet's core slowly cooling. Studies published in the journal Science show the same process also powers the planet's magnetic field, a topic long debated by scientists.

"Cooling of the planet's core not only fuelled the magnetic dynamo, it also led to contraction of the entire planet," said Principal Investigator Sean Solomon of the Carnegie Institution of Washington, US. "And the data from the flyby indicate that the total contraction is at least one-third greater than we previously thought."

Active youth
The Messenger (Mercury Surface, Space Environment, Geochemistry and Ranging) spacecraft passed within 200km (125 miles) of Mercury earlier this year.

It was the first time the planet had been viewed up close since Mariner 10's third and final fly-by in March 1975. A kidney-shaped volcanic vent surrounded by ejected material

The flyby was one of three to be made by the craft as it prepares to enter into orbit around the Solar System's smallest planet in 2011. Just days after the pass, scientists revealed that they had found evidence of volcanic activity on the planet, previously hinted at by Mariner 10.

Further analysis of areas such as the Caloris basin, one of the Solar Systems largest and youngest impact basins, found volcanic vents and evidence of "pyroclastic" debris blown from the volcano as it erupted. Other areas contained circular structures with wrinkled edges, similar to structures seen on the Moon and Mars.

Scientists believe these are impact craters that have been filled with massive quantities of lava, possibly 2.7km (1.3miles) deep. "That's a lot of lava," said Dr James Head of Brown University. "It shows the planet was really active in its early history." Researchers believe the peak of activity could have been three to four billion years ago.

Core effects
Sensors, such as the Fast Imaging Plasma Spectrometer (FIPS), onboard the craft also revealed details of the planet's atmospheric composition. FIPS recorded silicon, sodium and even water ions around Mercury. Ions are electrically charged particles. The scientists believe these were blasted from the surface of the planet by the solar wind, a stream of charged particles which buffets the Solar System.

Mercury's proximity to the Sun means it feels the full force of this wind, blasting atoms into space. Many of these are then trapped by the planet's magnetic field. "The Mercury magnetosphere is full of many ionic species, both atomic and molecular," said Dr Thomas Zurbuchen of the University of Michigan.

This magnetosphere is created by the planet's core, which accounts for 60% of the planet's mass. As well as influencing the space around the planet, the core has had an immense influence on surface features.

"The dominant tectonic landforms on Mercury, including areas imaged for the first time by Messenger, are features called lobate scarps, huge cliffs that mark the tops of crustal faults that formed during the contraction of the surrounding area," explained Dr Solomon. "They tell us how important the cooling core has been to the evolution of the surface."

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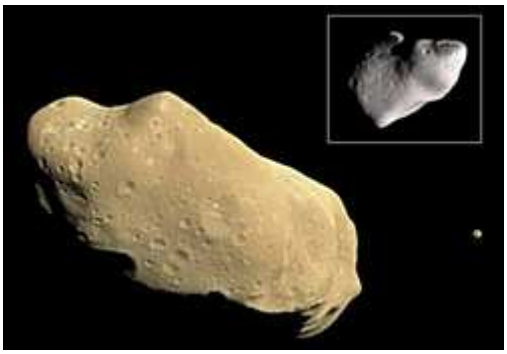
Sunlight makes asteroids binary system– July 9/08 Credit University of Maryland

Asteroids with moons, which scientists call binary asteroids, are common in the solar system. A longstanding question has been how the majority of such moons are formed. In this week's issue of the journal Nature, a trio of astronomers from Maryland and France say the surprising answer is sunlight, which can increase or decrease the spin rate of an asteroid.

This image shows the asteroid Ida and its moon Dactyl. *NEAR/JPL/NASA*



Derek Richardson, of the University of Maryland, his former student Kevin Walsh, now Poincare Fellow in the Planetology Group in the Cassiopee Laboratory of CNRS at the Cote d'Azur Observatory, France, and that group's leader, coauthor Patrick Michel outline a model showing that when solar energy spins up a rubble pile asteroid to a sufficiently fast rate, material is slung off from around the asteroid's equator. This process also exposes fresh material at the poles of the asteroid.

If the spun off bits of asteroid rubble shed sufficient excess motion through collisions with each other, then the material coalesces into a satellite that continues to orbit its parent.

Because the team's model closely matches observations from binary asteroids, it neatly fills in missing pieces to a solar system puzzle. And, it could have much more down-to-Earth implications as well. The model gives information on the shapes and structure of near-Earth binary asteroids that could be vital should such a pair need to be deflected away from a collision course with Earth.

Finally, the authors say, these findings suggest that a sample return mission to such a binary asteroid could bring back exposed pristine material from the poles of the parent asteroid, providing a chance to probe the internal composition of an asteroid without having to dig into it.

It's estimated that about 15 percent of near-Earth and main-belt asteroids with diameters less than 10 kilometers have satellites. Scientists have determined that these small binary asteroid pairs were not formed at the beginning of the solar system, indicating that some process still at work must have created them.

"It was at first thought the moons in these asteroid pairs probably formed through collisions and/or close encounters with planets," says Richardson, an associate professor of astronomy at the University of Maryland. "However, it was found that these mechanisms could not account for the large number of binary asteroids present among near-Earth and inner main belt asteroids."

Recent studies have outlined a thermal process — known as the YORP effect after the scientists (Yarkovsky, O'Keefe, Radzievskii, Paddack) who identified it — by which sunlight can speed up or slow down an asteroid's spin. Widespread evidence of this mechanism can be seen in the "notable abundance of both fast and slow rotators among [near-Earth asteroids] and small main belt asteroids," Walsh, Richardson and Michel write in the Nature paper.

The trio modeled different types of rubble pile asteroids — chunks of rock held together by gravity. This work, supported by the National Science Foundation and NASA, as well as the European Space Agency and the French National Planetology Program, is the first to show how the slow spinup of such asteroids leads over millions of years to mass loss that can form binaries. "Our model almost exactly matches the observations of our test case, binary asteroid KW4, which was imaged incredibly well by the NSF-supported Arecibo radio telescope in Puerto Rico," Walsh says.

"Based on our findings, the YORP effect appears to be the key to the origin of a large fraction of observed binaries," says Michel. "The implications are that binary asteroids are preferentially formed from aggregate objects [rubble piles], which agrees with the idea that such asteroids are quite porous. The porous nature of these asteroids has strong implications for defensive strategies if faced with an impact risk to Earth from such objects, because the energy required to deflect an asteroid depends sensitively on its internal structure," he said.

Doublet craters formed by the nearly simultaneous impact of objects of comparable size can be found in a number of places on Earth, suggesting that binary asteroids have hit our planet in the past. Similar doublet craters also can be found on other planets.

The authors say that their current findings also suggest that a space mission to a binary asteroid could bring back material that might shed new light on the solar system's early history. The oldest material in an asteroid should lie underneath its surface, explained Richardson, and the process of spinning off this surface material from the primary asteroid body to form its moon, or secondary body, should uncover the deeper older material.

"Thus a mission to collect and return a sample from the primary body of such a binary asteroid could give us information about the older, more pristine material inside an asteroid, just as the University of Maryland-led Deep Impact gave us information about the more pristine material inside a comet," Richardson says.

Michel adds, "Bringing back pristine material is the goal of our proposed Marco Polo mission, which is currently under study by the European Space Agency, in partnership with JAXA in Japan."

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Brightest star in the galaxy has competition- July 16/08 credit Jet Propulsion Laboratory

Nicknamed the "Peony nebula star," the bright stellar bulb was revealed by NASA's Spitzer Space Telescope and other ground-based telescopes. It blazes with the light of an estimated 3.2 million suns.

The reigning "brightest star" champion is Eta Carina, with a whopping solar wattage of 4.7 million suns. But according to astronomers, it's hard to pin down an exact brightness, or luminosity, for these scorching stars, so they could potentially shine with a similar amount of light.

"The Peony nebula star is a fascinating creature. It appears to be the second-brightest star that we now know of in the galaxy, and it's located deep into the galaxy's center," said Lidia Oskinova of Potsdam University in Germany. "There are probably other stars just as bright if not brighter in our galaxy that remain hidden from view." Oskinova is principal investigator for the research and second author of a paper appearing in a future issue of the journal Astronomy and Astrophysics.

This image from NASA's Spitzer Space Telescope shows the new silver medalist, circled in the inset above, in the central region of our Milky Way.

Scientists already knew about the Peony nebula star, but because of its sheltered location in the dusty central hub of our galaxy, its extreme luminosity was not revealed until now. Spitzer's dust-piercing infrared eyes can see straight into the heart of our galaxy, into regions impenetrable by visible light. Likewise, infrared data from the European Southern Observatory's New Technology Telescope in Chile were integral in calculating the Peony nebula star's luminosity. "Infrared astronomy opens extraordinary views into the environment of the central region of our galaxy," said Oskinova.

The brightest stars in the universe are also the biggest. Astronomers estimate the

Peony nebula star kicked off its life with a hefty mass of roughly 150 to 200 times that of our sun. Stars this massive are rare and puzzle astronomers because they push the limits required for stars to form. Theory predicts that if a star starts out too massive, it can't hold itself together and must break into a double or multiple stars instead.

Not only is the Peony nebula star hefty, it also has a wide girth. It is a type of giant blue star called a Wolf-Rayet star, with a diameter roughly 100 times that of our sun. That means this star, if placed where our sun is, would extend out to about the orbit of Mercury. With so much mass, the star barely keeps itself together. It sheds an enormous amount of stellar matter in the form of strong winds over its relatively short lifetime of a few million years. This matter is pushed so hard by strong radiation from the star that the winds speed up to about 1.6 million kilometers per hour (one million miles per hour) in only a few hours.

Ultimately, the Peony nebula star will blow up in a fantastic explosion of cosmic proportions called a supernova. In fact, Oskinova and her colleagues say that the star is ripe for exploding soon, which in astronomical terms mean anytime from now to millions of years from now. "When this star blows up, it will evaporate any planets orbiting stars in the vicinity," said Oskinova. "Farther out from the star, the explosion could actually trigger the birth of new stars."

In addition to the star itself, the astronomers noted a cloud of dust and gas, called a nebula, surrounding the star. The team nicknamed this cloud the Peony nebula because it resembles the ornate flower. "The nebula was probably created from the spray of dust leaking off the massive Peony nebula star," said Andreas Barniske of Potsdam University, lead author of the study. Wolf-Rainer Hamann, also of Potsdam University, is another co-author of the paper and the principal investigator of a Spitzer program enabling this research.

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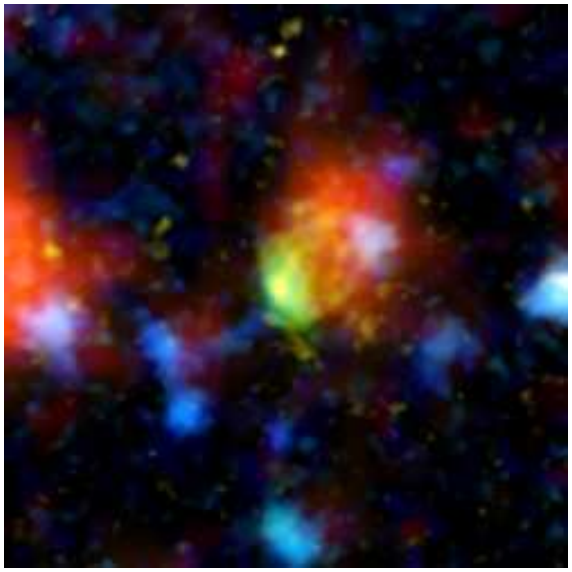
Rare star-making galaxy found– July 11/08 Credit Jet Propulsion Laboratory

Astronomers have uncovered an extreme stellar machine — a galaxy in the very remote universe pumping out stars at a surprising rate of up to 4,000 per year. In comparison, our own Milky Way galaxy turns out an average of just 10 stars per year.



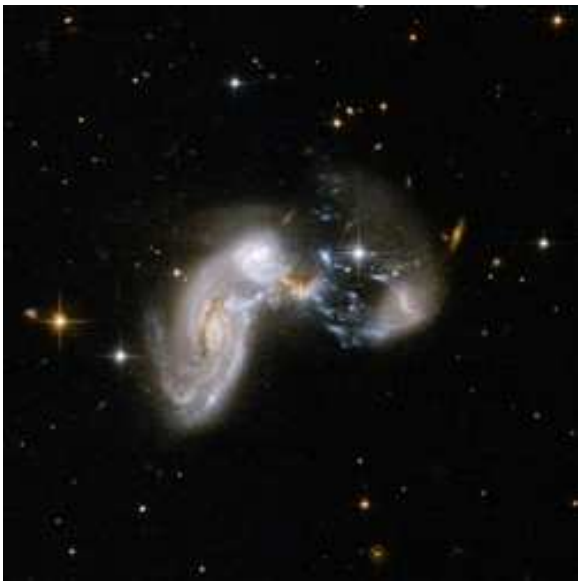
The discovery, made possible by several telescopes including NASA's Spitzer Space Telescope, goes against the most common theory of galaxy formation. According to the theory, called the Hierarchical Model, galaxies slowly bulk up their stars over time by absorbing tiny pieces of galaxies — and not in one big burst as observed in the newfound Baby Boom galaxy.

Green (visible-light wavelengths) denotes gas in the Baby Boom galaxy, while blue (also visible light) shows galaxies in the foreground that are not producing nearly as many stars. Yellow/orange (near-infrared light) indicates starlight from the outer portion of Baby Boom. The red blob to the left is another foreground galaxy that is not producing a lot of stars. NASA/JPL-Caltech/Subaru

"This galaxy is undergoing a major baby boom, producing most of its stars all at once," says Peter Capak of NASA's Spitzer Science Center at the California Institute of Technology, Pasadena. "If our human population was produced in a similar boom, then almost all of the people alive today would be the same age." Capak

is lead author of a new report detailing the discovery in the July 10th issue of the Astrophysical Journal Letters.

The Baby Boom galaxy, which belongs to a class of galaxies called starbursts, is the new record holder for the brightest starburst galaxy in the very distant universe, with brightness being a measure of its extreme star-formation rate. It was discovered and characterized using a suite of telescopes operating at different wavelengths. NASA's Hubble Space Telescope and Japan's Subaru Telescope, atop Mauna Kea in Hawaii, first spotted the galaxy in visible-light images, where it appeared as an inconspicuous smudge due to is great distance.



The Baby Boom galaxy, loosely resembles the galaxy shown here, Zw II 96 NASA/ESA/the Hubble Heritage Team.

It wasn't until Spitzer and the James Clerk Maxwell Telescope, also on Mauna Kea in Hawaii, observed the galaxy at infrared and submillimeter wavelengths, respectively, that the galaxy stood out as the brightest of the bunch. This is because it has a huge number of youthful stars. When stars are born, they shine with a lot of ultraviolet light and produce a lot of dust. The dust absorbs the ultraviolet light but, like a car sitting in the Sun, it warms up and re-emits light at infrared and submillimeter wavelengths, making the galaxy unusually bright to Spitzer and the James Clerk Maxwell Telescope.

To learn more about this galaxy's unique youthful glow, Capak and his team followed up with a number of telescopes. They used optical measurements from Keck to determine the exact distance to the galaxy — a whopping 12.3 billion light-years. That's looking back to a time when the universe was 1.3 billion years old (the universe is approximately 13.7 billion years old today). "If the universe was a human reaching retirement age, it would have been about 6 years old at the time we are seeing this galaxy," says Capak.

The astronomers made measurements at radio wavelengths with the National Science Foundation's Very Large Array in New Mexico. Together with Spitzer and James Clerk Maxwell data, these observations allowed the astronomers to calculate a star-forming rate of about 1,000 to 4,000 stars per year. At that rate, the galaxy needs only 50 million years, not very long on cosmic timescales, to grow into a galaxy equivalent to the most massive ones we see today. While galaxies in our nearby universe can produce stars at similarly high rates, the farthest one known before now was about 11.7 billion light-years away, or a time when the universe was 1.9 billion years old.

"Before now, we had only seen galaxies form stars like this in the teenaged universe, but this galaxy is forming when the universe was only a child," says Capak. "The question now is whether the majority of the very most massive galaxies form very early in the universe like the Baby Boom galaxy, or whether this is an exceptional case. Answering this question will help us determine to what degree the Hierarchical Model of galaxy formation still holds true."

"The incredible star-formation activity we have observed suggests that we may be witnessing, for the first time, the formation of one of the most massive elliptical galaxies in the universe," says co-author Nick Scoville of Caltech, the principal investigator of the Cosmic Evolution Survey, also known as Cosmos. The Cosmos program is an extensive survey of a large patch of distant galaxies across the full

spectrum of light. "The immediate identification of this galaxy with its extraordinary properties would not have been possible without the full range of observations in this survey," says Scoville.

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A Single Boulder May Prove that Antarctica and North America Were Once Connected– July 17/08 Credit National Science Foundation

A lone granite boulder found against all odds high atop a glacier in Antarctica may provide additional key evidence to support a theory that parts of the southernmost continent once were connected to North America hundreds of millions of years ago.

Writing in the July 11 edition of the journal Science, an international team of U.S. and Australian investigators describe their findings, which were made in the Transantarctic Mountains, and their significance to the problem of piecing together what an ancient supercontinent, called Rodinia, looked like. The U.S. investigators were funded by the National Science Foundation (NSF).

Previous lines of scientific evidence led researchers to theorise that about 600-800 million years ago a portion of Rodinia broke away from what is now the southwestern United States and eventually drifted southward to become eastern Antarctica and Australia.

The team's find, they argue, provides physical evidence that confirms the so-called southwestern United States and East Antarctica (SWEAT) hypothesis. "What this paper does is say that we have three main new lines of evidence that basically confirm the SWEAT idea," said John Goodge, an NSF-funded researcher with the Department of Geological Sciences at the University of Minnesota-Duluth.

Added Scott Borg, director of the division of Antarctic sciences in NSF's Office of Polar Programs, "this is first-rate work and a fascinating example of scientists at work putting together the pieces of a much larger puzzle. Not only do the authors pull together a diverse array of data to address a long-standing question about the evolution of the Earth's crust during a critical time for biological evolution, but the research shows how the ideas surrounding the SWEAT hypothesis have developed over time."

As a field researcher during the late 1980's and early 1990's, Borg authored papers on the SWEAT hypothesis. The boulder find came by serendipity while the researchers were picking though rubble carried through the Transantarctic Mountains by ice streams-rivers of ice-that flow at literally a glacial pace from East Antarctica. Goodge and his team were searching for rocks that might provide keys to the composition of the underlying continent crust of Antarctica, which in most places is buried under almost two miles of ice. "We were picking up boulders in the moraines that looked interesting," Goodge said. "It was basically just a hodge-podge of material."

One rock in particular, small enough to heft in one hand, found atop the Nimrod Glacier, was later determined to be a very specific form of granite with, as Goodge describes it, "a particular type of coarse-grained texture." Subsequent chemical and isotopic tests conducted in laboratories in the United States revealed that the boulder had a chemistry "very similar to a unique belt of igneous rocks in North America" that stretches from what is now California eastward through New Mexico to Kansas, Illinois and eventually through New Brunswick and Newfoundland in Canada.

That belt of rocks is known to have been a part of what is called Laurentia, which was a component of the supercontinent of Rodinia. "There is a long, linear belt of these igneous rocks that stretches across Laurentia. But 'bang' it stops, right there at the (western) margin where we knew that something rifted away" from what is now the West Coast of the United States," Goodge said. "It just ends right where that ancient rift margin is," Goodge said. "And these rocks are basically not found

in any other part of the world." That it should turn up on a glacier high up in the mountains of Antarctica is strong evidence in support of the SWEAT model that parts of North America continue into part of the frozen continent at the bottom of the Earth. "There's no other explanation for how it got where we found it," Goodge said. "It was bull-dozed over from that interior region of Antarctica." The find itself is compelling to geologists, Goodge noted, because little other physical evidences exists to allow them directly to put together the jigsaw puzzle of the long-disappeared Rodinia.

But because the supercontinent existed at a key time in the development of multi-cellular life on Earth, it also helps provide a geological context in which this massive biotic change took place. "During the Cambrian explosion about 520 million years ago we started seeing this huge expansion in the diversity of life forms," Goodge said. "This was also a time when the Earth was undergoing tremendous geologic changes." He added that "something helped trigger that big radiation in life." The shifting configuration of the continents, accompanied by collisions between landmasses, erosion and the influx of chemicals into the seas may well have provided the nutrients to that growing diversity of lifeforms.

"There are ideas developing about these connections between the geo-tectonic world on the one hand and biology on the other. The job of geoscientists in this context, he said "is to reconstruct what the world was like at the time."

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Buy and Sell

Here's your chance to clean out the closet and find a home for your slightly used treasures. Post your buy and sell items by emailing the Editor with your details.

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Ask an Expert

Have you been thumbing through the Astronomy or Sky and Telescope magazine and have some questions on the latest and greatest in astronomy gear? Or maybe you're narrowing down your search for just the right telescope and want to know the difference between Dobsonians, Schmidt-Cassegrains, Reflector and Refractors. Well wonder no more, email Brian Robilliard our resident expert to get the "inside scoop" on what's hot or not in astronomy gear.

Are you seeing double or unable to focus? Chances are you need to collimate your scope. Are you looking for a good eyepiece? Why do you need to know the focal length of your telescope's mirror and how do you determine the focal length? For answers to these and other telescope questions email Ed Maxfield our expert on telescope tips, hints and suggestions.

Are you new to astronomy? Want to know the how to find objects in the sky? Or just wondering what that bright object in the evening sky is? Well wonder no more; email Bryon Thompson our Public Outreach Officer and master of Astronomy 101 basics.

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Kids Korner

For the younger astronomers. We want your input on what you would like to see happening at the club. Tell us a bit about yourself and why you love astronomy. Email the Editor with your submissions. For the older folks, if you have any ideas that might spark the interest of a young upcoming astronomer, please send your submissions to the editor.

This month is all about Magnets the information are excerpts provided by Southern *Astronomical Delights, Kids Konnect and Windows to the Universe*.

A magnet is an object made of certain materials which create a magnetic field. Every magnet has at least one north pole and one south pole. By convention, we say that the magnetic field lines leave the North end of a magnet and enter the South end of a magnet. Static magnetic fields are dominated by the Earth's natural field. Small artificial sources of static fields (permanent magnets) are common, ranging from the specialized (audio speakers components, battery-operated motors, microwave ovens) to trivial (refrigerator magnets).

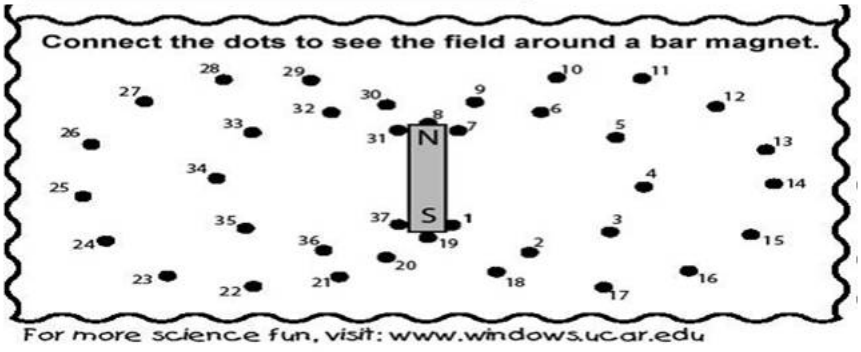
In the inner core of the Earth there is a high content of Iron and other heavy elements that produce the magnetic field of the Earth that surrounds us well into space. This is the magnosphere. Our Earth acts as a giant bar magnet and originates from the electric currents that vigorously flow through the metallic material. At present the axis of magnetism is 13o from the true poles of rotation. The north magnetic pole is situated in Greenland, while the south magnetic pole lies on the Australian side of Antarctica, just off Antarctica's coastline. This field is important for life as it protects the Earth from the large numbers of high velocity charged particles, like electrons and protons - the solar wind. During strong solar activity, the magnetic field captures the solar wind along the field lines entrapped in the concentric rings called the Van Allen Belts. Trapped electrons excite the gas 100 to 1000 kilometres in the upper atmosphere, so that the sky literally begins to glow. In other words; the magnetic field and it's interaction with ionized particles produce what we know as the aurora borealis ("Northern Lights"). Amazing stuff, isn't it?

Here's some more on magnetism, have fun!

Search for these magnetism words!

S	E	T	I	T	E	N	G	A	M
L	C	R	I	R	O	N	T	T	N
O	T	E	N	G	A	M	C	O	N
C	R	D	Z	D	N	H	A	P	S
F	I	E	L	D	T	C	R	S	S
S	H	Y	P	R	V	L	T	N	A
B	P	T	O	O	E	E	T	U	P
P	I	N	U	P	L	Y	A	S	M
F	A	M	E	O	Y	E	W	X	O
L	L	R	S	G	S	L	V	X	C

North
Field
Magnet
Compass
Repel
Iron
South
Sunspot
Pole
Attract



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RASC News

By Ed Maxfield

Royal Astronomical Society of Canada, Victoria Centre http://victoria.rasc.ca

Meetings

Meetings are held on the second Wednesday of each month except July and

August downstairs in the Elliot Bldg at U of Vic.

Astronomy Café
The Astronomy Café Meets on Monday evenings at Sir James Douglas School on Fairfield Road.

Star Party
The RASCALS Star Party is August 29th to 31st. Mark your calendars

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The Sky This Month

By Bryon Thompson

Observing Site: **Duncan, 48.783°N, 123.700°W**

As far as planets go Jupiter continues to steal the show this month. Still situated in the South, Jupiter, at magnitude -2.6 outshines almost everything else except the Moon and Venus. Jupiter is found in Sagittarius not far above the horizon and having reached opposition last month, will slowly begin to move to a lower altitude. Seeing clear views of the big planets features is not usually possible because you are looking through thicker atmosphere at low altitudes. You can however, get some good views of Jupiter's four large moons as they transit the planet and cast shadows on its surface. They may also be seen to disappear as they get occulted as they move behind Jupiter and into its shadow now cast to the east of the planet. On the same night as the Perseid meteor shower you can see Ganymede pass over the face of Jupiter at 8:29 pm PST on August 11. At 11:38 pm PST the shadow of this large moon will then follow its owner and pass into the eastern edge of Jupiter's disc. Ten days later its Callisto's turn to cast its shadow on the big planets face on the night of August 21 at approximately 9:35pm PST. The shadow takes almost three hours to pass out the other side of Jupiter's northern hemisphere. Callisto has a long period to its orbit taking almost 16.7 days to go around once, so this is your only chance to see this particular event this month. The shorter orbital periods of the other large moons makes them better candidates for visible occultations throughout the month. The orbital periods of the other large moons from longest to shortest is: Ganymede; 7.2 days, Europa; 3.6 days and Io; 1.8 days. Get out with your scope and see if you can witness one of these events and remember, it was the obits of these moons that Galileo saw so many years ago that became one of the most shattering discoveries in science and lead to the world view we take for granted today.

The other naked eye planets in Augusts' night sky are sunset chasers. Mercury, Venus and Saturn all set shortly after the sun does. Venus, although short lived is still the brightest object in the sky after sunset shining at magnitude -3.8. These three planets from August 14th to the 16th form a very close trio twenty minutes after sunset only 5 degrees above the horizon. Look for Venus first as the other two are almost lost in the bright evening twilight.

Mars can also be found low in the West but resides higher in the sky than the other three. On the last day of the month Mars joins in the fun and forms another low lying trio with Venus and Mercury.

A good binocular challenge exists this month as well. Neptune reaches opposition on August 15th in Capricornus. Find third magnitude Delta Capricorni on your chart and look 2.5 degrees northwest to see blue grey Neptune.

Uranus presents another good binocular find. Glowing at magnitude 5.7 in Aquarius, Uranus can be located by finding Phi Aquarii, a 4 magnitude star in the constellation's northeast corner. Blue green Uranus lies 5 degrees east northeast of this star.

Of course the big event in early hours of August 12th is the Perseid meteor shower. The moon should set near 1:30 am and provide dark skies for optimal viewing. The brightest Perseids are usually seen just prior to dawn. At that time due to the Earth's rotation the radient will appear highest in the sky. Overhead is then the

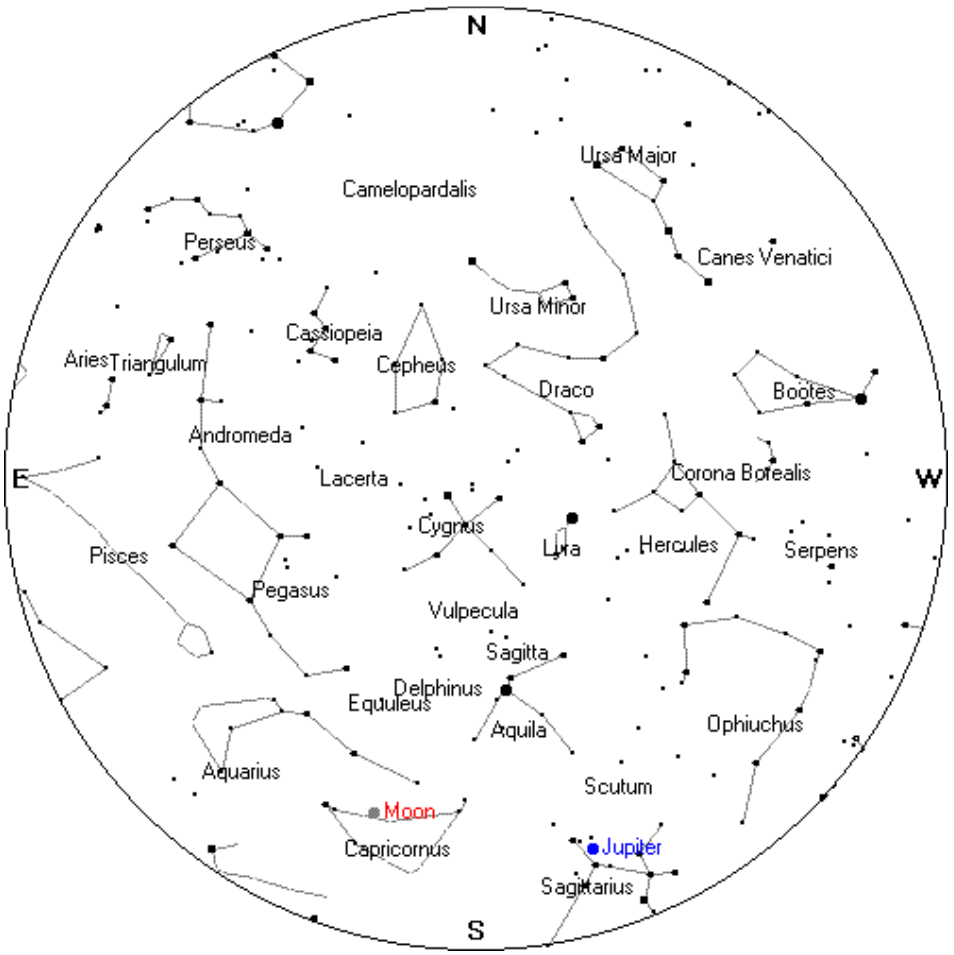
leading edge of the collision between the Earth and the cometary debris left over by comet 109P/Swift Tuttle; the cause of the meteor shower.

It's now that the meteors appear their brightest and the chances of seeing a fireball are the greatest. My favourite way to watch the Perseids is with a pair of binoculars. I know, I know you're supposed to use naked eye viewing to scan the whole sky. I do, but I also keep a pair of binoculars that have been previously focused on the sky in my tight little hands. When I see a meteor streak across the sky, I keep my eyes trained on that area of space and quickly bring the binoculars to my eyes. I am often treated to a wonderful sight! The glowing smoke trail left over by the vapourized piece of debris can sometimes still be seen for a few seconds; the bright ones may persist for up to a minute or so. As you can imagine, you have to be quick but it adds a new dimension to watching "shooting stars" that is an amazing sight indeed.

I hope you all get a chance to get out and enjoy the good weather and clear skies we are usually graced with in August. Drop me a line to vice-president@starfinders.ca and let me know if you see a memorable site like the perseid's glowing smoke trails and I will submit your story to the editor for inclusion in next month's Clear Skies. Have a great summer, share your curiosity with others and remember, astronomy is looking up!

Aug 01	03:13amPST	New Moon
Aug 08	01:20pmPST	First Quarter Moon
Aug 11	11:38pmPST	Ganymede's shadow passes over Jupiter's disc
Aug 12	early am	Perseid meteor shower peaks
Aug 15	sunset	Venus, Mercury, Saturn trio - 5° above horizon
Aug 16	02:16pmPST	Full Moon
Aug 21	09:35pmPST	Callisto's shadow enters Jupiter's disc
Aug 23	04:50pmPST	Last Quarter Moon
Aug 31	sunset	Mars, Venus, Mercury trio

Sky Chart —Here's your mid-August midnight sky chart. In order to use the sky chart properly remember the centre of the chart is the sky directly above your head (or the Zenith). Turn the chart so that the direction you are facing is at the bottom of the chart (or pointed toward your toes). The star field directly in front of you will be between the bottom of the chart and the centre.



Sky Chart Courtesy of Heavens-Above

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