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Greetings!

Welcome to the Cowichan Valley StarFinders Astronomy club's "Clear Skies" monthly newsletter.

For all you planet hunters out there, November was an amazing month. Making the news were two very different and fantastic finds. The first by Hubble which discovered planet, Fomalhaut b. A planet the size of Jupiter located in the constellation Piscis Australis, or the "Southern Fish." The other planetary discovery was right here at home at the National Research Council's Herzberg Institute in Saanich. Christian Marois imaged three bright planets around a single star in the constellation Pegasus. The star dubbed HR 8799, is 50 per cent larger and five times more luminous than our sun and is visible to the naked eye. For more on both these fantastic finds see our "Featured Articles" section.

Can you believe it's December already! Try and take some time in-between your holiday rushing to look up because with the temperatures dropping, once you bundle up, you will find our crispy chilly nights are great for binocular veiwing. To learn more of about our celestial feast see "The Sky This Month"

And speaking of feasts; our December dinner social date has been booked. Mark your Calendars for December 17th at 7:00pm where we will meet at *The Good Company Steakhouse* in Duncan for some holiday cheer and great company.

I know I speak for everyone at the CVSF Board of Directors in wishing you all a wonderful and magical holiday season. If we don't see you at the dinner on December 17th, be safe have a wonderful Christmas and we look forward to seeing you at one of the future socials in 2009.

It is always a pleasure to thank this month's contributors: Moe Raven 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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Meetings

December has tradionally been our "dinner social" and this year is no exception.

Our dinner social is booked for 7:00pm on WEDNESDAY December 17th at "The Good CompanySteakhouse" in Duncan

It is always a great time with the company of good friends and laughter, just the thing to get your holiday season off to a good start. Hope to see you all there.

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Minutes - October

By Freda Eckstein

Last month we had a wonderful presentation from Sheona Urquhart on "Dark

Matter, Dark Energy and Black Holes". Sheona has her Masters degree in Astrophysics and is working on her PhD at the University of Victoria. Her presentation was both very informative and light hearted. Unfortunately (yours truly) did not take notes so I cannot tell you the YouTube videos that were presented. Anyone remember?

Join us for our next meeting on Wednesday, Jan 28/09.

For more information about upcoming meeting dates go to [Starfinders Meetings](#) [back](#)

Upcoming Events

Throughout December

Island Telescope Science Emporium

Are extending their shopping hours throughout December. Select in-stock items are on sale as well as a manufacturers sales from names such as Celestron, Meade, Skywatcher, etc. Come check out the wonderful and diverse gift ideas and stocking stuffers available. There are lots of telescopes and science items arriving weekly.

See their Website <http://www.islandeyepiece.com/> for details.

December 2 and 3rd

Gwynne Dyer international journalist presents "Climate Wars", two public lectures taking place in Nanaimo (Vancouver Island University's Malaspina Theatre) on Tuesday December 2nd and at Qualicum Beach Civic Centre Wednesday, December 3, 2008. Tickets are \$20 Adults, \$15 Seniors. For more info see

<http://www.mala.ca/mainly/page.asp?Story=Top%20Story&ID=1542>

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Web News

Check out Astronomy.com's interactive star chart, StarDome, to see an accurate map of your sky <http://www.astronomy.com/asy/stardome/default.aspx>

If you're a teacher or student in Grades 6 to 8 plan for a "Voyage to Mars" – a fun way to explore the Earth and Space Systems curriculum, with lots of cross curricular ideas and activities. For more details, check out the cross-Canada Marsville program at <http://www.nrc-cnrc.gc.ca/eng/education/marsville/index.html>

Registration deadline is January 15th 2009.

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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".

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

Solar System's Young Twin has Two Asteroid Belts- October 27/08
Credit Harvard-Smithsonian CfA

Astronomers discovered the nearby star Epsilon Eridani has two rocky asteroid belts and an outer icy ring, making it a triple-ring system. The inner asteroid belt is a virtual twin of the asteroid belt in our solar system, while the outer asteroid belt holds 20 times more material. Moreover, the presence of these three rings of material implies that unseen planets confine and shape them.

Articles

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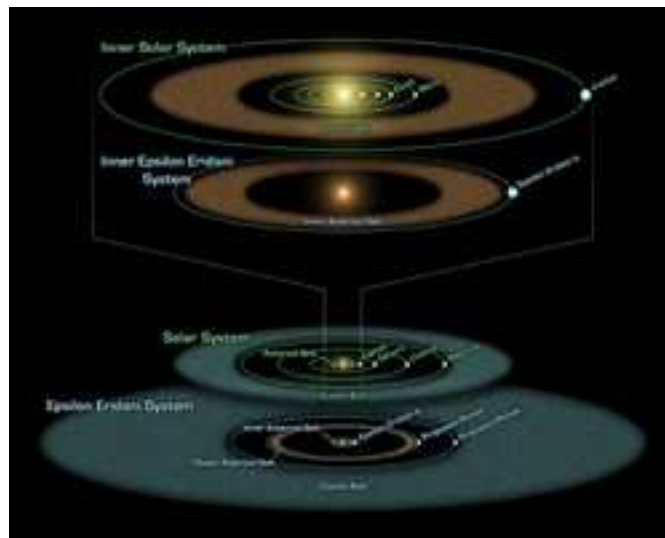
The star Epsilon Eridani is slightly smaller and cooler than the Sun. It is located about 10.5 light-years from Earth in the constellation Eridanus. Epsilon Eridani is the ninth closest star to the Sun and is visible to the unaided eye. It is also younger than the Sun, with an approximate age of 850 million years.

Epsilon Eridani and its planetary system show remarkable similarities to our solar system at a comparable age. "Studying Epsilon Eridani is like having a time machine to look at our solar system when it was young," said Smithsonian astronomer Massimo Marengo. Marengo is a co-author of the discovery paper, which will appear in the January 10 issue of *The Astrophysical Journal*.

Lead author Dana Backman (Search for Extraterrestrial Intelligence Institute) said, "This system probably looks a lot like ours did when life first took root on Earth."

Our solar system has a rocky asteroid belt between Mars and Jupiter. In total, it contains about 1/20 the mass of Earth's Moon. Using NASA's Spitzer Space Telescope, the team of astronomers found an identical asteroid belt orbiting Epsilon Eridani.

This artist's diagram compares the Epsilon Eridani system to our own solar system.



The two systems are structured similarly, and both host asteroids (brown), comets (blue) and planets (white dots). NASA/JPL-Caltech.

They also discovered a second asteroid belt about where Uranus is located in our solar system. The second asteroid belt contains about as much mass as Earth's Moon.

A third, icy ring of material seen previously extends about 35 to 100 astronomical units from Epsilon Eridani. A similar icy reservoir in our solar system is called the Kuiper Belt. However, Epsilon Eridani's outer ring holds about 100 times more material than ours.

When the Sun was 850 million years old, theorists calculate that our Kuiper Belt looked about the same as that of Epsilon Eridani. Since then, much of the Kuiper Belt material was swept away, some hurled out of the solar system and some was sent plunging into the inner planets in an event called the Late Heavy Bombardment. The Moon shows evidence of the Late Heavy Bombardment — giant craters that formed the lunar seas of lava called mare. It is possible that Epsilon Eridani will undergo a similar dramatic clearing in the future. "Epsilon Eridani looks a lot like the young solar system, so it's conceivable that it will evolve similarly," said Marengo.

The Spitzer data show gaps between each of the three rings surrounding Epsilon Eridani. Such gaps are best explained by the presence of planets that gravitationally mold the rings, just as the moons of Saturn constrain its rings.

"Planets are the easiest way to explain what we're seeing," stated Marengo. Specifically, three planets with masses between those of Neptune and Jupiter would fit the observations nicely. Radial velocity studies have detected a candidate planet near the innermost ring already. Those studies suggested that it orbited Epsilon Eridani on a highly elliptical path, characterized by an eccentricity of 0.7. The new finding rules out such an orbit, because the planet would have cleared out the inner asteroid belt long ago through gravitational

disruption.

A second planet must lurk near the second asteroid belt, and a third at about 35 astronomical units near the inner edge of Epsilon Eridani's Kuiper Belt. Future studies may detect these currently unseen worlds, as well as any terrestrial planets that may orbit inside the innermost asteroid belt.

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Scientists Selected for New Eye on the Universe- October 27/08 Credit SOFIA Science Center

On behalf of NASA, the Universities Space Research Association, Columbia, Maryland, selected three astronomers to participate the Stratospheric Observatory For Infrared Astronomy (SOFIA). SOFIA is a highly modified Boeing 747SP aircraft that carries a 98-inch (2.5-meter) diameter airborne infrared telescope.

Naming researchers from the astronomy community is a milestone on SOFIA's journey to become the most versatile airborne telescope in the world. The flying observatory will begin its short science, or "first light" observations, in early summer 2009, and will continue its program of celestial observations for the next 20 years.

"We are extremely pleased at the level of enthusiasm and the number and scope of the applications we received for the SOFIA short science program," said Eric Becklin, SOFIA chief scientific advisor. "The proposals we received set a high standard for future observation projects onboard SOFIA."

David Neufeld of Johns Hopkins University, Baltimore, will study the chemistry of warm interstellar gas using data the German Receiver for Astronomy at Terahertz Frequencies (GREAT) obtains. This instrument is a spectrometer developed specifically for the SOFIA program by a consortium of German research institutes, led by Rolf Guesten at the Max Planck Institute for Radioastronomy in Bonn, Germany. Neufeld will use data from GREAT to probe the chemistry of the warm gas by observing emissions from molecules, such as carbon monoxide (CO). The study will help researchers understand the nature of chemical reactions taking place in the warm gas that is found around forming stars as well as other regions in the interstellar medium.

The other two researchers selected to participate in the "first light" flights, Mark Morris of the University of California at Los Angeles, and Paul Harvey of the University of Colorado, Boulder, will join the team using the Faint Object InfraRed Camera for the SOFIA Telescope (FORCAST), a mid-spectrum infrared camera developed by Terry Herter of Cornell University, Ithaca, New York.

Morris will collaborate with the FORCAST team to study the Milky Way's center, a dynamic region of extreme gas densities and high-energy content. In the central region, which spans a distance of 1,000 light-years, the high concentration of molecular gas results in a high rate of massive star formation. Scientists will use the FORCAST instrument to develop the clearest view of the hot dust in the region. Harvey will work with the FORCAST team to interpret observations of bright star-forming regions to determine SOFIA's current and future imaging capabilities.



SOFIA observes radiation generated by cosmic objects across the widest wavelength range of any observatory, from 0.3 microns to 1.0 millimeters, spanning the visible, infrared, and sub-millimeter portions of the electromagnetic spectrum. Missions typically will last between 10 and 12 hours, and the aircraft flies from 7.5 to 8.5 miles (12 to 14 km) above Earth. Flying at these altitudes puts

SOFIA's infrared telescope above 99.8 percent of the water vapor in Earth's atmosphere. This enables a greater range of observations in the infrared spectrum.

NASA's SOFI, lifted off from Edwards Air Force Base at mid-day Thursday, October 11, on the first in a series of flight tests intended to verify the flight performance of the highly modified Boeing 747SP to its design capability.

Following the first light observations, SOFIA will begin its "basic science" program in late 2009 with approximately 15 flights. Proposals for the basic science flights will be solicited in December 2008.

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Moonshot Plans Could Be On Fast-track - October 30/08 Credit New Zealand Herald

CAPE CANAVERAL - Nasa officials said it might be possible to try out its new moon rocketship a year earlier than its current target date of 2015. That would mean just a four-year gap between the last space shuttle flight and the next-generation spacecraft, instead of five years. Many in Congress, including the two presidential candidates, are troubled by the prospect of the United States having to rely on Russia for trips to the international space station during that time.

Nasa is midway through a study looking at ways to move up its March 2015 test launch of the new Ares rocketship with a crew, in case the next president wants that. The new rocket would ultimately return the United States to the moon, but the initial flights would be to the space station. It will be difficult to accelerate the mission by much more than a year, however, said Jeff Hanley, manager of Nasa's back-to-the-moon program, called Constellation. "We're shooting for a more aggressive date of September 2014," and looking at even faster options, he said. "The real stretch is what can we do to accelerate as much as 18 months. That will be particularly hard." The two-month study, which includes outside experts, should be completed in early December.

Nasa's Ares rocket would have an Apollo-style capsule on top, called Orion, to carry astronauts. A moon flight is targeted for 2020. The Ares concept has been controversial from the start; some engineers, in fact, have been working in their off-hours on alternative rocket designs.

Right: An artists' impression of Nasa's shuttle replacement, the Ares rocket.

If Nasa were to drastically redesign the rocket at this point as some have suggested, it would push everything back three years, said Steve Cook, the Ares project manager at Marshall Space Flight Centre in Huntsville, Alabama. "Everybody's entitled to an opinion," Cook told reporters in a conference call. "But I think you've got to stick to the facts of engineering and project management, and the fact that we're three years into this. You'd basically back yourself up three years and start over again, so just watch the gap grow."



Nasa has been struggling with ways to make the new rocket safer and has come up with possible solutions for controlling its vibrations to prevent injuring the crew, and preventing the rocket from drifting into the launch tower at liftoff. Cook said the latter problem is remote - a southerly wind would have to be blowing 63 km/h or more - and could be controlled through the steering system or with tight wind constraints.

Space shuttle commander Brent Jett, director of flight crew operations, said he's sought dissenting opinions from his fellow astronauts, but no one is willing to scrap the Ares rocket. Nasa hopes to perform a test flight of an unmanned Ares rocket

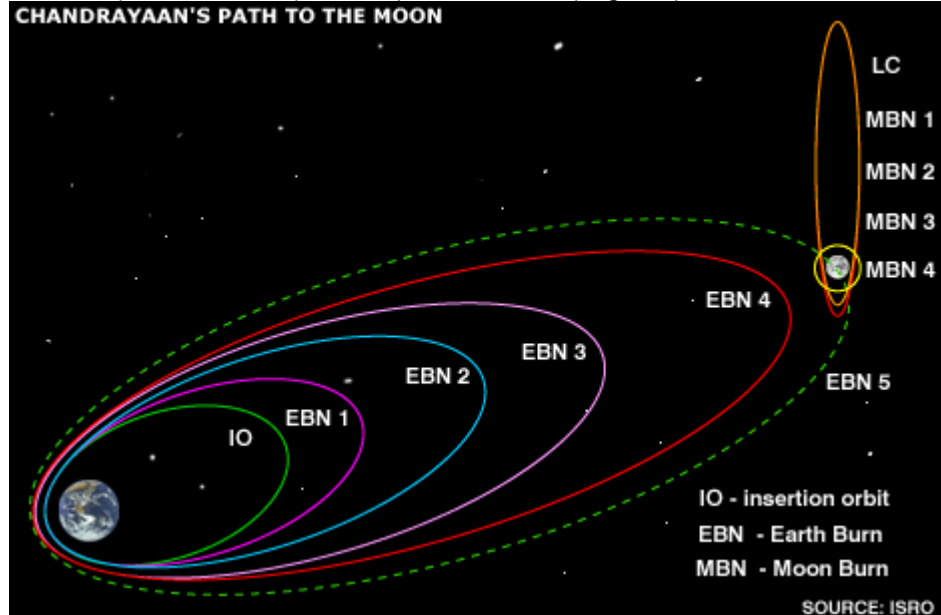
next July. But that could be delayed by the space shuttle repair mission to the Hubble Space Telescope. 6

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Indian Satellite Orbiting Moon – November 08/08 Credit BBC News.

India is celebrating the arrival of its Chandrayaan 1 spacecraft at the Moon.

An 817-second burn from the probe's engine on Saturday slowed Chandrayaan sufficiently for it to be captured by the lunar body's gravity.



The craft is now in an 11-hour polar ellipse that goes out to 7,502km from the Moon and comes as close as 504km.

Further brakings will bring the Indian satellite down to a near-circular, 100km orbit from where it can begin its two-year mapping mission.

Launched on 22 October, Chandrayaan is India's first satellite to break away from the Earth's gravitational field and reach the lunar body.

The mission will compile a 3D atlas of the lunar surface and map the distribution of elements and minerals. Powered by a single solar panel generating about 700 Watts, the Indian Space Research Organisation (ISRO) probe carries five Indian-built instruments and six constructed in other countries, including the US, Britain and Germany.

The Indian experiments include a 30kg probe that will be released from the mothership to slam into the lunar surface. The Moon Impact Probe (MIP) will record video footage on the way down and measure the composition of the Moon's tenuous atmosphere. It will also drop the Indian flag on the surface of the Moon.

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Hubble Directly Observes a Planet Orbiting Another Star –

November 13/08 Credit Science@NASA.

NASA's Hubble Space Telescope has taken the first visible-light snapshot of a planet circling another star. Estimated to be no more than three times Jupiter's mass, the planet, called Fomalhaut b, orbits the bright southern star Fomalhaut, located 25 light-years away in the constellation Piscis Australis, or the "Southern Fish."

Fomalhaut has been a candidate for planet hunting ever since an excess of dust (a telltale sign of planet formation) was discovered around the star in the early 1980s by NASA's Infrared Astronomy Satellite, IRAS. In 2004, the coronagraph in the

High Resolution Camera on Hubble's Advanced Camera for Surveys produced the first-ever resolved visible-light image of the region around Fomalhaut. (Note: A coronagraph is a device that can block the bright light of a central star to reveal faint objects around it.) It clearly showed a ring of protoplanetary debris approximately 21.5 billion miles across and having a sharp inner edge.

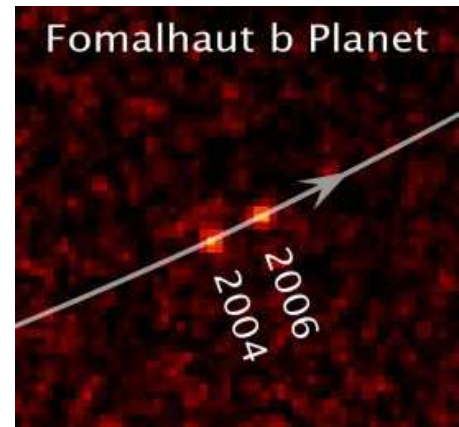
This large debris disk is similar to the Kuiper Belt, which encircles the solar system and contains a range of icy bodies from dust grains to objects the size of dwarf planets, such as Pluto.

Hubble astronomer Paul Kalas, of the University of California at Berkeley, and team members proposed in 2005 that the ring was being gravitationally modified or "shepherded" by a planet lying between the star and the ring's inner edge.

Now, Hubble has actually photographed a point source of light lying 1.8 billion miles inside the ring's inner edge. The results are being reported in the November 14 issue of Science magazine. "Our Hubble observations were incredibly demanding. Fomalhaut b is 1 billion times fainter than the star. We began this program in 2001, and our persistence finally paid off," Kalas says.

Observations taken 21 months apart by Hubble's Advanced Camera for Surveys' coronagraph show that the object is moving along a path around the star, and is therefore gravitationally bound to it. The planet is 10.7 billion miles from the star, or about 10 times the distance of the planet Saturn from our sun. The planet is brighter than expected for an object of three Jupiter masses. One possibility is that it has a Saturn-like ring of ice and dust reflecting starlight. The ring might eventually coalesce to form moons. The ring's estimated size is comparable to the region around Jupiter and its four largest orbiting satellites.

Right: This visible-light image from the Hubble shows the newly discovered planet, Fomalhaut b, orbiting its parent star.



Kalas and his team first used Hubble to photograph Fomalhaut in 2004, and made the unexpected discovery of its debris disk. At the time they noted a few bright sources in the image as planet candidates. A follow-up image in 2006 showed that one of the objects had changed position since the 2004 exposure. The amount of displacement between the two exposures corresponds to an 872-year-long orbit as calculated from Kepler's laws of planetary motion.

Future observations will attempt to see the planet in infrared light and will look for evidence of water vapor clouds in the atmosphere. This would yield clues to the evolution of a comparatively newborn 100-million-year-old planet. Astrometric measurements of the planet's orbit will provide enough precision to yield an accurate mass.

NASA's James Webb Space Telescope, scheduled to launch in 2013 will be able to make coronagraphic observations of Fomalhaut in the near- and mid-infrared. Webb will be able to hunt for other planets in the system and probe the region interior to the dust ring for structures such as an inner asteroid belt.

For more information about this story and the Hubble Space Telescope, visit: <http://www.nasa.gov/hubble>

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Stellar Discovery Has Genesis Here – November 14/08 Credit Times Colonist.

Island scientist's team takes first-ever images of planets outside solar system

A Saanich researcher leading a team of Canadian, U.S. and British astronomers has captured the first-ever images of planets circling a star outside our solar system.

Christian Marois, a 34-year-old research associate at the National Research Council's Herzberg Institute on Little Saanich Mountain, called the find "a gift from nature." He spotted the planets using observation techniques he came up with himself and wrote about in a doctoral thesis -- and for which, in 2005, he won the prestigious Plaskett Medal. Now this even larger accomplishment, images of three bright planets around a single star in the constellation Pegasus, has been revealed in this week's edition of the journal Science.

The images are like a window to the past, he said yesterday, "showing us what our solar system was looking like 60 million years ago." The star, dubbed HR 8799, is 50 per cent larger and five times more luminous than our sun and is visible to the naked eye. The planets appear to all be on the same plane, orbiting the star in a counter-clockwise direction.

"It's amazing -- I've been looking for a system like this for the past eight years," Marois said. "I would have been happy with one planet. Three was a surprise." These kinds of finds will be more common in the coming years, he said, as instrumentation probing the dark universe becomes more sensitive.

Working independently, the Hubble Space Telescope captured two images of another planet, a discovery that also appears in this week's Science. A team from the University of California at Berkeley found a dim spot in a cloud of hot dust and debris orbiting a star 25 light-years from us called Fomalhaut. It is a planet the size of Jupiter orbiting its star at very great distance -- 17 billion kilometres.

"It was completely different discoveries," Marois said. "They were made roughly at the same time." Marois said "roughly" because finding a planet is never a sudden discovery. A dim spot appears in a photo, people wonder what it could be, take more pictures, eventually decide it probably isn't a star and wait for months "to make sure the object is moving with its star. If they move together, that means it's a gravitationally-bound object."

The Hubble, Keck and Gemini telescopes that produced these photos are not new, but Marois said a change in the searching method, rather than new technology, led to the breakthrough. Recently, there's been a trend to looking at bigger stars, hoping they will have more, and bigger, planets. A very large planet isn't easier to see just because of its size but because it's probably young, hot and probably glowing.

As well, the planet around a very big star may orbit at a great distance from it. And being farther away makes it easier to see; planets close to a star are lost in the glare.

"We are actually seeing photons, light, from the planet itself. The fact that the system is young, they [planets] are still glowing from a lot of the energy they had accumulated," he said. His own work developing new observation techniques allows researchers to see objects 10 to 100 times deeper in contrast, an important matter when you're looking for planets orbiting brilliant stars.

Marois has been at Herzberg Institute for 11 months on a two- to five-year contract. "I think it's an amazing institute doing great work," he said. "It's a very dynamic place to be. I really enjoy the people here."

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Massive fireball lights up Prairie skies– November 20/08 Credit
Edmonton Journal

It wasn't a bird, and it sure as heck wasn't a plane, but whatever was in the sky over western Canada on Thursday night was very exciting for the people who saw it.

In Edmonton and across the Prairies, hundreds of people reported seeing a bright 9 flaming object light up the sky around 5:30 p.m. local time. It was variously described as green, yellow, purple or blue, and appeared as either an explosion or an object streaking through the sky. Sightings came from across the Prairies; from as far south as Medicine Hat, Alta., to as far north as Beauval, Sask. - 600 kilometres from Edmonton.



A mysterious bright light lit up the evening sky over Edmonton just before 5:30 p.m. There are reports that the phenomenon was seen as far north as Fort McMurray and as far east as Saskatchewan.

Marcel Gobeil, who lives on a farm south of Edmonton, was in his living room when he heard what he describes as a "loud boom," followed by bright colourful light in the sky. "At first I thought it was fireworks," said Gobeil. "I've never seen anything like it; it was green and blue and then turned to bright red." Gobeil said he thought the object hit the ground about 10 seconds later. "It seemed like it fell on Beaumont, but it's more likely it landed in Manitoba or Saskatchewan if it was a meteorite," he said.

Hundreds of kilometres to the east, farmer Bruce Trapp also saw the light show. "It lit up the yard almost like midday, but just for an instant," said Trapp, who farms about 70 kilometres southwest of Saskatoon. "It was far brighter than any lightning strike I've ever seen."

Shawn Mitchler was pumping gas at Radisson, Sask., about 60 kilometres northwest of Saskatoon, when the sky flashed green and yellow. "It seemed like fireworks or a missile coming down," said Mitchler, who estimates the light show lasted five to 10 seconds. "My heart just started racing because I didn't know what it was."

Edmonton International Airport spokesman Jim Rudolph said "the skies east of the airport lit up" at 5:27 p.m. "According to NavCanada, it appears that this was the result of a meteorite, but that has not been confirmed," said Rudolph, adding that operations at the airport were not affected. "What we probably saw was a fireball, which is the result of a rock coming into the atmosphere," said Chris Herd, an associate professor in the University of Alberta's department of earth and atmospheric sciences and curator of the university's meteorite collection. "The big question now is whether or not anything hit the ground."

Richard Huziak, a member of the Royal Astronomical Society who lives in Saskatoon, believes it was likely a meteor that did land somewhere near the Alberta-Saskatchewan border. It may be possible to determine a more precise location, since fireball video cameras designed to begin recording when a bright light appears in the sky are located in Saskatoon, Regina, Moose Jaw, Edmonton and Calgary. "It's very likely this one has been caught. It will show the track through the sky and might show the orbit back into space," Huziak said. But while many of the witnesses claimed to see something land, Herd said this was most likely an optical illusion. Since the fireball was a bright light several kilometres up in a dark sky, it would have appeared close to anyone who could see it. If something did fall to the Earth, it's extremely unlikely anyone would have witnessed it, Herd said. As the object fell through the Earth's atmosphere, it would slow down and the resulting decrease in friction would cause it to stop burning. "What we know about fireballs is that they're bright burning up for a certain amount of time in the atmosphere, but then they stop burning brightly. If there's a rock that continues

after that, it's falling in dark flight," he said. "This could literally be a couple of kilometres up in the air and it could fall the whole rest of the way without giving off any light. It could drop like a rock to the ground." Herd said while fireballs are quite frequent, they don't generally happen over populated areas. "Something as bright as this is pretty rare," he said. If something did ultimately hit the ground, Herd said, it would be a very exciting find. "It's not often that something actually lands and is found, because of all the factors that are working against you," he said, adding he hopes anyone who finds a new rock in their yard tomorrow will get in touch with him.

Meteorites often fall to Earth, but very few cause damage because the rocks often disintegrate as they travel through the atmosphere. For those who witnessed the fireball, Herd suggested they report it to the Meteorites and Impacts Advisory Committee to the Canadian Space Agency, which can be found at Miac.uqac.ca.

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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 how to find objects in the sky? Or just wondering what that bright object in the evening sky is? Well wonder no more; email [Byron 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.

Word Search

This month we have an Atmosphere and Cloud Word Search courtesy of Windows to the Universe.

<p>J S A W E A T H E R I L X S G N G X L O U B Q D A D U A I I C U Z P L Z G Y F T A A T M O S P H E R E S A A R T N Y M Z G G K R X R M I D F H A I O K Q A O T G X M P N C F X I D N G S E N O Z O E L I V R V I J M D H N I T R O G E N Y W M I R I E Y H K U P H A U L Z H I D Z Q Y Q D X Z M J E X O S P H E R E S Z O T N E C U L I T C O N Z</p>	<p>Word Search</p> <p>RAIN ATMOSPHERE NITROGEN STRATUS CLOUDS WEATHER LAYER EXOSPHERE OZONE NOCTILUCENT AIM</p>
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RASC News

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.

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The Sky This Month

By Bryon Thompson

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

The conjunction between Jupiter and Venus that peaked at the end of November continues December 1st. After all that is only one day after November's grand show. The two planets are not as close this month as they were the night before, but it's still a great way to start December. It's a good opportunity to compare the two brightest planets, Venus at magnitude -4.2 and giant Jupiter at magnitude -2.0. They are joined on the 1st by the crescent moon only five moon widths from Venus.

You will however need a clear view of the south western horizon as they are low in the evening sky. As the month progresses you'll see Venus climb higher in the sky as it moves toward its greatest elongation early in 2009. Jupiter will continue to dive to the horizon chasing the sunset as it moves toward solar conjunction. If you do get a clear look at the pair try to keep in mind the incredible distance between them and from us. Venus is closing its distance to us from 94 million miles to 74 million miles as it speeds ahead in its shorter orbit around the sun and presents an apparent disc changing from 17" to 21" across. Jupiter's much larger apparent disc is 34" across and yet this behemoth is 466 million miles further away than Venus. Breathtaking isn't it!

Our December skies provide some good binocular opportunities as well. On

December 26th look for Venus and place it in the lower center of your bino's field 12 of view. Look for three stars in a row near the northern point of the field. A faint magnitude 8 blue-green companion to the west of these three is the planet Neptune; the furthest "true" planet in our solar system. Another treat can be found earlier in the month before this 'boxing day special' just East of Venus. In the constellation Aquarius the blue-grey giant Uranus can be seen sitting very close to the star 96 Aquarii. Uranus is a little brighter than Neptune and with a clear sky the pale blue color is easy to see. Uranus is found very close to 96 Aquarii. The apparent distance between the two is about the same as Mizar is from Alcor; the two stars second from the end of the handle in the big Dipper. Try comparing the two to see if you agree.

For an early morning treat have a look at Saturn in the pre-dawn hours of December 23rd. The gas giant is much dimmer now because the rings are almost edge on. Look for a bright "star" just 1½ planet widths west of Saturn to see its big moon Titan. With the ring system approaching edge on early next year more of Saturn's disc can be seen. You may notice that the disc is wider than it is tall. Saturn spins at an incredible speed for its size, completing one axial rotation every 10 hours and the bulge in its middle is the result. You may be able to see one of Saturn's cloud top storms. They appear as a brighter spot in the dusky yellow hue of the disc and because of Saturn's fast rotation their movement across the face of the planet is obvious.

There are two meteor showers this month, one is almost washed out by the one day old full moon and the other has only a few meteors per hour but both are worth trying for if the clouds stay away. The Geminids normally are a great bunch of performers but this year they are all but washed out on the 13th by the full moon that occurs on the 12th. The Ursid Meteor shower however may produce more than its regular 5 meteors per hour. These can be seen from the 17th to the 26th but they peak on the 22nd. The radiant is in Ursa Minor and is high in the sky. The comet responsible for depositing the debris that creates this shower, 8P/Tuttle, visited just last January so there is potential for an increase in activity of up to 30 meteors per hour. With dark skies, it may turn out to be quite a good show.

If you get a few nights of clear sky, you may want to go asteroid hunting. The seventh magnitude asteroid Vesta reaches the end of its retrograde loop in Pisces this month. With your binoculars watch for a bright spot moving past the fourth magnitude binary star system Alpha Piscium. To separate the 4.2 and 5.2 magnitude stars that make up this binary system, you'll need a magnification of 120 times or more in a telescope. Vesta however, should be a good binocular or even naked eye object depending how dark your sky is. Given the recent fireball spotted over Alberta, Saskatchewan and Manitoba I thought it might be interesting to know a little more about Vesta. The following can be found in its entirety in 'Solarviews.com':

Vesta has a diameter of 525 kilometers (326 miles) Ground-based spectroscopy of Vesta indicates regions that are basaltic, which means lava flows once occurred on its surface. This is surprising evidence that the asteroid once had a molten interior, like Earth does. This contradicts conventional ideas that asteroids are essentially cold, rocky fragments left behind from the early days of planetary formation. In October 1960, two fence workers in Millbillillie, Western Australia, observed a fireball heading toward the ground, and pieces of the fallen meteorite were found ten years later. The fragments stood out from the area's reddish sandy soil because they had a shiny black fusion crust, produced by their fiery entry through Earth's atmosphere.

Unlike most other meteorites, this sample can be traced to its parent body, the asteroid Vesta. The meteorite's chemical identity points to Vesta because it has the same unique pyroxene spectral signature. Pyroxene is common in lava flows, meaning that the meteorite was created in an ancient lava flow on Vesta's surface. The structure of the meteorite's mineral grains also indicates it was molten and then cooled. The isotopes (oxygen atoms with varying number of neutrons) in the specimen are unlike the isotopes found for all other rocks of the Earth, Moon and most other meteorites.

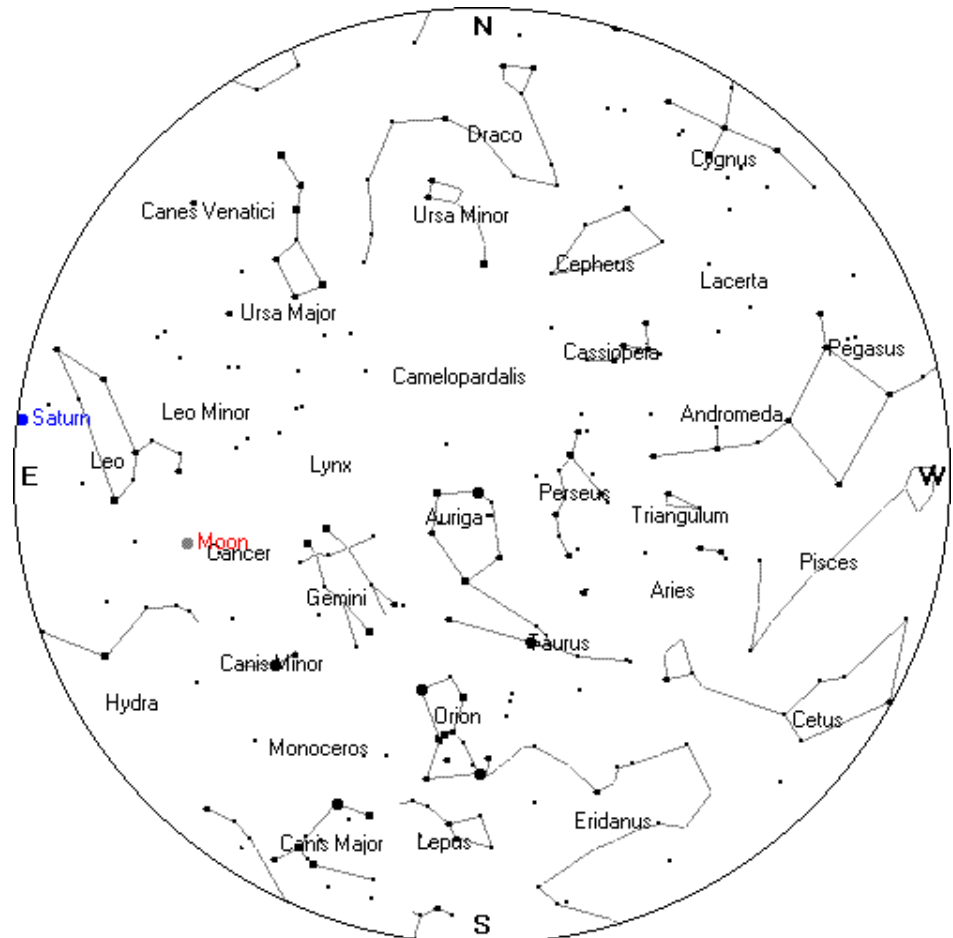
The meteorite also has the same pyroxene signature as other small asteroids,

recently discovered near Vesta, that are considered chips blasted off Vesta's surface. This debris extends all the way to an escape hatch region in the asteroid belt called the Kirkwood gap. This region is swept free of asteroids because Jupiter's gravitational pull removes material from the main belt and hurls it onto a new orbit that crosses Earth's path around the Sun.

Who knows, maybe the fireball we all missed seeing might have originated from an object we can gaze at this month! December promises cold chilly nights but usually crisp dark skies. If you can brave the cold you will definitely be treated to some memorable views, remember Astronomy is looking up.

December 1	sunset	Crescent Moon joins Venus Jupiter conjunction
December 5	07:25pmPST	First Quarter Moon
December 12	02:35pmPST	Full Moon
December 13	early AM	Geminid Meteor shower peaks
December 19	10:04amPST	Winter Solstice
December 19	08:30pmPST	Last quarter Moon
December 22	early AM	Ursid Meteor shower peaks
December 26	11:59amPST	Venus passes 1.5° south of Neptune
December 27	10:22am	New Moon

Sky Chart—Here's your mid-December 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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