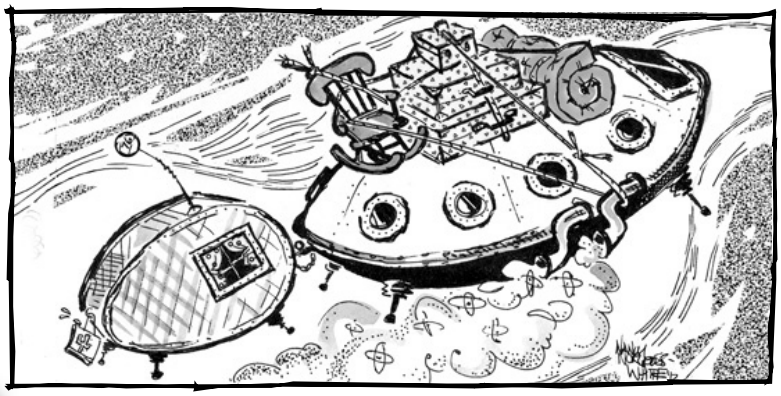
Star Gazer News



Astronomy News for Bluewater Stargazers
Vol 7 No. 3 March 2013

Travel to the Stars: The Jan 16 edition of *eSkeptic* has two articles on travel to the stars which the editor, Michael Shermer has kindly given permission to reprint -the first is in this issue of SGN. A nice addition to the piece is Nancy White's cartoon above -a humorous depiction of star travel. See pg 4 in this issue (with rebuttal coming in the April SGN). I especially love the exhaust from "atomic "drive above and doesn't that trailer looks familiar. eSkeptic is a weekly online newsletter that can be accessed at http://www.skeptic.com/eskeptic Subscribe there as well, if you want the skeptic's point of view on UFO's, Sasquatch, parapsychology, and pseudoscience in general.

March 2013 Contents

Comet #1 for 2013 (March)

This month we hope to see a good appearance (comet willing) of the first of 3 comets for 2013. **Comet PanSTARRS** (C2011/L4) was discovered June 6, 2011 by the Panoramic Survey Telescope and Rapid Response System atop Haleakala volcano in Hawaii. On Feb 7, it was magnitude 6 and spotted without optical aid. Predictions for maximum brightness vary from magnitude 2 to a whopping magnitude -4! Since this is a first time passage for the comet, it is even more unpredictable as it is not possible to say if the surface will hold up under the heat from the sun at its closest approach (0.3 au) or if it is in a fragile state that will disintegrate as did Comet Elenin recently. We should know in a few weeks. The comet is brightest near the sun so twilight observations are the rule. Note that there is a nice crescent moon about 4° away on Mar 12. On Mar 13, the moon will be "in" the tail.

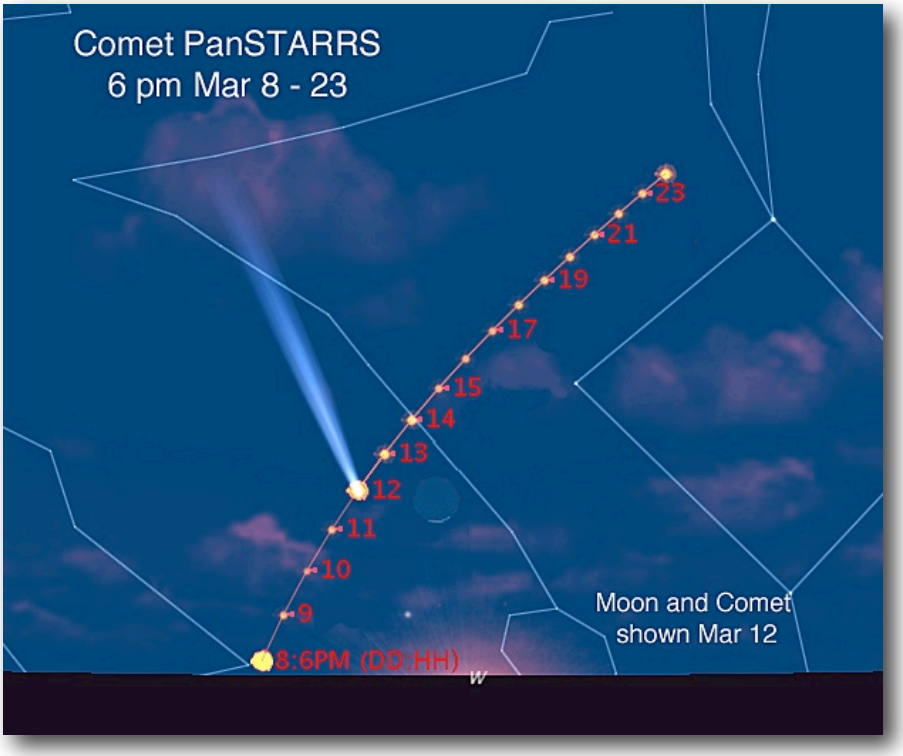


Chart above from Starry Night shows Comet 2011/L4 at 6 pm on designated March evenings from Mar 8 to Mar 24, the period of best visibility. Perihelion, when the comet is closest to the sun but not easily observed is Mar 10. It should become visible a few days later above the sun in the West. A 1.17 day-old moon is about 4° away a Mar 12, but it is a tough observation. Try the next night when the 2 day-old moon is above the comet at a distance of about 9°.

Mercury and Mars: This image taken on Feb 9 (one of the few clear nights in Feb) shows the day after the closest approach of Mars to Mercury in the western sky just after sunset. The minimum separation was on the evening of Feb 8 (a cloudy night) when the two planets were a mere 21 min of arc (0.3°) apart. This is one of my first images with a Canon 60Da camera. Focal length 85 mm, f/5.6, ISO 2000, 1/6th s exposure. Time of the image was 6:36 pm, only 24 minutes before the pair set below the horizon. At this point Mars (lower and fainter) was about 3° above the horizon, Mercury (upper bright star) was about 4°.

BAS Executive 2011-2012

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BAS Events for Mar 2013

Mar 2 **Port Elgin Rotary** Tour ES Fox 10:30 pm Guide: John H

Mar 6 **BAS meeting** Grey Roots Museum 7 pm
Annual General Meeting

Mar 9 **Messier Marathon** ES Fox @dark, a dusk 'til dawn event

Mar 16 **Messier Marathon** ES Fox (backup night)

Note: Jupiter, Cres Moon in Hyades look west at after sunset

Mar 16 on-> Comet PanSTARRS naked eye? look West after sunset.

Mar 23 **Earth Hour** (an informal event) ES Fox after dark (Moon LQ+3)

Nominations Report: from the V-P

As you read this, the nominating committee of BAS is working to find replacements for the two executive positions (President and Secretary) and one committee chair position (Public Outreach) that have become vacant.

We have received a nominee for President (Aaron Top) and Secretary (Lorraine Rodgers) and we are still looking for someone to fill the Public Outreach chair. The latter is simply an appointment and not an elected position and can be filled (or not) at the discretion of the executive.

Note that more than one nominee can stand for the two executive positions and if there is more than one for either position, an election is held at the meeting in March. Otherwise the position is declared filled by acclamation.

All current BAS members can be nominated for any executive position. All you need to do if you are interested is to call one of the executive members and we will put you on the ticket.

I mentioned last month that our jobs on exec are not overly burdensome and can be interesting. I re-iterate that and encourage you to consider joining the team.

We are planning to get back to doing a lot more observing now that the observatory is finished and we have a couple of comets to view in the sky this year.

Planning-wise, the list of events including topics/speakers at meetings is pretty much set for 2013. Our budget is in very good shape with enough money there to buy a few goodies for the club like a good GOTO mount and an autoguider for the 10-inch SCT at the Fox.

So, if you are interested in joining the executive team of BAS, please give an exec member like Brett or me a call.

What a scope is Webster!

As a former science and math teacher, I became fairly comfortable with equations and formulas. Who hasn't heard of the famous $E= mc^2$ that is the basis of the energy production in all stars (and atomic bombs here on Earth). I enjoy finding interesting applications of formulas in the everyday world. Case in point, driving a Prius around Owen Sound's hills always brings to mind the transfer of potential energy at the top of a hill into kinetic energy at the bottom. In the Prius, that KE is being converted to electrical energy that is stored in the battery as the braking energy is shunted into the battery charger! (No wonder my gas mileage is under 5.0 L/100 km, 60 mi/gal old style).

In astronomy, there are a few simple formulas that give some interesting values for the performance of a telescope. Many are based on practicalities since the atmosphere provides limits to the values derived. A simple example is the formula for the smallest observable separation between double stars. This is usually expressed in seconds of arc and calculated by the formula called Dawes limit where $\alpha = 116/D$. D is the diameter of your mirror in mm and α is the minimum separation. So a typical 8-inch (203 mm) mirror would be able to split two stars about 0.57 seconds of arc apart. Compare this to the Double-Double pairs which are 2.8" and 2.2" apart. No sweat.

So here for your reference are two formulas used to determine the **faintest star that can be seen** and the **closest separation at which a double star could be split**. (More can be found on pg 49 of this year's RASC Observer's Handbook, among other places):

limiting magnitude: **$m = 2.7 + 5 \log D$**
smallest resolvable angle: **$\alpha = 116/D$**

Out of curiosity, I calculated the values for the Webster 28-inch (711.2 mm).

I got **m** = 17.0 and **α** = 0.16". Compare this to a "typical" 8-inch scope with **m** = 12.7 and **α** = 0.57". The thing is, however, that in trying to split stars or just see faint ones, the atmosphere must be taken into consideration. Air puts a limit for splitting stars of about 0.5". The Webster and an 8-inch are about equal in that regard, then!

It is not quite so bad in the limiting magnitude calculation however. Where an 8-inch would be able to see about 41 000 stars per sq. deg. (1997 Dr. Sten Odenwald) a limiting magnitude of 17 would give about 180 million stars per sq. deg. of sky! Now that's a good reason to go for bigger aperture! Once again, the atmosphere limits the numbers and this is an average over a typical chunk of sky, so don't go counting stars to check and then write a nasty letter to the editor. It is just a guideline. Still, what a scope, that Webster!

Fox Observing Jan 15, 2013

This winter so far has been typically cloudy. Many past winters have had a few clear and cold nights when observing was possible (for short stretches!). However, there was one clear night in January this year when an observing session was held at the Fox -the first of the new year. The fact that there was no snow buildup on either the roof or the ground encouraged a few BAS members to make the effort to go out and observe. It was a fruitful night. Even the Webster was roused from its winter slumber and we had a look at Jupiter-in a word, spectacular! And finally, M42 was high and clear. We had viewed Orion late last year when it was still pretty low and now that it was "front and centre", it was possible to see hints of colour other than green in some parts of the nebula. We also spent some time searching for the Horsehead Nebula but the atmosphere was just not quite transparent enough to allow us to pick it out. The Flame Nebula was no problem, but the Horsehead would not show. (See Doug C. image from Sep 2012 below). We also observed some clusters, the most interesting being M46 in Puppis (see SGN pg 10 Feb/2013). It is a nice rich open cluster and in front of it is a tiny planetary nebula, NGC 2348 -a faint mini-Ring Nebula!

Also intriguing was our "discovery" of σ-Orionis a quintuple star system which has four easy to see components plus a fifth one that we did not know about at the time. No. 5 is a partner to the brightest star of the group but only 0.25" away. (compare to the "Double-Double" whose individual components are about 10 times farther apart (2.8" and 2.2").

Aaron Top was busy in the dark taking pictures during the night. Image left is a 2 minute exposure through a 10 mm Sigma lens (the "almost" fisheye). The brightest object is Jupiter flanked by the Hyades and Pleiades; Orion is easy to pick out. Sirius is in the haze slightly left of lower centre. Also easy to identify is Capella in Auriga. The two most prominent clusters in top right are the Double Cluster (smaller) and the larger Alpha Persei Cluster containing Mirfak. Camera used was a Canon 50D on a guiding equatorial mount. Nice shot, Aaron.

Image left was taken by Doug Cunningham last September and shows the region around the Horsehead and Flame Nebulas in all its glory. The winter is when Orion is highest and M42 and its surroundings are prime territory for exploring. The fainter nebulas should be no problem for the Webster. We will try again.

The star σ-Orionis is the bright star upper left. Two other images taken by Doug with the Canon 60Da (M45 and M42) were featured in the Oct 2012 SGN. Doug continues with more astrophotography featured in this month's Quetican Field of View column on pg 7.

Canon 60Da image, ISO 4000, three exp. total 343 s through an FSQ, 530 mm focal length refractor, processed in Maxim DL and iPhoto.

The Physics of UFOs BY MICHAEL K. GAINER

How realistic is it for spacecraft to travel interstellar distances to Earth?

UFO reports have been evaluated in terms of the supposed reliability of eyewitness accounts and questionable photographic evidence. The constraints that interstellar distances, time and the conservation of energy impose on interstellar space travel for these supposed alien craft seem never to be considered by UFO proponents. Since they do provide descriptions of spacecraft of circular disks, cylinders and triangles that move strangely and rapidly and vary in size from 50 feet in diameter to 300 feet long, I undertake here to apply these constraints to the design of a hypothetical spacecraft in order to determine the feasibility of such craft and their use for interstellar travel. As a physicist and astronomer I think it important to consider not just the accounts of alien contact, but the physics of such a possibility as well.

The basic principles of physics are applicable independently of where in the galaxy a stellar system is located and will not change over time. Newton's three laws of motion and the conservation of energy are descriptions of the manner in which different parts of a physical system interact. Consequently, a model based on an exploratory expedition leaving Earth would apply equally to all planetary systems in our galaxy. Any culture, no matter how advanced in technology, would face the same constraints imposed by physics.

For my model I have chosen a spacecraft with a crew of six that will leave its planet for a planet in the habitable zone of a star 10 light years away. It will be accelerated at a rate of 10 m/s^2 to a velocity of 0.5 times the velocity of light (0.5c). The time for it to reach this velocity is given by this equation: $t = v/a = 1.5\times10^8/10 = 3.06\times10^7$ s = 174 days.

This is remarkably short compared to the nonrelativistic time of 20 years for the trip to the destination star. I have chosen 0.5c to minimize the relativistic mass increase of the spacecraft and to minimize travel time. The acceleration rate is approximately equal to the gravity the crew would experience on an earth-like home planet.

The spacecraft would be constructed in orbit from components delivered by shuttles. It would include, in addition to engines and fuel, an internal power supply for all the operational systems as well as life support systems and sustenance for the crew. For a 20-year trip this would necessarily be a small nuclear reactor. A mechanism for rotating the crew's quarters to provide artificial gravity would be essential. I have chosen a live crew rather than robots or androids because all of the alien encounter and abduction stories indicate [live crew]. A shuttle for transporting the crew to the surface of the destination planet would also have to be on board. Our current space shuttles have an unloaded mass of 10^5 kg. Consequently, considering all of the requirements, a mass of 10^7 kg is not unreasonable for our model. The kinetic energy [$\frac{1}{2}mv^2$] of the spacecraft, defined as the energy any object has by virtue of its motion, at 0.5c is 1.13×10^{23} joules.

The only source that can supply energy of this magnitude is thermonuclear fusion. The work energy (blast energy) of a one-megaton nuclear bomb is 4.2×10^{15} joules. This is the energy that would be available for thrust if it were to power the spacecraft. It is 100 times the energy released by the Hiroshima atomic bomb. Hereafter I shall refer to it as a megaton of energy. The energy required to accelerate the spacecraft to 0.5c is then $E = 1.13\times10^{23}/4.2\times10^{15} = 2.7\times10^7$ megatons.

This energy would be expended over the 174 days of acceleration and is equal to 1.8 megatons per second during acceleration. The process is different from the use of controlled nuclear fusion for power generation. In that process, millisecond thermal pulses of energy are immediately conducted away to produce steam for generators. For propulsion of the hypothetical spacecraft the blast energy would have to be converted, with near 100% efficiency, to a constrained unidirectional particle beam with thrust pulses of 1.8 megatons per second for 174 days. For a round trip to a star 10 light years distant this rate of energy expenditure would be needed for slowing down at the destination, leaving, and slowing down again when returning to the home planet after a 40 year expedition.

A lesser source than thermonuclear fusion would be inadequate to provide the required energy for traveling at 0.5c. A lower velocity would mean travel times of hundreds to thousands of years. A lower acceleration rate would greatly increase the time to reach the desired velocity. For example, an acceleration of 0.5 m/s^2 would require 1.9 years to reach 0.1c. The required energy would be a one megaton pulse per minute. The travel time would be 200 years for a round trip to a stellar system 10 light years away.

There is no possible material construction that can constrain and direct the thermal and blast energy of the nuclear fusion rate required for interstellar travel. Consequently, I conclude that alien spacecraft cannot exist.

How then do we account for alien sightings? One personal example extrapolated to many others is illuminating. One evening as dusk was fading [...] I saw in the sky with my naked eye, about 30° above the horizon toward Pittsburgh in the west, a very bright star resembling the planet Venus. But Venus was not visible at that time. Through the telescope what I saw was a weather balloon with an instrument package dangling from it. As I watched it rise into the stratosphere it suddenly burst and presented a beautiful sight of hundreds of shards spreading spherically. If I had not been looking through a telescope I would have seen a bright stationary object in the sky that suddenly faded from view. It would have been what some UFO reports have described as a bright light that suddenly disappeared as if it were a spacecraft accelerating at an amazing speed. On another occasion I saw, from my house in the foothills of the Allegheny mountains, strange lights moving in irregular paths above the ridge a few miles away. These turned out to be lights on large cranes involved in a strip mining operation.

When UFOs are reported they should be evaluated with the attitude that alien spacecraft cannot exist. This is not closed mindedness. It is facing the reality of the constraints that time, stellar distances, and available energy place on interstellar space travel. We must also face the reality that human travel beyond the limits of the solar system is not possible. Any communication with sentient beings beyond the solar system can only take place through electromagnetic signal transmission and reception, so the SETI searches remain our best bet for contact.

Dr. Michael K. Gainer is Emeritus Professor of Physics and former chair of the Department of Physics at St. Vincent College in Latrobe, PA. He is the author of *Real Astronomy for Small Telescopes*, published by Springer in the Patrick Moore Practical Astronomy Series in 2006.

Image Right: Recently, Ed Robertson (Barenaked Ladies) and Chris Hadfield co-operated on the creation of “ISS: Is Somebody Singing” and then they recorded it “ensemble” in the CBC studios in Toronto.

They were accompanied by a high school chorus, the Wexford Gleeks from Wexford Collegiate School for the Arts, who were all there at the studio while Hadfield orbitted in ISS. It is a very catchy song, even making the mouthful “International Space Station” come out melodically in the lyrics. Robertson insisted on including the full name and it works. The music video is at: http://music.cbc.ca/#/concerts/Chris-Hadfield-and-Barenaked-Ladies-ISS-Is-Somebody-Singing-2013-02-05

You will enjoy it. “Hats off” to Hadfield and Robertson for bringing the space experience “down to Earth”. [Sorry for that, I don’t usually get to make two funnies in one sentence -ed]

Image Left: The Sarnia-Windsor area from ISS: Canadian astronaut and Sarnia native Chris Hadfield has fulfilled his promise to tweet a photo of his hometown from space.

“Even though I’ve been to 50 countries, I’ve been around the world hundreds of times, Sarnia really makes me feel like home,” Hadfield said recently.

This trip is the pinnacle of an astonishing career for the Sarnia-born astronaut who still vacations on nearby Stag Island.

He was the first Canadian to walk in space and the only Canadian aboard the Russian Space Station Mir.

In the weeks leading up to Dec. 19, the colonel visited Sarnia and promised Mayor Mike Bradley that he’d attempt another photo of our community from space.

Hadfield has been tweeting his space adventures at twitter.com/cmdr_hadfield

Image Right: In another media event, Colonel Hadfield, (soon to be Commander of the ISS) had a conversation with a science-fictional captain, James T. Kirk (T. for Tiberius). This occurred after some tweets between the two that started Star Trek fans clamoring for more.

The two chatted about a variety of things. Shatner asked Hadfield how he has coped with fear. Hadfield likened the fear to that of an actor not knowing his script, and said he coped by making sure he always "knew [his] lines."

Shatner pointed out that the consequences of making a mistake are not comparable in the two jobs." In my case, your face flushes and you get a sheen of flop sweat," he said. "In your case, you burn up. It's a little different."

Hadfield responded with a laugh, "Well, in both cases, you go down in flames — one's figurative and one is not."

The two agreed to continue the conversation over a cigar and whiskey at Hadfield’s N. Ont. cottage. Link: http://www.cbc.ca/news/arts/story/2013/02/07/technology-captain-kirk-chris-hadfield.html

The full 34 minute video has been posted on the Canadian Space Agency website: http://www.asc-csa.gc.ca/eng/default.asp

From the vantage point of the International Space Station (ISS), astronauts observe many spectacular phenomena, including aurora, noctilucent clouds, airglow, and sunglint on Earth's water bodies. Sunglint is light reflected off of a water surface towards the observer, such that it creates the appearance of a mirror-like surface.

If the viewing and lighting conditions are ideal, that mirror-like surface can extend over very large areas, such as the entire surface of Lake Ontario (approximately 18,960 square kilometers). This astronaut photograph was taken while the ISS was located over a point to the southeast of Nova Scotia, approximately 1,200 kilometers (740 miles) ground distance from the centerpoint of the image. Lake Ontario, Lake Huron, the Finger Lakes of New York, and numerous other bodies of water appear brilliantly lit by sunglint. To the west, Lake Erie is also highlighted by sunglint, but less light is being reflected towards the astronaut observer, resulting in a duller appearance.

Much of central Canada is obscured by extensive cloud cover in the image, whereas a smaller grouping of clouds obscures the Appalachian range and Pennsylvania (image lower left). The blue envelope of the Earth's atmosphere is visible above the curved limb, or horizon line, that extends across the upper third of the image. Such panoramic views of the planet are readily taken with handheld digital cameras through ISS viewing ports, which allow the astronaut to take advantage of the full range of viewing angles.

Astronaut photograph ISS031-E-123071 was acquired on June 14, 2012, with a Nikon D2Xs digital camera using a 45 mm lens, and is provided by the ISS Crew Earth Observations experiment and Image Science & Analysis Laboratory, Johnson Space Center. The image was taken by the Expedition 31 crew. It has been cropped and enhanced to improve contrast, and lens artifacts have been removed. The International Space Station Program supports the laboratory as part of the ISS National Lab to help astronauts take pictures of Earth that will be of the greatest value to scientists and the public, and to make those images freely available on the Internet. Additional images taken by astronauts and cosmonauts can be viewed at the NASA/JSC Gateway to Astronaut Photography of Earth.

[Zooming in on the Bruce Peninsula shows Owen Sound, Colpoys Bay and some tantalizing hints of reflection from a number of spots that can only be the numerous small lakes in Grey and Bruce. Checking Google maps shows an interesting group of lakes west of Wiarton and if one accounts for the angle of the view in the image, it is possible to pick out a white spot for each of Boat Lake, Spry, Isaac, Sky and Berford Lakes. Also there is a string of spots starting at what could only be Lake Charles and running SW along a line towards a large spot that can only be Arran Lake just east of Port Elgin. It is hard to image clouds (they would have to be cumulus) forming in just the exact pattern to mimic all of those small lakes. Besides, in the image, the only clouds in the area (over Lake Huron) and to the southeast of Grey-Bruce appear to be wispy cirrus and not cumulus. It is just amazing what can be picked out from over 1000 km away! -ed] This image can be found at:
http://eol.jsc.nasa.gov/EarthObservatory/GreatLakesinSunglint.htm

North vs. South - A Tale of Two Globulars

"It was as if a globe had been filled with moonlight
and hung before them in a net woven of the glint
of frosty stars."

The Hobbit by J.R.R.Tolkien

Ready for a Date with the Stars

I had an "all-night date" with the stars! It didn't matter that the night temperature would drop to freezing. It was Saturday, Feb 16th, and the Clear Sky Clock for Arizona Sky Village, near Portal, in SE Arizona, predicted minimal cloud, high transparency, and acceptable seeing. As the Sun set over Limestone Mountain, my imaging equipment, image left, was set up, aligned, and calibrated. I had assembled a TAK FSQ 106 and a TAK TOA 150 on a TAK EM 400 mount and attached two imaging cameras, a Canon 60Da and an SBIG STL 11K. My objective that night was to image, in wide field colour, celestial objects using the Canon 60Da attached to the FSQ 106; and, at the same time, image the same objects in black and white, using the SBIG STL 11K attached to the TOA 150. I didn't use any [manual] guiding this night, and, instead, relied on short exposures with the Canon's high ISO setting and short exposures on the chilled (-20C) CCD chip of the STL 11K.

After midnight, my imaging began in earnest. I had purchased Ruben Kier's book entitled "The 100 Best Astrophotography Targets" published by Springer in 2009. The book is organized into monthly selections of fascinating targets. The targets were chosen for their ability to inspire the viewer, their brightness, and their suitability for an average amateur's equipment. It is a great book and Kier illustrates each celestial object with his own image obtained by using a Meade 12-inch SCT attached to an AstroPhysics 1200 mount. What I really like about his book are his easily understood explanations of his image processing steps. No confusing techno-babble here, and I highly recommend it!

This night I seemed to be attracted to interacting galaxies; so, to name a few, I imaged the Whirlpool galaxy (M51) with its companion galaxy (NGC 5195); the Whale galaxy (NGC 4631) and its companion, the Hockey Stick galaxy (NGC 4656); and the face-on spiral galaxy M100 with its companion galaxy NGC 4312.

As the celestial vault turned, the heat drained from my body and I got COLD! The summer constellations of Scorpius and Sagittarius were prominent above the eastern horizon. It was now about 5:00 AM and I noticed a multitude of bright stars belonging to Centaurus skirting the SE horizon. Although I was cold and tired, this fascinating celestial real estate deserved closer inspection. I went into our hacienda to check out our star charts. Returning outside, my attention was directed to the famous globular cluster, Omega Centauri. Its soft glow, easily visible near Zeta and Epsilon Centauri, subtended an angle about the size of the Full Moon, and appeared to the left of Portal Peak about 8° in altitude where it never rises higher at ASV than 10°. Globular Clusters are favourite telescopic objects for amateur astronomers. They are dense, spherical collections of very old stars which are tightly bound by their gravity and are located in the outer halo of the Milky Way. The Milky Way has about 180 of these globulars. Many are wonderful sights in the telescope and some, like Omega Centauri, in the southern hemisphere, and M 13, in the northern hemisphere, are stunning beyond description.

The amateur astronomers in Australia and Chile usually brag about how their night skies are better than ours and contain more outstanding examples of celestial objects than we have in our northern skies. So, on this morning, both of these famous globular clusters were visible .... southern Omega Centauri about 8° above the SE horizon and northern M13, in Hercules, about 75° in altitude. I thought, what a great way to end my imaging session by taking a photograph of each one. I would use the same telescope (the FSQ 106); the same exposure, (150 seconds); the same camera, (Canon 60Da), the same mount, (TAK EM 400); the same noise reduction algorithms, and the same image processing (iPhoto). There would be no stacking and no [manual] guiding. Only M13, high in the NE at 75°, would have an elevation advantage and I couldn't easily correct for that. So, here are my two images, one above the other for comparison, Omega Centauri on top and M13 below. You can easily see that Omega wins, hands down,-and it was only 8° above the horizon!

M13 (north) vs Omega Centauri (south): *Two great globular clusters compared. Images taken with identical equipment and exposure times. Image scale is the same. Images by D. Cunningham ASV*

Omega Centauri, despite its lower altitude and higher atmospheric extinction, is brighter, (3.7 visual magnitude vs 5.8 for M13); it appears larger, (36 arc-min vs 16.6 arc-min for M13); it has more stars, (10 million vs 300,000 for M13); but it is closer (15,600 LY vs 25,000 LY for M13) and, in terms of ages and compositions of the stars, it has a greater diversity. Indeed, the best evidence to date is that Omega Centauri had a special genesis. It apparently is the remaining core of a dwarf galaxy that was cannibalized by our Milky way, about 12 billion years ago. Amazing on all fronts!

The photographic evidence confirms it. M13 is very nice and a favourite target for us northern amateurs; but, as far as globular clusters go, Omega Centauri is a knockout! Maybe those southern amateur astronomers have a point.

Monoceros (Mon)

Monoceros (the Unicorn) is an inconspicuous and relatively modern constellation, having probably been invented about the 16th century. This constellation is interesting in that it is diametrically opposite the center of our galaxy, the Milky Way; in looking at this area of the sky, you are looking toward the rim and outside edge of our galaxy. It is for this reason that the density of the stars in this region is so low. The open cluster NGC 2244 is visible to the naked eye and is a beautiful sight in fieldglasses. Near this cluster, around ε Monocerotis, is a fine field of stars observable in powerful binoculars or low power telescopes. [NGC 2244 is imbedded in the Rosette Nebula -ed]

DOUBLE STARS

	Mag.	Sep (s)	Location	Remarks
β	4.7-5.2-5.6	7-10	062607	White-Pearl Grey; beautiful
ε	4.5-6.5	14	062105	Gold-Blue
4	6.5-10.5 -11.5	3-9	060011	
Σ921	6.0-8.2	16	062811	
Σ1183	5.5-7.8	31	080409	

MESSIER OBJECTS

	Mag	Location	Remarks
M 50	6.3	070108	Open Cluster. Beautiful, red star in field.

Other Objects of Interest in Monoceros

NGC 2244 - Open Cluster; very beautiful; observer with low power. [This cluster is imbedded in the **Rosette Nebula**. -ed]
NGC 2261 - A diffuse nebula, **Hubble's Variable Nebula**; see R Monocerotis. First object imaged by 200-inch Hale telescope by E. Hubble, taken on Jan 26, 1949.
NGC 2264 - Open Cluster; Location 063810 [aka **Christmas Tree Cluster** see Dec 2012 SGN for more. -ed]
R Monocerotis - An irregular variable, maximum magnitude 9.5. This star is the center of an unusual nebula called a "Variable Nebula." It varies in brightness very rapidly. Barely visible in small scopes. Location 063709.
T Monocerotis - Cepheid var. per= 27 d, range 6.4-8.0 Location 062207.

Canis Minor (CMi)

α Canis Minoris - Procyon β Canis Minoris - Gomeisa

Canis Minor is easily located; its brightest star, Procyon, forms an equilateral triangle with Sirius in Canis Major and Betelgeuse in Orion. Procyon is a star similar to our sun, golden-yellow in color and having a magnitude of 0.37, making it the 8th brightest star in the sky. Procyon means "before the dog," so called because it rises about half an hour before Sirius, the Dog Star.

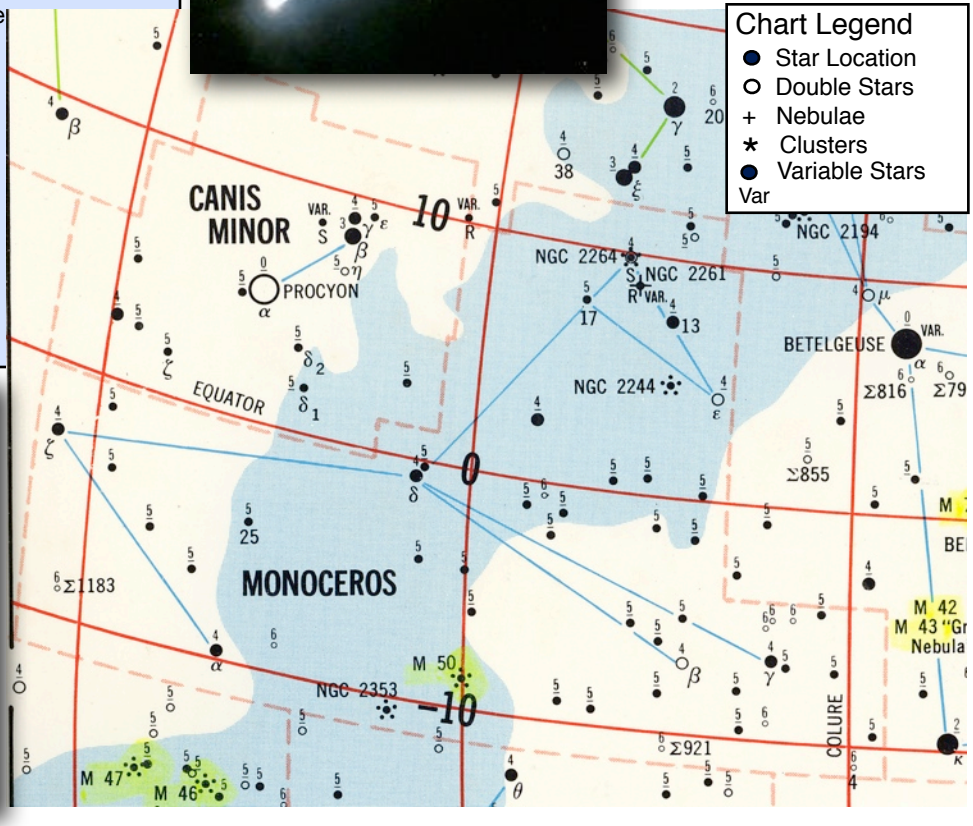
DOUBLE STARS

	Mag.	Sep (s)	Location	Remarks
α	0.5-13.5	5	073705	Visible only in large telescope.

Other Objects of Interest in Canis Minor

R Canis Minoris - Long period (338 d) variable, max mag = 8.0. Location 070610.
S Canis Minoris - Long period (332 d) variable, max mag = 7.5. Location 073008.

NGC 2261 (**Hubble's Variable Nebula** or **Caldwell 46**) is a variable nebula illuminated by the star R Monocerotis, which is not directly visible itself. Dense clouds of dust near R Mon may periodically block the illumination from the star. In 1949, Hubble himself imaged this object-the first photo taken by the 200-inch Hale Telescope on Mt. Palomar. [Wikipedia]



Rosette Nebula imaged by Stuart Heggie of the Flesherton area, who kindly allowed this image to be used in the Cosmic Images photo show for IYA 2009. The Rosette Nebula is a vast cloud of dust and gas, extending over an area of more than 1° across. Its parts have been assigned different NGC numbers: 2237, 2238, 2239, and 2246. The open star cluster NGC 2244 is situated within the nebula, consisting of the young stars which recently formed from the nebula's material. The brightest make the nebula shine by exciting its atoms to emit radiation. Star formation is still in progress in this vast cloud of interstellar matter. Distance to the Rosette Nebula is about 5 500 light years. Stuart's image was a multiple exposure totally 280 minutes with H-alpha and RGB filters. Telescope used was a Takahashi FSQ 106 mm refractor.

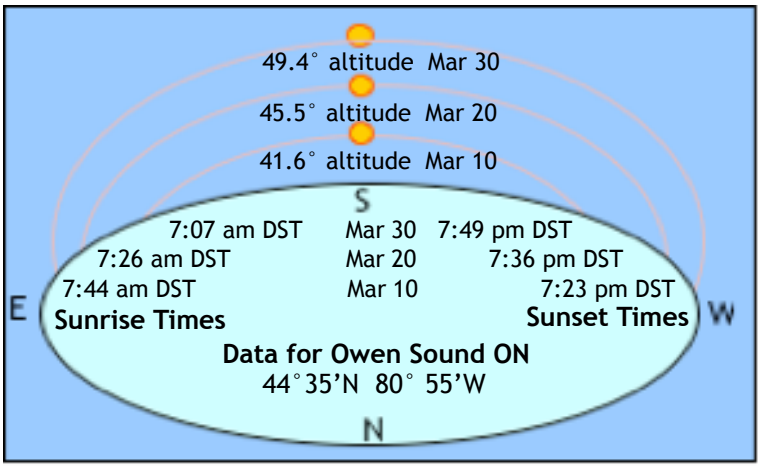
Mar 1 Spica 0.1° N of Moon, occultation (not vis. in N.America, again)
Mar 2 Saturn 3° N of Moon
Mar 4 Last Quarter Moon rises at 1:13 am EST
Mar 5 Moon at perigee (369 957 km)
Mar 9 Double Shadow Transit on Jupiter, vis. only BC,AB
Mar 10 DST begins 2:00 am (set clocks forward 1h)
Vesta 0.4° from Elnath (β-Tauri)
Mar 11 New Moon rises at 7:15 am DST
Mar 17 Jupiter 1.5° N of Moon
Moon at apogee (404 261 km)
Mar 19 First Quarter Moon rises at 12:04 pm DST
Mar 20 Vernal Equinox (7:02 am DST)
Mar 24 Jupiter 5° N of Aldebaran
Mar 27 Full Moon (Sap Moon) rises at 7:19 pm DST
Mar 28 Spica 0.01° S of Moon, occultation (not vis. in N.America, yet again)
Mar 29 Saturn 3° N of Moon
Mar 31 Mercury greatest elongation W (28°)

BAS Events

Mar 2 Port Elgin Rotary Tour ES Fox 10:30 pm Guide: John H
Mar 6 BAS meeting Grey Roots Museum 7 pm
Annual General Meeting
Mar 9 Messier Marathon ES Fox @dark, a dusk 'til dawn event
Mar 16 Messier Marathon ES Fox (backup night)
Note: Jupiter, Cres Moon in Hyades look west after sunset
Mar 16 on-> Comet PanSTARRS may be naked eye in West after sunset. See chart pg 1.
Mar 23 Earth Hour (informal) ES Fox after dark (Moon LQ + 3)

Planets

MERCURY, drops back down towards the sun and stays close to it for the first half of March. It does reach elongation W on Mar 31 (mag 0.3), but it still rises less than one hour before the sun. **VENUS**, (-3.9), is too close to the sun to be observed this month. **MARS** (1.2), also is too close to the Sun for viewing. It will not be easily visible until June or July in the morning sky. **JUPITER**, (-2.2) is now past the meridian (highest in the sky) by dark. By month-end it is lower in the SW sky (about 35°) but still a prime target for viewing. **SATURN**, (mag 0.4), is located in Libra and rises around 10 pm DST by month-end. Ring tilt is still 18°or so. **URANUS**, (5.7) is too close to the sun to see this month. **NEPTUNE**, (7.8) rises at the start of morning twilight. Finder charts for the **asteroid, Vesta** (7.3) and **dwarf planet, Ceres** (7.4) can be found on the S&T website. Ceres is only 0.4° from Elnath, the right horn of Taurus on Mar 10 and Vesta is still moving eastward between the horns of the Bull. **PLUTO** (mag. 14) is a dawn planet but only 22° high in Sagittarius at the start of morning twilight. The diagram below gives the sunrise/sunset times and the sun's altitude on three dates this month. The sun continues climbing in elevation this month and passes Spring Equinox on Mar 20. The moon calendar below the sun chart shows March lunar phases. Times of moonrise for NM, FQ, FM and LQ are in the Sky Calendar listing at left. We switch to DST on March 10 at 2 am.



Special Events

2013 Year of Comets!

March may be the month that we end our long drought of naked eye comets. Comet PanSTARRS (C/2011 L4) may make an appearance in the western sky. But this is not the only one that is presently visible or due to become visible later in the year. Right now in the southern hemisphere, Comet Lemmon (C/2012 F6) is making a nice appearance with long exposure images showing a beautiful green coma. On top of this, a previously discovered comet ISON (C/2012 S1) is predicted to brighten in late November. Comet ISON in some predictions will reach into the negative magnitudes! Some are guessing that it will be as bright or brighter than the full moon! This prediction is based on the fact that this is a new comet and has not been close to the sun before. It could just as easily break up and fade out. Only time will tell.

Comet Lemmon: *APOD image taken by Peter Ward, Barden Ridge Observatory (30 km S of Sydney AU) Check out the original image at http://apod.nasa.gov/apod/ap130207.html*

March 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4 LQ	5	6	7	8	9
10	11 NM	12	13	14	15	16
17	18	19 FQ	20	21	22	23
24	25	26	27 FM	28	29	30
31						

By permission
University of Texas
McDonald

BAS Member Loaner Scopes

Solar H-alpha scope now available!

Our Lunt solar scope is now available for loan by BAS members! You need to provide a mount like a heavy-duty tripod, or a regular equatorial or azimuth mount). A short training session will be provided on pickup.

BOTH 12-inch Dobs now available.

BOTH 12-inch telescopes are now available for the winter, and we have at least one **8-inch dobsonian** for free member loan. Contact Brett T. or John H. if you are interested.

Scopes come in and out periodically so keep checking with Brett or John if you are interested in a loaner.

SGN Classified Ads Section

FOR SALE: Canon EOS 50D DSLR
(body only)

15.1 Mp Excellent noise reduction features for night photos. Includes spare battery and charger, strap, software and manual.
Asking $ 600. John H. 519 371-0670 **stargazer@wightman.ca**
Information about the 50D can be found here:
http://en.wikipedia.org/wiki/Canon_EOS_50D
and here: http://www.imaging-resource.com/PRODS/E50D/E50DA.HTM

FREE STUFF:
Andreas Gada has donated back issues of **Sky & Telescope and Astronomy magazines**
These are free to pick up at the ES Fox Observatory
Next time you are there, HELP YOURSELF !

MORE FREE STUFF:
We are accumulating several small refractors and other equipment that we cannot use.

Check out the FREEBIE SCOPE BIN at the ES Fox Observatory
Next time you are there, HELP YOURSELF !

FOR SALE: Televue Pronto

2 element E.D. Refractor, 2.7" / 70mm diameter. f.l. 480mm, f/6.8. with 1-1/4" Star Diagonal, with 45 degree Prism diagonal (for terrestrial viewing), with TeleVue Red dot finder, complete with TeleVue Soft Case. Asking $ 700.-- Firm Anton VanDijk 519 376-9912
ravand@rogers.com

Dung Beetles do Galactic Navigation

Once a beetle (*Scarabaeus satyrus*) has constructed its dung ball, it moves off in a straight line in order to escape from rival beetles as quickly as possible, lest they try and steal its carefully crafted ball. This behaviour doesn't sound complicated, but several years ago, Marie Dacke of Lund University in Sweden and colleagues showed that polarised light from the moon is important for dung beetles to keep to a straight line.

Then the researchers were surprised to find the insects were able to stay on course even on a moonless night. "We thought there was something wrong in our set-up," Dacke says.

To test this [how stars play a role], the team moved the experiment to a planetarium. By switching stars on and off, Dacke discovered that the glowing strip of the whole Milky Way was what guided the beetles' movement. "Before it was assumed insects could not use the stars because their eyes don't have the resolution to see them," she says. Navigating using the whole of the Milky Way does away with the need to see individual stars.

Bug-eyed creatures using the galaxy to navigate? Seems like it is happening right here on Earth.

The full text of this article can be found at the New Scientist website below as well as at many other science news sites.

http://www.newscientist.com/article/dn23110-dung-beetles-navigate-using-the-milky-way.html

Working with astronomical image processors at the Space Telescope Science Institute in Baltimore, Md., renowned astrophotographer Robert Gendler has taken science data from the Hubble Space Telescope (HST) archive and combined it with his own ground-based observations to assemble a photo illustration of the magnificent spiral galaxy M106.

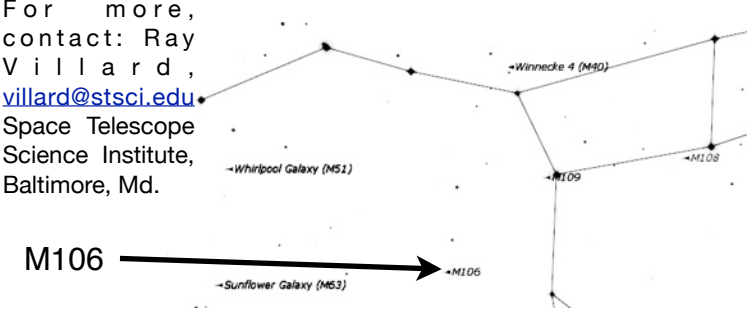
Gendler retrieved archival Hubble images of M106 to assemble a mosaic of the center of the galaxy. He then used his own and fellow astrophotographer Jay GaBany's observations of M106 to combine with the Hubble data in areas where there was less coverage, and finally, to fill in the holes and gaps where no Hubble data existed.

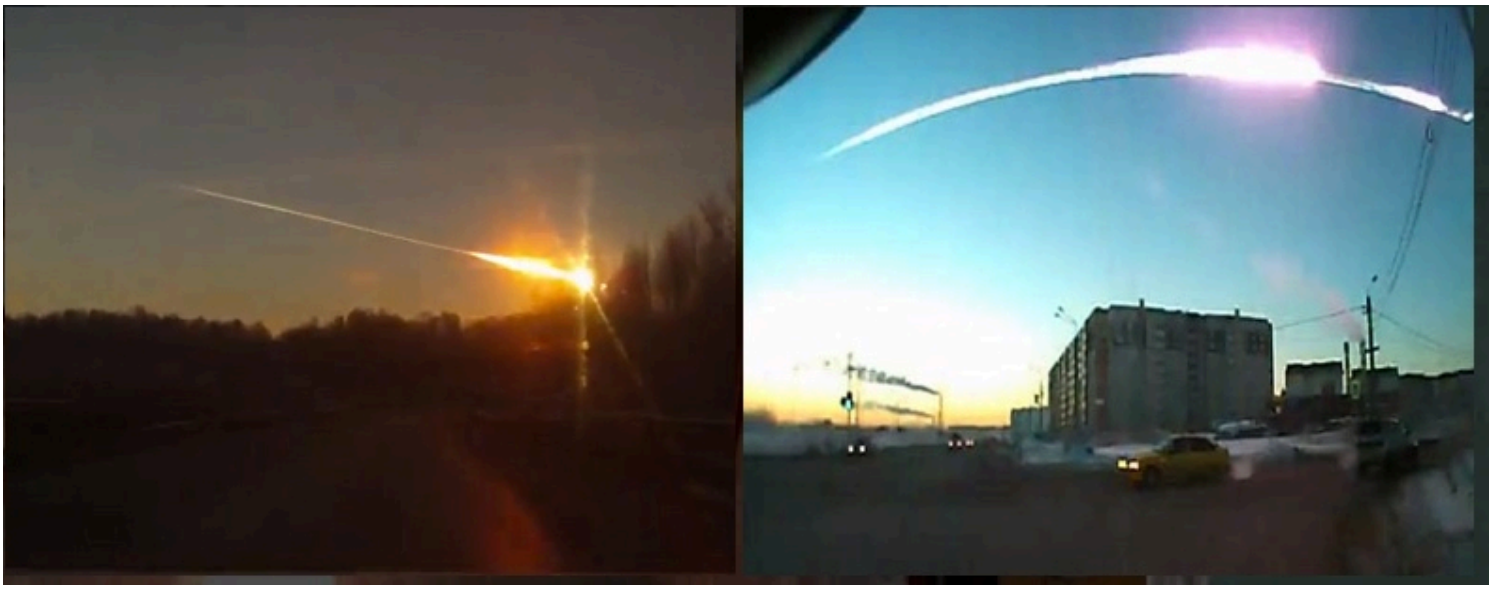
The center of the galaxy is composed almost entirely of HST data taken by the Advanced Camera for Surveys, Wide Field Camera 3, and Wide Field Planetary Camera 2 detectors. The outer spiral arms are predominantly HST data colorized with ground-based data taken by Gendler's and GaBany's 12.5-inch and 20-inch telescopes, located at very dark remote sites in New Mexico. The image also reveals the optical component of the "anomalous arms" of M106, seen here as red, glowing hydrogen emission.

Robert Gendler is a physician by profession but has been active in astrophotography for two decades. Robert started taking astro-images from his driveway in suburban Connecticut. He then spent several years imaging remotely from places like New Mexico and Western Australia. More recently, Robert has been spending his time assembling hybrid images from multiple data sources including the Hubble Legacy Archive. Many of these images have been featured on "Astronomy Picture of the Day" (http://apod.nasa.gov/apod/astropix.html) and in various books and magazines.

This portrait of M106 contains only the inner structure around the halo and nucleus of this Seyfert II active galaxy. Large amounts of gas from the galaxy are thought to be falling into and fueling a supermassive black hole contained in the nucleus. Also known as NGC 4258, M106 lies 23.5 million light-years away, in the constellation Canes Venatici.

For more, contact: Ray Villard, villard@stsci.edu Space Telescope Science Institute, Baltimore, Md.





Взрыв метеорита в небе над Уралом... Вся информация в одном посте.

The Google translation of the Russian caption says (in part): “Explosion of a meteorite in the skies over the Urals”. Details, videos and many reports came in from various sources (see one below from Spaceweather.com). Eventually 50-60 fragments were found and have apparently been confirmed by Russian meteorite researchers. They are “chondrites with an iron content of 10%” according to Victor Grokhovsky of Urals Federal University. This remains to be confirmed. Also unconfirmed is a 6-m crater in the ice of Lake Chebarkul reputed to be a crater punched through the ice by a larger fragment which may or may not be on the silty bottom of the 10 m deep lake. One women reported that a walnut sized piece tore through her coat. Although this report may be true (or not) others are more or less reliable. One stated that strange men in black cars were driving around offering thousands of rubles for fragments.

RUSSIAN METEOR STRIKE: On Friday, February 15th at 9:30 am local time in Russia, a small asteroid struck the atmosphere over the city of Chelyabinsk and exploded. According to reports from news organizations and Russian authorities, as many as 1000 people received minor injuries from the shock wave. This is the most energetic recorded meteor strike since the Tunguska impact of 1908.

Researchers have conducted a preliminary analysis of the event. "Here is what we know so far," says Bill Cooke, head of NASA's Meteoroid Environment Office. "The asteroid was about 15 meters* in diameter and weighed approximately 7000 metric tons. It struck Earth's atmosphere at 40,000 mph (18 km/s) and broke apart about 12 to 15 miles (20 to 25 km) above Earth's surface. The energy of the resulting explosion was in the vicinity of 300 kilotons of TNT." [The Hiroshima bomb was 16 kilotons, and the Tunguska explosion was estimated to be 15 MT or about 1000 times larger than Hiroshima, but see the end note in red. -ed]

"A shock wave propagated down and struck the city below, causing large numbers of windows to break, some walls to collapse, and minor damage throughout the city," he continued. "When you hear about injuries, those are undoubtedly due to the effects of the shock wave, not due to fragments striking the ground. There are undoubtedly fragments on the ground, but as of this time we know of no recovered fragments that we can verify."

Videos of the event may be found here and here. In many of the videos you can hear the sound of windows shattering as the meteor's loud shock wave reaches the ground (about 1.5 minutes later). Onlookers cry out in Russian as alarms and sirens sound in the background. This pair of wide-angle gif animations is also worth watching: #1, #2.

It is natural to wonder if this event has any connection to [the Feb 15th] record-setting flyby of asteroid 2012 DA14. Paul Chodas of the Near Earth Object Program at JPL says no. "The Russian fireball is not related to 2012 DA14 in any way. It's an incredible coincidence that we have had these two rare events in one day."

From Spaceweather.com (Feb 17, 2013)

***NASA later increased estimates to 17 m size, 10,000 tonnes mass and 500 kilotons blast energy.**