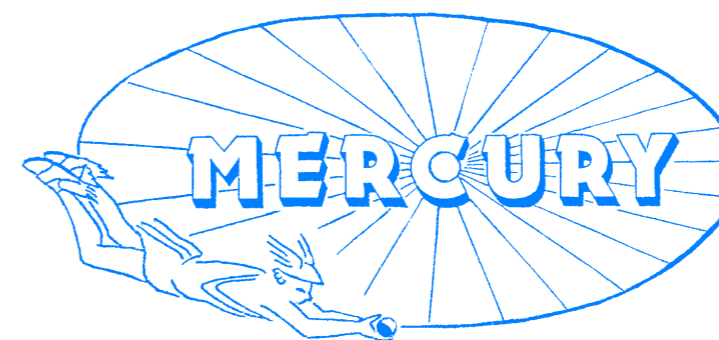


Stirling Astronomical Society
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www.stirlingastronomicalsociety.org.uk

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 E-mail: johnmoffat@inaberfoyle.demon.co.uk
 or visit the SAS website :
www.stirlingastronomicalsociety.org.uk

Thanks to all contributors. Please think about pieces, articles and images for the next October issue. Items describing events or the activities of the Society, or of individual members or groups of members, are especially welcome. Advanced notification of future events and activities can be included, particularly as *The Mercury* can now be accessed on the web.

Please give or send your contributions to:

Alex Houston
 41 Keirfold Avenue Tel: 01259-220958
 Tullibody, FK10 3BE E-mail: editor@themercury.org.uk
 (Please note that this has changed)

Copy can be in clear handwriting, typescript, images for scanning, e-mail attachments, or on floppy disk or CD. Contributions should normally not be more than about 750 to 1000 words in length. Please try to have material ready by the beginning of September for the October 2010 issue of *The Mercury*.

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EDITORIAL

Well, it is that time of the year again in central Scotland: no dark skies, no Society meetings and little astronomy to do other than read books unless, of course, you are a solar observer or an aficionado of noctilucent clouds. It may not be too surprising that this edition of *The Mercury* is somewhat reduced in size, although it may be argued that, with more time available, everyone should be contributing articles. Whatever the case, I am once again grateful to the usual suspects—Mark Butterworth, Chris Davis and Sandi Cayless—for their continued support of the journal.

Mark once again demonstrates his superb knowledge of the history of astronomy in his article “Asteroids” on page 2, Sandi combines some excellent research with a bit of fun as she relates the names of Society members to astronomical features on page 4, while Chris makes three contributions: a report on John Moffat’s excellent Smith lecture, “The Moon”, on page 6, an original, thought-provoking article, “Life and an Infinite Universe”, on page 7, and a report on the current state of the observatory dome on page 8. A guest article, “Crazy violent explosion shoots out two cosmic bullets” by Phil Plait on page 9, and an article by myself, “Venus, UFO’s. Astrology and Portobello” on page 11 complete this issue’s original articles. Our regular features “The Night Sky” and “Forthcoming Events” are on page 13 and page 15 respectively.

It may be of interest to some that *New Leaf News*, a newsletter from the Denny area dealing with green issues, has started to publish astronomical articles including, with appropriate permission, some taken from current and previous issues of *The Mercury*. I believe that this is a very worthwhile partnership which gives the Society, the journal and its contributing members extra publicity. The *New Leaf News* website is at <http://www.cgiscotland.org/page/CGINewsletters.html>.

Alex Houston

ASTEROIDS

Almost as soon as Kepler discovered his three laws of planetary motion, in 1605, astronomers began to look for some kind of pattern or mathematical explanation for the spacing of the planets in our solar system. They were particularly concerned about the huge distance separating Mars and Jupiter, which seemed to prevent a logical sequence.

The first mention of a series approximating the distances is found in David Gregory's *The Elements of Astronomy*, published in 1715. In it, he says, "...supposing the distance of the Earth from the Sun to be divided into ten equal Parts, of these the distance of Mercury will be about four, of Venus seven, of Mars fifteen, of Jupiter fifty two, and that of Saturn ninety five." In 1772, Johann Elert Bode, completed the second edition of his astronomical compendium *Anleitung zur Kenntniss des gestirnten Himmels*, into which he added the following footnote, credited to Johann Daniel Titius:

"This latter point seems in particular to follow from the astonishing relation which the known six planets observe in their distances from the Sun. Let the distance from the Sun to Saturn be taken as 100, then Mercury is separated by 4 such parts from the Sun. Venus is 4+3=7. The Earth 4+6=10. Mars 4+12=16. Now comes a gap in this so orderly progression. After Mars there follows a space of 4+24=28 parts, in which no planet has yet been seen. Can one believe that the Founder of the universe had left this space empty? Certainly not. From here we come to the distance of Jupiter by 4+48=52 parts, and finally to that of Saturn by 4+96=100 parts."

This mathematical sequence soon became known as "Bode's Law" and is now known as the "Titius-Bode Law". There is no physics involved in the formula behind the law, but its influence was significant and immediately emphasised the "missing" planet between Mars and Jupiter. When William Herschel discovered the planet Uranus in 1781, its orbital distance fitted very closely to the numerical sequence and Titius-Bode's Law was considered "proved". Astronomers across Europe began a concerted effort to find the missing planet, dividing the sky into 24 zones, each to be explored in detail by one astronomer. They referred to themselves light heartedly as the "celestial police". However, the "missing planet" mystery was solved by someone outside the group.

Giuseppe Piazzi at the Palermo Observatory in Sicily was working on producing the most accurate star catalogue of its time. On January 1st, 1801, he measured the position of an 8th magnitude star. Following standard cataloguing procedure,

¹ Piazzi was godfather to Charles Piazzi Smyth, Astronomer Royal for Scotland, from 1846 to 1888

METEOR SHOWERS (continued)

		Radiant		
	Maximum	RA	Decl.	
ι-Aquarids	06 Aug	22h10m	-15°	Rich in faint meteors.
		22h04m	-6°	
Perseids	12 Aug	03h04m	58°	Rich shower; very favourable.
Piscids	09 Sep	00h36m	7°	Low rates.
	21 Sep	00h24m	0°	

Times are BST, as viewed from Stirling.

Compiled by Alex Houston

FORTHCOMING MEETINGS

Meetings at the Smith (7.30pm—9.30pm)

10th September 2010

Speaker - Andy Longmore, Science and Technology Facilities Council.

Title - Adaptive Optics: Realising the Full Potential of Ground-Based Telescopes.

An almost full programme for the forthcoming season can be found on the website at www.stirlingastronomicalsociety.org.uk/lectures.html

Meetings at the Mayfield (7.30pm—9.30pm)

24th September 2010

Meetings at the Smith are open to all. Meetings at the Mayfield are for members only.

Other Events

Twinkle Twinkle Little Bat

28 August 2010 until 23.00 at Observatory following bat and moth observing.

Doors Open Days

18-19 September 2010 from 10.00 until 16.00 at Observatory.

CELESTIAL EVENTS VISIBLE FROM THE STIRLING AREA

CONJUNCTIONS, OPPOSITIONS AND ELONGATIONS

Date	Planet	Event
07 Aug	Mercury	Greatest elongation E
20 Aug	Venus	Greatest elongation E
20 Aug	Neptune	Opposition
03 Sep	Mercury	Inferior conjunction
19 Sep	Mercury	Greatest elongation W
21 Sep	Jupiter	Opposition
21 Sep	Uranus	Opposition

COMETS (visible* on 13 July, 12 August, 11/12 September)

	Date	RA	Dec	Transit	Magnitude
10P/Tempel	13 Jul	00h19m	-7°	05.57	10.2
	12 Aug	01h21m	-11°	05.00	10.2
	11 Sep	01h40m	-17°	03.20	10.6
29P/Schwassmann-Wachmann	13 Jul	09h49m	10°	15.27	13.2
81P/Wild	13 Jul	14h39m	-11°	20.17	11.4
103P/Hartley	12 Aug	22h35m	28°	02.14	11.6
	12 Sep	23h05m	43°	00.46	8.4
2P/Encke	11 Sep	13h59m	-21°	15.40	10.0

* Magnitude brighter than +14; declination > -30°; transit time not ±2 hours from 13.00 BST.

METEOR SHOWERS

	Maximum	Radiant		
		RA	Decl.	
Capricornids	08 Jul	20h44m	-15°	Bright yellow-blue meteors.
	15 Jul			
	26 Jul			
α-Cygnids	21 Jul	21h00m	48°	Weak, steady activity.
	21 Aug			
δ-Aquarids	29 Jul	22h36m	-17°	Fine southern shower.
	06 Aug	23h04m	2°	
Piscis Australis	31 Jul	22h40m	-30°	Southern shower.
α-Capricornids	02 Aug	20h36m	-10°	Long, slow fireballs.

he measured its position the following day, and found it had moved. Piazzi followed the object for a few days and working out its orbit determined it was not elongated, like a comet, but almost circular. He suspected something significant as it was located at roughly the distance of the "missing" planet, but elected to announce a comet discovery. The object quickly moved into the glare of the sun and was lost before other astronomers could confirm the discovery. However, the German astronomer Carl Friedrich Gauss, using his new method for calculating celestial orbits from limited data, estimated its position when it re-appeared. In December 1801 it was re-discovered very close to its calculated position. The data confirmed an elliptical orbit with a radius very close to that computed by the Titius-Bode law. Piazzi called the object Cerere Ferdinandea after the patron goddess of Sicily and the Sicilian King who founded his observatory.

It became known as Ceres and was suspected to be a major planet, although doubts about its true nature quickly surfaced. William Herschel with his 40 foot telescope saw that it had a very small disk, too small to be a major planet. He calculated its size at "significantly less than our moon". Heinrich Olbers, a German physician and accomplished amateur astronomer, soon found a similar object in the same region, which he named Pallas. By 1807, others named Juno and Vesta were found.

Their small diameters made them appear more like stars than planets and so Herschel coined the term asteroid (from "asteroidic", the Greek for "starlike"), establishing a new class of object in the solar system. It was assumed they were fragments of the large planet that should have occupied that region according to the Titius-Bode law. In the 1890's the developments of astrophotography allowed Max Wolf of the Heidelberg Observatory to discover hundreds of asteroids from their motion trails on photographic plates. Currently, it is estimated there are over two million asteroids. It is believed that rather than fragments of a former planet, they are a debris field that failed to coalesce into a planet.

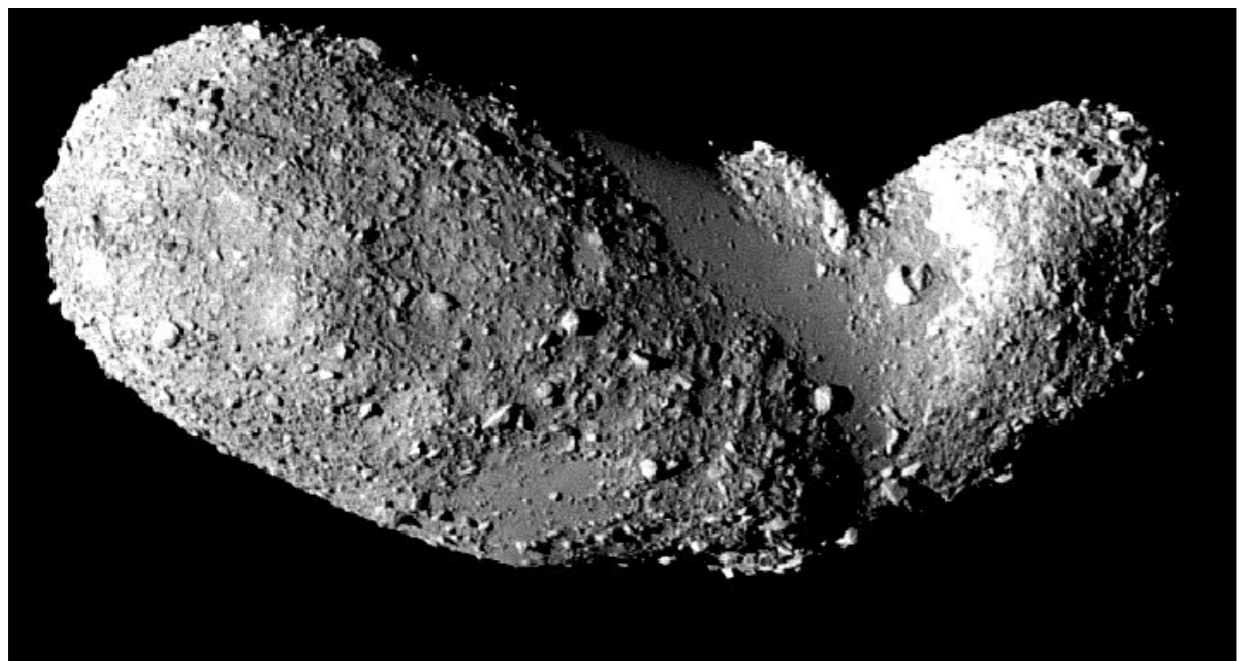
The first close-up photographs of asteroid-like objects were taken in 1971 when the Mariner 9 probe imaged Phobos and Deimos, the two small moons of Mars, which are probably captured asteroids. These images revealed the irregular, potato-like shapes of most asteroids, as did subsequent images from the Voyager probes of the small moons of the gas giants. The first true asteroid to be photographed in close-up was 951 Gaspra in 1991, followed in 1993 by 243 Ida and its moon Dactyl, all of which were imaged by the Galileo probe en route to Jupiter.

The first dedicated asteroid probe was NEAR Shoemaker, which photographed 253 Mathilde in 1997, before entering into orbit around 433 Eros, finally land-

ing on its surface in 2001. Other asteroids briefly visited by spacecraft en route to other destinations include 9969 Braille (by Deep Space 1 in 1999), and 5535 Annefrank (by Stardust in 2002). In September 2005, the Japanese Hayabusa probe started studying 25143 Itokawa in detail and may return samples of its surface to earth. Following that, the next asteroid encounters will involve the European Rosetta probe (launched in 2004), which flew by 2867 Šteins in 2008 and will buzz 21 Lutetia in 2010. In September 2007, NASA launched the Dawn Mission, which will orbit the dwarf planet Ceres and the asteroid 4 Vesta in 2011-2015, with its mission possibly then extended to 2 Pallas.

²Today, formally they are known as Minor Planets, although asteroid is still the commonly used name.

³Max Wolf discovered asteroid 4809 in 1928. In 2004 it was renamed Robert Ball after lobbying by Stirling Astronomical Society



Asteroid Itokawa imaged by the Japanese Hayabusa probe

Mark Butterworth

DO YOU SHARE YOUR NAME WITH AN ASTRONOMICAL FEATURE?

A list of the names of some of our members and corresponding astronomical objects appears opposite. Compiled by *Sandi Cayless*.

THE NIGHT SKY - July, August, September 2010

SUN				MOON		
Date	Rises	Sets	Phase	Rises	Sets	Constellation
04 Jul	04.36	22.04	LQ	23.58*	13.58	Pisces
11 Jul	04.44	21.58	NM	04.02	21.43	Gemini
18 Jul	04.54	21.49	FQ	14.44	23.35	Virgo
26 Jul	05.08	21.36	FM	21.26	05.35	Capricornus
03 Aug	05.23	21.20	LQ	23.07	15.32	Aries
10 Aug	05.36	21.05	NM	06.08	20.45	Leo
16 Aug	05.48	20.51	FQ	15.17	22.28	Libra
24 Aug	06.04	20.31	FM	19.58	05.53	Capricornus
01 Sep	06.19	20.11	LQ	22.19	15.43	Taurus
08 Sep	06.33	19.53	NM	06.41	19.18	Leo
15 Sep	06.47	19.34	FQ	16.18	22.51	Ophiuchus
23 Sep	07.03	19.13	FM	18.37	07.19	Pisces

* on 03 Jul (Moon does not rise on 04 Jul)

MERCURY					VENUS			
	Rises	Sets	Mag.	Constellation	Rises	Sets	Mag.	Constellation
04 Jul	05.00	22.43	-1.47	Gemini	08.29	23.51	-4.06	Leo
18 Jul	06.48	22.41	-0.33	Cancer	09.14	23.14	-4.12	Leo
03 Aug	08.15	21.55	0.28	Leo	10.01	22.25	-4.21	Virgo
16 Aug	08.35	21.00	0.86	Leo	10.34	21.43	-4.30	Virgo
01 Sep	07.05	19.44	4.35	Sextans	11.10	20.46	-4.42	Virgo
15 Sep	05.10	19.07	0.48	Leo	11.31	19.52	-4.52	Virgo

MARS					JUPITER			
	Rises	Sets	Mag.	Constellation	Rises	Sets	Mag.	Constellation
04 Jul	10.47	00.18	1.36	Leo	00.37	12.42	-2.50	Pisces
18 Jul	10.43	23.29	1.43	Leo	23.39	11.50	-2.60	Pisces
03 Aug	10.39	22.37	1.48	Virgo	22.37	10.46	-2.71	Pisces
16 Aug	10.37	21.56	1.50	Virgo	21.45	09.50	-2.80	Pisces
01 Sep	10.37	21.05	1.51	Virgo	20.40	08.38	-2.88	Pisces
15 Sep	10.39	20.23	1.51	Virgo	19.43	07.32	-2.92	Pisces

SATURN					URANUS			
	Rises	Sets	Mag.	Constellation	Rises	Sets	Mag.	Constellation
04 Jul	12.06	00.47	1.11	Virgo	00.30	12.31	5.82	Pisces
18 Jul	11.17	23.49	1.12	Virgo	23.31	11.35	5.79	Pisces
03 Aug	10.22	22.48	1.10	Virgo	22.28	10.31	5.77	Pisces
16 Aug	09.39	21.58	1.07	Virgo	21.37	09.38	5.75	Pisces
01 Sep	08.47	20.57	1.01	Virgo	20.33	08.32	5.73	Pisces
15 Sep	08.02	20.04	0.95	Virgo	19.37	07.33	5.73	Pisces

that she wants to speak to one of the astronomers and not a night-watchman”, was his reply. I decided to take the call.

After an introductory “Hello”, she blurted out excitedly, “I have spotted a UFO above Arthur’s Seat!”, which is, of course, a famous hill in the city. I was just about to inform her that it was Venus when I thought “Hold on! Venus is in the south and Arthur’s Seat is to the north.” The only way she could see Venus over Arthur’s Seat was if she lived to the north of it, where the nearest land across the Firth of Forth was the south coast of Fife many miles in the distance. Then I remembered Portobello.

Portobello is a long strung-out suburb of Edinburgh lying between Arthur’s Seat and the Firth. I had solved the problem. She lived in Portobello. “Madam, do you live in Portobello”, I asked. There was a long silence. Eventually she replied “Yes, I do. Isn’t it amazing what you astrologers can tell from the stars”.

In 1971, I left astronomy behind as a career and became a medical physicist specializing in medical imaging and image processing. I have, however, always thought of that story when I wanted something to smile about. The confusion between astronomy and astrology has always amused me, although I know some who get annoyed at the problem. I recall once incurring the wrath of Vincent Reddish, who, that morning, had been called a senior astrologer by the Scottish Daily Express. All I asked was if it was going to be a good day for Gemini people. From his look, and the fact that he was Deputy Director of the Observatory at the time, I gathered that it was not.

UFO’s have also given some astronomers problems. It is easy to be dismissive, but I seem to recall that Len Lawrence, an astronomer at the Observatory and a good friend, was a member of the British UFO Society. I know that this will come as a surprise to even amateur astronomers but Len was totally convinced of their existence.

For my own part, I am very sceptical; yet I once spotted something over Loch Long which I have never been able to explain fully. It was a light which moved in an unusual way and was definitely not a conventional aeroplane or helicopter. This occurred in the sixties when I was studying astronomy and it certainly was not a celestial object or artificial satellite, the latter being a rarity at the time in any case. That area of Scotland is well-known for testing military aircraft and I decided that was the most likely explanation. Len would have disagreed.

Alex Houston

Aitchison	Patera in Lavinia Planitia region of Venus
Alan	Lunar crater, part of 23 crater string Catena Davy (11.0° S, 7.0° W)
Albert	Minor planet 719
Alex	Minor planet 3367
Allen	Minor planet 19727
Anderson	Lunar impact crater located on the far side of the Moon; periodic comets 148P, 156P
Banks	Minor planet 13956
Bell	Lunar impact crater located on the far side of the Moon
Brown	Lunar impact crater in SE part of the Moon to SW of crater Tycho
Cairns	Crater on Mars at 23.8°N 47.5°W
Cameron	Small lunar impact crater lying across NW rim of crater Taruntius
Cooper	Lunar crater in N hemisphere on the far side of the Moon
Davis	A rock on Mars recorded by Mars Exploration Rover Spirit; minor planet 3638
Dixon	Minor planet 11833
Douglas	Minor planet 2684
George	Minor planet 3854
Georgina	Crater on Venus
Graham	Minor planet 3541
Grant	Minor planet 3154
Harrison	Minor planet 4149
Houston	Crater on Mars at 48.5°N 224.1°W; minor planet 3031
Iain	Tiny lunar crater near the rille Rima Bradley (Ian)
Jennifer	Crater on Venus; minor planet 6249
Kent	Minor planet 28346
Julie	Crater on Venus
Kathleen	Tiny lunar crater near the rille Rima Bradley; minor planet 3754
Love	Impact crater on the far side of the Moon
Mark	Crater on Saturn’s moon Mimas
Moffat	Minor planet 5542 (Moffatt)
Olivia	Crater on Venus; minor planet 835
Paul	Minor planet 3525
Peters	Small lunar crater in the N-NE part of the Moon
Rebecca	Crater on Venus
Roberta	Minor planet 335
Russell	Lava-flooded remains of lunar impact crater in W part of Oceanus Procellarum; Mars crater at 54.9° S 347.6°W; periodic comets 83D, 89P, 91P, 94P
Sandi	Crater on Venus
Simpson	Minor planet 4788
Smith	Lunar impact crater located within huge walled plain Apollo, on far side of Moon; Mars crater at 66.1°S 102.9°W
Stewart	Lunar crater
Terry	Minor planet 21952
Val	Crater on Venus (Valerie)

THE MOON

Smith lecture 8th January 2010

by John Moffat

John began by saying that before we knew what it was, the Moon was mystifying and was attributed all sorts of powers, even deified. As soon as it was realised the Moon was a great rock orbiting the Earth, theories developed to explain how it got there. John showed us animations of "The Drop Theory" and "The Great Collision Theory". The drop theory proposes that an impact on early molten Earth induced a great blob of molten rock to rise up on one side of the spinning Earth to be flung out into orbit, but simulations have failed to reproduce such a phenomenon. However, simulations of a Mars sized planetesimal hitting the Earth throws up great showers of material which form a disc of dust and debris particles in millions of chaotic colliding orbits resulting in accretion of the material into bigger and bigger objects. The biggest masses gravitationally gobbling up all the others until there was only one; the Moon. The initial impact would have been absorbed and dissipated by the blasting of the great masses of mantle material from the two objects into space, while their slowed metal cores went on to just merge together. Hence the Earth has an exceptionally large iron core and a strong magnetic field, while the Moon has no iron core and no pole to pole magnetic field.

The Moon is much larger in its proportion to the Earth than other solar system moons are to their parent planets. Even so, while the Moon is a quarter of the Earth's diameter it is only one eighty first of Earth's mass.

It is not of even density, so its centre of mass is not at the centre of its sphere. The dense side has got pulled to face the Earth so there is a far side of the Moon we never see from Earth. The Russians were the first to show us this far side and hence a lot of the features on the back of the Moon have Russian names.

John went on to show us some stunning pictures of the Moon's surface demonstrating how craters age over billions of years. In youngish craters the steep rims start slumping down forming terraces. In the big, old craters the terraces are eroded by billions of years of bombardment from meteorites, space dust, and radiation. Until humans actually went there it was thought dust from impacts and from space would have accumulated as a layer deep enough for space craft and astronauts to sink into with disastrous consequences. However, it was found that over millions of years in a vacuum continuously bombarded with solar protons and cosmic rays, the dust grains had mostly cemented together into rock, which was just as well for the Apollo missions.

The Apollo missions were seen to be very lucky because over a hundred robot

about that: this is an object with the mass of the Sun and it got kicked so hard it went shooting off hundreds of times faster than a rifle bullet. Yeah, you might want to sit for a moment and soak that in.

It gets worse! Since it's seen in the Chandra data, that means it's hot. Glowing at several million degrees, the energy it gives off in just X-rays is a hundred times the Sun's total energy production! If you replaced the Sun with SGR 0526-66, you'd barely be able to see it since it's so small, but it would hardly matter: the X-rays it gives off would cook the Earth like a marshmallow in a furnace. If that's not enough awesome for you, the magnetic field at the surface of the neutron star is about 100 trillion times stronger than the Earth's!

Neutron stars are small in stature, but nothing else about them is. Studying supernovae remnants is interesting scientifically for lots of reasons, not the least of which is that they create the heavy elements in the Universe, so we literally owe our lives to them. That would be enough... but I know that secretly, astronomers study them because they are simply so frakkin' cool.

Or maybe it's not so secret.

Phil Plait

Acknowledgements

Phil Plait's blog *Bad Astronomy* is at:

<http://blogs.discovermagazine.com/badastronomy/>

This content distributed by the AAVSO Writer's Bureau

VENUS, UFO's, ASTROLOGY AND PORTOBELLO

(with apologies to those who have heard the story before)

I believe that the year was 1968 and I was collecting spectra from the 36" telescope at the Royal Observatory Edinburgh (ROE) as part of my PhD project at Edinburgh University. I had been out on the roof of the observatory and noticed that Venus was particularly brilliant that night in the southern sky.

Health and safety in those days involved the night-watchman at the observatory checking in the domes every hour during his rounds. I was therefore surprised when he appeared in my dome on an unscheduled visit.

He informed me "There is a lady on the phone saying that she has spotted a UFO". "Tell her that it is Venus", I replied carrying on with my work. "I think

lumpy sphere of gas about 30 light years across (300 trillion kilometers, or 180 trillion miles), located in the Large Magellanic Cloud, a satellite galaxy to our Milky Way. The blue in the picture is the emission from gas heated to millions of degrees, and shows X-rays detected by the Chandra observatory. The yellow and purple are from Hubble data, showing gas being whipped and beaten by shock waves slamming around inside the remnant.

Turn your attention to the little blue blob to the right, marked by the red arrow. It's outside the main bubble of the nebula, meaning that it must be moving faster than the gas in general. This is seen sometimes in supernovae remnants: a bullet or focused blob of gas screaming away. It may be caused by magnetic fields in the expanding gas just after the star explodes, launching the octillions of tons of matter away in all directions, or it may be due to focusing from shock waves, which can sculpt the gas and create little pockets of denser knots.

Either way, this bullet is moving away from the nebula at speeds of more than 2200 km/sec (1300 miles per second) — fast enough to cross the United States in less than 3 seconds. The mass of the blob is unclear, but to give you an idea of the energies involved, it emits 10 times the Sun's total energy in just X-rays alone. Incredible.

Now focus your attention to the star-like point source indicated by the other red arrow, near the top of the remnant. The astronomers took a good look at that object, which was previously known to be an object called SGR 0526–66. SGR stands for Soft Gamma ray Repeater, an object that periodically blasts out flashes of super-high-energy gamma rays. SGRs are neutron stars, the ultra-compact and überdense (I know, I'm running out of adjectives.. but just you wait...) leftover cores of stars that have exploded. They can have more than the mass of the Sun compressed down into a ball just a few kilometers across! A cubic centimeter of neutron star material (usually called neutronium, a word I love love love) weighs about as much as the combined weight of all the cars in the United States. So there's that.

The astronomers found the age of the SGR to be a few thousand years, which matches the age of the nebula! That means it's very likely this is the leftover core of the star that exploded and created N49 itself. But what's it doing way off centre?

Astronomers think that sometimes the explosion can be off-centre in the star, so that things don't quite expand the same in all directions. Given the energies involved (hint: a LOT) this can give the neutron star a kick, sending it caroming through space at high velocity. If SGR 0526-66 is indeed the leftover cinder from the explosion, to get where it is in the time since the explosion it has to be moving at a velocity of at least 790 km/sec (490 miles/second). Think

space craft were sent to the Moon and the majority failed one way or another. John allowed generous time for questions and discussion, this time was well used especially by the members of the public attending this interesting meeting.

Chris Davis

LIFE AND AN INFINITE UNIVERSE

Trying to explain the Universe as a progression from pure energy to material galaxies is not actually enough. Cosmological theories will only be complete when they are able to explain galaxy formation containing intelligent life.

The fact we are obviously here leads to the assumption intelligent life is a natural product of the Universe. Far from it: we still do not know how life originated, it only seems to have done so once (we only know of one type of genetic material) and intelligence only seems to have evolved once after two and half billion years of evolution. The valid argument is that there are billions of star systems in the visible Universe, surely at least one other will have life..... not if the probability of life originating is hundreds of trillions to one, as some reputable calculations indicate based on the chance of the right proteins forming spontaneously to enable the first DNA to replicate.

Consequently our existence can be argued to be very special and it depends on some very particular properties of the Universe. The presence of planets with relatively stable climates to allow time for evolution, the unique ability of the element carbon, to form a vast range of "organic" molecules and the essential but atypical behaviour of water; to mention a few of those particular properties.

Therefore the question of how life could have evolved in the known Universe leads to the deeper question of how did a universe capable of evolving intelligent life ever come into existence.

There is a way to answer this question (without invoking the intervention of impossible-to-explain gods), and that is to postulate that the Universe is infinite in time and space, and that many of its perceived finely tuned constants allowing life are in fact variable parameters: parameters which can vary from time to time and place to place over massive time and space scales. Scales against which the Big Bang would appear as just a passing hiccup.

In such an infinitely diverse Universe just about anything could happen eventually, even the appearance of intelligent life from a cloud of hot gas.

Cosmological theory needs to be able to embrace the wider picture of an infi-

nite Universe from which our amazing life form could be seen to arise quite naturally, no matter the odds against it.

Chris Davis

DOME TEAM REPORT

Terry, Hamish and I had quite a successful morning up at the dome on Friday June 10.

Inspection revealed crumpled detached and missing copper cladding along the aperture edge. Terry was able to largely restore the cladding except for the missing bits, although he managed a temporary patch where the rain was getting in at the top.

Hamish carefully jemmied one of the top shutter wheels back onto its rail, and did all the necessary ladder setting to allow Terry safe access to the damaged cladding. The ladders were kindly lent to us by the Highland Hotel maintenance department.

I was "gofa" making sure the guys had what they needed when they needed it, then interrupting them to get some photos and video.

Although less water should get in now the missing copper flashing needs replacing, and the shutter is still up to an inch short of complete closure at the top of the aperture.

It could be something to do with the big rear pivot. It could be slightly misaligned and/or sticking. The pivot needs disassembling, inspecting and greasing.

Terry and Hamish have already generously offered their expertise for another dome maintenance session to start addressing the identified defects.

Chris Davis

Editor's Note:

The above article formed a report sent by Chris to our Chairman and is reproduced here with the permission of everyone involved.

GUEST ARTICLE: CRAZY VIOLENT EXPLOSION SHOOTS OUT TWO COSMIC BULLETS

I deal with superginormously ridiculous energies, velocities, and sizes all the time as an astronomer. You get used to it after a while... then something like this'll slap you upside the head: a star that exploded more than 5000 years ago launched two epic bullets. One is a cloud of gas screaming away at thousands of kilometers per second, and the other is the cinder of the star itself, an octillion-ton cannonball blasting through space in a totally different direction.

This is a composite picture of the supernova remnant N49: an expanding

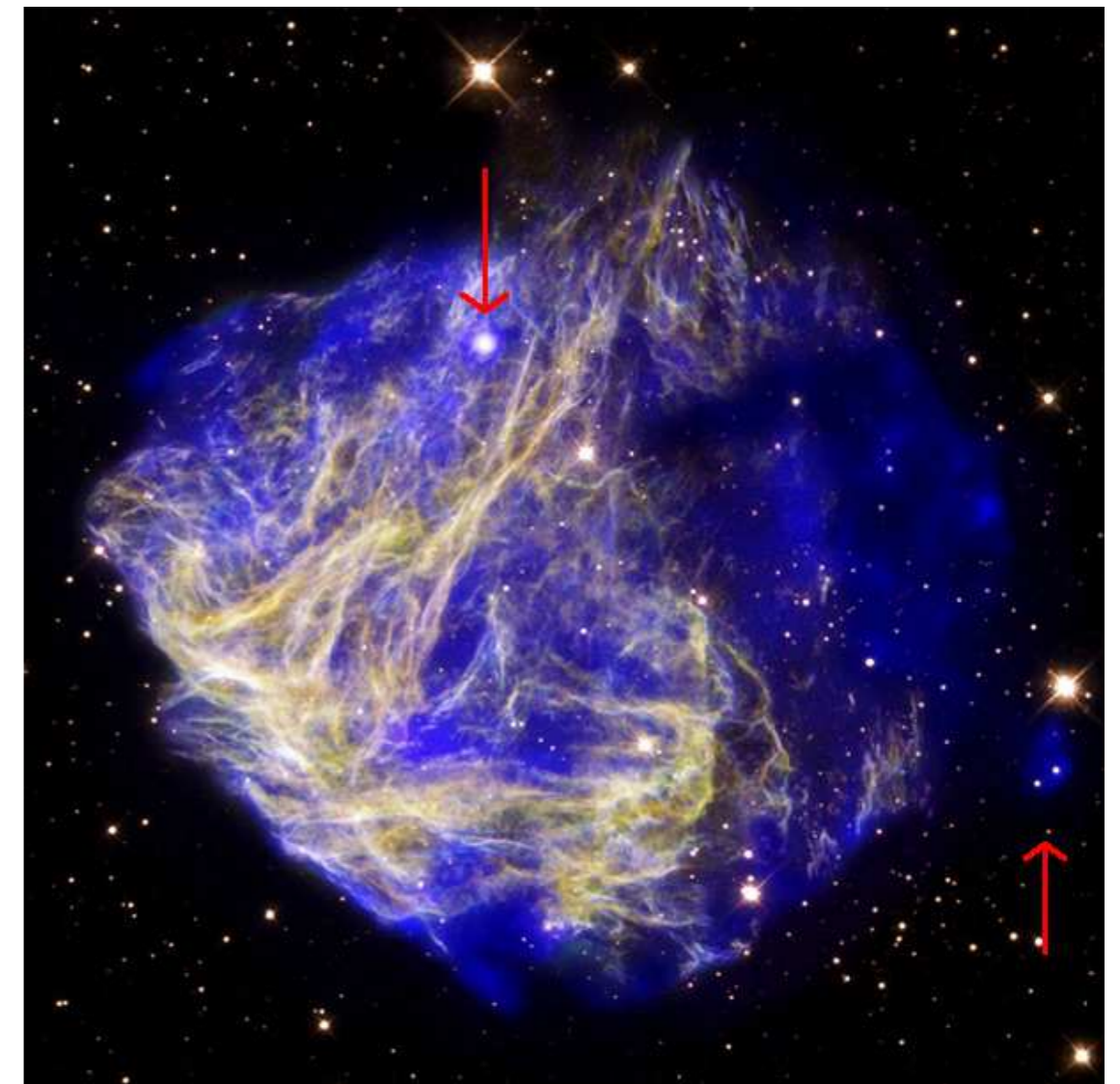


Image credit: X-ray: NASA/CXC/Penn State/S.Park et al
Optical: NASA/STScI/UIUC/Y.H.Chu & R.Williams et al