



TRANSIT

The Newsletter of



05 July 2008



Noctilucent clouds over County Durham, 27 June 2008

Front Page Image – Images taken by John and George Gargett

Last meeting : 13 June 2008. Dr Jim Wild of Lancaster University will give a talk on “The Aurora Borealis” as part of the International Heliophysical Year (IHY) programme.

Next meeting : 12 September 2008. Presidential Address: Title t.b.a.
by Jack Youdale FRAS, Honorary President of CaDAS

Letters to the Editor :

I read Alex's account of his correspondence with a boneheaded council official, with a mixture of amusement and dismay - but not a great deal of surprise. The gentleman concerned - a lighting engineer, who should know better - said that he was "not prepared to reduce the lighting level at the pavement", when Alex had, of course, not asked him to do any such thing!

If Alex felt that he was banging his head against a brick wall, then he has my sympathy. This brings to mind a conversation which I once had with a member of the public, on the subject of light pollution...

Back in 1990, during that year's National Astronomy Week, CaDAS had a display in the Castle Centre in Stockton, trying to get people interested. This was also the time when the Dark Skies 2000 campaign was launched, to try to combat light pollution in the UK - so as well as advertising our society, we were publicising the campaign.

While I was manning the stand, one chap saw the Dark Skies 2000

poster, and asked me what it was all about. Being well aware of the tendency of non-astronomers to get the wrong end of the stick, I carefully explained that we didn't want to "put the lights out", or to get rid of streetlights, but only to make them more efficient. Being also well aware that most people don't care about the interests of astronomers, I emphasised that light pollution does in fact affect everyone, as wasted light equals wasted electrical energy, equals wasted public money - not to mention the environmental consequences of wasting fossil fuels.

I explained that we were campaigning for the introduction of full-cutoff streetlights, which - and these were my exact words - "direct all the light downwards, where it's needed, and not upwards into the sky, where it's wasted. Then we would get the same level of illumination on the ground, for half the power."

His response: "But then 'ow would we see where we were going?"
D'OHHHH!!!!

From Neil Haggath

Meet the Plutoids: IAU Makes Amends for Pluto's

by Amir Alexander



It has been nearly two years since the members of the International Astronomical Union (IAU) decided that Pluto, known since its discovery as the "9th planet," was not a planet at all. Instead this longstanding favorite of children around the world was designated as a founding member of a new class of "dwarf planets." According to the IAU, the exclusive and now permanently closed club of "true" planets includes only the eight inner planets, from Mercury to Neptune. No new space rocks need apply.

Now, in an apparent effort to assuage angry Pluto supporters, the IAU has decided to honor the former planet with a new distinction: Dwarf planets, at least those residing at the edge of the solar system beyond the orbit of Neptune, will henceforth be known as "plutoids."

To be precise, according to the IAU's definition a plutoid is a celestial object that satisfies three conditions: it orbits the Sun at an average distance greater than that of Neptune; it is massive enough that its own gravity brings it to hydrostatic equilibrium, making it near-spherical; and it has not cleared the neighborhood around its path from other orbiting debris. This last condition is crucial for distinguishing

plutoids from true planets, which orbit in regal isolation after having cleared all debris from their path in the early days of the solar system.

In addition to Pluto itself, the IAU has so far designated only one other object as a plutoid: that is Eris, the giant Kuiper belt object (KBO) whose discovery upset the old planetary order. Unlike other large solar system objects detected in recent years, Eris was found to be larger than Pluto. It followed that if Pluto was a planet, then Eris should certainly be one as well, and other large KBO's might qualify for the honor as well. But if Eris was not a planet, then Pluto certainly should not be one either. It is this option that was ultimately adopted by the IAU, in effect permanently limiting the number of planets to eight.

In addition to Pluto and Eris, several other objects are being considered for the "plutoid" designation. The candidates include giant KBO's 2005FY9, known informally as "Easterbunny," and 2003EL61, nicknamed "Santa." Other large objects, such as Sedna and Quaoar, may qualify as well, but they are too dim for their shape to be determined with confidence. Their induction into the ranks of plutoids will therefore have to wait until better images are available.

Will Pluto's many fans around the world accept plutoids into their hearts, and acknowledge them as true heirs of their favourite (former) planet? Only time will tell.

Multiple Star Observations in May 2008 – Part 1

from Mike Gregory

O. S. 028/08 – Thursday May 1st –

It appeared to be a beautiful evening at 23.00 BST so I built my refractor up on the lawn and polar aligned for 22.15 UT but by the time I was ready to go, as ever, it was clouding over. The story of every suburban astronomer's life!

I had a go for Izar, epsilon Bootes, and though it was cleanly separated at 118x, there was just no contrast, so I changed tack and searched for M 3 and M 13. Both easily found but no amount of eyepiece changing made either look anything worth looking at thanks to thin hazy cloud. More in desperation than anything else, I had a go for M 104 and Porrima, gamma Virgo, in the southwest as it looked clearer, but no sign of the former and no chance of separating the latter.

I had a look at Saturn but the planet was sitting almost on the line of my roof and was shimmering behind the heat haze rising from the said roof. So I slewed almost 150 degrees across the night sky into Camelopardalis and the Gotostar found 1 Cam without any further slewing. Nicely split at just 25x and clearly so at 59x but, as ever, little sign of the vivid yellow and electric blue colours of eight months ago.

Next I moved eastwards into nearby Cassiopeia and had a go for Struve 3053, the Gotostar positioning the little 'bent tree' group of three stars almost in the centre of a two-degree

field of view. Again nicely split at 25x and widely so at 59x. However, the colours were not too clear; no sign of the yellow and turquoise that gives Struve 3053 the sobriquet 'Little Albireo'!

O. S. 029/08 – Friday May 2nd –

It looked to be a good night for observing, but what do I know... I set my refractor up at 23.30 but I must have misaligned it somehow and was miles out before I even started*. I found Arcturus (alpha Bootes) first and used the synch mode to improve my local alignment, my plan being to work through my whole list of multiple stars in Bootes. Alas, the best laid plans oft go awry...

I aimed for 1 Bootes (Struve 1772) first but could see no sign of a companion star. Perhaps at magnitude 8.5 this secondary was just too dim in the prevailing conditions, being only 4.6 arc seconds from its neighbour that is almost forty times brighter. Even after spending several minutes comfortably seated at the eyepiece and using various magnifications, no definite sign of a companion. However, thin cloud was drifting across from the west so this was not helping even though the primary star could still be seen. The spectra for 1 Bootes is A1 & dF8 (white and yellow white though almost yellow)

I moved to nearby Struve 1785, which, though closer and dimmer, has almost equal magnitudes of 7.6

& 8.0 and a separation of 3.3 arc seconds though slowly widening. The magnitude difference is quite small and the primary does not really outshine the secondary by all that much especially as they both appear to be orange red in colour – perhaps more like rust brown to my eyes – at 100x magnification. Struve 1785 is a gravitationally bound pair with a primary spectrum of K6 (according to Burnham) though Sky Catalogue 2000.0 suggests N2 (a deep red star with a temperature of 2,500 degrees which would agree more with my rust brown view) and a grade 2 period of 155.0 years. But as with 1 Bootes, conditions were simply not amicable for any kind of astronomical observing.

Not wishing to give up without seeing a nice double or two, I had a go for Izar (epsilon Bootes) and was able to separate this pair at 118x though there were no real signs of the yellow and blue colours. The primary looked definitely silvery though there was a hint, perhaps, of silver blue in the secondary. Very poor though compared to say five or six years ago!

Finally I managed to find and separate pi Bootes at 59x but, as with Izar, very poor compared to even recent times.

[O. S. 030/08 – Monday May 5th 2008](#) – Though conditions were far from amicable, I was well aware of this when I set my refractor up on the lawn at 23.15, polar aligning for 22.15 UT 5th May. If it was all going to go pear-shaped weather-wise

again then I was aware of that problem before I started.

The plan was basically a rerun of Friday's observing: I started with Struve 1772 and, as with Friday night, no clear success. At low magnifications (say 40x) this double looked as though it was elongated but at magnifications of around 80x & 120x there was absolutely no sign of two components. However, as stated in last Friday's entry, the primary of this pair outshines the secondary by a factor of almost 40x.

So I moved on to my second target, Struve 1785, which though tighter than Struve 1772, has almost equal magnitudes so neither star overpowers the other. Even in the rapidly worsening conditions, this gravitationally bound pair was comfortably separated. Conditions must have been better than last Friday for then both components looked decidedly reddish brown but on this occasion the slightly dimmer star appeared to have a lighter shade – say yellow white – though the Washington Double Star Catalogue says the primary is K4 and the secondary K6 which suggests I was correct the first time... I wish I had never started this!

My next target was Struve 1835, also in Bootes, which has magnitudes of 5.5 & 7.0 with a separation of 6.2 arc seconds. It was reasonably separated at 40x and easily so at 80x. The spectra suggests the colours are pure white and yellow, the secondary star being gravitationally bound in its own right with an orbital period of forty years;

magnitudes are equal at 7.5 and a very close separation of just 0.2 arc seconds – the domain of a 25 inch aperture – so I didn't bother!

I also looked at Struve 1834, another gravitationally bound pair with equal magnitudes of 7.0 and an orbital period of 320 years and, though the separation has widened from 1.1 arc seconds in 1950 to 1.4 arc seconds in 2000, splitting this pair was beyond me and my 102mm refractor on this – on any? - night.

F G W Struve gave Izar, epsilon Bootes; the poetic name of 'Pulcherrima' which means 'most beautiful' but it was not too impressive on this night. Just separated at 118x, it really needed 200x to bring out the blue of the secondary component. In previous years I have seen the colours at 60x from my own back garden.

Then to the almost adjacent xi Bootes, the yellow and reddish star which is one of the closest known GB stars to our Solar System though it looked more silver and bronze on this night. Easily split at 59x though!

Arcturus, alpha Bootes, is the brightest star in the northern hemisphere but, suddenly, it has gone. Just no sign of it in the haze so I moved eastwards into adjacent Hercules and had a look at kappa Her that is a very wide and nondescript unequal pair easily split at my lowest magnification. Colours supposedly yellow-orange and orange but on this occasion more like white and... Not much of a challenge!

In rapidly deteriorating conditions I searched for and found 95 Herculis, a neat pair made famous by the nineteenth century 'gentlemen' astronomers who frequently disagreed about the vivid colours. Clearly none of them ever observed from my back garden. To my eyes on this night both appeared silvery but it would be well worth returning on a better night.

By now Hercules was disappearing too so I moved further east into Lyrae but even that vivid blue searchlight of a star, Vega, was disappearing fast and it was time to retire gracelessly indoors!

Part 2 next month

Phobos Might Only Have 10 Million Years to Live

written by Fraser Cain

You can breathe easily. The Moon is slowly receding away from the Earth at a rate of 3.7 cm/year (1.5 in/yr). But the Martians aren't so lucky. Their moon Phobos is known to be

doing exactly the opposite. It's spiraling inward, and in the distant future it will crash into the surface of Mars. Researchers originally thought that Phobos has about 50 million

years to go, but an Indian researcher has re-run the calculations and thinks Phobos only has about a quarter of that time to live.



It was originally believed that Phobos would take about 50 million years to crash into the surface of Mars, but according to Bijay Kumar

Sharma, an Assistant Professor at the National Institute of Technology in Bihar, India, it might happen much more quickly. Dr. Sharma has revised the calculations for Phobos' destruction in his new paper, "Theoretical Formulation of the Phobos, moon of Mars, rate of altitudinal loss".

According to Sharma, Phobos will actually be destroyed about 10.4 million years from now, and not the 50 million years the researchers had previously calculated.

Phobos is believed to be an asteroid that Mars captured early on in its history. It's one of the least-reflective objects in the Solar System, and thought to be similar to a D-type asteroid. It currently orbits Mars at an altitude of about 9,380 km (or about 6,000 km above the Martian surface).

Why does the Earth's moon spiral outward, while Phobos is spiraling inward to Mars? The Moon formed billions of years ago when a Mars-

sized object crashed into Earth and sprayed material into orbit. This material pulled back together from mutual gravity to form the Moon, and this debris received a gravitational slingshot from the Earth.

The key is that the material was tossed into a high enough orbit, above what's known as the synchronous orbit. This is where the Moon completes an orbit slower than the Earth takes to rotate once. Since the Moon ended up higher than this orbit, it's spiraling outward. If its orbit was less than the length of a day, it would spiral inward.

And this is what has happened to Phobos. It orbits below this synchronous orbit, where it completes an orbit around Mars faster than the planet itself turns. It's spiraling inward instead of outward.

Once Phobos gets down to an altitude of only 7000 km above the center of Mars (or 3,620 km above its surface), it will enter what's known as the Roche limit. At this point, the tidal forces of Mars will tear Phobos apart, turning it into a ring that will continue to spiral into Mars. According to Dr. Sharma, this will happen in only 7.6 million years from now.

To know exactly how long Phobos has to live, Dr. Sharma suggests that a mission should be sent to Phobos to land on its surface and then use radar to measure the changing distance to Mars.

Bears in Space

from Pat Duggan



a tardigrade – “waterbear”

Is there anyone else out there? The question that sometimes astronomers ask as they look out into the dark blue yonder. In Popular Astronomy magazine a person called Tony Buick is appealing for help.

He has taken upon himself and his team the task of mapping in the UK occurrences of the tiny things called “Tardies”. Tardigrades, he tells us are living things that survive in extremely inhospitable circumstances on Earth and have been chosen to be studied in space.

The project is called Biopan – 6 and was launched on a Soyuz-U from

Kazakhstan in September 2007. It is carrying 43 European experiments under the name “TARDIS” and is run by the European Space Agency.

The tardigrade genus has more than 800 species already described and some are up to a millimetre long and called “water bears” because of their shape. They apparently evolved during the Cambrian Period 530million years ago or perhaps even earlier. “They rank among the most indestructible of animal forms,” he says, able to remain in a state of suspended animation or cryptobiosis.

He would like people to collect moss samples from places that periodically dry out. Place separate samples from different sites in pots and almost cover with rainwater for three hours. Bump the moss with tweezers onto a glass slide and look at the tiny wiggles through a microscope. Apparently the shape of the tardies is easy to identify, see website, www.givemethemoon.com and report your sightings.

A worthwhile website to visit

from Ed Restall

Have you come across this site? It's pretty comprehensive & has some quality podcasts: <http://astronomy.libsyn.com/>

Visual Observing and Drawing

from Michael Roe

I have done a lot of visual astronomical observing over many years and mostly I like to draw what I can see. My first observations I drew were of several phases of the Moon in 1974 when I was 12.

I have read a lot in astronomical magazines on the rise of CCDs and webcam observations and that observing at the eyepiece and drawing observations is somehow obsolete. But if you are good at something why stop? I strongly suspect that far more amateurs astronomers actually look through telescopes than use electronic devices, its just that magazines pay more attention to electronic ways of observing.

Visual observing takes a lot of patience and years of practice just to see the details on the Moon or planets, or the vague hazy forms of nebulae or comets. Always remember that photographs in books and magazines show far more brightness and detail in deep sky objects due to long exposures or CCD imaging than you can hope to see with the human eye. Also all those colours are almost non-existent looking through a telescope. I found this out in the 1970's, first from the black and white photographs in older books, then colour photographs. Sadly nebulae and galaxies appeared as faint and grey objects through the eyepiece! So, what looks more interesting?

The Moon is the easiest to observe with lots of bright and obvious features in any telescope but frequent observing sees more. For instance, most observers know that Plato is a dark oval crater but seeing the tiny craterlets on its floor is very difficult, I have only seen them a couple of times.

Planets are different, small, shockingly small in the eyepiece to a beginner but again, experience can help with seeing tiny details on Mars, Jupiter and Saturn. I have even seen smudgy markings on Venus but I have never anything on Mercury, seeing as a crescent is an achievement. Uranus is a tiny bluish disk, Neptune barely a disk. And Pluto? Get a big telescope, go to the south of Britain and it is still, I believe, looks as the faintest of stars

The stars look lovely, so bright and shiny. I have seen amazing swarms of stars in Sagittarius at a very low altitude and the nebula within it. If you want to see a nebulae start with the Orion Nebula, nothing else from British latitudes compares with it. Other nebulae from magnitudes from +6 to +10 are also visible, it is only recently that their magnitudes have been published in magazines.

Globular Clusters are among my favourite deep sky objects. Through my 12" telescope the M13 Globular Cluster in Hercules is spectacular, so many stars concentrated into the centre, brighter stars against a

thousand or so fainter magnitude +14 stars, an incredible sight!

Galaxies are interesting too but not as spectacular. The M51 Whirlpool Galaxy appears usually as a circular haze, bright in the centre, with a smaller companion haze, NGC 5195. I first saw it as a spiral in 1992 using an 11" reflector at the Basin Howe Star Party. Since then I have seen M51's spiral arms in my 8" Celestron and my 12" Meade Lightbridge Dobsonian. It looks like a very faint version of the photographs but with lots of surrounding haze.

There is also the oval Andromeda Galaxy, M31, large enough to see by naked eye at over 2 million light years away, but even in a telescope I can't see much structure at all. I do like observing the smaller distant galaxies in Virgo, Canes Venatici too. There are many galaxies in and near the bowl of the Plough constellation, my newer 12" telescope reveals more of these small fuzzy blurs.

Important things affecting observing are the weather itself, the state of the atmosphere called seeing, can blur viewing, especially high magnification views of the Moon and planets. Haze affects views of deep sky objects and unfortunately our British cloudy skies often stop any observing for long periods.

To locate objects a good sky atlas is essential. I use a 1970's Atlas Coeli, though there are now many more up to date versions of sky atlas.

Magnification is something to be careful with. Everybody knows that telescopes magnify, so the temptation is to use the highest power eyepiece.

I, like many new observers, used a x100 eyepiece on a 60mm (2.4") refractor telescope in 1972 and saw very little. Saturn streaked past through the field of view but I did observe the Moon - it had human visitors on its surface in those days.

So steer clear of adverts for x600 "Super Power Telescopes", you may might see a blurry view of the Moon but very little else! A larger telescope can give you wonderful star field view at x50 and x200 is good enough for any planetary view. Any new telescope takes time to become familiar to use, to learn the controls and to make any adjustments needed, properly aligning the spotter scope and learning to use a star atlas. My 12" reflector came with a disappointing modern style "red spot" finder instead of an optical finder tube, the manufacturers didn't think one was necessary. I very soon upgraded to a traditional spotter scope.

Now to drawing. This takes practise too and an artistic talent helps. I am lucky that I may have such a genetic talent. It is still difficult drawing something you see through a telescope and remembering it well enough to draw it. I use a torch covered in red cellophane when I am drawing, it doesn't affect night vision and provides sufficient torchlight.

In my time observing with many telescopes I have observed and

drawn many objects seen in the night sky including comets, some tiny and faint, others much brighter like Halley's Comet and Hale-Bopp, a spectacular comet. There is so much to observe and a permanent drawing is a wonderful record. There is one object I have only seen once, a supernova. It was in the M81 galaxy.

I have never seen a Quasar yet but I have seen asteroids, plenty nebulae, globular clusters and eight out of the nine planets (Pluto still eludes me) and many other wonders of our universe.

I would like to mention one man, Harold Hill. He died recently and was probably the best observer of the last few decades. His drawings of all things in the sky were amazingly accurate but his detailed drawings of the Moon, which he concentrated on, were stunning.

My ability is good but nowhere near Harold Hill's amazing skills. Exceptional helps too. I have seen many observations of planets better than mine but all of us who can should try. Good luck in your observing.

[Where are the Sunspots? Are we in for a Quiet Solar Cycle?](#)

written by Ian O'Neill



Daily Sun: 29 Jun 08, [Spaceweather.com](#)

The sun is blank--no sunspots. Credit: SOHO/MDI

So what's up with our Sun? Is it going through a depression? It seems as if our closest star is experiencing a surprisingly uneventful couple of years. Solar minimum has supposedly passed and we should be seeing a lot more magnetic activity, and we certainly should be observing lots more sunspots. Space weather forecasts have been putting Solar Cycle 24 as a historically active cycle... but so far, *nothing*. So what's the problem? Is it a ticking bomb, waiting to shock us with a huge jump in solar activity, flares and CMEs over a few months?

Or could this lack of activity a prelude to a very boring few years, possibly leading the Earth_Towards another Ice Age?

It's funny. Just as we begin to get worried that the next solar maximum is going to unleash all sorts of havoc on Earth, scientists begin to get concerned as to whether there is going to be a solar maximum at all. In a conference last week at Montana State University, solar physicists discussed the possibility that the Sun could be facing a long period of calm, leading to the contributed to what became known as the "Little Ice Age" here on Earth. As the Sun provides Earth with all its energy, during extended periods when the solar output is lower than average, it seems possible a lack of sunspots on the Sun (i.e. low activity) may be linked with periods of cold down here.

"It continues to be dead. That's a small concern, a very small concern." - Saku Tsuneta, National Astronomical Observatory of Japan and program manager for the Hinode solar mission.

However, solar physicists are not too worried about this possibility, after all, it's only been two years since solar minimum. Although activity has been low for the beginning of Cycle 24, sunspots have not been non-existent. In January of this year, a newborn spot was observed, as expected, in high latitude regions. More spots were seen in April. In March, sunspots from the previous solar cycle even made an

concern that there could be another Maunder Minimum. The Maunder Minimum (named after the late 19th Century solar astronomer Edward W. Maunder, who discovered the phenomenon) was a 17th Century, 30-year period when very few sunspots were observed on the disk of the Sun. It is thought by many scientists that this period

appearance, putting on an unexpected show of flares and coronal mass ejections (CMEs).

As pointed out by David Hathaway, a solar physicist at NASA's Marshall Space Flight Center, the fact that sunspots have already been observed in this new cycle means that it is highly unlikely we face anything as extreme as another Maunder Minimum. Hathaway says there is nothing unusual about having a relatively understated solar cycle after several particularly active cycles. Solar Cycle 23 was a very active period for the Sun with a greater than average number of sunspots observed on the solar surface.

It appears there are two different predictions for the activity level of the next solar cycle. On the one hand we have scientists that think this cycle might be below average, and on the other hand we have scientists who believe the next cycle will be the biggest yet. We certainly have a long way to go before we can begin making any accurate solar forecasts...

Are we alone?

A review of SETI and its weekly podcast by Andy Fleming

The age-old question, eloquently answered by Ellie Arroway's dad in Carl Sagan's book and following 1997 movie Contact "*well if we are, it's an awful waste of space*".

Over the last fifty years, more and more scientists have stepped out of the closet to seriously confront this most ancient of all questions, shunned for centuries by serious scientists, fearsome of professional ridicule. Both Frank Drake and Carl Sagan risked their professional careers by engaging with both the public and the scientific establishment in trying to have both exobiology and the Search for Extraterrestrial Intelligence (SETI) taken seriously.

The former of course went on to formulate the famous "Drake Equation" which ostensibly estimates the number of intelligent galactic civilisations, but in reality reveals the immensity of what we really don't know. The latter's PBS series "Cosmos" ponders the question of extra terrestrial intelligence several times when the late NASA astronomer asks what are their politics, religions, and how different are they from us?

Regarding exobiology, now termed astrobiology, Drake, Sagan and others succeeded. It's a subject that has finally come of age. The majority of serious scientists today are now minded to the consensus that life is common in the universe.

Some of it may be lurking within our own solar system – in sub-surface Mars or in Jupiter's moon Europa's subterranean water ocean. Many reckon it's only a question of time and political will before we find it – the technology already exists.

Indeed, with projects such as NASA's James Webb Telescope to be launched in 2013, and its Terrestrial Planet Finder project, we may, through spectroscopy of their atmospheres, have gathered evidence of the signature of life on planets orbiting other suns before evidence is forthcoming from Mars, and certainly Europa. However, most scientists take the view that when we find these critters they are likely to be primitive – microbes, bugs – lichens and algae if we're lucky.

The scientists at the SETI Institute in Pasadena, California stick their heads out further than this though. They're willing to spend their professional time and careers scanning millions of radio channels to see whether ET has mastered the art of propagating electromagnetic radiation, or even discovered the power of lasers. The search started with Frank Drake at the Green Bank Radio Telescope in the early 1960s and has, with new technology, quickly developed since then.

From scanning one channel at a time, SETI astronomers can now scan millions of frequencies at once.

They've even enlisted the help of some of the world's largest radio telescopes, such as the gigantic Arecibo dish in Puerto Rico, and had (albeit for a short period) the help of full scale NASA involvement. They've even enlisted surfers to participate in a most ingenious project called SETI@home, where wide scale distribution and processing of Arecibo data on individual personal computers globally circumvents the need for expensive supercomputers to process the masses of radio information. Drake and Sagan even sent a message in 1974 via the Arecibo dish to the globular cluster M13, in the hope ET will hear us (a reply via radio would take 46,000 years to reach us, so don't hold your breath!)

Despite direct NASA funding for SETI being withdrawn in the early nineties, and despite the lack of a repeated independently verified signal from ET, the SETI Institute continues to thrive and gather respectability. Evidence for this comes from an increasingly respectable list of sponsors including Sun Microsystems, Hewlett-Packard and a massive donation from Paul Allen, co-founder of Microsoft who has provided funds for the Allen Telescope Array (formerly the One Hectare Array) – a kind of Socorro Very Large Array on steroids purely for SETI.

The organisation's public outreach initiatives include a superb website at <http://seti.org/>, public lectures in the United States, and the now

weekly "Are We Alone?" SETI Institute Radio podcast.

I have had the pleasure of listening to this programme for the past couple of years. Whatever your feelings on SETI, and the "Intelligent" part of it certainly divides scientists (many of whom postulate that it is not science, as at its basis is an hypothesis that is not falsifiable) - as a standalone general science broadcast it is a polished piece of work, outshining much of what is available on terrestrial media in the UK. The programme is presented by SETI's senior astronomer, and man of fine humour and knowledge, Seth Shostak. This SETI stalwart is usually joined by Molly Bentley, who is the senior producer of SETI Radio, and has in the past presented science reports from the USA on both the BBC World Service and BBC News 24.

Like the Planetary Society's "Planetary Radio", "Are We Alone" always includes interviews with top scientists from a host of different fields, from sociology, psychology, anthropology and biology, right through to genetics, astrobiology, astrophysics and cosmology.

As NASA itself has concluded, illustrated by its own "Origins" initiative, the SETI Institute recognises the need for a multi-disciplinary approach when it comes to thinking about intelligent aliens. In the process, it educates the listener extremely well in cutting edge science, explained with wonderful analogies for the lay person. Indeed these excellent podcasts require little

previous scientific knowledge – this fact being amazingly juxtaposed with an enormous amount of valuable knowledge being conveyed in each fifty minute (35MB mp3 or wma format) fast broadband download.

This Sagan-esque public outreach approach, combined with the multi-disciplinary angle is illustrated well in the last SETI Radio broadcast I heard before penning this review. Entitled “Life’s Stories” it centred around a series of interviews conducted with senior scientists at the AbSciCon (an acronym standing for Astrobiology Science Conference) held recently in Santa Clara, California, and sponsored by the SETI Institute. On the show’s menu was a very interesting interview with Diana Valencia, planetary physicist at Harvard University, about the discovery of an increasing number of “super earths” (terrestrial or water worlds with masses up to five times that of the Earth).

Charly Lineweaver, cosmologist at the Australian National University was interviewed concerning his research into the size and age of possible habitable zones in galaxies, where stars and their solar systems can reside away from the effects of galactic central black holes, overcrowding of stars and resulting frequent supernovae events and lethal levels of cosmic rays.

Baruch Blumberg, a scientist at the Fox Chase Cancer Institute, Nobel Prize winner and Trustee at the SETI Institute was interviewed concerning the role of viruses in the

development of life, and was questioned as to whether viruses as self-replicating structures themselves constituted a primitive form of life. Other interviewees commented on their respective specialisms that included the length of the present epoch when the universe was able to form terrestrial planets (i.e. the period during which there was sufficient metallicity for terrestrial rocky worlds to form around stars). Asteroid impacts and volcanic activity were also discussed along with their implications for mass extinctions such as the KT and Permian, and resultant large reduction in biodiversity.

Unbelievably, all of these interesting items were discussed in a fascinating fifty minute quality audio broadcast (burn it onto audio CD and listen on your hi-fi), and one that I thoroughly endorse.

A quality science programme such as this cannot be cheap to research, or produce, bearing in mind in the superb technical and presentational quality. The programme succeeds in traversing the difficult tightrope of both being highly entertaining and highly informative, with both Seth Shostak’s knowledge, jokes and humour being nicely contrasted with Molly Bentley’s common sense and professional journalistic style. This is borne out by the terrestrial radio transmission of the show on many talk radio stations, both in the US, and globally.

For the listener, the show succeeds in providing a high quality up-to-date general science, astronomy and

cosmology “fix”, while it also acts as a superb ambassador for the organisation striving to answer that greatest of all questions – “Are We Alone”.

Full details of the present show and the SETI Radio show archive (all

available for download) at: <http://radio.seti.org/> where you can also participate in the SETI blog, contact Seth and Molly, or just enjoy the rest of a very professional website.

The Milky Way Has Only Two Spiral Arms

written by Fraser Cain



If you were stuck inside your house, you'd never know what it looks like from the outside. That's the situation with the Milky Way. We're inside it, so we don't really know what its structure looks like. There are other examples of grand spirals that we can see, but this is like seeing other houses outside your window; you just can't be sure. Astronomers have developed a detailed map of the Milky Way, and realized that they were giving our home galaxy too many arms; it's only got 2, and not 4 like astronomers originally thought.

The new revelation was made

possible thanks to NASA's Spitzer Space Telescope, which sees in the infrared spectrum, and can peer through the gas and dust that obscures the plane of the Milky Way. Previous maps of the Milky Way were first developed in the 1950s, when astronomers used radio telescopes to trace out the spiral arms of our home galaxy. They focused on gas clouds, and revealed what they thought were 4 major star-forming arms: Norma, Scutum-Centaurus, Sagittarius and Perseus.

We live in minor arm called the Orion Arm, or the Orion Spur, located between the Sagittarius and Perseus Arms.

And then in 2005, astronomers used infrared telescopes to pierce through the clouds of gas and dust to see that the central bar in the middle of the Milky Way extends much further than previously believed.

In a new survey by Spitzer, astronomers merged together 800,000 photographs containing over 110 million stars. Software counted up the number of stars and measured their density.

As expected, astronomers found an increase in density in stars towards the Scutum-Centaurus Arm, but no increase towards the Sagittarius and Norma arms. The Perseus arm wraps around the outer portion of our galaxy and can't be seen in the Spitzer images.

This helps make the case that the Milky Way only has two spiral arms; a commonly seen situation where a galaxy has a long central bar.

Where Is the New Horizons Spacecraft?

Written by Nancy Atkinson

Even though New Horizons is the speediest spacecraft ever to travel through our solar system, it still has a long way to go on its voyage to Pluto and the Kuiper Belt. However, New Horizons hit an interplanetary milepost in June 2008 by crossing the orbit of Saturn. At 1.5 billion kilometers or 935 million miles (10.06 astronomical units) distant, that's a mission's worth of miles for most spacecraft. But for New Horizons, it's just another interplanetary milepost on its voyage to the outer reaches of our solar system.

As a testament to New Horizons' speed, the spacecraft set a record for the fastest transit to Saturn by any spacecraft, making the trip in two years and four months. Voyager 1, the previous record holder, made the journey in approximately three years and two months.

Still aiming for its arrival at the Pluto/Charon system in July of 2015, New Horizons' mission managers tell us the spacecraft is healthy, and in electronic hibernation.

After a productive two-week series of system checks, maintenance activities, and software and command uploads, New Horizons is humming through the outer solar system at 65,740 kilometers per hour (40,850 mph). The team expects to keep the spacecraft in hibernation until Sept. 2.

Although the first 13 months of the mission kept the New Horizons team pretty busy, through its encounter with and gravity assist from Jupiter in February 2007, the next few years will probably be fairly quiet for the mission's scientists and engineers.

In a previous interview, Alan Stern, New Horizons' Principle Investigator told Universe Today, "The middle years will be long and probably, and hopefully, pretty boring. But it will include yearly spacecraft and instrument checkouts, trajectory corrections, instrument calibrations and rehearsals for the main mission."

During the last three years of the interplanetary cruise mission, Stern said teams will be writing, testing

and uploading the highly detailed command script for the Pluto/Charon encounter. The mission begins in earnest approximately a year before the spacecraft arrives at Pluto, as it begins to photograph the region.

As New Horizons crossed Saturn's orbit the ringed planet was nowhere to be seen, as it was more than 2.3 billion kilometers (1.4 billion miles) away from the spacecraft.

And speaking of the Voyager spacecraft (way back in the first paragraph), Voyagers 1 and 2 are at the edge of the Sun's heliosphere some 100 AU away, and are the only spacecraft operating farther out than New Horizons.

The next big milepost on New Horizons' journey? Crossing the orbit of Uranus, on March 18, 2011.

100 years since Tunguska

NASA/JPL NEWS RELEASE

Posted: June 29, 2008



At around 7:17 on the morning of June 30, 1908, a man based at the trading post at Vanavara in Siberia is sitting on his front porch. In a moment, 40 miles from the center of an immense blast of unknown origin, he will be hurled from his chair and the heat will be so intense he will feel as though his shirt is on fire. The man at the trading post, and others in a largely uninhabited region of Siberia, near the Podkamennaya Tunguska River, are to be accidental eyewitnesses to cosmological history.

"If you want to start a conversation with anyone in the asteroid business all you have to say is Tunguska," said Don Yeomans, manager of the Near-Earth Object Office at NASA's Jet Propulsion Laboratory. "It is the only entry of a large meteoroid we have in the modern era with first-hand accounts."

While the impact occurred in '08, the first scientific expedition to the area would have to wait for 19 years. In 1921, Leonid Kulik, the chief curator for the meteorite collection of the St. Petersburg museum led an expedition to Tunguska. But the harsh conditions of the Siberian outback thwarted his team's attempt to reach the area of the blast. In 1927, a new expedition, again lead by Kulik, reached its goal.

"At first, the locals were reluctant to tell Kulik about the event," said Yeomans. "They believed the blast was a visitation by the god Ogdy, who had cursed the area by smashing trees and killing animals."

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

"Those trees acted as markers, pointing directly away from the blast's epicenter," said Yeomans. "Later, when the team arrived at ground zero, they found the trees there standing upright -- but their limbs and bark had been stripped away. They looked like a forest of telephone poles."

Such debranching requires fast moving shock waves that break off a tree's branches before the branches can transfer the impact momentum to the tree's stem. Thirty seven years after the Tunguska blast, branchless trees would be found at the site of another massive explosion -- Hiroshima, Japan.

Kulik's expeditions (he traveled to Tunguska on three separate occasions) did finally get some of the locals to talk. One was the man based at the Vanara trading post who witnessed the heat blast as he was launched a few yards. His account:

Suddenly in the north sky... the sky was split in two, and high above the forest the whole northern part of the sky appeared covered with fire... At that moment there was a bang in the sky and a mighty crash... The crash was followed by a noise like stones falling from the sky, or of guns firing. The earth trembled.

The massive explosion packed a wallop. The resulting seismic shockwave registered with sensitive barometers as far away as England. Dense clouds formed over the region at high altitudes which reflected sunlight from beyond the horizon. Night skies glowed, and reports came in that people who lived as far away as Asia could read newspapers outdoors as late as midnight. Locally, hundreds of reindeer, the livelihood of local herders, were killed, but there was no direct evidence that any person perished in the blast.

"A century later some still debate the cause and come up with different scenarios that could have caused the explosion," said Yeomans. "But the generally agreed upon theory is that on the morning of June 30, 1908, a large space rock, about 120 feet across, entered the atmosphere of Siberia and then detonated in the sky."

It is estimated the asteroid entered Earth's atmosphere traveling at a speed of about 33,500 miles per hour. During its quick plunge, the 220-million-pound space rock heated the air surrounding it to 44,500 degrees Fahrenheit. At 7:17 a.m. (local Siberia time), at a height of about 28,000 feet, the combination of pressure and heat caused the asteroid to fragment and annihilate itself, producing a fireball and releasing energy equivalent to about 185 Hiroshima bombs.

"That is why there is no impact crater," said Yeomans. "The great majority of the asteroid is consumed in the explosion."

Yeomans and his colleagues at JPL's Near-Earth Object Office are

tasked with plotting the orbits of present-day comets and asteroids that cross Earth's path, and could be potentially hazardous to our planet.

Yeomans estimates that, on average, a Tunguska-sized asteroid will enter Earth's atmosphere once every 300 years. On this 100th anniversary of the Tunguska event, does that mean we have 200 years of largely meteor-free skies?

"Not necessarily," said Yeomans. "The 300 years between Tunguska-sized events is an average based on our best science. I think about Tunguska all the time from a scientific point of view, but the thought of another Tunguska does not keep me up at night."

Galaxy Zoo's special exhibition of merging galaxies

by Dr Emily Baldwin

Since Galaxy Zoo opened its gates almost a year ago, over 125,000 armchair astronomers have visited the online menagerie and made around 40,000,000 individual classifications of elliptical, spiral and merging galaxies. Now the team are appealing to the public to review their set of possible merging galaxies in order to answer some long standing questions about the weird and wonderful world of interacting galaxies.

As with any zoo the oddest creations provide the greatest thrill, and Galaxy Zoo is no exception. From the original classifications, the

results of which were recently submitted to peer reviewed journals, a fantastic set of merging galaxies have been identified.

The Galaxy Zoo team are now relying on the public to review the set of possible merging galaxies, in order to make sure the team have as many true merger candidates as possible, therefore maximising the pool of scientific data to work with.

The results will help to answer some of the long standing questions surrounding the importance and frequency of merging galaxies.

In theoretical simulations astronomers have found that the merger of spiral galaxies can create an elliptical galaxy, and that an elliptical can become a spiral by accretion of further stars and gas during its lifetime. Since Edwin Hubble first devised the galaxy classification system, which divided galaxies into two main categories – rugby ball shaped ‘elliptical’ galaxies and whirlpool like ‘spiral’ galaxies – there has been controversy among scientists about how these two principal types are even connected in the global understanding of galaxy formation and evolution.

By classifying some of these images visitors are helping astronomers to understand the structure of the Universe and how galaxies form and evolve..

The work of the Galaxy Zoo team, and of the interested public, is far from done: Galaxy Zoo 2's

development is well under way, which will see a much more detailed classification system of the brightest galaxies in the Sloan Digital Sky Survey, an ambitious astronomical survey which is systematically mapping a quarter of the entire sky.

Even further down the line we will see Galaxy Zoo 3 with brand new data.

The ultimate goal of Galaxy Zoo is to perform a census of the one million galaxies captured by the Sloan Digital Sky Survey.

To find instructions on how to contribute to the Galaxy Zoo survey, including an interactive tutorial to teach you how to classify the galaxies, visit www.galaxyzoo.org, but be warned, it's highly addictive!

Transit Tailpieces

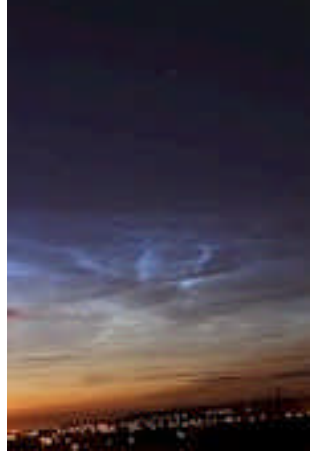
Articles : Please send contributions for the newsletter to Bob Mullen,

18 Chandlers Ridge, Nunthorpe, Middlesbrough, TS7 0JL, 01642 324939 (b2mullen@hotmail.com) Copy deadline date is the 20th of each month.).

A good introduction into the LHC at CERN

If you have 27.15 minutes to spare and want an insight into the Large Hadron Collider at CERN, follow the conversation between Dr Brian Cox and comedian (but intelligent) Chris Morris as they walk around the LHC.

<http://www.guardian.co.uk/science/audio/2008/jun/30/cern.chris.morris.podca>



More Noctilucent Clouds from John and George Gargett, June /July 2008

June's Jupiter from Keith Johnson

With Jupiter's altitude reaching just over 13° prior to this capture I knew instinctively that seeing conditions would be very, very poor, however what I really wanted to know is - how large Jupiter would show up on the Toucam Pro.2 CCD chip using my lowest power barlow which incidentally is a 2.5x Powermate. The RGB channels both automatically and manually, why manually ? due to the turbulent atmospheric conditions at such a low altitude it's like throwing the red, green and blue channels into a washing machine for a quick spin! The GRS was transiting during the capture.

An amateur using the same C9.25" OTA in Australia is achieving not only detail of Jupiter but some of the Jovian Moons too!



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