



TRANSIT

The Newsletter of



05 September 2007



A composite image of Perseid meteors travelling through Ursa Major using a Mintron video camera at the Wynyard Woodland Park Planetarium, Monday 13th August 2007 - Keith Johnson

Editorial

Next meeting : Friday, September 14, 2007 subject and presenter to be announced by the Secretary in his Summer Newsletter. Location - Wynyard Planetarium.

Masood UI Hasnan. We are very sad to report that Masood passed away in August after a long illness. Having been introduced to CaDAS by Ray Worthy he regularly appeared at meetings and always showed great interest in the content of the talks. He personified the social Society member in chatting with any member he met during the evening and I am pleased to report he was the first person to speak to me on my own first visit.

Our condolences go out to his family and his astronomical friends who will miss his presence.

Letters to the Editor :

From Neil Haggath

Thomas Wright Trophy 2007. This year's Thomas Wright Trophy quiz will be hosted by York A.S. - but still with Yours Truly as Questionmaster.

The good news - for those who saw my unsatisfactory effort a couple of years ago - is that I've now acquired a proper electronic lockout buzzer system (amazing what you can find on eBay!), so we can now have a couple of quickfire "on the buzzer" rounds.

If anyone wants to come along and support the CaDAS team, the details are as follows:

Date: Friday 5 Oct

Time: 8.00 p.m.

Venue: Priory Street Centre, Priory St., York.

<http://www.streetmap.co.uk/newmap.srf?x=459847&y=451528&z=1&sv=459847,451528&st=4&ar=Y&mapp=newmap.srf&searchp=newsearch.srf>

There's a car park just a couple of hundred yards away in Nunnery Lane.

Perseids at the Planetarium

from Bob Mullen

12/13 August 2007. After a dodgy day of wet weather and heavy cloud in the region it was a bit iffy going up to the Wynyard Planetarium at 8:00pm. By 10:00pm it was a totally different sky, clear over 80%. The early comers were treated to a superb view of Jupiter as it dipped behind the trees. A couple of telescopes gave members of the public their first view of the same four moons of Jupiter that tickled Mr Galileo all those years before.

DAS and CaDAS was well represented with a fair number of personal telescopes set up around the car park with the owners providing sky views and astro knowledge up to their usual high standard – the public visitors were mightily impressed.

The first observed meteor was also mightily impressive! An almost vertical slow blue-green trail with a glowing, good sized head and a trail of smoke. First time meteor observers were really spoilt. They were hooked. As an early evening bonus the Gargett twins looked at Heavensabove.com and announced timings for an imminent ISS (plus attached Shuttle) pass. On the dot it appeared from the west and cruised ever so gently and very brightly to the east.

By this time a number of meteors were being spotted from all directions of the compass. There seems to have been a large number of sporadics over the previous week as well as the Perseids, tonight was no different. Necks were rotating like a squad of nervous Meerkats and more shouts of disappointment than success were heard as they were inevitably looking in the wrong direction at a particular moment – all part of the fun. A fair number of meteors were slow Earth grazers and often gave enough time for most observers to re-orientate themselves and glimpse the trails.

The Gargett twins did their Heavensabove.com search again and came up with two timings for Iridium passes (communications satellites with huge reflective antennas). Again, spot on time, a most magnificent -7 magnitude Iridium flare appeared directly above the audience and lasted long enough for all to view it. A while later a second satellite produced a flare of -6 magnitude. In between times we observed a fair number of other man-made satellites passing overhead.

Most of the forecasts for this year's Perseids quoted anywhere between 70 – 100 meteors per hour, observation of these numbers should have been enhanced by a total lack of Moon. I would place the average rate we observed over the night was nearer 30 per hour. Judging by the number of faint fast-movers we observed I believe our limiting factor was the Teesside light pollution, the greater number of fainter meteors just being swamped by the background street lighting which became more dominant the longer we were outside. Observers on the North

Yorks moors or up in the wilds of Northumbria must have had their socks knocked off!

We estimated well over 100 people attended the event, most were first time observers and none, I am sure, went away disappointed. I was proud and impressed by the attention the DAS and CaDAS members paid to the public as they unreservedly allowed access to their telescopes and their knowledge of the night skies.

Although the clouds came in for an hour or so around 2:00 am they cleared almost totally for the rest of the night. Mars rose after midnight and shone brightly in Taurus, giving the observers their second planet of the night.

A great night of observing in really good company, the weather was kind, the meteors performed well, roll on the Leonids in November.

A Graphic Method of Showing Meteor Radiants

from Keith Johnson

On 12/13th August 2007 the Perseid meteor shower was captured over a number of hours by continually pointing the Mintron video camera towards Ursa Major. The video output was sent to a DVD recorder.

Using up a lot of time and patience the video was viewed the following day and any frames which had captured a meteor travelling through Ursa Major was extracted and combined onto a single image along with other captured meteors. The result is shown Fig 1.



Fig 1: Meteor trails through Ursa Major

An image including Ursa Major and the Perseus constellation was obtained from Skymap Pro - shown in Fig 2.



Fig 2 : Skymap Pro map with Ursa Major and Perseus constellations

I then scaled and layered the multi-meteor image from Ursa Major into the Skymap Pro, extending the meteor trail by adding coloured tracks which then depicted the radiant originating from Perseus. .

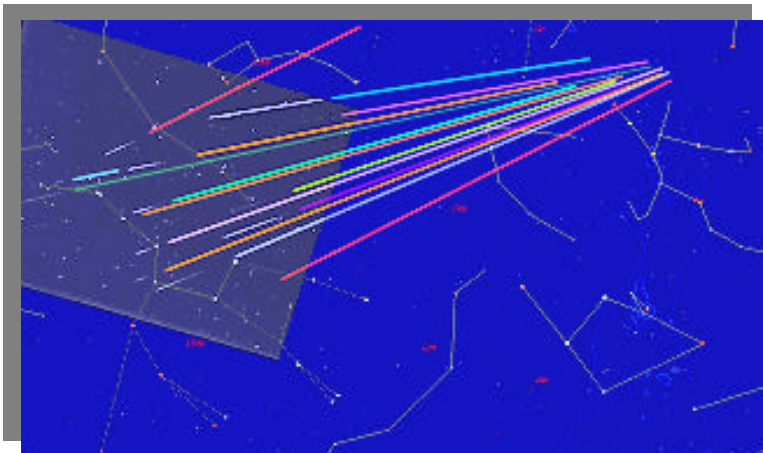


Fig 3 : Radiant trails superimposed onto meteor trails showing Perseus as the shower radiant

(A very clever demonstration. We used it in a WWP Planetarium presentation for Gifted and Talented youngsters attending a summer astronomy course at Durham University – they were very impressed. Editor)

The Summer Triangle

from Joe Rao

Well up in the eastern sky during the late-evening hours is the "Summer Triangle," not a constellation, but a very noteworthy star pattern of the summer sky consisting of three bright stars from three constellations.

Brightest of the three is Vega, in the constellation of Lyra, the Lyre. Next in brightness is Altair in Aquila, the Eagle. Finally, there is Deneb in Cygnus, the Swan.

To our eyes, Altair appears to shine only half as bright as Vega and Deneb seems only one-third as bright as Vega. So at first glance, Vega appears to rule this section of the sky. In reality, however, a bit of celestial deception is at work here, for Vega appears very bright chiefly because of its proximity to us. Vega is 25 light-years away, so when you are looking at it tonight, you are really seeing it as it was back in 1982.

Altair is 17 light-years away, closer than Vega, yet appearing somewhat dimmer. That tells us that in terms of overall luminosity between the two, Vega is indeed the brighter star: it is 48 times brighter than our sun, while Altair is only 12 times brighter.

A true giant

But what about the third star in the triangle, Deneb? Here, there is no comparison between either Altair or even Vega, for Deneb is one of the greatest supergiant stars known. It shines about 80,000 times brighter than our sun, but because of its vast distance from us – 1,467 light-years away – it appears as just a fairly conspicuous but by no means noteworthy star.

If it were somehow possible to move Deneb to Vega's distance from us, it would then appear to shine 16 times brighter than Venus is now, and capable of casting distinct shadows and be visible even in the daytime. Conversely, if we were to move Vega out to where Deneb is, it would shine only as bright as a ninth-magnitude star; you would need a star atlas to precisely locate it, and it would only be visible in good binoculars or a telescope.

With the bright moon now pretty much out of the evening sky this week, there is no better time than now to observe the beautiful summer Milky Way. With a good pair of binoculars or a telescope you can now observe millions of sparkling little stars that make up this glowing, irregular belt of luminosity. It appears to arch from the north-northeast to the south-southeast, with its brightest and most spectacular region running across the Summer Triangle and beyond toward the south-southeast horizon.

There appears to be a great black rift (sometimes called the "bifurcation") dividing it into two streams, beginning with Cygnus and extending down toward the south. Also in Cygnus is the black void known as the Northern Coal Sack.

This Coal Sack and the Rift are not holes in the Milky Way, but rather are vast clouds of dust drifting in interstellar space which, from our Earthly perspective, presents a solid and impenetrable curtain between us and the more distant stars.

[Did Life on Earth Originate With Comets?](#)

from Universetoday.com



The traditional thinking is that life on Earth began... on Earth. At some point in our distant past, some mixture of amino acids made the jump from a pool of organic molecules to something more lifelike. But maybe the source of life on Earth came from space, hitching a ride aboard balls of ice and dust comets.

This is the controversial theory proposed by Chandra Wickramasinghe, an astrobiologist at Cardiff University in the United Kingdom. Wickramasinghe is one of the long time proponents for the theory of panspermia; that life on Earth originated from space or another planet.

Wickramasinghe and his team are claiming that new evidence gathered by space probes reveals how these first organisms could have gotten started. When NASA's Deep Impact spacecraft ended its life in 2005, crashing into Comet Tempel 1, it discovered a mixture of organic and clay particles inside the comet.

One theory about the origins of life is that clay particles act as a catalyst, allowing simple organic molecules to get arranged into more and more complex structures. The 2004 Stardust mission found a range of complex hydrocarbon molecules when it collected particles from Comet Wild 2.

The Cardiff team think that radioactive elements inside comets could make pockets warm and toasty enough to keep water in its liquid form for millions of years. These iceballs could serve as the perfect incubators for early life. And when one finally crashes into a planet, it delivers this life to its new home.

Life and Intelligence In our Galaxy and Beyond

from Michael Roe

For centuries, maybe longer, the human race has wondered about life beyond our world. Certainly once the telescope was invented and the wandering stars called the Planets were seen as worlds, maybe like our Earth, speculation increased. Did life or some kind of people live there? The Moon was the most obvious place. It could be seen in great detail through telescopes but as observatories eventually revealed it as a desolate small world, totally airless, it fell out of favour as an abode of life.

The other worlds seemed more likely, especially Venus and Mars. Venus was conveniently hidden beneath clouds, anything might be under them. And Mars, well, the Martian canals brought speculation to fever pitch by 1900. Alas Venus was revealed by spacecraft as a roasting hell kind of a planet with a thick un-breathable atmosphere. Mars was revealed by other spacecraft as a world with a thin atmosphere and was very cold, the canals were an optical illusion, though there is still a chance of tough microbes living deep beneath the harsh surface. There are hopes too for life between the icy surface of Europa, one of Jupiter's moons, in its hidden icy sea. Other planets are either too hot, Mercury, or too cold, Saturn, Uranus, Neptune and Pluto.

So what about beyond our solar system? Billions of miles away, light years away amongst the other stars? We now definitely know there are other planets around many of the stars, that is the limit of our knowledge. What we know of life there is speculative as what our predecessors before 1800 knew about the solar system, still let's try.

It is known in our galaxy, the Milky Way, about 15 stars a year form over its lifetime so no more planets, life or intelligent life form more than 15 times a year on average. In fact many star systems of planets could easily be lifeless with just huge gas giant worlds or just small rocky or icy planets, missing the important life-bearing zone being too far away from their parent star, or having too eccentric an orbit.

Some even in such zones maybe pelted by asteroids or their star could be too variable or a short-lived giant star. Probably the very common Red Dwarf stars are too unsuitable also, with flares of radiation and planets close enough to produce life stuck one side permanently facing their sun, the other side permanently frozen. But composition, size, the right atmosphere, type of moons even, could destroy the chances of a planet even in the right orbit having life.

In fact for life to appear on any planet seems to need special conditions to form, probably hot bubbling springs or undersea vents gorging out chemicals, plus a few from asteroids and comet collision. Water is essential, so is carbon, given a

fairly stable environment and many millions of years life can appear, and we know it has on our Earth.

So among all kinds of strange worlds, gas giants with ring systems and rocky or icy battered worlds, there ought to be a few, just a few capable of supporting life, worlds rather like our own with oceans continents, maybe ice-caps, roughly the size of our Earth, looking similar to it from a distance, blue, covered in swirls of white clouds.

Of course such a world, as I've said, is rare and not among the nearest few stars, possibly up to a thousand stars would have to be examined to find one bearing some kind of life. And what could it be? Many types could be tough microbes or lichen-type life. 3,000 million years from life's origin to many-celled life beginning over 700 million years ago. Other life could be all kinds of strange forms – plants, animals or something else like fungi or even more alien.

Then we come to alien intelligence and extra-terrestrial civilisations. This has caused the most speculation. In fact, I have seen all kinds of TV programmes, among them my first memories over 40 years ago was a race of aliens called the Daleks on the television series, Dr Who. Its all very entertaining but doesn't get us to the truth at all. But the theory of evolution seems to help. Basically the evolution of life is this :- lifeforms are adapted to their environment and survive but when that environment changes most lifeforms die out, but some rare mutations survive, even breed and are adapted better than the original lifeforms to the new conditions. I think of evolution acting like a sieve, letting out just a few mutations.

But the thing is this that creatures, most likely animal life capable of the intelligence we have for writing, mass communication, science, space travel and civilisation of a higher order occurs in one out of a million star systems, it could be more or less. But using my one in a million figure that means one civilisation every 66,000 years on average appears in the Milky Way. Its not a lot and of course there could only be a few, even assuming a million years of civilisation each. So, where are these super highly advanced civilisations?

A good question! A physicist, Enrico Fermi, thought his conclusions were this ;_ if any highly advanced civilisations existed they would have colonised the Milky Way galaxy within a few millions of years. Yet even now, many years after he asked the question "where are they?" All our sophisticated telescopes, radio telescopes and spacecraft have picked up nothing! Nothing at all! No signals from alien civilisations have ever been detected by radio telescopes, by the many SETI (Search for Extra Terrestrial Intelligence) programmes, no amazing artificial celestial objects have been found in the sky and no genuine alien artefacts found on the surface of the Moon or similar worlds with hardly any surface erosion.

In fact, as the “Face of Mars”, and my Lunar Bridge feature show, any increase in resolution makes any suspected artificial feature dissolve into natural hills, ridges or craters just like the supposed “Canals of Mars!”

So why isn't the Milky Way galaxy full of star-hopping advanced aliens? And remember space crockery or flying saucers are usually in the eye and imagination of the beholder. Well, it is likely that other civilisations go through phases similar to ours. Various civilisations come and go across a planet, then one takes off, developing an Industrial Revolution based on science and technology. A huge population develops too and use of food, water and other resources spiral upwards. That is where our own civilisation is now, roughly 50 years from our first real spacecraft and radio telescopes.

But onwards onto the future many things could end our civilisation. The most likely threat is a combination of economic and population growth, currently at 6.5 billion humans, increasing at 85 million more every year. This will very likely end our civilisation in around 50 years time. This could easily happen to other civilisations throughout the Milky Way. Of course other civilisations may destroy themselves within a decade of inventing atomic bombs and others, more careful, with lower stable populations, might exist for thousands of years. But even assuming a generous average lifetime of 1000 years, that works out at a 1 in 66 chance of a sophisticated civilisation existing at any one time in the Milky Way galaxy. If these conclusions were wrong, advanced alien civilisations would have been detected by now.

At the moment there is one such civilisation in this galaxy and all of us here are members of it on planet Earth. Sadly this civilisation is certainly past its best. Look at the TV news if you have any doubts, we're not the civilisation anymore that got twelve people on the Moon over 30 years ago, are we? In fact a look at TV and the media shows that intelligent thought is not encouraged! So there we are, a Universe rather empty of civilisations. None have ever appeared capable of colonizing this galaxy or we would know. Possibly the nearest other civilisation is in some other galaxy millions of light years away. The lack of any civilisation exploring the galaxy could simply be the fact that travelling such distances in any reasonable time is physically impossible! Maybe the longer-lived civilisations live comfortably but not greedily, having explored their own planetary system but no further.

That is, the galaxy we could very well live in, with many worlds full of life, maybe millions, but those with advanced civilisations very rare, existing for just a few decades to a few thousand years. A flicker of existence on the galactic timescale!

Remember everyone, the universe is not how we may want it to be, it is how it is.

And what we can do about these dark thoughts? Not a lot! But I will probably watch those rather long-lived aliens, the Daleks, on TV, fantasy and fun!.

An Experiment to Test Panspermia

from Universe Today



One of most intriguing, and controversial, theories in astrobiology is the concept of Panspermia. This idea proposes that life on Earth might have begun on another planet, or maybe even out in interstellar space. Scientists have discovered just how hardy microbial life can be, surviving long journeys in the vacuum, cold, and radiation of space. Now an experiment has been devised to see how well microbes can withstand re-entry through the Earth's atmosphere.

The experiment, designed by Professor John Parnell from the University of Aberdeen, involves bolting a Scottish rock to the outside of an ESA research spacecraft. When the Foton M3 mission launches on Friday, September 14th, microbes in the rock will enjoy the acceleration of liftoff, 12 days of microgravity and vacuum, and then re-entry through the Earth's atmosphere.

"The objective behind this is to look at the rock's behaviour when it is exposed during re-entry through the Earth's atmosphere - when temperatures are extreme. This will tell us something about the likelihood of life being transferred between planets on meteorites.

"The Orkney rock is a very robust material but it will be interesting to see if organic matter in the rock is robust enough to survive the harsh conditions endured during re-entering the Earth's atmosphere."

In theory, asteroid strikes in the past excavated material on other planets, hurling microbe-laden rocks into interplanetary space. The rocks would then act as lifeboats, carrying the microbes to other planets. More importantly, they should protect the bacteria as the rock plunges into the atmosphere.

(As part of the same experiment Imperial College, London, considered strapping a first year Geology student on the other side of the ESA spacecraft to examine the feasibility of intelligent organic life both surviving re-entry and continuing intelligent behaviour following impact. In a recent round of volunteer student interviews it appears they failed to detect any sign of intelligence in the first place. This experiment has been delayed until further notice as they consider the level of intelligence in the Orkney rock surpasses that found in the volunteer students (with apologies to Mark) - Editor.

Astro imaging, the way it used to be done –

from the Bad Astronomer

Back in the day, before digital detectors, astronomers used glass plates to take images of the sky. Film is too flexible, and cannot be used to make accurate measurements of the positions of astronomical objects. Instead, companies like Kodak would spray the light-sensitive emulsion onto glass plates, which could be loaded into a large chamber on the back end of a telescope. The plates were big; 5x7 inches, 8x10 inches, and some were monsters, 18 inches on a side or more.

Using plates presented many problems. One is, they were heavy. Another was, duh, they were glass, and tended to break easily. A third one, weird as it may sound, is knowing which side had the emulsion on it! You can't look — they're light sensitive! All this has to be done in the dark, in a dark room. If you rub the plates, you mess up the emulsion and leave oil from your fingers. One classic way is to taste a corner! The emulsion has an odd, flat taste. Another way (invented by me — or at least I came up with it myself in grad school when we used plates as part of an imaging class) was to tap a corner of the plate on your front teeth. The glass side went *tink!* and the emulsion side went *tunk!* That worked every time.

A big problem is that plates aren't very sensitive to light. They absorb only about 2-5% of the light that hits them, as opposed to modern digital detectors, which can detect well over 95% of the light that hits them. So you might think that old plates are worthless, right? We can just retake the data with better cameras now! Bzzzzt. Nope. The sky changes. Galaxies change brightness, stars move (slowly, but some plates are 100 years old), supernova remnants expand. Old astronomical plates are literally a priceless, irreplaceable treasure.

And there lies the big problem. The Harvard Observatory has a collection of something like 500,000 plates — yes, half a million. These fragile slices of the past are hard to store. Imagine just how much they weigh in total! So the Observatory is embarking on a project to digitize all those plates.

If that sounds like a big job, well, *yeah*. We're talking petabytes of data! A petabyte is a thousand terabytes, and a terabyte is a thousand gigabytes. Getting the picture (harhar)? **This is millions of gigabytes of data.**

Yeah. It's a big job.

They were able to get enough money to buy the digitizer and start the project, but they'll need a few million bucks to get the job done. If there are any *very* wealthy BABloggees out there, now's the time to make yourself heard. You can pay per plates!

I was able to look at an old plate taken at the University of Virginia's telescope when I was in grad school there. I don't remember when it was taken; probably in

the 1930s or so. It was of the globular cluster M13, a glorious beehive of stars about 25,000 light years away. Had the plate not absorbed those photons, they would have streamed on their way, and they'd be, oh, some 70 trillion kilometers past the Earth by now (actually, they would have fallen to the floor of the observatory, but give me this poetic image). That old photo represented the cluster as it was seen more than half a century ago, a view we will literally never see again.

I hope Harvard is able to complete this noble project. The Universe goes on with or without us, but we have a chance here to freeze it, if only for a moment, and see what it was like in days gone by.

Don't forget, the Wynyard Woodland Planetarium and Observatory have a complete set of images from the 1956 Palomar All Sky Survey transferred from their glass plates to full size film plates. The survey covers from +90 degrees to -35 degrees and covers all 24 hours of RA. The U and V plates are exceedingly (and excitingly) detailed. The plates were personally donated to Dr John McCue and CaDAS by the ex-Astronomer Royal, Martin Rees..

A number of members in CaDAS are using these plates for a variety of research projects – asteroid orbits, double and multiple stars etc. Feel free to come along and view them on our electric viewing/measuring table at the Planetarium.

Some Thoughts on Science and Religion

from Neil Haggath

(as with some of Neil's other articles this one also comes with a health warning – Editor)

The August *Transit* includes a short article by Phil Plait on the definition of a scientific theory (“A scientific theory is much more than just a theory”). He uses the example of creationists who try to dismiss evolution by saying that “it’s just a theory”, and correctly says that those who use this argument either don’t understand, or conveniently choose to ignore, the scientific meaning of the word “theory”. I would like to elaborate on this theme.

As Plait says, a *law* describes something which happens in the natural world, based on observations, and a *theory* attempts to explain why it happens. They are not the same thing; a theory does not “become a law” when it’s proved. In fact, strictly speaking, a theory can never be absolutely *proved* to be correct; all we can say is that it’s supported by the evidence, and has passed all the tests applied to it. For example, we can be pretty confident that Einstein’s Theory of Special Relativity is correct, because it has passed every rigorous experimental test which has been applied to it for 100 years, with the observed results

matching those predicted by the theory to better than one part in a billion. But we can never be *absolutely 100% certain* that it will continue to pass even more accurate tests in the future.

The important point, however, is that a theory *can* be proved *wrong!* If a theory happens to be wrong, then it will, sooner or later, be *proved* wrong, by finding observations which can't be explained by the theory. This is how the scientific method works; a theory is formulated to explain the known facts and observations, then experiments are designed to test the theory. If an observation is found which doesn't fit, i.e. the observed outcome of an experiment doesn't match that predicted by the theory, then the theory is wrong, and must be modified so as to explain the new observations.

My point is that this is precisely what defines a scientific theory – it has to be testable, or as scientists say, *falsifiable*. That is, it must be possible to test the theory against observations, so that if it's wrong, it can be proved wrong. In fields outside science, there are many examples of so-called “theories”, which are, in the scientific sense, nothing of the sort. The most obvious examples are the so-called “conspiracy theories”, involving UFOs, the alleged faking of the Apollo landings, the death of Princess Diana, etc. etc. Every “conspiracy theory” is *by definition* untestable, since no matter how much evidence is presented, which proves such a “theory” wrong, its supporters will simply claim that the evidence was itself faked, as a further part of the conspiracy.

(As a priceless example, some 24-carat loony once appeared on a TV programme about UFOs, claiming that we are being visited by aliens on a regular basis. His pet “theory” was that the visitors’ spacecraft “are able to disguise themselves as ordinary aircraft”! How's *that* for a “theory” which can't be proved wrong?)

The same, of course, most certainly applies to religion, and especially to the claims of creationists! The rational among us can present any amount of evidence which proves the age of the Earth, but a creationist will respond by saying, “The scientists have got it wrong; they've misinterpreted the evidence”. Hmm, now let's see... the ages of rocks are determined by radioactive dating; the underlying physical process, radioactive decay, is so thoroughly understood that it's utilised daily in manufacturing (e.g. luminous paint, smoke alarms) and medical procedures (e.g. radiotherapy to treat tumours, barium tracers), the Voyager probes travelled across the Solar System powered by it, and millions of people routinely entrust their lives to heart pacemakers powered by it!

Some have even gone a step further, and claimed that “God has deliberately planted false evidence, to test our faith”! In other words, the entire Universe is a huge practical joke; their egomaniac God created it 6000 years ago, but then invested vast amounts of effort in making it *look* as if it's billions of years old – just to see whether we humans will continue to believe in him, when confronted

with overwhelming evidence of his non-existence! (Rick Fienberg, the Editor of *Sky and Telescope*, countered this by presenting the alternative “theory” that the Universe was created this morning, and each of us has just popped into existence, just as we are right now, with all our knowledge of history, and our memories of our lives up to now, falsely implanted in our brains. Think about it; this is no more ridiculous, and no less falsifiable!)

As Mark Twain said, “Faith is the ability to believe what you know not to be true.”

Those who know me may find this hard to believe, but I have a good friend who is a fundamentalist Christian and a creationist – the kind who actually believes that everything in the Bible is literally true, and that the Creation really happened 6000 years ago. And even more unbelievably, we have actually managed to discuss such matters in a (relatively!) civilised manner. He claims that creationism is “a valid scientific theory”, as an alternative to evolution and the Big Bang. *It is not!* From what I said above, it’s obvious that creationism is not a theory at all, in the scientific sense, as it is, again by definition, not falsifiable!

The same goes for any “explanation” of the Universe involving God, or any other supposed “supernatural” being. We can say that such and such a mythical event could not have happened, because it violates the laws of physics; the “faithful” will reply, “So what? God is *allowed* to violate the laws of physics!”

Returning to Plait’s example of evolution; some creationists have tried to tell us that the Theory of Evolution is not testable. The theory is supported by the fossil record; fossils of various organisms are found in particular rock strata, which correspond to specific periods of geologic time (remember that the ages of the strata are determined by radioactive dating – a physical process which is completely unconnected with evolution or biology), which enables us to create a “timeline” of evolution, showing that certain organisms existed before other more complex ones. But as the fossil record is incomplete, creationists claim that the gaps in it make it unreliable, as there is no absolute proof of one organism evolving from another. No, there isn’t – but the evidence we *do* have is enough to convince most rational people that evolution is the *most likely* explanation. (as Richard Dawkins points out, this “gaps in the record “ argument is analogous to saying that a jury can’t convict a person of murder, unless they are presented with a complete record of the accused’s every action, at every second of time leading up to the crime.)

More importantly, the creationists demand to know how the Theory of Evolution could be falsified; they claim that there is no hypothetical evidence which would convince scientists that the theory is wrong. But of course there is! *If* the theory was wrong, then there would be a blindingly obvious way in which it could be falsified. If a single fossil were ever to be found in the wrong rock stratum – in a layer corresponding to a time long before that particular creature is known to

have existed – then that would prove the entire theory wrong, wouldn't it? But of course, no such anomaly has ever been found, so the theory survives scrutiny.

I now come to my final point. One thing which I can never understand is how some people can profess both to be scientists and to believe in God! Some try to tell us that science and religion are somehow “compatible” – but *they are not!* From what I've said in this article, my reasons for saying so should now be obvious. Science and religion can never be compatible, as they are founded on completely opposing principles!

Firstly, religion (and I'm talking here about the concept of religion in general, not any specific one) is based on the concept of “sacred truths”; when a Christian (or Jew, Muslim, etc.) says that he “believes” such and such, he is actually saying “I stubbornly insist that this *is* the truth, and no amount of evidence will ever convince me otherwise”. Science, by contrast, is based on the principle that there is no such thing as a “sacred truth”; a theory is regarded as correct, only until such time as it is proved wrong by evidence.

Secondly, science is based on the principle that everything in nature can be described by natural laws (remember, laws describe nature, and theories attempt to explain it); in any given situation, given a knowledge of the laws and the initial conditions, the outcome can be predicted. Conversely, religion relies on the concept of “the Supernatural” and “miracles” – the notion that God (or gods) somehow exists “above” or “outside” the natural world (and I defy anyone to explain exactly what “outside” *means* in this context!), and is *not* subject to the natural laws of the Universe, but can violate them at will. This means that events in the natural world *can't* be predicted in accordance with the laws of science – and therefore, that all scientific investigation is pointless!

Furthermore, while the entire purpose of scientific investigation is to fill gaps in our knowledge and understanding, religion teaches that there are things which we are not *meant* to know – we are not permitted to “know the mind of God”, and have no right to try. The two are, *by definition*, incompatible, and always will be.

I'll end by saying that I thoroughly recommend Richard Dawkins' book, *The God Delusion* (Bantam Press, 2006). It's by far the best scientific demolition of religion I've ever read, and written in a style which is readable, entertaining and very witty. I recommend it not only to fellow atheists, but also to those “believers” who are not afraid to actually examine their “faith” in a critical manner.

Greatest Mysteries: How Did the Universe Begin?

from Kher Than

How did the universe come to be?

Fundamental mysteries

According to the standard Big Bang model, the universe was born during a period of inflation that began about 13.7 billion years ago. Like a rapidly expanding balloon, it swelled from a size smaller than an electron to nearly its current size within a tiny fraction of a second.

Initially, the universe was permeated only by energy. Some of this energy congealed into particles, which assembled into light atoms like hydrogen and helium. These atoms clumped first into galaxies, then stars, inside whose fiery furnaces all the other elements were forged.

This is the generally agreed-upon picture of our universe's origins as depicted by scientists. It is a powerful model that explains many of the things scientists see when they look up in the sky, such as the remarkable smoothness of space-time on large scales and the even distribution of galaxies on opposite sides of the universe.

But there are things about it that make some scientists uneasy. For starters, the idea that the universe underwent a period of rapid inflation early in its history cannot be directly tested, and it relies on the existence of a mysterious form of energy in the universe's beginning that has long disappeared.

"Inflation is an extremely powerful theory, and yet we still have no idea what caused inflation-or whether it is even the correct theory, although it works extremely well," said Eric Agol, an astrophysicist at the University of Washington.

For some scientists, inflation is a clunky addition to the Big Bang model, a necessary complexity appended to make it fit with observations. Nor was it the last such addition.

"We've also learned there has to be dark matter in the universe, and now dark energy," said Paul Steinhardt, a theoretical physicist at Princeton University. "So the way the model works today is you say, 'OK, you take some Big Bang, you take some inflation, you tune that to have the following properties, then you add a certain amount of dark matter and dark energy.' These things aren't connected in a coherent theory."

"What's disturbing is when you have a theory and you make a new observation, you have to add new components," Steinhardt added. "And they're not connected ... There's no reason to add them, and no particular reason to add them in that particular amount, except the observations. The question is how much you're explaining and how much you're engineering a model. And we don't know yet."

An ageless universe

In recent years, Steinhardt has been working with colleague Neil Turok at Cambridge University on a radical alternative to the standard Big Bang model.

According to their idea, called the ekpyrotic universe theory, the universe was born not just once, but multiple times in endless cycles of fiery death and rebirth. Enormous sheet-like "branes," representing different parts of our universe, collide about once every trillion years, triggering Big Bang-like explosions that re-inject matter and energy into the universe.

The pair claims that their ekpyrotic, or "cyclic," theory would explain not only inflation, but other cosmic mysteries as well, including dark matter, dark energy and why the universe appears to be expanding at an ever-accelerating clip.

While controversial, the ekpyrotic theory raises the possibility that the universe is ageless and self-renewing. It is a prospect perhaps even more awe-inspiring than a universe with a definite beginning and end, for it would mean that the stars in the sky, even the oldest ones, are like short-lived fireflies in the grand scheme of things.

"Does the universe resemble any of the physical models we make of it? I'd like to hope that the effort society pours into scientific research is getting us closer to fundamental truths, and not just a way to make useful tools," said Caltech astronomer Richard Massey. "But I'm equally terrified of finding out that everything I know is wrong, and secretly hope that I don't."

(Oh dear, here we go again, just when you think you are beginning to understand it they start with another fairy story... Editor)

Saturn's G Ring Explained

Cassini scientists think hidden icy masses could be the source of the dusty G ring. Provided by CICLOPS



The origins of Saturn's rings, shown here in an image from Hubble Space Telescope, have always been mysterious. But now, scientists have identified the G ring's possible source as unseen, icy particles confined within the ring's arc.

NASA/STScI/AURA

Cassini scientists may have identified the source of one of Saturn's more mysterious rings. Saturn's G ring likely is produced by relatively large, icy

particles that reside within a bright arc on the ring's inner edge.

The particles are confined within the arc by gravitational effects from Saturn's moon Mimas. Micrometeoroids collide with the particles, releasing smaller, dust-sized particles that brighten the arc. The plasma in the giant planet's magnetic field sweeps through this arc continually, dragging out the fine particles, which create the G ring.

The finding is evidence of the complex interaction between Saturn's moons, rings and magnetosphere. Studying this interaction is one of Cassini's objectives.

"Distant pictures from the cameras tell us where the arc is and how it moves, while plasma and dust measurements taken near the G ring tell us how much material is there," said Matthew Hedman, a Cassini imaging team associate at Cornell University in Ithaca, New York.

Saturn's rings compose an enormous, complex structure and their origin is a mystery. The rings are labeled in the order they were discovered.

From the planet outward, they are D, C, B, A, F, G and E. Main rings A, B, and C, from edge-to-edge, would fit neatly in the distance between Earth and the Moon. The most transparent rings are D, F, E, and G, outside the main rings.

Unlike Saturn's other dusty rings, the G ring is not associated closely with moons that either could supply material directly to it (as Enceladus does for the E ring), or sculpt and perturb its ring particles (as Prometheus and Pandora do for the F ring). Until now, the location of the G ring defied explanation..

Cassini images show that the bright arc within the G-ring extends one-sixth of the way around Saturn and is about 155 miles (250 kilometers) wide, much narrower than the full 3,700-mile (6,000-kilometer) width of the G ring. The arc has been observed several times since Cassini's 2004 arrival at the ringed planet and thus appears to be a long-lived feature. A gravitational disturbance caused by Mimas exists near the arc.

As part of their study, Hedman and colleagues conducted computer simulations that showed the gravitational disturbance of Mimas could indeed produce such a structure in Saturn's G ring. The only other places in the solar system where such disturbances occur are the ring arcs of Neptune.

Cassini's magnetospheric imaging instrument detected depletions in charged particles near the arc in 2005. According to the scientists, unseen mass in the arc must be absorbing the particles. "The small dust grains that the Cassini camera sees are not enough to absorb energetic electrons," said Elias Roussos of the Max-Planck-Institute for Solar System Research in Germany, and member of the magnetospheric imaging team. "This tells us that a lot more mass is distributed

within the arc."

The researchers concluded that there is a population of larger, as-yet-unseen bodies hiding in the arc, ranging in size from that of peas to small boulders. The total mass of all these bodies is equivalent to that of a 328-foot (100-meter) wide, ice-rich, small moon.

Joe Burns, member of the imaging team, said, "We'll have a super opportunity to spot the G ring's source bodies when Cassini flies about a thousand kilometers (600 miles) from the arc 18 months from now."

What Happens When a Meteor is on a Collision Course with Earth

by Joel Stottlemire

There seems to be a perception in the community that the Earth would somehow be better off being struck by an icy comet rather than by a similar sized rocky or metal object. This is, generally, not the case. Let's take a look at why not.

For the purpose of our discussion, we are going to assume that a one cubic mile object is about to strike the Earth traveling at the relatively slow speed of the Perseid Meteor Shower. That's about 33,000 miles per hour. An object coming directly from deep space or a comet approaching the sun could go much faster. I once got stuck for four hours in a traffic jam outside the baseball stadium in St. Louis and missed a very good concert so we'll assume the stadium is ground zero.

The common argument is that an icy object would be less dense and so would cause less damage. On a global scale, there would be less total energy in the impact and slightly less particulate matter in the atmosphere and ejected back into orbit after the event but only slightly less and I'm afraid it would make no difference what-so-ever to our doomed baseball fans.

Here's the problem. At a velocity of 33,000 miles per hour. When the object begins to be warmed and slowed by the atmosphere, say 100 miles up give or take, it is only 10.8 seconds from impact. This means that the entire column of air underneath it only has about 11 seconds to leave the area. Or, put another way, the air between the Earth and the object would have to move at 33,000 miles an hour to get out of the way.

Super computer modeling shows that this is not what happens. What happens is that the leading edge of the object, regardless of material, superheats into a gas or plasma, the air superheats into a gas or plasma, the stadium superheats into a gas or plasma, the upper level of the earth superheat. As for the fans, well, go ahead and put the onions on your hot dog, you'll never live to regret it.

Once things have gotten hot enough to turn concrete dugouts and Sy Young award winners into plasma, the issue of rocky vs. icy is only going to be interesting only to scientist in bunkers on other continents who are wondering when it's going to stop snowing mud.

Observing the Far Side of the Moon

from Mike Gregory

O.S. 033/07 – Monday August 6th 2007. – Just my luck I suppose. A poor day ends with a beautiful night.

I set the refractor up on the lawn at 22.45 BST but made the mistake of polar aligning for that time instead of 21.45 UT. So when I set up the Gotostar it was one hour out. Feeling to shattered to realign I searched out a few a few targets manually such as the Mizar-Alcor region and then epsilon Bootes. However, as conditions were too good just to wander about I removed the optical tube etc. and realigned for the correct time. I used Dubhe (alpha Ursa Majoris) to set up the Gotostar and found my first target, 20 Draco, quite easily. With the Moon absent, at least for a while, I was able to lay siege to 20 Draco and though it looked elongated I can't truly say I saw it as two separate components.

The next target was my old friend OS 525 in Lyrae which the Gotostar found almost outside the field of view. But after about thirty minutes of observing at various magnifications there was no sign of the close companion to the primary star.

I had a try for mu Draco; a true gravitationally bound pair with a separation of 1.9" but almost equal magnitudes. This will split reasonably easily at 120x and almost at half that magnification too.

By then it was becoming hazy in places so I searched in my own catalogue for a new challenge. I chose S 162 in Perseus which is said to be a triple star challenge, though I was far from confident of success.

Actually there at least five stars here, though with no proof of any real orbital motion between any of them except maybe the close Aa pair CHR4. For many years it was known that the primary star, which has an integrated magnitude of 6.5, had a composite spectrum. This means it consists of two components too close to be visually separated. Then in 1984 a group called the Centre for High Resolution Astronomy managed to separate the two components. Separation is said to be 0.1" and to do this visually you would need a refractor with an aperture of about 36 inches – multi-million dollar league. There has been no change in this separation up to 1994 though there has been a 57° change in position angle.

This primary star was first measured by W.Struve in 1829 and found to have a close visual companion of 7.0 and a wider companion of magnitude 8.4 at a separation of 21.0". Conditions are so poor around here that I needed a quite a low magnification to see this last star. When the magnification is boosted so as to separate the B star from the Aa pairing, the wide C star cannot be seen. The figures below have been taken from the Washington Double Star catalogue. For once the Sky Catalogue 2000.0 appears to agree!

01493+4754	CHR	4	Aa	1984	1994	7	194	251	0.1	0.1	A3V
01493+4754	STF	162	Aa-B	1828	2002	99	227	202	2.2	1.9	6.47 7.22
01493+4754	STF	162	Aa-C	1828	1998	40	177	179	20.6	21.0	6.47 8.4

Usually at the end of such observing sessions I type in my diary "Will try again on a better night" but around where I live conditions just get worse. Allied to a myriad of muscular aches I feel it is time to move on to another homebase. Perhaps I should try observing from the far side of the Moon.

O.S. 034/07 – Tuesday 7th 2007 – Despite the problems of last night here I am observing once more. Well, trying to observe but, again, fraught with difficulties. The main one was that the internal clock on the Gotostar memory is running fast this time by about eleven minutes. Though I corrected this the Gotostar had been set up earlier at an incorrect time and hence all the targets were a bit out. However, I did manage to find and split gamma Andromedae, sigma Cassiopeia and the relatively tight gravitationally bound pair of zeta Aquarius. Overall though a disappointing night.

O.S 035/07 – Wednesday 8th August 2007 – The third evening in a row and even worse than the two previous nights put together. Appears that I somehow polar aligned inaccurately and could not get the Gotostar properly set up. I used alpha Ursa Majoris for this purpose and had to slew quite a long way to line this star up.. Should have realised then what was wrong. Looks as though the equatorial head was not level before I started. Anyway, all I saw were poor views of Almach (gamma Andromedae) though the latter's secondary star showed a clear blue/green tint.

O.S. 036/07 – Thursday August 9th 2007 – Here I am setting the refractor up for the fourth night in a row. Must be barmy! I used Dubhe (alpha Ura Majoris) again to set up the Gotostar and was much closer compared to last night. I only had to slew a few arc minutes to align. However alpha Uma is probably a poor choice and I would probably get greater accuracy from the Gotostar if I used a bright star close to the equator such as zeta Aquarius.

By then, as ever, the clear sky was turning whitish sodium pink. As a test of the system I keyed in the NGC number for the Double Cluster in Perseus and the Gotostar put both clusters just off the centre of a tight field of view. Hence I fitted my lowest power eyepiece, a 40mm Plossl for a wide field view at 25x..

The view, however, was very poor compared to the last time I viewed the Double Cluster from my garden. Very few stars clearly on show compared to the 300 and 400 supposedly contained in the two clusters!

I then set out to view a few doubles new to me as my double star odyssey, started over 6 years ago, has long been in the doldrums due to various hassles. Trying to get going whilst I still can!

I searched for and found S 268 in Perseus, this pair not being too far away from the position of the Double Cluster. Magnitudes are 6.8 and 8.1 and the separation 2.7". Hence I needed 120x to split the pair though there was a suspicion of duplicity at 90x. Conditions were poor but to my eyes at least, the primary appeared to be yellowish white (spectrum of the primary is A2 which suggests it is a white star) and the secondary a bluish green but this was through a haze of pinkish white light pollution. So I decided to look for targets away from central Middlesbrough's direction and with higher declinations so as to have a thinner belt of haze to penetrate.

My next target was sigma Corona Borealis, a gravitationally bound pair with an orbital period of approximately 1000 years. The magnitudes are 5.6 and 6.6 and the separation 7.1" though currently widening. Despite the conditions they were quite easily separated at 59x, though it was awkward to obtain a crisp clear focus. Well, impossible actually but enough to suggest the colours might be silvery white and yellowy white, which the spectra F8 and G1 would almost agree with. Burnham's Celestial Handbook gives a good deal of information reference this pair for those who wish to learn more.

Another double is zeta Corona Borealis (S 1695) that has magnitudes similar to sigma CB at 5.1 and 6.0, though the separation is a little closer at 6.3". Hard to see what the colours might be but at least I managed to find it, the spectra being B6 and B7. This would suggest almost identical colours of blue tending definitely to towards white.

Next I had a go at S 2978 in Pegasus, though in hindsight, why do I make it so hard for myself by having to slew many degrees across the sky, other than to annoy the neighbours in the early hours (though nothing like as much as they annoy me!)? The Gotostar found S 2978 with reasonable ease. The co-ordinates are 2308+3248, the magnitudes are 6.3 and 7.5 and the separation is 8.4". The spectrum of the primary is A3, a white star, though colour identification was hopeless due to sky conditions. According to Burnham this pair share a common proper motion against the background stars and are relatively fixed. This suggests no orbital motion has been detected since FGW Struve first measured them in circa 1830 even though they may be gravitationally bound.

Conditions were getting hopeless approaching 24:00 hours BST with only the four bright stars of the Great Square plus Enif faintly penetrating haze. Overall,

only the three stars of the Summer Triangle (Vega, Deneb and Altair) almost above me plus Rasalhague (alpha Ophiuchis) high in the west were clearly on show.

Nevertheless, I continued, managing to find S 2841, also in Pegasus, though I had to search around due to relative dimness of the secondary. Co-ordinates are 2154+1942, magnitudes 6.4 and 7.9 and the separation 22.3". FGW Struve first measured this pair in 1829 and there has been no movement since. However, spectroscopic observations suggested that the secondary had a composite spectrum. In 1969 Paul Coyteau visually separated this star into two components of magnitudes 8.6 and 8.8. The separation is only 0.2" and thus completely beyond the amateur astronomer. I was not aware of this tight separation at the time and spent fifteen minutes at the eyepiece trying to see two stars!

Dr Paul Couteau is the "FGW Struve" of modern times with some 2,700 multiple star discoveries and 25,500 measures. Of course regular use of the twenty-inch and thirty-inch refractors at the Nice Observatory, more latterly equipped with the very latest CCD cameras, is probably a distinct advantage.

Well, I have digressed a little, but my final target for the night (now early Friday morning) was Albireo, though I had to be careful slewing in case the focal tube touched the tripod. Fortunately it did not and Albireo looked pretty neat and very wide at 59x.

Post Script – Almost twelve hours later and after four consecutive nights of observing and going to bed at five in the morning, little wonder I feel presently zonked out. I know "zonked" is probably not in the dictionary but that is how I feel presently. Why I do not use my multi-adjustable observing seat and view only at high declination...!

Yours astronomically, Mike.

Book Review : "Parallel Worlds: The Science of Alternative Universes and our Future in the Cosmos"

By Dr Michio Kaku , Penguin Books, 2006 @ £8.99

Reviewed by Andy Fleming :

The remit of this book is staggering – it is no less than the coverage of the development of cosmology from its beginnings in antiquity right up to the theory of the multiverse, and the fact that our universe may be just one of an infinite number, each possessing physical forces and constants with different strengths to ours. The fact that the publication is targeted at the lay person (who may have

little knowledge of cosmology and astronomy), makes the remit even more remarkable.

Kaku is one of the co-founders of a branch of String Theory and as such, one may start to read the book with the misconception that its contents will be biased towards the perspective of this particular theory. However, this is not the case, and the reader is firstly treated to a commendably objective history of astronomy, classical physics and the Copernican/Galilean Revolution, relativity, quantum mechanics, string theory, and the discovery of dark energy and dark matter, along with some extremely well written explanations and diagrams. The overriding power of modern cosmology in explaining the universe – the marriage of the study of large scale objects such as galaxies groups, with that of very small scale subatomic particles is a growing theme throughout the book, and includes a superb explanation of the Cosmic Microwave Background radiation, and culminates in a discussion of the Standard Model, Inflation, and the five eras of the development of our universe.

Kaku gives an elegant account of the breaking of symmetry of the physical forces a fraction of a second after the Big Bang, and how String Theory can reconcile gravity with the electro-weak and strong nuclear forces, hence providing a theory of everything. Like many other physicists, he is hopeful that the evidence for supersymmetry and many of the sub-atomic particles predicted by String Theory may be forthcoming when the Large Hadronic Collider (LHC) at CERN comes on line in 2008. He certainly hopes so - the discovery of the graviton, the Higgs particle, and minute black holes will mean many physicists have not been traversing a blind alley for the past forty years! Of course, an integral part of String Theory are extra spatial dimensions and Kaku develops this, and speculates on whether it will be possible to detect these.

The book puts our everyday notions of time and reality to the test, and examines the fate of the universe as it expands exponentially, speculating that after trillions of years of such expansion and subsequent cooling, conditions will be unable to sustain intelligent life. Kaku also speculates on the possibility of whether given enough time, and if we don't destroy ourselves first, we can ascend through the types of advanced civilisation to reach a point where we can harness the power of stars and galaxies and enter another universe where conditions are once again favourable for life.

Perhaps the most startling revelation is that the Copernican Theory of Mediocrity may apply to our universe. The values of the universal constants and forces may, after all, be arbitrary, and a random result of symmetry breaking in a certain way at the time of the Big Bang. For example, Kaku shows how if one decreases the general strength of gravity by an infinitesimally small amount clouds of hydrogen will not coalesce into stars, planets and galaxies and life would not exist. Increase gravity and stars will burn and die too quickly, never allowing the time for planets and life to evolve.

Kaku documents a stark choice facing physicists, either our universe has been created in a way conducive to the development of complexity and ultimately life itself (the anthropogenic principle), or we live in a multiverse of universes – by an infinitesimally small chance we just happen to live in one of the few habitable universes. Kaku eloquently shows how astro-physics, philosophy and even religion are drawn together at this point.

In conclusion, *Parallel Worlds* is a fascinating insight into current cosmological theory and models, and sheds light on many of the dilemmas and discoveries with which astrophysicists and cosmologists are now grappling. By its very nature, any book involving cosmology will become dated rapidly, and this book will probably be no exception (especially when the LHC is brought on line). However Dr Kaku should be complemented in a superb attempt to portray contemporary cosmological and physical theories in a highly interesting and readily understandable way. The book contains an excellent glossary of cosmological and physical terms, and there is little mathematics.

For me anyway, it's the sort of book which, once started, you simply can't put down.

Andy Fleming

Wynyard Woodland Park Public Planetarium Shows:

Autumn/Winter 2007/2008

Public shows last for about 1 ¼ hours.

- Friday 7th September 2007, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 21st September 2007, 7:30p.m. : “Black Holes and Beyond”
- Friday 5th October 2007, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 19th October 2007, 7:30p.m. : “Black Holes and Beyond”
- Friday 2nd November 2007, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 16th November 2007, 7:30p.m. : “Black Holes and Beyond”
- Friday 7th December 2007, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 21st December 2007, 7:30p.m. : “Black Holes and Beyond”
- Friday 4th January 2008, 7:30p.m. : “What’s Up in the Night Sky this month?”

- Friday 18th January 2008, 7:30p.m. : “Exoplanets and Extraterrestrials”
- Friday 1st February 2008, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 15th February 2008, 7:30p.m. : “Exoplanets and Extraterrestrials”
- Friday 7th March 2008, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 21st March 2008, 7:30p.m. : “Exoplanets and Extraterrestrials”
- Friday 4th April 2008, 7:30p.m. : “What’s Up in the Night Sky this month?”
- Friday 18th April 2008, 7:30p.m. : “Exoplanets and Extraterrestrials”

Public Observing

See the wonders of the universe through the observatory telescope. The Wynyard Observatory is located near the planetarium and houses a large reflecting telescope. Through this can be seen clusters of stars and clouds of gas in our own Milky Way galaxy, plus many more galaxies in their own right out in the depths of the universe. Public observing nights take place on Friday evenings from September to April, from 9:00 pm onwards. Come along, free of charge, but only if the sky is clear of cloud!

Transit Tailpieces

For Sale – Meade LX90 8” Schmitt-Cassegrain , brand new still boxed, unused. With Autostar II GoTo; plus many, many accessories; total cost new £1997; for sale at £975:
Contact Jack Youdale 01740 630249

For Sale : Tal reflector 2M 150mm with motorised equatorial mount, 1200mm focal length, misc eyepieces and filters, with wooden boxes for telescope and motor. Offers. Contact Wynyard Planetarium 01740 630544 or e-mail b2mullen@hotmail.com (seller has lots of astro bits and pieces including Mamiya and Vivitar 35mm SLR film cameras).

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.

Life from Pollution

Earth is a pretty congenial place for water-based life, and there's no real reason to assume all life must be like us; in fact, when life first arose on Earth it was nothing like us — and I don't mean bipeds with a penchant for reading blogs and starting wars based on superstitions. I mean they weren't even oxygen-based; they grew up to use chemicals like ammonia and methane. Oxygen-users evolved later as O₂ was created as a waste product of the earlier life.

We breathe some other long-dead species' pollution.

The last line reminds of travelling on the Tube when I worked in London - Editor

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Above : A bunch of previous astronauts at the recent Phoenix, Az Spacefest.

Some of them walked on the Moon - do you recognise any of them?

Stop Press! Mars Rovers Rolling Again After the Dust Storm!

Opportunity has resumed daily communications with Earth. Opportunity drove some 13 meters (44 feet) closer to the rim of Victoria Crater so it would be better positioned to soak up the Sun's rays. Spirit is up and running as well and is positioning itself to make more observations of the Home Plate region of Gusev Crater's Columbia Hills