TRANSIT

The Newsletter of

Cleveland & Darlington Astronomical Society

12th March, 2004. Julian Day 2453077

Dust spills into the immense Albor Tholus caldera

Everyone is raving about the recent picture from the Mars probe of Albor Tholus, with dust cascading into the crater.

Editorial

The Society Book Project. Not much progress to report this month. In fact none at all. **If a**nyone is still thinking of doing a piece, please send it in, there still seems to be some time left – the publication date keeps going back.

February meeting. David Cook of Harrogate A.S. gave an enthralling talk entitled "Sundials – Not Just a Pretty Face". As well as showing us some weird and wonderful sundials from all parts of the World, including hand-held ones and models made with loving care, his description of the movements of the Sun in the sky were among the clearest one could have. The computer programs he has written, giving a visual presentation of the path of the Sun, were particularly spectacular. Once the eye is atuned to looking for sundials they are everywhere!

March meeting. The next meeting is on 12th March, 2004, in the Village Hall, when David Robertson of Durham University will be the guest speaker. At the time of going to press, no title had been announced.

Cosmos V. Neil Haggath gave an advanced notice of Cosmos V North East, which will be held this autumn. The venue will be the Stockton campus of Durham University and the date will be announced soon.

Transit of Venus. June the 8th is but 13 weeks away. There are lots of magazine articles appearing and web sites to visit. Remember, this was the phenomenon which allowed the distance from the Earth to the Sun to be measured with unprecedented accuracy back in the 17th century and which confirmed that the universe was much larger than was thought at the time. No doubt there will be a Planetarium/Observatory meeting on the day to witness the event.

Articles always needed. Contributions to <u>your</u> newsletter are always welcome. Without them, Transit fails in its aim of providing a way for all members to communicate with all members. Please keep the articles coming.

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The Revised History of the Universe in 200 Words or Less

From Bob Mullen

Bob is doing a distance learning course from the University of Central Lancashire this year and sent me this piece, which caught his eye. Rod Cuff and I are doing the same course and we are all enjoying it enormously. Expressions like mind-bending and mind-blowing and mind-shredding are being used. It's not the facts themselves but the amazing concepts we are having to get our heads round. Such as discussing the Universe when it was 10^{-32} seconds old.

Quantum fluctuation. Inflation. Expansion. Particle-antiparticle annihilation. Deuterium and helium production. Matter Domination. Recombination. Blackbody radiation. Local contraction. Large scale structure formation. Violent relaxation. Virialization. Galaxy formation. Turbulent fragmentation. Contraction. Ionization. Opaque hydrogen. Massive star formation. Deuterium ignition. Hydrogen fusion. Hydrogen depletion. Core contraction. Envelope expansion. Helium fusion. Carbon, oxygen, and silicon fusion. Iron production. Implosion. Supernova explosion. Metals injection. Star formation. Stellar remnant production. Supernova explosions. Star formation. Condensation. Planetesimal

accretion. Planetary differentiation. Crust solidification. Volatile gas expulsion. Water condensation. Carbon dioxide solution. Water photodissociation. Escaping hydrogen. Ozone production. Ultraviolet absorption. Polymerization. Coacervate formation. Molecular reproduction. Protein construction. Fermentation. Photosynthetic unicellular organisms! Oxidation. Mutation. Natural selection. Evolution. Cell differentiation. Respiration. Sexual reproduction. Multicellular organisms. Evolutionary diversification. Fossilization. Trilobite domination. Land exploration. Comet collision. Dinosaur extinction. Mammal expansion. Homo sapiens manifestation. Language acquisition. Glaciation.
Innovation. Religion. Animal domestication. Fermentation. Food surplus production. Inscription. Civilization! Exploration. Warring nations. Empire creation and destruction. Expansion. Scientific explanation. Colonization. Revolution. Constitution. Industrialization. Emancipation. Invention. Mass production. Urbanization. Migration. World conflagration. Suffrage extension. Depression. World conflagration. Fission explosions. Computerization. United Nations. Population explosion. Environmental degradation. Space exploration. Superpower confrontation. Liberation. Lunar excursions. Resignation. Internet expansion. Globalization. Reunification. Dissolution. Union. World Wide Web creation. Composition. Extrapolation?

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Are we living in a Black Hole?

Still on the subject of cosmology and Black Holes, have you thought about the following curiosity? You will all know, I am sure, that a black hole is an object with such a strong gravitational field that nothing – not even light – can escape from it. If an object is squeezed into its Schwartzchild radius it becomes a black hole. All very exciting. It depends on the mass of the object and if the mass is large enough, a Black Hole is inevitable. The Schwartzchild radius for the universe, mass 1.7×10^{54} kg, is about 10^{27} metres. Problem – the universe was much smaller than this for a long time, so it can't expand outside its Schwartzchild radius. Not only that, we are inside the event horizon and can't get out. I put this to the Professor of Astronomy at a University of Central Lancashire study weekend recently and his response was that it would be perfectly possible to live in a very large black hole and not know!! The tidal forces, usually postulated to destroy everything, would be negligible
Now there's a thought.

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Amazing Astronomical Facts

The Sun

Another in the "I don't believe it" series. It takes 170,000 years for the energy created at the centre of the Sun, the photons, to travel the 696,000 km to reach the surface. Thus the energy flows outward at an average rate of 0.1 mm per hour – slower

than a snail's pace! Once they escape from the surface the photons travel the 150 million km to the Earth in 8 minutes, of course.

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Control to Beagle Two

From Barry Hetherington

Control to Beagle Two

Control to Beagle Two

Come in please, Beagle Two.

We know you're out there, Beagle Two.

We're sorry about the violent landing. It must have been quite a shock to you.

We hope you didn't get dizzy bouncing along the surface.

We hope you didn't get your paintwork scratched.

We're sorry it's so cold out there.

We suppose that it's quite dusty as well.

We hope that you landed on a nice part of the surface, with a good view.

It must be quite lonely for you out there.

We're still listening for you, Beagle Two.

Both the American probes are talking to us, Beagle Two.

Most of it is rubbish, but they're still talking to us.

Things are not too good down here, Beagle Two.

All the technicians have been sacked.

The rest of us have received redundancy notices.

We are going to have a party for you in June, if there's anyone left.

Can you here us Beagle Two.

We're signing off now, Beagle Two.

We'll talk to you again tomorrow.

Control out.

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Cosmos V - Preliminary Announcement

Dear All,
Later this year, CaDAS will host the fifth Cosmos North-East convention; the provisional date is Saturday 2 October, and the venue will probably be a large lecture theatre at the Stockton Campus of Durham University. The last time, we were at the Pursglove Centre in Guisborough but this has become so expensive that we have had to look for a new venue.
For the benefit of members who have joined us since 2000, Cosmos is held every four years, somewhere in the North-East. It's a full-day convention, with a programme of five speakers, always headed by a major name, and attended by astronomers from across the North of England.
Neil M. Haggath

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The CaDAS Interview – Janet Gibson

Janet and I had been chatting at one of the regular meetings about her article for the Book project. After writing an article about the Solar System, we were wondering what to do about pictures – whether to scan some from a book or download them from some of the wonderful internet sites available nowadays. Then I had this great idea; why not an interview! Janet lives in Thornaby at The Green. I knew Thornaby from the Bike Express offices at the old airfield and always looked on Thornaby as being exclusively urban. However, turning off the main road into The Green takes you into a rural enclave which had the air of a small village. There is a very old church made from a light sandstone and an original farmhouse with a huge sundial on one of its walls. We chatted in Janet's front room. I deployed my little interview tape recorder.

How did you get started in astronomy?
Oh, I've been interested since I was very small. My Dad used to show me the Plough and the planets. I remember drawing pictures and writing about the stars. Not for school, just for my own interest. It was so absorbing and interesting.

Where you brought up in the North East?
No. My family upbringing was in Harrogate, or Knaresborough, really. I have two brothers and a sister. One of my brothers was very interested in Geology and we did a lot of that together. In fact when it came to deciding what to study as a hobby, it was a choice between geology, astronomy or languages.

And how do you come to be in Thornaby?
When I got married, we moved to Macclesfield for a while and then to here in 1987. My husband works for ICI, which brought us here. It's a very pleasant area and we have been her for about 16 years.

You have a young family of your own.
We have four girls, 19, 16, 13 and 9. They are all still at home, although the eldest is working now. They were home from the local school for the holidays last week, that's why I suggested this week for the interview. They are a boisterous lot. The youngest wants to be into everything. When you have a young family, you tend to be well occupied with domestic things. I decided a few years ago that I had to get out and do something of my own and be intellectually stretched. At first I did GCSE Astronomy at the local 6th Form College and now I am doing Fred Stevenson's Cosmology course. Its much more interesting than I thought it was going to be. Its run by the University of Leeds and takes about three years.

What was your educational route?
I did O and A levels at school, then left to get a job. I wasn't bothered about going to University. I guess at that age the social life becomes important. *Did you enjoy school?* Yes, I think I did. I've always enjoyed learning new things. I liked the 6th form at school, when you were a bit more senior and talked to the teachers more equally.

Have you ever made a telescope?
When I was doing the GCSE course we made a telescope from a cardboard tubes and lenses but I haven't made one from scratch, grinding the mirror and all that. I earned a lot about the physics and optics, though. *Did it work?* Oh, yes. There were good views of the Moon and Jupiter and Saturn and all that sort of stuff.

Are you happy with maths and computers, then?
With maths, yes, I suppose so. Well the maths I've needed so fat, anyway. Computers – well, I'm not so handy with them. When you have kids, they tend to do it for you and they are so much quicker and better. I'd better say I am not very computer literate. About those pictures for the book article, I think I'll take you up on your offer of scanning pictures from a book *Well, have a think about which ones you want and let me know.*

Do you travel a lot?
I haven't done much travelling abroad. Our family holidays are to Scotland mostly. Places like Stirling, the West Highlands and Skye. They are mostly self-catering and doing things together as a family. We don't go on the normal package holidays, it's so expensive for a big family.

When did you join the Society?
It was in about 1999, yes that's right, I've been a member for about 4 years. I met someone who was already a member and they suggested I should join. I enjoy the lectures, although some of them are a bit over my head! I don't know very many people

there, although I would like to have a chat about mutually interesting things. It would be nice to have some sort of social event sometime to meet people informally – maybe in July and August when there are no meetings? The lack of social contacts in the Society mean I don't know very many people by name. The photos on the back of the Newsletter help.

Do you go to the Planetarium or the Observatory on Friday nights?
No, I don't. I am out a few nights in the week now and the girls like me to be at home. Two of the girls have sung in a choir at the Planetarium on one of the fund-raising nights, so they know about it. Perhaps I should take them along one night, they may become interested in the astronomy.

Do you do a lot of observing?
I do a bit in the back garden but the neighbour's security lights make things a bit difficult. They keep switching on and off randomly as the cats roam about. The roads lights are not too bad here, so the seeing is reasonable. My big interest is the Solar system and the planets. There has been a revolution in Planetary science I the last few years with all the new satellites and voyaging probes. I find it fascinating. Patrick Moore's Atlas of the Universe is very good and has some very good images of the Solar system. I have found that knowing a bit about Cosmology has made everything that much more interesting. I would recommend everyone to have a go at the Cosmology course Fred Stevenson does. I guess I am more of an armchair astronomer than an observer.

Do you have time for any other hobbies and interests?
The other things I do are here at home. I like gardening – which reminds me, I have a lot of jobs to catch up with once this very cold weather and snow goes away. Everything gets out of hand so quickly. The other thing I enjoy is knitting. I do a lot of that, especially keeping the family going with hats and gloves and warm jerseys. *Do you have a knitting machine?* Good heavens, no! That would be sacrilege. It has to be manual only. It means you can do other things – conversation, radio, TV – at the same time. The idea is to enjoy the skills, not have a big production line. I do woollen toys for the church. We are members of the local church. The building is very old – Saxon in parts, I think, although it was knocked about by Henry the Eighth. You should go and have a look at it while you are here. *(Which I did and found a lovely old building, quite small, on the village green; about twenty people would fill it up).*

What about the cinema?
No, we don't go to the pictures very much. I love the sci-fi on TV, though. The original Star Trek was wonderful and Babylon 5 and Stargate series had me hooked. I am very keen on sci-fi reading, as well. I love reading. Lucy Montgomery novels, Anne of Green Gables and all that sort of thing. I enjoy reading factual, astronomy books, such as Patrick Moore's books, which are always very readable and interesting. I always try to watch Sky at Night but they are at such odd times, they have to be recorded and I always forget.

Do you ever think about your motivation for doing astronomy?

My original motive was to have something outside the family of my own. To be someone other than someone's mother or husband. Now it has a momentum of its own, which means it all worked, I suppose. I do get out to do "my own thing". Once you are with other people who are enthusiastic, it all gets carried along, I think.

Who influenced you the most?
That is a difficult one, I've never thought about it. Off the cuff, I suppose I would say my Dad. We did a lot together, playing tennis, walking in Scotland, climbing mountains, Ben Nevis, Ben Lawers, Goat Fell, Snowdon. I like walking and the mountains and wish I could do more.

And what makes a civilised society?
I can only agree with the majority of replies to this question. Tolerance and respect for others. I wish we could find a way of avoiding conflicts and fighting one another.

And so the interview came to an end. As I was leaving I noticed a big bookcase, filled with video tapes. Complete series of Babylon 5 and Star Trek. I wonder if Janet would be prepared to lend them out to other trekkies?

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Logs and Knots and Astronomy

One of those lovely experiences of being a grandfather cropped up the other day. My grand-daughter was describing some of her sailing experiences. She lives on the west coast of Scotland, in North Connel, and sails dinghies as well as the privilege of sailing the lochs and islands of the area in the family yacht. She also sailed the Clyde and the Irish Sea in a youth boat, Alba Venturer – she was first mate for a few watches! Last year her 14-year old brother crewed a yacht for the owner returning from New York across the Atlantic. They are a nautical lot up there.

So I trotted out a series of related questions to which I was fairly certain she wouldn't know the answers – "why do sailors call the speedometer on a yacht a 'log', why is it measured in knots and what is a knot, anyway?". Satisfaction. Although she is a very bright girl, with top exam results and at University, she didn't know. Well, she knew that knots were nautical miles per hour and that a nautical mile was the length of one minute of the Earth's latitude. However, putting on the wise old grandfather voice, I explained. Sailors of old used to throw a log (literally, a piece of a tree!) overboard attached to a rope with knots in it. They were spaced so that in a given time, measured using a sand timer of course, by counting the knots they measured the speed of the boat through the water in, yes, KNOTS!

Not to be outdone, we had to make one and test it. One nautical mile per hour is 0.51444 metres per second. So if we chose 5 seconds as the counting time (using a modern quartz watch this time), the knots had to be 2.572 metres apart. We made one with a big plant pot at the end instead of a log and measured the speed of the Tees at Darlington as 2 knots. It looked a lot faster, so we cross-checked by throwing in a branch and walking alongside. 3 knots is a fast walk and we could go faster than the stick. Now she can make one for their yacht.

Ah, yes, she said, but what about the metre? Who decided what the length of a metre should be and what is it? I told you she was bright. And here is the point of the story – at last, I hear you say. Jack Youdale, in his President's Address, had told us that the metre was chosen by the French Revolution as one ten millionth of a quarter of the Earth's circumference (now called 40,000 kilometres). So being a member of CaDAS had preserved my standing as a wise old grandfather.

Alex Menarry

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A Couple of Snippets

by Neil Haggath

1. The incredible ignorance of some people never ceases to amaze me… Some time ago, Professor Colin Pillinger, the brains behind the British *Beagle 2* probe, was interviewed on "Radio 5 Live". Part of the conversation went like this:
Interviewer: "Why do you call it *Beagle 2*?"
Pillinger: "It's named in honour of the original *Beagle*, the ship which carried Charles Darwin on the voyage which led to our understanding of evolution."
Interviewer: "Were you part of that mission too?"
D'OHHHHH!!!!!!!

2. A couple of years ago, I wrote an article on astronomers' sense of humour, and the way they invent contrived names for instruments, to fit humorous or corny acronyms. Well, space scientists are no different.

First, the extendable instrument arm on the aforementioned *Beagle 2* is called the "Payload Adjustable Workbench" – the PAW.

Meanwhile, two American probes are also en route to Mars, each carrying a lander with a wheeled roving vehicle. The latter are, of course, referred to as "rovers". See a pattern forming here?

When these rovers were under development, and being field tested in the Mars-like terrain of the California desert, that phase of the programme was called "Field Integrated Design and Operations", or FIDO.

Groan!

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Fast-flying Black Hole yields clues to Supernova Origin

NASA Release from Ray Worthy

A nearby black hole is hurtling like a cannonball through the disk of our galaxy. The detection of this speed demon is the best evidence yet, some astronomers say, that stellar-mass black holes -- those that are several times as massive as the Earth's Sun -- are created when a dying, massive star explodes in a violent supernova. The stellar-mass black hole, called GRO J1655-40, is streaking across space at a rate of 250,000 miles per hour, which is four times faster than the average velocity of the stars in that

galactic neighborhood. At that speed, the black hole may have been hurled through space by a supernova blast. Even though, by definition, black holes swallow light, the runaway black hole has a companion star, allowing astronomers to track it. NASA Hubble Space Telescope's sharp view allowed astronomers to measure the black hole's motion across the sky in images taken in 1995 and 2001.

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Atomic Hammer Flattens Mirrors

Space telescopes need ultra-flat mirrors to make sure they provide undistorted images. The problem is that polishing can remove too much surface material from the mirror. Two US inventors, Jacques Kools of California and Adrian Devasahayam of New York, have a solution. An inert gas, such as argon, is ionised and fired as a low energy beam towards the surface of a copper mirror in a vacuum. By carefully controlling the beam's energy and making sure it hits the surface head on, the pair have found that they can physically "hammer" the surface atoms flat without etching away the coating.
New Scientist, Jan 2004.

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A Mnemonic for Pi

How to amaze your friends by telling them the value of π to 20 decimal places. Just remember this sentence. "How I need a drink, alcoholic of course, after the heavy lectures involving quantum mechanics and pi and electron wave optics". On second thoughts it may be easier to memorise the numbers!!
Does anyone else have some useful astronomic mnemonics (try saying that quickly)? I know there are a few for the order of the planets from the Sun.

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Book Review
Norton's Star Atlas
Edited by Ian Ridpath

I know a lot of you have a copy of this wonderful book but I must encourage everyone else to get a copy. The first sentence of the Foreward, by Lief J. Robinson, says it all. "Once in a blue moon, a book appears that dramatically and forever changes its subject; in short, the work becomes an indispensable resource for generations". It is not an exaggeration to say that no astronomer should be without Norton's Star Atlas. Arthur P. Norton was a genius. This book is a joy to have and to leaf through for shear enjoyment. Every time I do, I learn something.

Eight star charts, drawn in 16 maps, are usually the first port of call when wanting to know where a star is in the heavens. Stellar magnitudes down to six are drawn as a circle proportional to the magnitude. Variable stars and double stars are indicated.

Constellations and their boundaries are drawn. Nebulae and galaxies are all there. In my view all star atlases are a work of art, as much as one of science.

57 Tables are scattered throughout the book in the relevant chapters, giving all manner of useful information and saving lots of calculation time. Four didactic chapters are a mine of information for amateur astronomers. They explain everything you wanted to know but didn't know you wanted to know. Position and Time, Practical Astronomy, The Solar System, and Stars Nebulae and Galaxies. All the basic knowledge a member of an astronomical society needs to know. If you could memorise this lot, you may even be able to baffle our astromind champion – or win the contest yourself.

By now you will have realised that my recommendation must be, if you don't have a copy, you must go out and get one. NOW. It's published by Longman in soft or hardback and costs washers. I bought my first (hardback) copy in 1962, the maps were epoch 1950 and it was the 14th Edition. In 1998, it was the 19th edition, epoch 2000.0. Maybe there's another edition out by now.

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Transit Tailpiece

Quote/Unquote

I beseech you, therefore, with all my strength, to attend to it diligently with a telescope . .
Jeremia Horrocks, Lancastrian astronomer famous for his Transit of Venus observations, 1639.

Man has ventured far beyond the flaming ramparts of the world and in mind and spirit traversed the boundless universe.
Lucretius, 99-55 BC

Man is the measure of all things.
Protagoras, 5th cent BC

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For Sale Meade LXD 55, Model SN8, 8 inch Schmidt-Newtonian telescope, with case of 8 eyepieces. Cost new, a year ago, was £1100. If you wish to see the instrument, please call 01388 773948, Miss C. Prestedge. Please contact the Editor for the address of the lady selling the scope, if required..

Post and Email If anyone wishes to change the way they receive their Transit, please let me know. If any member is not receiving a copy, or has changed their address, please let me know.

Articles Wanted! Please send contributions for the newsletter to Alex Menarry, 23, Abbey Road, Darlington, DL3 7RD, 01325 482597 or to John McCue, 01642 892446 (john.mccue@ntlworld.com). Copy deadline date is the 1st of each month

The Back Page Picture(s)

The March Portrait Gallery

John Crowther who was interviewed some time ago

Janet Gibson

And here's one, sent by John McCue, of a group in the Planetarium. I think he said they were using a remote control telescope at the time.