TRANSIT

The Newsletter of

Cleveland & Darlington Astronomical Society

12th May, 2004. Julian Day 2453140

Sent to me by a friend. Trick photo or computer fake? Or just a globe light?

Editorial

April meeting. The Presidential address this year was "Beginning Astronomy". Once again Jack Youdale entertained us for an evening, this time with a "back to basics" talk. He reminded us that astronomy was the oldest science, enjoyed by amateurs all over the world and the primary reason for our Society – to encourage and assist beginners. His survey of the subjects amateurs can enjoy and make a contribution was a timely reminder of the width and breadth of the astronomy subjects out there.

May meeting. Please note we are back to the "First Friday" formula for the May meeting, which gives May 14th. Mark Swinbank, one of our members at Durham University, will give a talk with the intriguing title of "Weighing the Universe".

Cosmos V. A reminder that Neil Haggath has arranged this special day of lectures for our enjoyment. People from all over the North East attend, so apply to Neil for tickets as soon as possible. Please remember Neil's appeal for an SAE to be sent with your ticket application, to keep down costs. The date is 18th September, the venue Queen's Campus of Durham University in Stockton-on-Tees, just off the A66.

Transit of Venus. Don't forget to watch this historic event in the morning of June 8th. (You notice the confidence that we will have clear skies on that day?). There are a couple of short articles on the subject later in Transit.

The Borg. The strange email messages circulating among our members seem to have dried up recently. Presumably it was a virus, which has now been sterilised. But who is The Borg? Always remember his timely advice to zap these things instantly.

Planetarium and Observatory. John reported that he had given 450 shows in the last 2 years, talking to a wide variety of audiences. The non-astronomy events help to widen the range of people who enjoy the building. The observatory is working very well now, with a camera link to the Planetarium. A small group of regular observers is now being formed and John invited members to join, if they were interested in regular observing with like-minded people. There is an open invitation to gather at the Planetarium for the Transit of Venus on June 8th : come and bring your telescopes and cameras to observe, or just come along and enjoy the occasion.

John is organising a lecture at Bede College, Hale Rd., Billingham, at 10am on Friday, May 14th. The speaker, Andrew Cameron, is a leading player in the search for extra-solar planets and the society has permission to attend. The event is free. Please report to reception to let them know you are in the college.

Articles for Transit. You cannot have not noticed my appeals for everyone out there to have a go at writing an article or a piece of news for ***your*** newsletter. Any and All contributions are always welcome. My regular correspondents must know I am grateful, even if I don't say so (thank you all). Darran Summerfield and Rob Peeling responded to my appeals - Darran's second article is in this issue and one of Rob's will be in next month's.

Essays for Courses. On the same subject, Rod Cuff had the brilliant idea that the essays people sweat over for astronomy distance learning courses would make ideal articles and give them the wider audience they deserve. There are three in reserve – one each from Rod, Bob Mullen and me. If anyone else has written such works of art, please send them in for publication.

An Appeal from Neil!

I have received a number of postal requests for Cosmos V tickets, which did not include an s.a.e. - despite the fact that every piece of publicity specifically requests you to do so! Please note that I am running the event on a tight budget. If you don't include an s.a.e. with your cheque, then I have to pay for the return postage out of the funds. If I have to do that for everyone, then it will amount to a significant chunk of the budget, thereby reducing the potential profit for CaDAS.
So please can everyone help me, and your Society, by including an s.a.e. with your payment.
Neil M. Haggath

A Transit of Venus Tip

From Neil M. Haggath

It has been well publicised that the transit of Venus should be visible to the naked eye - protected by a mylar filter, naturally! - for those with good eyesight. Someone in Sky and Telescope has given a useful tip on how to test whether your own eyesight is good enough. Draw a black dot 2 mm in diameter on a sheet of white paper, and view it, in good light, from a distance of 7 metres or 23 feet. If you can see the dot, then you should see Venus. I tried it in not particularly good light (outdoors on a wet and grotty day), and could just make out the dot.
I would add a further hint. If the dot is in the centre of the paper, then there's a chance that you might "see" it, just because you know that it's there! So I suggest this method: Use a square sheet of paper, and draw the dot significantly displaced from the centre. Get someone else to stick it onto a wall at a random orientation, while you stand 7 metres away with your back turned. Then see if you can see the dot, with no prior knowledge of where it is on the paper.

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Astronomy and the Internet

from Rod Cuff

If you have any particular areas that you'd like me to tackle for a future issue, please e-mail me (rod@wordandweb.co.uk).

Transit of Venus

- The University of Central Lancashire has for some time been running a website at www.transit-of-venus.org.uk that focuses on the activities in Britain related to the 8 June transit. Among other things, there's an events calendar where you can find out what's happening around the country, and you can also get a free poster – I picked up a copy at Astrofest, and very striking it is, too. There's also an interactive web page where you can enter your own observations on the day, and get back a calculation of the Astronomical Unit based on your results.

- The European Southern Observatory's website on the transit is at www.vt-2004.org. It covers the Europe-wide collaborative VT-2004 programme, which will include online debate on the Web, and live images from solar telescopes
- The German site at www.venus-transit.de has a good coverage of the historical aspects of Venus transits, and a number of dynamic simulations of planetary movements to help illustrate what's going on.
- If you'll be abroad on Transit Day, the NASA site at http://sunearth.gsfc.nasa.gov/eclipse/transit/venus/city04-1.html will give you timings for 125 cities around the world.
- Have you a South African connection? The website about the observations of the 1882 transit from Wellington, South Africa, makes good reading. It's at www.saao.ac.za/~wpk/tov1882/tovwell.html.
- For a rather different approach to Venus transits, try www.experiencefestival.com/index.php/topic/articles/article/2314. There you will learn that "Venus transits may be alone among astronomical events to have a track record that associates them with major steps in the development of the Global Brain". Irresistible.
- If you're a teacher or want to get young people interested in what's going on, there are copious resources at www.transitofvenus.org. Almost everything on this American site can be freely copied for educational purposes.

News

- In April, Southern Hemisphere astronomers announced the first clear-cut detection of an extrasolar planet by a completely new technique – gravitational microlensing. Potentially, this technique can be used to detect quite modest-sized planets, and amateurs can have a hand in following up and tracking the short-term changes that occur. It's all described at http://skyandtelescope.com/news/article_1242_1.asp.
- Using radio telescopy, astronomers have succeeded in putting a limit on the physical size of the massive black hole at the centre of the Milky Way. Research described at http://spaceflightnow.com/news/n0404/02blackhole indicates that it would certainly fit within the orbit of Mercury – all 4 million solar masses of it …
- It's nearly time to see the comet display that should be visible in our skies in May – check out http://www.arksky.org/.

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Observing the Sun – for the Transit of Venus?

If you don't want to make your own projector using a telescope or binoculars, there are several commercial instruments available. They all use a small lens and a system of mirrors to project an image of the Sun to a convenient place. The prices range from about £40 to £275, depending on the method of construction, and they produce a projected image size of between 5 and 10 centimetres.

A couple of issues ago, Neil wrote about the one he has bought and which he brought to the last meeting to show it to us all. It comes in two versions – the cheaper

cardboard construction, which is quite adequate, and a more expensive wooden model. They are available from BCF at 0207 405 2156.

A model costing £275, producing a solar image diameter of 85mm, comes from Starlab UK. They are on 01892 654618.
Try websites www.solarscope.org, www.telescope house.co.uk or www.starlab.com.

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Historical supernovae

By Darran Summerfield

This timeline describes several bright supernovae witnessed by astronomers over the past millennium, by Robert Burnham, adapted from an article in Astronomy magazine.

No bright supernovae have exploded in the Milky Way Galaxy since the invention of the telescope in 1610. However, at least five supernovae that must have occurred within our galaxy were recorded in various chronicles and writings from medieval times into the Renaissance.
For a full exploration of the historical record and what modern astronomers can discern from it, see "Historical Supernovae and their Remnants" by F. Richard Stephenson and David A. Green (Oxford University Press, 2002).

1006
The supernova of 1006 first appeared May 1st in the constellation Lupus the Wolf. It was noted in records from China, Japan, the Arab dominions, and Europe. As the magazine story notes, it reached a peak apparent brightness of -7.5 magnitude and remained visible for about two years. Its behaviour suggests a Type Ia supernova, produced when a white dwarf member of a close binary star system accretes gas from its companion and grows in mass to the point where it explodes.

1054
This supernova appeared July 4th in the constellation Taurus the Bull. It was noted in records from China and Japan but not, apparently, from Europe or the Arab regions. A pictograph at Chaco Canyon, New Mexico, however, may record its appearance as seen by Anasazi Indian skywatchers. The supernova reached a peak apparent brightness of about -3.5 magnitude and remained visible for nearly two years. It was probably a Type II supernova, the kind that forms when a single massive star explodes, leaving a neutron star as its gravestone. The supernova's gaseous remnant is visible today in backyard telescopes as the Crab Nebula in Taurus.

1181
Discovered August 6th in the constellation Cassiopeia the Queen, this supernova was noted in records from China and Japan. Its maximum brightness remains uncertain, but it probably shone at zero magnitude or slightly brighter. The supernova's type is unknown, but it remained visible for about six months. The radio source 3C58 is believed to be the remnant of the supernova; a deep photograph shows a few faint filaments that may be the gaseous remnant.

1572
The 1572 supernova was discovered November 6th in the constellation Cassiopeia the Queen. It was noted in records from China, Korea, and Europe, where the supernova's position and declining brightness were observed with high accuracy by Tycho Brahe. (The supernova is often termed "Tycho's supernova.") It reached a peak brightness of about -4 magnitude and remained visible until March 1574. It was probably a Type I supernova, although the sub-type is uncertain. The remnant is the radio source 3C10.

1604
Another supernova was discovered on October 13, 1604, in Ophiuchus the Serpent-bearer. It was noted in records from China, Korea, and Europe, where it attracted much attention. The supernova is often called Kepler's supernova, because he carefully measured its position and tracked the changes in brightness. It was discovered about a month before reaching peak brightness, which was roughly -3 magnitude, but its type is undetermined. The supernova was never visible in daylight, and it faded from view in October 1605. The supernova's remnant is the radio source 3C358.

Possible supernovae
Asian records mention "guest stars" that were clearly not comets) in the following years, all A.D.: 70, 185, 369, 386, 393, and 837 (two guest stars). "Guest star" was the general term used in Chinese astronomy for novae and supernovae, also for comets in some records. Astronomers can distinguish among these only where the description is unambiguous and where the observational record is good enough to create a light curve - or in cases where a clear-cut supernova remnant is found at the location.

On these grounds, astronomers suspect that the guest stars of 185 and 393 were likely supernovae. The others were either too ambiguous to tell or were ordinary novae.

The future?
I'd like to think we're a bit overdue for the next one...

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If only Euclid had learned Origami

Sent by John Crowther
An abridged Times article by Ian Stewart

Over the fireplace at home there is a tiny red dragon. A friend folded it for my wife, starting with a single sheet of paper, and it's so beautiful that we've kept it ever since. Origami, the art of shaping paper into forms and structures, is a curious magic. All over the world there are origami societies whose members share their new inventions – a violinist playing her instrument, a clapping monkey, a new design of paper cup. One ambitious group is even attempting to recreate Leonardo da Vinci's Last Supper. There is even an international notation to record folding instructions, so that you can explain your new invention to someone who does not speak your language.

But there is more to origami than cute paper animals and obsessive enthusiasts. It can help doctors and nurses to rehabilitate you after an injury to your hand (making frogs

is a recognised therapeutic exercise). Prison psychiatrists can use it to teach inmates how to follow instructions and focus their minds. And one day, origami could even save your life.

Paper folding began in China about 2,000 years ago, soon after paper was invented by Ts'ai Lun, a servant of the Emperor. Some time during the 6th century it spread to Japan and the Japanese turned it into an elaborate art form. In Japanese *ori* means folding and *kami* means paper. Samurai used to give each other gifts of dried meat wrapped in paper (known as a noshi). Shinto nobility wrapped glasses of rice wine in paper butterflies (a bit like fancy napkin-folding in modern restaurants).

Today it is a skill widely practised in the West. Robert Lang, a physicist, engineer and inventor, is also one of the world's greatest paper folders. He can make a paper butterfly, but his interest runs much deeper, into the general mathematical principles that govern how paper can fold. At the heart of every origami design, he says, are numbers and geometry, the two great strands of mathematical thought. You can divide angles into three exactly equal parts using just a piece of paper – a feat far beyond Euclid's traditional geometrical instruments of ruler and compasses.

Origami is, in fact, extremely high-tech. An array of orbiting telescopes, a possible successor to the Hubble telescope, is being designed by Roderick Hyde and Shamasundar Dixit, of the Lawrence Livermore National Laboratory in California. The idea is to have a number of telescopes, each 100 metres across. In order to launch them, they must fold up. Hyde and Dixit are developing a "Fresnel lens", commonly used to collapse a large lens into a flat sheet. Ridges and valleys in the sheet change the directions of light just like a conventional lens, and focus it. The Hyde-Dixit design folds a lens from a thin sheet of plastic, rather like a series of fans joined in a circle. Another folded structure important for satellites is the solar panel used to obtain power.

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The CaDAS Interview – Rod Cuff

As a regular Transit correspondent, Rod's writings will be familiar to you all. He does the "Astronomy and the Internet" feature, which many people have said has helped them to use the enormous amount of information available on the World Wide Web. He is an enthusiast, taking distance learning courses with the University of Central Lancashire, attending Astrofest and observing from his back garden. For this interview he travelled to Darlington and we talked in our front room. I really didn't need to ask questions in a formal way, the conversation just flowed.

Is the Interview for this month's Transit? *I am in the process of writing up Malcolm Bannister's interview from a couple of weeks ago, so it depends which is finished and approved first.*

Do you know Malcolm? No, I don't know many people by name. The meetings are friendly enough and very enjoyable: Neil does an excellent job. But getting to know individuals and fitting a face to a name is quite difficult. The first meeting I attended I remember sitting next to you and we chatted easily. *A few people have said that to me. One suggestion has been to have a barbecue at the Planetarium. Do you think that*

would help to get to know people? Yes, I think we need something like that. And maybe regular, advertised observing sessions at Castle Eden Walkway, or Wynyard Observatory, as I think it's called now. Variable star observing or finding all the Messiers or something.

How did you hear of the Society?
I went to Astrofest a few years ago and Cleveland and Darlington was in the list of Societies. I visited the web site and then just turned up at the next available meeting. That was about three years ago. Finding the place was a problem! Thorpe Thewles is easy to find but the village hall, in the dark, is a bit elusive. I talked with John McCue early on, and have chatted several times since. I had a 1957 edition of Norton's Star Atlas when John was looking for past editions for the Planetarium, so I handed it on to him. A friend of mine, John Woodruff, is copy-editor for the Atlas and is mentioned in the acknowledgements.

You once told me you were a copy-editor. How did that come about?
It was by accident. For 31 years I was in software development with IBM in Hampshire. Just before I took early retirement in 1998 I ran a development team, and took on the task of ensuring that the documentation was correct both technically and linguistically. It incorporated copy editing by default. Thinking of what I might do after retiring – I wanted to do some job, if possible working from home and part-time – copy-editing or proofreading seemed to be a good choice. From the Internet I found what is now the Society for Editors and Proofreaders (www.sfep.org.uk), took a couple of courses while still at IBM, contacted some clients and it took off from there.

What sort of subjects do you work with?
Maths and computers, of course, which was my job at IBM, medical and business subjects, dancing and ballet (don't ask!), and astronomy.

Did you join IBM from University?
In my final year of doing Maths at Cambridge, I got keen on joining the British Antarctic Survey. The idea of spending a couple of years in Antarctica really appealed to me. However, the type of work I was offered wasn't so attractive, and instead I joined IBM at a country house in the middle of the Hampshire fields. It was only going to be for a couple of years, but IBM was such a good employer at the time, I stayed. It was interesting work and among other things gave me a couple of years in Northern California. Later, they even paid me to go off and do a PhD while still with the firm. It was the change of management style that came along in the 1990s that made me think about retiring.

What was the subject of your thesis?
The human interface to computers. *You can do a PhD in that?* Oh, yes – I have the thesis to read, if you like! At the time (1977-80), computers were only for experts, for number crunching with card readers and tape readers and all sorts of esoteric ways of putting information in and getting it out. IBM was looking towards making computers

available to non-experts, to use as a general tool to do all the things we now do with them.

How did you start in Astronomy?
Very early. I must have been seven or eight when I picked up my Dad's copy of a book by Fred Hoyle, "The Nature of the Universe" – the text of his 1950 radio lectures. My father was a policeman and one of those men who are interested in all sorts of things and keen on learning. Once I started reading, my interest just took off. I started visiting the library and reading all I could get hold of about astronomy. It was all armchair stuff at the time, without much knowledge of the sky. Later, when I was 11, my parents bought me a 2-inch refractor.

Where were you brought up?
In Bristol. I was an only child in an extended family of adults. I won a scholarship to Queen Elizabeth's Hospital in Bristol, boarding during the week and going home on Sundays – which was when the telescope was used. My first sight of the Moon through the telescope was a truly life-changing event. Once I'd looked at a few other things in the sky, I was literally starry-eyed. It was a new and fascinating world. I remember seeing the 1957 comet and the very first of Patrick Moore's "Sky at Night" programmes that same year.

Did you enjoy your education?
Not so much enjoyed; I just got on with it (though I hated being a boarder). I liked Maths and Science and English. While at school I realised I needed a bigger telescope and tried to grind a mirror. It made an enormous noise, echoing in the classroom, and the mirror wasn't actually spherical when I had finished. It never did work. However, I bought the 1957 edition of Norton's Star Atlas and continued with the astronomy. I wanted to be a professional astronomer then. It was Fred Hoyle's Cambridge heyday, and perhaps partly with that at the back of my mind I went to Pembroke College there – the college my headmaster had been to, so the legend was that it was easier to get into than most!

How do you come to be living in the North of England?
Although I was living in Surrey in the 1990s, I had friends in Redcar. When I visited them after my marriage broke up in 1998, I met Brenda, now my partner, at their house. After conducting a long-distance relationship for the best part of a year, during which I gradually came to like this part of the world very much, I moved up without a qualm to where we live now in Guisborough.

Do you enjoy travelling?
Very much so. We're about to take a walking trip in the lower French Alps, travelling there by train. I've been walking or camping in the Lake District, Yosemite, California generally, Oregon, Crater Lake, Northern Arizona... In Arizona there is a community set up specially for astronomers, determined to keep the surrounding skies dark, designing the lighting for minimum pollution and all that. It's called Arizona Sky Village (www.arizonaskyvillage.com). *What a wonderful idea.* We went to Africa in June 2001 to see the solar total eclipse in Malawi. We were in a party of 15 in a very isolated area

and the skies were sensational. Another fascinating place we visited last year was Ethiopia. The culture is based on a form of Christianity that was frozen in the fifth century, and the history is most interesting. Alas, they seem almost resigned to having a severe famine every ten years or so.

Do you have any heroes?
My father was a big influence, with his interest in maths and astronomy. He had been to university for a year but couldn't keep up with the work for some reason. Fred Hoyle was a hero of mine in the early years. His work on the nuclear processes in stars was very influential at the time. I was a great fan of the Steady State Theory, of which he was a strong advocate, of course, until the cosmic background radiation was discovered and scuppered it. Bertrand Russell was also a big influence on me, for his clarity of thought and his writing style. I was a supporter of CND, over which he presided for some years. He wasn't a very pleasant person, though, from some accounts.

You are a member of the BAA.
I joined two years ago to try to get more directly involved with astronomy. That's also one of the reasons for doing the distance learning courses with UCLan – to become more involved and find a commitment to some area of astronomy. The UCLan material is fascinating stuff. The cosmology course this year was very good, and needed commitment and some effort. In fact I wish they would put a bit more maths into the course, but Barbara *(the senior tutor)* says that would put a lot of people off.

Are you interested in music?
One of the abiding interests throughout my adult life has been choral music. I've sung in many choirs, big and small, starting while I was at university, with choirs conducted or accompanied by undergraduates who later became very well known, such as David Munrow and Christopher Hogwood. Before I moved north, I sang with Guildford Philharmonic Choir for nearly a decade and created my first website for them! Locally it's not been so easy. I joined the excellent Consort of Voices at the University of Durham, which is about 28 strong and consists mostly of undergraduates. After 4 years with them, I'm having a fallow year and will probably join a more local choir. Brenda does Arabic dancing very well, but I don't think I'll try to get involved in that!

And now my daft questions, the Dictator one and the Civilised Society.
As far as the Dictator is concerned, my first (well, second) act would be to abolish the Dictator! I'm opposed to individuals having too much power, no matter how benevolent they may start out being. A civilised society? Well, just before abolishing the post of Dictator, I'd try to impose some radical means of re-distributing the wealth of the world. Particularly once you've seen a few poor African countries, the current system is unacceptable. What makes a society civilised? Tolerance, lifelong learning, people with commitment, social fairness and egalitarianism.

Then there's my "motivation" question. You are highly motivated and enthusiastic. Have you ever thought about why? (This caused the first real pause in our conversation.)

Well, you just have it or you don't. *No, that's a cop-out. Where did it come from in the first place?* My mind is now going back to my primary education. The world is full of things to explore. I remember Mr Mayes's class when I was 9 or 10. He enthused us all with a wide diversity of subjects – he was a classic polymath. He even read the "Iliad" to us 9-year-olds and made it enthralling. I think enthusiasm is probably acquired at a very young age from a very good educator.

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Worse Than Light Pollution?

There was a horrifying article in New Scientist last week. Because *homo sapiens* is unlikely to be able to agree how stop polluting the atmosphere with greenhouse gases, some idiots are coming up with other suggestions to mitigate the effects. One idea is to put a huge mirror in space to reflect some of the Sun's rays out into space again. Another idea is to float zillions of reflective balloons in the stratosphere to stop the Sun's heat from reaching us. Who thought of naming us *homo* ***sapiens***?

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Transit Tailpiece

Quote/Unquote
There is a theory which says that if anyone discovers exactly what the universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened.
Douglas Adams

The simplicities of natural laws arise through the complexities of the language we use for their expression.
Eugene Wigner

I dreamt I died and went to heaven and St Peter led me into the presence of God. And God said "You won't remember me but I took your quantum mechanics course in Berkeley in 1947".
Robert Serber

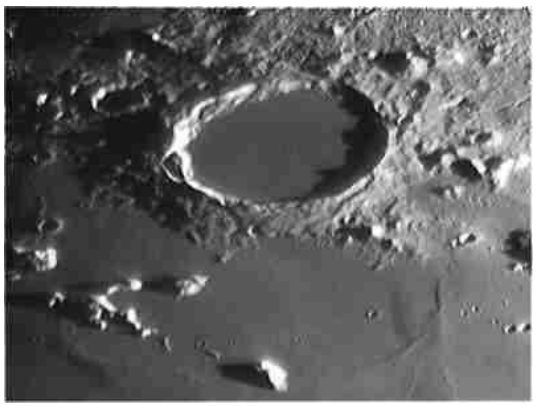
* *

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 Interviewee this month is Rod Cuff, our Internet Correspondent



A selection of **colour** images taken by Malcolm Bannister and Jack Youdale. Our members are doing some stunning work in this field and I have some beauties from Jurgen Schmoll and Keith Johnson for future editions.