# TRANSIT

The Newsletter of

Cleveland & Darlington Astronomical Society

25th June, 2004. Julian Day 2453182

A fascinated group of people at one of John's Public Shows. To find out what they are so interested in, see the back page.

**Editorial**

**May meeting.** The speaker for our May meeting was Mark Swinbank, one of our younger members who is studying at Durham University to become a professional astronomer. As he was being introduced, Neil presented him with a certificate making him a Honorary Life Member of the Society, in keeping with the tradition that any society member who becomes a professional astronomer automatically becomes a life member.

Mark is studying the "missing mass" in the universe and entitled his talk "Weighing the Universe". Due to technical difficulties we were unable to acquire the data projector to enable Mark to illustrate his talk until near the end. However, such was his enthusiasm and ability that he talked through his subject with consummate skill.

**June meeting.** Please note that the meeting is much later in the month than is usual, on Friday, June 25th, entitled "Venus Showcase". The reason is to allow time for members' observations of the Transit of Venus, on Tuesday May 8th, to be organised ready for presentation at the meeting. There will also be a talk on the subject. Recall that the last time a complete transit of Venus could be seen from Britain was 1283 and it there is no record that anyone observed it then. 20-year-old Jeremia Horrocks, with William Crabtree, were the first to predict and record an observation from Britain in 1683.

At least two members are going abroad to increase the probability of actually seeing the event!

**Cosmos V.** Tickets, cost £8 per person, are still available for this unique day. Please apply to Neil as soon as possible, including an SAE with your application, to keep down costs. The date is 18th September, 10am to 6.15 pm, the venue Queen's Campus of Durham University in Stockton-on-Tees, just off the A66. A map is provided when the tickets are sent to you.

**Moon pictures.** Did everyone name the back page Moon pictures? The top two were Plato and Clavius, the bottom two Tycho and The Straight Wall. Hands up those who knew them (Michael, John, Darran and Neil excluded).

**Membership Subscriptions.** There are more than 20 members who have not yet renewed their subscriptions. They are now six months overdue and the £6 should be paid immediately to Ian Miles at 11, Heathfield Park, Middleton St George, Darlington DL2 1LN. If we do not hear from you in the next month, we must assume you no longer wish to be a member.

**Planetarium and Observatory.** There is now a Society group of observers who meet regularly at the Observatory. If you would like to join them, please contact John McCue for the meeting times and dates.

**Scarborough Star Festival.** The Fourth Summer Festival is from Friday, 13th August to Monday, 16th August, at Adderstone Field in Dalby Forest. Telephone contact is 01723 500389 and there is a website at www.scarborough-as.org.uk. Neil Haggath always warmly recommends this weekend at a prime dark sky site.

# Some Astronomical Terms

by Darran Summerfield

Here's a quick look at some astronomical nomenclature for beginners, although some of this might also be of interest to the 'old hats'. For instance I knew what a Parsec was, but I didn't know why.

**Sky Measures**

Beginners often have trouble describing distances on the sky. You might get into a conversation that sounds like this: "Do you see those two stars? The ones that look about eight inches apart?"

"Yeah, but they look more like six feet apart to me. . . ." The problem here is that distances on the sky can't be expressed in linear measures like feet or inches. The way to do it is by angular measure.

Astronomers might say the two stars are ten degrees (10°) apart. That means if lines were drawn from your eye to each star, the two lines would form a 10° angle at your eye. Hold your fist at arm's length and sight past it with one eye. Your fist from side to side covers about 10° of sky. A fingertip at arm's length covers about 1°. The Sun and Moon are each ½ wide. The Big Dipper is 25° long. From the horizon to the point overhead (the zenith) is 90°. There are finer divisions of angular measure. A degree is made up of 60 arcminutes, and each arcminute is divided into 60 arcseconds.

If two objects appear a quarter degree apart, astronomers might note that as 15 arcminutes (abbreviated 15' ). The brightest planets usually appear just a few dozen arcseconds across as seen from Earth. A 5-inch telescope can resolve details 1 arcsecond (1" ) across. This is the width of a penny seen at a distance of 4 kilometres (2½miles).

**Sky Co-ordinates**

Seen from Earth, the night sky looks like a huge dome with stars stuck on its inside surface. If the Earth beneath us vanished, we'd see stars all around us - and we'd have the breathtaking sensation of hanging at the centre of an immense, star-speckled sphere.

Astronomers designate the positions of stars by where they are on this celestial sphere. Picture the Earth hanging at the centre of the celestial sphere. Imagine the Earth's latitude and longitude lines expanding outward and printing themselves on the celestial sphere's inside. They now provide a co-ordinate grid on the sky that tells the position of any star, just as latitude and longitude tell the position of any point on Earth. In the sky, "latitude" is called declination and "longitude" is called right ascension.

Declination is expressed in degrees, arcminutes, and arcseconds north (+) or south (-) of the celestial equator. Right ascension is expressed not in degrees but in hours (h), minutes (m), and seconds (s) of time, from 0 to 24 hours. Astronomers set up this arrangement long ago because the Earth completes one turn in about 24 hours, so the celestial sphere appears to take about 24 hours to complete one turn around Earth. There's a slight complication. A star's celestial co-ordinates gradually change over the years, due to a slow shift of the Earth's orientation in space called precession. When right ascension and declination are given in books and atlases, you might see them accompanied with a year date such as 2000.0. (The ".0" means the beginning of the year.) This is the moment

for which the co-ordinates are strictly correct. For most amateur purposes this refinement is too small to matter.

**Brightness**

The brightness of a star (or anything else in the sky) is called its magnitude. You'll encounter this term often. The magnitude system began about 2,100 years ago when the Greek astronomer Hipparchus divided stars into brightness classes. He called the brightest ones "1st magnitude," meaning "biggest." Those a little fainter he called "2nd magnitude," and so on down to the faintest ones he could see ("6th magnitude"). With the invention of the telescope, observers could see even fainter stars. Thus 7th, 8th, and 9th magnitudes were added. Today binoculars will show stars as faint as 9th magnitude, and an amateur's 6-inch telescope will go to 12th or 13th. The largest and most sensitive telescopes used by professional astronomers can reach to about 29th magnitude - more than a billion times fainter than the faintest stars visible to the unaided eye.

It turns out that some of Hipparchus's "1st-magnitude" stars are brighter than others. To accommodate them, the scale now extends into negative numbers. Vega is zero (0) magnitude, and Sirius, the brightest star in the sky, is magnitude -1.4. Venus is even brighter, usually magnitude -4. The full Moon shines at magnitude -13, and the Sun, -27.

**Distances**

The Earth orbits the Sun once a year at a distance from the Sun averaging 150 million kilometres, or 93 million miles. That distance is called one astronomical unit (a.u.). The distance that light travels in a year - 9.5 trillion km, or 63,000 a.u. - is called a light-year. Note that the light-year is a measure of distance, not time. . . just like kilometres or miles. Most of the brightest stars in the sky lie a few dozen to a couple thousand light-years away. The Andromeda Galaxy, the nearest large galaxy beyond our own Milky Way, is 2.5 million light-years distant. Professional astronomers often use another unit for big distances: the parsec. One parsec equals 3.26 light-years. (In case you're really wondering, a parsec is the distance where a star shows a parallax of one arcsecond against the background sky when the Earth moves 1 a.u. around the Sun.).

A kiloparsec is 1,000 parsecs, and a megaparsec is a million parsecs.

[This has been adapted from a recent Sky and Telescope article].

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## A Short Tour of Ordinary Stars

By Rob Peeling

With the steady diet of spectacular and beautiful images that we see in the press releases of the Hubble Space Telescope and other world observatories, we could be forgiven for thinking that the galaxy is entirely populated by such objects. It isn’t. The universe is actually dominated by billions of “ordinary” stars. This article briefly discusses the nature and classification of ordinary stars and how they relate to the more exotic and photogenic stars and star-like objects in the sky. Examples of the main types of stars visible either with the naked eye or a small telescope are suggested.

Ordinary stars are spheres of glowing gas within which hydrogen is being converted to helium by the process of nuclear fusion. However the properties of these stars, properly termed the main sequence, are hugely varied (see figure 1). Amazingly, all the differences in behaviour are explained by one thing, the mass of the star.

At the birth of a star, interstellar gas contracts due to gravity. As it does so it gets hotter. Eventually it reaches a temperature where hydrogen starts to fuse into helium and the energy released balances the force of gravity and stops the contraction. All aspects of the life of a star are dominated by the balance between the collapsing force of gravity and expansion forces due to the release of energy from thermonuclear fusion. The implication is that *all* stars lie within the main sequence at the start of their lives. This means that all the fascinating varieties of stars and star-like objects found must be in some way derived from the main sequence stars. They are in fact stages in the birth and death of the main sequence stars.

If there is less than 8% mass of the Sun then the collapsing gas will never become hot enough for fusion to commence and make it into a star. More than about 100 times the mass of our Sun and the fusion reactions will be too energetic and the new star will tear itself apart. These upper and lower limits define the full extent of the main sequence of stars (see figure 2). All stars on the main sequence are called dwarfs.

Stars are classified by studying their light. Isaac Newton showed that the light of the sun split into a spectrum or rainbow when passed through a prism. In the early 1800's Joseph von Fraunhofer noticed dark lines in the Sun's spectrum and went on to discover that similar spectral lines existed and varied from star to star. As scientific understanding advanced in the 19$^{th}$ Century, it was realised that the colour of star is related to its temperature with red the coolest, passing through orange, and yellow to white and that the hottest stars being bluish. It also emerged that the dark lines were caused by absorption of light by the chemical elements although the full explanation of this didn't come until the development of quantum theory in the 1920's. These developments lead to the classification scheme based on analysis of spectra proposed by Annie Cannon in 1901 which is basis of the one used today. There are seven types of stellar spectra; O, B, A, F, G, K, M. The curious order of letters arises out of earlier classification attempts being combined and then finally arranged from hottest to coldest, an order that also corresponds to decreasing mass.

Our own Sun is a type G dwarf and a typical representative of about 4% of the stellar population. What would our Sun look like from a planet orbiting another star? A bit like Achird or eta Cassiopeiae which is a 3.46 magnitude G dwarf star located 19.4 light-years away and easily visible to the naked eye. Use a small telescope and you will see that Achird is actually a double star. The brighter star (A) is yellowish but there is distinct contrast with the slightly orange companion (B). Achird B is an example of a class K dwarf. Although K stars are more abundant than G stars they are dimmer (about 20% of the Sun's luminosity) and so there isn't an easy to find, naked eye example. Achird B is actually at the cold end of the range for K and is as near as we will get to a class M dwarf. This is because although main sequence M stars are by far the most common type

of star they are also very dim at approximately 1% of the Sun's luminosity. This makes them difficult targets for small telescopes.

Look beneath the handle of the Big Dipper for a fairly bright star. This is Cor Coroli. Through a small telescope it splits into a double. The fainter (magnitude 5.5) of the pair is an F dwarf and the brighter (magnitude 2.9) is an A dwarf. Compared to Achird there is little colour contrast and both stars appear white. The pair are 110 light-years away. There is a clear difference in luminosity between the spectral classes but also consider that these stars are 6 times further away than Achird and yet the A type star is brighter to the naked eye than the G star in Achird.

Back to the Big Dipper. Most of the stars in this pattern are A dwarfs, excepting Dubhe, the northernmost pointer which is type F and noticeably yellowish to the naked eye. The other exception is Alkaid at the tip of the tail which is a B dwarf (magnitude 1.85, 100.7 light-years distant). Alkaid is considerably brighter than Cor Coroli and must be more luminous since they lie at similar distances.

Finally an example of a type O dwarf. These are very rare so the choice is restricted. The easiest is theta-1 Orionis C which is visible during the northern winter. Using binoculars, follow the line of stars hanging beneath Orion's belt. There is a misty patch, the Orion Nebula and in the middle is theta-1 Orionis. With a telescope the bluish stars split into the famous Trapezium and the brightest star in the group is C at magnitude of 5.13 despite lying 1763 light-years away. The contrast in luminosity of this star to Achird is dramatic.

**References & Further Reading**


1. Norton's Star Atlas & Reference Handbook, 19th Edition, Editor I. Ridpath, Longman

Chapter 5 is a clear account of the relationship between brightness and magnitude and also gives a brief introduction to spectral classification of stars.

2. Stars & Their Spectra, JB Kaler, Cambridge University Press, 1989

This is a very detailed account of the spectral classification of stars and of all types of stars. The history of spectral classification is well covered.

3. Extreme Stars, JB Kaler, Cambridge University Press, 2001

This covers similar material but more rather more accessibly than Stars & Their Spectra. The stars are grouped by superlatives e.g. coolest, brightest, largest etc. rather than by spectral classification.

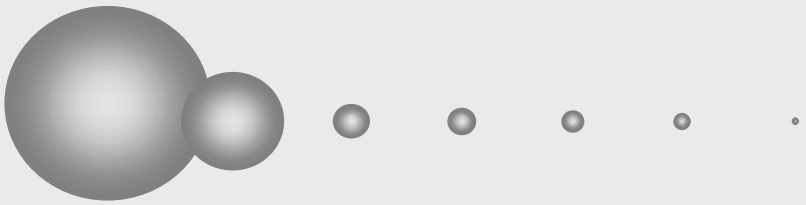
4. Blinded by the Light, J Gribbin, Black Swan, 1992

Very readable account of the development of our understanding of the nuclear processes within stars.

**Internet Resources**

http://www.astro.uiuc.edu/~kaler
The website of the author of two of the books above. Gives example stars for the various classes of star.

http://www.anzwers.org/free/universe/index.html
The website of Richard Powell. An Atlas of the Universe. Well worth visiting because of the quality of the graphics used in the illustrations.



| Spectral Type | O | B | A | F | G | K | M |
|---|---|---|---|---|---|---|---|
| Temperature | 40,000 K | 20,000 K | 8,500 K | 6,500 K | 5,700 K | 4,500 K | 3,200 K |
| Mass (Sun = 1) | 50 | 10 | 2.0 | 1.5 | 1.0 | 0.7 | 0.2 |
| Luminosity (Sun = 1) | 100,000 | 1,000 | 20 | 4 | 1.0 | 0.2 | 0.01 |
| Diameter (Sun =1) | 10 | 5 | 1.7 | 1.3 | 1.0 | 0.8 | 0.3 |
| Lifetime (million yrs) | 10 | 100 | 1,000 | 5,000 | 10,000 | 50,000 | 100,000 |
| Absolute Visual Magnitude | -7.7 | -2.7 | 1.6 | 3.3 | 4.8 | 6.6 | 9.8 |
| Abundance | 0.00001% | 0.05% | 0.3% | 1.5% | 4% | 9% | 80% |

**Figure 1: Comparison of Properties of Main Sequence Stars (adapted from a web page by Richard Powell at http://www.anzwers.org/free/universe/startype.html)**

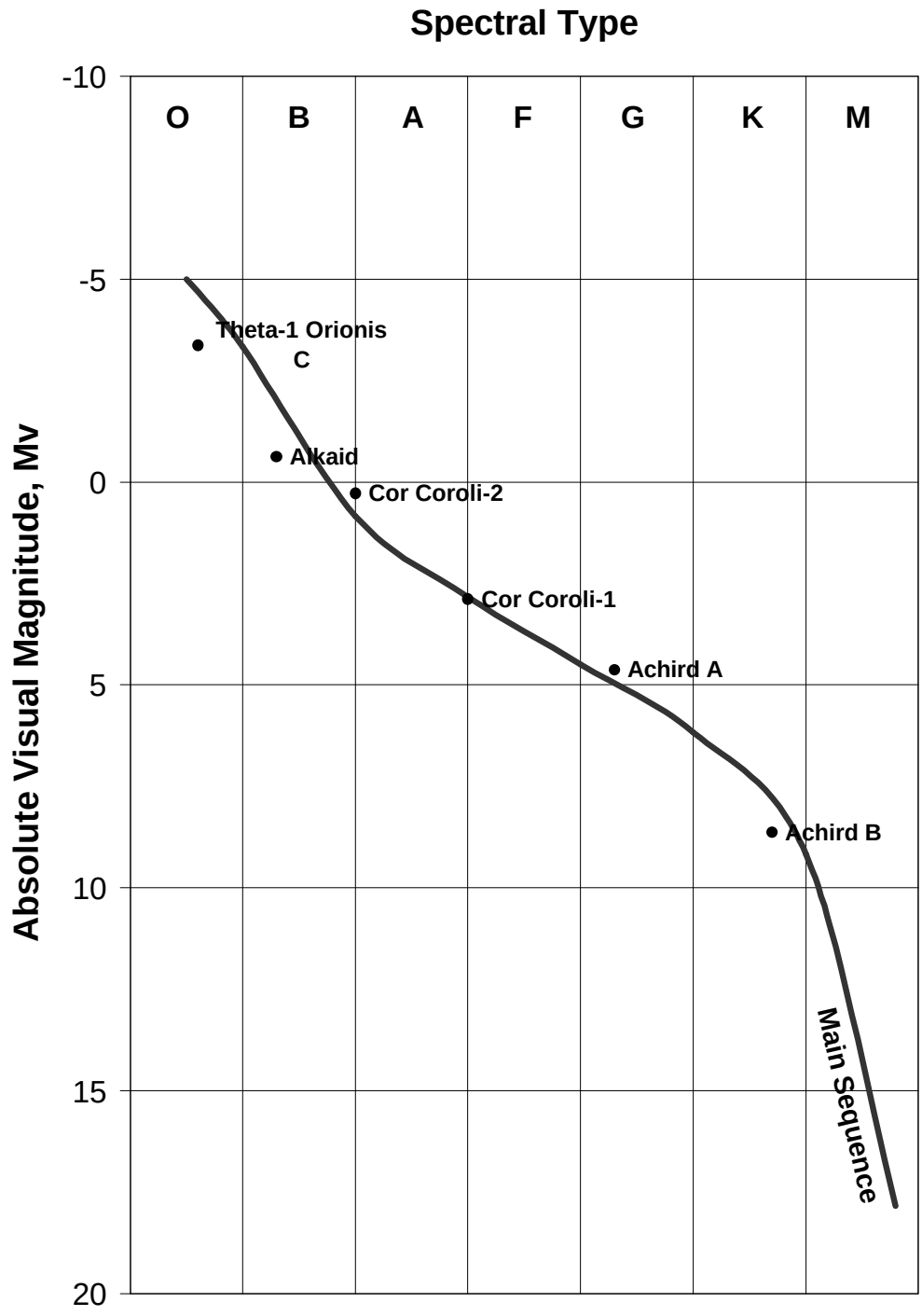



**Figure 2: The Hertzspung Russell Diagram is a standard method used by astronomers to understand the main types of stars and their life histories. This version shows the range of the main sequence and where the examples discussed lie.**

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# The CaDAS Interview – Malcolm Bannister

*Malcolm is one of the Society members who has become very interested in using webcams and inexpensive security TV cameras for astronomical imaging. The cameras used are remarkably cheap and the methods used should be well within the capabilities of most of our observers. They are a good substitute for CCD cameras, which are quite expensive and need some experience to use, although for scientific measurements – as opposed to imaging - they cannot yet be used instead of the CCD camera. Malcolm and Jack Youdale do a lot of observing together and how that came about became clear as the interview progressed.*

*How did you come to start using these small TV cameras?*
Two or three years ago Jack and I saw an article in Sky and Telescope. Someone had had the idea to use a video camera attached to a telescope to record video of brighter astronomical objects to videotape. The tape was subsequently processed using a computer to produce an enhanced still image. Around this time, other experimenters were starting to use webcams and security cameras to do more or less the same thing, and no doubt with this in mind, Dr Steve Wainwright and others started a newsgroup called the QuickCam and Unconventional Imaging Astronomy Group (QCUAIG). QuickCams were the first webcams that were modified for astronomical use. As its name implies, this group provides an exchange of ideas and information for enthusiasts who don't use conventional (and expensive) CCD cameras. Various modifications for webcams and cheap security cameras started to appear at this time, notably from Steve Chambers. I got a cheap black and white security camera from Homebase for £9.99 and set about it with the intention to use it for astronomical imaging. Jack turned up an adaptor on his lathe, we stuck it onto the telescope, waited for it to get dark, pointed it at Jupiter and much to our surprise, it worked.

*Tell me a bit more how the system works.*
First you need to get your images in digital form on to the hard drive of your PC. You can use a webcam, which connects directly to the USB port, or you can use a Video Capture Card which can get analogue images either directly from a video camera like a Mintron, or from a previously recorded video tape and convert them to digital files. You need a very fast PC with a lot of RAM if you use a capture card to get high resolution images. You don't need such high specification if you use a webcam because the images from a webcam are digital in the first place, although you need a lot of RAM for image processing. There's a wealth of information on the Internet for anyone who's interested in imaging.

Once the images are on your hard drive you can use software like Registax to process the images, then Paint Shop Pro or Photoshop to do the final tweaking, although there are lots of other programs available free on the internet that will do the same job.

*Is that how you obtained the amazing lunar pictures you sent me?*
They were done using a Philips ToUcam shooting ten frames a second at 640x480 pixels resolution on Jack's 12" Cassegrain. The way we used the camera was to remove the

lens and substitute an adapter to allow the camera to be put where the eyepiece of the telescope would be. The image falls directly on the ccd of the camera. The camera was plugged into my laptop and the pictures were made by aligning and stacking about eighty frames using Registax.

*How do you come to know Jack?*
I'm marrying his eldest daughter, Yvonne, this coming Saturday.. We have been frantically busy for the last few weeks, as you can imagine. We are going to be married in the Planetarium on the same day as Jack and Pat's Golden Wedding anniversary.

*I'm surprised you agreed to this interview at this time!*
Well, the meeting tonight and a quiet talk in the pub afterwards is a bit more relaxing than all the wedding arrangements we have been making.

*Have you lived in the North East all your life, so far?*
Yes, I was born and brought up in Washington and my family are still there. My Dad died some time ago but my Mam still lives there. I had three brothers but only one is alive today. Simon will be my best man on Saturday.

*What about your education?*
I went to Washington Grammar School till the sixth form, then left to go into industry. My first job was in Wallsend, running machines for a laundry but that quickly changed to looking after their computers. I moved to a computer bureau after that and ran data processing for companies that couldn't afford their own computers, huge and very expensive in those days. I did a bit of programming as well. In the end I left. While I was between jobs I became more involved in my hobby of music.

*What sort of music?*
I've been playing guitar and other instruments since I was about 11 and I played in various bands ranging from folk to rock! I finally retired from the stage when I was about 25 but went straight into the production side of things, recording and running sound and lighting equipment for various bands. I finally retired from that about seven years ago and started to devote more time to astronomy, although I keep my hand in helping out with the students' productions at work. I met Yvonne at a charity concert at the old Stockton Racecourse where her brother's band Glacier was playing.

*So that's how you come to know Jack!*
Yes. I had been interested in astronomy since I was a lad and to find a mentor like him was just wonderful. I was knocked out by his observatory and all the equipment he makes. We have done a lot of astronomy together and to have the use of his observatory in the back garden and all his experience and his workshop facilities was just right. Yvonne likes observing with a telescope as well. and her folks have a caravan in Stanhope, where the skies are really very dark for this part of the world. Jack made me a six-inch Newtonian one Christmas and we keep it at Stanhope for when the sky's clear.

*What is your job now?*

After I left touring with bands, I went to the Job Centre looking for courses to get qualified for a new career. I saw a Lab Technicians Course, did that and now I am Senior Lab Technician at All Saints College in Newcastle. I've been there for about 12 years and before that I was a Lab Technician in Gateshead. It's a great job and I enjoy it enormously. No two days are the same and there are always lots of problems and challenges to keep me on my toes. The students range from Year 7 to A level. I sometimes teach the odd lesson and my astronomical presentations are in great demand. The students just lap it up.

*So life is pretty hectic?*
Oh yes, I'm always too busy. I would like to start an Astronomy evening class at the School but there's not enough time. I will do it one day, though. It would be a sort of astronomy course in the evenings, with weekly lectures. Whenever I tell the kids about the really simple astronomy, like how the sky works and how the planets go round the sun, they are fascinated. They hadn't thought about it before and find it very interesting. They can come up with some very probing questions though.

*You said you have been interested in astronomy from being a boy. How did it start?*
Patrick Moore was just starting "The Sky at Night" on TV and I couldn't miss it. He was showing how to make a telescope using spectacle lenses as well as the night sky and what to observe. My uncle gave me a Patrick Moore's Observer's book of Astronomy and I was hooked. I remember seeing a partial solar eclipse round about that time. It all mushroomed from then. I was in the Venture Scouts and we camped in the Cairngorms a couple of times and the skies there were just amazing. I only had binoculars then. It was just like looking at a star chart – there were so many stars it was difficult to recognise the constellations. But the Milky Way was sensational.

*What is your favourite area of astronomy?*
At the moment it is planetary imaging. The cameras we are using are ideal for it. We haven't reached the limits of what we can do with the cameras yet. Mars and Saturn are the favourites but we'll move on to Jupiter next. There are a lot of improvements to make. We are thinking of mounting a small camera at the main mirror prime focus without the use of a secondary mirror. The camera is no bigger than a secondary and it may improve the resolution. The only optics would be the primary mirror, although it's possible that a re-imaging lens may have to be used to get the correct scale. It may be possible to do some deep sky imaging but then you need to have a method of integrating the exposure, which is not easy with the small cameras. You have to dive into the electronics and make some modifications. Electronically the modifications are quite simple but the components are so small and delicate that it's really tricky to work on them

Keith Johnson, in his talk at the Member's Night, seemed worried about the ethics of imaging using computer enhancement. What's your view on this?
The stacking technique seems to me to be acceptable. Your are only improving the signal to noise ratio. When it comes to actual "enhancement" or manipulating the image to extract the maximum amount of detail, I think you can only go so far. You may get a lot

of extra detail but is it really there or is it artifacts caused by over-processing? I would rather have a nice smooth image that looks like what you would see in a big telescope but that's just me!

*Do you have time for any other hobbies?*
I am a keen birdwatcher. We live close to Washington Wildfowl Park and so we see a lot of fairly rare birds, both inside the park and flying around. We like holidaying in Scotland. Last time we went to Gairloch in the highlands. We were lucky to have a trip on a marine survey boat while we were there. We saw quite a few birds that you don't normally see in Washington! You could see harbour porpoises from our hotel window. We went to Greece once but I would rather holiday in this country. I find the whole of natural history seems to go together. Bird watching makes you see the botany, the insects, the geology and all the natural world. Astronomy is part of it, of course. Being out at night is really observing the whole of the natural world at night. It's the total environment that's the attraction.

*That's very true. I remember canoeists and fishermen telling me the same thing – it's being in the situation that matters.*
We spend a lot of time walking in the Durham Dales. At Cowshill there are lots of mining remains. There is a track up to an old mine which was surfaced with spoil from the excavations. It's covered in pieces of fluorospar and galena and really twinkles in the sun. The silver content of the lead from the mines was quite high. There's a story of workers offering to re-lead the church roofs for free. When they were asked "What's the catch?" they said "There isn't one!". The Churches got nice new roofs and the workers got the old lead which was about ten percent silver!

*When did you join the Society?*
I've been a member for about 3 years now. With visiting Jack a lot, I was also going to the meetings, so I thought I had better pay my membership fee. *Have you any comments on the Society – good or bad?* No criticisms. I would like to see more young people encouraged to join and come along. Maybe we need a Junior CaDAS based at the Planetarium with John McCue and some of us looking after them and giving them interesting and exclusive things to do. The Society has such a good mix of people, technical and non-technical, and all keen and enthusiastic, but not many young ones come along.

*What has been your most satisfying astronomical moment to date?*
Easy! When I saw the first small TV camera picture of Jupiter. To think you could produce such an image with such cheap equipment! However, I am thinking of going back a step or two and trying "wet" or "chemical" photography, which I haven't done much of. That is one area which passed me by and I would like to give it a try. I have the ambition to rival David Malin!!

*What sort of things do you read?*
At the moment I am re-reading Carl Sagan's "Cosmos". Most of my reading is factual. I don't watch much television or go to the cinema or the theatre. I like reading John

Mortimer's "Rumpole" novels though. I was on Jury Service once and I can see where Mortimer got his ideas from. He was a Barrister after all. I also like science fiction, particularly Arthur C Clarke and Isaac Asimov.

*Who has influenced you the most?*
Jack, of course.

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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).

## Cosmic Microwave Background

- Have you always wanted to get to grips with what the CMB is all about and why people get so excited about it? A good primer is at http://map.gsfc.nasa.gov/m_uni/uni_101bbtest3.html …
- … or there's a nice "viewgraph" presentation at http://background.uchicago.edu/~whu/beginners/introduction.html
- OK, so it came from the Hot Big Bang (http://csep10.phys.utk.edu/astr162/lect/cosmology/hotbb.html) …
- … not that this discovery stopped Sir Fred Hoyle (www.longman.co.uk/tt_secsci/resources/scimon/hoyle/hoyle.htm) from trying hard to fit it into the Steady State Theory.

## News

- A quick reminder about www.transit-of-venus.org.uk or www.vt-2004.org for coverage of the Venus transit on 8 June.
- Comet C/2001 Q4 (NEAT) has a very comprehensive page devoted to it at http://cometography.com/lcomets/2001q4.html, with copious information and many photographs. I especially like the one showing the comet passing the Praesepe cluster (M44), which was my own first view of it in binoculars. This photo has just a tad more detail than I could pick up, though … (The whole of the cometography.com site is well worth looking through.)
- The Cassini spacecraft is now nearing Saturn, and sending back spectacular pictures – see http://saturn.jpl.nasa.gov/index.cfm, which includes a new image every day. On 11 June it will encounter its first moon, Phoebe – see http://saturn.jpl.nasa.gov/operations/approach.cfm .
- For a good coverage of what we think we know about Saturn at the moment (at least some of which is bound to be overturned by Cassini!), check out www.solarviews.com/eng/saturn.htm, which again has some great photos.
- Things that would have been impossible to contemplate observing even a decade ago are becoming almost routine. For instance, one of the early discoveries of the infrared Spitzer Space Telescope (www.spitzer.caltech.edu) is of an empty ring in the protodisk around a young sun 420 light years away, indicating planet formation much

earlier than current theory proposes (http://skyandtelescope.com/news/article_1264_1.asp). Another theory bites the dust, literally?

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## Transit Tailpiece

From John Crowther

*John has written the entire June Tailpiece single-handed!*

1) Last Month's Cover photo: Where is the Sun holder? Not on Earth, where a little fingernail at arm's length would easily cover the Sun.

2) A New Year?

To us amateur astronomers the Summer Solstice may be seen as our New Year. For after the solstice the days slowly begin to shorten and the nights to lengthen. At this time of year I sometimes tease people by saying " The nights are drawing in again". The usual response goes something like this "They haven't blinking well drawn out yet". We all hope for dark, clear nights but when those stormy cloudy ones arrive how about building a rocket? Well, not a real one or even a small working one but one from the range of card kits which are available (see below).

3) Model Roundup

A listing of models by subject

No 13 Rockets

Schreiber – scale 1:100

**Ariane 44 L/V31 …….£22.95**

Wilhelmshaven – scale 1:50 unless otherwise stated

**V2 (German and US versions with transporter and launch pad)…£35.95**

**Bomarc (US interceptor with launch ramp)…….£22.95**

**Ariane 5 (1:250) ……£7.95**

GELI – scale 1:33

**V1 Flying Bomb ……..£4.50**

Fly Model – scale 1:33

**Arado 234 and V1 …….£12.95**

Maly Modelaz – scale 1:33

**Fiesler Fi103 Reichenberg (manned V1) with Bachem Natter and Tank buster**

**Junkers 87 …….£8.95**

Details from "Marile Models, Turnagain, Finch Lane, Amersham, Bucks HP7 9NE

4) From an article "Moon of Doom" by Colin Wilson, in the Daily Mail, on the day of the eclipse of the Moon, recently - incorrect and misleading?

"*The blood colour is due tot the fact that the Moon, unlike the Sun, is too close to be totally eclipsed by the Earth's shadow. But the rays of the Sun that do light it up are bent by the Earth's atmosphere towards the red end of the spectrum.*"

5) Literally a Tail Piece!
From the Daily Telegraph of May 14th, 2004.
"Venice's gondoliers are being forced by ever-higher tides to "amputate" the tail end of their boats in order to squeeze under the city's bridges. The boatmen blame the more frequent high tides bedevilling the city on global warming and one of the rainiest seasons in years."

6) A Tail piece "Howler"
"The greatest miracle in the Bible is when Joshua told his son to stand still and he obeyed him".

**Quote/Unquote**
Three from John Crowther :-

Were a star quenched on high
For ages would its light
Still travelling downwards from the sky
Shine on our mortal sight
*Longfellow*

How like a queen comes forth the lonely moon
From the slow opening curtains of the clouds
Walking in beauty to her midnight throne
*George Croly*

Isles of light and silver streams
And gloomy gulfs of mystic shade
*Proctor*

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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.

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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)

Malcolm Bannister has been interviewed this month.

The object of the Planetarium audience's fascination (picture on page 1) was this projection of the Sun. John is setting up a number of projection methods for the Transit of Venus on June 8th. Anyone visiting the Planetarium on that date will be able to see these projections, whether they have a system of their own or not.