

TRANSIT

The Newsletter of



8th March, 2002. Julian Day 2452342

Editorial

February Meeting. John Harper, from Scarborough AS, entertained our usual big audience with a 2-hour canter through the Zodiac, reported later in this edition.

CaDAS next meeting will be on March 8th, at Thorpe Thewles Village Hall, when Dr John Steele, Durham University, will talk on “Astronomy in Ancient Babylon”. In April the meeting is on the 12th. Dr Paula Chadwick, also from Durham University, will talk on a subject to be announced later.

e-mail disaster. My abject apologies to all those who receive Transit by e-mail, for the inordinately long time it took to transmit the February edition. My experiment with pictures was ok for a printed version but I had no idea that e-mail was so intolerant of big files. The original file size was 3 Mbytes, so at 56 kbytes per sec should have disappeared down the cyber-tubes in about one minute. Unfortunately, the usual computer hype came into play and some members were reporting up to an hour to download. How I love Bill Gates – I blame him for all my computer-rage events. In future, I will keep the email version well down in size by deleting the pretty pictures – sorry to have to do that.

Financial statement. Treasurer Ian Miles publishes his accounts of the Society’s finances for 2001 in this issue. I’m amazed he manages to run our affairs on a subscription as low as £6 a year.

Beagle2. This project is now winding up to its climax next year. A recent publication is summarised inside, and a notice of a lecture in York in April is given some publicity.

Astrofest 2002. I didn’t manage to get there (Grandpa duties intervened!). If anyone who did go would like to tell us all about it, the article will be gratefully received.

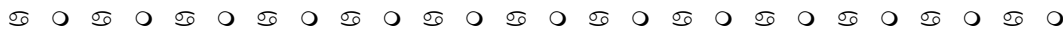
Web cameras. Last month one of our enthusiasts displayed “the sort of equipment any of us could use on our telescopes to record the images we see”, so it was said. I am sure we would all be interested in a description of what sort of cameras are suitable and how they can be mounted and used. Any takers?

Book Review. Although I promised to kick this item off, there has been enough material to fill 16 pages without it. Would anyone like to volunteer as the Transit book reviewer – an unrivalled chance to recommend all your favourite books?

British Astronomical Association. If those members who are active in any of the BAA sections would like to keep us all informed of what is happening, this would be a welcome addition to Transit. This applies to the SPA and RAS as well, of course. CaDAS boasts quite a few active and important members of these organisations. If you would like to enthuse others with accounts of your activities, please do.

Light Pollution, USA. Reading past issues of Sky and Telescope recently, the eye was caught by a case where a property developer threatened the Fred Whipple Observatory on Mount Hopkins with a \$900 million lawsuit when the Observatory (quite legally) objected to the light pollution the development would cause. Luckily the planning authorities were on the side of this world class astronomical site and prevented the developers from irresponsibly destroying it.

Sunderland AS. Meetings in March are 15th or 16th, Deep Sky Observing session; 17th General Meeting at Quaker Meeting House, 30, Roker Park Road, Sunderland, 7.30pm; and 22nd or 23rd, Deep Sky Observing session 2.
Details on website, sunderlandastro.com



CaDAS Meeting, February 8th, 2002

Notices.

- 1) The occultation of Jupiter by the Moon on January 26th had been recorded by Keith Stewart. A sequence of pictures taken using a web-cam had been circulated by John McCue via e-mail. Keith had brought the equipment to show members how it was done.
- 2) A reminder about subscriptions was announced – they are now due. Please send to Ian Miles as soon as possible.
- 3) Two new members were welcomed to the Society.
- 4) Neil gave an advance notice of The Ilkeston 21st Birthday Convention to be held on Saturday, 11th May.

Lecture. The Society welcomed John Harper, President of Scarborough Astronomical Society, to talk on The Signs of the Zodiac. He began by reminding us that the occultation of Jupiter was one of a series, the next being on February 23rd at 0240. There will also be an occultation of Saturn, again by the Moon, on 16th April. There is an SPA Occultation Group Web Site which can be consulted on these matters. John also told us about the Second Scarborough Summer Star Festival Weekend to be held at Adderstone Field, a dark sky site on the North York Moors. The date is August

9th to 12th, cost £15, form available after the lecture. On 16th March there will be a Messier Marathon at the same place – see Scarborough AS website for details.

“The Circle of the Animals” could have been an alternative title to the Lecture – 12 constellations, mostly named after animals, the only exception being Libra, named by the Romans; each with its ancient symbol. The Planets, wanderers of the Solar system, as well as the Sun and Moon pass through the Zodiac, within 5 degrees of its middle line, now called the ecliptic. The astronomical background of the Zodiac was touched on, to point out that this belief system has fundamental problems. For example the shapes being quite illusory because the stars are at various distances and the precession of the equinoxes moving the positions of the Constellations, if not “the signs”.

As a result of this unbelief – John joked - the Finger of Fate pointed at the overhead projector, which failed under the strain. Our lecturer at this point showed his encyclopaedic knowledge, as well as his experience as a lecturer, by ad libbing for 20 minutes, while a replacement projector was brought. It also showed how CaDAS can overcome these problems.

And so we were treated to an erudite, lucid and wide-ranging description of each of the Signs and Constellations of the Zodiac, with some wonderful maps and pictures. Although John had taken a fall while running in Scarborough, it did not dim his enthusiasm or our enjoyment of a two-hour evening’s entertainment.

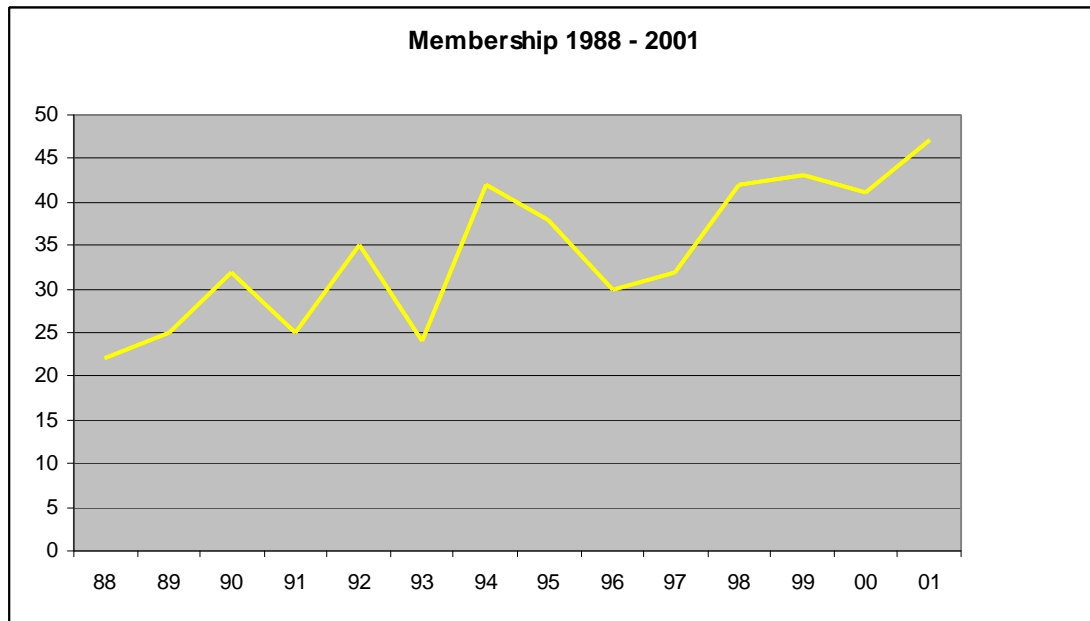
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Cleveland & Darlington Astronomical Society
2001 Financial Summary

	<u>Expenditure</u>	<u>Income</u>	<u>Balance</u>
2001 Opening Balance			329.91
Room Hire	117.00		
Speaker Expenses	127.00		
Mailing Expenses	43.30		
FAS Subscriptions (incl insurance)	27.50		
Telescope Tube (Observatory Refurb.)	46.00		
Raffle Prize	5.00		
Planetarium Dedication Raffle *	55.00		
Planetarium Grant *	1000.00		
Subscriptions (44 Adult, 2 Family, 1 Junior)		287.00	
Entry Fees/Tea & Raffle Proceeds		142.64	
Bank Interest		2.26	
Asteroid Puzzle (Observatory Refurbishment)		75.00	
Planetarium Dedication Raffle *		55.10	
Planetarium Grant *		1000.00	
Closing Balance 2001			471.11

* Planetarium Project funds transferred to a dedicated account.

I.Miles, CaDAS Treasurer, 21st February 2002



The CaDAS Interview – Barry Hetherington

Chairman Barry is another of those constant figures in the Society, who rarely misses a meeting. My wife had attended one of his weekend Astronomy lecture days organised by the WEA at Bennet House in Darlington. She gave him a glowing testimonial afterwards and recommended that I should go on some future occasion. Here was an opportunity to find out more about the motivations and background of our Chairman. We both live in Darlington, so I battled through the football crowds to his house. We talked in a comfortable room lined with books and a magnificent globe of the Earth on the table – of which more later.

You've been interested in astronomy from the very beginning? Yes, I remember being interested at school – I must have been about 11. Sputnik 1 went up and fired my imagination about space and the Solar system and all that. I was hooked from that moment. I bought a small reflecting telescope from Charles Frank of Glasgow, when he started up selling ex-army optical equipment in the 1950's. I found observing to be a cold occupation, with dew forming on lenses and glasses, and decided to concentrate on the History of Astronomy. I don't do a lot of observing, although I bought a 4inch Vixen refractor in 1992.

Astronomy wasn't taught at school, then, was it? No, certainly not at the school I went to in Hartlepool and left at 15 without any qualifications. My education started when I left school. *In fact you have had a lifetime of learning ever since, being self-taught in all sorts of subjects. Why does this happen so often, I wonder?* I don't know. School did nothing for me. It was just a conveyor belt without any inspiration or stirring of the

imagination. I joined the WEA for twenty-odd years and learned about the things I was interested in – well it's all in the Obituary I gave you. *You really have written your Obituary, then?* Oh, yes. I don't want them to get it wrong – or, worse still, say nothing at all!. You can read lots of details in there. *Have you specified what to do with your ashes?* No, I don't care, I won't be there then!

You aren't a religious person? No, I'm not. Looking at the night sky and studying natural history stirs all sorts of thoughts about a creator and infinity. The Universe is very big and we are very small. I have this thought about God, where he (yes, a male person) is looking at the Universe and zooms in to our Galaxy. Then he sees a Sun with a Solar system, zooms in a bit further and sees a blue Planet. He takes out a rubber and says "That was a mistake", rubs it out and departs. And nothing has changed in any significant way.

Go back a bit. You were brought up in Hartlepool and have lived in the area ever since. Yes, I remember a happy family life and moving to Darlington when I was 15. I have lived here ever since, remaining a bachelor and continuing to live in the family house. The job I took in Darlington at Messrs Freeman, Son and Curry proved to be a life-long career. It developed from trainee legal executive to Legal Cashier.

You lectured quite a lot for the WEA. Well, I did for many years but not now. I had to give it up because of shortage of time. I thought when I was semi-retired I would have plenty of time but I'm busier than ever trying to fit things in. One big job at the present is doing the annual report for the Darlington and Teeside Field Club. I'm President this year again, after an interval of twenty years. People give me their section reports and I have to edit them into one document. Trying to make the English scan and yet preserve the writer's intent is sometimes quite difficult. You have to respect the writer's style and acknowledge that it remains their work.

The Field Club is a long-running organisation, isn't it? That's right. It started in 1891 and has had a weekly meeting ever since then, without missing one. A remarkable record. The membership is about 100. The Darlington Club does a lot of work with the Durham Wildlife Trust, providing some of the best naturalists in the County. *Barry gave me a copy of the History of the Field Club which he had written and published.* In the Field Club, I've been Astronomy Leader, Geology Leader and Entomology Leader at various times in the past. Natural History is a wonderful field for those who want to go on learning throughout their life. The field is limitless and always interesting. I became very interested in plant galls at one time, joining the British Plant Gall Society and becoming their auditor and treasurer.

He also showed me his Pre-Telescope History of Astronomy, published by Wiley in hardback in 1996. I've always wondered about the invention of the telescope. There's a book by Robert Temple entitled The Crystal Sun, which makes the case for lenses being invented as early as Roman times. So why was the telescope so late in coming?

Yes, I've read that book and my explanation is one of the mind set of the times. It needs a reason for the idea of putting together two lenses to see a far distance and that idea

came before the 1600's. The brilliant idea of Galileo was to point it upwards instead of horizontally, with all the results we know about. The telescope may well have been around much earlier than Galileo's time. In fact there is a reference to what must be a telescope in Chaucer's Canterbury Tales, 1300's. I chose to write about the pre-telescopic era to limit the period covered by the book. Allan Chapman was very encouraging and advised on how to find a publisher. But actually getting published is quite a battle and needs a lot of determination in the face of rejections.

Did you start the Darlington Astronomical Society? After 20 years in the WEA, I asked for a course in astronomy. They eventually told me that the only way they could run a course was if I taught it. So I took on the job. After about 3 years the class suggested we form a Society, which we did in about 1980, when Cleveland AS was starting up, too. Ours was quite small – 8 or 10 members – so when David Graham suggested a merger in about 1990, we all agreed it was a great idea.

Why have you never been elected FRAS? Friends did offer to propose me, but in the end I declined. It would have meant another set of magazines. *He gestured to the collections of magazines of all kinds on the shelves of his Library.*

With Astronomy and the Field Club, do you have time for any other interests? Yes, I'm very interested in the development of book design and in 1967 joined the Society of Scribes and Illuminators. I enjoy calligraphy and lectured for Osmiroid, the pen makers, for a time. Egyptology has fascinated me for a long time. In 1995 I co-founded the Durham Ancient Egypt Society, with its newsletter IPWTY. There's a big Millennium project on at the moment among a Darlington group of embroiderers – yes, I embroider, too. This will depict World, British and local history over the last 1000 years in 60 panels. I like photography, too.

What about music and films ? I like light music but no, I don't dance. Films – I love adventure and action. I have dvd's of all the Rambo series. *What about 'The Hunt for Red Oktober'?* Marvellous. I know the dialogue off by heart.

Are you worried about light pollution? As far as the Observatory is concerned, I worry more about the trees at the moment, which are growing quite high now. I don't know what species they are (*what! after all you were telling me about the field club. Go to the bottom of the class*) but they will need trimming soon. The problem is it's a protected area and nature reserve. Maybe if we re-plant in a responsible way with smaller species we will be able to persuade the Local Authority to do something.

If you were World Dictator, what measure would you introduce? My initial reaction is to ban weapons but it's people who kill, not the guns. So I would have to find a way of educating people not to kill one another.

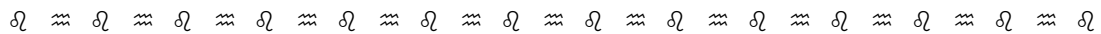
Who has influenced you the most? No-one. I'm a bit of a loner, really. *Well have you any heroes?* Oh, that would be Alexander Humboldt. Have you read his 1850 book "Cosmos"? He was a precise writer and gave credit to everyone whose information he

used. Here was a man who wanted to learn about everything possible and explore the unknown places of the World. I don't like travelling but I want to learn about everything.

What is your most satisfying achievement? Publishing the books and naming 12 asteroids. *How do you get to name asteroids?* Flagstaff, Arizona, wanted names for 150 asteroids they had discovered and approached the BAA for ideas, who approached me. I suggested historical British astronomers and the IAU verified the names.. One was Mason-Dixon, of the Mason-Dixon line, in the USA. Dixon came from Cockfield and was an astronomer. The other names are in the dictionary of Minor Planets (*of which Barry, naturally, has a copy*), with an acknowledgement to me.

What's good about CaDAS and what would you change? The biggest asset is the grand group of keen, practical astronomers, with boundless enthusiasm. The Observatory and the Planetarium are superb. We have an excellent lecture series – Neil does a great job, with his wide network of contacts. One thing I would like to improve is communication amongst members and keeping in touch, which I suppose means having a good Newsletter. The problem here is that, given a monthly issue with a cost of, say, 50p a copy, the sub of £6 a year will be quickly used up and we need expenses for lecturers. That needs thinking about.

Before I go, tell me about this very unusual globe. They are made in China. I bought this from Castle Crystals in Barnard Castle. The inlays are all different coloured minerals and look, they fit exactly, without any gaps. And come downstairs and look at this. This is an atlas - a flat globe, if you like – made in the same way.



Beagle 2

Here is a quick precis of “Beagle 2 Bulletin”, issue 7, for those who do not have a copy. Your editor is ashamed to say that he knew very little (journalese for complete ignorance) of this British space initiative. How long it has been in the development stage is not given in the Bulletin but the launch date is now expected to be June, 2003. There was a recent BBCTV documentary and news item on it – did you see it? The broadcasts marked the successful entry into Mars orbit of the NASA Odyssey spacecraft, in 2001. The project is led by the OU and Beagle 2's Board of Management also has representatives from Astrium Ltd, University of Leicester, BNSC and ESA. The prime industrial contractor are Astrium Ltd, with McLaren Composites, Martin-Baker Aircraft and others. Other technical and scientific involvement comes from ESA member states. Beagle 2 is the landing component of the European Space Agency's mission to Mars – Mars Express. It will take off from Baikanour in Kazakhstan, landing by parachute. The main science objective is to seek evidence of past and present life on the surface of Mars. All the sampling and analysis will be carried out remotely, without the need to return samples to Earth. Communications will be through the NASA Odyssey orbiter, hence the interest in the success of that mission. For more information on this British project, have a look at www.beagle2.com.

The York Astronomical Society

Founded 1972

Presents

A lecture by Professor Colin Pillinger FRS

The Beagle 2 project is the British led effort to land on Mars as part of the European Space Agency's Mars Express Mission to be launched in June 2003. The project's Team Leader is Professor Colin Pillinger FRS. As part of The York Astronomical Society's 30th anniversary celebrations, Professor Pillinger will be presenting a lecture about this exciting venture to the Red Planet. All members of the public are welcome to come along.

The lecture takes place at 7pm on Friday 5th April 2002 at The Priory Street Centre, York. Entry costs just £1.50 per person, and includes refreshments.

For further information, see our website at www.yorkastro.freeserve.co.uk or call 07944 751277 (evenings)

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Letter From New Zealand – February 2002

from Frank Gibson

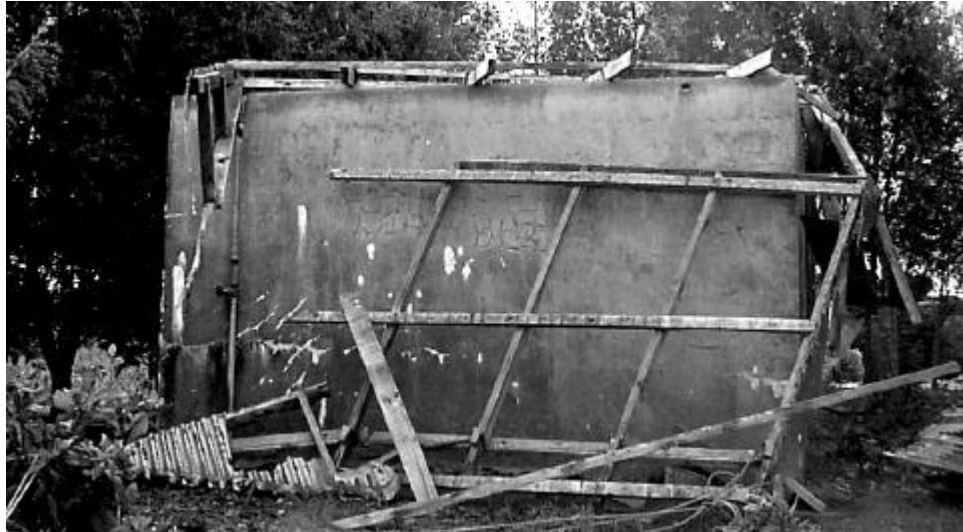
Well, here we are again. Back at school after the summer break, which is long but never long enough. A nice letter from the boss to say my bursary physics examination results were excellent contrasts with the first glimpse of the next batch and me wondering how I am going to maintain last years high standard. All the teachers out there will know what I mean.

I thought I would show you my observatory this month. Its level of performance is a million light years below the high level attained by John McCue but therein lies the challenge. I will take you through the story.

About five years ago I found that a pension scheme, which I had paid into in England and forgotten about, had decided to mature and I suddenly found myself with a fair amount of cash in hand. I immediately paid off the mortgage and decided to spend part of the rest on something I had always wanted but was never able to afford. After thinking about fast motorcycles (I was a bit of a tearaway when I was younger) I realized that a telescope was less likely to kill me or end in divorce. I hunted through the adverts in the magazines and eventually bought a Celestron CM 1100. This is an 11 inch Schmidt-Cassegrain with a very solid mount and an accurate tracking system. Having got it home. (It took two journeys to the courier depot because I did not realize just how much space it would take up in my car). I set it up on the deck at the front of the house and prepared to enjoy wonderful vistas of the universe.

Most houses in New Zealand are timber built which is great for earthquakes (of which we have quite a few) because they bend instead of collapsing. This also means that when you set up a pretty heavy telescope on what is essentially a wooden platform. If a mouse coughs three fields away the image jumps all over the place. The only way I could get an even slightly steady image was to wait until the house was empty or everyone else was asleep and then carefully sit in a chair and hold my breath while I gently put my eye to the eyepiece. This was very unsatisfactory. I decided to use some kiwi ingenuity.

At the high point of my land there are two concrete water tanks. They had seen better days. I decided to repair one and put it back into use and



turn the other into an observatory. Here is a picture of the tank just after I had removed the corrugated roof. I removed the roof by levering up the sides with a crow bar and then cutting through the steel bars connecting the roof to the walls. Having done this I fastened fence wire to each end of the roof and using a fence tensioning device (every good Kiwi has one) I gradually pulled the roof off its mountings. Lots of destructive fun. The height of the side walls is about 3 metres. Inside the tank was about 30 cm of fetid ooze. Because of the height of the walls, mounting the telescope at ground level would have meant only limited sky would be available, so I gave my friend George a ring. George is ex New Zealand SAS and not noted for subtlety. We decided to cut about a metre off the top of the walls to bring them down to head height. We used a very heavy wheel cutter, a couple of large hammers and language that any astronomer would be ashamed of. The top of the tank, which had so readily leaked water, would not budge one angstrom. We retreated, opened a couple of beers and put on a steak while we reconsidered. I decided that if the mountain would not come to Mohamed we would have to build our own mountain. First we had to gain easy access to the inside of the tank. Here a pneumatic drill hung from a rope was useful. The picture shows George in action cutting a doorway in the end wall. I then used the rusty corrugated iron,



which had been the roof, to make shuttering for a concrete block. This block had to be high enough to raise the telescope to the height of the walls and wide enough to comfortably accommodate the tripod legs. This called for a concrete block 1.1 m high and 1.3m square. In principle this is easy. In practice getting a concrete truck up to the observatory would have been impossible without cutting down some of my favourite trees, taking out a few fences and driving over my wife's flower beds. So I borrowed a cement mixer from a friend and man handled the concrete one bucket at a time from the mixer into the tank and into the shuttering for the block. This was hard work and I began to get back some of the muscle definition that over the years has hidden itself beneath the evidence of good living and insufficient exercise.

Before building the block, I had worked out roughly where the tripod legs would be for correct alignment of the equatorial mount. When the concrete came to about 10 cm from the top of the mould I dropped three paving stones into position on top of the concrete (one for each leg) so that I would have leeway in positioning the tripod.

This left me with a concrete block large enough to set the telescope on but not wide enough to stand on while the telescope is in position. I could have got around this by filling the tank wall to wall with concrete but this would have been both expensive and more importantly excruciatingly hard work one bucket at a time by hand. So I used technology with which I am familiar – decking. Most New Zealand houses have a deck. It is the area around the house, which has been covered with a raised wooden platform. It is where you entertain guests with a beer on warm summer evenings. On a fine summers morning it is great to drink strong coffee with egg and bacon for breakfast on the deck. The weather in Britain does not really justify a deck. I digress.

To allow free movement around the telescope I used expansion bolts to fasten lengths of 100 x 50 mm timber around the inside walls of the tank and bridged the gap to the concrete block using decking timber (it is produced specially here for outdoor flooring). So I now had a place to solidly mount the telescope. Unfortunately, rain happens and I did not want to let \$10,000 worth of investment stand out in it. Next month I shall tell you how I got around this problem

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Jupiter graze event observed
from David Graham

I count my self lucky to have had some views of February's grazing occultation, given the far from favourable weather - had it been a night later, then I wouldn't have glimpsed it at all! At one stage, Jupiter was bisected by a large basin on the Moon, which I think was Bailly, on the south-west limb of the latter at 66.8 deg. south, 69.4 deg. west. Despite it being a blustery day with frequent showers, brief breaks in the fast moving, low cloud sheet early in the evening did permit the grazing occultation of Jupiter by the Moon to be seen from my observing site at Ripon, North Yorkshire.

First contact was missed but was probably about 18h 00m UT from here. Fourth contact, when Jupiter was clear of the Moon, was at about 18h 10m UT. Up to 50% of the polar diameter of Jupiter, basically the entire northern hemisphere of the planet, was observed to be obscured by the southern polar limb of the Moon. My wife likened the planet to a 'pimple' on the Moon, as seen through my 150mm Maksutov Cassegrain on a power of x100. When holes in the cloud allowed the event to be caught, the SEB of Jupiter remained visible at all the times. Three of the Galilean moons lay off Jupiter's following limb but I did not register any occultation events for them. A very narrow strip of what I took to be 'lunar shadow' bisected the disk of Jupiter for at least an appreciable fraction of the graze event.

I am pleased to have caught the occultation, not the least as the previous occasion when I saw a Jupiter/Moon occultation was as long ago as 1983! There is an SPA Occultation Web Site, which I visit quite often to see what's new! I am a member of the SPA as well as CaDAS.

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A Future Supernova In Our Galaxy
By Michael Roe

I've often wondered when the next supernova in our galaxy will flare up. I often check the sky, just in case! Once, in 1987, the radio news reported a supernova. I was about to rush out to my telescope, then the words "Large Magellanic Cloud" made me realise this was in a satellite galaxy and several thousand miles of rock prevented me seeing it. A supernova is a glorious and terrible event – a massive star exploding, giving off as much light as a medium-sized galaxy. But none have been seen within our Galaxy since 1604, just before Galileo and others first observed the stars with telescopes. As telescopes have become larger and more sophisticated over the centuries, the next Milky Way supernova has frustratingly refused to show up. It's almost 400 years now!

The previous supernovae were seen in AD 185, 393, 1006, 1054, 1181, 1572 and 1604. If telescopes had been invented in, say, 1000AD, they would have had two chances in a century to observe supernovae, then another in 1181. By chance there was a supernova in 1572 and one 32 years later, so that could explain the long wait – like hitting the jackpot in bingo twice in consecutive games, you expect to have to wait a longer time than average for another win.

On to a discussion of supernovae themselves. There are two main types, Type I and Type II, each with sub-divisions. A Type I supernova occurs when a white dwarf orbits a red giant. The white dwarf accretes material from its red giant partner until its whole mass collapses under its own gravity, then explodes. These can be the brightest supernovae. Type II is a giant star, at least 8 times as massive as our Sun. Before exploding, it creates its energy, as all stars do, by transforming hydrogen into the heavier elements, helium, lithium, oxygen etc., until it gets to iron, when normal conditions of any star's core will not permit any higher elements. At the end of its life the star collapses, then explodes, leaving a neutron star or a black hole. As it explodes, the supernova creates enough

energy to transform iron into the heavy elements lead, gold, platinum, uranium and others, which is where such elements on Earth originate.

It's an interesting thought that, among all the stars we can see with then naked eye and even more which are visible with binoculars or a small telescope, a small number – half a dozen or so – don't actually exist! By this I mean that although their light is visible now, it is centuries old light and, since that light left its parent star, the stars have become supernovae. Here is my idea: if you want to catch the next supernova in our Galaxy you have to identify the most likely stars. There must be some with special characteristics or behaviour destined to become supernovae within centuries or even sooner – which are they?

Type I supernovae occur from tightly connected binary stars as I've mentioned, similar to normal novae-producing stars, though there could be differences. Eta Carinae, the slow nova of the 1840's, is predicted by some astronomers to become the next supernova in our part of the galaxy.

Type II supernovae originate from red supergiant stars like Betelgeuse in Orion, at least that's the theory. But the 1987 Large Magellanic Cloud supernova was a blue supergiant previously. Assuming most of the Type II supernovae are from red giants, we need to check the star catalogues. Using my Atlas Coeli Star Catalogue, I find surprisingly few, just 5, of the spectral type M, and of absolute magnitude -4 or brighter - that's 4,000 times brighter than our Sun's brilliance. Also 6 stars were found of the variable type SRc, that's semi-regular supergiants down to magnitude $+8$ or so. The M supergiants are down to magnitude $+6.25$ with not many of either type from the thousands of measured stars. Here are my candidates to be a future supernova in our galaxy.

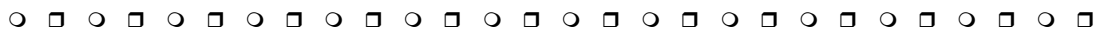
M Type Supergiants

	Abs Mag	mag	spectrum
Y Phe	-5.0	3.4	cM1
a Ori	-5.1	0.8 var.	cM2
a Sco	-5.0	1.22	M1
GC9870	-4.9	5.13	M1
GC 27704	-4.9	5.12	M6

SRc Type Variables

	Magnitudes	spectrum
AD Per	7.7 to 8.4	cM2
SU Per	7.0 to 8.5	cM3
TV Gem	6.6 to 8.0	cM1
Y Lyn	6.9 to 7.4	cM5
RW Cyg	7.6 to 9.0	cM3
y Cep	3.6 to 5.1	M2

Some supernovae are believed to be very faint, obscured by galactic dust. These occur about once every 20 years and would easily be missed until recently. I am concentrating on bright supernovae, magnitude 0 or brighter. We could learn so much now. The last supernova observations in our galaxy were in a pre-telescope age of superstition and omens, although Tycho and Kepler made some good observations. As the post-supernova nebula expands, it would look fascinating with today's large telescopes. Lastly, the Hubble Space Telescope can produce images of nearby galaxies. When a supernova goes off, like the 1993 supernova in the M81 galaxy, we should find more about the original star. And of course the Hipparchos star catalogue has information on over a million stars, any one of which could be the next supernova. So keep a watch on the heavens and wait. The next supernova could appear soon – at least within the next century!



Gemini South Telescope sees First Light

A huge infra-red telescope, based in Cerro Panchon in the Chilean Andes, officially opened its eye on the southern skies in January. Gemini South has an 8-metre mirror, fitted with active and adaptive optics, like its twin, Gemini North, which was commissioned in 1999. Active optics is a system of computer controlled actuators, which correct any distortion in the mirror as it moves. Adaptive optics adjusts either the main or an intermediate mirror using information on the wave front entering the mirror. In this way any distortions introduced by turbulence in the atmosphere can be corrected for. At infra-red wavelengths the corrections are easier. These telescopes now have an angular resolution about the same as the Hubble Space Telescope.

With adaptive optics, telescopes need not be sent into space to observe at wavelengths which can penetrate the Earth's atmosphere, with huge cost savings. Space telescopes can then concentrate on those wavelengths unable to penetrate the atmosphere. Gemini North and South are identical twins. The pair are located on either side of the equator at similar longitudes, which means astronomers can scan the northern and southern skies simultaneously. Objects such as comets can then be tracked as they pass from one hemisphere to the other.



Fossil Roadshow from John Crowther

John's son, Martin, was a past member of CaDAS. He is now an assistant curator of the Royal Museum and Art Gallery in Canterbury. Those of you who knew him will be interested to know what assistant curators do on Saturdays. Well, on Saturday, January 12th, 2002, he welcomed The Fossil Roadshow, an event aimed at interesting children in rocks, fossils and meteorites. Look through a microscope at some NASA moonrock! Create a crater of your own. Hunt for real shark's teeth. Marvel at the fluorescent

minerals and see gems polished from raw crystal. Here's Martin entertaining a group of youngsters, making their very own meteorite craters.



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A Motorised Dobsonian Telescope

By Mark Rice

A few meetings ago, Mark brought his telescope to Thorpe Thewles and demonstrated it. Here is a write-up on some of the details. Anyone who doesn't like star-hopping too much should find this piece of gear will find them just about anything. Most objects visible in small telescopes are in the software data-bases. It's a great privilege to have people like Mark in the Society to turn to for advice on these matters. Ed.

This telescope is completely "home built" except for the mirrors and eyepieces. It was made from plywood and chipboard using common tools such as drills, saws and a router. Cost to build the telescope itself was approximately £350, including about £200 for the mirrors. Motorising has added about a hundred pounds for the steppers and electronics - not including the laptop computer.

The telescope itself is a "Newtonian" design which uses an 8.75 inch parabolic main mirror, and a 1.75 inch flat diagonal mirror suspended from a home made spider. It has a focal length of 63 inches and a focal ratio of 7.3. The mount is an "alt-azimuth" design which uses ideas popularised by John Dobson - hence the common name "Dobsonian".

The motorisation consists of a laptop computer, a driver box (small home-built circuit board with about 25 pounds worth of electronics), two five volt stepper motors, and a small keypad. The computer converts the Right Ascension and Declination coordinates of celestial objects into Altitude and Azimuth, calculates the movement required, then sends appropriate signals via the driver box to move the two motors. This provides "tracking" - the ability to move at the same rate as an object appears to move across the

heavens, keeping it in the eyepiece, and "slewing" - the ability to move quickly from one area of the sky to another.

The computer which provides this control is the 486 Laptop which can be seen attached to the base unit of the telescope. Powered by car battery, the whole system will run self-contained for several hours. If the telescope were to be used only at locations where mains power is available, the laptop could easily be substituted by virtually any desk top PC (386/486/Pentium) The electronics are connected to the Laptop's printer port.

The computer is told of the location of the scope (Longitude and Latitude) and also knows the local time and time zone. It has data files containing the positions of a vast number of celestial objects. Using this information it is able to compute sidereal time, the required altitude and azimuth, and move to any object in its database. Data files can easily be constructed from a multitude of other sources on the Internet, or coordinates can be simply keyed.

Setting up the telescope requires that it is placed on a reasonably flat area. A star is chosen from the internal database and the telescope is moved to point to the star, after which a button is pressed. This is repeated with a second star. The software "knows" what positions the two stars should be in and what time the observed positions were taken. From this it can deduce what direction the scope is oriented, and how level the base is. This is then sufficient for visual observation of other objects.

By performing a "three star initialisation" the program receives more information and is capable of working out and compensating for any errors in construction (axes not exactly 90 degrees, optical axis not exactly coincident with the mechanical one), etc. This information is stored and used for future observing sessions (requiring repeating after collimation).

The scope needs further work, especially tidying up, but has been complete enough to allow a couple of weeks testing. It has proved to be accurate enough to keep an object in the eyepiece for 30 minutes and to find local objects within about 0.5 degree accuracy. Tuning of the software will improve this significantly, hopefully to within a few arc-minutes. The slew rate is currently a rather sedate 0.8 degrees per second in azimuth, but this should at least double when I move to a 24 volt battery system and install better flywheels.

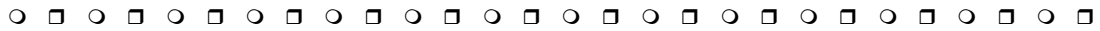
Although the software is capable for compensating for a number of constructional deficiencies, I don't think the build quality of the telescope is sufficient for long exposure astro-photography.... But my next one will be!

The second laptop computer on the desk is not needed for normal operation, but shows what can be done using popular planetarium type software. The two computers communicate through a "null modem" serial cable which is connected into the respective RS232 communications ports.

I am currently running "Skymap Pro version 6". This communicates with the telescope computer in the same manner as it would with an LX2000. Skymap "knows" where the telescope is pointing and can display a "cross-hair" on the display. When the telescope is moved using the handpad, Skymap updates the screen. The telescope can be

controlled by Skymap by clicking on an object and telling it to "slew" to the required location.

If anyone fancies having a go at building one, or has any questions or comments, please get in touch !



Quote/Unquote

Telescope (n) : A device having a relation to the eye similar to that of the telephone to the ear, enabling distant objects to plague us with a multitude of needless details.

Ambrose Bierce

On religion, I tend towards deism but consider it's proof largely a problem in astrophysics. The existence of a cosmological God who created the Universe, as envisaged by deism, is possible and may eventually be settled, perhaps by forms of material evidence not yet imagined.

E. O. Wilson, Consilience

"Astronomy Now" and the US mag. "Astronomy". Gareth Morris still has a number of back issues of these magazines, "free to a good home". Please contact him at gareth_morris7@hotmail.com, or the Editor, if you would like to have them.

Custom Telescopes UK. Glen Oliver, a long-time member of the Society, can supply telescopes and accessories of all kinds. He operates from Hartlepool and has a website www.goliver.freereserve.co.uk. Support local businessmen! Glen tells me that he now has an Astronomy and Space books page on his website.

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CaDAS Website Don't forget to visit our very own website and give John McCue your comments (www.stocktonsfsc.ac.uk/mccue/caseden.htm).

Articles Please send contributions for the Newsletter to Alex Menarry, 23, Abbey Road, Darlington, DL3 7RD, 01325 482597 (a.menarry@virgin.net) or to John McCue, 01642 892446 (john.mccue@ntlworld.com).