



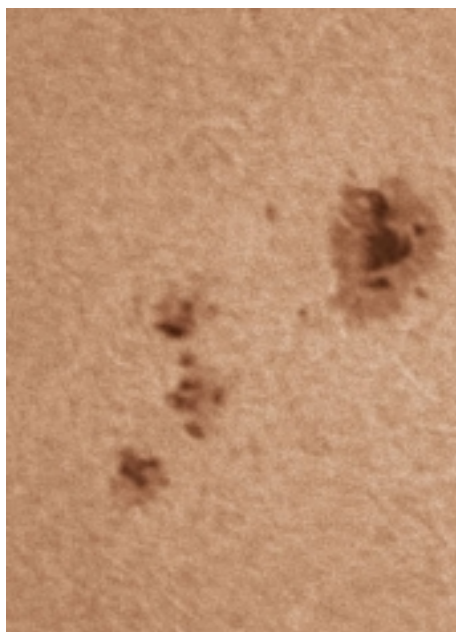
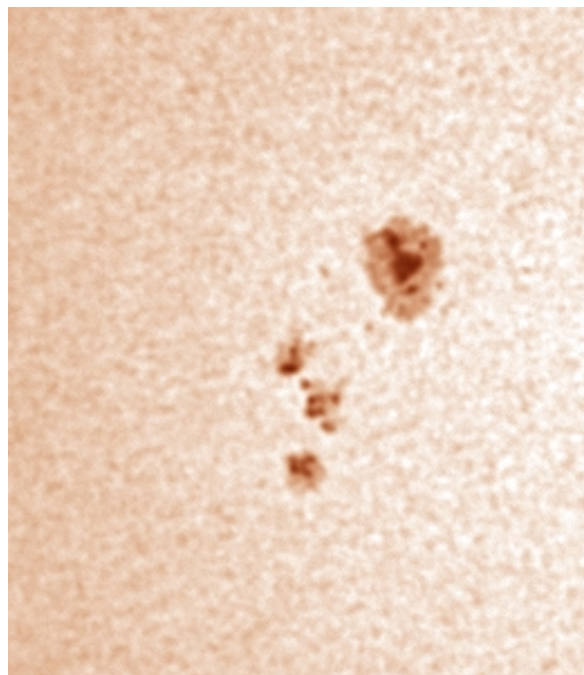
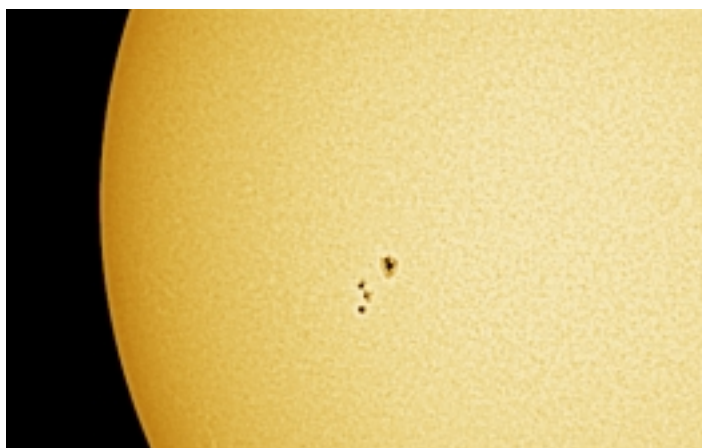
CAPELLA

CAMBRIDGE ASTRONOMICAL ASSOCIATION

Newsletter 145. July/August 2010.

www.caa-cya.org

Registered Charity No. 800782



Sunspot pictures by Daniel Coe

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Cambridge Astronomical Association and Cambridge Young Astronomers

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Capella: Members should send contributions for Capella to: Ken Day, 28 Waddelow Road, Waterbeach, Cambridge, CB25 9LA. e-mail to Brian Lister (btl21@cam.ac.uk) **Please make sure e-mail contributions are in .TXT format.**

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Chairman's Comments

Hello everyone, and welcome to another edition of Capella. It is that time of year when the sky really just doesn't get dark for us, so the chances of any practical astronomy are much reduced. I wonder, do any of our members undertake observations of the sun? Has anyone got access to one of those "solarscopes" that split the light up and just let through only the single wavelength - usually of hydrogen - sometimes calcium - or other elements? It would be interesting to hear from anyone who does. A great topic for a piece here in Capella, especially if you have any images perhaps. We do need people to contribute articles, news, images or just interesting interludes for that matter. Otherwise, you are stuck with reading the ramblings that I come up with. I have managed to bully a few poor people into it, but there are lots of you out there so, send things in! I am happy to help create the words to go with an interesting image, so get emailing! Changing tack for a moment, we had a really fascinating speaker meeting, with Prof. Bob Lambourne talking about faster than light galaxies and keeping us all spellbound for about ninety minutes. Judging by the questions over tea and biscuits afterwards, many of you found this as fascinating and mind-bending as I did. We have many more great speakers lined up, but any suggestions for people we should ask, or topics that would be interesting then please let someone on the committee have them. The Young Astronomers groups are going along very nicely. As I write this we are preparing for the 7-11 year old group on the subject of "Astronomical Voyages", and no doubt Brian has some fabulous paper-and-glue creation planned. He just asked me to bring some long-nosed pliers, I have no idea why, and didn't ask. The event calendar really starts to get busy again from September with the Steam-driving, the trip to the Science Museum, see the website for details! Anyway, that's all from me for now. Clear skies! Paul

Speaker Meetings

Friday 16th July 2010 Peter Rea

"Apollo 15: The Wonder of the Unknown at Hadley-Apennine"

Peter can never remember a time when he was not fascinated by space exploration. He started school in the same year the Russians launched Sputnik 1. He watched as the race between the Russians and Americans gathered pace. At 17, Peter stayed up all night as the crew of Apollo 11 set foot on the Moon. At 20, he observed and photographed the launch of Apollo 16. Peter has always been interested in the exploration of the Moon and planets and in the last 20 years has studied the geology of these worlds. His fascination for geology has taken him to the deserts of Africa and the USA, to the bottom of Meteor Crater in Arizona and to volcanic Islands in New Zealand. He says that to appreciate other planets we need to understand our own. Yet Peter remains an amateur in the field having gained professional qualifications in a totally different subject. When not visiting architects' practices he loves to study maps and images from Mars and the Moon.

This month's lecture, is a follow up to "A Panoramic Moon" given by Peter to the CAA over two years ago. Apollo 15 was the first of the so called J-class missions to the Moon with

a Lunar Rover and extended stay time. Apollo 15 would stay on the moon for 66 hours, almost the same as Apollos 12 and 14 together. The distance travelled on the moon was 28 km which was 5 times further than Apollos 11, 12 and 14 combined. It landed in the Apennine mountain range on the south east edge of Mare Imbrium. Two of the highest mountains on the moon were at different ends of the landing site, affording spectacular views. With a mixture of Moon panoramas (some never before shown) and 3D anaglyphs, our speaker hopes to show what it was really like at this magnificent landing site. Perhaps we really can experience the wonder of the unknown at Hadley-Apennine.

Friday 20th August 2010 Dr Manda Benerji

“Galaxies in the Distant Universe: Colours, Redshifts and Star Formation.”

Manda is a postdoctoral researcher at the IoA and works mainly on the most distant galaxies in our Universe. Prior to this, she did her PhD at University College London.



Much of Manda’s current research involves searching for distant quasars which are some of the brightest and rarest objects in our Universe. Quasars are the powerful emissions that originate from the supermassive black holes that reside at the centres of galaxies. She uses data covering many different wavelengths in order to find such distant objects and understand their evolutionary history. In her talk she’ll be discussing why we need data in all these different wavelengths in order to better understand galaxies in our Universe and how all the different wavelengths allow us to build up a more complete picture of galaxies by showing up the different components that make up galaxies.

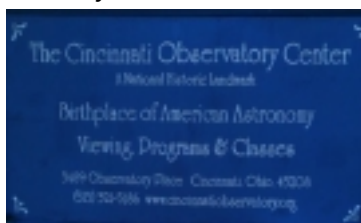
These meetings will be in the Hoyle building of the Institute of Astronomy, Madingley Road, Cambridge. Doors will open at 7.30 pm. and the talk will begin at 8 p.m. For security reasons, entry will not be possible after 8.10.

As usual, the library will be open before and after the lectures and refreshments will be available after the lectures.

Member’s Contributions

Visit to Cincinnati Observatory Centre, Home of American Astronomy

By Paul Fellows



The main observatory building

in with the public observing evening, which they put on there every Thursday night.

I had the good fortune to be in Cincinnati in June on business with sufficient time to pay a visit the Observatory, which is only a few miles from downtown Cincinnati, and join

History

The Cincinnati Observatory was founded by one Ormsby McKnight Mitchel in 1842 - a time when there were only a few small telescopes in the USA, but no organized observatory. After a public appeal he managed to get 300 subscribers to fund the purchase of instruments, and he sources a 12 inch lens from Germany, and set about the construction of the observatory on top of Mount Ida, 400 feet above the city. The 12 inch telescope became operational in 1845.

In 1848 the Observatory started a program to measure time and longitude very accurately, and the Astronomer



Royal in England, Sir George Airy, even suggested that Cincinnati be the zero-point for land surveys in the US, as Greenwich was in England.

In 1873 with the city of Cincinnati expanding rapidly, the whole observatory was moved from Mount Ida (which has been renamed Mount Adams now) to its current home on Mount Lookout, only a few miles to the east.

In 1904 a new Alvan Clark 16-inch refractor replaced the 12-inch, which was itself moved to a new building, and both instruments remain there to this day.



The Mitchell building

Today

The observatory centre is now designated as a historic landmark and has been, and is being, restored to an immaculate standard. With support from the University of Cincinnati, it runs with a small but dedicated team of staff and volunteers and presents many educational events and outreach activities.

Take a look at <http://www.cincinnatiobservatory.org> for more information

The Visit

I arrived on a beautiful June evening at about 8pm, with blue skies, so there was some chance of doing a bit of observing, but of course at this time of year, there was never going to be much darkness until very late in the evening. About 40 other people also turned out and we were treated by Jeff Hutton of Xavier University to a very well presented talk on the subject of constellations, and how they are merely made-up by our minds and our desire to see patterns and organise things. A great little practical demonstration of this was a small model of the plough made in 3D with tiny bulbs representing the principle stars places at their correct positions and distances - so that you could spin it around and see how the familiar "saucepan" shape is only something we see because of our view-point here on earth.



The 12" refractor of 1845

Following this, it was time for a tour of the telescopes, and a spot of viewing through the 12-inch refractor - of Saturn - and I have to say, it was

the best view of this planet I have ever had. So sharp! So much detail! I wish I could have hooked up my camera and had a go at imaging, but there was a queue!

Outside on the lawn there was a smaller Dobsonian, staffed by volunteers and showing Venus in the twilight.

As expected it was not really dark enough to see much else, and some cloud was coming over by now and gradually defeating us.

Having introduced myself to the team, I was treated to a private tour of the rest of the facilities by John Ventre, the official historian, including the main building with



John Ventre at the controls of the 16-inch



Jeff Hutton explains the features of the 12-inch

the 16-inch telescope.

Apparently the ball-bearings for the large dome were made using civil war cannon-balls! How's that for recycling! I also saw the magnificent library, and down in the bowels of the earth, the master chronometer - which was the principle time standard for the USA for many years.

The building once even had a "time-ball" like the one at Greenwich, and this is apparently to be restored.

I have to thank the team there especially Jeff and John for making me so welcome, and also for inviting me back next time I happen to be passing.



The Master Chronometer

Trio of galaxies in Leo

This tri is comprised of NGC 3628 a.k.a. “the hamburger”, M65 and M66/ Arp 16. The group as a whole is also known variously as the Leo Triplet, Arp 317 or the M66 Group. North is to the left in this image. M66 is located at the lower right, M65 above it, and NGC3628 to the left

The Leo trio is a triplet of galaxies that shows some interesting distortions due to the members’ gravitational interactions. Perhaps in-part due to the interactions M66 appears to have a relatively high rate of supernova explosions with 3 detected between 1989 and 2009 alone. Its Arp designation is due to the distorted asymmetric spiral arms that appear to rise above the nucleus.

The edge-on galaxy NGC3628 also seems to be dis-

turbed with a faint detached arm of material below it that is just visible above the noise floor in the image, and the splayed-out ends of its spiral arms. In extremely deep images the detached arm can be better discerned and turns out to be a faint tidal tail that stretches out to more than twice the length of the galaxy.

This image was taken in April this year, by Paul Beskeen at the Pumpkin Patch Observatory, Bourn, Cambridge, using his Astro Optik 400mm Cassegrain at prime focus (f=1200mm), with an Astrodon RGB imager and a YR Cyclops filter wheel. It is built up from 10-minute exposures (7 red, 5 green, 6 blue) combined and processed with Photoshop to make this magnificent galactic panorama!



Seeing

by Jim Hysom

It was the 1st. March 1949 when I became aware of seeing - astronomical seeing, that is. It was at the time of my first view through an astronomical telescope, a 3.5" (89mm) Wray refractor owned by a fellow student of Luton Technical College. We were looking at Saturn (mag. x 110). It was a splendid view; Roger Hales explained that not all nights were good. Some which looked fine to the unaided eye might prove disappointing through the telescope. Twinkling was not good; it was better when

the stars shone steadily. If the unaided eye cannot see a steady image, then what hope is there for a highly magnified one?

Poor seeing is generated when light passes through layers of the atmosphere with differing refractive indices. These differences are caused by variations in temperature, pressure or humidity. If the boundary layers slide past one another with very little interaction, then not much degradation takes place. But if there is much

turbulent mixing then a telescope will produce a star image somewhat or much larger than under near perfect conditions. The worse the conditions, the larger the disc. Conversely, the better the conditions, the smaller the disc, until a limit is reached.

Given that an instrument's optics are very good and properly squared-on (collimated) then the size of the disc will depend on the aperture; the larger the aperture, the smaller the disc.

That great supporter of the early Cambridge Astronomical Association, Dr. W. H. Steavenson, knew a great deal about the atmospheric effects that lead to poor seeing. In a presentation to the British Astronomical Association (J. Brit. Astron. Assoc., 70, 204, 1960) he listed a number of causes of poor seeing. Refractors often give steadier images than reflectors. This is partly caused by light entering the closed tube at a higher point above ground level. There is often much turbulence in the first two or three metres above the ground but sometimes this ground effect can extend up to a kilometre or more.

In September 2008 in Italy there was a conference on Optical Turbulence: Astronomy meets Meteorology. The report, edited by Elena Masciadri and Marc Sarayin contains nearly fifty papers. In reading this, a degree in physics would be useful! Much of the background of these papers will be familiar to practical astronomers - it's nice to see the graphs and numbers though.

In designing a new ground-based observatory, this report would be essential reading. By placing such an observatory several thousand metres above sea level, not only is there much less atmosphere to look through but air temperature variations are less and most of the cloud cover is below the telescope.

Instruments work much better with small seeing discs and data are gathered nine times more quickly with half second arc images than with ones with three times that size. Seeing is relative to telescope and observer. An amateur with a 3" (76 mm) refractor may think that a 1.5 arc second image is near perfect whereas a professional on a high mountain with a several metre aperture would think it mediocre.

Images can be improved in many cases by the use of adaptive optics in reflectors. Often in the converging light beam, an optical element can be incorporated that can be tipped or tilted many times a second. Deviant beams are sent to the average position. This may halve the spot size. Another device is to use a flexible mirror with many push-pull actuators attached to the back of the mirror. Again, this method considerably concentrates the image, not only shortening exposure times but allows fainter stars to be seen. When the seeing gets worse, the fainter stars are no longer detected.

Large observatories are expensive to run and are often in remote mountain sites. Not all observing programmes require the best of seeing. Much effort is put into collecting data on atmospheric conditions and trying to collate them with seeing quality. What the astronomers would dearly like to know is not only will it be clear tonight but will it also be clear in, say, three nights' time and will the seeing be excellent. The observatory manager could plan ahead and make sure that the most suitable equipment is attached to the telescope. There is a great deal of confidence that prediction of future excellent seeing will become routine, otherwise, the building of 20- or even 30-metre telescopes might not be cost effective.

For Sale

14" Meade – with 2" eyepiece stopped down for 1.25mm eyepieces

Auto Focuser attached.

240v DC converter

New Remote control handset (as yet uninstalled)

Wedge

Pier

Giant Field Tripod & shock pads

Kendrick Anti Dew Equipment

Front plate Stop Down with 5" solar filter

Bespoke full length cover.

Moving to smaller house with light pollution

£3.500.00p the lot

Barry Warman 07905 526255 or 01767 651291

Book Review

by David Roberts

Cosmos, A Field Guide by Giles Sparrow.

I was very fortunate to be able to borrow the above book from the Cambridge Astronomical Association (CAA) library, as it is a very new addition to the library. Despite many other things going on in my life I have had a chance to go through it. Although the book is full of fascinating photographs from such as the Hubble Space Telescope (HST) and Cassini etc it is a weighty tome that I would consider a coffee table type of book.

It is large and heavy but I would recommend that it be read in parts or dipped into. The photographs are beautiful and there is enough text to give an explanation for the pictures. It starts with the inner Solar System (Sun through to the Asteroid belt) then the outer solar system (Jupiter

out to Pluto) and then deals with the Edgeworth-Kuiper belt. For those planets that have moons there are some pictures of these plus their place in orbit around the appropriate Planet. From there it looks at the Milky Way, the realms of the galaxies and to such objects as Planetary Nebula, Supernova (e), H-H objects and QSOs' etc.

All in all worthwhile looking at and if you have friends who are slightly interested in Astronomy you could borrow and have available when they visit. No doubt they will be fascinated to look at the pictures and read the explanations. However they will need to be forewarned that looking at these objects through modest equipment will not show the same as the pictures. This is definitely not an observer's handbook.

CYA Meetings

7-11 Year Group

Saturday 31st July 2010

"Astronomy from Space; 2009"

In 2009 there were about 75 launches from various nations of the Earth, some only put one satellite into orbit others put two, or more satellites in orbit - most of them were communications and Earth observation satellites. This month we'll be looking at the handful of astronomical satellites that were launched last year and also be showing some of the early results. Lunar Reconnaissance Orbiter has already sent back some remarkably clear close-up images of the Moon, even showing pathways left by the Apollo astronauts feet (you can't quite see the individual footprints), thus proving men really did go to the Moon. Although if you're a conspiracy theory twit, these photos are fakes!

Saturday 28th August 2010

"Astronomical Superheroes."

Ahh! There's a problem about this meeting because we can't tell you much about this session as each presenter will be telling you about his or her own choice of astronomical superhero. Come along and find out who gets chosen.

These meetings will be held in the Hoyle Building at the Institute of Astronomy, Madingley Road from 10 a.m. till noon. Free to CYA members; for non-members there is a £1.00 fee.

11-plus age Group

Monday 2nd August 2010

"Superdense Stuff."

Some of the older CYA members had noted that the 7 - 11 year group had that topic a few months ago. So after a bit of a protest we agreed to look at black holes, neutron stars and white dwarfs. Just how much stuff can you squeeze into a cubic centimetre?

Monday 6th September 2010

"Faster than light galaxies."

Spooky stuff! How can you have whole galaxies travelling at this amazing speed, when we're told that nothing can travel faster than light?

These meetings will be held in the Hoyle Building at the Institute of Astronomy, Madingley Road from 7.15 p.m. till 8.45 p.m. Free to CYA members; for non-members there is a £1.00 fee.

CAA News

Steam driving trip

There are just four places left contact Brian to book your space. Please book the Science museum and IMAX cinema trip as soon as possible so we know whether to book two or three coaches

Public observing sessions

Starting on Wednesday 1st September we'll be holding our practice sessions for the public observing. The four instruments used are; a 14-inch and an 8-inch Cassegrain telescopes (SCT), an 8-inch HyperStar telescope (HST) which gives a much larger field of view than the SCTs and a wide angle zoom lens which give a field of view ranging from the size of the Plough to that of the Pleiades. The images from the six cameras (the two SCTs have a choice of colour or much more sensitive monochrome cameras) are projected onto three large screens. If you would like to come along and help us it would be very much appreciated, you'll be trained in how to use these instruments during September while there's no audience to observe the occasional blunder. Then by October we should be proficient (ho ho!) ready for the crowds. You need not be very technically minded (like Brian), we'll soon find you some thing to do!

Capella.

As usual we would welcome contributions from members; photos, letters, articles etc. As you can see, we have very few items in this issue. So, just send your efforts to Paul via our website or Brian by email bt121@cam.ac.uk who will pass them onto Ken - our editor. Do not send us articles from other publications or the web. All your own work please!

Subscriptions

Subs. were due on 1st April 2010 and remain unchanged; £4 for standing order mandate on-line membership, £5 on-line membership and £10 postal membership. CAA membership covers all the family living at the same address. If you require a receipt please enclose an SAE. Any queries please contact either Mickey or Brian (see page 2 for contact details). Still the best value in the galaxy.

Loan telescopes

There are usually no long waiting periods for the loan telescopes. Visit our web site (www.caa-cya.org) and click on to book an instrument, or ring Mickey Pallett on 01480-

CAA/CYA coach trip to London Science Museum

and IMAX cinema

Saturday 25th September 2010

IMAX film: "Hubble 3D" (45 minutes) This recently released film on the life of the HST including repair missions to the HST. See some of the amazing images taken by Hubble, and travel through the Orion and Eagle nebulae.

The final manned repair mission to the Hubble Space Telescope in May 2009. An IMAX 3D camera was taken on this mission, which contained a mile of film, though this allowed for only 8 minutes 30 seconds of footage to be recorded. The Science Museum IMAX screen is 26 metres wide by 20 metres high, not quite as high a five double-decker buses.

Motion Simulator Theatre: "The Legend of Apollo 3D" (15 minutes). Feel what it's like on a Saturn V rocket as it heads for the Moon, take a trip on a rover over the lunar surface.

CYA tour, we'll be giving a guided tour of the "Exploring Space" section, from Sputnik 1 to the Huygens probe that landed on Titan. Included will be Britain's only space rocket, the Apollo 10 command module, Beagle 2 and Spacelab 2 X-ray Telescope.

New galleries including - Cosmos and Culture show how astronomy has changed the way we see the Universe. Exhibits include the first detailed drawing of the Moon, Herschel's telescope that discovered Uranus, and the six foot mirror from Lord Rosse's monster telescope.

Two coaches, one quiet and the CYA one - not so quiet, with on-board entertainment including 'Astro Bingo' with prizes for the winners (who have to shout "observatory!")

Over 20 galleries including Power, Flight, Computing, Measuring Time (new), Dan Dare and the Birth of Hi-tech Britain (new), and Energy - Fuelling for the Future (also new) this interactive gallery is ideal for 7 - 14 year olds.

Launchpad this gallery is well suited for CYA members and has oodles of hands-on activities which are great fun, and has recently moved to the 3rd floor with lots on new interactive exhibits Simulator (5 minutes). Enjoy a rollercoaster ride on an alien planet. Pay at the simulator

Book now for a great day out with the benefits of group booking rates, this trip is also subsidised by the CAA to keep the costs as low as possible.

Cambridge Astronomical Association and Cambridge Young Astronomers coach trip to the

London Science Museum and IMAX Cinema

Sat 25th Sept 2010 leaving the IoA at 9.30am

Adult name(s)

.....

Child name(s)

.....

Address

.....

.....

.....

Postcode Evening phoneNo

The ticket price includes the cost of the coach and entry into the IMAX cinema (entry into the museum is free). The Motion Simulator Theatre ride is optional. Pre-booked is £2 extra (The usual price is £5 adults, child / concession £4).

Number	Total
..... adults at £17 (IMAX film and Motion Simulator Theatre)	£
..... adults at £15 (IMAX film only)	£
..... children/OAPs/concessions* at £15 (IMAX film and Motion Simulator Theatre)	£
..... children/OAPs/concessions* at £13 (IMAX film only)	£

..... Friends & other family members are welcome; please add £2 for each CAA/CYA non-member.

Remember CAA/CYA membership covers everyone living at the same address £

Total amount enclosed £

Please make cheques payable to "Cambridge Astronomical Association" and send to:

Brian Lister, 80 Ramsden Square, Cambridge, CB4 2BL

If you have any queries, please contact Brian by phone; 01223 420954 (evenings) or email bt121@cam.ac.uk (weekdays). Tickets will be sent nearer the time. All children must be accompanied by a responsible adult.

*Concessions:- full time education, invalidity benefit or unemployed. Proof may be needed on the day.

Monday 13th September 2010 Steam driving experience at Didcot
Railway Centre. 8am - 4pm

The day includes bacon butties, introductory talk, driving and firing GWR 3822, having a go at being a guard! tours of the centre including engine sheds, workshops, signal boxes, two course lunch in the restaurant, going under the loco in the inspection pit and seeing it being refueled at the coaling stage, etc. The 'Heavy Freight' 3822 was built in 1940 and weighs nearly 90 tons and will be hauling a couple of carriages for the day so that you can get plenty of aroma therapy! A brilliant day out for just £80 for members and £85 for non-members. Standby engine GWR 5322.

Name

Address
.....
.....

Postcode Evening phone No

Amount enclosed £80 for members £85 for non-members £.....

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