



# CAPELLA

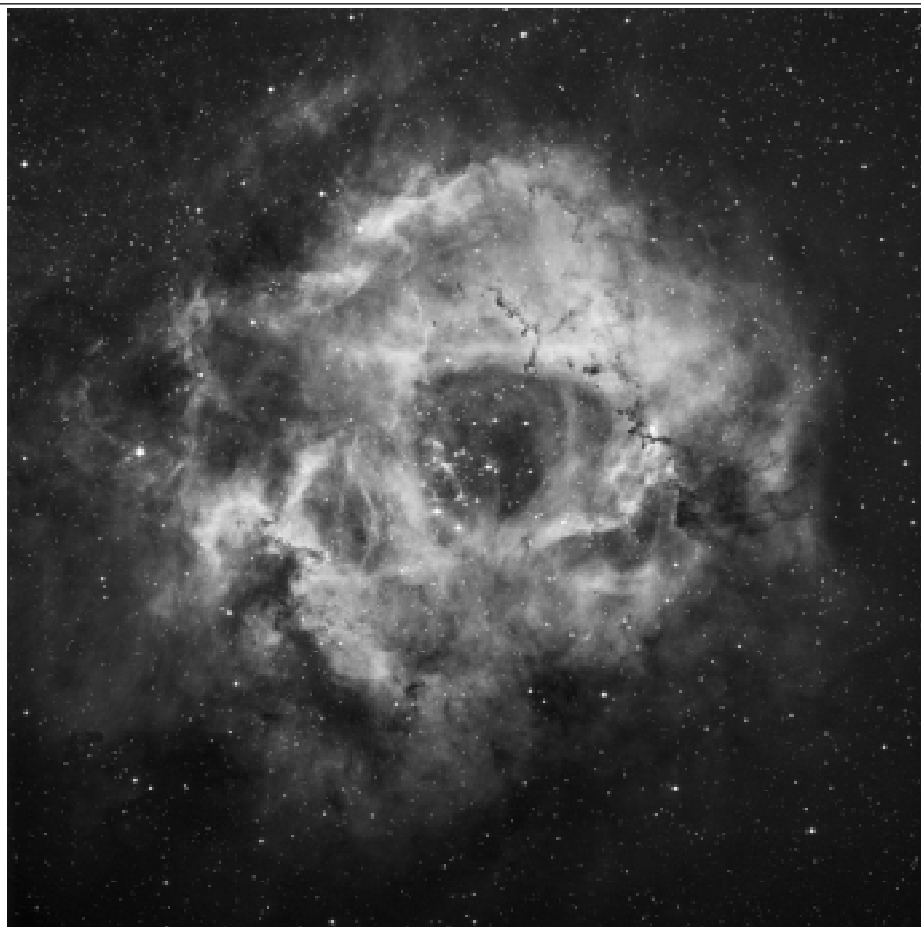
CAMBRIDGE ASTRONOMICAL ASSOCIATION

Newsletter 140. September/October 2009.

[www.caa-cya.org](http://www.caa-cya.org)

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*CAA 1959-2009*  
*Golden Anniversary Year*



*An image of the Rosette Nebula*

*Taken at the pumpkin patch observatory near Bourne by Paul Beskeen of the CAA with his 400mm Cassegrain telescope. The Rosette nebula has four catalogue entries, NGC 2237, 2238, 2239 and 2246 referring to various parts of this immense object. It covers an area of sky about equal to three times the diameter of the full moon, so most telescopes can't capture the whole thing. This image is taken using a filter that singles out Hydrogen alpha light - which allows us to see the delicate structure of the glowing gas of the nebula as a result of the intense light of the bright young stars in the centre which, combined with their stellar wind, has carved out the "hole" in the centre.*

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Cambridge Young Astronomers (both groups): Brian Lister Tel: 01223-420954, (evenings) or e-mail btl21@cam.ac.uk

Telescopes for hire to members: Stanley Trafford Tel: 01223-880624 or book on-line

Library: Barry Crellin

Webmaster: Paul Fellows.

Website: www.caa-cya.org

### Chairman's comment.

Following on from last issue, when I reported on a Cambridge UFO sighting, another Cambridge news reporter contacted us. This time with a short clip video showing some blue lights moving around above houses recorded at the end of August. If genuine (there are some very clever computer programmes and equally clever folk out there that can produce very plausible fakes), I believe that this is another example of earthlights, as many people have not heard of these enigmatic objects. Here is a little guide.

### Earthlights (Also called Earthquake lights)

#### Appearance

Generally spherical, ranging in size from a few inches in diameter to a kilometre or more. Their colours, like stars, range from blue, white, or yellow, to orange and red. Sometimes they scintillate thus creating the illusion that they're spinning. Can be very bright and be seen from over 100km away and can vary in brightness over very short time periods. Earthlights appear singly or in groups and even swarms of many hundreds. In daylight, when not lit, they appear grey.

#### Movement

Usually random, and can gyrate around each other. They can change speed dramatically from hovering to several hundred km/h in an instant. They can disappear, reappear and sometimes multiply in number.

#### How they are formed.

Seismic in origin and from rocks containing quartz. It is not fully understood how they form, two of the suggested mechanisms are; piezo-luminescence (deformation of crystals) and tribo-luminescence (fracturing of crystals)

#### Where found.

Can appear almost anywhere. In the UK there have been numerous sightings of the Longdendale Lights, Derbyshire. These lights have been seen for centuries and some places are named after them. e.g. Lantern Pike and Shining Clough. In the USA there are about 30 places where earthlights are seen regularly (called

spooklights). The Marfa Lights, Texas, Joplin lights, Missouri, the Gurdon Lights, Arkansas, are well known examples. In some areas of Mexico earthlights can be seen almost on a daily basis.

#### Other effects.

Earthlights can sometimes be seen before or after earthquakes, and are associated with geological faults. Also strong magnetic fields sometimes occur which can cause communications interference and systems failure in aircraft, cars etc. (The Tehran UFO incident in 1976 is a good example). Some planes have crashed and pilots have been killed. Felix Monclar was the probably first pilot killed in 1953.

#### A Brief History of Earthlights.

373 BC Earthquake lights were first recorded

25th February 1942. The Battle of Los Angeles. About 25 UFOs approach LA at speed and then hover over the city. They open fire. 1430 12.8 lb anti-aircraft shells were fired in an hour. UFOs suddenly disappear. Six deaths reported (3 heart attacks, 3 killed by shells). The official response came from the Secretary of the Navy who blamed 'war nerves!' (It was shortly after Pearl Harbour). One of the 12 000 air raid wardens on duty said of one of the objects she'd observed, 'It was a lovely pale orange and about the most beautiful thing you've ever seen.'

24th June 1947. First flying saucers seen near Mount Rainier in Washington. Kenneth

Arnold spotted nine shiny, bright objects in loose formation moving at tremendous speed in the distant sky. After landing, Arnold - a veteran pilot - described his sighting to 'The East Oregonian' saying the objects 'flew like a saucer would if you skipped it across the water.' Other papers reported objects 'flying like saucers' and later 'saucerlike' objects and ultimately 'flying saucers.' A bad case of Chinese whispers! The name has stuck.

26th September 1966. First good photo of an earthlight which only lasted 1.5 minutes taken at Mt Kimyo, Japan.

Mid 1970s. So many UFOs were seen in South Wales that questions were asked in Parliament, who asked the MoD to investigate. Recently released documents show that they concluded they were caused by Harrier jets hovering. (Have you heard a Harrier hovering? Is everyone in South Wales deaf?) The Variscan Front is a large geological fault that runs the length of South Wales.

26th May 1987 Waterbury, Connecticut Motorists reported that, as the object became visible, a number of cars lost power and had to pull off the highway. More than 200 people phoned the police in 45 minutes! Over 300 metres in diameter. Interesting range of colours.

1989 Paul Devereux plotted the many locations of UFOs seen in 1904/5 near Egryn in Wales. The many baffled witnesses told their stories to a Daily Mail reporter who was there and described them as balls of fire. When Devereux showed the plotted locations to a geologist they matched the position of the Mochras fault that ran through the area. The term Earthlights introduced.

17th October 1989 Loma Prieta, California. Professor Antony Fraser-Smith accidentally discovers magnetic fields associated with earthquakes (he was carrying out an experiment on submarines), using a single-axis search-coil magnetometer, observed signal strengths 20 times higher than normal two weeks before, rising to 60 times (with a spike 300 times) normal about three hours before the 7.1 magnitude earthquake which killed 63 people.

30th June 2003 QuakeSat launched, a shoe-box sized satellite. Later in 2003, its magnetometer detected a series of ultra low frequency bursts two months before, and several weeks after, the 22nd December 6.5-magnitude earthquake in San Simeon, California. QuakeSat II planned

24th January 2005 Widespread UFO sightings were observed along with communications loss. Two days later a 9th magnitude earthquake hits Asia. Large scale radio interference also occurred with the 9.5 magnitude quake in Chile in 1960 and the 9.2 magnitude quake in Alaska in 1964.

27th April 2007 Two huge UFOs seen near Guernsey resulted in the Jersey Evening Post running with the headline 'Pilots spot mile-wide UFOs near Alderney.' Two pilots and their passengers independently reported these massive yellow lights, as did people on the ground. The following day a 4.3 magnitude earthquake shook southern England, which resulted in only minor damage - toppled chimneys, cracked roads etc.

If you wish to see the video of the Cambridge UFOs please email me [bt121@cam.ac.uk](mailto:bt121@cam.ac.uk) and I'll send you a copy.

Brian

## *Speaker Meetings*

Friday 18th November 2009 Professor Gerry Gilmore

**What was there before there was anything?**

**And what happened next?**

**And what is cold dark matter anyway?**

Cosmology now allows us to say with some plausibility quite a lot about the early universe, and the stuff of what it is made. But overall, we know almost nothing about anything...

Gerry Gilmore is Professor of Experimental Philosophy at the Institute of Astronomy and is involved in GAIA (an ambitious mission to chart a three-dimensional map of our Galaxy), OPTICON (Optical Infrared Co-ordination Network for astronomy and ELT (the next generation of Extremely Large Telescopes).

Friday 16th October 2009 Andy Green

### **To Infinity and Beyond!**

There are many places around the world that we know are true icons of astronomy and space, from observatories in Hawaii and the Kennedy Space Center in Florida to the observatories in Australia and beyond. This lecture will take us on a tour of these places and many others.

Andy has visited all the places in this lecture and he will give us an insight into their histories, and hopefully inspire us to make our own pilgrimages to them. In between his numerous visits (he's recently returned from a trip to China to see the total Solar eclipse) Andy runs StarDome, a 6 metre mobile planetarium, making it one of the largest in the UK with the added bonus of being large enough to view the presentation sitting on chairs.

As usual, these speaker meetings will be in the Sackler Theatre at the Institute of Astronomy, Madingley Road, Cambridge. The doors will be open from 7.30 p.m. with the talks beginning at 8.00 p.m. and we need to remind you that, for security reasons, the doors will be locked shortly after the start of the talks.

Coffee, tea and biscuits afterwards for convivial chats after the talks. And the Library will be open both before and after the talks.

## *Moon Watch and Star Party*

Wednesday 27th and Thursday 28th October 2009

As part of the International Year of Astronomy we're joining the IoA in presenting another couple of Moonwatch evenings. Dr Carolin Crawford will give a talk (both nights) on "Will we return to the Moon?" at 7.15pm. This will be followed by observing. If members have a telescope and wish to bring it along, they're most welcome - we'll be setting up from 6.30pm. Also well placed for observation, Jupiter makes a welcome return.

## *Special events at St. John's College*

There are two astronomical events happening at St John's College over the next few months - an open day and a three-month exhibition. Both are open to all and entry is free.

### *Hoyle Day at St John's.*

Saturday 17th October 2009, 11am to 5pm

Visit the magnificent seventeenth century library of St John's College and learn about one of the College's most remarkable Fellows

Professor Sir Fred Hoyle FRS (1915-2001) was one of the twentieth century's most colourful and controversial scientists. His most highly acclaimed work was in the field of stellar nucleosynthesis: calculating how it is that the chemical elements we see around us were created inside stars. Despite having coined the term 'big bang' he was a life-long adherent to the opposing theory of a 'steady-state' universe. His later work spanned many areas of science and beyond, taking in the geology of the earth, the politics of energy provision, and the origin of diseases and of life itself.

Exhibitions and talk (Pre booking for the talk is essential, contact Katie Birkwood, Hoyle Project Associate kib21@cam.ac.uk or 01223 339362).

## Exhibition:- "The Way to the Stars: a history of College astronomy"

5th October until 21st December 2009, from 9am to 5pm on weekdays.

Exhibits will include:

- \* medieval manuscripts
- \* eighteenth-century astronomical instruments
- \* archive photographs and prints
- \* the papers of eminent Johnian astronomers such as John Couch Adams, one of the men who discovered the planet Neptune.

Visit St John's college website for further info:-

([www.joh.cam.ac.uk/library/special\\_collections/hoyle/past\\_events](http://www.joh.cam.ac.uk/library/special_collections/hoyle/past_events))


## Members' Contributions

### A Letter from Stanley Trafford

I enjoyed reading Ronald Manley's contribution in the May/June edition of *Capella*. I particularly liked the idea that Fitzroy was the man who sailed with Darwin on the Beagle. I do think that this should be the other way around. After all, Fitzroy was only the captain. Now I thought that Darwin's position on the voyage had been planned right from the beginning. However, this was not at all the case. Normally on such voyages it would be the ship's surgeon who would have carried out many of the observations and collecting eventually done by Darwin. I learned this from a lecture given by Stephen J. Gould in which he pointed out that before joining the ship, Darwin actually had no official capacity on the voyage at all. He was in fact invited by Fitzroy to be what we might call a 'gentleman's companion'. Fitzroy was concerned about the mental stress that the long voyage would have on him as captain of the ship. As captain he would have to remain aloof from the other officers so he was keen to have with him a companion of a suitable social status. On his mind may have been the fate of his uncle who ended his own life, possibly for similar reasons. Sadly, very much later in his career Fitzroy did shoot himself. Darwin's presence on the voyage perhaps ensured that it was a success for more than one reason.

Also of interest is the question of the Sun's output. Yes, it seems that it does vary in output by a very small amount. This variation is in step with the sunspot cycle and maximum output is at sunspot maximum. Interestingly, in the middle of the 17th century and a short time after the observation of sunspots by Galileo and others it seems that the sunspot cycles stopped. For about 70 years there were virtually no sunspots at all. This has become known as the Maunder minimum after the British astronomer Edward Walter Maunder who first drew attention to it. What is also interesting is that this coincided with a

marked cooling of the Earth's climate, a period that has become known as the mini ice age. Could this happen again? Those of you who monitor the Sun may have noted that the next sunspot cycle seems to be a little late. Sunspot minimum should have occurred last year yet sunspots still continue to be rare. During the past few months I have been watching the Sun more closely and have failed to find even the tiniest sunspot. Even at sunspot minimum a few sunspots would be expected. Is the Sun entering another Maunder minimum and would this result in a decline in the Sun's output? Well of course it is too early to say and we can only speculate. On the other hand what would be the effect this time on the Earth's climate.

I suspect that any such cooling will be countered at least partially by the warming caused by the CO<sub>2</sub> we are busily pumping into the atmosphere. There can be no doubt that without a change in the Sun the Earth will warm up. The rising amount CO<sub>2</sub> in the atmosphere is absorbing more of the Earth's thermal radiation and preventing it escaping as freely as before and it is also clear where this extra CO<sub>2</sub> is coming from. The exponential rise in CO<sub>2</sub> started around the year 1700 and what happened around 1700? This was the start of the industrial revolution and the beginning of the widespread burning of coal. Anthropogenic global warming is by far the biggest threat we face, bigger than the current financial crisis, even bigger than terrorism. Another Maunder minimum may ease our problem a little but don't think we can relax our efforts to counter global warming. On the contrary, next time you see a proposal for another wind farm, don't moan, instead think how elegant the turbines look and give the proposal your full support. I don't know who Al Gore's hit men are supposed to be but if they are trying to spread the same message as Al Gore himself then please listen to what they have to say. 

### What's Happening to the Sun

by Jim Hysom

For several years I've been viewing the Sun daily, when clear. My telescope is a 32 mm aperture zoom which goes from x8 to x20. It is fitted with a solar filter which transmits about one part in 30 000, giving a white image. I can usually pick up the Sun in about 15 seconds and then

it is a quick twist of the ring that takes it to x20. It was rare during 2008 that anything was visible - just a blank disc. At the latter part of 2007 we were expecting a solar minimum, but nothing like this. So far this year there have been very few sunspots, and those small. I have a refractor


of 63 and 102 mm aperture for more detailed views, but there has been nothing worth viewing.

Some weeks ago I was discussing this dearth of spots with Prof. Douglas Gough of the Institute of Astronomy. I was wondering whether we were in for another Maunder minimum. E.W. Maunder, around about 1900, analysed sunspot records and found that very few spots were seen over the 70-year period 1645-1710, a period which is named after him. He explained that in pre-telescopic times tree rings and ice core samples indicate periods of low sunspot activity. He kindly gave me a pre-print of a chapter of a book, to be published this year, in which he describes the possible causes of sunspots and of their fluctuations.<sup>1</sup>

Does it matter if there are few or no sunspots? It seems that at such periods (and contrary to what might be thought) the irradiance from the Sun is less and there are cold periods. These can be extremely cold with great frosts lasting well into the Spring and the Thames freezing over. So it does matter!

The primary variation in sunspot frequency and area is on an approximately 11-year cycle. Sunspots are caused by intense magnetic fields, the polarity of which flips over

every second cycle, so it's really a 22-year cycle. Investigators have searched for other cycles. Back in the early 1950s an 80-year cycle in the size of the maxima was suspected, but this is now thought to be nonexistent.

The Maunder minimum is one of a series, the so-called grand minima. The Oort minimum was from 101 to 1050; the Wolf minimum from 1280 to 1350 and the Spörer minimum from 1450 to 1550. It is possible - dare we say probable - that another grand minimum has started. Reading the latest *Sky and Telescope*, August 2009, one wouldn't think so. In an article by Robert Zimmerman it is suggested that cycle 24 is under way, albeit late. If we are in for another grand minimum with its attendant period of intense cold, this will be somewhat mitigated by the do-called global warming, but doubtless we would use up even more fossil fuels to keep warm, increasing the carbon dioxide level in the atmosphere. What will then happen when the grand minimum is over? 

#### Reference.

1. The Vainu Bappu Memorial Lecture: "What is a Sunspot?" by D.O. Gough in "Magnetic coupling between the interior and atmosphere of the Sun"; Eds. S.S. Hanson and R.J. Rutten, *Astrophysics and Space Science Proceedings*; Springer-Verlag, Heidelberg, Berlin, 2009

## Listening to Weather Satellites

by David Cattermole.

Most of us now take weather satellite images for granted, available daily on TV news and downloadable from the internet. As technology advances, the signals transmitted by these satellites are being migrated from a simple easy to read and decode VHF signal to higher frequencies with digitised and often encrypted data, but at the moment there are still several satellites broadcasting signals that can be received easily and decoded with simple equipment as they pass overhead.

Some weather satellites are in geo-stationary orbits giving a good general view of major weather systems but not very high resolution because of their high altitudes and a poor views of the poles. The satellites I am most interested in are in low Earth-Sun synchronous polar orbits. Their orbits do not go directly over the poles, but are offset about 8' so that they precess at the same rate as the earth orbits the sun, then the satellites' orbits will stay

roughly in the same plane relative to the Sun throughout the year and they will pass over the same locations at about the same time each day. The orbital periods of these satellites is about 100 minutes, with an altitude of about 800km: the camera view is wide enough that they can cover most of the Earth each day with greater image swathe overlaps towards the poles. The satellites use a type of line scan camera, transmitting their data continuously as a modulated audio tone so that an image can start to be assembled as soon as the satellite is within range. The radio signals usually only propagate as far as the horizon, which is several thousand kilometres because of the satellite's altitude.

Basic equipment needed is a computer with a soundcard and an FM receiver for 137MHz. An internet connection makes things easier, but is not essential. I use a dedicated homebuilt RX2 receiver, pre-tuned to the weather satellite frequencies. It is a good idea to check that your computer clock is synchronised with a standard time source; this is where broadband becomes useful, or you may miss the satellite passing. I use a program

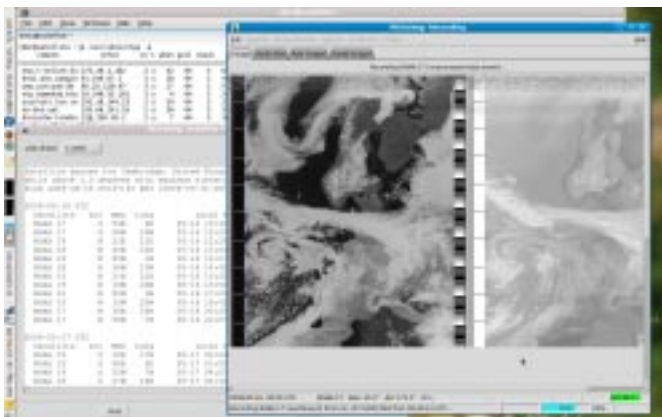


Fig 1: Screenshot showing live reception of satellite data using WXtoimg.



Fig 2: Image processed by WXtoimg from NOAA-19 (13 July 2009)

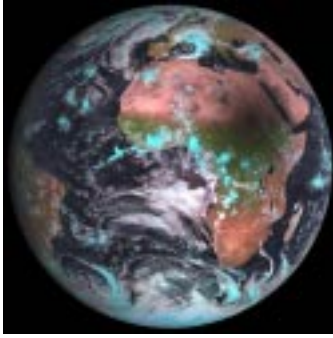


Fig 3: Image of world from geo-stationary satellite (3 October 2005 - Eclipse).

called WXtoimg, - which may be downloaded free from <http://www.wxtoimg.com> - to decode the images. This program also deals with the orbital parameters for you and will predict when the satellite is passing, set the receiver to the correct frequency and then apply map overlays to the received images afterwards. This setup will currently receive and

decode signals from 4 American weather satellites, - NOAA-15, NOAA-17, NOAA-18 and NOAA-19 (see <http://www.osd.noaa.gov/> for more information). These can be received using an omni-directional antenna and, depending on its type and location, the signal may still be receivable when the satellite is as far away as Greenland or northern Africa.

It is also possible, but more complicated, to receive live images from geo-stationary weather satellites since Eumetsat has arranged for some of these signals to be disseminated using satellite TV technology using a system called Eumetcast, (see <http://www.eumetsat.int>). After installing a satellite TV receiver card in your PC, pointing the dish at the correct satellite, and buying a dongle from Eumetsat, with the appropriate software, you can get live geo-stationary satellite images updated every 15 minutes.

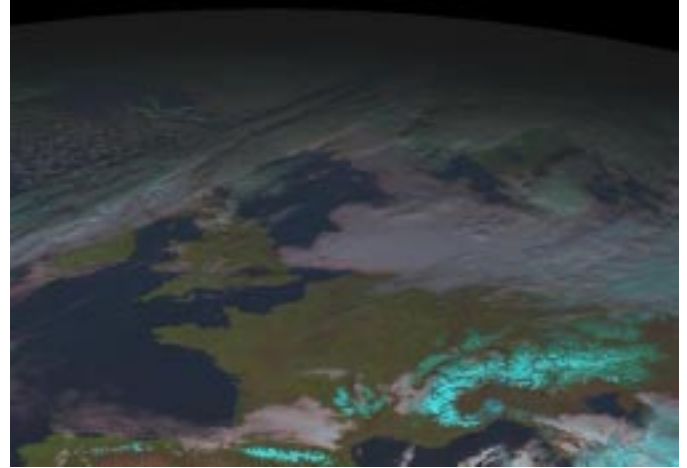


Fig 4: Image of Europe from geo-stationary satellite (11 December 2005 - Fire at Bunsfield Oil Depot)

The polar orbiting satellites provide data in both visible and infra-red simultaneously on the 137 MHz link, allowing different processing to be carried out highlighting cloud cover or other information. WXtoimg allows the selection of many different processing options including adding false colour and map overlays to emphasize different features, saving the resulting images in standard formats to allow further processing or viewing using other imaging software. Much additional data is collected by the weather satellites but that requires more complex equipment as the downlinks are on higher frequencies and need steerable antenna systems to track the satellites. If this has got you interested and you would like to find out more, a good place to start looking is <http://www.geo-web.org.uk>

### Public Observing Sessions at the Institute of Astronomy, Madingley Road.

During September we will be having practice sessions when will be setting up our telescopes and equipment and making sure we all know what we're doing (without an audience) and ironing out any bugs! If you wish to join us please meet by the Northumberland Dome at 7.30pm each Wednesday. From Wednesday 7th October the public turn up. Doors open at 6.50pm with a talk at 7.15pm by a researcher from the Institute followed by observing just before 8pm using the historic telescopes and our telescope/big screen set up, where we give guided tours of the night sky. See the IoA website ([www.ast.cam.ac.uk/public/public\\_observing](http://www.ast.cam.ac.uk/public/public_observing)) for the list of speakers.

## CAA/CYA News

### Loan Telescopes

There are usually no long waiting periods for the loan telescopes, visit our website and click on book a telescope, or give Stanley a ring on 01223 880624 (after 8pm). He will then be able to give the current state of affairs as to which instruments are available.

### Website

The new website is now up and running . Our thanks to Paul Fellows for grabbing the bull by the horns and going for it! Also our thanks to Ian Hunter who has

maintained our current website for the last five years even when he moved away from the Cambridge area.

### Reminder Service

Don't forget that on our website [www.caa-cya.org](http://www.caa-cya.org) reminder service you now have the option of being informed when *Capella* is ready for downloading.

## CYA Meetings

### 7-11 Age Group

Saturday 26th. September 2009

#### **CYA Visit to Duxford**

What of astronomical interest can be seen at Duxford?  
 Radar that found radio sources from space.  
 The spy plane that collected comet dust  
 Simulator ride  
 A cracking 'Eggsperiment'  
 US bomber used for UV astronomy  
 A jet involved in famous UFO incident  
 Space travel  
 Rockets and much more  
 Fees:- £2.00 for CYA members, £3 for non-members  
 Adults' entry fee is £12.80

The visit is from 10 a.m. till 1 p.m., after which the whole of the Duxford museum will be available to you all.

Saturday 31st October 2009

#### **"Winter Sky and the Colour of Stars."**

As it's getting darker earlier, we'll be looking at what can be seen in the night sky during winter months with emphasis on the colours of stars. Many of these colourful stars can be seen with the unaided eye or a pair of binoculars. We will also answer the question; if green is part of the spectrum, why don't we get green stars? We shall also show where to find you other interesting objects that can be seen in the winter constellations.

This meeting 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+ Age Group

Monday 5th October 2009

#### **A Grave Effect**

How come:-  
 the seas are effected by the Sun and Moon?  
 interacting galaxies affect each other?  
 there are tidal effects on stars and galaxies?  
 space craft accelerate by planetart fly-bys?  
 Yes, it's gravity

This meeting 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.