



## TRANSIT

The August 2010 Newsletter of



### **NEXT MEETING (first of the season)**

**10 September 2010, 7.15 pm for a 7.30 pm start**  
Wynyard Woodland Park Planetarium

### **The Big Universe**

**Gary Fildes FRAS** *Kielder Observatory A.S.*

Take a walk through the various scientific methods used throughout history to understand and test how we have formed a picture of our evolving Universe. From Galileo to Einstein, celestial spheres to quantum theory and general relativity. I hope to deliver the talk in my usual enthusiastic manner using modern theory to expose and confirm what we think we know about the Universe around us!! And How!

*(note the change of title from that in the Summer Newsletter)*



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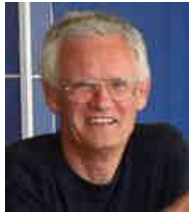
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## Editorial

*Rod Cuff*



I've been to solar eclipses in Mozambique, Libya and the edge of the Gobi Desert in China – quite an exotic-sounding lot, but Easter Island tops them all, I reckon. Hooray for Julia & Stephen Goudge, then, who braved the dire forecasts of bad weather all along the path of the July 11 eclipse this year and were well rewarded for their faith – see their account starting on page 5.

Your hardworking committee, collective noses permanently to the grindstone, would like to you to let us know what you think about the new 'informal workshops' initiative beginning with a Messier Bingo session on 29 September – see the article starting on page 11. And there's something *For sale* again ... also on page 11.

One non-*Transit* publishing event of note: Rob Peeling's letter about his sightings of the Venusian green flash (*Transit*, May 2010) has now appeared in the August issue of the *BAA Journal*.

I hope you enjoy the hot weather of August and will be ready to start the observing (and CaDAS) season again in September. The copy deadline for the September issue is **Saturday 28 August**.

Rod Cuff, [info@cadast-astro.org.uk](mailto:info@cadast-astro.org.uk), 1 Farndale Drive, Guisborough TS14 8JD (01287 638154)

## OBSERVATION REPORTS AND PLANNING

### Skylights – August 2010

#### The Sun

Don't forget solar observing on Sunday 29 August, from 3pm to 6pm at the Planetarium – the poster for this is on page 16.



*Rob Peeling*

#### The Moon

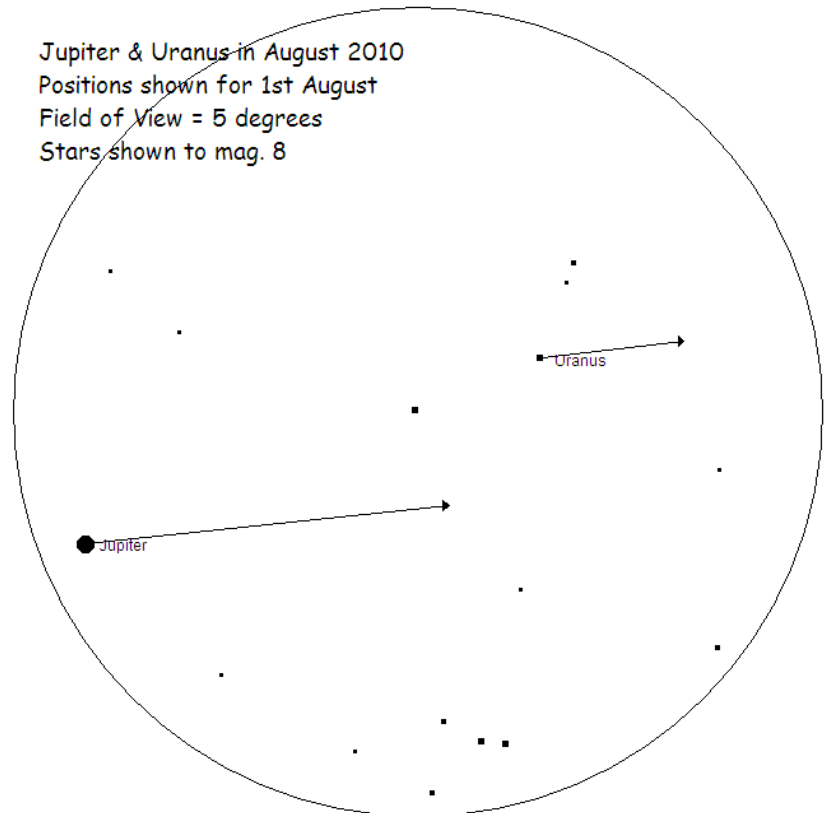
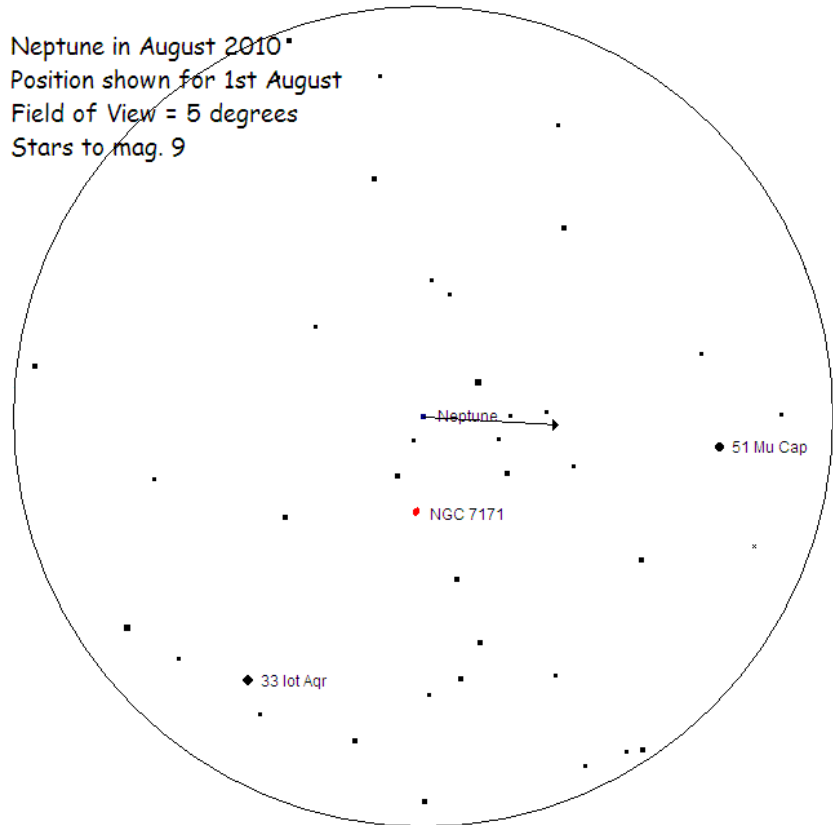
3 July	10 July	16 July	24 July
Last Quarter	New Moon	First Quarter	Full Moon

#### Planets

**Jupiter** is the most conspicuous planet in the night sky in August. It will rise at ~21:40 UT at the start of the month and progressively earlier through the month to ~19:40 UT by 31 August. Enjoy night by night the constantly changing positions of the four Galilean satellites. Also note the missing south equatorial band (mentioned in June's notes) and see if you can observe the [Great Red Spot](#).

**Uranus** leads Jupiter into the sky this year and in fact the pair are almost flying in formation throughout the month. Both planets are in retrograde motion (moving west), with Jupiter slowly

catching up on Uranus as the month passes. Uranus is easy to see in binoculars or a finder. Below are finder charts for both Uranus and **Neptune** this month.



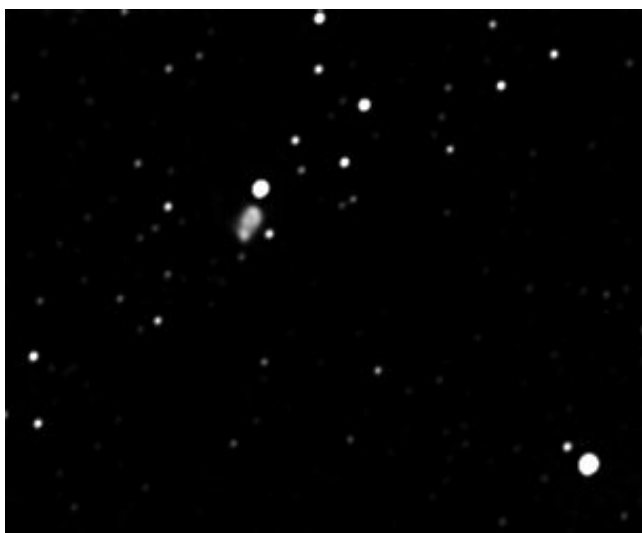
## Meteors

The **Perseids** are a highlight of the meteor observing year. The maximum is 12/13 August. Ed is holding a public observing session at the Planetarium for the maximum. The session starts at 21:00 on 12 August and is planned to go on until 06:00 the next morning – see the poster on page 16. This [meteor show](#) is associated with the comet Smith-Tuttle.

## Deep-sky objects

Here are two [planetary nebulae](#) in the constellation of Ophiuchus that you may enjoy finding.

The first is **NGC 6572**, which lies south of  $\eta$  Oph. It's plotted in *Norton's* and will be included in most other star atlases. It is very bright for a planetary nebula and at first difficult to spot because it is very starlike in appearance. However, its colour is what gives it away. Suddenly you realise that you are looking at a bright green star, and that can't be right! Higher power or an [OIII or UHC filter](#) will show some nebulosity to confirm that it really *is* a planetary nebula. It deserves its nickname of the **Emerald Eye planetary**.



The other planetary nebula is **NGC 6309** (*left*), which lies a little north of  $\eta$  (eta) Oph. This is quite a difficult object to find because the surrounding field is confused by the presence of a nearby double star and because it is low in the Teesside sky. This is confusing because the nebula itself is close to another star and so superficially appears to be another double. Careful inspection reveals that one of the 'stars' is the nebula and that the shape is elongated towards the real star. This gives the appearance of an **exclamation mark**, which is one of the several names for this object. It is also referred to as the **Box Nebula** and **Tempel 1** (after the discoverer).

Other objects worth looking out for are **M11, the Wild Duck cluster** in Scutum, which is easy in binoculars and is a very rich open cluster. I have never understood the Wild Duck name, though – I can't see anything that resembles the lines in a flying flock of ducks.

Further south from M11 are two famous nebulae: **M16, the Eagle Nebula**, and **M17, the Swan Nebula**. The star cluster associated with M16 is easy to see but the nebulosity itself is much more elusive. M17, however, is easy to see and does (to my eyes anyway) merit the Swan description.



## [Rapa Nui10 –](#) [A total solar eclipse from Easter island](#)

*Julia Goudge*



[Rapa Nui](#) is an example to all of us on our island planet. When a Polynesian chief arrived 500 years ago with members of his extended family and a few chickens, it was a wooded paradise. By the time Dutch sailors happened upon it on Easter Day 1722, it was denuded. Today the resident population is around 5,000, while at its peak the island had 20,000, mostly living off the catch from the sea. A second group of settlers had been forced into a slave role carving the giant [Moai statues](#) from volcanic rock.

Trees were used as rollers to move the huge ancestor monuments into position in front of the villages they were to protect. Without wood for boats, the island was doomed to starvation and civil war. After that, European diseases and slave traders cut the population dramatically and everyone who could use the island's unique script was lost.



Stephen (*who took some of the photos*) has been planning to witness the eclipse on Easter Island on Sunday 11 July 2010 for many years, but the day before the event there was almost continuous rainfall. He didn't want to risk equipment in the rain, and opted to stay behind in the hotel with the group astronomer, [John Parkinson](#), and another John, a dedicated solar observer. The tour operator had offered a farm site inland, but it had no special attractions and looked likely to have cloud.



Most of the group went into town for a brief visit to the museum, where an exhibit on astronomy had been set up. The curator explained how they had been using the opportunity to educate the local people over the previous weeks. Three telescopes had been set up with [Mylar filters](#). There didn't appear to be any using any other kind of solar filter.

From there we made our way down closer to the sea and in front of the Moai, where a party atmosphere prevailed (*right*). The position gave us a chance of watching the Moon's shadow approaching over the sea. I



I took some photographs of the Moai to try to demonstrate the changing light quality as the light source narrows from the usual half-degree disk and approaches towards a point source, where there is less diffusion of the sun's light. I had pricked out a card (*below*) to spell out the island's name and the date. Held in front of a white background, the individual pinholes transmit images of the Sun during the partial phase. That was popular. We had less success trying to use a partially shielded mirror to reflect an image on the white background.



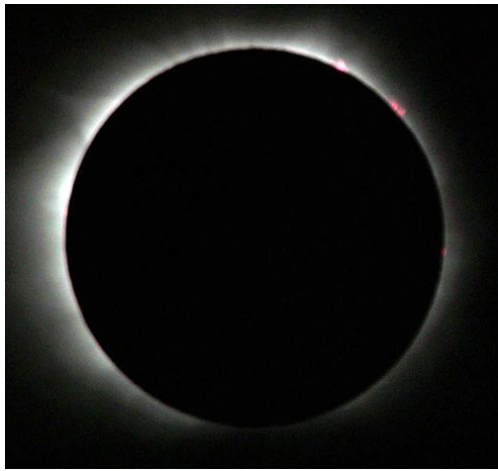
We had noted how bright Venus was at night. The German group were first to spot it well before totality. A highlight for one of our group was being able to say he had definitely seen Mercury.

Sunspots have been remarkably few and we were surprised at how active the corona was at totality – we should have listened to our keen solar observer, who had told us he felt there was a lot of activity developing just before the eclipse. The overall light levels seemed high, like just after sunset rather than evening. Of course, we could see areas of sea that were not in the Moon's shadow.

A wispy cloud moved over just as [Bailey's beads](#) appeared, but didn't spoil the spectacle

for us. A group of islanders in traditional dress (very *little* dress apart from body paint) took up a chant. A disadvantage of being at a party site was that many people took flash pictures at totality, which would interfere with serious photography, but it was great to see how excited the 'eclipse virgins' were as they finally saw just what makes an eclipse special.

On the Monday evening I came out of the church to see the first new moon directly ahead of me shining over the sea and down the road to the beach. Venus was still bright in the night sky.



## GENERAL ARTICLES

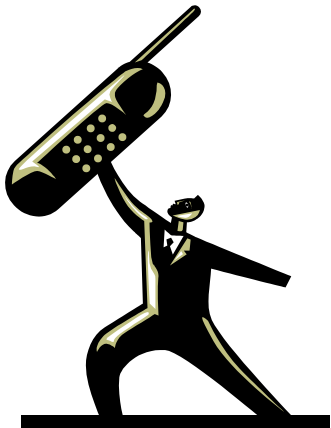
### [Why is science important?](#)

*Neil Haggath*



This piece isn't about astronomy *per se*, but bear with me, folks...

Last weekend, as I write this, I spent a day hiking in the Peak District. I stopped to eat my packed lunch at a spot which could justifiably be described as the middle of nowhere – high on a ridge, near an old quarry, where the nearest farmhouse, let alone village, was a couple of kilometres away. Yet from this spot, I was able not only to phone my dad in Teesside, but also to send a text message to my girlfriend, who lives in Kenya!



'So what?', you may be thinking. Why am I bothering to mention this? Today, we all take mobile phones for granted; indeed, those younger than about 20 have never known a world without them.

Well, it got me thinking once again about a theme on which both John Crowther and I have written a couple of times recently. Before I continue, I'll repeat a paragraph that I wrote a few months ago:

*Here in the UK, someone recently began an internet campaign to encourage youngsters to take an interest in science. He set up a website on which he asked scientists and science writers to write short essays on 'Why is science important?' To me, the most appalling thought of all is that it's actually necessary to ask such a question!*

As I've lamented before, we now have a society in which the majority of people have absolutely no knowledge of, or interest in, science of any kind, or anything remotely intellectual. I've mentioned that many lack such fundamental knowledge as how to tell directions by the Sun – and, even more dismayingly, seem to *care* even less.

We have an entire culture among younger people in which it's seen as 'cool' to be thick, and in which those who do have intellectual interests are invariably regarded as 'geeks', 'nerds' or whatever is the latest derisory word for the opposite of 'cool'. Owing to this kind of peer

pressure, many youngsters may actually be deterred from pursuing intellectual studies or hobbies.

Nor is this restricted to youngsters. I've even heard of cases of parents discouraging their own children. On Phil Plait's [Bad Astronomy blog](#), a commenter recently told a horrifying story. When visiting the home of some family acquaintances, he found that their teenage son was fascinated by astronomy; on learning that the guest was an astronomer, the lad began asking him a lot of questions – but then his father butted in with a sneering 'Who cares?'. According to the commenter, this idiot and his wife practically *boasted* about having almost zero interest in anything beyond beer, TV chat shows and gossiping about their neighbours, as if it was something to be proud of – and apparently wanted their son to grow up the same!

## BAD ASTRONOMY

So now to my point. To answer that question, 'Why is science important?', we need look no further than those handy little devices that most of us now carry in our pockets every day. Is it not an *amazing* thought that, even while on a hillside miles from anywhere, I can send a message in a matter of seconds to someone on another continent – by means of a device small enough to hold in the palm of my hand?

Those very same people who dismiss science and all intellectual pursuits with 'Who cares?' would be lost without their mobile phones, their iPods, and their PlayStations on which to play their silly mindless games. And most ironically of all, even those who believe in astrology, subscribe to absurd 'conspiracy theories' or believe that the Earth is only 6000 years old,

happily use computers and the internet to propagate their anti-reality nonsense!

As for the generation who have never known a world without mobile phones, PCs and iPods – it doesn't even seem to occur to them that there ever *was* a world without those things, and that someone, at some point in time, had to *invent* them!

Frankly, I find this more baffling than anything. You could apply the argument of 'never known a world without <insert appropriate

*technology*>' to *any* generation of the last century and longer. I personally never knew a world without cars, electric lighting or (landline!) telephones, and from as early an age as I can remember, my parents had a TV set – albeit black and white. But from a very early age I was not only perfectly aware that there had been a world without those things, but had a pretty extensive knowledge of who invented many of them, and when. That was the sort of 'general knowledge' that schoolboys learned in those days; by the age of about eight or nine, I knew, for example, that Alexander Graham Bell invented the telephone in 1876, and that the Wright Brothers built the first aeroplane in 1903. And I was quite familiar with such things as penny-



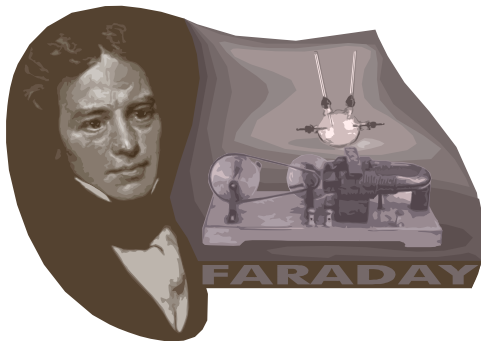


farthing bicycles, biplanes and the Model T Ford, despite never actually having *seen* any of them. But mention any of those people or things to the average youngster today, and I suspect you would be met with a look as blank as the paper on which they have never written a letter.

(The American writer [Harlan Ellison](#) once gave a talk to a group of students in which he mentioned some examples of past technology. When he mentioned listening to music on old-fashioned vinyl records, he was met with a sea of blank faces; none of his audience had ever *seen* a record, nor even knew what one was! He then told them about when he started off as a young writer, and his hands used to ache from spending hours at a time with a mechanical typewriter; one student actually asked him, 'Why didn't you use a computer?' I kid you not!!!!

I told this story to a friend in his thirties who has a 6-year-old daughter. He conceded that such thoughts had never occurred to him until that moment – but immediately resolved that he would show his daughter a record, and other examples of obsolete technology, and ensure that she doesn't grow up in such a state of ignorance.)

So what makes all these marvellous things possible? Why, *science*, of course! You could argue that it's *engineers* who invent practical devices – but they are simply applying the principles that have previously been discovered by means of pure scientific research.



Going back to the example with which I began; just think of all the science that led to the humble mobile phone... First, the discovery of electricity in the mid-19<sup>th</sup> century. Then the invention of the telephone itself (134 years ago!); the discovery of electromagnetic waves; Marconi's first use of radio waves to transmit signals; the invention of successive generations of electronics technology – first vacuum tubes, then transistors, then semiconductors and microcircuits, and the miniaturisation that the latter made possible. And finally, of course, the fantastic advances in

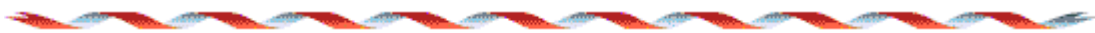
computer technology within a few short decades. (How's this for a thought: the phone in your pocket has *thousands of times* more memory and processing power than the computers that enabled the Apollo astronauts to land on the Moon!)

Another example... At the start of this piece, I mentioned my girlfriend in Kenya. Well, it's due to the physicists who discovered the principles of aerodynamics, and the genius of Sir Frank Whittle, who invented the jet engine, that we now have a world in which it's *possible* for a person to have a girlfriend or boyfriend thousands of kilometres away on another continent!

Once again, those same people who are so dismissive of science take it for granted that they can board a plane and fly to, say, the Greek Islands for their holidays. But many of them wouldn't be able to show you, on a map of the world, the country to which they were going – and don't even understand such a simple concept as why they have to put their watches forward a couple of hours...

Finally, there are those who whine about spaceflight being 'a scandalous waste of money' – while happily watching their weekly football on satellite TV...

So the next time you encounter someone with a 'Who cares?' attitude to science, try getting them to think a little about what their comfortable life would be like without it.



## A simple and less challenging universe (but not yet...)

John Crowther



'What goes around, comes around' is a saying that's very true for astronomy, both theoretical and practical.

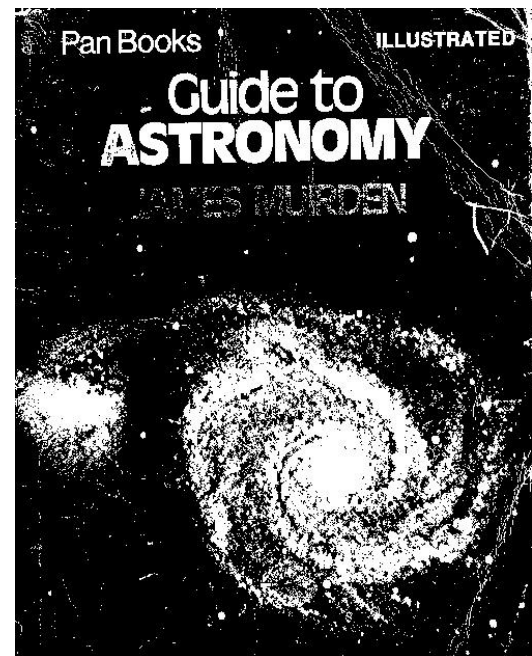
*Transit* for July 2007 contained an article, 'Our lonely future – three trillion years from now' by [Fraser Cain](#) (I've kept my copy because the cover picture was '[Analemma over Ukraine](#)', a connection with my interest in sundials). Apparently, three trillion years into the future all that will be observable is our own galaxy.

Is the writer correct, or will our local group still be in view? Is gravity strong enough for it to hold together? Will a dominant life-form evolved from the 'naked apes' that migrated from around a red giant sun still have a faint memory of a far distant past? The Earth-centred universe that the 'apes' first imagined will by then be a real single-galaxy or group-of-galaxies universe. For 'what goes around, comes around', and if there's a Big Crunch it may give way to another Big Bang.

Earlier this year I added *Guide to Astronomy* by James Muirden (Pan 1972) to my collection of old paperback astrobooks. Much has changed in forty years. Our knowledge has expanded and is still expanding so rapidly that specialists must have difficulty in keeping up. A 21<sup>st</sup>-century Leonardo would have to stick to just one subject. As examples, here are some quotes from Muirden's book.

### Chapter 25, The world of cosmology

*The universe is a dangerous place – a sort of abstract wilderness embracing the worlds of physics, astronomy, metaphysics, biology, and theology. These all subscribe to the super-world of cosmology, to which students of these various sciences can contribute. Strictly speaking there is no such person as a 'cosmologist' for the simple reason that nobody can be physicist, astronomer, metaphysicist, biologist, and theologian at the same time.*



**Chapter 24, Galaxies and galaxies** gives us a very small scale, with the galaxies being about 25 feet apart:

*A pinhead is 1/16 of an inch across. Representing the Earth by such a pinhead:*

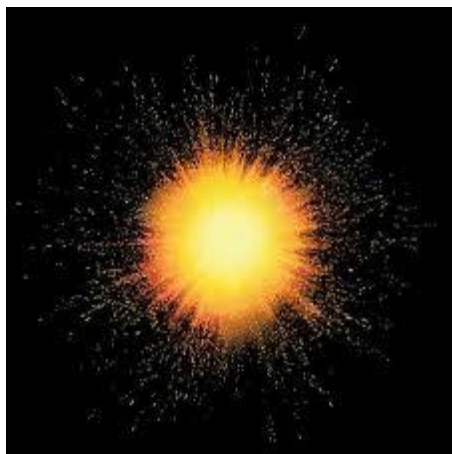
- *The Sun is 6 inches across and 18 yards away.*
- *The nearest star is 3,000 miles away.*
- *The diameter of the Galaxy is 60,000,000 miles – 2/3 of the real distance from the Earth to the Sun.*

Already sizes have become ridiculous. Reducing the diameter of the Galaxy to 1 foot:

- M31 is 25 feet away.
- The boundary of the observable universe is over 1 mile away, in all directions.

..... [and later:] .....

So we are back at a time when the material that now forms the galaxies was confined within a



*much smaller space than it is today. But this was not the beginning of the process; it was merely the end of the first stage. The matter itself came from a far more condensed aggregation that is known as the primeval atom. The primeval atom contained all the material from which the universe is built, so densely packed that its density was perhaps 1,000,000 times that of a white dwarf! It was solid nuclear matter, and once again it must be considered as infinitely large. Worse still, it did not really exist at all, because time did not begin until it exploded and began to form the primordial clouds of hydrogen. If God ever said 'Let there be Light' it was at the instant of the explosion of the primeval atom. What happened before then is beyond the scope of both science and*

*comprehension, since we cannot conceive existence without time; the word itself implies the passage of time.*

## CaDAS NEWS

### For sale

#### **Bausch and Lomb professional 4.5" reflector**

Model 780200. Comes with tripod, 2 eyepieces, balance weight, and various knobs and flexible cables to control the telescope.

£150 ono

**Richard Bennett** ([rosemarie.bennett@ntlworld.com](mailto:rosemarie.bennett@ntlworld.com))

### The Alternative CaDAS Meetings / Workshops

*[Some of this article is adapted from the CaDAS committee minutes of 22 March, which were circulated with last month's Transit. – RNC]*

Your committee and several other members of CaDAS have thought for some time that it would be good to augment the normal monthly round of CaDAS meetings with some more informal gatherings on other evenings. These might often be especially (but by no means exclusively) directed towards members with relatively modest knowledge and experience of astronomy. Anyone would be welcome to come along for all or part of the sessions, which would typically

either be led by one or more CaDAS members experienced in a particular topic area, or be voyages of democratic exploration by all concerned! We've decided to try out the idea, and for want of anything better to call these occasions, we've gone with 'workshops'.

We expect attendances at workshops like this to be variable – if no one turns up for any particular evening, the organiser(s) will no doubt go for an early pint, but if even one person appears it will be worthwhile and the event will run. It's all an experiment that we hope will get enough support to become a regular feature of CaDAS life.

After some discussion on the place, format, best day of the week, subjects, etc., we've decided to go for Wednesday evenings at the Planetarium, quarterly to start with to gauge the response. The first workshop will be a Messier Bingo Evening, on Wednesday, 29 September at 19:30 at the Planetarium, to be organised by Ed Restall and Rob Peeling.

## Messier Bingo

This term may be new to you – it was to me! Here's what it involves.

Each person is given a sheet of paper modelled on a traditional bingo card, containing ten or so images of objects from Charles Messier's famous [catalogue](#) of 110 celestial objects, each labelled with its catalogue number (see the example on the next page, courtesy of Edward Gomez at [Las Cumbres Observatory](#)).

The workshop leader then randomly chooses objects one by one (by computer, random number stabbing or whatever), and you mark your card if that object is on it. The first person to have a fully marked card shouts something (probably unprintable), and has won a Major Prize. This may be a 12" LX200 telescope or a personal day out with Patrick Moore, but is rather more likely to be a Mars Bar or some such.

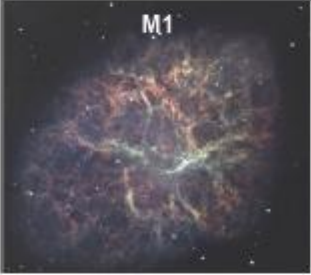
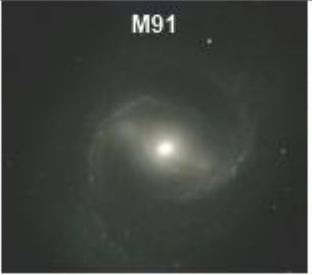







This is of course an excuse to talk about the objects on the way – what kind of objects they are, perhaps something of their observational history, whereabouts in the sky and at what time of year you can see them, whether you've personally observed them, etc. By the end of the evening, everyone should know much more about these objects and others like them, and no doubt conversation will wander onto other catalogues, astronomical history and anything that anyone wants to talk about. Eventually we probably wind up at the pub ...





# Messier Bingo card

Name:

 <p>M1</p>	 <p>M91</p>	 <p>M27</p>
Object Type: <input type="text"/>	Object Type: <input type="text"/>	Object Type: <input type="text"/>
 <p>M3</p>	 <p>M66</p>	 <p>M74</p>
Object Type: <input type="text"/>	Object Type: <input type="text"/>	Object Type: <input type="text"/>
 <p>M109</p>	 <p>M58</p>	 <p>M46</p>
Object Type: <input type="text"/>	Object Type: <input type="text"/>	Object Type: <input type="text"/>

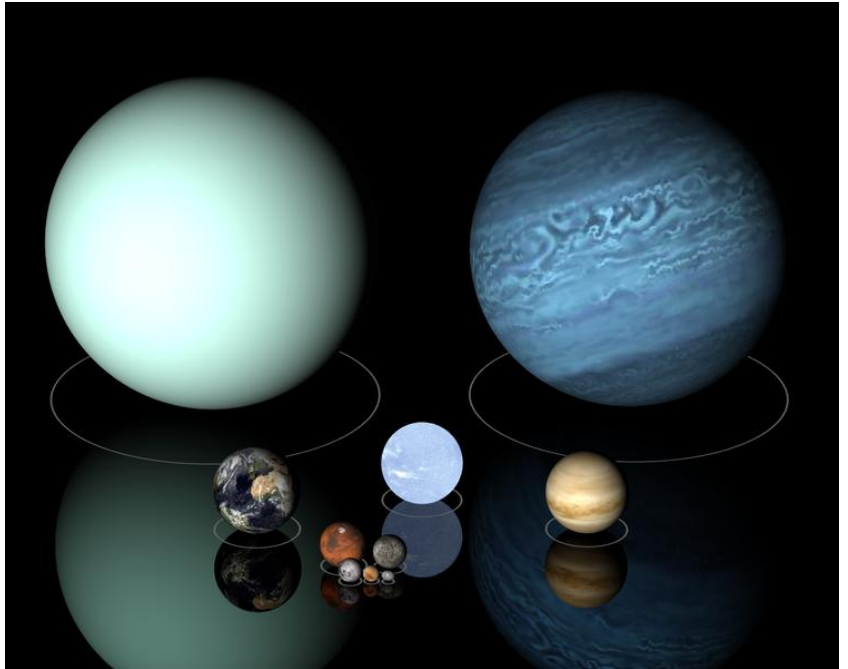




## Other workshop ideas

Here are some other subjects that have been suggested as workshop topics. We would very much like to know what you think of these, which appeal to you personally, which ones you think would be good to run in the coming season (we can handle perhaps another three), any suggestions you have for how they should be run, whether you personally would be willing to run or co-run one of the evenings, and any other topics you would like to see added to the list. Please let either me ([info@cadastro.org.uk](mailto:info@cadastro.org.uk)) or Alex Menarry ([general-secretary@cadastro.org.uk](mailto:general-secretary@cadastro.org.uk)) know your views – we'll print a selection of them in *Transit* if we get enough.

- Talks and hands-on demos concerning telescopes for amateur observers
- Studying the Moon and its major features
- The planets and the Solar System generally (*right*)
- Sundials and the equation of time
- The Sun, sunspots and how they vary
- Imaging in general, how to get going in astrophotography, and what software packages experienced members use
- Demonstrations of and names of other available useful/used software – eg [Stellarium](#), [Celestia](#), [Where is M13?](#)
- The 20 best sights in the sky to eyeball (come and disagree!); the 100 best doubles to search for
- General sites available on the Web for astronomical use, information or entertainment – eg APOD, EPOD, the BAA site, the AAVSO site
- Distance-learning courses available and recommended, including offering help with their problems to any member enrolled on such a course
- Objects in the [Caldwell catalogue](#) (Caldwell Bingo, anyone?)
- The [Hertzsprung–Russell diagram](#).



## THE TRANSIT QUIZ

### Answer to July's quiz

Where in the Solar System would you find the following?

1. STZ – *on Jupiter: South Temperate Zone*
2. Nereid – *around Neptune: it's the third-largest moon*
3. The Kirkwood gaps – *in the asteroid belt: asteroid-free regions that are empty because they're in resonance with Jupiter's orbit*
4. Carrington rotations – *on the Sun: a system for comparing surface locations over time*
5. TLPs – *on the Moon: Transient Lunar Phenomena – flashes etc probably caused by meteoroid impact*
6. May transits of 13 and 46 years – *Mercury, passing in front of the Sun as seen from Earth.*



*November transits, however, occur at intervals of 7, 13 or 33 years. BTW, the next Mercury transit is on 9 May 2016.*

7. Counter glow – *in the night sky as seen from Earth: a faint glow, also known as gegenschein, directly opposite the Sun, and caused by light reflecting from particles in the plane of the ecliptic.*

8. Stickney – *on Mars' larger moon, Phobos: it's a large and very prominent crater (see left).*

9. Valhalla – *on Jupiter's moon Callisto: it's a large multi-ring impact basin.*

10. Chondrules – *probably everywhere! We see them in stony meteorites as millimetre-sized round grains, but it's thought they're also floating freely around the Solar System.*

### August's quiz

In which countries would you find these observatories or telescopes? For ones in the USA, in which state?

- |   |                   |                                     |
|---|-------------------|-------------------------------------|
| 1. Kitt Peak                            | 2. Arecibo        | 3. Roque de las Muchachos           |
| 4. Chacaltaya Astrophysical Observatory | 5. Apache Point   |                                     |
| 6. Foggy Bottom                         | 7. Yerkes         | 8. Isaac Newton group of telescopes |
| 9. Submillimetre Array.                 | 10. Siding Spring |                                     |





Stockton-on-Tees  
BOROUGH COUNCIL

Wynyard Woodland Park  
Planetarium & Observatory



CARE FOR YOUR AREA  
NO MESSING!

# Summer Observing:

Thursday 12<sup>th</sup> August from 9:00pm 'til late  
& Sunday 29<sup>th</sup> August from 3:00pm to 6:00pm

## 12<sup>th</sup> August: *Meteors!*

The Perseids are one of the best meteor showers of the year. Observe in the relative warmth of a summer night, with the usual deep sky telescope observing thrown in. Shooting stars in abundance – make a wish on every one!



Shooting Stars – a meteor shower.



The Sun – filaments, prominences & sun spots.



## 29<sup>th</sup> August: *Seeing the Sun*

Safely observe the Sun and perhaps get a chance to catch a glimpse of a storm on our local star, through the telescopes outside the planetarium.

The telescopes are safely filtered and used by experts, please DO NOT look at the Sun yourself with any optical instrument such as binoculars or telescopes as you will go blind!

**Observing events are FREE. The Solar Observing will only take place if the sky is clear and the Sun is out ... for obvious reasons! It is made possible by equipment provided by the Science and Technology Facilities Council. Meteor Observing will only take place if the sky is clear of cloud.**

The Wynyard Planetarium & Observatory is a joint venture between Stockton Borough Council and the Cleveland and Darlington Astronomical Society, supported by the Durham Astronomical Society. Providing information, education & entertainment in space and science on Teesside and across the northeast.



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