

# SciTalk

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Number 2 – May 2010

## Australia has a hotspot of its own ... when will it erupt?

Australia's hotspot is several hundred kilometres wide and currently lies under Victoria, Bass Strait, Tasmania and the floor of the Tasman Sea. It's one of more than a hundred systems identified around the world. This hotspot, a region in the Earth's crust where the planet expels some of its internal heat, is hopefully slumbering. Present hotspot activity is possibly confined to the triggering of earthquakes in predicted areas, such as the recent event off the coast of north-west Tasmania, and deep gas discharges under Victoria and Tasmania.

Some scientists believe a new Australian volcano is being created. They suspect an earthquake that originated 50 kilometres from King Island on 7 February 2002 with a magnitude of 4.5 signalled the reawakening of the hot spot. Wally Johnson, a volcanologist at Geoscience Australia, said the fact that there were earthquakes taking place in the area 'means that geologically, the hot spot has to be regarded as active, even though it hasn't produced volcanic eruptions as such'. He said it could easily spawn a volcano within 100 years.


Active volcanoes in Australia include Heard Island and the McDonald Islands, a subantarctic group located in the Southern Ocean, about 4100 kms southwest of Western Australia. McDonald Island began erupting in 1992, after lying dormant for 75 000 years. It has erupted several times since, with satellite pictures in 2001 showing that the island had doubled in size. Heard Island consists of two volcanic cones, Big Ben and Mt Dixon, joined by a narrow isthmus. Both cones are young, but only Big Ben has been observed to erupt.

You can read more about volcanoes in the article 'Teaching about volcanoes, earthquakes and glaciers' on page 4.

## National Curriculum feedback done?

Have you given your feedback on the National Curriculum at: [www.acara.edu.au/curriculum\\_development.html](http://www.acara.edu.au/curriculum_development.html)?

The draft Australian Science curriculum is available for consultation until 23 May 2010. It is online and includes content descriptions, achievement standards, content elaborations and annotated work samples. Teachers should provide feedback online and through the BOS and state forums such as STANSW.

 **Get 13, 16 or 20 August 2010**  
into your school calendar  
to come to **Physics is Fun**  
in **National Science Week**

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*... see page 6 for full details*

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## ★★ ATTENTION ★★

After you have read this, please write/tick your name below and pass it on.

- 1. ....
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- 3. ....
- 4. ....
- 5. ....

*Please return to file or noticeboard.*

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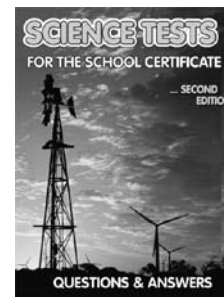
★★ *See pages 1, 11 & 12* ★★  
Send in your entries now  
**(ALL IN THE ONE ENVELOPE if you prefer!)**

This SciTalk & past issues are available at  
[www.odlumgarner.com](http://www.odlumgarner.com)

## Book Giveaway

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★★★

**Winner for SciTalk 1/10**

Congratulations to Stacie Luppi, Barellan Central who won *Understanding for Years 7 & 8* (rrp \$32.95 ea) published by Odlum & Garner.

# Diary Dates 2010



## 2010 – International Year of Biodiversity

**For:** Shell Questacon Science Circus 2010 program: [www.questacon.edu.au/html/on\\_the\\_road.html](http://www.questacon.edu.au/html/on_the_road.html)  
**? Sept:** Astronomy Open Night & Lectures: Macquarie Uni, [www.astronomy.mq.edu.au/](http://www.astronomy.mq.edu.au/)

### MAY 2010

- 5–7 Science at the Shine Dome conference, Australian Academy of Science
- 31 Science Teachers' Forum. Children's Medical Research Institute. [www.cmri.com.au](http://www.cmri.com.au)
- 7, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

### JUNE 2010

- 7, 11 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 18,19 NSW Schools Titration Competition. [www.nswtitration.com/](http://www.nswtitration.com/)
- 21 Winter Solstice (9.28 pm EST)
- 23, 24 Hands-on Microscopy. Details: [i.kaplin@usyd.edu.au](mailto:i.kaplin@usyd.edu.au)
- 25 Biology Teachers PD Day. Museum of Human Disease, UNSW. Ph: (02) 9385 1522

### JULY 2010

- 2 Closing date Crystal Growing Comp. [www.chem.unsw.edu.au/RACI/](http://www.chem.unsw.edu.au/RACI/) Ph: (02) 9663 4960
- 4–7 CONASTA 59: *Celebrating Diversity – in Science, in Learning and in the Environment.*  
Venue: University of Technology Sydney. Details: [www.conasta.edu.au/](http://www.conasta.edu.au/)
- 19–25 National Chemistry Week. [www.raci.org.au/national/events/chemistryweek.html](http://www.raci.org.au/national/events/chemistryweek.html)
- 22 National Chemistry Quiz. [www.raci.org.au/national/events/nationalchemistryquiz.html](http://www.raci.org.au/national/events/nationalchemistryquiz.html)

### AUGUST 2010

- 2–15 Australian Science Festival, ACT. For school Activities visit: [www.sciencefestival.com.au](http://www.sciencefestival.com.au)
- 6 Jeans for Genes Day. [www.jeansforgenes.org.au/](http://www.jeansforgenes.org.au/)
- 9, 13, 16, 20 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 14–22 National Science Week. *Australian Biodiversity.*
- 13, 16, 20 National Science Week events: Physics is Fun at Luna Park. [www.odlumgarner.com](http://www.odlumgarner.com)
- 23 Physics Olympiad Nat. Qualifying Exam. [www.asi.edu.au/olympiads/](http://www.asi.edu.au/olympiads/) Ph: 6125 9645
- 26 Biology Olympiad Nat. Qualifying Exam. [www.asi.edu.au/olympiads/](http://www.asi.edu.au/olympiads/) Ph: 6125 9645
- 31 Chemistry Olympiad Nat. Qualifying Exam. [www.asi.edu.au/olympiads/](http://www.asi.edu.au/olympiads/) Ph: 6125 9645

### SEPTEMBER 2010

- 2 Rio Tinto Big Science Competition: [www.asi.edu.au/bigscience/](http://www.asi.edu.au/bigscience/)
- 10, 13 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 23 Spring Equinox

### OCTOBER 2010

- 10–16 Earth Science Week. [www.earthsciweek.org](http://www.earthsciweek.org) & [www.ga.gov.au/education/events/science-week/index.jsp](http://www.ga.gov.au/education/events/science-week/index.jsp) Ph: 6249 9859
- 18, 22, 25, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

### NOVEMBER 2010

- tba Science Teachers' Forum. Children's Medical Research Institute. [www.cmri.com.au](http://www.cmri.com.au)
- 1 Biol & Environ. Sciences Science Teachers' Workshop. Uni of Sydney. Details: p4
- 2 & 3 Chemistry Science Teachers' Workshop. Uni of Sydney. Details: p4
- 4 & 5 Physics Science Teachers' Workshop. Uni of Sydney School of Physics: Details: p4, <http://sydney.edu.au/science/physics/foundation/education/stw.shtml>
- 1, 5, 15, 19 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 22, 26, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

### DECEMBER 2010

- 3, 10, 13 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 22 Summer Solstice (9.38 am EST)

**JANUARY 2011** National Youth Science Forum. Forms to local Rotary club by 29/5/10, interviews from July.

*While all dates have been checked to ensure that information in DIARY DATES is correct, no responsibility will be accepted by the publisher or Editor for any omissions or inaccuracies in it.*

## Update on BOS matters

Regularly check the BOS website to ensure you have the latest data – for syllabuses, past exam papers, news, Official Notices, Board Bulletins, the statistics archive & more.

### Official Notices are now online ONLY

Official Notices will be effective from the date they appear on the BOS website.

### Changes for 2010 HSC Exams for Senior Science, Earth & Environmental Science, Biology, Chemistry and Physics

In Section I, the mark value of the objective response items has increased from 15 marks to 20 marks and the mark value of the short-answer questions has decreased from 60 marks to 55 marks.

### BOS enquiries:

- Ph: (02) 9367 8111, fax: (02) 9367 8484
- Website: [www.boardofstudies.nsw.edu.au/](http://www.boardofstudies.nsw.edu.au/)
- BOS contacts for Science:
  - Inspector Science, K–12 & Senior
  - Assessment Officer – Science

"The smallest act of kindness is worth more than the grandest intention."  
... unknown

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## Night Stalk

Australian wildlife is in trouble and needs your help! If you would like to help Australian scientists and conservationists, you can take part in this year's Night Stalk.

Twist Night Stalk is easy, fun and something everyone can do. All you need is a torch and a Spotter's Log. Choose one night or a number of nights between 1 September and 16 October and spotlight in your local bushland. Record all native/introduced animal

## 1 September–16 October 2010

species: mammals, birds, bats, reptiles and frogs, that you find and send your Spotter's Log to Perth Zoo.

This annual national survey, now in its 12th year, is designed to collect information about animals still living in the wild, especially near urban areas, and their distribution over time.

For information: Twist Night Stalk  
PO Box 489 South Perth WA 6151

Fax: (08) 9474 4113

Email: [nightstalk@perthzoo.wa.gov.au](mailto:nightstalk@perthzoo.wa.gov.au)

Visit: [www.perthzoo.wa.gov.au/Get-Involved/Nightstalk](http://www.perthzoo.wa.gov.au/Get-Involved/Nightstalk) & download a Spotter's Log or complete one online.







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Louise Freys, Faculty of Science  
E [science.alliance@sydney.edu.au](mailto:science.alliance@sydney.edu.au)  
T +61 2 9351 5268  
[sydney.edu.au/science/outreach/teacher\\_resources/teachers\\_workshop](http://sydney.edu.au/science/outreach/teacher_resources/teachers_workshop)

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## Australian Museum 2010

### Exhibitions to explore

Find out about minerals, fossils, dinosaurs, megafauna, endangered Australian animals, adaptations, birds, insects and other invertebrates in our semi-permanent exhibitions:

- Dinosaurs
- Surviving Australia
- Birds and Insects
- Skeletons
- Planet of Minerals
- Chapman Mineral Collection
- Search and Discover
- Indigenous Australians

### For bookings and further information

Ph (02) 9320 6163 Fax (02) 9320 6072  
[www.australianmuseum.net.au/education-services](http://www.australianmuseum.net.au/education-services)

### Free Teachers Preview Night – 27 May\*

Teachers are invited to explore all our exhibitions and find out about our curriculum-linked programs for schools including our Biodiversity Trail inspired by the International Year of Biodiversity.

When: Thursday 27 May 2010, 5.15 pm to 7.30pm.  
Refreshments will be provided.

### \* Urgent – Register by 24 May

Send your name(s), school and school address via:

- email – [learning.services@austmus.gov.au](mailto:learning.services@austmus.gov.au)
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## Teaching about volcanoes, earthquakes and glaciers

There are a number of reliable internet resources that will give your students research experience to obtain current as well as historical information, with great photographs and/or videos of earthquakes, volcanoes and glaciers. Students can even go on a virtual tour of several volcanoes! Researching to discover and learn about these natural events will help to satisfy the syllabus requirements in Science Stages 4 and 5. It will give students the practical experience of accessing and collecting information from secondary sources using internet technology.

### • Volcano sites

\* [www.swisseduc.ch/stromboli/index-en.html](http://www.swisseduc.ch/stromboli/index-en.html)

This site covers Etna, Stromboli and many other volcanoes of the world. It is so up-to-date that it covers the recent eruption in Iceland of Eyjafjallajökull. Simulated field trips are included to visit various volcanoes. There are great labelled photos of gas clouds, ash clouds, lava eruptions, lava flows, lahars, geysers, hot springs, craters (and right inside some), cinder cones, volcanic ash, and more.

\* <http://volcanoes.usgs.gov/>

The USGS Volcano Hazards Program monitors active and potentially active volcanoes to assess their hazards. Their Photo Glossary of volcanic terms will help students learn what each term means. There are great photos in the various Observatory Archives.

\* [www.volcano.si.edu/world/](http://www.volcano.si.edu/world/)

This covers volcanoes around the world giving their location, type of volcano, status, last known eruption and a photo.

### • Earthquake site

<http://earthquake.usgs.gov/>

The USGS has an extensive earthquake monitoring and reporting system. Their site provides excellent data about earthquakes, not only in the US, but also worldwide.

### • Glacier site

[www.swisseduc.ch/glaciers/index-en.html](http://www.swisseduc.ch/glaciers/index-en.html)

This site is ideal when teaching the water cycle in Stage 4 Science. The water cycle involves the movement and storage of water. Glaciers are part of the water storage process.

## Science on the Web

### • Natural fibres

[www.naturalfibres2009.org/en/fibres/index.html](http://www.naturalfibres2009.org/en/fibres/index.html)

This profiles '15 natural fibres' that are some of the world's major plant and animal fibres – many have been used since the dawn of civilisation. Each profile includes detailed information about the fibre, its uses and production, as well as a photomicrograph of the fibre. The fibres range from cotton, which dominates world fibre production, to specialty fibres such as cashmere which, though produced in far smaller quantities, have particular properties that place them in the luxury textiles market. It explains why our use of natural fibres instead of synthetic fibres will contribute to a more healthy lifestyle and provide food security and eradication of poverty as they help economically by boosting the livelihood of farmers. Using natural fibres is also a sustainable choice. Renewable and carbon neutral, natural fibres leave residues that can be used to generate electricity. And they are 100% biodegradable.

## HSC Physics and the Large Hadron Collider at CERN

There is no mention of particle colliders or the Large Hadron Collider (LHC) in particular in the Stage 6 Core Physics syllabus. However, the LHC was examined in Question 25 of the 2009 HSC Physics examination.

The HSC Physics Syllabus Dot Point 9.4.1 states that students learn to: “identify that moving charged particles in a magnetic field experience a force, identify that charged plates produce an electric field, describe quantitatively the force acting on a charge moving through a magnetic field, using  $F=qvB\sin\theta$ ”. They also need to be able to “solve problems and analyse information using:  $F=qvB\sin\theta$ ,  $F=qE$  and  $E = V/d$ .”

So why is knowledge of the LHC required in the 2009 HSC question? Students who studied the Option ‘Quanta to Quarks’ would have learnt about particle accelerators for Dotpoint 9.8.4 and quite possibly have investigated the LHC and so therefore know that it accelerates identical particles in opposite directions.

\* \* \* \* \*

The LHC is the largest of the particle accelerators and is operated by CERN. It is located underground between Geneva in Switzerland and the French Jura Mountains. The particles used in the LHC are always identical with respect to mass, speed and charge. Currently, the two particles being used are either protons ( $H^+$ ) or lead nuclei ( $Pb^{82+}$ ). Hence the charge on the particles is always the **same**.

Question 25 in the HSC Physics examination is quite inaccurate in its LHC information. Firstly, the LHC is not a perfect circle. It comprises eight arcs (circular) each separated by straight insertion sections. Its radius is not the 4.2 m as given in the HSC question ... it has a circumference of 26.659km and so has a radius of a little over 4.24 km. The LHC underground tunnel has an overall slope of 1.4% and its depth varies from between 175 m under the Jura Mountains to around 50 m near to Geneva. The magnetic field is complex and non-uniform, unlike that shown in the diagram with HSC Physics Question 25 which is simple and uniform.

The accelerator complex at CERN is actually a succession of machines with increasingly higher energies. Each machine injects the beam into the next one, which takes over to bring the beam to an even higher energy. The LHC is the final stage in the process where the beam is split into two separate beams one circulating clockwise and the other anticlockwise. So the LHC is used to accelerate beams of identical particles (with the same charge) in opposite directions.

The intense magnetic fields produced in the LHC are produced using over 9600 superconducting magnets held at a temperature of only 1.9 K using liquid helium cryogenics. The magnetic fields reach a maximum of 8.3 T. They are non-uniform (unlike the diagram in HSC Question 25) because, as well as increasing the energy of both the clockwise and anticlockwise particle

beams, each beam must be kept focussed down to the smallest possible cross-section at the collision points to maximise the chance of collisions occurring.

In reality, the LHC has particle beams moving at 99.9999991% of the speed of light and this requires much more intense magnetic fields as a result. The magnetic fields are therefore very different to the calculations that result from part (b) of HSC Question 25.

The Physics HSC Question 25 was probably intending that students would answer it by only looking at the diagram and using their knowledge from Syllabus Dot Point 9.4.1. In which case, they would have thought that the particles had opposite charges. Students with any knowledge of the LHC and particle accelerators would therefore have been at a disadvantage as they would have correctly indicated that the charge on the particles is always the *same*, rather than the opposite implied by the diagram.

\* \* \* \* \*

An excellent illustrated video explanation of the operation of the CERN accelerator complex as it accelerates protons can be found at: <http://www.youtube.com/user/T56rOx>

This will help you to visualise and understand what the LHC does.

Reference:

CERN: LHC the guide published CERN 2009 (at: <http://public.web.cern.ch/public/en/lhc/Photosynthesis>)

### ● Topics on NOVA: Science in the News

[www.science.org.au/nova](http://www.science.org.au/nova)

Updated regularly by the Australian Academy of Science, this site provides reliable information on topical issues in Science. It is great for research, assignments and for encouraging an interest in Science. Many of the topics are great for studying environmental issues for the ‘International Year of Biodiversity’. Their latest topics include:

#### \* **Dirty, rotten swine flu – and how to beat it**

Read all about this flu and the methods used to develop a vaccine.

#### \* **Making light of metals**

The light metals aluminium, titanium and magnesium are taking a load off transport and other everyday objects. Through advances in production and processing, these ‘light metals’ are now cheaper and more versatile and so are used in cars, trucks, train and aircraft bicycles, laptop cases, mobile phones iPods.

#### \* **Australia’s low emission energy future**

Australia’s population is expected to swell from 21 million to around 35 million by 2056 and demand for energy is surging with it. With this, as well as our past reliance on cheap energy sources, how can Australia achieve a target reduction of greenhouse gas emissions by the year 2020? Four strategies to achieve a low emission cost-effective energy future include developing alternative fuels, using renewable energy sources, improving energy efficiency in Australian households and businesses, and placing a price on carbon through an emissions trading scheme.



The Australian Science Festival is back in 2010 celebrating the variety of life. It will be in Canberra from 2–15 August, linking its exciting program into the International year of Biodiversity. There will be over 50 Science events to learn about sustainability, climate change and the environment – details can be found at: <http://sciencefestival.com.au>

The schools’ programs (2–6, 9–13 August) will provide opportunities for your students to become captivated with the world of Science.

## EARTH SCIENCE WEEK

10–16 October 2010 • Theme: “Exploring Energy”

Earth Science Week aims to raise awareness of earth science and its significance and impact to every day life, education and society. It will encourage people everywhere to explore the natural world and learn about the geosciences.

*Exploring Energy*, the theme of Earth Science Week 2010, will engage young people and the public in learning about Earth’s energy resources as well as to remind them that Earth science is all around us.

Geoscience Australia hosts Australia’s Earth Science Week and aligns activities such as the *Geologi 2010* Student Short Film competition with the international theme. For more information on events, go to: [www.ga.gov.au/education/events/index.jsp](http://www.ga.gov.au/education/events/index.jsp)

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 June 7, 11. Aug 9, 13, 16, 20.  
 Sept 10, 13. Oct 18, 22, 25, 29.  
 Nov 1, 5, 15, 19, 22, 26, 29.  
 Dec 3, 10, 13.

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**ENQUIRIES/BOOKINGS**

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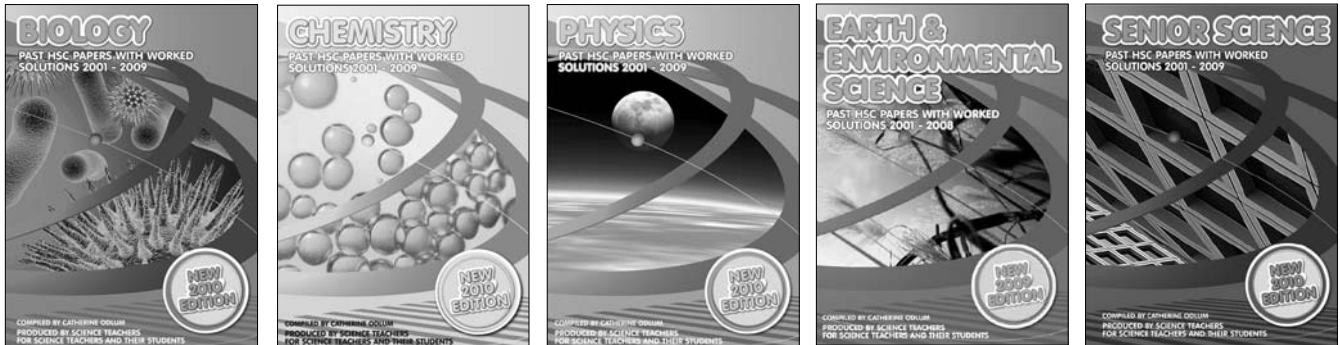
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## What's coming up in the night skies?

... Robert Garner

With winter's approach, the nights are longer and the skies are clearer with less cloud and lower humidity. The conditions for viewing the night sky are good, as long as you rug up!

The winter solstice occurs at 9 pm on 21 June. At this time, the Sun is at its furthest position north at the Tropic of Cancer when it has a declination of +23.5°. It subsequently appears to move south towards the Tropic of Capricorn until 22 December's summer solstice. The Earth will be at aphelion, the position in its elliptical orbit when it is furthest from the Sun, on 6 July.

### The winter constellations

Prominent winter constellations are *Scorpius* (the 'scorpion') and *Sagittarius* (the 'archer', also known as 'The Teapot') in the eastern night sky. *Antares*, one of the largest stars we know, is the 'heart of the scorpion'. It is a red giant star and is quite red to the naked eye. If you look further down the body of the scorpion, the tail is a reversed 'question mark'. In several Polynesian cultures, this group of stars is seen as a fish hook and is often represented in items of Polynesian jewellery.

Higher in the sky and towards the north is the constellation Virgo, in which you find the bright star *Spica*.

### The Planets

*Mercury* becomes visible in the morning pre-dawn sky in mid-May in the NE sky and will be seen until mid-June. It will be lost in the twilight as it approaches conjunction on 28 June. Mercury will reappear in the evening twilight early in July. The best opportunity for evening viewing of Mercury this year is from mid-July until mid-August in the NW sky.

In May, *Venus* is in the western evening sky, *Mars* and *Saturn* are in the northern skies. Through winter they all move into the NW evening sky and will appear closer together as mid-winter approaches. All three will be only a few degrees apart in July and August.

*Venus* shows phases like the Moon. The phases of Venus were first described by the astronomer, Galileo, around 400 years ago. Binoculars will show that Venus, which was 'full' around New Year, is approaching 'last quarter' in July/August. Venus' phases were used as proof that Venus was orbiting around the Sun and not the Earth.

In May, *Jupiter* is high in the NE sky one hour before sunrise. In June and July, it will rise in the E sky around 12.30 pm, but it rises earlier from around 9.30 pm as the months progress, so it will become easier to view. On 30–31 July it will be near the Moon.

Throughout May–July, the planet *Uranus* is close to Jupiter in the sky. With a magnitude of 5.9, Uranus can be just seen with the naked eye from areas with very dark skies. It is easily seen with binoculars. Point your binoculars at Jupiter and what appears to be a bright 'star' in your field of view will be *Uranus*. The much fainter 'stars' near Jupiter will be Jupiter's Galilean moons.

### Moon

A partial eclipse of the Moon at full moon occurs on 26 June from 8.16–11.00 pm. At mid-eclipse at 9.38 pm, 54% of the Moon's disc will be in the Earth's umbral shadow.

### Meteors

The peaks of most meteor showers over winter this year occur around full moon when there is too much light to allow them to be easily observed. The Perseids, that appear 16 July to 26 August, peak around 13 August when viewing conditions should be good enough to pick up many meteors against dark skies. □

### Some Aboriginal perspectives

#### Venus ... the Morning Star and Evening Star

Venus is important in many aboriginal cultures. The morning star was an important sign to the Aborigines who arose at early dawn to begin their hunting. It, too, was personified and frequently associated with death.

One local legend in north-eastern Arnhem Land suggests a realisation that the morning star and the evening star are the same entity. Banumbirr, the morning star, lives on Bralgu, the Island of the Dead. She is so afraid of drowning that she can be persuaded to light her friends across the sea at night only if she is held on a long string by two old women who pull her back to shore at dawn and keep her during the day in a basket. Tied by the string, she can never rise high in the sky and is seen most clearly at dawn and dusk when she is close to home. Because of the connection with Bralgu, the morning star ceremony is an important part of the ritual for the dead. Banumbirr is represented by a totem stick to the top of which is bound a cluster of white feathers, denoting the star, with long strings ending in smaller bunches of feathers to suggest the rays. When a person dies, his/her spirit is conducted by the star to its last resting place on Bralgu.

In another story, the Yolngu people gather after sunset to await the rising of Venus, which they called Banumbirr. As she approaches from the east, in the early hours before dawn, she draws behind her a rope of light attached to the Earth. Along this rope, is a richly decorated 'Morning Star Pole', that the people use to communicate with their dead loved ones, showing that they still love and remember them. Two aspects of this ritual are evidence that these aboriginal people had developed astronomical knowledge. The rope binding shows they recognised that Venus was not able to move far from the Sun. More importantly, they were able to track the motion of Venus so that they could plan when to hold their Morning Star Ceremony. □

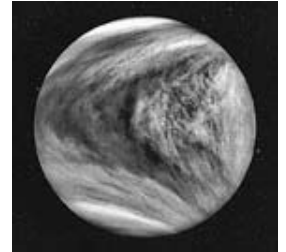


Figure 1: The planet Venus

#### References:

'Searching for the Astronomy of Aboriginal Australians' by Ray P Norris 2007 [www.atnf.csiro.au/research/AboriginalAstronomy/whatis.htm](http://www.atnf.csiro.au/research/AboriginalAstronomy/whatis.htm)  
<http://emudreaming.com/Examples/banumbirr.htm>  
 'Explorers of the Southern Sky' Haynes 1996  
 Photo credit: NASA ... a computer generated picture of Venus using Magellan radar data from 1990 orbit of Venus

### MACQUARIE UNI OBSERVATORY FRIDAY NIGHT OBSERVING

On clear nights, our 'starfinder' (planisphere) sessions demonstrate how to identify bright stars, constellations and planets. This is followed by observing with the telescopes (12" & 16" Meade telescopes). Even with the light pollution of the city, we can easily see double and multiple stars, open and globular star clusters, and the brighter nebulae. The Moon and planets, when in suitable positions, are easily viewed with any of our instruments. On dark, moonless nights with good seeing, we may also observe the brightest galaxies. In the event of cloud, our program includes a mixed al fresco presentation of slides, posters and scale models.

Located in the grounds of Macquarie Uni (access via Gymnasium Rd), the observatory is open to the public every Friday night, March–Nov inclusive, 7:30–9 pm, subject to bookings or rain. You can phone 0427 433 388 if the weather is doubtful.

## Taking a photomicrograph .... in 1904

In these days of modern microscopes with flat field objectives, quartz halogen illumination, electronic exposure determination and sensitive film emulsions, it is interesting to consider how the microscopist a hundred years ago strived to take a good photomicrograph. Despite the difficulties, the early workers often achieved quite remarkable results.

As Dave Walker comments in *Microscopy UK*: 'Perhaps there are parallels with the photographers of that era. The quality of many of the early landscape and portrait photographs both technically and artistically are still very much admired today. Like the photographers, the photomicrographers of that era knew how to get the most out of the equipment and materials at their disposal.' He discusses the book 'Nature Through Microscope and Camera' by Richard Kerr (published in 1905) with photomicrographs by Arthur E Smith that demonstrates this.

Figure 1 is a recent scan of a photomicrograph from the 105 year old book (Fig 3 in the book). It is almost as good as if it were taken using a modern microscope (some



FIGURE 1: *Heliopelta melti*, a diatom

distortion occurred in scanning). The book includes photomicrographs taken at a wide range of magnifications, including the detail of diatoms at 1750 X and 'macro' shots of beautifully laid out whole insects at 8X.

Figure 2 shows the equipment used to take the photomicrographs (Fig 8 in the book). You can just see the string the user is holding to adjust the focus on the microscope. The impressive bellows extension was required to project the image onto the large 12x10 inch photographic plates.

In another 100 years, what will writers think of our photomicrography techniques?

Adapted from an article by Dave Walker at: [www.microscopy-uk.org.uk/mag/art97b/oldphoto.html](http://www.microscopy-uk.org.uk/mag/art97b/oldphoto.html)

## Updates

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<http://news.discovery.com/>

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Items are in categories such as Space, Earth, Tech, Animals, Dinosaurs, Archaeology, History and Humans. Recommend this site to your students to broaden their general knowledge. For example, they can currently read about amber in 'Animals' and how a 95-million-year-old piece of amber found in Ethiopia offers amazing fossils for many familiar species, including spiders, ants, wasps, plants and more.

### • Hubble Site

<http://hubblesite.org/>

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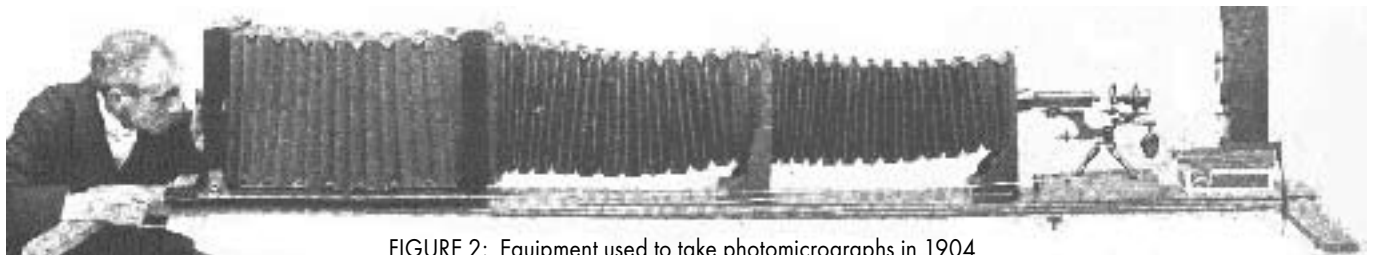


FIGURE 2: Equipment used to take photomicrographs in 1904

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- You can download free sky charts each month to explore the night sky from: <http://skymaps.com/downloads.html>
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<http://members.ozemail.com.au/~starrylady/Planis1.htm>

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