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SciTalk

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Number 4 – October 2008

What do you really remember?

Some interesting research is being conducted into what humans can actually remember. It would appear that our memories are not as accurate as most people believe. This raises questions with regard to the memories of eyewitnesses, especially if their evidence is to be used in a court of law. How accurate are their memories?

Many researchers are now challenging whether eyewitnesses recounting what they saw is the best way of accessing their memory. It has been suggested that brain scans might help verify memories.

If someone was killed in front of you, would you remember exactly what happened?

Think of a journey you made yesterday. I'm sure you remember it. But can you remember whom you sat next to? Can you remember what the weather was like? Who was in front of you in the petrol queue? Was it a man or a woman? Naturally, most of the time we do not remember all these details. But what if a person was killed in front of you? As a witness to this crime, your ability to recall minor details about it may play a significant role in authenticating your memory of the offence.

Some researchers suggest that we shouldn't need to remember these details. They are increasingly questioning the way that the police, lawyers and the courts think about memory. They argue that this conventional model of memory – like a detailed photograph or video film – is fundamentally flawed. One of the most prominent of these researchers, Professor Elizabeth Loftus of the University of California at Irvine, has suggested that courts should really have a new oath for witnesses: "Do you swear to tell the truth, the whole truth, or whatever it is you think you remember?"

Researchers such as Professor Martin Conway, a cognitive psychologist at Leeds University, are calling for a major rethink of memory and the law, and has suggested

… continued on page 5

Start planning now to celebrate National Science Week 15–23 August 2009

INSIDE SCITALK ▸▸▸▸

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See pages 1, 5 & 12

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This book provides comprehensive coverage of all Stage 5 Science Syllabus Dot Points using questions and answers. It is the ideal revision guide for Years 9 and 10 Science. It covers all the Prescribed Focus Areas, plus the Knowledge and Understanding and Skills sections in the Syllabus. Students can complete this book after each topic during Years 9 and 10, or for revision during Year 10.

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★ ★ ★

Winner for *SciTalk 3/08*

Congratulations to Lynette Trent, Bethany College, who won *Dot Point HSC Chemistry Investigations* ($44.95) published by Science Press.

Diary Dates 2008-09

planetearth Earth Sciences for Society 2007 – 2009

International Year of Planet Earth 2007–2009
(Also: *International Polar Year, International Year of the Reef, International Heliophysical Year, & International Year of Sanitation)*

OCTOBER 2008
17, 20, 24, 27 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2008
10, 14, 21, Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
24, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2008
5, 12 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
21 Summer Solstice

2009 – International Year of Astronomy
For: Shell Questacon Science Circus 2009 program: www.questacon.edu.au/html/on_the_road.html

JANUARY 2009 National Youth Science Forum. Enquiries: (02) 6125 2777, www.nysf.edu.au/

FEBRUARY 2009
27 Schools' Clean Up Australia Day. Ph: 1800 282 329. Details. www.cleanup.com.au

MARCH 2009
2–8 Seaweek 2009: www.mesa.edu.au Some resources will also be at: www.ausmepa.org.au
13, 16, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
20 Autumn Equinox. Also: International Earth Day. www.earthsite.org/
[Note: 20 March is the original day, but it is celebrated on 22 April in some places: www.earthday.net/]

MAY 2009
6–8 Science at the Shine Dome, Australian Academy of Science: Details on teacher awards to attend, soon at: www.science.org.au
tba Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au
27–31 Australian Science Festival, ACT. School Activities: 27–29/5. www.sciencefestival.com.au
8, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

JUNE 2009
1, 5 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
tba Closing date Crystal Growing Comp. www.chem.unsw.edu.au/RACI/ Ph: (02) 9663 4960
tba NSW Schools Titration Competition. www.nswtitration.com/

JULY 2009
4–7 CONASTA 58: *Science Education – a Bridge to the Future*. Ph (07) 3861 5444. Fax (07) 3861 5701. Launceston, TAS. www.cdesign.com.au/conasta58/
25–1 Aug National Chemistry Week. www.raci.org.au/national/events/chemistryweek.html
30 National Chemistry Quiz. www.raci.org.au/national/events/nationalchemistryquiz.html
12–25 35th International Science School: Held by The Science Foundation for Physics. See pp3

AUGUST 2009
7 Jeans for Genes Day. www.jeansforgenes.org.au/
15–23 National Science Week. *Astronomy: Science Without Limits.* www.asta.edu.au/nscwk
14, 17, 21 Science Week events: Physics is Fun at Luna Park. www.odlumgarner.com
19 Physics Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: 27 June. 6125 9645
26 Biology Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: 27 June. 6125 9645

SEPTEMBER 2009
2 Chemistry Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: 27 June. 61259645
18, 21 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
22 Spring equinox

OCTOBER 2009
11–17 Earth Science Week. www.ga.gov.au/education/events, 6249 9859 (www.earthsciweek.org)
23, 26, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2009
tba Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au
2, 16, 20 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
23, 27, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2009
4, 11 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

JANUARY 2010 National Youth Science Forum. Forms to local Rotary club by 15/5/09, interviews in July. Only for Yr 11 in 2008. Enquiries: 6125 2777, fax 6125 8015, email: nsss@anu.au, www.nysf.edu.au/

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, Official Notices, Board Bulletins, the statistics archive & more.

HSC Advice Line
The HSC Advice Line will operate this year for students from 11 Oct–6 Nov, on 13 11 12.

Proposals about some aspects of HSC exam specifications and assessment tasks
Comments to be submitted by 28 October 2008. Details are at: www.boardofstudies.nsw.edu.au/syllabus_hsc/exam-proposals/
If adopted, the proposed changes would apply no earlier than the Year 12 of 2010.

2008 HSC and SC timetables & 2008 Approved Scientific Calculators
These are on the BOS website. The HSC exam period is from 16 October–13 November, while the School Certificate test period is 10–14 November 2008.

Official Notices go online
Official Notices will be effective from the date they are on the BOS website. They will still appear in print form for at least 2008, but will be on the website prior to the Board Bulletin reaching schools.

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

NOTE: Your purchase of the Odlum & Garner Past HSC Biology, Chemistry and Physics books helps to support the production of Past HSC books for Earth & Environmental Science and Senior Science. Thank you to all the teachers who support these projects.

OUT AND ABOUT

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2008 & 2009 EXCURSION OPTIONS

The Museum of Human Disease is a pathology museum at UNSW offering interactive programs with amazing insights into the nature and progression of disease in its many forms. We offer 2 hour curriculum-based programs in the following areas:

HSC Biology – *The Search for Better Health*

HSC Senior Science – *Bionics*

Junior Science – *Infectious & Non-infectious diseases, microorganisms*

Further information and bookings:

T 02 9385 1522
E diseasemuseum@unsw.edu.au
W www.diseasemuseum.unsw.edu.au

MUSEUM OF HUMAN DISEASE

UNSW THE UNIVERSITY OF NEW SOUTH WALES

SHIPWRECKS, CORROSION & CONSERVATION

STAGE 6 CHEMISTRY

This program relates to the *Shipwrecks, Corrosion and Conservation* option. Students attend an AV presentation on conservation and restoration, including footage taken during the recovery of material from HMAS *Bounty*. Students then participate in a hands-on workshop focusing on desalination of metal objects, metal and corrosion product identification, methods of protecting metals and rates of corrosion.

This is followed by a guided tour of shipwreck material in the museum. Students may also visit the destroyer HMAS *Vampire* and submarine HMAS *Onslow*.

The program is 4 hours, at a cost of $20.00 per student (teachers free).

Bookings & Information:

Phone: 9298 3655 Fax: 9298 3660
Email: bookings@anmm.gov.au
Location: 2 Murray Street, Darling Harbour

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For more information and education resources go to:

- www.sydneyaquarium.com.au … and go to *Aqua School*
- www.sydneywildlifeworld.com.au/ … and go to *For Teachers*

Email: education@sydneyattractions.com.au
Ph: (02) 8251 7811 Fax: (02) 9262 2385
Location: Aquarium Pier, Darling Harbour, Sydney

SYDNEY AQUARIUM

Sydney WildlifeWorld

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31 Wheat Rd, Darling Harbour, Sydney 2000

IMAX THEATRE

BOOKINGS FOR 2009 AVAILABLE NOW

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Legends of the Sky 3D … starts Term 2, 2009

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For School Bookings:

Ph: (02) 9213 1600 Fax: (02) 9281 3833
Email: education@imax.com.au
Visit our website to check session times for schools:
www.imax.com.au/schooltimetables

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For further information visit www.landsedge.com.au, email michele@landsedge.com.au or phone (02) 9969 0038.

Science on the Web

- **A great website when teaching**

Dot Point 4 for Preliminary Topic 8.5: 'The Cosmic Engine'
www.spacew.com/
Contains news and photos: from sunrises to sunsets, solar flares, sunspots, coronal mass ejections, auroras, plus up-to-date solar cycle and space weather events. The 'Astroalert' section of this site (*www.spacew.com/astroalert.html*) has information, video clips and photos concerning the Sun and its activity, and its effects on the Earth. A great and SAFE way to 'see' what happens on the Sun.

- **Natural resources materials**

www.mii.org
This site contains materials that are free to download from the Mineral Information Institute (USA) to help stimulate student interest in, and understanding about all types of natural resources if you go to the 'For Teachers' section. They will help you teach your students about the importance of our natural resources and looking after them. It is helpful when doing Stage 4 Science, Dot Point 4.11.

Continued from page 1 …

some guidelines that will help scientists who specialise in memory research when they testify as expert witnesses to help the courts assess the evidence.

Memories are essentially a construct from a variety of sources and experiences, Professor Conway says. They are not necessarily a factual account of what happened. What's more, a significant proportion of people seem to be highly suggestible and will quite readily change what they remember if given appropriate cues.

In one well-known study, Dutch researchers questioned people about a 1992 accident in which a cargo plane had crashed into a block of flats near Schiphol Airport. Ten months later, they conducted a survey asking if people remembered seeing the TV film of the plane hitting the building. More than half of the respondents said they had.

A later study found that the proportion had gone up to two-thirds. The problem is, there is no TV film of the accident. Asking the question had itself apparently changed people's memories. Thus it would appear that witnesses can consciously or subconsciously have their memories altered.

There is little data available regarding the extent of suggestive questioning of eyewitnesses. One British study using actual interviews indicates that approximately one out of every six questions posed to eyewitnesses was in some way suggestive. The police say they are already aware of the risks and do their utmost to avoid them. □

Taken from:
http://news.bbc.co.uk/2/hi/uk_news/magazine/7457653.stm (17/6/08)
… by Rebecca Fordham

Science on the Web … continued

- **A great website for the Earth Sciences**

www.mnh.si.edu/earth/main_frames.html
The Rocks Gallery at the Smithsonian National Museum of Natural History website provides a variety of materials that will help you and your students – on gems and minerals, rocks and mining, plate tectonics and volcanoes, and the solar system.

- **Topics on NOVA: Science in the News**

www.science.org.au/nova
Maintained and updated regularly by the Australian Academy of Science, this site provides reliable and up-to-date information on many topical issues in Science. It is great for research, assignments as well as for encouraging an interest in Science.

NEW NOVA TOPICS include:

* *The quest to make hydrogen the fuel of the future*
Australia and many other countries around the world are preparing for hydrogen to take over from fossil fuels such as oil and natural gas, and move to what's being called the 'hydrogen economy'. But there are some big hurdles to overcome before it can happen.

* *Stormwater – helping to tackle Australia's water crisis*
With reduced water supplies and a growing population, should Australians be letting stormwater go down the drain?

* *Bushfires spark extensive search for answers*
They can start with a momentary flicker, they can burn for months, and their effects can scar landscapes and lives for years.

- **Asteroid encounters that almost happened**

www.discoverychannel.ca (go to 'Topics', then 'Space' to find this)
If your corner of the Earth were about to be hit by a relatively large asteroid - say the size of a large city - you wouldn't know it until a second before impact. At that point, you and everything around you would crinkle and vaporise, like plastic wrap in a fire. This article on asteroids describes what asteroids can and have done to Earth.

- **Squeeze a little lime into seawater to cut carbon: scientists**

www.discoverychannel.ca
Scientists have found a feasible way to reverse levels of CO_2 in the atmosphere - potentially even turning back the environmental clock to pre-industrial times: Just add lime, they say.

- **Plant-based fuel could replace fossil fuels in your car: study**

www.discoverychannel.ca (go to 'Topics', then 'Science' to find this)
In a bold claim that farm and forest waste products could be efficiently processed into fuels on a scale that would render fossil fuels unnecessary, Chemical Engineering Professor Rakesh Agrawal says a 'hydrogen-carbon based economy' is possible. □

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* * * * *

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(for 2 adults & 2 children worth $68) … send in your name, school, & school address on an envelope by **19 December 2008** to:
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WINNER: Renée Marshall, Snowy Mountains Grammar won the Sydney Aquarium family pass for *SciTalk No. 3–2008.*

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* This pass will be valid for any one film for any session, except public holidays and films advertised as 'no free list'.

WINNER: Boaz Magal, Willoughby Girls High won the IMAX Sydney family pass for *SciTalk No. 3–2008.*

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* * * * *

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WINNER: S Pankhurst, GRC Penshurst Girls Campus won a Sydney Wildlife World family pass for *SciTalk No. 3–2008.*

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Please note: Our excursion notes are only for use when on an excursion day booked through Physics is Fun. It is an offence under Copyright Laws to use them on any other occasion without written permission from Physics is Fun.

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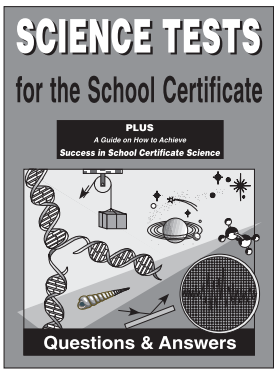

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Photo Spot Sodium chloride crystals

Sodium chloride, also known as common salt or table salt (or just 'salt'), has the chemical formula NaCl. The sodium chloride mined from solid layers in the ground is called 'rock salt'. When produced along with other, usually powdery, salt-like compounds by evaporation from seawater, it is called 'sea salt' or 'solar salt'. 'Brine' is the term for salty water from which salt can be produced. Geologically, salt is also known by its mineral name 'halite'.

Pure halite is typically colourless to yellow, though it is often coloured by impurities. It is soft and breaks (cleaves) into cubes. Halite forms isometric (cubic) crystals, as seen in Figure 1. The halite structure (see Figure 2) is held together with ionic bonds and electrostatic forces. Its most noticeable and important physical feature is that halite is readily soluble in water.

Sodium chloride (halite) is the salt most responsible for the salinity of the ocean. Chloride and sodium ions, the two major components of it, are necessary for the survival of humans and other animals as they are part of their extracellular fluid. Sodium chloride is involved in regulating the water content (fluid balance) of the body. Although sodium chloride is essential for animal life, it is toxic to most land plants.

Sodium chloride is consumed by humans and other animals as part of their diet, and has been used for millennia as a food seasoning and for food preservation, especially meats. When used for human consumption, sodium chloride is produced in different forms: unrefined salt (such as sea salt), refined salt (table salt), and iodised salt. Even in earliest times, humans valued salt licks, springs, and marshes, and would go to great effort to visit them and carry salt away. Salt cravings may be caused by trace mineral deficiencies as well as by a deficiency of sodium chloride itself. Conversely, over-consumption of salt increases the risk of health problems, including high blood pressure.

Other uses of sodium chloride include: to prepare sodium hydroxide, soda ash, caustic soda, hydrochloric acid, chlorine, metallic sodium, it is used in ceramic glazes, metallurgy, curing of hides, mineral waters, soap manufacture, home water softeners, de-icing roadways, photography, herbicide, fire extinguishing, nuclear reactors, mouthwash, medicine (heat exhaustion), and in scientific equipment for optical parts. Single crystals are used for spectroscopy, ultraviolet and infrared transmission.

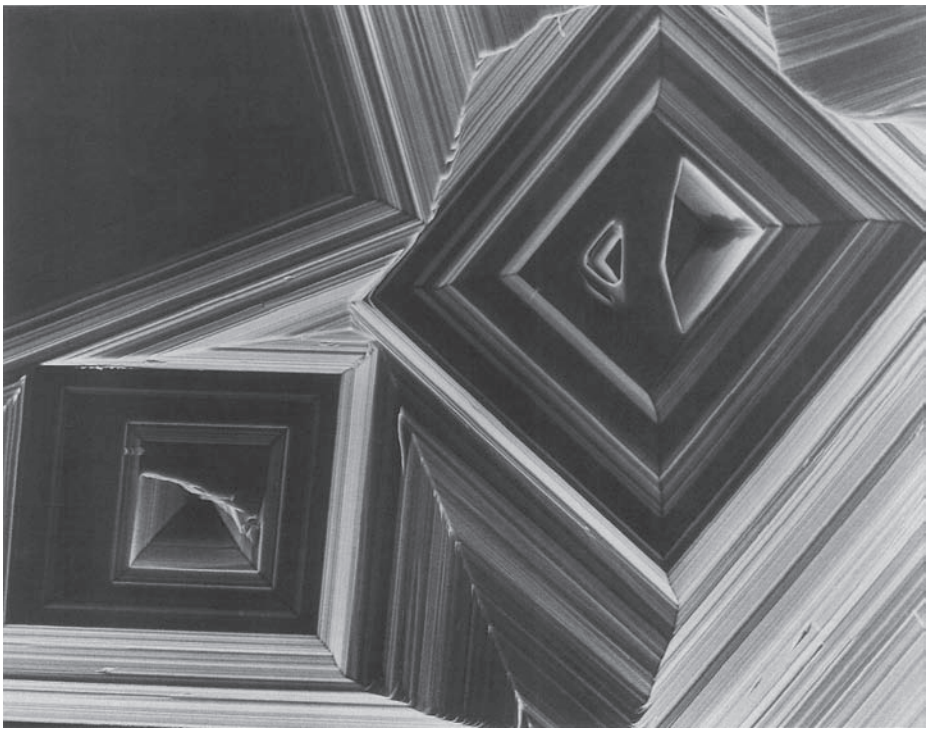

FIGURE 1: 'NaCl crystals'. This photomicrograph was taken using a scanning electron microscope. It was taken by Deborah Skelly, Queensland University of Technology.

Sources of sodium chloride

Sodium chloride occurs dissolved in seawater, along with other salts of sodium, calcium, magnesium, and other light metals. When seawater evaporates in a closed lake, playa, or lagoon, sodium chloride and other minerals precipitate out and sink to the bottom as crystals. In this way, vast beds of sedimentary evaporite minerals containing sodium chloride have been formed and may be up to hundreds of metres thick and underlie broad areas. When sediments containing rock salt are folded and uplifted, the beds of rock salt are exposed, and in time they dissolve away, forming brines which either percolate into the ground or the ocean, or collect in salt lakes.

Much salt is produced by controlled evaporation of seawater or of brines in salt lakes. In this technique, the water is pumped or drained into shallow ponds. Solar evaporation will eventually (in an arid climate) concentrate the salt to the point where it crystallises on the floor of the pond.

Salt is also produced by mining rock salt, using heavy equipment underground, or by pumping hot water in pipes into the salt deposit, where the hot water dissolves the halite. The resulting salt water is then pumped to surface and evaporated to yield salt. This is called 'solution mining'. In some modern dry salt lakes, a crust of halite can be recovered by simply scraping the salt crust off the lake bottom with bulldozers or scrapers.

Salt is produced in most of the countries on Earth. After the United States, the largest producers of salt are China, Germany, India, and Canada. In most other countries having a seacoast, salt for local use is produced by evaporation of seawater. □

An interesting fact

In Roman society, sodium chloride salt was used as currency, and soldiers were paid in salt. The Latin word sal is the root for the English word salary. Based on this, we have the familiar phrase that a person is 'worth their salt', meaning worth the wages they receive.

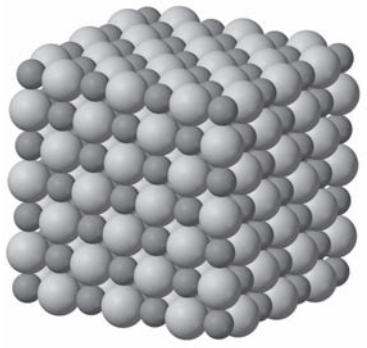

FIGURE 2. Model of halite (NaCl) structure

In this model, the chloride ions are larger and lighter in colour, than the sodium ions,. The gaps between them are octahedral in shape. Each ion is surrounded by six ions of the other kind. This same basic structure is found in many other minerals, and is known as the halite structure. This arrangement is known as cubic close packed.

Astronomy

Auroras make spectacular viewing

... Don Whiteman

Aurora, the Latin word for 'dawn', was the name given to the Roman goddess of the dawn, who renewed herself every morning and flew across the sky, announcing the arrival of the Sun.

Auroras (or aurorae, sing: aurora) occur as either the Aurora Borealis (*Boreas* being Greek for wind) in the Northern Hemisphere or the Aurora Australis in the Southern Hemisphere. These auroras are also known as the Northern Lights and Southern Lights respectively. These phenomena typically occur in Earth's ionosphere (uppermost part of the atmosphere) and occur mostly during higher levels of solar activity.

Why do auroras occur?

The solar wind is a stream of charged particles—a plasma—ejected from the upper atmosphere of the Sun. It consists mostly of electrons and protons. As the solar wind approaches Earth, which has a well-developed magnetic region (the magnetosphere) around it, most charged particles are deflected and travel around the planet rather than bombarding the atmosphere or surface. However, some collide with atoms and molecules of Earth's ionosphere, at about 80 km above the Earth, and electronically excite them. As these particles return to their ground state, they lose their excitation energy by the emission of light of distinct wavelength and thus a distinct colour.

The unique colours of light produced by a gas are called its 'spectrum'. The colours in an aurora are determined by the spectra of gases in the Earth's atmosphere, and the height at which the most collisions take place. Incoming particles tend to collide with different gases at different heights. Different gases react differently and produce different colours.

Very high in the ionosphere (above 300 km), oxygen is the most common atom, and collisions there can create a red aurora. The strong yellow-to-green light that is most common is produced by collisions with oxygen at lower altitudes, between 100 and 300 km. The blue colours are caused by ionised nitrogen, whereas molecular nitrogen will produce reds and purples with rippled edges. Lighter gases high in the ionosphere, like hydrogen and helium, make colours like blue and purple, but our eyes cannot always see them in the night sky. The level of solar wind activity from the Sun can also influence the colours in an aurora.

Figure 1. An aurora taken using a 30 second time exposure at Burrumbuttock, NSW (50 km NW of Albury) in October 2003. The aurora was right overhead, with yellows and greens nearer the horizon, and red lights above these colours.

Photograph by amateur astronomer, Mick Laws

What do auroras look like?

Most people liken an aurora to a diffuse glow, or as a 'curtain' with many folds or parallel rays (called striations) blowing in a light breeze. During an aurora, the sky glows in beautiful vibrant colours, with the chances of visibility increasing with proximity to the Earth's magnetic poles where the aurora may be high overhead.

Occurrence of auroras

Auroras are a common occurrence in the Arctic and Antarctic. They are occasionally seen in more temperate latitudes, when a strong magnetic storm occurs and temporarily expands the auroral oval (the area around each geomagnetic pole where aurora are most likely to occur). Large magnetic storms occur more frequently during the months around the equinoxes in spring and autumn, and are more common during the 3–4 years around a solar maximum, i.e. the peak in activity in the Sun's 11-year cycle.

At a solar maximum, the Sun has many sunspots, solar flares and associated coronal mass ejections (CMEs) of a plasma from the Sun's corona. This results in more solar wind and much greater magnetic storm activity. Thus a greater number of auroras occur, making it is a good time for sky watchers. However, it creates problems for astronauts due to radiation storms and can cause disruptions to power and satellite communications, as well as malfunctions in the GPS system. At a solar minimum, there are fewer sunspots and solar flares subside. Sometimes, days or weeks go by without a spot. This results in fewer auroras to observe.

Observing auroras

At present, the Sun is heading towards a solar maximum (expected in 2012), so we should soon see an increase in auroral activity due to an increase in the solar wind. Although aurora can be seen most nights at the poles, Tasmania, King Island and Southern Victoria are good places in Australia to see aurora. The likelihood of seeing one near Sydney is slim, however this has happened on several occasions in the past.

During the period of October to November in 2003 (in Solar Cycle 23) there was a period of intense solar activity (two 'Jupiter-sized" sunspots on the Sun's surface and CMEs), somewhat unexpected as the Sun was winding down from the solar maximum in 2001. This solar activity resulted in powerful solar winds bombarding Earth.

Dr Thompson, of the Australian Space Weather Agency, reported that many satellite communications were affected and the crew on the International Space Station had to protect themselves from the heightened radiation levels by moving to the aft end of the service module. A large number of aurora were seen as far north as Albury, Wollongong and even Coonabarabran.

The aurora images in Figures 1 and 2 were taken from a farm in Burrumbuttock NSW (50 km NW of Albury) in October 2003 by amateur astronomer Mick Laws.

If you go to *www.spacew.com/astroalert.html* you can see video sequences of the October and November 2003 solar flares that led to the auroras at this time, such as the one shown in Figures 1 and 2. □

Note about Sky Charts & Planispheres

- You can download free sky charts each month to explore the night sky from: *http://skymaps.com/downloads.html*
  OR www.sydneyobservatory.com.au
- Better still, there is a planisphere to print and use at:
  http://members.ozemail.com.au/~starrylady/Planis1.htm

Figure 2. A closer view of the same aurora as in Fig 1. Note the small star trails produced by a 75 second time exposure. If you look closely at the photo, just above the aurora, to the left of centre, and below the power line are the Small and Large Magellanic Clouds (the SMC being slightly higher and to the right of the LMC).

Photograph by amateur astronomer, Mick Laws

What you can observe in the night skies

As Spring heads to Summer, the professional astronomer complains that there are only about 6 hours of viewing time (10 pm–4 am) and more turbulence in the air due to the warmer atmosphere, as well as more dust and often smoke from bushfires to interfere with observations. However, the amateur astronomer is usually pleased to be able to view the night sky without dressing like an Antarctic explorer.

Planets

On 31 October, the Moon will be just below the bright star Antares prior to being next to **Venus** on 1 November. During November, Venus will rise higher each night in the western sky, passing the 'Teapot' in Sagittarius and by end of November it will be only 2° from Jupiter. On 1 December the 3-day-old Moon will make a spectacular triangle with both planets just above it. Venus will appear progressively higher in the sky than **Jupiter** during December. On New Year's Eve, **Venus** will be found directly above the crescent Moon.

The time to look for **Saturn** will be just before the onset of dawn on 22 November – just below the 24-day-old waning Moon. By around 19–20 December it will be seen near the Moon in the early morning eastern sky, a few hours after having risen at about 1 am.

Constellations

In November, *Scorpius* and *Sagittarius* are moving into the western twilight soon to disappear from view. *Taurus* and *Orion* will soon be prominent overhead at night. If you have been following the motion of *Crux*, the Southern Cross, you will find that from lying on its side during Spring, it is now turning to be upside down with the two pointers to the west and the bright star, Canopus to the east. The colourful collection of stars, known as the Jewel Box, appear just above β-Crucis on the western side of *Crux* and the dark Coal Sack will be just above it. Directly above the long arm of *Crux*, you should be able to see a small fuzzy patch of light. This is the Small Magellanic Cloud. If you follow a line through α and β-Crucis towards the north-east, a similar but bigger patch of light should be seen. This is the Large Magellanic Cloud. The two are about 200 000 light years away and are both satellite galaxies of the Milky Way.

Meteors

The *Southern Taurids* are active 1–24 November, with a peak on 5 November. This peak should make good viewing as the Moon is near first quarter, so the sky will be moon free after midnight. The *Leonids* are active 10–23 November, peaking on 18 November but, with the Moon at last quarter on 20 November, viewing conditions are less favourable. These meteors often have long trains, so it is still worth looking.

Summer Solstice

Summer Solstice, when the hours of daylight are at their longest, occurs at 11 pm on 21 December. The Sun reaches its maximum declination of 23.5°S over the Tropic of Capricorn at the time. Only places between the Tropics can ever have the Sun directly overhead.

Some trivia

Christmas Day this year marks the 250th anniversary of Johann Palitzsch's discovery of Halley's Comet on its first predicted return in 1758, as anticipated by Edmond Halley who determined the periodicity of Halley's comet in 1705. □

International Year of Astronomy in 2009

In 2009 it will be 400 years since Galileo Galilei turned a telescope to the night sky. The International Year of Astronomy (IYA2009) will mark this event by celebrating astronomy and its contributions to society and culture.

With the theme of *The Universe, Yours to Discover*, IYA hopes to reconnect people with the night sky so that they gain a deeper insight into astronomy's role in enriching all human cultures, and learn more about the latest astronomy discoveries and essential role of astronomy in science education.

IYA2009 is an initiative of the International Astronomical Union and UNESCO. IYA2009 activities will take place locally, regionally and nationally.

* * * * *

For more information go to:
www.astronomy2009.org.au/
or contact:
Helen Sim, CSIRO Australia Telescope National Facility,
ph (02) 9372 4251,
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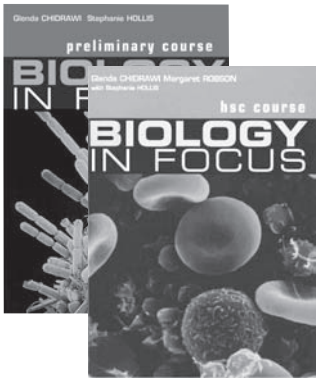

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CONTRIBUTIONS

SciTalk is due into schools mid-term. All contributions for *SciTalk* should be directed to the Editor (see below).

CLOSING DATES

- *SciTalk* No. 1–February 2009 … Jan 30
- *SciTalk* No. 2–May 2009 … April 28
- *SciTalk* No. 3–August 2009 … July 27
- *SciTalk* No. 4–October 2009 … Oct 2

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