Providing support and promoting excellence in science education

SciTalk

ISSN 1323-7667

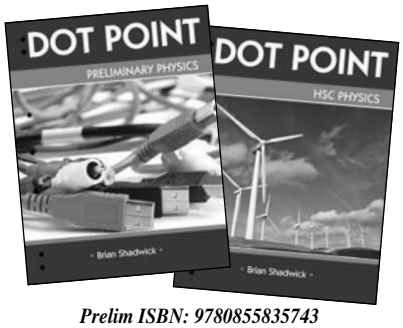
Number 1 – February 2007

Book Giveaway

You could WIN these books ...

• DOT POINT HSC PHYSICS
• DOT POINT PRELIMINARY PHYSICS

by Brian Shadwick



Prelim ISBN: 9780855835743
HSC ISBN: 9780855835750

WIN

RRP: $36.95 ea
Published by Science Press

These great books cover every dot point from the Stage 6 Physics Syllabus. Each dot point has questions and answers that students should be able to do if they wish to achieve well in their Preliminary Physics exams and in the HSC Physics exam.

TO WIN: Send in your name, school and school address, on the back of an envelope **by 10 April 2007 to** Book Giveaway, PO Box 442, Harbord 2096

★ ★ ★

Winner for *SciTalk 4/06*

Congratulations to Sara Cork, Dorrigo High, who won *Chemistry Contexts 1 & 2 with student CD* ($60 ea) published by Pearson Education.

★★ ATTENTION ★★

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

☐ 1. .....
☐ 2. .....
☐ 3. .....
☐ 4. .....
☐ 5. .....

Please return to file or noticeboard.

PRIZES TO WIN!

See pages 1, 4 & 12
Send in your entries now
(ALL IN THE ONE ENVELOPE if you prefer!)

This *SciTalk* & past issues are available at http://homepage.mac.com/robertgarner

National Science Week & 2007–2008 International Polar Year

The International Polar Year (IPY) begins in March 2007. This scientific program will focus on the Arctic and Antarctic and their global impacts and will actually span two years, extending to March 2009 to ensure that both poles are sampled over consecutive summers.

To help schools celebrate IPY in 2007, the Australian Science Teachers' Association (ASTA) has announced that the schools' theme for National Science Week 2007 will be "Antarctic Science". ASTA's Resource Book on Antarctic Science will be sent to schools around May (*www.asta.edu.au/*). National Science Week aims to increase community awareness and understanding of the role of science, technology and innovation in everyday life and our future. So join in and be part of this international event.

The IPY in 2007–2008 will provide an opportunity to engage the next generation of young scientists and to get the public to realise that what happens at the poles does influence us.

The IPY 2007–2008 will involve over 200 projects, with thousands of scientists from around the world studying a wide range of physical, biological and social research topics related to the polar regions.

The IPY website (*http://www.ipy.org/*) has information on five focus areas: ice, atmosphere, land, oceans, people, space; and many activities for teachers to use in the Educators section, e.g. the project "Breaking The Ice" (PDF) – a hands-on, interactive way to introduce the IPY to your students. There is also a special Australian site (*www.ipyeducation.org.au/*) for educators, with a calendar of IPY-related events and polar science related activities.

The IPY comes at a time when scientists are warning us about global warming and its consequences. There is abundant evidence of changes in snow and

... continued on page 7

INSIDE SCITALK ▶▶▶▶

Diary Dates 2007

2007 – International Polar Year* AND *International Year of the Dolphin

FEBRUARY–MARCH 2007

Feb-March Shell Questacon Science Circus: NSW Riverina: Young, West Wyalong, Cowra, Narrandera, Griffith, Wagga Wagga, Albury. www.questacon.edu.au/html/on_the_road.html

MARCH 2007

3 Schools' Clean Up Australia Day. Ph: 1800 024 890. Details. www.cleanup.com.au

4–10 Seaweek 2007: Marine Bycatch Matters. http://www.mesa.edu.au/seaweek.asp some resources at www.ausmepa.org.au

16, 19 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

20 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/]

APRIL 2007

2 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

MAY 2007

2–4 Science at the Shine Dome. Australian Academy of Science. Applications for awards for teachers to attend this symposium in by: tba. Details soon at: www.science.org.au

10, 11 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

23 CMRI Science Teachers' Form at Westmead Sydney. Details on page 3.

JUNE 2007

1, 4, 8 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

15, 16 RACI NSW Schools Titration Comp. Details on page 5 & at: www.nswtitration.com

22 Closing date Crystal Growing Comp. www.chem.unsw.edu.au/raci/crystal_grow/index

JULY 2007

1–14 International Science School: Yr 11 & 12 students, Uni of Syd. Details on page 4.

8–12 CONASTA 56, ICASE 2007, & World Conference on Science & Tech Edn: *Sustainable, Responsible, Global*. (08)92662174. Fax (08)92010003. www.worldste2007.asn.au/

22–28 National Chemistry Week. www.raci.org.au/national/events/chemistryweek.html

26 National Chemistry Quiz. www.raci.org.au/national/events/nationalchemistryquiz.html

AUGUST 2007

3 Jeans for Genes Day – helps to fund scientists working at Children's Medical Research Institute to prevent & treat genetic diseases & chronic illness. (02) 9687 2800, www.jeans4genes.com.au/what.php

15–26 Australian Science Festival, ACT. School Activities will be at: www.sciencefestival.com.au

18–26 National Science Week – *Antarctic Science*. www.scienceweek.info.au/

17, 20, 23 Science Week events: Physics is Fun at Luna Park. http://homepage.mac.com/robertgarner

22 Physics Olympiad Nat'l Qualifying Exam. www.aso.edu.au/ Close date: 29 June. 61259645

29 Biology Olympiad Nat'l Qualifying Exam. www.aso.edu.au/ Close date: 29 June. 61259645

SEPTEMBER 2007

7 National Threatened Species Day. www.deh.gov.au/biodiversity/threatened/ts-day/index.html & www.deh.gov.au/biodiversity/threatened/information/

5 Chemistry Olympiad Nat'l Qualifying Exam. www.aso.edu.au Close date: 29 June. 61259645

13 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

OCTOBER 2007

7–13 Earth Science Week 2007. www.earthsciweek.org/ & www.ga.gov.au/about/event/

19, 22, 26, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2007

2, 8, 12, 16 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

23, 26, 29, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2007

6, 7 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

JANUARY 2008 National Youth Science Forum. Forms to local Rotary club by 15/5/07, interviews in July. Only for Yr 11 in 2007. 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.

March 4-10 Seaweek 07 "Marine Bycatch Matters"

Marine by-catch matters

Whether you live near the sea or a long way from it, it is important to learn to live in a sustainable way that will help to protect and preserve our terrestial and marine environments. It is everyone's responsibility to learn that marine by-catch does matter. The Marine Education Society of Australasia (MESA) has activities, competitions, resources and linked websites each year for Seaweek. 2007 things will soon be available (as well as past years) at: *www.mesa.edu.au/seaweek.asp* □

BOARD OF STUDIES

Update on BOS matters

Regularly check the BOS website to ensure you have the latest information. It contains syllabuses, past exam papers, Official Notices, Board Bulletins, a statistics archive & more.

HSC: All My Own Work … from 2008
From 2008, students entered for one or more HSC courses will be required to have satisfactorily completed this program. It will help them learn to follow the correct principles and practices for locating and using information as part of their HSC program. (see *Board Bulletin Vol 15 No 5 and No 6*).

Minor amendments to Stage 6 Syllabuses
Changes have occurred to the syllabuses for Chemistry, Biology Physics and Senior Science. These latest changes incorporate what to do about the changes in IUPAC names for Chemistry (see *BOS 51/06, 52/06, 52/06* and *54/06* and latest versions of each syllabus is now on the BOS website).

On BOS website:

- **HSC Marking Centre Notes & Guidelines: these will be available during Tm 1 2007**
- **Past HSC exams** and **SC Science Tests**
- **Amended Periodic Table** *(BOS 22/05)*

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.

OUT AND ABOUT

SYDNEY WILDLIFE WORLD

Darling Harbour, Sydney 2000

Sydney's newest excursion venue – NOW OPEN!

- ★ Home to the largest variety of Australian plants and animals under one roof, Sydney Wildlife World provides an amazing educational and entertaining experience.
- ★ With 9 different habitats, each representing a unique Australian environment or animal, students learn of the immense diversity of Australia's extensive flora and fauna, in one convenient location. Animals featured include butterflies, koalas, echidnas, reptiles, birds, many invertebrates and more.
- ★ NSW and ACT teachers are encouraged to preview Sydney Wildlife World for excursion purposes. Simply present teacher ID at the Admissions Desk for complimentary entry at any time.
- ★ Open 9 am–10 pm
- ★ Book your excursion NOW on 8251 7811, or visit *www.sydneywildlifeworld.com.au* to view the comprehensive range of curriculum-based educational kits.

SCIENCE CENTRE & PLANETARIUM

University of Wollongong
Squires Way, Fairymeadow
Only 45 mins from southern Sydney.

- ★ ***Taking bookings for 2007!***
- ★ **Star Trails Outreach Program 2007** – visiting schools with interactive Science Shows. Ask about our portable Planetarium.
- ★ We have an extensive range of ***shows & exhibits***, including:
  - **Stellar Evolution** – planetarium program for HSC Physics
  - **Superconductors & Liquid Nitrogen** – live science show
  - **Zap! Understanding Electricity**
  - **Energy and Motion**
  - **The Changing Earth**
  - **Dinosaurs, Fossils & Coal … NEW EXHIBITION!**
- ★ School entry includes two floors of hands-on exhibits, a science show, plus a ***planetarium / laser show***.
- ★ ***Also available***: environmental field trips, science shop, kiosk, science fun bags, membership programs.
- ★ ***Book now*** for an excursion. Information/bookings: (02) 4286 5000. Website: http://sciencecentre.uow.edu.au

MUSEUM OF HUMAN DISEASE

2007 SCHOOLS PROGRAM & TEACHERS DAY

The Museum of Human Disease is a pathology museum at The University of New South Wales offering interactive programs with amazing insights into the nature and progression of disease in its many forms. In 2007 we are offering 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*

The **2007 Professional Development Day** for teachers of HSC Biology will be held on **Friday 20 July**.

Further information and registration forms will be distributed to schools in early March.

Further information and bookings
T 02 9385 1522 **E** museum.hallofhealth@unsw.edu.au
W www.hallofhealth.med.unsw.edu.au

MUSEUM OF HUMAN DISEASE — UNSW THE UNIVERSITY OF NEW SOUTH WALES

CHILDREN'S MEDICAL RESEARCH INSTITUTE

Science Teachers' Forum

To be held at the
Children's Medical Research Institute
Westmead, Sydney
Wednesday 23 May 2007
9.45 am–4.30 pm

This one-day Science Teachers' Forum will focus on the science of genetics and disease, concentrating on topics relevant to the HSC Biology syllabus.

The forum will include an introduction to the use of **Gene Technology** in medical research, followed by captivating presentations from two prominent CMRI research scientists on **Genes in Development** and **Genetically Modified Mice to study Muscle and Muscle Diseases**. There will also be an informative session devoted to the topic of **Genetics and Ethical Issues** followed by interactive hands-on practical laboratory demonstrations of simple DNA-based techniques.

Places will be limited, so please book by **Wednesday 11 April 2007**.
Contact: Jane Fleming **02 9687 2800**
or email: jfleming@cmri.com.au
(an additional Forum will be held in November)

SCIENCE IN FOCUS AT IMAX

31 Wheat Rd, Darling Harbour, Sydney 2000

IMAX THEATRE

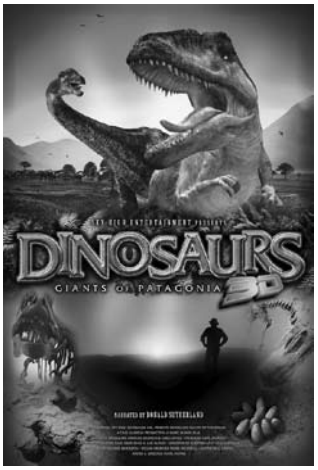
★ A BIG YEAR OF FILMS

Join us for the launch of the 2007 Education Program at IMAX on:
* Tuesday 13 March, 6–7.30 pm, or
* Sunday 25 March, 10–11.30 am
RVSP is essential: www.imax.com.au/schoolsrsvp

★ **New in 2007:**
- *Lions 3D* … starts February
- *Dinosaurs 3D* … starts March
- *Mummies: Secrets of the Pharaohs* … starts April
- *Sea Monsters 3D* … starts September
- *Wild Africa 3D* … starts November

★ *DINOSAURS 3D*

Follow alongside a world-renowned palaeontologist to visit sites of major dinosaur discoveries in Patagonia, including the largest animal that ever lived on Earth – the Argentinosaur, and its nemesis, the Gigantosaur, a carnivore that could easily challenge the famous T-Rex. Travel back in time to see these amazing beasts of our pre-historic past come to life and witness the catastrophe that could have led to their ultimate demise.



★ For bookings & enquiries

CALL IMAX Education
on (02) 9213 1600
OR Email: education@imax.com.au
OR Visit our new website: ***www.imax.com.au/schools***

The University of Sydney

ISS2007
EcoScience

34th Professor Harry Messel International Science School for year 11 & 12 Science students

1–14 July 2007 at The University of Sydney
Applications close Thursday 5 April 2007
Application forms will be available from mid-February 2007 at: www.scienceschool.usyd.edu.au

In July 2007, 140 students from across Australia and around the world will gather at the School of Physics, The University of Sydney for two weeks of cutting-edge science. *EcoScience* will include daily lectures with a central theme of ecology and environmental science. Many diverse areas of this inter-disciplinary field will be featured, with each topic examined in one or two lectures by internationally respected scientists.

Beyond the lecture theatres, ISS scholars participate in other activities — experiments, museums, lab tours, a harbour cruise — all designed to enthuse and excite their scientific curiosity.

All scholars are competitively selected at State level, and attendance is by scholarship only. The scholarships are valued at approximately $3 000 and cover return travel within Australia, board and accommodation at Women's College for the duration of the School, all events and activities organised by the Science Foundation for Physics and a copy of the official ISS book of lectures.

For more information contact: Dr Chris Stewart
ph (02) 9351 3622, fax (02) 9351 7726,
email c.stewart@physics.usyd.edu.au
or visit www.scienceschool.usyd.edu.au

WIN A FAMILY PASS TO SYDNEY WILDLIFE WORLD

Sydney Wildlife World at Darling Harbour is a great NEW science excursion venue, which opened last September. It displays Australian fauna and flora in 9 different habitats. With over 6000 animals, this will link well to the syllabus. Details: *www.sydneywildlifeworld.com.au*

* * * * *

TO WIN A FAMILY PASS TO SYDNEY WILDLIFE WORLD
(for 2 adults & 2 children worth $68)

Send in your name, school, & school address on an envelope by **10 April 2007** to: *Sydney Wildlife World Teacher Offer PO Box 442, Harbord NSW 2096.*

WINNER: Barbara Weir, Warrawong High, won a Sydney Wildlife World family pass for *SciTalk No. 4–2006.*

WIN A FAMILY PASS TO SYDNEY AQUARIUM

Sydney Aquarium at Darling Harbour is a great science excursion venue. It showcases Australian aquatic habitats, their fauna and flora, information on habitat characteristics, animal adaptations and conservation issues. Bookings are essential. Excursions are self-guided. Information: *www.sydneyaquarium.com.au*

* * * * *

TO WIN A FAMILY PASS TO SYDNEY AQUARIUM:
(for 2 adults & 2 children worth $66) … send in your name, school, & school address on an envelope by **10 April 2007** to:

Sydney Aquarium Teacher Offer, PO Box 442, Harbord NSW 2096

WINNER: Rosemary Ioannidis, St George Christian School, won the Sydney Aquarium family pass for *SciTalk No. 4–2006.*

Australian Museum Schools Programs 2007

Involve your students in exhibitions and stimulating curriculum-linked programs exploring nature and cultures.

For secondary schools:

★ **Sessions with a Museum Educator** – these include:
- Evolution trail combo (Yr 9–10)
- Aboriginal studies talks (Yr 7–12)
- Fossils (Yr 9–12)
- Human Story (Yr 11-12)
- Evolution of Australian Biota (Yr 11–12)
- Geoscience (Yr 11–12) and Investigations Days (Yr 7–10)
- Site Study for History students (Yr 7–10)

★ **K–12 self-guided activities** are also available.

★ **Special Exhibitions for schools in Term 1, 2007**:
- *Wildlife Photographer* (closing 18 march 2007)
  Experience candid photographs highlighting our precious wildlife and nature.
- *Eaten Alive: the world of predators* (closing 22 April 2007)
  See how menacing animals, including spiders and insects, lure and capture their prey.

★ **For bookings & further information:**
ph 9320 6163, fax 9320 6072

★ **Australian Museum**
Open daily 9.30 am–5 pm
6 College St Sydney (opp Hyde Park)
www.australianmuseum.net.au

AUSTRALIAN MUSEUM

WIN A FAMILY PASS TO IMAX

IMAX Sydney, at Darling Harbour, is open every day. More than 8 storeys high, it has the world's biggest cinema screen to give audiences the ultimate film experience. IMAX films are both entertaining and educational. Films are constantly changing and cover a wide range of themes. High quality resource materials & teacher guides are provided for school visits.

★ ✧ ★ ✧ ★ ✧ ★

TO WIN A FAMILY PASS* TO IMAX: (for 2 adults and 2 children worth $50) … send in your name, school, & school address on an envelope **by 10 April 2007** to:

IMAX Give Away, PO Box 442, Harbord NSW 2096

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

WINNER: Cathy Munro, Kiama High, won the IMAX Sydney family pass for *SciTalk No. 4–2006.*

IMAX THEATRE SYDNEY

Errata

In the article "Pasteurisation, but without milk" in *SciTalk No. 4-2006* the name of the inventor was unfortunately misspelled. Apologies to **Julie Frost**, a recent graduate of UNSW, who designed the Mvura.

The Mvura (meaning water) is a unique device designed for transporting, purifying, storing and dispensing water, e.g. in Third World and developing communities where many people at present are unable to access safe, clean water. It is hoped that one day this device may be used to help such people. The Mvura can hold up to 15 litres of water and works by pasteurising the water using the Sun's heat energy, thus killing most harmful pathogens in it. (Ed) □

RACI NSW SCHOOLS TITRATION COMPETITION 2007

16 June (most Syd Metro, Wollongong Uni), 15 June (UNSW, St John Bosco College); tba – most regional venues

The 2007 NSW Schools Titration Competition is a great way for Year 11/12 chemistry students to test their quantitative analytical skills. Organised by the Chemical Education Group of the Royal Australian Chemical Institute (RACI) it is held across NSW. Students have 90 minutes to complete a set of acid-base titrations to determine the unknown concentration of a weak acid. Entry costs $24/team of 3 – with a max of 8 teams/school.

A team's score depends on the accuracy of each member. At each venue, each member of the winning team wins a trophy. Winning teams may then be invited to the National Competition in September 2007. All students receive a Certificate of Excellence or Merit or Participation. The **de Miklouho-Maclay Prize for Practical Chemistry** (certificate & $100) is awarded to the NSW student with the best overall results.

Competition entry can be used to satisfy 1.5 hours of practical experience and contribute to the Chemistry Syllabus outcomes: P2, P10, P12 & H12 [12.2(a),(b),12.4(b)].

* * * * *

★ **For details, entry forms, hints & tips:**
- internet: *www.nswtitration.com* • email: *ajhey@ozonline.com.au*
- ph/fax: 9601 1021 • address: POB 282 Georges Hall 2198

★ **Closing date is 4 May 2007**

★ **2006 NSW Schools Titration Competition**
30 teams achieved an Excellent award. Congratulations to the following teams:
- *1st:* Fort St HS;
- *2nd:* Fort St HS;
- *3rd:* Christian Bros HS Lewisham.

★ **2006 National Competition results**
305 teams of three students entered the 2006 NSW Schools Titration competition. 29 teams went on to compete in the National Competition in September at UNSW. Of the top 25 scores, 3 were by NSW teams: 10th place (SHORE), 18th place (Sydney Girls' HS) and 21st place (Willoughby GHS). 1st place in Australia was Marymount College from Queensland.

★ **2006 de Miklouho-Maclay Prize**
The 2006 **de Miklouho-Maclay Prize** for excellence in Chemistry went jointly to Edward O'Neill and Chao Wang of SHORE School with a near perfect score!

★ Congratulations to all these competitors! □

Exam Choice

ABN 56 345 318 164

Fax: 02 9975 1886
PO Box 71 Forestville NSW 2087

Trial HSC, School Certificate and Preliminary Science Exams

Exam Choice is a group of teachers highly experienced in all facets of the exam process.

This is our third year of producing **Trial and Preliminary Science Exams** which:

- assess over the **full range of performance**
- are mapped to outcomes and the NSW syllabuses
- use the prescribed verbs in clearly worded questions
- come with **clear marking guidelines** and sample answers
- are delivered **on time** and are reasonably priced

NEW – all orders this year will include an electronic copy of the exam papers for no extra charge

Complete the order form below and fax this sheet back to us.

Contact Person .....

Phone No. ..... **Fax**.....

School .....

Delivery Address .....

..... **Postcode**.....

	Price	Tick to order	Total
Biology Trial	$60		
Biology Preliminary	$50		
Chemistry Trial	$60		
Chemistry Preliminary	$50		
Physics Trial	$60		
Physics Preliminary	$50		
Senior Combination pack (all six senior papers)	$280		

NEW – this year we are introducing a Trial School Certificate exam for the first time.

Trial Science School Certificate	$70		

All papers will be delivered in Week 1 of Term 3. Invoices will be sent with the papers. Papers can be used as exams at any time after delivery but are not to be released to students before 15 August (Trial) or 17 September (Preliminary and School Certificate.)

Continued from page 1 …

ice: reductions in extent and mass of glaciers and ice sheets, reductions in area, timing, and duration of snow cover, and reductions in extent and thickness of sea ice. Changes in snow cover and sea ice have immediate local consequences for terrestrial and marine ecosystems. Permafrost influences nearly 25% of the northern hemisphere landmass, and shows substantial decomposition due to the warming climate. Permafrost degradation affects local ecology and hydrology as well as coastal and soil stability. How these changes will impact on millions of people are described in detail on the IPY website.

The IPY will be a time of discovery and hopefully answer many questions: What clues are there under the ice to the planet's past? How does life survive extreme cold and long dark? What structural and physiological adaptations evolved in cold waters and propagated through the oceans? What marvels of photochemistry occur when spring's first light strikes winter snow? How do microbial communities in the upper ocean influence cloudiness in the atmosphere above? How have humans survived in the Arctic for thousands of years?

The 2007–2008 IPY is the fourth IPY – the first was in 1882–83 and was inspired by Karl Weyprecht, an Austro-Hungarian naval officer who believed polar exploration ought to focus on scientific goals. The second IPY was in 1932–33 (although this was diminished due to the global depression) and the third in 1957–58.

The International Heliophysical Year (IHY), is also set for 2007 and will extend the focus to the entire solar system and beyond. You can find out more about this at: *http://ihy2007.org/* □

2007 Crystal Growing Competition

Students in K–8 are invited to grow crystals of potassium aluminium sulfate (= alum or potash alum) for five weeks and submit them to the RACI for judging by Friday 22 June 2007. Biggest will not necessarily be the best!

All details and rules are at: *www.chem.unsw.edu.au/raci/crystal_grow/index.htm* □

ABC TV: Science Programs for schools

These 15–20 minute programs are broadcast weekdays from 10.15–11.30 am.

Science program details, dates & times are at: *www.abc.net.au/schoolstvtitlelist.htm* and there are teachers' resources at: *www.abc.net.au/schoolstv/tresources.htm* □

ABC TV

BHP BILLITON SCIENCE AWARDS

These awards encourage and reward excellence in teaching science, and reward young people for innovative research projects using thorough scientific procedure.

The BHP Billiton Science Student Awards, Science Teacher Awards, and School of the Year Award have been sponsored and managed by BHP Billiton since 1981, and are run in conjunction with CSIRO.

It's time to start planning your entries. There are fantastic prizes to be won!

In 2007 the Science Teachers' Association (STA) in each state/territory will select finalists for the BHP Billiton Science Awards. To be eligible for selection as a finalist you must first submit a project into your STA Awards or successfully complete a science project (silver or gold category) in the CSIRO CREST Awards (Science). Finalists will be required to prepare a science fair exhibit for display in a public venue and judging.

Consult your local STA or CREST office for details and their closing date.

★ ✧ ★ ✧ ★

ENQUIRIES:
http://scienceawards.bhpbilliton.com
BHP Billiton Science Awards
ph (03) 9252 6409, fax (03) 9252 6265
Email: Rosemary.Maclean@csiro.au

CSIRO bhpbilliton

Photo Spot — Starch granules from *Marsilea drummondii* (or Nardoo)

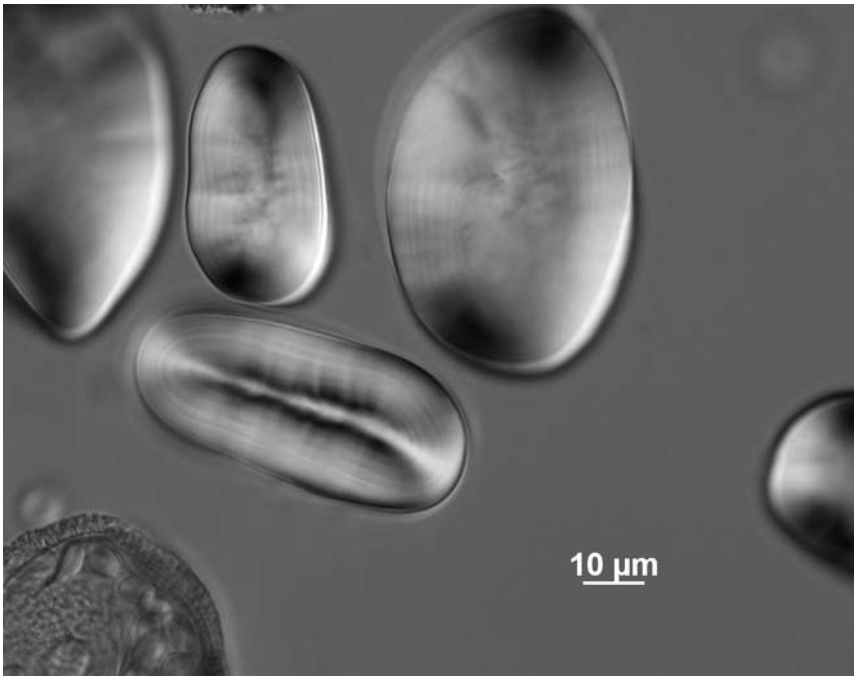
These starch granules are from the plant *Marsilea drummondii*, or Nardoo (also Ngardu) as it is more commonly known. The image shows two whole granules in 'plan' view and a third in 'profile' view giving an idea of the size and shape of the granules. The image also shows a vesicle within which the starch is stored in the lower left.

M drummondii (Nardoo) was a staple economic plant used by Australian Aboriginals who lived in semi-arid or arid zones. The starch is found in underground storage organs called sporocarps and was collected and processed before consumption. Aboriginal people in arid Australia would collect the spore cases, roast them, discard the cases, and grind the spores with water to make a dough which they cooked to make cakes.

The deaths of Burke and Wills in 1861 whilst on their expedition across Australia are thought to have been exacerbated from eating Nardoo that was not processed properly. Nardoo must be ground with water to remove the toxins (thyaminase) and baked before eating (see Box 1).

Nardoo is toxic to humans if the thyaminase is still present in it when eaten, though we know that modern feral pigs regularly consume it. It is generally not favoured by stock when alternative feed is available. It has been claimed to cause poisoning in sheep, horses and cattle. However, ingestion does not always result in poisoning.

The starch granules are left as residues on the surface of grinding stones and may persist for thousands of years. Archaeologists who recover grinding stone tools during excavation have been able to isolate these residues and starch granules from grasses to demonstrate the antiquity of the plant processing of these plants in Australia in excess of 25 000 years.



ABOVE: Starch granules from *Marsilea drummondii* (or Nardoo as it is more commonly known) Photomicrograph was taken by Judith Field, Australian Key Centre for Microscopy & Microanalysis. It was taken with a Zeiss Axiomat Brightfield microscope using Differential Interference Contrast

Nardoo is endemic to inland areas of Australia, in all states and territories except Tasmania and the ACT. It is an aquatic perennial fern that forms clumps about 8–10 cm high at the edge of inland lakes, waterholes, claypans, swamps, rivers and floodplains, but is more usually a submerged plant with leaves, reminiscent of four-leafed-clover, floating on the water surface. Its reproduction and germination is almost completely dependent on cycles of flooding and drying. It has a low salinity tolerance and is potentially a species that may provide useful indication of health of mudflats as well as being a suitable plant for monitoring purposes.

Nardoo is now a popular horticulture subject and is widely cultivated as a garden pond plant. □

BOX 1. Nardoo can lead to beri-beri Aboriginals helped the explorers on Burke and Wills' expedition across Australia by feeding them with damper and seedcakes made from Nardoo. Interestingly, Wills wrote that "while Nardoo was abundantly available as a food source, it assuaged their hunger but provided virtually no nutrients and did nothing to curb their physical deterioration". Unbeknown to the explorers, Nardoo seeds contain thiaminase which depletes the body of Vitamin B1. As a result, it is likely that Burke and Wills' deaths resulted in part from beri-beri (see Box 2). Evidence to this effect is further provided by fellow explorer, John King's account, in which it is revealed that Burke complained of leg and back pain shortly before his death.

BOX 2. Beri-beri This nervous system ailment is caused by thiamine (vitamin B1) deficiency. Its symptoms include weight loss, emotional disturbances, impaired sensory perception, weakness and pain in the limbs, and periods of irregular heart rate. Edema (swelling of body tissues) is common. In advanced cases, there may is heart failure and death.

Treatment is with thiamine hydrochloride, either in tablet form or injection. A rapid and dramatic recovery within hours can be made when this is administered to patients with beriberi, and their health can be transformed within an hour of administration of the treatment. Thiamine occurs naturally in fresh foods and unrefined cereals, especially fresh meat, legumes, green vegetables, fruit, and milk.

2007 declared "Year of the Dolphin"

Dolphins are intrinsically tied to our cultural history and awareness. Living in oceans and rivers, their survival is becoming increasingly difficult. Threats for dolphins are on the rise – from entanglement in fishing nets, marine pollution, prey depletion due to overfishing, to deliberate hunting and disturbance from noise. These are only some of the causes why dolphins might soon be extinct in the world's seas. Dolphins need clean and quiet oceans, protected areas and people who care.

2007 has been declared the "Year of the Dolphin" (YOD) by the UN Convention on Migratory Species to help protect dolphins by creating an awareness of dolphin species, and educating/informing decision makers and local communities. The YOD will be part of the UN Decade on Education for Sustainable Development. The YOD website *www.yod2007.org/* has articles on dolphin species around the world: the threats that dolphins face, and how to safely view dolphins, plus many dolphin photographs. □

RIGHT: *Marsilea drummondii* (or Nardoo as it is more commonly known)
(Image: Australian National Botanic Gardens)

Astronomy

What a way to start 2007!

... Don Whiteman

Comet McNaught put on the best naked eye display of any comet for the last 40 years and even then it was better than Comet West in 1976. For anyone who looked at the sunset in the western skies around mid January was treated to a view that will last a lifetime.

Comet McNaught

Comet McNaught (C/2006 P1) was a routine discovery by Rob McNaught on 7 August 2006, with the Uppsala Schmidt telescope at Siding Spring Observatory, near Coonabarabran, NSW as part of a survey. The mission of the Siding Spring Survey is to contribute to the inventory of near-earth objects (NEOs), or more specifically, the potentially hazardous asteroids (PHAs) and comets (PHOs) that may pose a threat of impact with Earth.

Figure 1. Comet McNaught: a 120 second exposure taken by Scott Branson on 21 January 2007 near Snowtown in SA

Comets

Comets have been known since antiquity. There are Chinese records of Comet Halley going back to 240 BC.

Comets are often called dirty snowballs. They are a mixture of ice (both water and frozen gases) and dust that for some reason did not get incorporated into planets when the solar system was formed. Comets are composed of a solid core (or 'nucleus') that is located within the 'coma', as well as 'tails'.

The 'nucleus' is usually a couple of kilometres across and consists of a mixture of ices of various compounds of carbon, hydrogen, oxygen and nitrogen – with water ice as the a major constituent – as well as 'dust' grains containing silicon, magnesium and other heavier elements. This dust, mixed in with the ices, results in the nucleus of a comet being rather dark.

Figure 2. Structure of a typical comet when it is near the Sun. In this diagram, the Sun would be to the lower right.

The 'coma' is the diffused patch of light that forms around the nucleus as the comet approaches the Sun. The heat from the Sun makes the nucleus unstable and material (gas and dust) is ejected and forms the coma.

Many comets have two 'tails', not one. Notably the tails are always pointed away from the Sun regardless of the comet's motion and can be up to 150 million km in length. The 'gas tail' (called the 'ion tail') is composed of many different types of ionised molecules being drawn away from the coma by solar winds. The 'dust tail' is composed of dust particles liberated from the nucleus as the ices are vaporised by the Sun. Typically, the ion tail will be almost straight, and the dust tail will exhibit a slight curve back along the comet's path. This means that a comet's ion and dust tails are separated, and are often seen as such, normally in photographs, but sometimes visually as in Comet McNaught.

Comets are influenced by the gravity of the Sun (and other objects in the Solar System). Most comets move in elliptical orbits around the Sun. Some comets are on smaller orbits and are seen more regularly. These are called Periodic Comets. Others that return within less than 200 years are called Short Period Comets. The comet with the shortest known period is Comet Encke, which moves around the Sun every 3.3 years and is due to appear.

Some comets are on such large orbits that they take thousands of years to complete each revolution. A great example of this was Comet Hyakutake in 1996, Comet Hale-Bopp in 1997 and indeed Comet McNaught. Any close approaches to the planets can significantly affect the orbits of Comets.

What's coming up in the skies overhead?

Planets

Venus has been low in the early western night sky during January and was often mistaken for Comet McNaught. It will remain an early evening object through February until mid-August. By mid-February it is in Pisces but will move into Aries by mid-March. It will stay there until mid-April when it moves into Taurus for the remainder of the month moving into Gemini in early May.

Saturn has just passed opposition (11 Feb) and will be at its brightest and largest through into April. It will remain an all night object in the north-eastern sky until the end of April when it will be setting around midnight. Any size telescope will reveal its magnificent rings. Larger apertures will show the Cassini Division.

By early March, **Jupiter** will be rising in the eastern sky just before midnight in the constellation of Ophiuchus (just below the belly of Scorpius) and will be easy to find with the naked eye. Jupiter will be really close to the Moon on 12 March, 8 April and 5 May. A 15 cm telescope will reveal its equatorial bands and its paler temperate zones. From 6 April it begins its retrograde motion which will continue until early August. It will be rising around 9 pm and should be fairly high in the eastern sky by midnight. By early May it will be rising before 8 pm. Jupiter is heading towards a perihelic opposition in June.

Meteor showers

The delta-Leonids will be active 15 Feb–10 March and peak on 25 Feb. The Virginids will be active in late evenings from 25 Jan–15 April with several peaks in this period.

* * * * *

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 3. Taking photographs of a comet can be a lot of fun, especially if you have a tripod and can use time exposure.

This fascinating photograph of Comet McNaught was taken by Tim Thorpe, in the Southern Mt Lofty Ranges about 2 km from Meadows in SA on 23 January, 2007. The exposure time of 114 seconds also resulted in some 'mini' star trails in the night sky.

Tim said he "had fun contending with cows and the two pet sheep who live them. These animals are intensely curious and any-thing happening in their space gets attention! Finally, satisfied I was not interesting any more and had no hay for them, they settled down content to just watch what I was doing, totally oblivious to the amazing show behind them."

HSC statistics: Entries for science courses and options for the 2006 HSC

The total number of entries for the HSC Science courses* in 2006 was 38 942 and the total number of HSC entries for the 2006 HSC was 65 602. So Science entries were 59.4% of the total entries.

The number of HSC Science entries as a percentage of the total HSC entries from 1992–2006 is shown in the table below. This percentage has decreased significantly from the peak of 90.8% of the total candidature in 1992# with 54 414 students doing a Science course to only 58.0% in 2001. Since 2001, the percentage of Science entries has not varied greatly from around 58.0%, but this is much lower than in past years.

Entries for HSC Science courses 1992–2006 as a percentage of the total number of HSC entries#															
YEAR	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
%	90.8	87.7	80.1	72.0	73.8	72.3	70.2	69.9	64.1	58.0	55.8	56.5	58.3	58.4	59.4

The pattern of options presented at the 2006 HSC for each Science course is given as a percentage in the following tables.

Biology	
Total 2006 candidature 14 067 (♂5 291 ♀8 776)	
Q28. Communication	58.7%
Q29. Biotechnology	7.8%
Q30. Genetics: The Code Broken?	20.3%
Q31. The Human Story	12.5%
Q32. Biochemistry	0.5%
	99.8% §

Physics	
Total 2006 candidature 9 116 (♂ 6 851 ♀ 2 265)	
Q28. Geophysics	1.1%
Q29. Medical Physics	26.8%
Q30. Astrophysics	26.0%
Q31. From Quanta to Quarks	44.0%
Q32. The Age of Silicon	2.1%
	100.0% §

* These are the total number of entries in Science courses, and not the actual number of students who study a Science course, since a fair percentage actually study 2 courses in the same year, and some students since Pathways do 3 science courses.

\# The total number of entries prior to 1996 was based on the total English candidature. Since then, due to Pathways, the total figure each year is still based on English entries, but is slightly affected by acceleration students, Pathways students, etc.

§ The total number of students below reflects the actual number of students who received a result for each subject. It differs from the figures given in the media as their figures are the number of HSC entries for each subject as of September 2006. There is usually a difference between these two sets of figures because some students have illness/misadventure and so do not sit for the examination.

[Note: Individual option percentages are rounded to the nearest 0.1%, thus totals are not exactly 100.0% for some courses.]

Chemistry	
Total 2006 candidature 10 217 (♂5 465 ♀ 4 752)	
Q28. Industrial Chemistry	38.9%
Q29. Shipwrecks, Corrosion and Conservation	42.8%
Q30. The Biochemistry of Movement	1.4%
Q31. The Chemistry of Art	3.4%
Q32. Forensic Chemistry	13.2%
	99.7% §

Earth & Environmental Science	
Total 2006 candidature 1 140 (♂ 646 ♀494)	
Q28. Introduced Species & the Australian Environment	78.0%
Q29. Organic Geology – A Non-renewable Resource	8.1%
Q30. Mining and the Australian Environment	4.4%
Q31. Oceanography	9.0%
	99.5% §

Senior Science	
Total 2006 candidature 4 019 (♂ 2 246 ♀ 1 773)	
Q28. Polymers	4.4%
Q29. Preservatives and Additives	3.5%
Q30. Pharmaceuticals	17.3%
Q31. Disasters	65.5%
Q32. Space Science	9.1%
	99.8% §

Distinction Cosmology: Total 2006 Candidature was 26 (20 males, 6 females).
Science Life: Total 2006 Candidature was 357 (212 males, 145 females).
(These courses are part of the total science entries.)

These tables were prepared by Robert Garner using data provided by Board of Studies, Jan 2007.

✧ Macquarie University Observatory Public Observing Program ✧

Open to the public every Friday night from March–November (except Good Friday). Opens 8.30–10 pm in March & Nov, & 7.30–9 pm in April–October. Entry is via Gymnasium Rd, near Culloden & Waterloo Roads roundabout. If raining, please ring 0427 433 388 to confirm if open.

On fine nights, we offer a 'starfinder' session to demonstrate how to identify bright stars, constellations and planets. This is followed by observing with the 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 or rain, our all-weather program includes a mixed presentation of slides, posters and scale models.

Admission: $5 per person. Children under 5 are free.
No bookings needed, unless you have 10^{+}: ph 0427 433 388.
For parking information: *www.astronomy.mq.edu.au/publicObs.html*

★ CONGRATULATIONS ★

SciTalk No. 4–2006 "Astronomy Giveaway" winners, George Green, Keira HS & Sally Staniforth, Coolah Central, each won a copy of:

ASTRONOMY 2007
A PRACTICAL GUIDE TO THE NIGHT SKY
by Glenn Dawes, Peter Northfield, Ken Wallace

Available from Quasar Publishing: http://www.quasarastronomy.com.au/
OR The Binocular & Telescope Shop, 84 Wentworth Pk Rd, Glebe
ph 9518 7255, fax 9518 5711, email: info@bintel.com.au/ Cost:$20 (plus $3 post)

COMPETITION CORNER

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HOW TO ENTER: Send an answer to the Quiz Question, your name, school, & school address, on an envelope to: Competition Corner, PO Box 442 Harbord NSW 2096 – by 10 April 2007

SciTalk 4/06 answer: Autotroph

QUIZ QUESTION: Which inert gas is radioactive?

Winner for *SciTalk 4/06*: *Biology in Context: student text & CD* ($89.95 ea) published by Oxford University Press, was won by Margaret Cahill, Riverina Institute of TAFE (Wagga Wagga campus).

SUBSCRIPTIONS … *SciTalk* is available FREE to all secondary science faculties in NSW and the ACT. However, if you would like to receive your OWN personal copy or extra copies of *SciTalk*, subscriptions are available for just $20 per 4 issues. Please send a cheque for $20 + GST = $22.00 (to *SciTalk*), plus your name, address and telephone number … and you will receive the next four issues of *SciTalk*.

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SciTalk aims to provide science teachers with up-to-date information, important dates, the latest products available, plus 'what's on' in various excursion venues.

Please pass *SciTalk* on to all Science teachers at your school so they can benefit from it – or put it up on your notice board for reference.

Contributions, advertising and inserts are welcome.

Copies of *SciTalk* are also available at:
http://homepage.mac.com/robertgarner

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 2007 … Jan 25
- *SciTalk* No. 2–June 2007 … April 5
- *SciTalk* No. 3–August 2007 … June 29
- *SciTalk* No. 4–November 2007 … Sept 28

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