

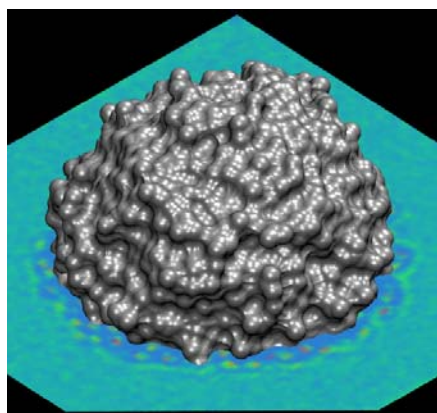
The Royal Society of Western Australia

The unexpected chemistry of carbonates - making mountains from gas.

Professor Julian Gale

**A John Curtin Distinguished Professor of Computational Chemistry and ARC
Professorial Fellow Theoretical Chemistry Program Leader, Department of
Chemistry, Curtin University.**

**Webb Lecture Theatre
The University of Western Australia
(See location map, page 6)**



When carbon dioxide from the atmosphere dissolves in water, this sets in motion a sequence of chemical events that can lead to the creation of carbonate minerals that are the basis of many natural structures from shells to mountains. It can also be the cause of considerable technological cost through the formation of pipe-scale and other unwanted materials. This presentation will explore how we can use some of the world's largest computers to understand the underlying chemistry of these processes, thereby unlocking some of the secrets of the unexpected behaviour of carbonates.

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Members, guests and visitors welcome

<http://www.rswa.org.au>

This issue of the RSWA Proceedings was edited by Margaret Brocx rswa@inet.net.au

Royal Society of Western Australia Governance Review

As you would be aware from email correspondence, on Friday the 29th July a Special Forum of the Royal Society of Western Australia was held to discuss some concerns held by a number of members of the Society regarding the AGM and pending elections to Council.

I was asked to attend this meeting by one member of the Council to try to assist in finding a way forward for the Society. I agreed to so do. The meeting was also assisted by a solicitor, with relevant experience in the governance of community associations.

At the Special Forum both the President and the Proceedings Secretary spoke, and a number of members of the audience also asked questions.

The Special Forum agreed by consensus, and with no-one present disagreeing, to proceed to:

1. Continue with the Electoral Commission election already underway, noting that also included with the election papers are some immediate Constitutional amendment proposals.
2. Establish a tripartite Review Panel to inquire into the matters raised before and at the Special Forum concerning the Society's governance, and to recommend amendments to the Constitution to place the Society's governance onto a sound footing. These recommendations will be provided to the Council and membership at the same time.

The membership of the Review Panel will consist of one person nominated by the Council, a second person nominated by those self-identified people concerned with recent decisions, and a third person to chair the Panel nominated by the first two mentioned members.

The procedures of the Review Panel will be as informal as possible. Written documents will be reviewed, interested parties interviewed and a report prepared.

The Special Forum agreed that the first two nominees names will be forwarded to Assoc Prof John Bailey by close of business on 5th August, 2011. The selection of the chair will then commence. The only timeline identified is that of an interim report being provided to the Council and members within one month of the Panel being established. It is expected that this report will outline the remaining timeline.

At the end of the Special Forum it was agreed that I should prepare this summary of events for inclusion in the next issue of the Proceedings so as to keep members apprised of the evenings outcomes.

Assoc Prof John Bailey
Member
31st July, 2011.

Grains of Truth: Pollen in the forensic arena

The Presidential address, *Grains of Truth: Pollen in the forensic arena*, was delivered by the retiring President Dr Lynne Milne. Lynne is a Senior Lecturer in the Dept of Applied Geology at Curtin University, a sessional lecturer in forensic science at Murdoch University and Edith Cowan University, an Adjunct Research Fellow in the School of Earth and Environment at the University of Western Australia and works with State and Federal police. Lynne is a palynologist specialising in pollen morphology and its applications in geology, geography, environmental science, immunology and botany. She became involved in forensic palynology when asked to help solve a Queensland murder in 1997. Internationally renowned as a forensic palynologist, Lynne was the subject of Australian Story (ABC TV) and Forensic Investigators (Channel 7) in 2005, and is the author of *A Grain of Truth: How pollen brought a murdered to justice*.

In her presentation Lynne took us into the microscopic and 'Magical World of Pollen', illustrating that pollen is not just yellow dust that is the bane of hayfever sufferers and life-blood of many small animals and insects.



Pollen (and fern and moss spores) from most plant families, genera and often species can be distinguished from each other by their varied shapes, sizes, aperture types and intricate surface ornamentation. As pollen is essentially

the sperm of the plant world, plants need to produce enormous amounts of it to ensure some reaches its intended destination - BUT - most pollen ends up in soil, dust, water, mud and on and in anything exposed to the atmosphere. As the walls of pollen and spores are composed of a tough biopolymer (sporopollenin) they can also be found preserved in sedimentary rocks that were deposited, many millions of years ago, ever since the plants that produced them evolved. It is the microscopic size of pollen and spores, and their abundance and durability that has seen palynology become an invaluable investigative tool in petroleum exploration, the investigation of environmental/climate change, and more recently, forensic science.



Forensic palynology follows Locard's Principle which states that 'Every contact leaves a trace'. It can be used to help solve the same crimes that DNA and fingerprinting are used for, but importantly, can also be used in investigations for which DNA and fingerprints are not present. It can determine the geographic origin of drugs and other goods, assist in clarifying events (where did the assault take place?), indicate the direction an investigation should take (Where is the gravesite? Where has this car been?), and disprove or prove an alibi (Was this person at the crime scene?).

Forensic palynology has been used routinely in New Zealand for almost 30 years and is commonly used in the UK to help solve crimes ranging from homicide to fraud, but elsewhere in the world it is treated as a novelty that is used when all else fails!

Prior to 1997, forensic palynology had incidentally been used in a couple of Australian civil cases. In 1997 Lynne was engaged by the Queensland police to assist in the investigation of the murder of a young mother, Samantha Bodsworth. Samantha lived in Gympie and was estranged from her de facto and father of her two small boys, Michael Bodsworth. Her body was found in bushland near the commercial centre of Noosa. Mature and immature coastal wattle (*Acacia longifolia sophorae*) was in full flower in this area. Samantha's car was found outside a nightclub in Gympie. A wattle flower was found in the car and one was lodged behind the number plate. Using the flowers, vacuumings from the driver's side of Samantha's car and tape lifts from Michael Bodsworth's washed clothing, Lynne was able to link the car to Noosa and Michael Bodsworth to the car. This evidence was used to arrest Michael Bodsworth and commit him to trial. Bodsworth initially confessed, but withdrew his confession and the case went to court. He was convicted of murder and sentenced to 25 years in prison.

On returning to Perth in 1998 after almost 13 years in Brisbane, Lynne worked on a serial rape case that police had been working on for 5 years. Police had an identikit picture of the rapist and knew he was of Aboriginal descent, and they had his DNA and a pair of shoes they suspected belonged to him. Police asked Lynne to narrow down their search area and try to work out where this person lived and worked. From material on the soles of the shoes Lynne was able to determine that the rapist worked in a country area, probably in the chaff-cutting industry centred around the Northam – York area. Lynne contacted a prominent chaff-cutting farmer and found that the industry employed teams of itinerant workers to stook the hay in November-December, and some returned in January – February to cut the chaff. The assault from which the police obtained the shoes took place in March. The chaff-cutting farmer provided police with a list of the itinerant workers he employed, and police followed up on their DNA. One of the workers DNA was a very close match to that of the rapist – who

turned out to be his brother. A case that had puzzled police for years was solved in a few short weeks. Donald Wayne Garlett confessed to the rapes and was sentenced to 18 years without parole.

Lynne also briefly described her role in a number of other Western Australian cases, including the Jennifer Wilby case, her work with cannabis and the Australian Federal Police, and one of the Garry Narkle cases. Although Lynne and the DPP believed the palynology evidence in the Narkle case was conclusive, the judge did not feel that the complainant, an aboriginal paint-sniffing teenager, was a reliable witness. There was no jury and the judge was baffled and a little confused by this 'new' forensic tool, palynology. This, and other issues that were raised during the trial that led to Narkle being acquitted, led to several Forensic Science Masters research projects.

There has been little empirical research conducted on Forensic Palynology, with most knowledge coming from casework. Although it is well-known in forensic palynological circles that after clothing is washed, or has been worn for several days after an event (e.g. assault), it will still retain pollen collected during that event. Similarly, it is known that "No two physical objects can ever, in a theoretical sense, be the same", Murray and Tedrow, 1992. For example, soil collected from two places only one metre apart will have the same pollen and spore types in it, but their percent occurrence may be slightly different.

Lynne's student Louise Rowell's research project was on the retention of pollen on clothing from a simulated rape. She tested three conditions - pollen retained on clothing immediately after the assault; after three days wear and after washing. The results showed that: 1. clothing that has been worn for several days after it has come into prolonged/abrasive contact with soil at a site, will still contain a pollen assemblage characteristic of that site; 2. clothing that has been washed after it has come into prolonged/abrasive contact with soil at a site, will still contain a pollen assemblage

characteristic of that site and; 3. no matter how much pollen is present in a sample, it is the presence/absence and relative occurrence of species that determine whether samples have come from the same locality or not.

Another student, Han Lin, researched the statistical degree of probability that samples were or were not from the same locality. In the current climate of DNA and statistical probabilities, judges and juries expect some sort of statistical analysis. Han studied the 2 m x 3 m garden in which the Narkle rape was alleged to have taken place. He divided it into 1 m² quadrats, took three samples from each and three samples from the overall garden. His results showed that, based on the Bray-Curtin index, all samples fell below the dissimilarity index of 0.15, and NMD analysis showed that all samples fell close together, but that the sample taken three years previously from the same garden was exceptionally close, but not as close as the samples collected for the research. He concluded pollen assemblages collected from the same place are not identical but have a relatively small degree of dissimilarity, and that it is possible to delimit the range of dissimilarity of replicate samples from a crime scene and use this to illustrate a match between it and an evidentiary sample.

Currently, State police tend to use palynology as a last resort. Only education of police, the judiciary and the public, training of forensic palynologists and more exposure in courts over time will change the attitude of State police to using forensic palynology and other minor forensic disciplines, such as mycology and entomology, on a routine basis. The Federal Police are now using palynology more, and Lynne continues to work on large cases with them.

The Presidential Address was published without amendment as requested by Lynne Milne

Medalists and other aspects of the AGM will be published on the RSWA website due to size constraints due to the inclusion of information on proposed changes to the Constitution.

Second Call for Abstracts and Posters Royal Society of WA 13th Annual Postgraduate Symposium

Postgraduate students in agriculture, natural sciences, earth and environmental sciences, physical sciences, biology and environmental engineering are invited to present the findings of their research at the RSWA 13th Annual Postgraduate Student Symposium. Finishing Masters or PhD students or those who have submitted within one year of the symposium date normally present their work orally. Poster presentations are invited from Honours, Masters or PhD students. This symposium provides an opportunity for students to present their work in a public forum and network with other postgraduates from different disciplines and institutions.

When:

9:30 am to 5:00 pm
Saturday 17th September 2011

Where:

Webb LT, The University of Western Australia

Information for presenters:

Abstract and brief curriculum vitae should be emailed to L.Milne@curtin.edu.au by Friday 19th August, 2011. Please indicate whether you prefer an oral or poster presentation and when you expect to submit your thesis. Free RSWA membership (first year) is provided to all presenters. Half price Membership is offered (first year) to all attendees who wish to join on the day.

Who should attend?

This is a cross-campus multidisciplinary symposium with FREE Registration that includes a BBQ lunch. Fellow students, scientists and interested members of the public are WELCOME to attend. Non-presenters, to assist with catering, please RSVP to symposium organisers by the 9th September, for further details contact:

Dr Lynne Milne, Dept of Applied Geology
Curtin University Mobile 0414 400 219
L.Milne@curtin.edu.au

Dr Hugo Bekle
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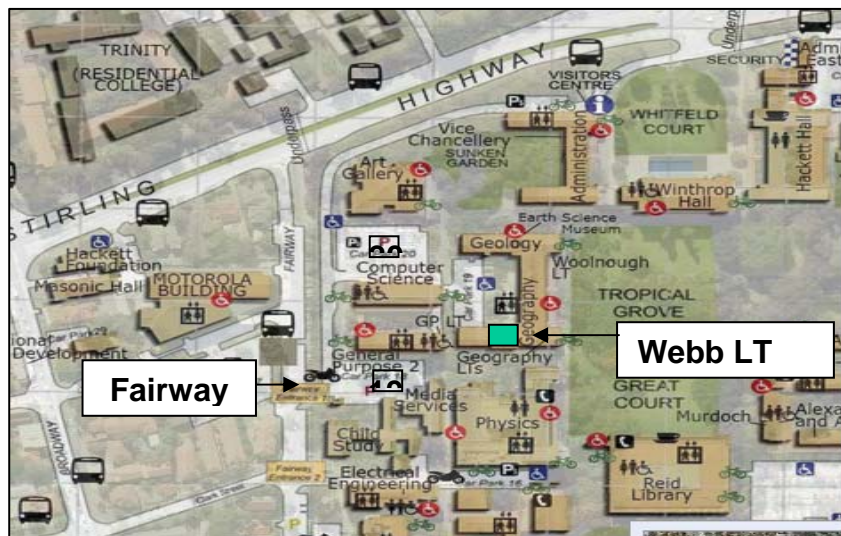
RSWA Events Calendar 2011

This space will be updated each month in order to provide RSWA members and guests with a calendar of up-coming events which will include ordinary monthly meeting, and special events such as Public Forums, Symposia, and excursions. *Watch this space!*

<i>Date</i>	<i>Time</i>	<i>Venue</i>	<i>Event</i>
<i>August 22nd</i>	<i>7 pm</i>	<i>Web LT UWA</i>	Science Week Events National Science Week International Year of Chemistry 2011 Professor Julian Gale - <i>The unexpected chemistry of carbonates - making mountains from gas</i>
<i>17th September</i>	<i>9:30 am</i>	<i>UWA</i>	<i>RSWA Post-graduate Symposium</i>
<i>17th October</i>	<i>TBA</i>	<i>TBA</i>	<i>TBA</i>
<i>21st November</i>	<i>7 pm</i>	<i>Kings Park</i>	<i>Professor Michael Borowitzka</i>
<i>December</i>	<i>TBA</i>	<i>WA Conservation Science Centre (DEC).</i>	<i>RSWA Christmas function</i>

Map showing location of Web LT UWA

Free parking is available in all UWA carparks after 6.00 pm. Carparks 19 and 20 are the most suitable for access to the Webb Lecture Theatre. Access is available through the front or rear of the Geography building.



An interactive map is available at www.uwa.edu/campus-map

SPECIAL RESOLUTIONS PROPOSED TO ALTER THE CONSTITUTION OF THE ROYAL SOCIETY OF WESTERN AUSTRALIA INC

As per the Associations Incorporation Act 1987 sections 18 and 19, an incorporated association may alter its rules by special resolution but not otherwise.

The following five (5) SPECIAL RESOLUTIONS TO ALTER THE CONSTITUTION OF THE ROYAL SOCIETY OF WESTERN AUSTRALIA, proposed and accepted by the RSWA Council at the Council meeting on 20th of June, 2011, will be put to Members eligible to vote in a postal ballot to be distributed by the Electoral Commission. The result of the ballot which will be announced at the Ordinary Meeting on Monday 22nd August. .

Below is a description of the amendments and explanations for the reasons for change.

The following changes to the constitution are proposed (*alterations are indicated in italics*)

AMENDMENT 1 - Membership

Current Rule

11. (c) Student Members: The Council may, on application to be made each year in such form it may require, admit as Student Members, persons who are undertaking full-time studies in Western Australia, or as agreed by Council. Student Members shall have the same rights and privileges, *and shall be subject to the same restrictions, as Associate Members, except that they shall receive the Journal of the Society.*

Proposed change

11. (c) Student Members: The Council may, on application to be made each year in such form it may require, admit as Student Members, persons who are undertaking full-time studies in Western Australia, or as agreed by Council. Student Members shall have the same rights and privileges *as Ordinary Members.*

Reason for proposed change:

As the current rules stand, student members are given the same rights as Associate Members and as such are not able to vote or stand for Council. Council has recognised the need to encourage a younger cohort of RSWA members to take the Society into the future. Fee paying student members should have the right to actively participate in the decision-making process of the Society. Giving student members more ownership of the society through enabling them a say in the way the organisation is run, or through active

AMENDMENT 2 - Subscriptions

Current Rule

24. All subscriptions shall be payable in advance and shall become due on the first day of July in each year. Any member whose subscription is unpaid six months after the due date in any year shall be deemed to be not financial. *After this date a late fee shall be payable at a rate determined by Council from time to time.*

Proposed change

24. All subscriptions shall be payable in advance and shall become due on the first day of July in each year. Any member whose subscription is unpaid six months after the due date in any year shall be deemed to be not financial. *As such, they will cease to receive the Journal and will be ineligible to vote.*

Reason for proposed change:

To reduce the financial burden on the Society created from continued support of non-financial members. To provide an incentive for members to maintain their commitment to the Society in order to continue to receive their rights and privileges such as voting rights and the Journal of RSWA.

AMENDMENT 3 - Ordinary General Meetings

Current Rule

49. Ordinary General Meetings of The Society shall be held at 8 *p.m.* on the third Monday of the months March to June and August to December inclusive in each year, unless the Council determines otherwise, but at least three Ordinary General Meetings shall be held in each financial year. Notice of each Ordinary General Meeting shall be sent to all members of each class. A quorum for an Ordinary General Meeting shall be seven Ordinary or Honorary Members personally present. Conduct of an Ordinary General Meeting shall be at the discretion of the President or Chairman elected by such meeting.

Proposed change

49. Ordinary General Meetings of The Society shall be held *at a time determined by Council* on the third Monday of the months March to June and August to December inclusive in each year, unless the Council determines otherwise, but at least three Ordinary General Meetings shall be held in each financial year. Notice of each Ordinary General Meeting shall be sent to all members of each class. A quorum for an Ordinary General Meeting shall be seven Ordinary or Honorary Members personally present. Conduct of an Ordinary General Meeting shall be at the discretion of the President or Chairman elected by such meeting.

Reason for proposed change:

This alteration merely allows greater flexibility to Council in the scheduling of meetings, enabling the running of various meeting or event formats.

AMENDMENT 4 - Alteration of the Constitution and Rules and Regulations

Current Rule

67. The Constitution *or the Rules and Regulations or any of them* may be amended, altered, enlarged or repealed *from time to time* by a resolution passed by 75 percent of Ordinary or Honorary Members voting *in a postal ballot conducted by the Council*. Notice of intention to *conduct such a ballot shall be given with notice of an impending Ordinary or Annual or Special General Meeting of The Society and the proposed amendment or amendments shall be presented at that meeting at least one calendar month before the ballot is held.*

Proposed change

67. The Constitution (*Rules and Regulations*) may be amended, altered, enlarged or repealed, *in accordance with the procedure set out in sections 17, 18 and 19 of the Act*, by a *special* resolution passed by 75 percent of Ordinary or Honorary Members *voting at a general meeting of the Society, or by proxy or postal vote*. Notice of intention to propose the resolution shall be given with notice of an impending Ordinary or Annual or Special General Meeting of the Society.

Reason for proposed change:

The changes here enable the Society to make alterations or amendments to the Constitution (Rules or Regulations), with notice, at any General meeting of the Society in accordance with the rules of the Associations Incorporation Act 1987. The current clause only permits a postal vote and rules out the possibility of voting at a special general or Annual General meeting or, if possible, future electronic voting. The proposed wording closely follows "A Guide for Incorporated Societies in Western Australia" put out by the Department of Commerce, 2010.

AMENDMENT 5 - General

1. The scientific society known as "The Royal Society of Western Australia Incorporated" (hereinafter referred to as "The Society") has the objects, purposes, and powers hereinafter mentioned.

Proposed inclusion

Definitions

(a) In these rules, unless the contrary intention appears-

‘The Society’ refers to The Royal Society of Western Australia Incorporated

‘Member’ means member of The Society in accordance with rule 11a – f of the Constitution.

‘Financial’ with respect to membership means that a member has paid the appropriate fees in accordance with, and no later than 6 months after the due date specified in rule 24 of the Constitution.

‘The Council’ means those officers duly elected in accordance with rules 25 -29 of the Constitution and charged with the management of the Society.

‘Committee meeting’ means a meeting referred to in rule 31

‘The Journal’ means the Journal of the Royal Society of Western Australia and means the publication produced by the Society in accordance with rules 55-60 of the Constitution.

‘The Proceedings’ means the Proceedings of the Annual general meeting as referred to in rule 51 of the Constitution.

‘Annual general meeting’ means a meeting referred to in rule 50 of the Constitution.

‘Special general meeting’ means a meeting other than the ordinary or annual general meeting which is called in accordance with rule 53.

‘Quorum’ for all ordinary, annual or special general meetings of the Society means seven Ordinary or Honorary Members personally present in accordance with Rules 49, 52 and 54 of the Constitution. Quorum for Council meetings means six committee members present as defined in rule 32 of the Constitution.

‘Poll’ means voting conducted in written form (as opposed to show of hands)

‘The Act’ means the Associations Incorporation Act 1987

‘Special resolution’ has the meaning given by rule 67 of the Constitution and section 24 of the Act

Reason for proposed inclusion

There are currently no Definitions under rule 1 of the RSWA Constitution. The wording closely follows the wording of examples of Constitutions provided by the Dept of Commerce Guidelines for Incorporated Associations 2010, and is similarly included in Item 1 of the Constitution.