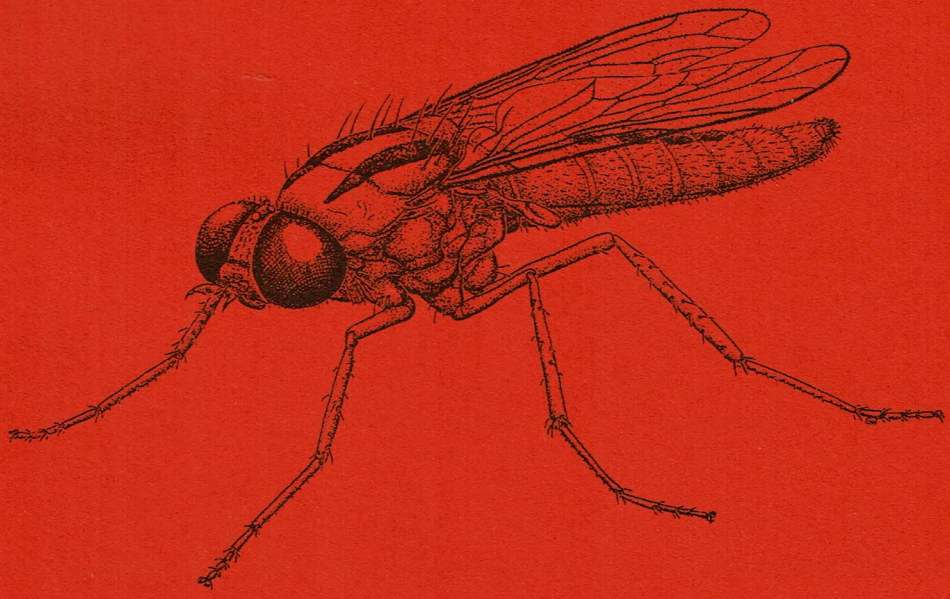
ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NEWS BULLETIN



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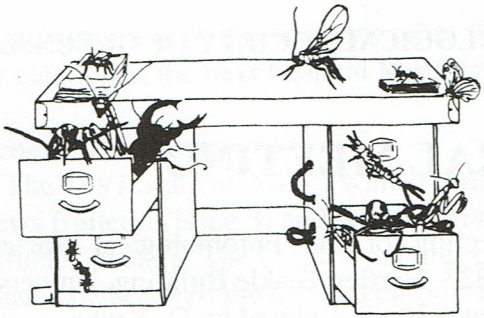
The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia and particularly in Queensland. Membership is open to anyone interested in Entomology. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin* and are normally held in the Entomology Department, The University of Queensland at 6.30 pm on the second Monday of each month (March to June, August to December each year). Visitors and prospective members are welcome. Membership information can be obtained from the Honorary Secretary or other office bearers.

Contributions to the ***NEWS BULLETIN*** such as items of news, trip reports, announcements, etc are welcome and should be sent to the *News Bulletin* Editor.

The Society publishes ***THE AUSTRALIAN ENTOMOLOGIST***. This is a refereed, illustrated journal devoted to entomology of the Australian region, including New Zealand, Papua New Guinea and islands of the south western Pacific. The journal is published in four parts annually.

EMBLEM: The Society's emblem, chosen in 1973 on the 50th anniversary of the Society, is the king stag beetle, *Phalacrognathus muelleri* (Macleay), family Lucanidae. Its magnificent metallic purple and green colouration make it one of the most attractive of all Australian Coleoptera. It is restricted to the rainforests of northern Queensland.

COVER: A stiletto fly belonging to an undescribed genus and species of Therevidae (Diptera: Asiloidea) drawn by Shaun Winterton. Shaun and David Yeates are currently working on the systematics on this family, which is extremely diverse in the woodland and semi-arid habitats of Australia.



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The issue of this document does **NOT** constitute formal publication for the purposes of the "International Code of Zoological Nomenclature 3rd edition 1985". Authors alone are responsible for the views expressed.

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GENERAL MEETING

Minutes of the General Meeting of the Entomological Society of Queensland Inc. held in Room 323, Hartley Teakle Building, University of Queensland, on 12 May 1997, at 6.30pm. Chaired by D. Yeates.

Attendance: C. Burwell, J. Christensen, T. Clarke, V. Davies, S. Evans, E. Exley, M. Griffiths, T. Heard, D.S. Kettle, J. King, C. Lambkin, J. Lamy, P. LaBrie, A. Loch, E.N. Marks, G. Maywald, D. Merritt, L. Miller, G. Monteith, L. Muir, H. Nahrung, P. Peterson, E. Reye, P. Room, B. Russell, O. Seeman, B. Sutherst, D. Walter, T. Withers, D. Yeates.

Visitors: S. Lawson, C. Palmer, H. Proctor, A. Shevington, J. Shevington, T. Watanabe, S. Winterton, A. Zwick.

Apologies: L. Barton Browne, M. Schneider, R. Wylie.

Minutes: The Minutes of the last General Meeting were circulated in News Bulletin Vol. 25, Issue 2. It was moved C. Lambkin, seconded E. Exley that the Minutes be accepted.

Nominations:

C. Palmer
Department of Entomology
University of Queensland
Qld. 4072

Nominated by D. Yeates
Seconded by C. Lambkin

Austin McLennan
Alan Fletcher Research Station
PO Box 36
Sherwood
Qld. 4075

Nominated by H. Nahrung
Seconded by C. Burwell

In accordance with the Society's rules, these candidates will be considered for election at the next General Meeting.

General Business:

1. The 1997 Student Award winner will be announced in the forthcoming News Bulletin (Issue 3) and will present his/her talk at the June Notes and Exhibits meeting. The Council requires extra time to complete judging and break a tie between the top two entries. Council is drafting more extensive criteria for judging the Student Award because of the increasing number and quality of entries received by the Society in recent years. The criteria for judging will be included in promotional material for future Student Awards.

2. The feature documentary "Microcosmos" (rated G) will be opening on June 12 at Hoyts. A brochure about the film was circulated. The Council is organising a group booking for Tuesday evening June 17. The exact cost is unavailable as it depends on the number in the group, but a generous discount off the normal price is expected. A sheet was circulated and 35 members and guests indicated they would like to attend.

Main Business:

Eucalypt entomology in temperate Australia

Tony Clarke
Department of Entomology
The University of Queensland

When preparing this paper, I noted with interest that after my talk tonight the Society will have heard four talks and two notes and exhibits displays on topics relating to forest entomology in the last ten months. While everyone may be heartily sick of hearing about trees and insects, I believe this number of speakers is a reflection of the current interest in forestry and forest sustainability which is prevalent in today's society.

Tonight I hope to give people a back ground to a major shift in forest management currently under way in Australia. Judy King touched on this topic in her presidential address, and I refer to the development of native hardwood plantations as a long-term means of alleviating logging pressure on native forest stands. Through out this talk I will be referring specifically to *Eucalyptus* species when I refer to native hardwoods, but I am aware that some of the native rainforest hardwoods are also being considered as plantation species. Nevertheless, the vast bulk of Australia's native hardwood estate currently consists of *Eucalyptus*.

Many Australians are unaware of the importance to the forestry sector to the Australian community and the rural community in particular. The Industry employs 85,000 people directly and contributes approximately 1% of national GDP. In Tasmania, approximately 20% of work force are associated with the timber industry. The sector has a turnover of approximately $10 billion/annum, but the National trade deficit in wood and wood products is still of a magnitude of approximately $2 billion/annum.

As the broader Australian community expresses its concern over the continued logging of native forests, the forestry sector is by necessity forced to look for ways to maintain and increase the quantity and quality of its product from an ever-decreasing land base. While this will, and does include more intensively managing native forests, Australia's National Forest Policy states explicitly that Australia's wood production will come from "ecologically sustainable wood production from native forests and expanded areas of commercial plantations." Australia's plantation estate is currently greater than one million hectares, of which approximately 91% are softwood (predominantly *Pinus*) while the remainder is predominantly *Eucalyptus*. Of these eucalypt plantations, the greater majority is established in temperate Australia.

Temperate eucalypt plantations are currently being planted at a rate of approximately 20,000 ha per annum. The species being planted are predominantly *Eucalyptus nitens* (shining gum) and *E. globulus* (blue gum), but there are also significant existing areas of *E. regnans* (mountain ash), *E. camaldulensis* (river red gum) and *E. grandis*. The rotation time for *E.*

nitens and *E. globulus* is expected to be 12-20 yrs for pulp and 60+ yrs for solid wood products. Studies have shown that the economics of eucalypt plantations are commonly dubious, particularly if they are grown any distance from a processing mill and are grown on less than first quality sites. This economic issue has serious implications for applied entomology in that there is a need to reduce insect populations which can limit production, but at the same time few organisations are willing to invest the money that is required for proper scouting and management.

So what are some of the problems which eucalypts face? Among the insects there are foliage feeders, shoot feeders, borers of living timber and borers of dead timber. Vertebrate pests such possums, wallabies and birds can also cause serious problems, particularly at plantation establishment when they remove nearly all seedlings put in the ground. Finally, viral and fungal pathogens, and nutrient and water deficiencies can complicate the issue of forest health. While this list may not seem too much of a problem, if we look at it in more detail, for example at the foliage feeders only, we can see that there is a rapid increase in the number of potential pests (Table 1).

Table 1: Common foliage pests of temperate *Eucalyptus* species.

Scientific name	Common name	Order	Family
Chrysophtharta spp	Tortoise beetles	Coleoptera	Chrysomelidae
Paropsis spp	Tortoise beetles	Coleoptera	Chrysomelidae
Heteroynx spp	Cockchafers	Coleoptera	Scarabidae
Anoplagnathus spp	Christmas beetles	Coleoptera	Scarabidae
Gonipterus scutellatus	Eucalyptus weevil	Coleoptera	Curculionidae
Uraba lugens	Gum-leaf skeletonizer	Lepidoptera	Nolidae
Mnesampela privata	Autumn gum moth	Lepidoptera	Geometridae
Opodiphthera spp	Emperor gum moths	Lepidoptera	Saturniidae
Doratifiera spp. & *Limacodes* spp.	Cup moths	Lepidoptera	Limacodidae
Ctenarytaina eucalypti	Blue gum psyllid	Hemiptera	Psyllidae
Cardiaspina spp	Lerps	Hemiptera	Psyllidae
Glycaspis spp	Lerps	Hemiptera	Psyllidae
Eriococcus spp	Gum tree scale	Hemiptera	Eriococcidae
Perga spp	Spitfire grubs	Hymenoptera	Pergidae
Phylacteophaga spp	Leaf-blister sawflies	Hymenoptera	Pergidae

At the beginning of 1993 I took up a post-doc as an insect ecologist with the CRC for Temperate Hardwood Forestry in Tasmania. The CRCTHF was a first round CRC dedicated to the research and development of eucalypt plantations. Its partners include The University of Tasmania, CSIRO Division of Forestry and Forest Products, Forestry Tasmania and most of the major private forest companies in temperate Australia. The CRC has four programs, three research and one education program. Resource Protection, the smallest of the three research programs had, technically, four sub-projects, but in reality these merged into an entomology project and a vertebrate-browsing project.

Costs of insect and vertebrate browsing are quite dramatic if not controlled. For *E. regnans*, insect browsing can cause 45% loss of height increment, 52% loss of basal areas increment and 44% mean annual increment loss. Vertebrates cause even more damage, with 63% of unprotected planting's failing, up to 87% loss of seedlings and for those trees that do establish, MAI losses of up to 42%. It was these sort of figures which ensured interest from the commercial partners in our work and have seen the increase in importance of Resource protection in the new CRC for Sustainable Production Forestry.

So what were the insects with which we worked. Most of our work was with the Eucalyptus leaf beetle, *Chrysophtharta bimaculata* (Col.: Chrysomelidae), but we also had student projects and some minor projects on other insects including *Pyrgoides orphana* (Col: Chrysomelidae), *Gonipterus scutellatus* (Col.: Curculionidae), *Mnesampela privata* (Lep. Geometridae), *Amorbus obscuricornis* and *Gelonus tasmanicus* (Hem.: Coreidae), and *Perga affinis insularis* (Hym.: Pergidae). Most of my work was involved with *C. bimaculata* and I'll concentrate on this insect.

C. bimaculata is a typical paropsine chrysomelid and belongs to a very speciose group in Australia which are common folivors of eucalypts and other Myrtaceae. Adults cause a typical scalloping effect on leaf margins. Eggs are laid on host leaves and the resultant larvae consume whole leaves, causing loss of the young season's growth. Beetles over-winter as sexually immature adults, emerge in late spring, and have an oviposition period

which runs from early December to early February in a normal season. The species is, for the most part, univoltine and the F1 adults diapause locally in sheltered, well-drained environments.

The task that was given to me when I arrived in Tasmania was to investigate movement of the beetle. *C. bimaculata* was known to be a highly mobile species, with populations suddenly appearing and disappearing from a forest coupe, but foresters knew little more than that. An understanding of movement was considered important for IPM monitoring purposes, for understanding insecticide resistance management and, at the level of host tree location and acceptance, for understanding mechanisms related with tree resistance.

The eucalypt "ash" forests of Tasmania, those forests dominated by *E. regnans*, *E. obliqua* and *E. delegatensis*, cover a very large proportion of Tasmania. Thus, to understand movement properly, there was a need to look at movement at different levels. These include inter-regional movement, movement between stands within a region or district, within stands, and between different adjacent trees. Movement within trees has also not been ignored and is the part of a PhD currently being undertaken by a Mr Bradley Howlett.

Work on interregional population movement was undertaken in collaboration with the Identities lab of the CRC for Tropical Pest Management. Using isozyme electrophoretic analysis and the distribution of allele frequencies, it appears that there are apparently high levels of between region movement. No genetic differentiation of populations based on eucalypt species from which they were collected was found, but interestingly two populations from the northwest and northeast of the island showed genetic differentiation greater than expected by distance effects alone. Unfortunately we were not able to pursue this finding.

At the within and between coupe level, we found that beetles were highly patchy, occurring in locally dense aggregations of approximately 100m diameter. Adults exhibit a "gipsy" like movement pattern throughout the season and for any one site will be present for roughly 14 days on only one

or two occasions per season. If the populations are reproductively active the beetles will oviposit at the site, moving on when eggs begin to hatch.

We carried out sampling surveys to see how beetle populations were using native forest with respect to young plantations. Through our other work we had demonstrated that populations were highly mobile, but a perception remained that beetles would preferentially use plantations over old forest because of the even aged high quality resource they offered. What we found was that beetle populations were using abutting native stands and plantation stands at the same time and with roughly the same level of larvae produced. This finding is good news with regards to managing insecticide resistance, but means that control measures aimed at long term suppression of insects within a plantation are probably useless.

With regards to beetle choice of individual host trees, we know that there is a high level of variation in host susceptibility. I don't have time to go into the details of what the mechanism of resistance is, but we have reasonable evidence to show that it is linked to female oviposition, rather than nymphal survival. The resistance traits, which may be related to the growth phenology of the tree rather than secondary chemical traits, are highly heritable and there is a good likelihood that they are traits which could be successfully incorporated into a breeding program.

In closing I'd like to acknowledge the other members of our group: Dr John Madden, program manager; technical officers Mr Vin Patel and Mr Stephen Paterson; quantitative geneticist Ms Carolyn Raymond; and present and former PhD students, Mr Bradley Howlett, Mr Alastiar Hunt, Mr Zoltan Lukacs, Ms Kathryn Patterson, Ms Tara Simmul and Dr Martin Steinbauer.

Q: Can you calculate the number of beetles per *Eucalyptus regnans* canopy?

A: This is a very difficult to do accurately. Younger trees have a cone-shaped canopy and mature trees have a very sparse, broken-up canopy. Working out the leaf area is extremely difficult. I tried using Leaf Area

Indices obtained using a machine that measures the area above you where the light is not getting through, but these Indices were not really suitable. My ball-park figures were in the 10,000s of larvae per tree.

Q: Where is the mortality between egg and adult?

A: Mostly the L_1 larvae. There is indirect evidence that they wash off during storms etc., there is heavy predation e.g. by two Coccinellids, they are eaten inadvertently by adults munching away on the other side of the leaf, and at certain times of the year there is parasitism of the later instars.

Q: Have you considered that these massive aggregations of beetles occur to overwhelm the defense responses of the tree?

A: Yes we have considered this but for *Eucalyptus* as a genus there is no evidence to suggest that the trees exhibit such a response. We have not addressed this question directly, but at no stage has there been any evidence to indicate the possibility of induced defenses.

Q: Is there any syndrome of dieback of Tasmanian trees caused by insects?

A: Rural tree decline is a problem, particularly in the Midlands, but is primarily caused by possums and Scarabs afterwards.

Q: You indicated that leaf chemicals did not seem to be an important cue for these beetles, but there is some evidence from other parts of Australia that leaf chemicals are important, e.g. for Christmas beetles.

A: Yes, but the other work is based on the chemical 1,8 cineol and there is almost no 1,8 cineol in *Eucalyptus regnans*, 0.05% of the total leaf chemistry is cineol.

Q: What sort of characteristics of *Eucalyptus regnans* do you think were important?

A: I think a lot of it has to do with plant phenology.

Chris Burwell gave the Vote of Thanks.

There being no further business, the President closed the meeting.

NOTICE OF FUTURE MEETINGS

10 June: (Tuesday)	Notes and Exhibits, Student Award Presentation
11 August:	tba

PEOPLE AND PROJECTS

NATURAL RESOURCES

NEWS FROM QDNR

Alan Fletcher Research Station, Sherwood.

Michael Day and Martin Hannan-Jones traveled to NSW to collect lantana specimens and observe the distribution of control agents. Ricardo Segura of CSIRO, Mexico, has collected and sent larvae, pupae and adults of *Aerenicopsis championi*, a cerambycid for biological control of lantana Tanya McAndrews will replace Bronwyn Kettle who is leaving the lantana project to take up a position with DPI, Bundaberg.

Dr Dhileepan addressed the Parthenuim Study Group on his field evaluation of the effect of biocontrol agents on parthenium. Results show that the insects significantly affect plant growth and seed production: the seed bank of sites with insects increased by only 8%, compared with a 450% increase at sites from which insects were excluded. Another shipment of *Thecesternus hirsutus*, a parthenium root-feeder, which is being reared for host-testing in Charters Towers has been received in quarantine. Host specificity testing of *Carmenta* continues, the results of which were discussed at the last CTPM Insect-host discussion group.

Rachel McFadyen traveled to Indonesia, where high populations of a stem-galling fly, *Procecidochares connixa*, are causing damage on Siam weed in North Sumatra.

Allan Tomley completed a survey of plant pathogens and *Euclasta whalleyi*, a rubbervine biocontrol agent, in Northern Queensland. *E. whalleyi* is patchily distributed throughout most of the range of rubbervine.

Contracts are in place with the International Institute of Biological Control (IIBC) for the collection of insects for biological control of prickly acacia.

NEWS FROM DPI MAREEBA

Andrew Davis visited Nigel Stork at the Cooperative Research Centre for Tropical Rainforest Ecology and Management in Cairns in May. Andrew is based at the Danum Valley field station of the Royal Society in Sabah, where he is mostly now involved with management. He has had previous experience with entomology in Borneo, undertaking a PhD on dung beetle ecology and worked with Nigel on canopy studies. He presented a talk at Atherton CSIRO Forestry on the field stations current projects.

Harry Fay and Bryan Cantrell are now somewhere over the Pacific as part of a 15 day quick tour of sterile insect fruit fly factories as a final step before the building of a $12m version at Walkamin on the Atherton Tableland. Operating production units will be visited in S.E. Asia, USA, and Guatamalah.

NEWS FROM DPI FORESTRY
Indooroopilly, Brisbane

Ross Wylie (Indooroopilly) traveled to SE Asia in April and May. During an ACIAR project development trip from 6-19 April he visited Bangladesh, the Philippines, Thailand, and Malaysia. He is optimistic that the new project on the ecology and control of the cedar shoot borer (*Hypsipyla robusta*) will start next year. This insect is a pest of cedars and mahogany

of tropical forests worldwide. From 3-10 May Ross was involved in a workshop in Indonesia on insect pests of eucalypts and acacias. The workshop was held at Bogor at the Center for International Forestry Research (CIFOR), and stemmed from current ACIAR work in Indonesia, Malaysia, Thailand, and Vietnam.

NEWS FROM DPI AGRICULTURE
Indooroopilly, Brisbane

Bob Corcoran (Indooroopilly) has just returned from two weeks in Malaysia and one week in Vietnam. He was in Malaysia as part of his current ACIAR project examining physiological characteristics of Malaysian papaya fruit flies for comparison with those of North Queensland papaya fruit flies. He spent a week in Vietnam on new ACIAR project work developing low cost quarantine heat treatments for tropical fruit.

NEWS FROM QDNR
Tropical Weeds Research Centre, Charters Towers.

Dhileepan updated the parthenium study group in Brisbane on latest progress of the parthenium biocontrol project. He also met with Rachel McFadyen and Steve Atkins to discuss parthenium in great depth.

Ruth Huwer is back to the routine of insect mass-rearing after enjoying a ten day camping trip around Kakadu and the Top End and visiting Berthold Hennecke.

Marie Vitelli has returned to TWRC after finishing the baby boom process.

NEWS FROM UNITED STATES DEPARTMENT OF AGRICULTURE
Australian Biological Control Laboratories

The Melaleuca group was heartened by the news that the first insect has been released on *Melaleuca quinquenervia* in the United States. The Melaleuca leaf weevil, *Oxyops vitiosa*, was released in Florida in late April. This insect has been in quarantine since 1992.

Jeff Makinson traveled to Townsville in May to pick up the ABCL insect collection. It is being moved to Brisbane following the closure of the Townsville laboratory last December.

NEWS FROM THE QUEENSLAND INSTITUTE OF MEDICAL RESEARCH
Mosquito Control Laboratory, Brisbane

Peter Ryan, a PhD scholar at the Mosquito Control Laboratory, has been awarded The Walter & Eliza Hall Travelling Scholarship. The scholarship will enable Peter to visit vector control laboratories in California to obtain an overview of their arbovirus surveillance programs.

The Health and Medical Research Expo will be held at the QIMR on Sunday, June 1 between 10am - 4pm. Information on cancer research, Ross River virus, malaria, asthma, liver disease, glandular fever and much more will be available. Entry is free and parking is available at Pacific Parking (opp. Royal Brisbane Hospital).

Microcosmos

The feature documentary "Microcosmos" is opening on 12 June at Hoyts in Brisbane. This film by Claude Nuridsany and Marie Perennou was an official selection for the 1996 Cannes Film Festival. Microcosmos chronicles one full day in the life of "the bug universe" in a meadow in the French countryside. It is advertised as "a surprisingly entertaining, visually stunning treat".

The Society is making a group booking for the Tuesday evening 17 June. Discounted tickets available! If you would like to be included in the group booking, contact any of the Councillors listed on the back of the News Bulletin. Please leave a contact number as well as your name.

Entomological Society of Queensland
1996 Student Award

The Society is pleased to announce the winner of the 1996 Student Award is Mrs Christine Lambkin.

All entries were of a high standard. The other applicants should be congratulated for their submissions: Susan Evans, Jodie Christiansen and Peter Ryan.

Christine will be presented her award at June's Notes and Exhibits meeting. She will also give a presentation based on her paper.

Once again the Society would like to thank all applicants and judges for the success of the 1996 award.

SOCIETY SUBSCRIPTION RATES

ORDINARY: Persons resident within the municipality of Brisbane - $23pa ($20 if paid by AGM).

COUNTRY: Persons resident elsewhere - $21 pa ($18 if paid by AGM).

JOINT: Couples in either of the above categories who share a copy of the *News Bulletin*, but each otherwise have full membership privileges.

Ordinary - $30 pa ($27 if paid by AGM).

Country - $27 pa ($24 if paid by AGM).

ASSOCIATE: Students and others at the discretion of the Society Council - $15 pa ($12 if paid by AGM). Associate Membership conveys full membership privileges except the right to vote on the conduct of affairs of the Society, to hold office and to nominate new members.

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ELSEWHERE:	Individuals A$20 pa	Institutions A$22 pa

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NOTICE OF NEXT MEETING

The next meeting of the Society will be held at 6.30 pm on **Tuesday 10 June** in Room **402**, Hartley Teakle Building, UQ.

The main business will be Notes and Exhibits with the Student Award Presentation by Mrs Christine Lambert. Refreshments will be served before the meeting at 6.00 pm in the Tea Room (510).

VISITORS ARE WELCOME