

Guest Editorial

RACI Natural Products Group Symposium

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This special section of *Molecules* is dedicated to the Royal Australian Chemical Institute's Natural Products Group. The Group meets annually for a one-day symposium, in the first week of October at a venue in or around Sydney, Australia.

The most recent program can be found on the web at: <http://www.chem.mq.edu.au/npg>. This collection of seven papers form the proceedings of the 1999 and 2000 one-day symposia and I would like to thank the authors for their patience and our sponsors ATTORI, Macquarie University, University of NSW, Novogen, Novartis, MDPI and *Molecules* and of course the Royal Australian Chemical Institute (RACI) for their generous support.

Natural Products Chemistry has a long and illustrious history in Australia. In fact, the first chemistry department in the country, at the University of Sydney, was founded on Natural Products Chemistry with such great names as H. G. Smith, Sir Robert Robinson and Ernest Ritchie to name just a few. Australia's unique flora and fauna found both terrestrially and (more recently) in the marine environment has assured more or less continuous interest in Natural Products Chemistry in this country. Our biodiversity has also spawned several attempts to protect Australia's financial interests in the applications of its chemical diversity. The most famous (and failed) attempt was by the West Australian government (CALMS) who attempted to restrict access to biodiversity and insisted in up-front payment for collections. More recently, the Federal Government has initiated an enquiry into access to Australia's biodiversity and ways of ensuring ownership. This was a major topic of discussion at the 2000 Natural Products Group annual one-day symposium, initiated by an excellent lecture from Sally Petherbridge, assistant director of the Access Taskforce (http://www.ecofriends.org.au/member/cbn/projects/LifeLines6.1/NP_Access.html)

The scientific program also reflected the current state of Natural Products Chemistry in Australia. Essential oils have always been economically important to Australia, which is a major exporter of oils

such as Eucalyptus and Tea Tree. More recently, our native flowers have become important in the fragrance industry. In this collection, there are three papers dealing with essential oils.

Drug discovery has also always been a major focus of Natural Products Chemistry worldwide and Australia is no exception. Currently there are several drug companies (eg Astra-Zeneca, Novartis and Biota) that are actively pursuing drug leads from Australian flora and fauna. We are lucky to have a paper in this issue from ExGenix, a small home-grown bioprospecting company who are also interested in marine natural products. Marine Natural Products Chemistry started in Australia in the early 1980's with the establishment of the Roche Research Institute for Marine Pharmacology (RRIMP) which met an untimely death in 1984 due to financial difficulties of the parent company. At the time, John Coll at James Cook University was already very active in the natural products of soft corals and other smaller groups existed in Tasmania, Western Australia and Sydney. Today, Macquarie University, Melbourne and the University of Queensland can be added to the list. No doubt this area will become more important in the near future with active collaborations between larger overseas companies and local research groups.

Instrumentation is an important part of Natural Products Chemistry, rising to prominence in the 1940's when infrared spectroscopy was crucial in the structure elucidation of penicillin. Then came NMR spectroscopy, which dominated structure elucidation for three decades with monumental leaps in technology starting with the Fourier Transform, then superconducting magnets and multidimensional NMR and most recently pulsed field gradients. However, the last ten years has seen no major advance. In contrast, mass spectrometry seems to have taken up the gauntlet and major advances in this field have seen this technique becoming increasingly important. This is reflected in the papers of this special issue where virtually every report relies heavily on mass spectrometric techniques.

"Where to now?" This was the call at a recent symposium to honour the contribution of Rod Rickards and John McLeod to Natural Products Chemistry held at the Australian National University. This is a serious question as Natural Products Chemistry can be considered a mature science. We have fantastic instrumentation (*vide supra*) that makes structure elucidation far less challenging and have a good idea of what sorts of compounds can be found in any given group of organisms.

Where to now indeed! My personal opinion is that Natural Products Chemistry has a bright future but that future lies in conjunction with functional genomics. This area has been termed "chemical genetics" and used natural products to modulate genes instead of the classical approach of using knock-out or oncogenes. I see the next great challenge of Natural Products Chemistry as the discovery of the cellular target of all natural products. Given the immense possible chemical diversity (10^{43} compounds of 1000 molecular weight or less) there is no way we will ever be able to synthesise and characterise even a small fraction of these. In fact, there is not enough matter in the universe to make even one of each of these compounds. While combinatorial chemistry certainly can make large numbers of compounds it is yet to be seen whether this method is any good at developing leads. This reminds me of a joke I once told at a molecular modelling conference and may be an appropriate way to end this editorial.

Two Queenslanders were drinking at a pub and one leaves to catch the bus home. The other leaves at closing time to find his mate crawling around on the footpath. He says: "Hey Bruce, what are you doing? Bruce replies that he has dropped a \$2 coin and that he needs it to get home. His friend joins

him in crawling on all fours around the lamppost and after another quarter hour the new searcher, convinced the coin is not anywhere to be seen says to Bruce “Bruce, where exactly did you drop this coin?” Bruce replies that it was “over there”, pointing some ten metres away but quickly adds “...but the light is better here.”

Perhaps Nature has been in the business of combinatorial chemistry long enough to have provided all the leads we need.

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