VISITING FELLOWS (POST-RETIREMENT)

Seven of the retired staff members, appointed by invitation of the Dean, have continued independent research programs:

Emeritus Professor Athelstan L J Beckwith AO BSc *WA* DPhil *Oxford*, FRACI, FAA, FRS (retired 1996) is continuing his work on the structure, stability and reactions of organic free radicals. The ESR spectrometer previously housed in the Birch Building has been moved to a new laboratory and recommissioned. Cooperative work involving ESR spectrometry has been established with other researchers both within the RSC and other Australian Universities. The factors that underlie the high diastereoselectivity of various radical reactions are being studied, as is the utility of ESR spectroscopy for the estimation of radical stability. A major collection of ESR data for organic radicals is in the hands of the publisher. Two major papers on radical stability and the kinetics of reactions involving persistent radical intermediates are nearing completion.

Emeritus Professor Martin A Bennett BSc PhD DIC DSc *London*, ARCS, FRACI, FAA, FRS (retired 2000). During 2005 Professor Bennett has continued collaboration with Professor Suresh Bhargava at RMIT University and has co-supervised a postdoctoral fellow (Matthew Byrnes, a former PhD student at RSC), a research assistant (Steven Privér), and two PhD students working at RMIT on the chemistry of cyclometallated complexes of gold and palladium. A second full paper on Steven Privér's PhD work has appeared in *Inorg. Chem.* Two reviews have been completed during the year: one is a joint work with the RMIT group for *Coord. Chem. Rev.* on cyclometallated tertiary phosphine complexes, the other results from the PhD work of Joanne Adams, his last ANU PhD student, on tethered arene complexes, and will be published in *Advances in Organometallic Chemistry*. He also continues to referee extensively for international journals, including *Organometallics, Dalton Trans., Inorg. Chem., New J. Chem., J. Organomet. Chem.,* and *Inorg. Chim. Acta*.

Dr Richard Bramley MSc *Sydney*, PhD *London*, MRACI (retired 1997). During the year, Dr Bramley has continued consultations with the Laser Physics Group, RSPhysSE, ANU, particularly on microwave safety issues concerning unshielded loop-gap resonators. He has also consulted with the Faculty of Engineering and Information Technology on aspects of EPR spectroscopy, similarly with the EPR Dating Laboratory of RSES, and with academic staff in the School of Environmental and Mathematical Sciences at University College, ADFA, on low radiation, digital X-ray imaging. Consultations last year with staff at Caltech in their attempts to pursue zero-field EPR spectroscopy have been rewarded with their successful construction and operation this year of a zero-field EPR spectrometer. He continues a major collaboration with University College, ADFA, and indirectly with the Quantum Computing group at UNSW, extending this year to the University of Melbourne, all ultimately aiming to use implanted silicon as a quantum computing material. Work has continued on electric field rather than magnetic field readout in P doped silicon, and EPR has been successfully detected photoelectrically in such materials. The transfer of an electromagnet to ADFA will facilitate their construction of a millikelvin pulsed EPR spectrometer, a unique facility to which the RSC will have access.

Dr Desmond J Brown BSc MSc *Sydney* PhD DSc *London* (retired 1986), formerly of the JCSMR, has begun a detailed critical review of research on the six naphthyridine systems. This will be the first book on naphthyridines in over a century and will be his eleventh book on diazabenzenes and di- or polyazanaphthalenes within the Wiley series *The Chemistry of Heterocyclic Compounds*.

Dr John K MacLeod BSc PhD *Queensland*, FRACI (retired in 1999) continued to be involved in writing papers resulting from work carried out by two of his former PhD students and from a collaborative project with Dr Murali Nayudu, Division of Botany and Zoology (BoZo), School of Life Sciences, ANU.

Emeritus Professor Rodney W Rickards BSc *Sydney* FRACI, FAA (retired in 1999) is also a Visiting Scientist at CSIRO Entomology. Collaboration continued with Dr Geoffrey Smith in the Division of Biochemistry and Molecular Biology (BaMBi), Faculty of Science, ANU, on biologically-active cyanobacterial metabolites, in particular the calothrixins, pentacyclic indoloquinone heterocycles from the genus *Calothrix*. These structurally unique natural products possess potent antimalarial activity and cytotoxic activity, which is selective for tumour cells. Under an agreement with the ANU, and with a view to possible human application, an international pharmaceutical company has screened the calothrixins and several derivatives against tumour cell lines *in vitro*, and will now synthesise larger amounts of selected compounds for *in vivo* testing in animals. Research on a possible aggregation pheromone of the unusual velvet worm *Onychophora* continues in conjunction with Drs David Rowell of BaMBi and Judith Reinhard of the RSBS, ANU. This material is available only at mass spectrometric levels, and presents a major structural challenge. Professor Rickards' research, in collaboration with Dr Stephen Trowell at CSIRO, is directed towards the discovery of new antibiotics for human use from novel natural sources such as termites, sawflies, and other insects and terrestrial invertebrates selected from Australia's unique biodiversity. The four million species of insects that exist on Earth constitute a virtually untapped pharmaceutical resource, in contrast to the plants and microorganisms which have long been the conventional areas for drug discovery, but which are now failing to provide the structural novelty required in new antibiotics. Work to date has established the value of this new approach to antibiotic discovery, and has resulted in two international patent applications.

Emeritus Professor Alan M Sargeson BSc PhD DipEd *Sydney*, FRACI, FAA, FRS (retired in 1996) is collaborating with Dr S V Smith, ANSTO, and with Professor B T Golding, University of Newcastle-upon-Tyne, UK, on the development of detecting therapeutic agents for cancer. In this past year, collaborations have continued with Addenbrook's Hospital of Cambridge University, UK, for detecting breast cancer with the SarAr technology. The project with the Boston Children's Hospital, Harvard Medical School, to label a humanised antibody and target neuroblastoma is also progressing. Recently, Dr Suzanne Smith has also made batches of the cage complex, SarAr, for other research groups in the UK and USA and advertised its advantages at the PacifiChem Meeting in Honolulu.

Publications arising from work conducted by these Fellows and their groups are listed in the Publications Section.