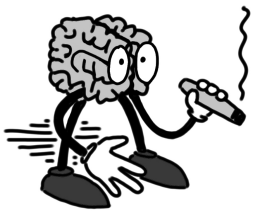

Math matters

Garth Gaudry

Groucho Marx famously quipped that he would not want to belong to a club that would have him as a member. What can we say of the Australian mathematics club of the early 21st century and of its prospects for the future? Who will want to belong to it?

Looking back at the Australian academic world as it was 40 or so years ago, the picture was extremely rosy and the attractions of an academic career irresistible to many very able young people. The same applied to careers in the CSIRO, the Aeronautical Research Laboratories and various other research organisations. The nation was hungry for scientific talent and enthusiastic about developing it; it was in the heyday of post-war expansion, and the heady excitement of the Sputnik era. The glory days of Menzies' passion for university education were at their peak. Community support for education generally, and university education in particular, was high. Though university mathematics departments were small and contained few productive research mathematicians, optimism about the future was palpable. By comparison with today, universities seemed closer to their communities, whether through research directly related to the nation's emphasis on primary production, the creative writing of novels, poetry and short stories by many of the staff of university English departments or the direct and highly visible involvement of university staff in syllabus setting and examining in the public examinations system. And university graduates were not pestered by their Alma Mater, as they are now, for donations in support of grand-sounding and expensive 'market-related' ventures of dubious worth.

In his recent article (Gazette **31** (2004), 6), Peter Hall painted a comprehensive and accurate picture of the difficulties facing the mathematical sciences in Australia. There can be no doubt, the situation is serious. In the dog-eat-dog world of contemporary Australian universities, key departments have been allowed to wither and many able people have left Australia, having given up hope of improvement. Continual cutbacks by successive governments, of both political persuasions, and the use of market forces as one of the main determinants of worth have undermined morale. Thus, there is an obsession with counting publications—but not reading them—adding up the money a person has "brought in", and counting the number of PhD degrees produced, irrespective of quality. Rarely, in the last twenty years, has a Vice-Chancellor spoken publicly about academic values, scholarship and the like. Most readers of the *Gazette* will be familiar with these facts and with many other similarly deplorable aspects of current university life.

These recitals having been made, is there anything to be done other than to accept the seemingly inevitable demise of Australian mathematics? Do mathematicians need to adopt a different outlook? I think it is clear that nothing can be taken for granted in modern Australia. Each group, no matter how worthy its cause and endeavours, has to earn its place in the sun. Bright young people have an array of job options that nobody could have foreseen 30 or 40 years ago. So the progression from mathematical ability to the honours degree, PhD and academic life is just one of many options—and among the less attractive. Why not simply take a job in the outside

world, be rewarded better and be able to afford a house in Sydney?

Australian mathematicians therefore face daunting challenges. Yet there are hopeful signs that it may be possible to reverse the trends of the past twenty years or so. In the last 18 months, the Australian mathematical community has been given extraordinary opportunities to rebuild. In 2002, the Victorian Government established the Australian Mathematical Sciences Institute (AMSI), jointly with a consortium of Australian universities and other mathematical organisations. The Federal Government announced in January 2004 the award to AMSI of the International Centre of Excellence for Education in Mathematics (ICE-EM). The combined annual budget of AMSI and ICE-EM is approximately $3M. Not long after AMSI was established, the ARC awarded the Centre of Excellence in the Mathematics and Statistics of Complex Systems (MASCOS) to a consortium of researchers spread across five universities, with AMSI as a partner. I know that the commitment to cooperate across institutional boundaries, already evident in AMSI, was a key consideration in this further success. The Federal Minister, Dr Brendan Nelson, speaking at the first AMSI Summer School in Melbourne in February 2003, praised that initiative and said that the cooperative and collaborative approach underlying the Summer School and AMSI was a model for others to emulate. Underlying these major grants is a recognition that, through national collaboration, the mathematical sciences can be rebuilt and made to flourish. This applies to schools, undergraduate education, cutting-edge research and joint endeavours with industry and commerce.

The Australian mathematical sciences community now needs to show that it can deliver on its promises by working together to make a success of AMSI, ICE-EM and MASCOS. This will require a significant shift away from past attitudes and behaviour. The dominant viewpoint hitherto has been one of "winner take all". To illustrate what is now possible through cooperation, consider the programs of AMSI and MASCOS in industry and commerce. AMSI and MASCOS have recently appointed jointly a highly qualified and very experienced Industry Marketing Manager, Dr Thomas Montague. One of his tasks will be to help mathematicians and statisticians collaborate on projects in which the pooling of expertise, wherever it is found among member institutions, will be essential. The availability of funding to support such projects is not in question. A willingness to put aside initial impulses to go-it-alone will be one of the keys to success.

Taking a further example from ICE-EM, we intend funding people in member institutions to work with colleagues in other disciplines to produce new undergraduate course material in cross-disciplinary areas, to be made available nationally. Some of the areas under consideration are quantitative biology, data mining and risk management. Based on the many positive experiences I had as Head of School at UNSW, I would expect an enthusiastic response from many people in other disciplines. Once again, the key to success is genuine cooperation and a willingness to listen to the other side.

In my time as Director of AMSI, I have been gratified by the extraordinary support we have had from people outside of the mathematical sciences. The level of appreciation of our discipline and its extraordinary impact is extremely high. Many of these people are contributing enthusiastically and generously to the work of AMSI, ICE-EM and MASCOS. I believe that one of the challenges we face in rebuilding the mathematical sciences in this country is for us in the profession to broaden our horizons and to demonstrate our willingness to cooperate, not only among ourselves but with people from the many other endeavours in which the mathematical sciences play a significant role. The future is in our own hands.

Australian Mathematical Sciences Institute, VIC 3010
E-mail: garth@amsi.org.au