

Comments on Jack Sommer's article were sought from three people very familiar with New Zealand's science and technology community. The first commentator is a science practitioner, the second a former Minister of R S & T and the third is the Government's chief science advisor. The Association sincerely thanks each for their contribution to this important issue.

Editor

Comments on "New Zealand Science Policy Reforms: Voices from the Grassroots of Science"

Neil Milestone

Dr Jack Sommer's 2000 survey reiterates the findings in the 1996 survey of discontent amongst those carrying out the science and technology essential for New Zealand's future development. We are a country very reliant on export of commodities from our primary produce sector. The success of these exports depends on a weak New Zealand dollar (hence the concern when it approached USD 0.45 earlier this year) which increases the cost of imports. To maintain or improve our standard of living in today's world, we must compete internationally in the export of high technology, high value products and although these are growing, progress is slow. Developing a 'knowledge economy' relies on having a skilled and highly motivated workforce available. As our industries in this area are few and small, the industry R&D investment is limited and government must take the initiative to provide the funding for development and growth. A real concern is that despite successive governments' commitment to 0.8 per cent of GDP for science funding, there has been little movement to this level.

It is disappointing to see there is little shift in thinking from the last survey, but that is perhaps not surprising. Even after 13 years, the way in which New Zealand funds and conducts its science and technology is changing on an almost continuous basis. Broad and sweeping changes still seem to be the norm with little consistent message to the researchers. Those who work within the system, particularly those managing research teams, have difficulty keeping up with a policy and procedures that can change direction from one year to the next. There appears to be an increasing number of parties outside the working science community who seem to want to add their own agenda to change and scientists feel they have little input into what happens. It is understandable that many Crown Research Institute scientists feel insecure in their jobs. In the early stages of change, a loss in funding meant a loss in jobs as CRI's struggled to adapt to a radically different system. Today though, the CRI's have become successful businesses, relying less on government funds so the potential for job losses no longer has the same impact. The universities now feel the pressure of change, likely to worsen after the latest Tertiary Education Advisory Committee reports, and this is reflected in the survey.

The age distribution of the survey shows a disproportionately high number of older scientists, mostly European males and reflects an historical trend. It does highlight though, the upcoming shortage of skilled science researchers and we must address how we will get scientists to stay in New Zealand. Training a scientist typically takes about 7-8 years plus the almost necessary post-doc. Thus the age distribution will not change dramatically in the near future, even if we do something about it now. However we must plan how to address it when these older scientists start retiring. The salaries of New Zealand scientists do not stand up well against international comparisons and make science an unattractive choice for young people considering where they will work. This is particularly so when most of the training is funded by students living at subsistence levels and with an ever increasing student loan. Salaries at the end of training are typically around \$46,000 to \$50,000 although in the CRI's these are now increasing. When compared with many business management and IT graduates who after only 3-4 years of university study can earn near that level of income after 2-3 years of working, there is a real financial cost in taking science. The cost disadvantage is not readily recovered over a working life except by the internationally best who can readily get a job overseas and often do.

Salary is often not the prime driver for a scientist. Scientists are creative but need the environment to be innovative and continual change does not provide that. To take science from a novel idea in a laboratory to a commercial reality rarely occurs within a 10-year timeframe. Long term funding support is needed with the opportunity to use people with a wide range of different skills. There appears to be an expectation that every project will be a winner when the reality is that only about 1 per cent will be a commercial success. To be an effective scientist, specialisation is essential to ensure leading edge research in a field, an important criterion to obtain Foundation for Research, Science and Technology funding. In New Zealand, with its low level of technical expertise in industry and its small population, there is likely to be only one place to work and that is at a CRI partly funded through government contracts. In most other professions, movement between jobs is the norm and there are usually plenty of opportunities for advancement positions.

The student perception that there are difficulties with a career in science means university science departments are now finding it increasingly difficult to attract post-graduates. As a consequence, lower funding ensues with increased pressures on staffing. The graduate shortage is now causing recruitment problems in the CRI's, who having worked through their changes are looking for new staff. Very few New Zealanders are applying for advertised positions so we must recruit overseas for essential positions and offer higher salaries thus putting pressure on the base levels. If salaries do rise, New Zealand scientists might be retained here instead of moving overseas.

Despite major efforts by the Royal Society of New Zealand and the CRI's to portray scientists as people working for the community, the public perception of scientists continues to be that of back room laboratory "men in white coats." The media rely on sensationalism to grab people's attention and unfortunately, we tend to only get headlines if there is something controversial. Reporting seems to be particularly bad in New Zealand where media largely choose to ignore science or presents an unbalanced view. Even when we celebrate our successes with Royal Society medal presentations, despite adequate publicity the media are notable by their absence. A point remarked on by the Minister, at this year's presentations. Still, the visit earlier this year by New Zealand's Nobel Laureate did help to raise the profile of how successful a New Zealand scientist can be, particularly when it was quickly realised he was very much an ordinary person. We must all work towards changing public perception of the value of science and technology and how important its contribution is to New Zealand's well being, now and in the future.

On a personal note, my son worked at the Industrial Research Limited after completing his BSc degree and before going on to his next degree. At one point he said to me "Is there something wrong? Working at IRL is fun. My work is great and I can see where it could be used. All my friends hate the jobs they are doing with their degrees in art and philosophy". I do not think he has it wrong, as working in science is fun. He is now studying pulp and paper chemistry at a Canadian university because he was unable to get funding here. The industrial problem he is working on has real interest for New Zealand. This has not always been a hallmark of many New Zealand university courses in the past. Perhaps that is the key to the unease of some of our scientists. The old style training at universities was largely academic and we became isolated from what is needed for New Zealand. We were not taught those skills necessary to work with industry. CRI's now need graduates to work with industry, both to solve their problems and to develop new ideas for them. Fortunately courses are changing, often through closer collaboration between CRI's and universities. Long may that continue. We each have a very definite role to play in ensuring New Zealand is able to ride the 'knowledge wave'. Will my son come back to New Zealand? I certainly hope so, but he will need an employment climate that will offer him stability, with a clear career path and adequate reward for over 8 years of study.

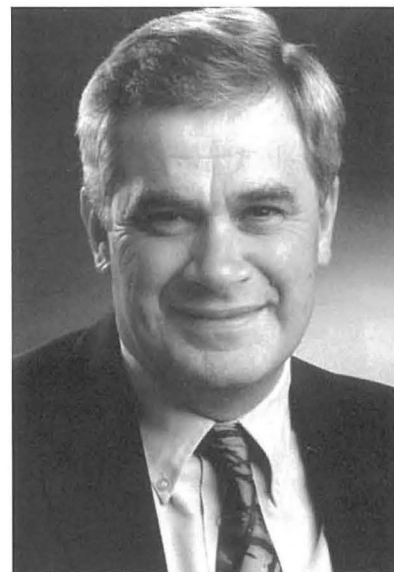
The importance of this survey is summed up well by Dr Summer when he says,

[The] two surveys of New Zealand scientists ... provide unique, baseline data on the attributes and attitudes of New Zealand's science community...

By using this baseline data ... future changes in the science community may be monitored, and performance measures developed. The surveys may also serve as a source of fundamental data for public or private policy making, a voice for scientists, and an instrument to enhance public understanding of science and technology. Each of these survey functions can contribute to different aspects of the continuing effort of New Zealand to make the best use of limited resources and highly skilled personnel. The strong response rate to these surveys should give confidence to those who might fund future surveys on a regular basis.

Dr Summer has signalled some real concerns. It is my hope that these findings are heeded and some action is taken, as New Zealand's future depends on its science community.

Dr Neil Milestone is the Chairman of the Executive Committee of the Royal Society of New Zealand Council representing the Physical Sciences Electoral College. He initially graduated from Victoria University of Wellington with a MSc(hons) in Chemistry. His PhD studies were at University of



Waikato in Soil Chemistry, and he was one of the first science graduates there. He joined DSIR Chemistry in 1973 and gained international recognition for his work in cement hydration and geothermal cementing systems. His work was recognised by the NZ Institute of Chemistry with their Shell Industrial Prize in 1994. He was also a key member of the DSIR group working with zeolites and development of the synthetic fuels plant at Motonui who were awarded the NZIC Shell Industrial Prize for their work in 1991. The Royal Society awarded him an S&T Medal for his research into silicates and catalysis in 1997. Neil was awarded a DSc by Victoria University for his research into the chemistry of industrial silicates in 2000.