Australian Government

AUSTRALIA'S CHIEF SCIENTIST

2012 SOUTH AUSTRALIAN SCIENCE EXCELLENCE AWARDS GALA
(BEGAN IN 2005)

10 MINUTE SPEECH

MATHEMEMATICS, ENGINEERING AND SCIENCE IN THE NATIONAL INTEREST

INTERCONTINENTAL HOTEL, NORTH TERRACE, ADELAIDE

17 AUGUST 2012

CHECK AGAINST DELIVERY

Good evening and thank you for inviting me to be a part of this celebration of science in South Australia.

In all of the speeches I give, from pre-schoolers to Rotary Clubs, about the importance of science, I enjoy two types the most. The first are graduation speeches because they infuse me with optimism because of the potential of our future scientists and how they have the skills to reshape our world.

My other favourite speeches are awards. They serve as a great reminder of the exceptional talent we have in this country and the profound effect our work has on the health, prosperity and sustainability of Australia and throughout the world.

As Professor Bursill mentioned, South Australia's science talent pool is rich and has been for a long time, and I congratulate those here tonight, who will add to that long list in the State's history.

I have been invited to take part here tonight in my capacity as Australia's Chief Scientist to talk about a report that my office released in May this year regarding Mathematics, Engineering and Science in the National Interest.

Although it was already an interest close to my heart and one I intended on examining within the Health of Australian Science Report, the Prime Minister beat me to it by asking that I provide her with advice on means to encourage greater participation in mathematics, statistics and science courses of study at university.

The reason for her request was the sense that doing nothing to attract students into these courses at university means that the number won't meet future needs and that will have an adverse effect on our national interest.

So I start with a simple premise. It is, I think, through scientific knowledge and its application, through the wise use of technologies, that we will secure a prosperous future for ourselves – prosperous in all senses, economic, social and cultural – and our security.

As I have already stated, I am proud of Australian science. We perform well at the international scientific table. With 0.3% of the population, we produce around 3% of the world's scientific publications. We have significant expertise in many areas.

And yet despite this, by and large, many, maybe most Australians are disengaged with science. You can see this in our university science and mathematics enrolments. You can see it in the projected shortages in engineering, statistics and the research workforce. And you can see it in the ways the public conducts scientific debate whether it be about climate change, stem cells or nanotechnology.

This is an important time in our country's history. The problems we face – indeed, the problems that the world faces – won't be solved, or even managed without science and technology. Yet it is not clear to me that most people, or even many people, really understand the importance of science and technology to our future.

In fact a survey conducted early this year - of year 11-12 students in Australia indicated surprisingly little understanding of the science all around us, all the time, and its value[1].

Of those studying science, just 33% thought science was 'almost always' relevant to their future (although 47% thought it 'almost always' relevant to Australia's future!) and only 19% thought it 'almost always' useful in everyday life.

[1] Goodrum, D, Druhan, A & Abbs, J 2012, *The Status and Quality of Year 11 and 12 Science in Australian Schools*, Report prepared for the Office of the Chief Scientist by the Australian Academy of Science, Canberra.

Of the students **not** studying science (roughly one-third the cohort), 1% thought it relevant to their future ‘almost always’ (42% thought never) and 4% thought it ‘almost always’ useful in everyday life, 42% thought sometimes and 18% thought never. Considering the science and mathematics in everything from their school shoes, clothes, plastic bank notes, television, mobile telephone and food, this is profoundly discomforting.

Most of us in this room probably assume or hope that people think science is ‘a good’ – as we doubtless do. We are probably all quite sympathetic towards science and mathematics, so it may surprise us, but many, maybe most people seem to take it for granted.

Nowhere can this be seen more prominently than in our attitudes to food and agriculture. A recent survey found that 75% of school children thought that cotton socks were made from animals, and 27% were convinced that yoghurt was a plant based product[2].

As a society, we are almost entirely disconnected from the food production and distribution process. Very few of us have visited an abattoir, even fewer a cotton farm. And yet

[2] Rocard M et al. Science Education now: a renewed education for the future of Europe. Directorate-General for Research, European Commission, 2007.

with no knowledge of the process, we continue to expect quality foods on our supermarket shelves day after day.

And while I agree that science, mathematics and engineering hold the solutions to many of our future challenges, assuming that science will always be there when we need it is incredibly risky, especially if we can't engage and inspire the younger generations to pursue science.

This brings me to my next point. In our country, students have a right to choose what they want to study, and rightly so. So our task is to make the study of science, mathematics and engineering so compellingly interesting, with employers offering fantastic career options, that greater numbers than ever will want to study them.

We have some way to go. In 2002, something like 22% of the graduating class from Australian universities was in the sciences, technologies, engineering and mathematics (STEM). The proportion in China in 2002 was 52%, Japan 64%, South Korea 41%, Europe 27% and the US 17%. Since then there have been strenuous efforts to change those percentages – in the US with additional funds and a target of an additional one million (STEM) graduates over the coming decade on top of their present three million, and in Europe where it was declared: *because Europe's*

future is at stake decision-makers must demand action on improving science education (at all levels)[3]. And they did.

I have argued that we, too, need to change. Fortunately, the Australian Government has now provided resources to support science and mathematics education, in response to the recommendations made in the report.

So where do go from here and what is the best way to encourage more students to take science at university?

We need to consider the option of offering students scholarships straight out of high school to study science. Sometimes it means cadetships – giving them access to businesses and careers from year one of their degree.

But mostly, we need to make science inspiring again, make it interesting.

One survey found that one of the main reasons students don't take mathematical sciences or science is because they think it's boring. As was written in a US journal, we do to our students what was done to us. We promote rote learning, memorizing and regurgitating. And there are those of us old enough remember how bad that was.

[3] Rocard M et al. Science Education now: a renewed education for the future of Europe. Directorate-General for Research, European Commission, 2007

So we do have to come to terms with the fact that we live now in a different world. We need to think about how we deliver science, mathematics and engineering to a generation of students who have many, many, many more options available to them than we ever had, and who make choices.

The issue for us is how we make it so fundamentally interesting, so grippingly interesting that people will come in numbers because they'll want to do it. First at school, then at university.

The reason it is so important to have students studying science in high school is partly to increase the numbers that go on to university, but also partly because we need to develop a science literate community.

We need to change the way our community thinks about science, mathematics and engineering. And give them the information they need to make informed decisions about what to do, and what is important.

That is why nights like tonight are so important. It shows the community that science is not only valuable but valued; and it is these affirmations that enable perceptions to change and inspire people to aspire!

Thank you.