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AUSTRALIA'S CHIEF SCIENTIST

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CHECK AGAINST DELIVERY

Good afternoon, and thanks to the Royal Society of Victoria for inviting me here this afternoon.

The Royal Society of Victoria and I have much in common in our views about science, its role in society, and particularly the pivotal role science awareness plays in shaping our society into the future.

Like the Society, I too believe that scientific development and its practical translation holds the key to a healthy, prosperous future for all Australians. As our dependence on scientific development increases, the role of science advocates such as the Society only becomes more important.

Although I have been quoted a bit recently saying that I don't like to live my life looking at the rear vision mirror, I do take exception when reflecting on our rich history of pioneers, explorers and innovators.

Those who could see the value of doing things better by embracing new ideas. The Society has long supported such endeavours, in diverse fields from the first Australian Antarctic Exploration Committee in 1885 to the iconic Burke and Wills expedition, the 150th anniversary of which was commemorated last year.

I see this spirit of pioneering and exploration continued today in Australian science, developing new ideas to improve the lives of Australians. Ideas such as WiFi, developed at the CSIRO, which lets me check football scores no matter where I am, or new therapies such as Gardasil, developed at the University of Queensland, which is the first vaccine against cancer.

As our population grows and pressure on resources mounts, we face more of these complex problems that require scientific solutions.

It is only through scientific advancements and their practical implementations that we will secure a sustainable future for our country.

Science holds the key to our continued prosperity. Yet we live in a time when there is a disconnect between the relevance of science to everyday life, and the public's perception of it.

This is reflected in the declining rates of science participation in the senior years of school, reported in the *Health of Australian Science* report released by my Office in May of this year.

In line with participation, we found scientific literacy was also slipping. On a positive note, we found that the rate of decline had slowed, but not yet stabilised.

So, despite living in an age where they are touched by science in almost all facets of their life, students are not engaged with the study of science.

I want to share two statistics with you which demonstrate this disconnect. First, in 2011, it was estimated that 60 per cent of all Australians had a smart phone¹, and this number is growing quickly. Figures from the UK indicate this is likely to be higher for teenagers.²

Secondly, as I have spoken about before, our younger generation seems disinterested in science. Of the year 11/12 students **not** studying science in 2011, only 4 per cent thought science was 'almost always' useful in everyday life while 60 per cent thought it 'never' or only 'sometimes' useful; 1 per cent thought it relevant to their future 'almost always' while 42 per cent thought 'never.'³

So despite having a technological marvel made possible by science in their back pocket to give just one example,

¹ Various primary sources, collated in DejeanSEO report, Smartphone usage in Australia 2011. <http://dejanseo.com.au/smartphone-usage-in-australia/>

² OfCom Communications Market Report, 2012., pg 13

http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/CMR_UK_2012.pdf

³ Goodrum et al 2012, The Status and Quality of Year 11 and 12 Science in Australian Schools

many young people don't see science as relevant to their life.

The picture of science in higher education is more complex than secondary school. In the *Health of Australian Science* report, we found that enrolments differed greatly by field of study. For example, health science had robust enrolment, whereas agricultural science had decreasing enrolments and our capacity in this field is vulnerable. Our approach to building and maintaining our scientific capacity must be tailored, and reflect student enrolments, capacity and the national interest.

To ensure a prosperous future, we need more Australians with a science education, not less. This is because the study of science prepares people for a lifetime of learning, critical thinking and seeking evidence to understand the world around them.

This has value far outside the traditional scientific disciplines which is demonstrated in the data presented in my *Health of Australian Science* report, and particularly in another report I recently had the privilege of launching - "A

Background in Science: What science means for Australian Society”.⁴

The report by Doctor Kerri-Lee Harris surveyed 800 science graduates to examine the way they have used their science degrees and how the degree influences their lives in a broader sense.

Career wise, the report found that only 40% of science graduates ended up as ‘working scientists’.

However 97% of all respondents, *regardless of the field of work they were in*, found their science knowledge or skills useful in their work.

These statistics show us that an understanding of science is more than knowing the specifics of a field of study. The way science teaches people to think, critically and looking for evidence, is valuable in a whole range of professions.

As I alluded to earlier, Australians don’t necessarily value science conceptually, but we are often quick to take up new scientific innovations. In fact, to return to my early example about smart phones, we have some of the highest per capita uptake in the world.

⁴ Harris, 2012. A Background in Science: What Science Means for Australian society.

We are not Luddites, and are happy to embrace new and innovative technology. At the same time, science literacy is falling, and science is not seen as relevant to daily life.

So how do we bridge this gap? I believe it falls to organisations such as my Office and the Royal Society of Victoria to advocate for and raise awareness of science in the wider community.

We shouldn't be afraid to engage the public in science discourse. This is especially true now, when the debate about scientific issues such as climate change has become mired in politics and rhetoric.

As the American orator Robert G. Ingersoll said "Science is the enemy of fear and credulity. It invites investigation, challenges the reason, stimulates inquiry, and welcomes the unbeliever."

We need to engage in dialogue precisely because the pressing issues of our time pertain to science. We cannot let spin doctors and shock jocks dominate the conversation. In a time of information overload, we must increase science literacy in the wider community so that people can interpret and be critical of information, identifying the differences between opinions and evidence.

I believe that increasing science literacy in the community requires engagement on all levels. But I think this is particularly important for our young people. In addition to the benefits I just outlined, there is another reason to increase science awareness in the very young, and it's one that shock jocks and scientists can agree on.

Research by the Nobel prize winning economist James Heckman found that investment in early childhood education has significant economic and social benefits.⁵

On the economic side, investment in early childhood education has high rates of return, improves the returns of later educational investments and mitigates expensive remedial educational intervention later. It also has life-long social benefits, particularly for vulnerable children.

Therefore, raising science awareness can help students now, and throughout their lifetime. Science literacy also helps Australia as a whole, now and into the future.

The skills, knowledge and imagination of scientists will meet the big challenges society faces now, and in future. Challenges like climate change, energy and food security and treating medical conditions. For this to happen in the

⁵ Heckman and Masterov, 2004. The Productivity Argument for Investing in Young Children. http://jenni.uchicago.edu/Invest/FILES/dugger_2004-12-02_dvm.pdf

future, science education must meet the needs of the students of today, whose inquiring minds will shape our future scientific endeavours.

Children like to inquire, to ask questions. I am sure every parent here, like myself, has experienced the “why, why, why” phase our children go through. Endless questions about how everything works, from why is air invisible to how cars work to why paints makes different colours when you mix them.

Children look at the world in constant enquiry and wonder. And this is exactly what scientists do. They look at the world and ask “why”. And they don’t stop asking until they get an answer. I cannot put it better than the twice-awarded Nobel Laureate Marie Curie, who said “I am among those who think that science has great beauty. A scientist in his laboratory is not only a technician: he is also a child placed before natural phenomena which impress him like a fairy tale.”

And on that very fitting note, it is with great pleasure that I officially launch this year’s Royal Society of Victoria’s fund raising program for the very important purpose of promoting early childhood awareness of and participation in science.

I cannot emphasise enough how important this cause is and I look forward to seeing the outcomes of your great work.

Thank you.