Australian Government

Chief Scientist

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FRONTIERS 2014: THE ART, SCIENCE AND FUTURE OF OTORHINOLARYNGOLOGY

20 MINUTE ADDRESS FOLLOWED BY 15 MINUTE Q&A

THE PROBLEMS AND POLITICS OF SCIENTIFIC ACHIEVEMENT

31 JULY, 2014

SHERATON ON THE PARK, SYDNEY

It is a great pleasure to join you at the global frontiers conference.

This is also the right time of year to be discussing this area.

There is nothing like a head-cold and a stuffed nose to remind you how much you enjoy the privilege of breathing.

How hard it is to sneeze with any dignity.

How limited is the technology of the tissue.

There is an old Spanish proverb: *From the bitterness of disease man learns the sweetness of health*.

Canberra in late July, even Sydney althouth it is several degrees warmer, can be an excellent classroom.

It is in our nature to complain about the minor troubles we suffer, rather than be thankful for the larger ones we are spared.

But perhaps we would do well to reflect occasionally on the experience of our forebears, when confronted with problems of the ear, nose and throat.

Consider the popular treatments on offer for ear-ache in the nineteenth century, as documented by Sir William Wilde. [Queen Victoria's ear surgeon, as well as Oscar Wilde's father.][1]

- The physician of his day would begin with warm almond oil, dripped into the ear.
- If unsuccessful, he could proceed to turpentine – then a slice of bacon, inserted into the ear every second night.

[1] Sir William Wilde, *Practical observations on aural surgery and the nature and treatment of diseases of the ear* (Dublin, 1853) http://www.archive.org/stream/practicalobserv00wildgoog#page/n4/mode/2up

- After that there's nothing for it but a week at the seaside, plenty of fresh air and several tots of rum.

It is all in essential respects the same treatment prescribed in 1500 BC in the Ancient Egyptian Papyruses, the world's oldest known medical texts – swapping frankincense for turpentine.[2]

From Ancient Egypt to Victorian Britain, we have had no better answer to our suffering than this: guesses, superstition, and hope. And, I suppose, rum.

If we no longer put bacon in our ears, we have science to thank.

We look instead to the remarkable horizon that the speakers in this conference will outline.

- A world made more liveable through science and research.
- Businesses and jobs, founded on that research output.
- A healthier population, equipped to learn, to work and to live well.

If we were far-sighted, we might look to the future, and see that all progress is founded on opportunities such as these.

So why have I come today to speak of the 'problems' of scientific achievement? Why not the 'problems' of ignorance instead?

The relationship between our science and our society is far from straightforward.

If we doubt it, we need only look at the massive social divides in ear, nose and throat health in this country:[3]

[2] Kennedy Hunter, *A Short History of Otolaryngology* (Belfast, 1951) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2479702/pdf/ulstermedj00165-0022.pdf

- Indigenous children are still five times more likely than non-Indigenous children to be affected by complete or partial hearing loss.
- The rate of middle ear infection in some Indigenous communities is ten times higher than the 4 per cent defined by the World Health Organisation as a 'massive public health problem'.

So our capability that allows us to do something good does not always mean our society gets it done.

By the same token, our enthusiasm for the benefits of science has not always led us to think about securing those benefits into the future.

When Australians are asked about science, they tend to respond positively.

The Australian National Centre for the Public Awareness of Science surveyed over 1000 Australians this year.[4]

- 88 per cent said that a career in science was a good idea.
- 79 per cent agreed that Australia should be a world leader in science.

It seems we are particularly enthusiastic about research touching on our health.

- 72 per cent were interested in information about medical discoveries – compared to 63 per cent for scientific discoveries more broadly.

Encouraging signs, particularly for the people in this room.

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[3] Burns J, Thomson N (2013) *Review of ear health and hearing among Indigenous Australians*. http://www.healthinfonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review

[4] Australian National Centre for the Public Awareness of Science, *How do Australians engage with science?* (April 2014) http://diffusion.weblogs.anu.edu.au/files/2014/05/Searle-S.D.-2014.-How-do-Australians-engage-with-science.-April-2014.pdf

But consider this. When asked to name any Australian achievements in science, less than half were able to think of something specific.

The winner by far was the Cochlear implant, which occurred to just 17 per cent of people.

We clearly have some way to go in communicating what you do – or how central it is to **our** future.

This is not just the finding of one survey.

- It is a challenge we see writ large in schools. Australian schools show a decline in the rates of participation in 'science' subjects to the lowest level in 20 years.[5]
- The challenge continues down the pipeline from study to work. We are looking offshore for the workers we are failing to train. Australian businesses sponsored no fewer than 11,360 457-visas in professional, scientific and technical jobs between 2008 and 2012.[6]
- The Australian Industry Group has warned that "Our relative decline of STEM skills is holding back our national economy and causing real frustration for employers."[7]

The Royal Society recently observed that, "In science and mathematics there is a **fortunate** coincidence between the intellectual and cultural needs of the individual and the economic needs of the nation."[8]

So there is a push factor, and a pull factor – and still the pipeline isn't flowing. Still there is much to learn and much to change.

[5] T. Lyons J. Kennedy, F. Quinn, *The continuing decline of science and mathematics enrolements in Australian high schools.* In press.
[6] Department of Immigration & Citizenship, Subclass 457 Statistics
[7] Australian Industry Group, *Lifting our Science, Technology, Engineering and Maths (STEM) Skills* (2013).
[8] https://royalsociety.org/~/media/education/policy/vision/reports/vision-full-report-20140625.pdf

Economists and people who think like them would refer that conundrum off to the market. I would suggest we listen to the voice of experience: a science system left to drift will run aground.

When we speak of the science system, we are speaking of a pipeline of skills, stretching from earliest exposure to science in the classroom all the way through a lifetime of learning.

We are speaking of the culture that shapes the choices individuals make around risk: the personal risks they accept in planning their careers; the business risks they take on when contemplating a new endeavour; and the societal risks they recognise when they make their choice at the ballot box.

We are speaking of complex physical and human infrastructure that takes time to grow to scale.

And we are speaking of a body of knowledge built on the collective efforts of researchers all over the globe – of which we are a net beneficiary, by a very wide margin.

It defies all logic to pin our hopes on benign neglect. To assume that it will be alright, because it has been alright.

What we require is a fundamental shift in our thinking – from science on the margins, to science at the core.

- Science at the core of public policy and our agenda for Australia.
- Science at the core of the school curriculum and the higher education system.
- Science at the core of the way every business functions.
- And science at the core of the image of Australia we project to the world.

For that, we require a plan.

We will otherwise be doomed to repeat the mistakes of the past: on-again, off-again policies; too often based on terminating programs; too rarely linked to national priorities; operating on too small a scale to achieve an impact.

Some might, and some do, accuse me of ambition. I would suggest that we are not short of ambition in this country.

When it isn't about sport, it is for items like a Synchrotron, for example. For a research vessel. For a Medical Research Future Fund.

For my part I welcome investment in science, as I welcome the recognition that such investment yields returns in both economic and social terms.

But surely we need to support these ambitions with a framework that might allow us to be clear about their implications.

- How, for example, will a measure on the scale of the new Medical Research Future Fund influence the priorities of institutions and individuals, in the business sector as well as the research community?
- How will it accommodate what we now don't do that we could, by contrast with just giving a bit more money to a few more people to do what they will? How about the undoubted need for translational research and for clinical trials?
- What sort of skills are required to support excellence in medical research, and how can we ensure the pipeline is there to sustain it?
- What are the risks attached to a shift in our research profile that the Future Fund could introduce – and what opportunities might it open?

- What does it mean for our international engagement?

I do not know if we yet have the answers.

As I say, this is not by any means a concern unique to this fund. It is instead the daily reality of decision-making in a system built of fragments.

We struggle today to even count the number of maths-trained teachers in state schools – let alone think strategically about the capabilities we ought to take to 2050.

I am not suggesting that we can change the terms of the debate overnight.

I *am* suggesting that we cannot expect to prosper with a withered sense of what Australia can and ought to be.

The good news is that we have good science, good potential and many opportunities – plus the need.

You in this room have an inspiring and important story to tell about our future.

Our job, your job, my job, is to provide the best possible evidence that you can as you engage in the unbiased search for knowledge and its translation into goods and services that will improve the lot of human-kind. And to explain it carefully and clearly.

Let’s not speak about our future with bacon in our ears.