



Australian Government

Chief Scientist

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LAUNCH OF *TECHNOLOGY AND AUSTRALIA'S FUTURE*

Challenged to change

**Shine Dome
CANBERRA**

Stumbling to progress

About 2.6 million years ago a human ancestor picked up a rock somewhere in East Africa and knocked off a bit to make a sharp-edged flake.¹

Before that, we were users of tools. Now we were toolmakers – and we might say that tools had begun to make us.

But our ancestor didn't know that when he or she picked up the rock.

We didn't come together as a tribe, much less as a species, and decide on the balance of the evidence that tool-making was going to serve humanity well.

We didn't envisage that tools would in time allow our descendants to spread across the Earth and dominate all other forms of life.

We didn't foresee that food could come in packets, water from a tap, light at the flick of a switch.

We didn't imagine all the gadgets on which we now collectively spend about US\$1 trillion, every year.²

But nor did we imagine the 42 million tonnes of unwanted gadgets dumped in 2014 alone.³

Nor did we think about the 8 million tonnes of plastic waste that enter the oceans, every year.⁴

¹ Smithsonian National Institute of Natural History, 'What Does It Mean to be Human? Tools and Food'. Available <http://humanorigins.si.edu/human-characteristics/tools-food>.

² Variety, "Electronics posts record 1 trillion in sales driven by new smartphones, tablets", January 5, 2015. Available: <http://variety.com/2015/digital/news/electronics-biz-posts-record-1-trillion-in-sales-driven-by-new-smartphones-tablets-1201392613/>.

³ Baldé, C.P., Wang, F., Kuehr, R., Huisman, J. (2015), The global e-waste monitor – 2014, United Nations University, IAS – SCYCLE, Bonn, Germany.

⁴ Jambeck et al, "Plastic waste inputs from land into the ocean," *Science* 13 February 2015: Vol. 347 no. 6223 pp. 768-771.

Nor did we worry that human beings would acquire the technologies to build the capacity to destroy themselves - in ever more ingenious ways.

We saw only what we wanted, and a way to bring it about.

And so we have continued to this day – in little steps or bigger leaps, never knowing where they would take us over time.

There is no inevitable path. There is no guarantee that the steps will be wise, or that humanity will be better off because we took them – next year, next century, next millennium.

There are only fallible people, with short memories, and limited imaginations, making choices, as best they know how.

Today we are a world of some 7 billion people, heading to a world of 9 if not 10 billion people by 2100.⁵

So how do we make the decisions about the technologies that will make us who we are?

And how do we maximise the chances that our decisions will ultimately serve us *and* our descendants well?

In short: how do we face the future?

Responding to the impetus to change

In the past, we might have set out to be ‘future-proof’. Our Prime Minister has observed, and he repeated it last week, that the phrase is well-meaning, but unhelpful.⁶

You build a bomb-proof shelter to be safe from bombs. You build a rabbit-proof fence to keep out the rabbits.

⁵ Wolfgang Fengler, “Will the World Reach 10 Billion People?” Brookings Institute, September 4 2015.
<http://www.brookings.edu/blogs/future-development/posts/2015/09/04-global-population-growth-fengler>

⁶ <http://www.businessinsider.com.au/malcolm-turnbull-disruption-is-our-friend-2015-9>.

But the future is not a threat from which we need protection – or can be protected. It is something we can shape by our actions today.

So instead of future-proofing we ought to talk about future-priming – building those assets and skills that position us to benefit as best we can from change.

That, on my reading, is the challenge that has been put to us, as people who reflect and occasionally offer opinions on these things.

So this is a timely paper from the Australian Council of Learned Academies (ACOLA).

It was one of the initial six papers commissioned in the Securing Australia's Future series in June 2012.

The intent behind this series was simple: we can't know the future, but we ought to know it's going to be different, so we may as well think as constructively as we can about how to make it better. How to focus on opportunity, not anxiety.

We have many tools across the research community for thinking about the opportunities: tools developed within different disciplines, which help us see a richer and more complex picture than any one perspective alone.

So when the Office of the Chief Scientist and the Australian Research Council (ARC) got together to commission this program and these papers, we did so quite deliberately through ACOLA.

We wanted to bring together the expertise and the perspectives of the different disciplines that are found within the four academies.

We also wanted to look at the chosen topics all the way to the horizon.

This was a reflection of the fact that the government of the day (and several of the ministers) were losing interest when the agenda of Prime Minister's Science Engineering and Innovation Council (PMSEIC) was so far ahead of the exigencies with which they had to deal that it had little immediate relevance to their needs today.

We had to develop a process that would give advice on the immediate to short-term, as well as advice about positioning on some topics that would see us well prepared for the medium to longer term. We did, and this Securing Australia's Future program is part of the latter.

Our final requirement as the contractors was that the reports should provide evidence from which recommendations could be drawn – by a group using the evidence provided but comprising people mostly outside the Expert Working Group (EWG). That is to say, the Chief Scientist, together with the chair of the EWG and officials would draft recommendations for consideration by government.

It was the feeling that a more 'arm's length' approach to recommendations, relying on the evidence provided, would have the weight of them not being put together by experts with a particular interest. I have seen no reason to change that feeling.

Education is the key

Other speakers will expand more fully on the findings of this report – talk about the evidence, if you like - but to me the take-home message is simple.

We are not just a species that uses technology. We are a society of technology users.

So every one of us needs to be part of that society, and the education to be able to contribute meaningfully to deliberations about the way forward.

And if enough of us have that grounding, beginning in primary school if not pre-school, then from it will flow the pipeline of STEM-trained people we require.

People with the encouragement and support to be the scientists, technologists, engineers and mathematicians who will provide us with the opportunities to survive and prosper in a competitive, probably hostile world.

And STEM literate people who will help us to make the ‘moral judgement’ that Tony Blair once talked about – because we all know that technology can be used for good or for ill.

We have to choose, and fear-mongering feeding off ignorance is hardly a healthy part of the conversation. We have to be better than that. And STEM communication will be a key. People will need to see the difference between evidence and snake oil.

Alongside this, we must remember the importance of the humanities and the social sciences. It is they which will play an important part in the future: from the design and development of technologies to the decisions we will have to make, the understanding of where we came from, how we got there (or

here) and the societal implications and possible responses to certain action or inaction.

There is not one piece of this puzzle that is not important to the nation, indeed to the world, that we are trying to build.

The key to it all is education.

- Education that allows individuals to pursue many different paths, but gives them a common language and sense of purpose.
- Education that teaches us our history in ways that help us shape the future.
- Education that engages us, excites us, inspires us.

It is an important message and a worthy outcome of this report.

So 2.6 million years ago a human ancestor picked up a rock.

I'm glad he or she did.

I hope that our descendants, whoever they are and wherever they are, will be glad for the decisions we made.

On that note, I am pleased to launch *Technology and Australia's Future*.

Thank you.