



Australian Government

CHIEF SCIENTIST OF AUSTRALIA

ADDRESS TO THE NATIONAL PRESS CLUB

CANBERRA

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Good afternoon.

It's a great pleasure to be with you today, for the fourth time, I believe, but this time in my new capacity as Australia's Chief Scientist. I look forward to having my free membership of the Club renewed – and promise I'll be back in a year looking for the same outcome.

Let me start by assuring you that after one month in the job I know that I am far down a learning curve with a steep slope in front of me. It's a familiar place - I have been down here before. Different curves maybe, but way down nonetheless. So at least I know what to do – learn before you speak.

This afternoon, therefore, I will focus on a bit of 'the vision thing': my role, not statistics and not great detail.

First question then: why did I accept appointment as Chief Scientist? There is a simple response:

- The value of good science to our nation and the world is colossal – and I want to work for Australian science and its place in the world.

Science has got us to where we are today – many of the good bits and sometimes the bad; and it holds the key to our future.

It is the key to understanding and tackling the big issues we face as a nation and as a world.

Now, if science is so important – you may well ask - why does it struggle to cut through into the mainstream debate?

Unfortunately, we seem to be living in a world where sport, celebrity and the 24 hour news or, more accurately, a 24 hour commentary cycle sprinkled with news, seem to dominate relentlessly.

- Do any of us really believe that the future of the world depends on whether the Swans win this year's flag?
- Does it really matter who wins MasterChef?
- And do we care if Shane Warne and Liz Hurley are about to get serious?

Of course, in the global scheme of things, none of these things matters much at all.

But science does.

Science can cure diseases. It has given us GPS and mobile 'phones, and it has given us the 'talking movies' and the internet.

But because it's everywhere, we don't often seem to think about what science has done for us, just as we sometimes seem to take both the power and the potential of science for granted. As in, she'll be right, it'll be there when we need it.'

But make no mistake, our future as a nation, our prosperity, our quality of life and the well being of the entire planet, all depend very much on science.

And as the challenges we face become increasingly complex, the importance of science, and the understandings derived from good and properly conducted science, will become ever more important.

To address the big issues – which include sustainably securing our economic, cultural and social prosperity – we require the input, the expertise and the guidance of our scientists.

So we need them, and we need their expertise, in many fields and across many fields. To get them we have to continue to invest – in the right way, in the right place - and with the right amount and at the right time.

Unfortunately, expenditure on science is too often seen as a cost – something that is somehow taking away from other more pressing, more immediate needs. And its value gets lost in the ‘it costs a lot’ argument.

But far from being just another cost, expenditure on science is a sound and prudent investment. We must encourage the Government to continue its commitment: it will reach nearly \$9.4 billion this financial year and includes a record investment in CSIRO, important provision for infrastructure, supporting better the indirect costs of research, growing PhD scholarships and other important elements. We need also to provide the Minister with the evidence to argue for growth.

And we have to make clear that we are in it for the long term. The dividends may be now, tomorrow, or they could be 10, or 20 or 30 years away. We need them whenever they come.

In that regard, does anyone really think that the public research funds spent over years on much of agricultural research or energy or the cochlear implant, the cervical cancer vaccine or the influenza drugs was not an investment?

Of course not.

In economic and in quality of life terms, for ourselves and others around the world, investments like these have been an unparalleled success.

Australia must continue to expand its scientific capabilities if we are to remain internationally engaged, competitive and relevant.

And sure... this costs money. And of course how much will always be a judgement call

But if we want that prosperous, healthy and secure future we must organise for it and continue to invest for it. It won't just happen because some time out there we will wish that we had.

We don't want to find ourselves in the situation of importing skills, technology and know-how – we don't want to go back to what we used to be.

Let me remind you.

For the first half of the last century, there was little (not none, but little) research done in Australia. The CSIR (later CSIRO) was established in 1926 – but research was not seen to be a central function of universities. This was not true in Germany from about 1810, or the United States where teaching inspired by research on the German model flourished from the 1860s.

Britain was slow to follow: Oxford introduced the DPhil (PhD) based on the German and US model in 1914 (the first in the UK to do so).

We were like Britain, just slower: we produced our first PhD graduate from the University of Melbourne in 1948.

In a manner of speaking, Australia was then a mendicant country. We contributed little to the world's stock of knowledge but we hoped to get what we needed when or whenever we needed it. Some would argue that we often got something, but not always what we needed.

Then in the mid-1940s, post-war reconstruction of Australia was planned and led by politicians and public servants with imagination and vision. They saw that it was time for a 'new' Australia, a different Australia that was socially, economically and culturally prosperous, and an aware and respected international citizen.

To that group, it was not an option to let Australia become again a country that depended so much on what others did. It was accepted that we needed to contribute to the world's knowledge, and through that contribution help Australia assume its proper

place in world affairs – as it was put. They sought to change the culture – and they did.

They established the ANU as a research hub; they encouraged other universities and now Australian universities educate students in a research-rich environment and are major contributors to research and development and innovation.

But sometimes prosperity breeds complacency. Now I sometimes hear: why? Why can't we let others do the hard yards, do the investment and carry the cost, while we float by extracting what we want for a minimal effort? Not earn our place, just expect it. A free rider.

We are small in population terms. We are small in university terms. We are small in research terms. But we do make, in many fields, a major contribution to the world, partly through our publications and their quality, partly through the perspective that comes from being who we are, and partly through the particular perspective that comes with being where we are. And while we may contribute just 4 or so per cent to the world's knowledge, we also must have people with the capacity to use some of the 96 per cent to our advantage.

I think that those planning reconstruction after 1945 can be proud of their legacy. Those of us who have inherited it need to make sure that it is not squandered. It is up to us to ensure that our contribution to knowledge is of a high order, and of high quality, so that Australia's place in 'world affairs' is secure. It will be secure if we have something to say, and it will be because the world wants to hear what we have to say - because of what we

do. And to paraphrase Simon McKeon *because we do something more than look after ourselves.* (*The Age*, 19 June 2011).

It does mean that we have to be serious. We can't be unaccountable and we can't just drift. We have to be considered and purposeful. And our work has to be of up there with the best. Our decisions and our policies must be made consciously on the basis of good evidence.

It is a simple fact that quality science can't be done at low cost, and mediocre science is no more acceptable than a 'begging bowl' would be. We need to make hard decisions about what we can and cannot do – since we can't do everything or support just anything. That means making one of the hardest decisions of all – selective investment.

I want the Office of the Chief Scientist to play a substantial part in providing the evidence that not just underpins the hard decisions, but encourages them to be made.

In Australia we have the capacity to do what has to be done – and steps have been taken. But we need to use our present wealth and invest it wisely, with foresight and for the long-term.

Being a quarry is not a wise or sustainable path for any nation to take.

Way back in 1990, one John Dawkins said: *'More than ever before, the reservoir of talent in our people will have to eclipse our great natural resources as the determinant of our success. We will have to use our intelligence and our wit to cement the processes of*

change and to secure and improve our place in the world. This involves working better and smarter, scuttling mediocrity for quality and distinction. We cannot enter the next century rollicking on the sheep's back or creaking and swaying in some coal truck.¹

True then, true (or even truer) now. Even if it is the trucks creaking along full of our present day assets that provide us with much of the wherewithal we need to invest wisely in our future, sustainable assets.

If we are to get there, it means continuing to invest in *our intelligence and our wit*: in Research and Development, amongst other things, and supporting innovation.

It means working with industry to develop and use new technologies.

It also means supporting 'blue sky' science where the benefits are less immediately obvious but are nonetheless critical because it provides much of the essential knowledge used for application-derived benefits.

The spinoffs are often unusual and unconnected to the original purpose but they can deliver massively.

- Think of Wi Fi technology – it is undoubtedly one of the most practical scientific discoveries ever – but it began with a

¹ The Hon JS Dawkins, Minister for Employment, Education and Training *Can Australia become the clever country?* Australia Day Address, Fremantle, 1990

group of radio astronomers listening to faint radio whispers from exploding black holes!

I'd also argue that whatever we do as scientists has to be acceptable to the community as a whole – and that means that science is conducted with, and in the context of, work in the humanities, arts and social sciences. These disciplines offer much to help us understand and change our world, and without them the full benefits from science as we know it could be lost.

Make no mistake; the successful and prosperous nations of the future will be those whose communities embrace science in its context and in all its forms.

I am not saying science has all the answers.

Science is not always perfect and interpretations of observations are not always unanimously agreed. Except in some fields of the more theoretical kind, science won't often 'prove' things. There will be uncertainty. But good science will increase probability through the weight of evidence from 'possible' to 'beyond reasonable doubt' and through its processes: ideas, critique, observation or experimentation, critique, publication in peer-reviewed literature for exposure to the world of peers; robust critique and debate of the results and their meaning, more experimentation or more observation, or replication or modification, critique ... and the cycle repeats.

Scientific consensus 'beyond reasonable doubt' - based on the weight of evidence, the collective judgment and the position of

the majority of the relevant expert scientists – provides the best guidance we have for decisions that are informed and rational.

This all makes science too important to be left at the periphery of the decision making process.

It needs to be front and centre.

I am pleased to say that steps have been taken. Earlier this year, before I started in this job, the *APS200* project was launched. It will start later this year and investigate the *Place of Science in policy development in the Public Service*.

Part of my responsibility is to ensure that the science is available; that scientific evidence is put in front of the politicians and policy writers in the public service. It may be from my office, or it may be because we know who to call to get it there – advice fully, frankly and directly available.

Quite rightly, politicians will take into account a wide range of considerations from a multiplicity of sources – and make their judgements and decisions accordingly.

My goal is to ensure they have no excuses for not having the relevant scientific advice in front of them.

Ultimately, what they do with that advice is their business. But if politicians consistently ignore scientific evidence they will be doing themselves and the nation a great disservice.

And ultimately they will have to answer to their constituents.

And this is why it is so important that science is also made accessible to the broader community.

The best way for science to have influence is for there to be a level of science literacy at all levels in the community.

This is the philosophy underpinning the national strategy for the coordinated science engagement and communication strategy - *Inspiring Australia*.

Inspiring Australia is important because it promotes science to all Australians.

If the community understands, appreciates and values science – this will inevitably be reflected in our political process and the decisions that are made.

And if as a nation we are to make bold, visionary and difficult decisions we need a scientifically literate community. One that understands that there will be uncertainty, but one that knows to give appropriate weight to the consensus and to the critic. One that knows the critic is not always right – if not always wrong. Galileo was right, for example, when he put science against dogma – observation against opinion – not the other way around.

Science properly conducted will always have room for alternative explanations deduced from properly conducted science. Progress is made when outcomes or observations from that science are debated and when they confirm or they change what we think. It is how science works, and it is how science advances our

understanding – changing the consensus based on what science has revealed.

Too often the scientific discussion gets mixed up with the political debate – or with the political response to the scientific evidence.

But for it all to work, we need the right science and the right science education – the right profile of disciplines.

I want to take up this issue. One of my first tasks will be to carry out a thorough check of Australia's science sector, its profile and its sustainability.

In particular we need to see how well we are preparing to meet the expected needs of the future.

At present the profile of Australian science, so much of which is in the universities, is heavily influenced by what undergraduate students choose to study. When universities respond to demand, as they must, Australia risks losing capability in, say, physics – losing staff, infrastructure and graduates - if fewer and fewer undergraduates study physics.

At some stage we need to make a judgement about what is going to be important and what will be needed. And knowing what is being done elsewhere in the world will be an important aid to judgement.

Then we need to decide how to invest in order to develop the science profile of the country in a strategic way – and not leave so much of it to student study patterns offset by some cross-subsidy.

As we contemplate the profile of science, we need to be attentive to academic and industry needs.

Increased linkages between researchers and industry, higher levels of R&D and the successful commercialisation of good ideas are all essential if we are to translate our scientific excellence into national prosperity.

Just as science needs to be accessible to politicians and the community – it also needs to be available to – and to contribute to - the business sector.

Science and innovation are the building blocks of a resilient and dynamic economy that boasts high wage, high skill and sustainable jobs.

We need to get this right – because if we want science to contribute to our lives in 5, 10 or 20 years we need to start producing the scientists. Or developing a highly targeted and attractive immigration program! Or both.

Finally, I want to reiterate just how important it is that we engage our young people in science

If we want to be a scientifically literate nation - we simply must inculcate the coming generations with an enthusiasm for the wonder, beauty and endless potential of science.

Science is awe inspiring – we need to stir the imagination of our youth so they pursue a career in science or, at the very least, grow into informed decisions makers who have some understanding of science and how it works.

Some of us in the room will remember the heady days of space travel and television as defining scientific images of our time.

The time has come to rekindle this type of excitement.

And there is no shortage of inspiration – the SKA and the Giant Magellan Telescopes, the Large Hadron Collider, the promise of commercial space flights, sustaining our environment and curing diseases are all big projects that stir the imagination and reinforce the importance of science to us all.

As part of raising an appreciation of science we need to make sure the coming generations are equipped to handle and make the most of the seemingly endless potential and applications of science in their lives.

We need science teachers and we need to support them through their careers. We need students. It won't work without either. And to get them we will need to be careful, strategic and willing to invest.

To tackle and overcome the challenges of our time – we need science.

As Chief Scientist I will speak up and be an advocate for science. I know that some of my best work won't be visible – I have never known a government to respond well to constant megaphone advocacy from people in positions like mine. But I'll be around.

I haven't taken the role on because I am hoping that people might start calling me 'Chief'.

And I am not here because I can't find anyone to play golf with, though the science of the game continues to elude me.

I am here on behalf of science.

I am here to help ensure the immense potential of science to create a better and more prosperous Australia is fully realised.

And for what it's worth:

- The Swans were at \$2.45 to win the flag – a couple of weeks ago and \$24 after last weekend.
- Somebody was evicted from MasterChef last night.
- And Liz Hurley is now officially divorced, further fuelling speculation about her future with Mr Warne.

With the exception perhaps of the Swans, these things don't matter.

Science does.

Thank you

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