



Australian Government

**JR VICKERY ADDRESS AT THE 44TH ANNUAL
AIFST CONVENTION**

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Chief Scientist for Australia**

**Sydney Convention Centre
9:55am, Monday, 11 July 2011**

Ladies and Gentlemen, I am pleased to have been invited speak to you today as Australia's Chief Scientist.

Since some of you might not have known that Australia has a Chief Scientist, and as I am fairly new to this role, I thought that I would start with a quick introduction and give you some idea of what I hope to deliver in this position.

I am of course a scientist. The first half of my adult life was spent trying to understand how parts of the nervous system might work.

If that wasn't enough of a challenge, I recall saying to my wife when I turned 40, that there had to be sharper edges to life. What I meant was that there had to be sharp edges when compared with an academic life teaching enthusiastic medical students and a successful research laboratory that I had built with my colleagues. I soon found that to be true. I took various roles in higher education and finally ended up as Vice Chancellor of The Australian National University for a decade. Sharp edges (and minds and pens) all over the place.

I had retired for a whole 2 months or so when I was offered this position. As I have said before, it wasn't that I couldn't find somebody to play golf with, but rather the fact that I was actually offered an opportunity to advocate for,

and to work for, Australian science that encouraged me to accept the offer. Add the fact that even at my age the thought of golf, golf and more golf did not thrill - I realised that I still hanker for the odd sharp edge. I think I have found the edges again – with a lot to learn, again, because I don't want to be like some people - an instant expert on everything.

As Chief Scientist I have multiple obligations. I must advocate for science - to ensure that science has a voice at the highest levels.

I must advise Government and Ministers on scientific issues – the actual and the emerging ones – I have to make sure that scientific evidence is put before policy makers.

And I will be helping people to see the links between science and their every day experiences.

I will be helping to broaden understanding of science and its importance, to people directly, as we secure an economically, socially and culturally prosperous future for Australia.

So I took pleasure in accepting your invitation to speak today because the AIFST makes all the right connections;

and I especially appreciate the opportunity to give the JR Vickery address at the 44th Annual AIFST Convention.

JR Vickery, as many of you will know, was an extraordinary man who did many things. Amongst his many achievements he won fame for extending the storage life of chilled beef and improving the quality of frozen beef during WWII. One of his tasks was to develop dehydrated meat for the Allied forces. In Britain it became known as Vickery mutton.¹

I don't need to tell you just how important this development was, not only to the war effort but to changing the way we live. It is scientific contributions like these, scientific leaps really, that make our everyday lives so much easier today, and sometimes even saves them!

Science has meant that we can now buy vacuum packed steak from every supermarket - instead of just bully beef in cans! It is the sort of innovation and its application that sets the benchmark that we should always be aiming to meet – one that helps us to tackle tomorrow today - by ensuring our capacity to prepare quality and nutritious food for a larger population than just those fortunately close to

¹ Science Image Bringing Science into Focus, AR1341, 2001, CSIRO, Australia, viewed July 5 2011, <http://www.scienceimage.csiro.au/index.cfm?event=site.image.detail&id=1341>

the producer. It makes sense: in terms of health, and in terms of the economy.

The food industry in Australia is a vital component of the economy today. And it has to be tomorrow. It makes a significant contribution, especially to the economies of regional areas through employment, business and service opportunities. And it must do so tomorrow.

The food and beverage sector consistently accounts for at least 18% of employment in the Australian manufacturing sector. In 2009-10 employment in the industry was 226,750. The net trade balance in the food manufacturing sector was \$5.7 billion in 2009–10.²

But as we tackle tomorrow today, Australia's food industry obviously faces challenges. With a projected growth in the Australian population giving us many more mouths to feed; and a global human population growing to 9 billion by 2050³ likely to translate into an increased demand for Australian food – the big challenge is obvious. We will have to increase our capacity to meet additional demand at home and contribute to the demand from abroad.

² ABS, International Trade in Goods and Services, Australia, Manufacturing Exports and Imports (Cat No 5368.0 Tables 32a & 35a).

³ PMSEIC (2010), *Australia and Food Security in a Changing World*, The Prime Minister's Science, Engineering and Innovation Council, Canberra, Australia

For these reasons, it is imperative to invest in our intelligence, and our resources, to develop our scientific research, our industry and its development. It is our best way to look after ourselves – and the best way to contribute to the global challenge – use our unique know-how.

The Prime Minister’s Science Engineering and Innovation Council, “PMSEIC,” published a report last year entitled: “Australia and Food Security in a Changing.” In this report they say that: “although Australia accounts for less than 3% of global food trade, we are one of just a handful of net food exporting nations of the world.”⁴

This elevates Australian food science and technology to a critical position on the international stage. But it is unlikely that we will be producing enough food to serve the needs of the world – to be the world’s food bowl. There are too many factors working against us for us to be that. But it does not stop us making a substantial contribution to the world’s benefit – by exporting know-how.

Indeed, as Michael D’Occhio of the University of Queensland has said:

⁴ PMSEIC (2010), *Australia and Food Security in a Changing World*, The Prime Minister’s Science, Engineering and Innovation Council, Canberra, Australia

“Australia never has been and never will be a food basket or the food bowl of the world. The reality is that we produce food for 60 million people. We feed 22 million-odd at home and 40 million overseas. But put in the global context, that 40 million that we feed overseas represents less than 3 per cent of global food movements. How Australia contributes to food security globally is through knowledge, training and technology transfer.” – what I called know-how.⁵

To put this into context, let me talk about an improved breed of Tiger Prawns – some of which I have sampled.

CSIRO scientists and the prawn industry have bred an improved Black Tiger prawn which is producing record yields in aquaculture farms. The average industry productivity for farmed prawns is five tonnes per hectare. The new prawns produced an average of 17.5 tonnes per hectare this year.

Just as importantly – they taste great! These prawns have won five gold medals at the Sydney Royal Easter

⁵ Straight. K, Landline, 26 June 2011, *The Future of Food*, ABC, Australia, viewed 5 July 2011, <http://www.abc.net.au/landline>

Show in the past two years, including ‘Champion of Show’, the highest award possible.⁶

The scientists from CSIRO's Food Futures Flagship have used DNA technology, screening and selective breeding to provide a boost for prawn farmers and for the provision of the food.

There are many issues that threaten food supply and its adequacy. These include: declining natural resources such as arable land and useable water; a burgeoning human population – the nine billion plus by 2050; a global decline in food research and especially development; and continuing protectionist policies in some countries that prevent food from moving to where it is needed, and which stops the market mechanism from sending appropriate signals to food producers.⁷

Another major issue that affects our food industry is the impact of climate change. It's noteworthy that CSIRO scientists are already working on the basis that we need to factor carbon emissions into our food sustainability as part of the work conducted by the Sustainable Agriculture Flagship.

⁶ Commonwealth Science and Industrial Research Organisation – <http://www.csiro.au/science/tiger-prawn-farming.html>

⁷ PMSEIC (2010), *Australia and Food Security in a Changing World*, The Prime Minister's Science, Engineering and Innovation Council, Canberra, Australia

The Flagship aims to reduce the carbon footprint of Australia's land use whilst achieving the productivity gains needed for prosperous agricultural and forest industries - and global food security.

The Flagship provides a critical integration of knowledge and technologies relevant to sustainable farming systems adapted to Australian soils, climates and regional circumstances. A key challenge is to maintain or increase our productivity and our support for regional communities – as we seek to meet national and ultimately global targets for atmospheric carbon.

The national challenge goal of the Sustainable Agriculture Flagship of CSIRO will be to secure Australian agricultural and forestry industries through increasing productivity by 50% and reducing net carbon emissions per unit of food and fibre by at least 50% between now and 2030 through a mix of productivity growth, emissions reduction and carbon storage in soils and vegetation.⁸

While all of that is important, we must also be mindful that, very fundamentally, the food industry in Australia is a crucial part of our economy – as I said before.

⁸ Commonwealth Science and Industrial Research Organisation - <http://www.csiro.au/org/Sustainable-Agriculture-Flagship.html>

Australia exported \$16.5 billion in substantially transformed food products and \$0.36 billion in elaborately transformed food products in 2009-10.⁹

Australia's 50 largest food and beverage corporations produce almost three-quarters of the domestic industry's revenue.¹⁰

There were 12,624 businesses in food manufacturing industry as at June 2009.¹¹

And, since 1991, there have been 28 CRCs performing research for the food industry. In total, these CRCs have been contracted to receive \$588.428 million in program funds.¹²

As we tackle tomorrow today, however, and as we seek to extend the local economic benefits, in their own and in the national interest, we must understand that the status quo won't get us happily through the challenges ahead. We must get better at what we do.

And we will achieve this with the industry and the R&D sector working together, because when they do that well,

⁹ Department of Foreign Affairs and Trade—*about Australia* fact sheet series, Food Industry

¹⁰ Ibid

¹¹ Ibid

¹² Department of Innovation, Industry, Science and Research - <http://www.innovation.gov.au/Research/CRC/Pages/default.aspx>

good things happen leading to products and services that make people's lives better, healthier and safer

I am not the first to talk about the importance of innovation as a driver of the Australian economy into the future – not the first and certainly not the last. I would wager it is said somewhere in Australia, in public, every day.

While Australia has done well on the world stage with a number of Nobel laureates, it's often the seemingly mundane, or the unexpected, that can make a difference.

For instance where would we be today without the microwave oven?

The invention of the microwave happened when one Percy Spencer was touring one of his laboratories. He stopped briefly in front of a magnetron, the power tube that drives a radar set, and noticed that the chocolate bar in his pocket had begun to melt.

Following this he did what any good inventor would do, he went in search of some corn. Holding the bag of unpopped corn next to the magnetron, Spencer watched as the kernels exploded into puffy white bits.

It took a while for the microwave oven to be refined to a point where it would be useful to the average consumer. But today, Percy Spencer's radar boxes melt chocolate

and pop popcorn in millions of homes around the world – and probably out of this world, too, in space-craft.

An observant scientist, a clever mind, some lateral thinking and a revolution in the way we prepare food.¹³

Biotechnology and nanotechnology, not known that way in Percy's time, can be expected to do the same thing: transform production and preparation processes that lead to more sustainable production and processing of food.

In turn, this will help ensure Australia's future prosperity by helping to retain high-quality, high-value jobs and improve our health, wellbeing and environment.

And then you have to get it to market. It needs packaging – and something other than, or additional to, the tin can. Something akin to the need Vickery confronted – but with the same basic principles: to get food to where it is needed that is conserved, preserved and delivered safely. We might now add, given the apparent sophistication of our times, that it should also be quality food that is not just safe but a delight to eat.

¹³ Ament. P. Fascinating facts about Percy Lebaron Spencer inventor of the Microwave Oven in 1945. Troy MI: 1997-2006, The Great Idea Finder, 20 October 2006, viewed 5 July 2011 <http://www.ideafinder.com>

Packaging materials based on a converted agricultural product, starch, have been developed and commercialised in Australia by Plantic Technologies.

The company is a spin-off from the Cooperative Research Centre for International Food Manufacture and Packaging Science which first developed the technology more than a decade ago.

The company started in the confectionary and baking markets.

In partnership with the CRC for Polymers, Plantic has expanded its R&D to develop a new bioplastic in 2008 that was suitable for products ranging from Easter eggs to USB thumb drives.

It's been well-received, with the major UK retailer, Marks and Spencer, using Plantic-developed plastic trays for its entire Swiss chocolate range last Christmas.

But we have to do it again, and again, and again. There are no oars or laurels to rest on in this world. It is about getting better, getting more productive, improving production and always looking for the innovation that gives us an edge. Our research, and our development, is critical to the future.

We don't do badly. Total Australian Government funding for rural R&D for 2008/9 was AUD710 million.¹⁴ Food manufacturing (excluding beverages) R&D expenditure for 2007-08 and 2008-09 was approximately \$369 million and \$389 million.¹⁵

This is a good start. But it does mean working to ensure that governments are willing to continue to invest in the food sciences and their R&D – and to increase that investment as resources permit.

That means persuading them of Australia's capacity to deliver a substantial contribution to our own food security as well as playing a role as a global citizen. And it means persuading the public that there is a major global issue that Australia can help resolve – even if we are small.

What do I conclude from this?

In order to ensure our R&D effort continues we need, all of us, to be advocates for science. It is important that the community realises the value of science and its impact on their lives.

That's it, at the most basic level.

¹⁴ Productivity Commission, Rural Research and Development Corporations, September 2010

¹⁵ Ibid

I think that people take for granted the very worthwhile outcomes of science.

For example, while there has been a spectacular rise in food related TV shows urban living seems to have created a cultural disconnect between us and food production/preparation. There is a risk that our children or our grandchildren will forget that a chip comes from a potato; or forget that milk is not produced somewhere in square invariably plastic containers.

It's incumbent on all of us to ensure that we raise the profile of science. And that our children and grand children have a level of science literacy that far exceeds the norm today.

In turn this will encourage more people to embrace the notion that a career in science is highly worthwhile.

Taking all things into consideration, and putting aside my natural bias, if I was starting again I would still be choosing science as a career – at least as my early career.

Can I ask that you join with me, and that you work at all levels, to engage with your industry partners in Australia and overseas, with the community and with your local schools to remind them just how important science is to their lives; to their health and their nutrition.

I also ask you to be vocal in your communities in your support for science and particularly in this area of science where you have special expertise. The reality is that if we don't tell people about the importance of science and what it means to them, the importance of what you do, how will they ever really know? And it is too important simply to think that they will find out somehow. Too important to leave to others to get the message across, we must own that responsibility.

But let me leave you on a lighter note. Food and science are a marriage that will never end in divorce, in fact they can work so well together they can earn you three Michelin stars. Heston Blumenthal has become one of the world's best chefs by using scientific methods to create his unique dishes. When he roasts potatoes he insists on cooking them in oil and not the preferred Nigella Lawson rule of goose fat. Why? He says oil makes them crisp up better. Now, as scientists we would ask, but why? Well, Heston asked the same question - let me quote the man himself:

“The oil does not go into the potato itself. I know this because a scientist at Cambridge did an MRI scan on

potatoes for me. He monitored the water flow into a potato covered in oil. The oil remained on the surface.”¹⁶

So the next time you indulge in a Sunday roast with golden, crunchy spuds, you can marvel at how the hot oil remained on the outside and feel slightly less guilty about eating one or 5, all thanks to an MRI machine that some scientist(s) invented... and Heston of course.

Thank you

¹⁶ Stogdon. C, 17 November 2008, *Heston Blumenthal: Good chemistry*, The Telegraph, viewed 5 July 2011, <http://www.telegraph.co.uk>