

***Scientists, economists, and other rent seeking creatures I have known:
Recollections of a dismal scientist***

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You may be wondering who I am and what the hell I'm doing here tonight. You'll be dismayed to know that I'm wondering the same thing. More worrying still, so are the organisers of this fine event.

Let me explain. A few months ago the Chief Scientist Jim Peacock rang and told me that he'd come to think of my contributions to the Innovation Review as so witty that he thought that if I turned up and gave a speech to the CSIRO scientists in Canberra everyone could have a good laugh.

I note he didn't say 'witty and wise', but then that was just as well as it halved my level of performance anxiety.

Anyway, immediately I got off the phone, the saying that came to my terrified mind was the one attributed to Abraham Lincoln. "You can fool all the people some of the time, and some of the people all the time, but you can't fool all of the people all of the time."

I nearly rang back and cancelled, but then I realised, that from what the Chief Scientist had said, all I really needed to do was fool all of the people in the room for about fifteen minutes.

A few months later Jim got a phone call from Adelaide from the Organisers of these science awards. They thought they'd lined up tonight's speaker – Jim's successor as Chief Scientist Penny Sackett. But there was a clash. The previous speaker was Tim Flannery.

They'd heard about a young American up and comer who gave a good speech, but Barack Obama was busy. Anyway Jim had an idea. It seems I passed the audition in Canberra, and here I am tonight – freshly minted talent on the speaking circuit.

But the organisers are raising the bar. A bigger room, more people, a longer speech and bow ties and beautiful gowns.

So here I go. Three or four minutes already gone.

Please don't refrain from having a few more drinks as I speak.

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After grueling negotiations we settled on a speech topic “Scientists, economists, and other rent seeking creatures I have known: Recollections of a dismal scientist”.

What might an economist have to say to such an impressive collection of scientists? Well firstly if you bought stocks at any time in the last six months . . . you shouldn't have.

Only marginally more usefully, let me tell you a guilty secret. I was responsible for the National Innovation Summit in 2000. This is how it happened. I was working at the Business Council of Australia and did the first survey which showed R&D plunging following the Howard Government's slashing the R&D tax concession.

Asked what our 'message' should be I somewhat naively replied said something like this. “Well we think slashing the concession was a mistake which should be reversed”. It turned out that this was a *faux pas*.

The government didn't want us to say that.

What else could we say I?

Somewhat nonplused I said – half tongue in cheek – “we could have an R&D Summit”.

I doubt these were the exact words used by my boss – memory plays tricks after all – but my mind goes back to the 1930s movie in which Fred Astaire says to Ginger Rogers “Hey that idea's so crazy it just might work”.

Before I could whistle that old Bee Gee's song “I started a joke”, swarms of scientists appeared praising our vision. Swamping the meager resources of the BCA secretariat, like an army of well drilled ants walking off with the desiccated skeleton of a large spider and disassembling it to drag into their nest, they took the desiccated body of the Government's science and innovation policy, and assembled the National Innovation Summit. I presume ants live off those spiders they haul around, and likewise the upshot of the Summit saw Australia's scientists eat a little better for a year or two.

This was my initiation into the world of scientific rent seeking, every bit as much a spectacle as I'd seen working for Senator John Button when he announced the tariff review that gave rise to the Button Plan. The scientists said the same kinds of things as the component producers. That the country couldn't compete without them.

But there's a difference between scientists and your garden variety rent seekers, of which more in a moment.

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Another thing that I can tell you as an economist is that, extraordinarily enough, one of the best theories of science produced before the twentieth century was produced by the father of modern economics and a favourite of mine – Adam Smith in an early work on the history of astronomy.

Like Thomas Kuhn's idea of anomalies lurking, waiting to disrupt 'normal science', eventually propagating the seismic shift of a scientific revolution Smith concluded that *surprise* – which disrupted our commonsense or what he called 'the fancy' the initial engine of science.

When the "momentary emotion" of surprise is over we are left in the second phase of wonder – to cut through Smith's more urbane exposition, we wonder, as you did when I first rose to spoke, what the hell is going on.

But the thing I admire about Smith is that his portrait of the denouement of all this is not a mechanical one. The criteria according to which theory selection is ultimately made are aesthetic ones.

We're looking for the 'aha' moment, a moment of pleasure in our contemplation of the object – and of repose in our troubled minds. And this leads us more fully to admire the world we are investigating. Twenty five years after Smith died in 1790, the poet John Keats, famously had a similar idea – that beauty was truth, truth beauty – and perhaps more controversially that that is all we know, or all we need to know on earth. Einstein felt the same way if we are to believe the story about what he said when asked what if the observed procession of Mercury had threatened to falsify his theory. "Then so much the worse for God".

Like his contemporaries, Smith was infatuated with the Isaac Newton's scientific revolution. And yet through it all he clung to his very modern insistence that Newton might not be the last word – that Newton's system for all its glory wasn't the truth, but rather the highest form of human contrivance.

Yet Smith was torn himself, like Pygmalion mistaking human creation for reality.

Here is Smith.

And even **we**, while we have been endeavouring to represent all philosophical systems as mere inventions of the imagination, . . . have insensibly been drawn in, to make use of language expressing the connecting principles of this one, as if they were . . . real Can we wonder then, that it should have gained the general and complete approbation of mankind, and that it should now be considered, not as an attempt to connect in the imagination the phaenomena of the Heavens, but as the greatest discovery that ever was made by man, the discovery of an immense chain of the most important and sublime truths, all closely connected together, by one capital fact, of the reality of which we have daily experience.

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And in the shadow of Newton, Adam Smith built his economics around just one idea. Just as Newton had built his system around the inverse square law of gravitational attraction, Smith built his economics around a single human characteristic – our tendency to ‘truck, barter and exchange’. Economics has been built on very simple foundations since that time. Of course that’s a weakness if people don’t proceed with proper understanding of the simplifications they’re making. But it’s also a great strength – the strength of Ockham’s razor.

Smith’s idea was that in the presence of certain conditions, the most efficient form of cooperation was competition. That’s a sufficiently powerful idea that we often misunderstand it – imagining that competition and cooperation are opposites. So I’ll say it again, Smith’s idea was that, in certain circumstances, competition provided a form of cooperation between humans that was so miraculous it was hard to believe it hadn’t been written into Nature by the creator.

His idea has been refined, but I’d say there is still a single idea at the foundation of economics. Today, I’d say that the single idea in economics is opportunity cost. And that idea was being mulled around in the mind of a stockbroker called David Ricardo during the Napoleonic wars. I can’t resist telling you, apropos of nothing, that there’s a good chance Ricardo was penning his great work in political economy just as Lord Wellington was reviewing his troops to go into battle and observed in his inimitably dry way, one feels after a long and tense sigh “ . . . well, they may not scare Napoleon, but by God they scare me”.

It was Ricardo’s principle of comparative advantage that showed most clearly that countries that trade with each other don’t compete with each other like firms do. And yet, the analogy of international competition between nations exercises a vice like grip on a human imagination which was born on the African savanna and for which the most important social question was often – are you with ‘us’ or ‘them’.

I won’t go into the idea here in much detail except to say that it reminds me of a joke that was circulating when I was a kid and circulates with different personnel today. On a church in Hawthorn in Melbourne the pastor had written the challenge “What would you do if Jesus came to Hawthorn”. Underneath in graffiti, someone had replied “Move Peter Hudson to centre half forward”.

You can get an intuition for Ricardo’s principle of comparative advantage if you understand how in the 1971 Grand Final Peter Hudson, the greatest full forward of his era, or Buddy Franklin in the most recent Grand Final – likewise the best full forward there is now – spent some crucial periods of the game at centre half forward.

In both cases what mattered for Hawthorn was not Buddy Franklin’s or Peter Hudson’s absolute abilities, but their abilities relative to other Hawthorn players in the circumstances that presented themselves. Their absolute best position was full forward, but sometimes their comparative

advantage – comparative to the other players in the side and considering their opposition – was at centre half forward with other capable fellows filling in at full forward.

But a real understanding of comparative advantage – of the fact that it makes more sense to say that Australian firms compete against each other (for labour and cash and other resources) rather than against other countries – is almost routinely ignored, including by people who present themselves as knowing, and indeed feel themselves to know the economic basics.

Here's the now newly minted Nobel Laureate in economics Paul Krugman on the point:

Almost nobody — in business or government — would disagree with this statement: “Today America is part of a truly global economy. To maintain our standard of living, we must learn to compete in an ever tougher world marketplace. . .”

The problem is: It's baloney. . . . The U.S. and Japan are simply not competitors in the same way that, say, Ford competes with Toyota. Any country's standard of living depends almost entirely on its own domestic economic performance, and not on how it performs relative to other countries. . .

The issues involved are not hard to sort out — we're not talking quantum mechanics here. So if you hear someone say something along the lines of “America needs higher productivity so that it can compete in today's global economy,” never mind who he is, or how plausible he sounds. He might as well be wearing a flashing neon sign that reads I DON'T KNOW WHAT I'M TALKING ABOUT.

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But in case this talk about the single idea in economics sounds a little triumphant let me tell you a story. I attended the launch of the last book published by the Australia's most distinguished public servant Nugget Coombs. After the launch I was sitting next to someone who claimed triumphantly that she really didn't understand economics. I said to her what I've said to you – that there's only one idea in economics and that it was simple commonsense. Nugget Coombs having overheard this, leaned over and added “yes and it's wrong!”.

Because of the simplicity and the compelling nature of their logic, economists are constantly in danger of overreaching – of thinking they know more about the world than they do. That's something economists should have been reflecting on in recent months. This is what one US executive said in 2007.

It is hard for us, without being flippanant, to even see a scenario within any kind of realm of reason that would see us losing one dollar in any of those transactions.

That was Joseph J Cassano, and he was basing his comments on the analysis of risk quants who were clever enough to build mathematical contraptions that gave him these answers but not wise

enough to notice – as Adam Smith reminds us – that however beautiful they are, models are human contrivances – not reality. Joseph Cassano was in charge of AIG's credit default swaps (CDS) operation. It blew his company up.

Economists can be so confident of the simple way they've ordered the world in their models and in their heads that they can say things that offend commonsense. I recall one of Australia's most distinguished economists – sitting as a Commissioner on the Productivity Commission at the time – telling us that there was no such thing as a merit good. A 'merit good' for your edification is economic jargon for something that might be considered as worthy in its own right. It's a difficult notion of course, because we can't agree. For instance I personally regarded Sir Ian McKellen's King Lear as a merit good, but not Barrie Kosky's – or what I saw of it.

Since people can't agree, and no demonstration can force them to agree on what's worthy and what's not, why not drop the whole thing and let individuals decide? If some go to the opera and others to the casino who are we to say one is better than the other. And if Australian businesses can make money making and selling potato chips, who are we to say that making silicon chips or DNA chips is somehow better. Well, while that's a very valid argument, it is not, as I'll go on to suggest, the last word on the subject.

And there's an additional hazard. Though it is now infinitely more technical than it was in Smith's day, economics remains as Smith built it, one long diatribe against the fallacies of 'do-it-yourself' economics. That is the economics against which I quoted Paul Krugman raging a minute ago. It's the economics inside the heads of the uninitiated that says that high tariffs create jobs when they typically destroy them, that technology will destroy jobs when it will more often create them.

And added to the fools who seem hard wired to fall for this stuff, there are knaves who promote it – because they benefit from it. As Smith put it, "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public".

Following Smith, economics comes with a strong sense of self righteousness against special pleading.

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And that brings me to science and to rent seeking.

Because there is very good economic evidence that a great deal of science needs to be supported by the public purse as it was by the princes of Europe. That's because it does much more good for the world than can ever be captured by anyone conducting or funding it.

Now my idea of a true economic rationalist would be one that was aware of this problem and so in some sense welcomed lobbying for worthwhile uses of public money. But here I come back to Smith's great insight – that aesthetics plays a big role in the thinking of disciplines. And like I said,

economics is such a powerfully simple discipline, that it comes with a powerfully simple policy aesthetic. That aesthetic is to impose a heavy, often impossibly heavy burden of proof against government funding of anything much and indeed to regard the process of lobbying as essentially distasteful.

But in a democracy you don't get money off the government without making it clear to the government – which has no shortage of hungry snouts bustling at its trough – that there'll be a price to pay if they don't come good. There is nothing very pretty about this. But if there isn't a well organised lobby for science, science goes hungry – and following it in a decade or so's time does Australia's productivity growth.

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But even that doesn't capture quite what I want to say tonight. To do so I want to take you back, even further than Smith, to sixteenth and seventeenth century Europe. To the rise of science.

In a fascinating paper, David argues that the precondition for 'take-off' in modern science was the culture of peer review within a community of openness. But where on earth might such a culture have come from given the ancestry of science in the secrecy of military engineering and the cults of alchemy. He argues that science emerged from the unique conjunction of several factors. Firstly princes sought to aggrandise their court by attracting to it 'stars'. In a bid for self-aggrandisement they went in pursuit of 'merit goods' – and they found them in the arts and what was then called 'natural philosophy' or science.

The culture of openness then arose from emerging stars' need to advertise their achievements to distant princes in the hope of patronage. Galileo exploited his ability to prepare superior telescopes for the Grand Duke of Tuscany, Cosimo de' Medici the second and urged his patron to present these to other European princes, whereby they too might observe the new-found moons of Jupiter that Galileo had proclaimed "the Medicean stars."

If publicity could fuel a scientific career in this world of merit goods, the patron had another problem. He could see for himself the difference between a painting by Giorgio Vasari and one by Michelangelo. Vasari once showed the Michelangelo a hall of frescoes he had painted asking him whether he could believe that he – Vasari – had done them all in one month. Michelangelo, not normally the master of deadpan, replied that indeed he could.

But Galileo's telescope notwithstanding, princes had a much harder time sorting the crank scientists from the Galileos. And so they asked other scientists . . . and peer review emerged. And so, just as something as beautiful as the peacock's tail grew from the simpler stuff of survival of the fittest, the glories of modern science grew out of the tenacious fight for prestige.

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Part of David's point is the historical contingency and the fragility of the institutional matrix within which modern science emerged. And the ease with which it is undermined.

It was ever thus.

I constantly observe this elsewhere in the area of innovation and by innovation I mean much more than the commercialisation of science. I mean the development of new and better approaches to pretty much anything.

High school science teacher Clay Reid established a vineyard on school grounds at Clare High School. He used it to transform science teaching in his school. But it wasn't easy. Reid had to meet all the regulatory and other institutional requirements of the vineyard – OHS, insurance, food safety, workers compensation, children's safety. He thought what he'd been through was hard enough, but simply rolled his eyes at the prospect of getting similar approvals if he were doing it in partnership with another business on someone else's land! And so the prospect of 'scaling up' his success to other schools in other endeavours is lost (one can imagine similar school interaction with many local businesses). And it is lost in a way that's almost invisible. We never see regulation closing activities down, for they never get that far.

That's why the Review of the National Innovation System proposed an Advocate for Government Innovation to act as a chaperone for ideas like Clay Reid's to help him get 'permissions to innovate' as they are called in the UK and to act as a 'challenge agency' to help him through the regulatory and institutional maze – just as far more established enterprises get 'project facilitation' through the maze of approvals if they announce their intention to build a new plant.

Whether it's in science or business or government, that which is new is usually contingent and fragile. And science is always new. In human life, as in the animal and plant kingdoms, most innovations, even if they are clearly superior in many ways will not survive. We could do worse than systematically trying to make that environment just a little more welcoming, a little less hostile to, and a little less shocked by, the new.

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One of the echoes of science's past as an item of aristocratic display amongst the princes of Europe is that to this day scientists are often driven by a quest for glory, which some even manage to acquire beyond the grave. A neat trick and perhaps the only one left after human knowledge, ingenuity and scepticism has chomped its way through fonder notions of how the world works.

Certainly today, Galileo the first outshines Cosimo the second.

And in the self interested struggle for glory in the wider world there's an inner glory. If it was Einstein who spoke of looking into 'the mind of God', economists have taken up the more mundane term of

modern psychologists who talk about 'intrinsic motivation' – the love of the work for its own sake, for its intrinsic beauty and satisfaction.

I was privileged enough to attend the 2008 Prime Minister's Prize for Science a few months ago and saw the five awarded scientists all radiating the results of intrinsic motivation. Three of the five were from your lovely state of South Australia. And Clay Reid from Clare High School won \$50,000 for the high school teaching prize.

And economists have discovered that you don't want to mess with intrinsic motivation. Thus for instance if you make small payments to people for giving their blood, you get less blood. For the extrinsic reward of money turns the donor's gesture of fellow feeling into a slightly painful way to make an even slighter amount of money.

Economists have also discovered that awards – if they're the real thing, that is the heartfelt admiration and gratitude of the community – intensify intrinsic motivation.

Indeed one could argue that if we were being mercenary about it, that awards are a neat trick that the community plays on scientists. The same kind of trick that was revealed when, in the Douglas Adams series the Hitchhikers Guide to the Galaxy, the dolphins clear out from a doomed planet earth leaving a note to us humans "So long and thanks for all the fish".

But while the awards burgeon in Australia, the funding for science does not. So at least in Australia, I think better prizes and more funding complement each other – and I promise to keep quiet about their potential as substitutes.

Tonight I'm grateful to join you in celebrating the achievements of people who long ago decided to dedicate themselves to the rewards they can get from doing something they're good at, something worthwhile and something they love. Sad to say, most would have known they could greater extrinsic rewards from pursuing other paths.

So to those who were nominated for these awards I'd like to congratulate you on your choice: to get into the chase for scientific knowledge which is a gift for all, and which cannot be done well without the sense of the beauty of the world. I suspect you will have had more intense moments of pleasure in the love of your own work than you'll get tonight. And here are the rest of us, offering what we can. Our own recognition of your wonderful achievements.

I for one am in awe of them.