

Science Is Not Consensus

BOB CARTER

THE ideas that science should work in society's interests, that scientists should be accountable or that scarce research money should be spent on science that is useful or fits national priorities are apparently innocent, reasonable ideas. Yet these are wrong assertions, and their implementation has profoundly damaged Australia's research capabilities.

Between the 1950s and the 1970s, Australia built a national capability in science which, given the small size of the population, was outstanding. At that time, leadership in science matters often came from CSIRO or university researchers, but excellent science was also accomplished within many State or Federal government agencies. As an example, all States supported some type of geological survey organization (often under the umbrella of a Department of Mines or Primary Industry), which was responsible for systematic geological mapping and mineral and other resource surveys, and which provided the government with generally dispassionate advice on related matters.

With the 1980s, however, came a restructuring of the way in which such groups operated. Public-good programme funding for the activities of government science agencies shrank, and was replaced by funding for individual projects with limited lifetimes, a management technique which turns out to be in large part responsible also for the ongoing imbroglio at the Australian Museum. An individual scientist's salary thus often comes to be funded as a part-charge against several different projects, and when a project ends, so does the salary. So, too, comes an abrupt end to the chances of a government getting disinterested advice on science matters of the day. One

particularly egregious example epitomizes the problem, which is the hopelessly inadequate understanding which both the Queensland and Federal Governments exhibit about the endless phantom threats generated by environmental crusaders about the Great Barrier Reef.

As a mechanism for concentrating a scientist's mind, however, project, rather than baseline, funding can't be bettered. It provides a massive incentive for writing project reports which, in one guise or another, always discover the need for more money to be spent on this or that allied problem. And if an allied problem can't be identified, then the fertility of human imagination is such that a new one always can be; the solution of which, coincidentally, usually requires just the training and expertise possessed by the report writer or by some of his or her professional dependants. Ably assisted by environmental scare campaigners, our governments have become truly world-class at problem generation.

Regrettably, such politicization of science has not been confined to the government service. Under the guise of competitive excellence, similar methods are increasingly being applied by national research funding agencies to manage university researchers. In the past, these agencies have generally made a sound investment of their (our) money, with laudable scientific outcomes, by calling for applications in all areas of knowledge and funding only those of the highest quality. Since the 1980s, however, more and more research money has been directed into special interest centres of one type or another, and into tagged areas of alleged 'national interest' such as genetic engineering or microelectronics. But who is to say

that these fields are more important than others? Who picks the winners?

Those who usurp to themselves the authority to pronounce one or another discipline field as of national interest at the expense of another—or, worse, at the expense of funding for the enabling and basic sciences—exhibit a breathtaking, albeit often innocent, arrogance. Such funding mechanisms produce the anticipated result, which is, along with some successes, the support of much politically popular, bureaucratic and mediocre science. On the plus side, particularly for the newspaper and advertising industries, the move towards funding special centres has admittedly seen the generation of a new national industry of Scientific Public Relations. Such PR offices have now propagated throughout the University sector and the scientific civil service, and their staffs vie to provide frisbee-science stories to reporters who generally have neither the time nor the skills to write accurately judged science stories from scratch themselves.

The university research funding that came to be directed into special centres and areas was, in general, not the fruit of a new tree. Rather—in the typical zero-sum exercise that has for too long kept Australia's R&D below 1 per cent of GDP at times when intelligent nations spend more than 2 per cent and aim for a target of 3 per cent—the money has been in part redirected from the insultingly termed 'welfare' or 'margarine' (a little, spread thinly, for everyone) research funding which used, properly, to be allocated to nearly all university staff. 'Properly', first, because the competitive nature of their appointment ensures that, with very rare exceptions, all university staff have the ability and training to accomplish productive research; second, be- ▶

cause it is an established pragmatic principle of economics that the first allocated dollars are always the most cost-efficient; and, third, because such funding has proved to provide huge multiplier and productivity benefits.

Formerly, in the 1970s, a small amount of annual funding of this type was made available to nearly all research-active university staff. The funds provided a needed stimulus for research output, and had a markedly beneficial effect on the standard of both teaching and research in universities. To achieve support for their research today, university staff are required to compete in an annual round of grant applications through the Australian Research Council. This system, although of historic excellence and still excellent in principle, is grossly underfunded. Each year, the Council has to brand as failures four out of every five research grant applications submitted from amongst the cleverest and best trained persons in Australia. Research skills and experience which many applicants have spent decades of unpaid overtime honing are thereby deemed not worthy of support. You do not need a degree in psychology to understand the corrosive damage that such a system inflicts. Lacking support for their research activity, university staff, cynical and disillusioned, retreat to their weekenders for a spot of fishing where—unlike in the shark-pool of ‘winner-take-all’ research grant competition—there is at least a likelihood that they will catch something.

Profoundly unfashionable though it is to say so, it is in Australia’s national interest that (in addition to increasing the pool of competitive large-grant moneys) small-grant research funding should be restored for all university staff. Instead, the focus of attention is on ever larger grants for ever fewer science superstars or supercentres. More than 300 years of experience should have taught us that progress in science is not achieved through picking winners or via ‘Mummy knows best’ mechanisms. Every teenager understands that Mummy, though always

well-meaning, often doesn’t know what is best. Our skepticism about experts should also be sharpened by the splendid misjudgements that they so often make, as when a former Chairman of IBM estimated in the 1950s that there would be a market for 5–6 computers in the whole world.

The result of a ‘picking winners’ process, inevitably, is to provoke a desperate scramble by scientists to justify their own expertise in terms of the

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nearest ‘winner category’, and the loss of the type of disinterested scientific advice which has hitherto been a vital part of the way our democracy worked. Such disinterested advice is now a part of history. It has been replaced by science advocacy and spin to such a degree that many of the public have lost their trust in science altogether. Robert May, President of the Royal Society of London, describes ‘the resulting crisis in public trust’ as ‘one of the greatest challenges facing scientific policy-makers today’.

Current public debates in Australia—or what passes for them—on matters such as GM food, the health of the Great Barrier Reef, and the reality of climate change, are irredeemably in the hands of the spinmeisters. Nary a press release issues forth from CSIRO

or from any of our much-vaunted Cooperative Research Centres which hasn’t been tweaked and tuned to extract the maximum press (and therefore public) interest. Global warming alarms are followed by biodiversity alarms are followed by salinity alarms are followed by rising sea-level alarms are followed by destruction of the Great Barrier Reef alarms. Why? Because governments no longer employ or support scientists to do the science which interests them, but rather to do the science which government—using a magical insight that no normal mortal would claim—adjudges to be important. To capture government’s attention, and funding, requires the generation of a crisis in one of these politically sensitive areas. And for a government employee to speak out against a prevailing science or societal wisdom which generates research money for his employing agency is, rightly, perceived to be professional suicide. Thus did our venerable handmaiden, science, become a sex-worker.

Government is aided in its aims to control science directions by the generally uncritical nature of the press and public. That nothing sells newspapers like a good public alarm is seldom lost on editors, who, with a few honourable exceptions, do not employ journalists who are competent to separate science hype from science bullshit. For instance, during the recent heated public debate on GM-food in New Zealand, the Royal Society of New Zealand commented that ‘what is so alarming about the debacle is the stunning degree of scientific illiteracy (or wilful ignorance) which was demonstrated amongst so many of the commentators who joined the feeding frenzy’.

Rather than employ scientists whose aim is to find out about the world because it interests them, government agencies now instead employ managers whose aim is to tell us, often at the behest of environmentalists, how we can and can’t enjoy our natural heritage. Witness the audacity of the Great Barrier Reef Marine

Park Authority as it endeavours to place huge areas of the reef tract out-of-bounds in the absence of a skerrick of scientific justification. As in this example, 'alarms' have become both a necessary and sufficient mechanism by which scientists and science managers raise their funding in Australia today. Most active scientists are only too well aware of the problem, but say nothing, not least because speaking out may carry the loss of their job or research funding. As Barry Jones pointed out 'The public intellectual is in retreat. We have more paid academics (in Australia) than at any time in history, but across the nation they have fallen strangely silent'. 'Trust me, I'm a scientist' used to be a proud and genuine claim; it has passed into history as a hollow cynicism.

In industry, experienced executive managers understand that much of the money that they spend on advertising is wasted, in the sense that it has little effect on consumer spending. If only one could know in advance which particular advertising strategy would be successful, large sums of money could be saved. That such advance knowledge is generally impossible is the source of great sustenance to the advertising industry. And as it is with advertising, so it is with science. If we invest in 100 research flowers, then perhaps one will bloom. We do not, and cannot, know in advance which one. Therefore, the sensible investment strategy is to ensure that the most excellent scientists and proposals are funded irrespective of their precise discipline field. For in this way, 'the random walk of science is preserved by the best young researchers deciding what they wish to do, not what bureaucrats and older scientists tell them to do' (John Dewey, acceptance speech on the award of the Penrose Medal, 1992). Dewey added that 'our whole system should be geared toward trusting and supporting clever young people with their own ideas rather than in designing projects that constrain and shackle them'. He is, of course, quite right, and it is disastrous that Australia's national

policy on research funding has, for 20 years now, been heading resolutely in the opposite direction.

To the extent that it is possible for any human endeavour to be so, science is value-free. Science is a way of attempting to understand the world in which we live from a rational point of view, based on observation, experiment and tested theory. Irritatingly, especially for governments, science does not operate by consensus and it is often best progressed by mavericks. The alternative to a scientific approach is one based on superstition, phobia, religion or politics. These alternatives are abundantly on display in the activities of the green political groups, and in general they are neither productive nor pretty. Though claiming to base their concerns on scientific

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evidence, and intending thereby to occupy the moral high ground, many environmental organizations are in fact abusers of scientific process. For instance, their crusading attitude to the irrational Kyoto Protocol prompted the comment from a former President of the Mineralogical Society of America that 'the idea that humans have significantly enhanced global warming is by far the most massive abuse of science that I have ever seen' (Malcolm Ross, interview, June 1997).

As is often the case in human affairs, it is relatively easy to diagnose the 'research funding problem' in Australia. In resource terms it can be summarized as 'too little to too few under too much managerial control'. In the current political environment it is, however, not easy to redress this situation.

Science itself is far too important for the future of the nation for it to be left to politicians who make a virtue of not understanding it, to news editors whose prime interest is in circulation figures, or to environmentalists who purposely misrepresent it. Yet it is mainly through the eyes of these three groups that the average citizen today views scientific matters.

Australia needs a declared spending target of at least 2 per cent of GDP on research and development, together with a strategy for achieving that figure. At the same time, there should be less emphasis on the support of scientific superstars and special research centres, a significant increase in funding for research in the basic and enabling sciences and for research infrastructure, and a restoration of some type of minimal-grant funding for all active researchers employed in public institutions. As part of such changes, larger research awards from the competitive pool should continue to be judged on the basis of excellence, but without constraints as to the field of endeavour to which they apply.

Picking a few winners not only often doesn't work. It also creates a highly cynical and disillusioned attitude amongst the losers, and results in a decreased national productivity which runs into billions of dollars annually plus unquantifiable opportunity costs. For these reasons, if for no others, the time has come for Australia to fund its scientists properly again.

Professor Bob Carter is a geologist and marine scientist with more than 30 years of experience in active research. He has served on many national and international research funding and research management organizations, including the Australian Research Council.

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