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Guests in the President's House

Steven Shapin

- *Science, Money and Politics: Political Triumph and Ethical Erosion* by Daniel Greenberg

America loves science. It has always loved science. As long ago as the 1830s, Tocqueville remarked on America's love of science, and present-day surveys establish not only that 85 per cent of Americans believe that science 'makes the world a better place' but that an astonishing 80 per cent endorse Government support for scientific research even when no material benefits are in view. True, Americans sometimes show their love of science in ways that foreigners find strange. So many cultural practices now claim to be scientific that Americans can be notably hazy at distinguishing between academic orthodoxy, vaunting scientific ambition, and New Age or fundamentalist claptrap. The best-armed anti-Darwinian organisation in my neighbourhood styles itself the Institute for Creation Research; its leading lights call themselves Creation Scientists; and its website flaunts their doctoral degrees in natural science from distinguished universities. There is no reason necessarily to infer disrespect for science from belief in, say, alien abduction, especially when a professor at the Harvard Medical School takes it very seriously indeed. Americans are keen on the idea of science and its promised goods, while their familiarity with the facts, theories and practices of orthodox science is demonstrably more shaky than that of many other developed countries. Sociologists securely document the fact that remarkable numbers of Americans think astrology is at least probably true (40 per cent) and that the idea of human evolution is probably false (44 per cent). Only 11 per cent can say what a 'molecule' is, and 52 per cent don't know that the Earth makes an annual trip round the Sun. (These statistics are apparently on the conservative side: if you want them, other surveys

will give you even more appalling figures.)

Other ways in which Americans show their love of science are more straightforward. They lavish a lot of money on the support of science, pure and applied. In 1998, the total amount spent in the US on R&D (research and development) was \$227 billion. That is 44 per cent of the R&D expenditure of the entire world, and more than the combined R&D budgets of Japan, the United Kingdom, Germany, France, Italy and Canada. Of that, \$75 billion comes from the Federal Government, and, as is rightly emphasised by some critics, 50 per cent of US Government support comes from the Pentagon. But even if you take out the massive defence component, the US still leads the world in non-military R&D. American industry supplies 68 per cent of R&D funding, naturally biased towards concrete technical development, leaving the Federal Government as the main sponsor of so-called pure, or basic, research, the sort done mainly in universities. Even here the supplies from Government sources dwarf those of any other country. The National Science Foundation (NSF) assumes major responsibility for basic research in most areas (annual budget: \$2.5 billion), while the budget of the National Institutes of Health (NIH), responsible for most basic biomedical research, has ballooned to \$18 billion. By contrast, research in the humanities is cheap, and valued much more cheaply by the American public: the National Endowment for the Humanities spends only \$150 million on its university clients, and continually struggles to defend even those humble crusts against cynical politicians who don't see support of 'queer theory and semiotics in the poetry of John Clare' as a big vote-winner with the folks back home in Kansas. That is one reason why, as long ago as 1962, W.H. Auden said: 'When I find myself in the company of scientists, I feel like a shabby curate who has strayed by mistake into a drawing room full of dukes.'

By these and other measures, the American love affair with science has become even more ardent over recent decades. In constant dollars, R&D expenditure has nearly doubled from the early 1980s to the late 1990s; even its percentage (now about 2.8 per cent) of a rapidly growing GDP has increased, if only marginally. The NSF budget for academic research, again in constant dollars, has grown by

over 250 per cent since 1970 and that of the NIH by a staggering 425 per cent. These facts should provide boringly incontrovertible evidence of the financial health of American science and of the cultural esteem which ultimately produces these material outcomes. The statesmen of American science should be hugging themselves with contentment. But they are not. As support for science has burgeoned since World War Two, and even since the end of the Cold War, the scientific establishment has constantly bemoaned the passing of a financial golden age and the 'public misunderstanding' of science which is identified as the proximate cause of this supposed decline in favour.

This paradox is the organising theme of Daniel Greenberg's heroically researched book. Were the politics of science as important as the altitude of Presidential trousers, Greenberg would certainly be acknowledged as one of the greatest American investigative journalists of the last half-century. In the 1960s, Greenberg was news editor for *Science* magazine, the official weekly organ of the American Association for the Advancement of Science, and then for several years that journal's European correspondent based in London. In 1971, he became proprietor-editor of the insiders' bi-weekly *Science and Government Report*, a position he gave up several years ago. *The Politics of Pure Science* (its UK title was *The Politics of American Science*), published in 1967, was, like *Science, Money and Politics*, a lively journalistic book which argued that the politics of science was just like any other kind of politics. Such differences as there were arose from the fact that scientists weren't very good politicians, and the vital role of science and technology in modern American life meant that, for many purposes, they didn't have to be. More vividly written and polemically argued than Greenberg's earlier book, *Science, Money and Politics* brings the story up to date.

For all the recent inflammatory talk of supposed 'anti-science' tendencies in contemporary culture, a critique of scientific knowledge is not the same as criticism of modern science. Greenberg is utterly unconcerned with the status of scientific knowledge: he's not a sociologist or a philosopher and he's quite content to take it for granted that science is true, powerful and frequently productive, just

as scientists often say it is. Greenberg loves science, too. But, like very many scientists, he is fiercely critical of many aspects of current financial, political and ethical arrangements bearing on the conduct of American science, arrangements which, if unchecked, have the capacity to undermine the integrity and authority of scientific knowledge. In those senses, Greenberg is an irreverent critic of science in just the way that other sorts of journalist are critical of political and legal practices – not because they necessarily think the people involved in these practices are any more sleazy than the norm, but because it is traditionally considered part of the American journalist's vocation to make public institutions transparent and accountable. The American scientific community has been lucky to have a critic who believes enough in the traditional 'right values of science' to worry that in its 'single-minded pursuit of more money' it is beginning to go 'down the path to becoming a toady of corporate power'.

America's love affair with science has never had much to do with humanistic values. 'In aristocratic ages,' Tocqueville noted, 'science is more particularly called upon to furnish gratification to the mind; in democracies, to the body.' From Bacon's time, men of science worked hard to convince patrons and princes that disinterested inquiry would eventually produce power, wealth and long life. Until the 20th century, relatively few believed them. Then came hybrid maize, penicillin, microchips and, especially, the Bomb. In the United States, the decisive moment was Hiroshima. In a way that scarcely anyone had foreseen, theoretical physicists, supposed to be among the most useless of scientists, were celebrated for winning the War in the Pacific and were now expected to guarantee winning the Cold War. The Bomb changed everything, and, from that moment on, the promised utility of all sorts of scientific research was the key to the public treasure-chest. The principal document outlining proposed structures for postwar government support of science announced that advances even in the purest of sciences were sure to lead to more and better jobs, more productive crops, the prevention and cure of diseases, and still bigger bombs. There were goods for everyone: whether you wanted the prolongation of American lives or the systematic termination of Soviet Communist lives.

These arguments were, to a degree, oversold: much science remains quite irrelevant to achieving any such goods, and the American War on Cancer lavishly funded since the 1960s has yet to realise any of the wilder promises made for it. In the late 1960s, the element of hype in these justifications was increasingly recognised, even by the Pentagon, which set about assessing exactly what bangs it was buying with its basic science bucks. But there was also a lot of truth in some of the justifications, and by the 1970s scientific, medical and engineering research was being so tightly woven into the fabric of American society that not even Presidents of a mind to do so could deliver on their intentions to cut the scientific community down to size. Outraged by campus demonstrations against the Vietnam War, Nixon called his chief scientific adviser into the Oval Office: 'Ed, how much money does the Federal Government put into MIT every year?' Edward David didn't have the exact sum to hand – it was in fact \$105 million in 1972 – but Nixon was adamant: 'I want it all cut off.' In a dither, David scurried back to his office and phoned Nixon's assistant John Ehrlichman, asking: 'What do you do about this?' Ehrlichman came back: 'Don't do anything. A week from now he'll have forgotten that he said it.' And that's what happened. As Greenberg says, 'Washington had many years earlier reached the point where it needed MIT as much as MIT needed Washington.' Through the Presidencies of Reagan, Bush the Elder and Clinton, the pattern repeated itself: Administrations bent on cost-cutting, and with many other pressing priorities, set out to take the axe to the science budget. They did have some momentary and local successes, but in the long run and in general the attempts failed. When Nixon took power in 1968, the Federal Government was spending \$1.5 billion on research in universities; when he resigned six years later, it was spending \$2 billion – and this despite the fact that Nixon and his henchmen viewed academic scientists as Democratic 'bastards' and 'nuts' 'who don't know a goddam thing', and despite the fact that Nixon had so little trust in the loyalty of his own scientific advisers that he eliminated their formal place in the White House. For this reason, it's unfortunate that this dauntingly long book so rarely ventures 'outside the Beltway': Washington DC isn't a vantage-point from which it's easy to report on the integration of science in everyday American life.

Greenberg extensively documents scientists' continuing lamentations about the passing of the supposed golden age in which research grants hung low on trees and the social value of every kind of scientific research was suitably acknowledged by Administrations of all political complexions. But he also mobilises solid evidence to show that American science has never been better regarded or better supported than at the present time. Why, then, is there such discontent? The physicist I.I. Rabi pointed to 'something like a Parkinson's Law' in science: new discoveries open up new lines of research; scientists' capacity to absorb money expands in relation to the funds available to be absorbed. Big Science has a big price tag: once only high-energy physics and astronomy were hugely expensive; now you may need many millions to be a serious player in genomics and other areas of molecular biology. More generally, science, like all kinds of other claimants to public funding, functions in a scarcity economy, the legacy of the 'anti-government, anti-tax politics of our time'.

When, early in the Clinton Administration, Congress cancelled the high-energy physicists' vastly expensive proton accelerator, the Superconducting Super Collider (SSC), it had many reasons for doing so. The original cost estimate submitted by the physicists in 1986 was \$4 billion, and the Reagan Administration was assured that up to half of that would be contributed by foreign governments. Several years later, the projected bill stood at \$12 billion, and, since no foreign governments had actually been involved in the planning process, not a single pound, yen or Deutschmark was ever committed. As Bush the Elder's science adviser told Greenberg, the Europeans were bridling at this early eruption of American unilateralism, saying that 'this was our machine and we could damn well pay for it, and lots of luck.' American scientists in different disciplines, and even in different branches of physics, were worried that the SSC would 'crowd out other basic science research', and, as the projected costs grew, the scientific establishment broke ranks. In 1991, a Nobel-winning physicist told the House Budget Committee that it was a sad sight to see fellow physicists making 'false claims that particle physics did everything from magnetic-resonance imaging and the computer revolution to the television screen and sliced bread'. When Clinton

became President in 1993, he'd had enough, and, while he didn't kill the SSC himself, neither did he strive officiously to keep it alive. Money was needed for other things, including the politically well-entrenched space station ('a celestial turkey of uncertain purpose'). Anyway, the huge hole in the ground for the SSC, into which \$2 billion had already been sunk, was being dug in Bush's Texas.

Even so leaders of the scientific community had other ideas about where to place the blame for the death of the SSC and for what they generally took to be their sadly reduced condition. Like many other politically engaged scientists, the physicist Leon Lederman pointed his finger at the spectre of an 'increasingly alarming anti-science, anti-rational mood' stalking the land. Public hostility to science flowed from public ignorance of science, and 'only when citizens have reasonable scientific savvy, will their Congressional servants vote correctly.' Lederman's proposed remedy for the poor state of public 'savvy' included an unintentionally hilarious proposal for a prime-time TV show called *The Dean*, scripted to be the '*LA Law* and *NYPD Blue* of science and scientists', and situated in the 'GRALE Institute' (for 'General Research at the Leading Edge'). The plan was 'to share some real science with the audience', and to this end the cast of characters included such real-life scientific types as the 'statuesque and graceful' Melissa Gebbe (who can 'virtually singlehandedly design and build a massive accelerator') and the obligatory 'haughty Brit' who 'dresses with nauseating precision' and who 'professes to care about the world, but abuses those closest to him'. The NSF and the Department of Energy were pleased to put \$100,000 into preparing a sample script, and another \$50,000 was subscribed by a private foundation. Distinguished scientists were over the moon about the result ('very gripping', 'exciting entertainment', 'fantastic'). The script was accordingly presented to several senior TV executives, who 'warmly thanked' Dr Lederman, and evidently promised, in show-business terms of art, to get back to him.

The idea that Government support for science depends on public understanding of scientific knowledge is not one that Greenberg can take seriously: 'the unfortunate, non-democratic truth is that science

in the United States, and other nations, too, prospers in a state of disengagement from public understanding of the substance of science.' In 1998, the Department of Energy spent almost \$700 million on high-energy physics research – not a discipline that the public, or even other sorts of scientist, can hope to mug up in the time left over from their day-jobs and domestic duties. Greenberg suspects that what the 'public understanders' are really interested in increasing is not lay comprehension but lay wonder – a view shared by the occasional critical scientist. So the distinguished cancer researcher Maxine Singer warned in 1996 that 'public information about science is now, to a large extent, in the hands of institutional public-relations departments.' Advancing the cause of your next grant is not the same thing as enhancing public understanding: 'There is too much hype,' Singer said. 'Every gene that is discovered will lead to a cure for cancer. Maybe, but not for a long time. Even the Superconducting Super Collider was said to have important implications for improving human health.' Greenberg himself concludes that 'the public is not hostile to science. Rather, busy with other concerns, it entrusts the care and feeding of science to others, even if unsure about who they are and what they are doing.'

President Eisenhower's Farewell Address in 1961 cautioned Americans to be wary of the growing political power of the 'military-industrial complex'. Less remembered was his warning that 'we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite.' In what Jürgen Habermas came to call 'technocracy', scientific and technological experts would be 'on top' as opposed to 'on tap', and they would usurp political power by a prior definition of problems and their permissible solutions. Greenberg isn't worried about any such development: 'scientists are not on top; they never have been.' First, and crucially, scientists rarely if ever speak with one voice on pertinent policy matters. When Truman didn't like Oppenheimer's objections to a crash programme for developing the H-bomb, he could turn to Edward Teller for scientific enthusiasm, as Reagan did when launching Star Wars in the face of other scientists' bitter opposition. From Reagan to Bush the Younger, many eminent scientists have opposed missile defence systems, writing eloquent

letters to the *New York Review of Books*, but there are thousands of other scientists delighted to take the money and do the work. And even when there is a high degree of scientific consensus, political expedients can easily trump expertise. No amount of scientific evidence for human-caused global warming stopped the present Bush from pronouncing the Kyoto accords dead. And when the panel of environmental scientists specially appointed by Bush himself found causes for immediate concern, the President's response so far has been to do precisely nothing. As one Presidential science adviser said, 'there's nothing more useless than advice that is not wanted.' Science is important to modern American statecraft and economic activity, but its politics never have occupied much executive attention, and do not now. A Clinton aide, assigned (as Greenberg writes) 'to "massage" the scientists – an especially insistent lot about their concerns – confided to me, with eye-rolling exasperation: "It's like talking to mental patients. You have to look like you take them seriously."'

Finally, as scientific expertise is increasingly and almost invisibly integrated into a range of political and economic institutions, the independence of that expertise becomes problematic. This is part of what Greenberg means by 'ethical erosion'. Burned by Nixon's hostility, and by the consequences of an earlier foray into electoral politics when they organised publicly against Barry Goldwater, leaders of American science learned the costs of acquiring a political appearance. Presidential science advisers shifted from seeing themselves as free-acting representatives of the scientific community – 'speaking truth to power' – towards acknowledging their role as 'guests in the President's house', doing the bidding of whatever Administration they happened to serve, enlisting the scientific advice the President required to achieve whatever ends were agreed by prior political decision. Their playing the political game meant the effective muting of an independent voice and the neutering of a tradition of independent political activism going back to the postwar years, when large numbers of atomic scientists publicly opposed the arms race, arguing for international control of nuclear weapons, and (successfully) urging a test-ban. The *Bulletin of the Atomic Scientists*, which was the major platform for scientific opposition to the arms race, has seen its circulation shrink in recent years from 21,000 to

7000. As Greenberg sees it, everywhere in modern America, cash has compromised conscience. If you want to know the career of morality in contemporary science, just follow the money.

It's a harsh judgment, but it's one shared to a very large extent by critical voices within science itself. Editors of major biomedical journals on both sides of the Atlantic are very concerned about the effects on scientific integrity of the practices that now so tightly tie research to the interests of the pharmaceutical companies. The recent deaths of subjects in clinical trials at both Johns Hopkins and the University of Pennsylvania have prompted systematic reflection about the meaning of informed consent and about scientists' material interests and the way they can compromise patient wellbeing. What future scientific integrity and what future public trust in science if science is no longer heard as an independent truth-speaking voice?

Ten years after he vigorously defended the technical feasibility of Star Wars as Reagan's official scientific adviser in the White House, the physicist George Keyworth had a belated crisis of conscience.

Interviewed by Greenberg, he volunteered that the Government scientists at the weapons-designing Livermore laboratory had 'lied' in supporting the Strategic Defense Initiative (SDI), and that he had knowingly transmitted their 'lies' to the Administration. Greenberg pressed him: 'Tell me a lie that Livermore has told, a big lie.'

Keyworth reluctantly replied that 'the whole argument for so-called third-generation nuclear weapons whose radiated energy could be focused into a directed-energy weapon, and used, for instance, as an SDI entity, was a pack of lies, unadulterated lies.' That's what it means to be a 'guest in the President's house'. What are the 'guests' telling us now? And how much will Americans love science if they find out that it's not the truth?

Steven Shapin teaches at Harvard and has written several books on the history of early modern science. His next will be *The Life of Science: A Moral History of a Late Modern Vocation*.

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