Blinding us with science

When scientists come out supporting the most nasty, environmentally destructive and scientifically weak positions, it is tempting to dismiss them as either stupid or corrupt. ***Alan Roberts*** *suggests otherwise, and offers some advice on dealing with dubious scientific conclusions.*

IN RECENT TIMES the media has featured some surprising findings by qualified scientists, for example:

'There is no reason to fear the alleged greenhouse effect'

'Tobacco smoking does not cause lung cancer'

'Nuclear power is clean and safe'.

Surely, some environmentalists will think, the scientists involved must be so sincerely economic-rationalist that they are selling themselves to the highest bidder. But, while there have been some notorious cases of scientific fraud, the great majority of scientists are not to be bought like this; it is rather a case of:

> You cannot hope to bribe or twist
> – Thank God! – the average scientist.
> But seeing what the man will do
> Unbribed, there's no occasion to.[1]

Even this is a bit too harsh. Let's look at a couple of illuminating cases.

In 1962 Algeria gained its independence by the Treaty of Evian. As one result, France could no longer test its nuclear bombs in the Sahara, and turned to a remaining Polynesian colony in the Pacific, the Tuamotu archipelago. The actual atoll site is better known by the name of Mururoa.

The effects on Australia of each series of tests, which began in 1966, were reported on by the National Radiation Advisory Committee (NRAC), originally appointed by the Commonwealth Government in 1957. The Committee's conclusions changed little from its first report in 1968:

> fallout from both series of French nuclear weapons tests in the Pacific is of no significance as a hazard to the health of the Australian population.[2]

through to 1972:

> the external gamma-radiation dose ... presents no hazard to the population compared with the average annual background dose ... The other aspect ... is the dose to the thyroid ... [These] doses are small compared with the radiation protection guide and do not present a hazard to the population.[3]

Since the attitude now current, and widely advocated even then, is that any increase in radiation dose is a hazard, these conclusions were dubious, to say the least. Noting that the Committee included certain illustrious figures well-known to readers of *Nuclear Knights*[4], you might find their presence highly relevant. As for instance, Professor Sir Philip Baxter, KBE, CMG, FAA; Professor E.W. Titterton, CMG, FAA; Professor Sir Leslie Martin, CBE, FRS, FAA.

But the findings did not follow simply from these gentlemen's well-known desire to see that nuclear energy in any form had a good PR image. In calculating the radioactive dose at various centres in Australia before and after the explosions, the committee used the accepted data and methods of the day. The real lesson emerges only if later events are considered.

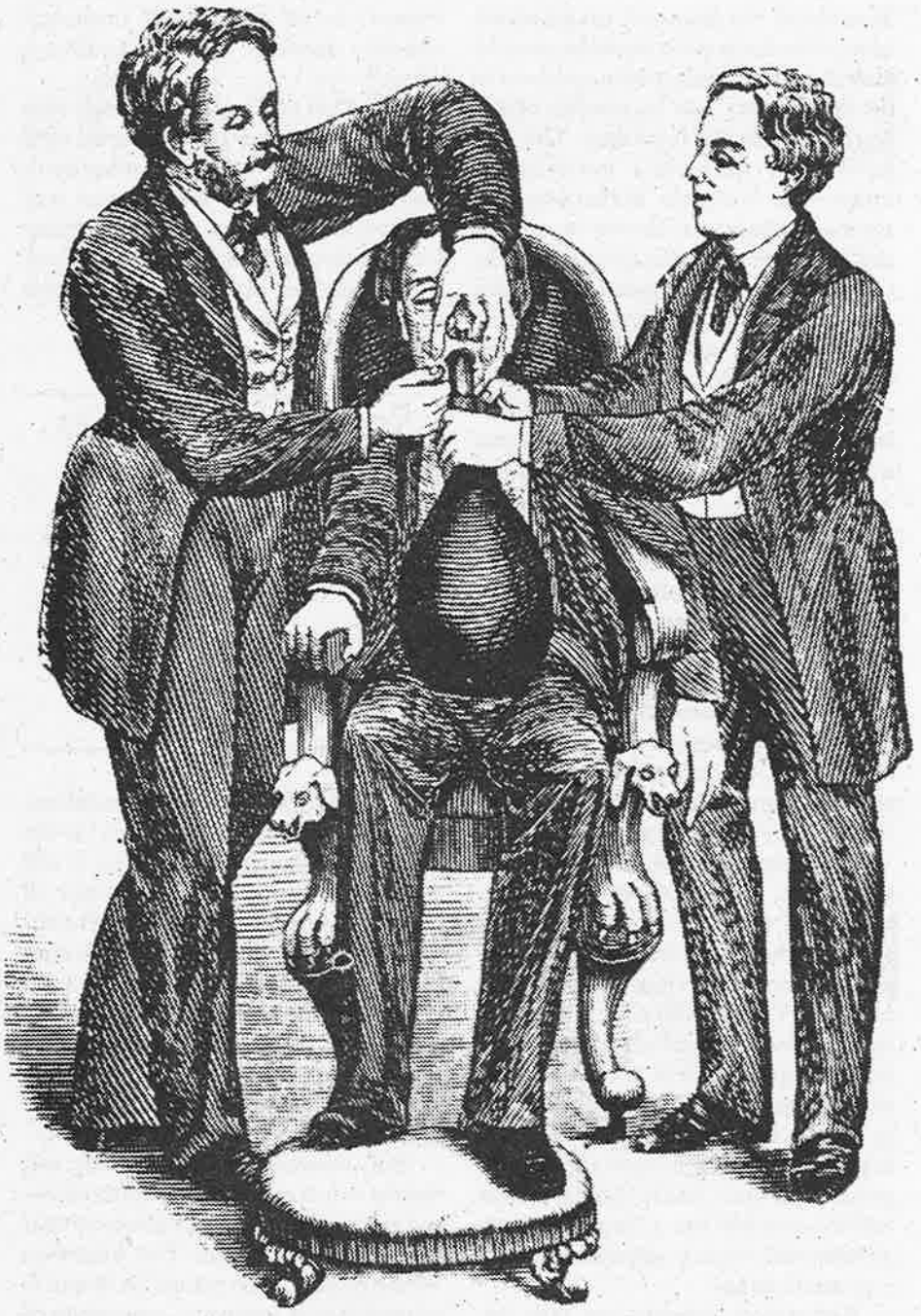
In 1972 the Whitlam Labor government was elected. Unlike the preceding Liberal-Country (now National) Party coalitions, it had no desire to keep open the option of polluting the Pacific with Australian nuclear stations or weapons, or of getting the help of France in doing so. (France had not then signed the Non-proliferation Treaty.)

On the contrary, it wanted to take a case to the International Court of Justice at the Hague against France's use of the Pacific as a nuclear testing ground. It therefore bypassed the NRAC and, through the Academy of Science, obtained a committee of equally reputable scientists whose report justified the legal case. Accordingly, in 1973 the Attorney General, Lionel Murphy, was able to approach the Court with sound scientific findings in his hand, that showed Australian citizens could be expected to die as a result of the French tests. A non-hazard was now, it appeared, a hazard.

The important thing to appreciate is that the two committees worked on exactly the same scientific data. Where they disagreed was on the conclusions to be drawn. Is a hazard to be regarded as 'significant' because a dozen or so extra deaths is only a small percentage of the number liable to get cancer anyway? If so, then the NRAC was right. Or are a dozen fatalities to be taken seriously anyway, regardless of any other deaths that might be occurring? The second committee thought they were.

(It is a pity Hannibal Lector, the cannibal serial killer from *Silence of the Lambs*, did not have the advantage of the NRAC's statistical approach. He could have pointed to the thousands who die each year in the USA from motor accidents, and what a minuscule percentage of this figure were the few dozen people he chose to kill and eat.)

Quite obviously, each committee brought in a report that was to the liking of the government it served. But this does not mean that scientists are a bunch of servile scoundrels; most of them are certainly not. The disagreement was over values. (A government will of course see to it that its scientific advisers share its relevant values.)



Is abstract Science, with a capital S, a value-free concept? Since abstract Science exists only in abstraction, this is not a very interesting question. Scientific activity, in the real world, is crammed full of value choices. What goals will be pursued? (a Moon landing, or the conquest of hunger?); what methods will be used? (should we test drugs on jailbird volunteers or inflict pain on experimental animals?); how will the findings be described? (with value-laden words like 'normal', 'deviant', 'functional'.

And when the question at issue is one with current social import, one's political views and moral values will always be decisive in the example above. Scientists have no particular authority or superior knowledge on such questions of values.[5] They can certainly be criticised when they pretend to possess any such expertise.

But there is another, and probably more important, way in which vested interests can use scientists to serve their ends.

When In Doubt ... Do What?

Because of the distorted values which have guided scientific research since at least the rise of industrial capitalism in the last century, our knowledge of the world is weirdly lopsided. The behaviour of subatomic particles of interest to weapons makers or the nuclear industry is known in minute detail, but there are big question marks over the vastly more important question of world climate and how it is determined. Human activity now takes place on such a scale that it alters basic parameters of the world as a biosphere, but this kind of lopsidedness means that we do not know what the effects of this activity will be.

The problems involved are, from a scientific viewpoint, much more difficult than those already solved in particle physics or industrial chemistry. The comparatively recent attention paid to them cannot magically turn up the complete answers; the problems are those of how complex systems behave, ones much more complex than the simplified arrangements of the physics or chemistry laboratory.

Thus there will often be, for quite some time, doubt and uncertainty attached to the answers found. Here again, value judgements enter. We might insist that rigorous proof be found for the harmful effects of a particular environmental disturbance, before steps are taken to curb it; while awaiting such proof, let us do business as usual. Or we might rather (as I believe we should) reverse the onus of proof and, once aware that a certain activity possibly has a large-scale environmental impact, suspend it until it is proved benign.

But vested interests can take advantage of these uncertainties – is it malignant? is it benign? – to further their ends. In a particular case, some scientists will incline to stress (for all sorts of reasons, sometimes honest, sometimes dubious) the evidence suggesting a benign impact. Even if they constitute a minority of responsible scientific opinion, they will be seized on by the interested corporation, industry or government, supported financially and/or made prominent in the media. (An example is the Bush administration's use of the Marshall Institute's minority opinions on the greenhouse effect.)

This kind of ploy is easily dealt with by pointing out how the publicised view is a minority one in the field concerned. But there is another and popular way for vested interests to use uncertainty for their own ends: they simply overlook the phrases in the scientists' reports which express this uncertainty.

Search (sometimes you will need a high-powered torch) for the explicit or implicit value judgements

For example, an environmental-impact firm prepares an EIS draft for the interested corporation. Usually it will not have 'in-house' experts to cover all the fields involved, and will sub-contract a consultant (often an academic) to cover a particular ecological concern. The consultants will usually report with complete honesty – for no other reason than that they would be foolish to jeopardise their scientific reputation for a consulting fee or two.

But, because an honest study will usually detect considerable areas of uncertainty, this report will often contain careful qualifications. For example: 'While no impact on species A, B and C is immediately apparent, a program of research needs to be undertaken before one can be sure of this.' In its summary report to the client, the firm 'translates' this as: 'There are no grounds for expecting harm to species A, B or C.'

Not exactly a lie. Not exactly the truth. But welcome news to the client...

We might put together a few rough rules-of-thumb to guide us in studying environmental statements and similar documents, when they appear to give their blessing to noxious practices.

- Don't assume the scientists concerned are conscious crooks. They usually aren't and you will find it hard to prove anyway.
- Search (sometimes you will need a high-powered torch) for the explicit or implicit value judgements the reports contain. See if you agree with them.
- Look for the fine print in the scientific work: where it is qualified, what uncertainties it expressed that somehow disappeared from the publicised version.

Sometimes, of course, a detailed study of the scientific work itself should be done; but this will take someone qualified in the field. The suggestions above deal with aspects on which you are as authoritative an expert as anyone in the world.

References

1 Apologies to Hilaire Belloc, in whose similar text the second line ended with 'British journalist'

2 National Radiation Advisory Committee, *Biological aspects of fallout in Australia from French nuclear weapons explosions in the Pacific, June-July 1967, Report to the Prime Minister,* December 1967, Commonwealth Government Printer, Canberra, 1968.

3 National Radiation Advisory Committee, *Biological aspects of fallout in Australia from French nuclear weapons explosions in the Pacific, June-August 1971*, Commonwealth Government Printing Office, Canberra, 1972.

4 Brian Martin, *Nuclear Knights*, Rupert Public Interest Movement, Canberra, 1980.

5 For a detailed study of a particular scientific dispute (the effect on the ozone layer of supersonic transport) and its content of values, see Brian Martin, *The Bias of Science* Society for Social Responsibility in Science, Canberra, 1979, and its catalogue of aspects in which science is not value-free.

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