

errors in *Please Just F* Off: It's Our Turn Now* could be seen as indicative of a book that has been carelessly slapped together. But what's more damning is Heath's sloppiness with sources. A random check of his assertions on pages 25 and 168 pointed to a UK poll as evidence of Australian youth opinion on unions as well as being indicative of international opinion on the Iraq war when the poll in question was about neither. Instead, the Guardian ICM poll of December 2004 was about voting expectations. Whether there is some legitimate reason for this particular referencing bungle is not as important as what it shows about his loose way with research.

For Heath, the book will have achieved its purpose of propelling generational warfare to centre-stage. I can sense the excitement and intelligence of 'my generation' and Heath is right in pointing out it is young people who will shape the future of this country—but hopefully not in the ill-thought out ways he advocates.

Surely throwing around labels isn't all that's needed to make Australia a better place?

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Catastrophe: Risk and Response

By **Richard A Posner**
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'Have you heard, it's in the stars, next July we collide with Mars' Cole Porter

The subject, catastrophe, ought to command attention. Armageddon, global warming, plagues, the end of the earth, the galaxy or the universe are all possible but with what probability? Some are certainties but billions of years hence. Others are a little more immediate. What should we do? Richard Posner attempts to answer this question in a book that is overlong, humourless and with suggestions that are guaranteed to irritate the various constituencies he is trying to assist.

There are two broad classes of disaster, natural and man made. Man-made are accidental or intentional. Catastrophes are disasters on a larger scale. Posner is at the grand end of catastrophes as opposed to Disraeli whose modest example was of a misfortune if Gladstone fell into the Thames but a calamity if he were fished out.

Natural catastrophes of an extreme sort have ranged from the massive activity of the volcanoes of 535 AD (possibly a super Krakatoa) and Krakatoa to asteroid collisions. Loss of biodiversity and global warming, although presented as human induced, are not unnatural phenomena and should be categorised as such. Plagues, which are a combination of the natural and human induced influences, the result of organisms either new or transferred from animals to humans, should also be included.

The potential palate of manmade catastrophes can be as broad as you wish to make it. Nuclear and bio-terrorism, industrial activity, accidents from scientific research or even from milli-, micro- and nano-technology could all be considered.

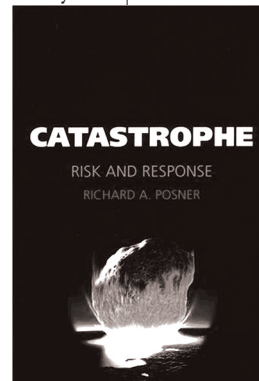
The central issue is whether mitigation of these risks is possible. An extreme example would be planning for human migration from earth in three to four billion years time as the sun swells to become a red giant. Whether the race will have survived that long or succumbed to some other calamity is probably not our concern but there is a known time for this event.

But assessing risk mitigation for events with uncertain timing but estimated or known frequency becomes very difficult. Mitigating human derived risks is even more so. For terrorism, a state can take measures as far

as its citizens approve but the issue of freedom and rights tends to impose limits. On the other hand risks derived from scientific discoveries and procedures and indeed their interaction with rogue states and terrorism is a much more vexing problem. In between these poles are the risks derived from ordinary activity, this includes global warming, bio-diversity and disease.

Posner considers natural catastrophes, scientific and unintended accidents and intentional catastrophes. He attempts to tease out how the social sciences and the law could help or even take the lead in mitigation by following three prime examples to exhaustion: asteroids, bio-terrorism with science and accidental science.

The risk of asteroid collision could be mitigated. If the approach



of a substantial rock is detected then some action might be possible to deflect it away from the earth. The issue is how much does a detection and deflection system cost set against the damage. The extinction of the dinosaurs is an example of destructive possibilities. Posner shows various risk benefit calculations which depend on severity of impact, value of lives lost, probability of collision and of course the discount rate. How much to spend on a program of no immediate benefit is a common question in businesses and governments that finance long-term exploration or research and development. There are no rules and it is not zero-base budgeting but more custom and practice. A secondary issue, the need for more consideration of the direction of scientific research, is illustrated by the planned construction of a large aperture telescope to search for distant galaxies. Posner suggests that it would be perfect for asteroid watching but the astronomers have ideas elsewhere well beyond the solar system.

Terrorist weapons coming from unconstrained scientific research has an example drawn from Australia where scientists from the CSIRO and ANU in Canberra made a virulent mousepox virus by stitching in a gene to make IL-4, a cytokine, a signalling molecule of the immune system. The aim was to control mouse plagues in grain silos by rendering the mice infertile. Instead the virus killed them. But further, the engineered vaccine also killed mice immunised against normal mousepox. Their immunity was overcome. This could be repeated by engineering IL-4 into smallpox and hence create a potential new weapon for bioterrorists. Society has to limit access to lethal biologicals but limiting or stopping scientific experiments needs the Wisdom of Solomon and he is not currently

available. The technique with cytokines has another side to it in the search for treatments for HIV and cancer.

Finally there is the risk of destruction of the planet as a consequence of an accidental runaway nuclear physics experiment at the Relativistic Heavy Ion Collider, Brookhaven National Laboratory, Long Island. This is a similar dilemma to that faced by the makers of the first hydrogen bomb. Would it trigger a worldwide chain reaction through the atmosphere and oceans of the world? A theoretical physics group, led by Gregory Breit, were asked to calculate the odds. The trial went ahead. Likewise, the Relativistic Heavy Ion Collider has been operating since 2000 and we are all well.

The issue of how to deal with estimated and unknowable risks remains and is a perfect place for the precautionary principle—a delay until more is known.

Posner sees risk benefit analysis as the basis of assessing response. He suggests a number of ways to help develop responses: a scientifically literate legal profession, a science court and a centre for catastrophe assessment and response. He suggests an international Environmental Protection Agency, a bio-weaponry agency and catastrophic risk review for new projects. He also considers limiting science study for foreigners and enhanced security measures.

These suggestions are a scattergun approach. Patent law requires familiarity with science and technology but Posner wants to go further and educate lawyers for catastrophic risk law. A science court conjures up visions of past Presidents of the Royal Society in London holding court while at present science risk assessment is covered by in the United States by the likes of the Food and Drug Administration, the EPA and even

occasional scientists in the basement of the White House signing off proposals. This is responsibility spread across agencies rather than concentrated in a single agency. The surrender of some authority to an international agency is even more problematic.

These ideas probably have as much chance of being adopted as the probability of Cole Porter's catchy prediction of planetary collision.

The book addresses real and important issues without adding much to ways of thinking about mitigation of risk. It would have been better reduced to a paper.

Reviewed by Tom Quirk