Preface for *Risco* – the Brazilian translation of *Risk* - August 2008

Deus é Brasileiro?

I first encountered the idea that God might be a Brazilian forty years ago. I was a visiting student at the University of São Paulo. On a trip from São Paulo to Santos I was the passenger of an extremely skilful Brazilian driver. I was terrified. I begged him to slow down. "Don't worry," he said, taking a hand off the wheel to pat my knee reassuringly, "Deus é Brasileiro."

I am grateful for the invitation to write a preface to this book for Brazilian readers. It provides an opportunity to reflect both on my experience of risk in Brazil and on developments in the field of risk since the book was first published in 1995.

If there can be such a thing as a time-lapse epiphany, I had one on the winding road to Santos. It was only some years later, when I was attempting to formalize some thoughts on perceptions of risk, that I began to appreciate the importance of God's nationality.

Most of the literature on risk insists on distinguishing "real" or "objective" risk from "perceived" risk. Objective risk is what the experts, usually statisticians and actuaries, know, and perceived risk is what the rest of us believe. But risk is a word that refers to the future, and the future exists only in our imaginations. All risk is perceived; and perception is rooted in belief. What the statisticians and actuaries know is history. It is transmuted into risk by passage through the filter of belief (book, p 43).

These filters take many forms. Some are optimistic. Many Australians like to claim that they live in "the lucky country" – perhaps a secular version of Deus e Brasileiro. Might such filters influence behaviour? The statisticians tell us that the lucky Australians die in road accidents 50 per cent more often than the less fortunate British, and Brazilians driving under the protection of a partisan deity die on the road three and a half times more often. The British Foreign Office offers the following advice to Britons venturing to Brazil: "Drive carefully in Brazil. The style of driving and standards are very different from the UK. Brazil has a high road accident rate; in 2005 19 people per 100,000 of the population died in Brazil compared to 5.5 people per 100,000 of the population in the UK."

The book (chapters 7 and 8) explores various explanations for the large and persistent differences in road death rates between countries, and within countries, over time. It also speculates briefly (p. 204) about the influence of religious belief on judgments about risk. Since 1995, and especially since 11 September 2001, the role of religious filters has assumed growing salience. In The War on Terror God appears to intercede on both sides with devastating effect.

Further thoughts

The two main themes around which the arguments of the book are organized are *risk compensation* and *cultural theory*. They have come to seem, to me, almost embarrassingly obvious.

The version of risk compensation introduced in Chapter 2 is derived from the works of the economist Sam Peltzman and the psychologist Gerald Wilde that I first encountered in the 1970s. For most economists and psychologists today the idea of risk compensation is axiomatic; while in pursuit of opportunities, we scan our environment for evidence of safety and danger and modify our behaviour in response to what we observe. Where the phenomenon is still the subject of debate, the argument now is usually not about its existence but about the magnitude of its effect – is the behavioural response to perceived changes in risk, partial, complete, or more than complete?

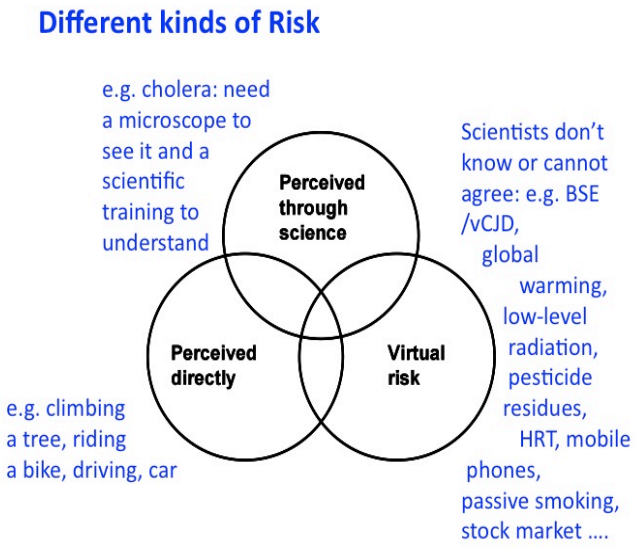
I first encountered the idea of cultural theory, introduced in Chapter 3, in the work of Mary Douglas and Michael Thompson. It helped to organize in a systematic way the diversity of positions that I encountered in debates about the most sensible way to manage risk. It introduced me to what Thompson calls "plural rationalities", and brought a semblance of order to what otherwise appeared to be incoherent shouting matches.

These two main themes appear to be standing up to the tests of time robustly. Since the book was published I have continued to elaborate them and explore their utility. Below I set out some further thoughts.

Types of Risk

In chapter two I call attention to "varieties of uncertainty" and the blurred boundary between what is called *risk* and what is called *uncertainty*. Figure 1 in this preface suggests that further distinctions can be helpful. Uncertainty is now consigned to the circle labelled "virtual risk"; in the same circle are also to be found contested hypotheses, ignorance, and unknown unknowns. If an issue cannot be settled by science we are compelled to rely on *judgment*, some combination of instinct, intuition and experience. Some find this enormously liberating; all interested parties feel free to argue from their beliefs, prejudices or superstitions. It is in this circle that we find the longest-running and most acrimonious arguments. Virtual risks may or may not be real, but beliefs about them have real consequences.

Figure 1

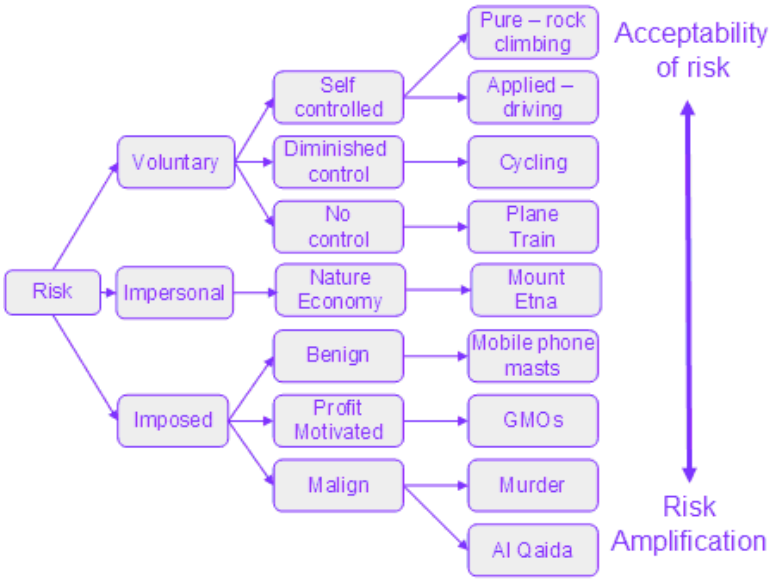


The circle labelled “perceived through science” contains most of the published risk literature. Here we find books, reports and articles with verifiable numbers, cause-and-effect reasoning, probability and inference. This is the domain of, amongst many others, biologists with microscopes, astronomers with telescopes, evidence based medicine, highway engineers and vehicle designers, bridge builders, epidemiologists, statisticians and insurance company actuaries. And the central bankers and hedge fund managers negotiating a safe course through turbulent financial seas? We will return to the latter two in a moment.

The third circle, risk “perceived directly” is a category to which I would now give greater emphasis. We all routinely manage risks in this circle in everyday life. As with virtual risks we manage them using judgement; we do not undertake formal, probabilistic risk assessments before we cross the road. The area in Figure 1 in which this category overlaps with risk perceived through science is frequently a zone of conflict. While we all might cross the road exercising our judgement others, institutional risk managers armed with statistics and different safety standards, often conclude that our behaviour ought to be managed to make us safer than we apparently choose to be.

Another way of classifying risks to which I devoted insufficient attention in the book is illustrated by Figure 2.

Figure 2: Risk acceptability and risk amplification: what kills you matters



Acceptance of a given actuarial level of risk varies widely with the perceived level of control an individual can exercise over it and, in the case of imposed risks, with the perceived motives of the imposer.

With "pure" voluntary risks, the risk itself, with its associated challenge and rush of adrenaline, is the reward. Most climbers on Mount Everest and K2 know that it is dangerous and willingly take the risk (the fatality rate on K2 - fatalities/those reaching the summit – is reported to be 1 in 4).

With a voluntary, self-controlled, applied risk, such as driving, the reward is getting expeditiously from A to B. But the sense of control that drivers have over their fates appears to encourage a high level of tolerance of the risks involved.

Cycling from A to B (I write as a London cyclist) is done with a diminished sense of control over one's fate. This sense is supported by statistics that show that per kilometre travelled a cyclist is much more likely to die than someone in a car. This is a good example of the importance of distinguishing between relative and absolute risk. Although much greater, the absolute risk of cycling is still small - 1 fatality in 25 million kilometres cycled; not even Lance Armstrong can begin to cover that distance in a lifetime of cycling. And numerous studies have demonstrated that the extra relative risk is more than offset by the health benefits of regular cycling; regular cyclists live longer.

While people may voluntarily board planes, buses and trains, the popular reaction to crashes in which passengers are passive victims, suggests that the public demand a higher standard of safety in circumstances in which people voluntarily hand over control of their safety to pilots, or bus, or train drivers.

Risks imposed by nature - such as those endured by people living on the San Andreas Fault or the slopes of Mount Etna – or by impersonal economic forces - such as the vicissitudes of the global economy - are placed in the middle of the scale. Reactions vary widely. Such risks are usually seen as motiveless and are responded to fatalistically - unless or until the risk can be connected to base human motives. The damage caused by Hurricane Katrina to New Orleans is now attributed more to willful bureaucratic neglect than to nature. And the search for the causes of the economic devastation attributed to the “credit crunch” is now focusing on the enormous bonuses paid to the bankers who profited from the subprime debacle.

Imposed risks are less tolerated. Consider mobile phones. The risk associated with the handsets is either non-existent or very small. The risk associated with the base stations, measured by radiation dose, unless one is up the mast with an ear to the transmitter, is orders of magnitude less. Yet all around the world billions are queuing up to take the voluntary risk, and almost all the opposition is focused on the base stations, which are seen by objectors as impositions. Because the radiation dose received from the handset increases with distance from the base station, to the extent that campaigns against the base stations are successful, they will increase the distance from the base station to the average handset, and thus the radiation dose. The base station risk, if it exists, might be labeled a benignly imposed risk; no one supposes that the phone company wishes to murder all those in the neighbourhood.

Less tolerated are risks whose imposers are perceived as motivated by profit or greed. In Europe, big biotech companies such as Monsanto are routinely denounced by environmentalist opponents for being more concerned with profit than the welfare of the environment or the consumers of its products.

Less tolerated still are malignly imposed risks - crimes ranging from mugging to rape and murder. In most countries in the world the number of deaths on the road far exceeds the numbers of murders, but far more people are sent to jail for murder than for causing death by dangerous driving. In the United States in 2002 16,000

people were murdered - a statistic that evoked far more popular concern than the 42,000 killed on the road - but far less concern than that inspired by the zero killed by terrorists.

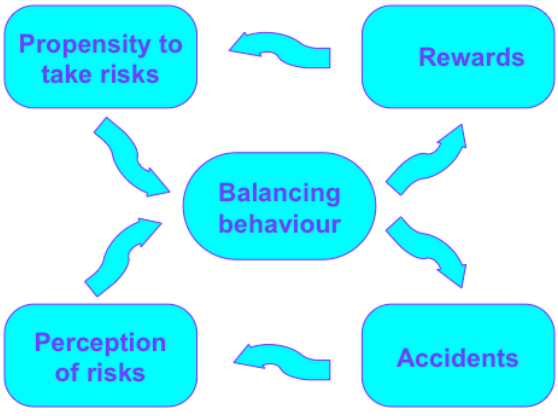
Which brings us to terrorism and Al Qaida. How do we account for the massive scale, world-wide, of the outpourings of grief and anger attaching to its victims, whose numbers are dwarfed by victims of other causes of violent death? In London 52 people were killed by terrorist bombs on 7 July 2005, about six days worth of death on the road. But thousands of people do not gather in Trafalgar Square every Sunday to mark, with a three minute silence, their grief for the previous week's road accident victims.

At the time of writing the British Government is proposing legislation that would permit the detention of terrorist suspects without charge for 42 days. The malign intent of the terrorist is amplified by governments who see it as a threat to their ability to govern. To justify forms of surveillance and restrictions on liberty previously associated with tyrannies "democratic" governments now characterize terrorism as a threat to Our Way of Life.

Institutional risk management and bottom-loop bias

Figure 2.2 (book p 15) describes the "risk thermostat", the essence of Wilde's risk compensation hypothesis. It makes the point that a propensity to take risks leads to risk taking behaviour that leads, *by definition,* to accidents: to take a risk is to do something that carries with it a probability of an adverse outcome.

The Risk Thermostat (book page 15)



Frequently after an accident people chorus that risk was not managed properly. Not necessarily so. Culpable negligence must contend with bad luck as the explanation. If people take risks there will be accidents. A zero risk world is unattainable.

Yet in the most affluent countries of the world there is a trend toward increasing institutional risk aversion. Most of us in our daily lives routinely manage risks by balancing perceived rewards against the perceived risk of accidents. But some us (not me) are promoted to the ranks of the institutional risk managers. Their job is to

reduce accidents, and then get them lower still. For them, one accident is one too many.

They are enjoined not to have their judgement about what is safe or dangerous corrupted by contemplation of the rewards of risk taking. In terms of the Risk Thermostat they have become institutional manifestations of *bottom loop bias.* The top loop, the rewards loop, is someone else's concern, perhaps the sales or marketing department.

But in many cases, in Britain the domain of education provides a good example, there is no effective top-loop counterweight. The unopposed demands for ever more safety result in significant opportunity costs. Interesting experiments in chemistry classes, field trips, games and sports are lost, not to mention the uncounted hours of productive teaching and research time devoted to the filling in of fatuous risk assessments.

In Britain at the time of writing one-sided institutional risk aversion and lack of trust are promoting defensive medicine, the practice of medicine in which doctors' fears of liability compromise the welfare of the patient. The system is burdened with minutely detailed audit trails, risk assessments and expensive, unnecessary and sometimes risky tests. Fear of liability, ever more stringent health and safety regulations, and the rising cost of insurance are leading to the abandonment of traditional fairs, fetes and street parties, the chopping down of many mature trees, the removal of hanging flower baskets and the banning of conkers played without goggles (if you don't play conkers in Brazil try Google).

Top-loop bias and weapons of financial mass destruction

At the time of writing (August 2008) the world is in a state of financial turmoil that might be attributed to top-loop bias. The "subprime crisis" and the "credit crunch" can be viewed as the consequence of financial risk taking in a context in which the rewards for playing successfully with other people's money were enormous. In a good year the Christmas bonus of a foreign exchange dealer or hedge fund manager was enough to retire on for life. And if he had a financial "accident" and lost his clients or shareholders a lot of money, the worst that was likely to happen was that he would need to find another job – while still retaining his earlier bonuses. On a more modest, but far more widespread scale, this distortion of incentives led commission-hungry sellers of mortgages to persuade large numbers of people to assume debts that they had no hope of repaying, especially in a climate of collapsing property prices.

The problem has been compounded by the hubris that confuses luck with financial genius, a condition nicely described by Nassim Nicholas Taleb in *Fooled by Randomness*[1]. The complex financial instruments devised by the so-called financial "rocket scientists" – famously labeled *weapons of financial mass destruction* by Warren Buffett - have become beyond the comprehension of most people trading

[1] Nassim Nicholas Taleb in *Fooled by Randomness,* Random House, New York 2005.

them, and often beyond the comprehension of their devisers. Their apparent mathematical sophistication led many who dealt in them to believe that they were safely within the scientific circle of Figure 1.

In reality they were in the Virtual Risk circle where the available numbers provided spurious support for judgments based on speculation, superstition and prejudice – and greed and vanity. A famous example has been compellingly documented by Roger Lowenstein in *When Genius Failed*[2]. It is the story of the spectacular fall, in September 1998, of Long Term Capital Management, a fall that came close to bringing down the global financial markets. The principal "geniuses" in this story were Robert Merton and Myron Scholes who shared a Nobel Prize for Economics in 1997 for their discovery of "a new method to determine the value of derivatives". So long as the assumptions embodied in their model held, so long as the phenomena they were modeling could be confined within the scientific circle of Figure 1, their genius trumped all competitors, and produced astonishing profits. But their vanity, arrogance and early success deceived them into believing that they had a formula for managing uncertainty.

Cultural Theory

I first encountered *cultural theory* (see chapters 3 and 4) when writing *Risk*. Since publication of the book in 1995 I have been increasingly impressed by the ability of cultural theory to bring a modicum of order and civility to debates about risk. It is *not* a typology for pigeonholing participants in debates about risk. Occasionally one encounters a pure type, but most of us are too complex and multi-faceted to be captured by a simple label. It does however provide a useful framework and vocabulary for describing the attitudes encountered in discussions about the best way to approach an uncertain future. It helps people to introspect about their own biases and prejudices.

On numerous occasions since publication of the book I have been offered an opportunity to introduce an audience to the insights of cultural theory, but offered only a few minutes in which to do it. By happy chance I discovered that the icons of Figures 3.1, 3.2 and 3.3 (book Chapter 3) could be transformed into cartoons – Figure 3.

The cartoon version received its first outing when Michael Thompson (the author of the typology) and I were commissioned by Britain's Health and Safety Executive to write a report entitled *Societal Concerns about Risk*[3]. We began by telling the HSE, in the words of Margaret Thatcher, that "there is no such thing as society", by which we meant that there is no single societal view on problems of risk.

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[2] Roger Lowenstein, *When Genius Failed*

[3] *Taking Account of Societal Concerns About Risk: Framing the Problem:* Research Report 035 (with Michael Thompson) Health and Safety Executive, London 2002: http://www.hse.gov.uk/research/rrpdf/rr035.pdf

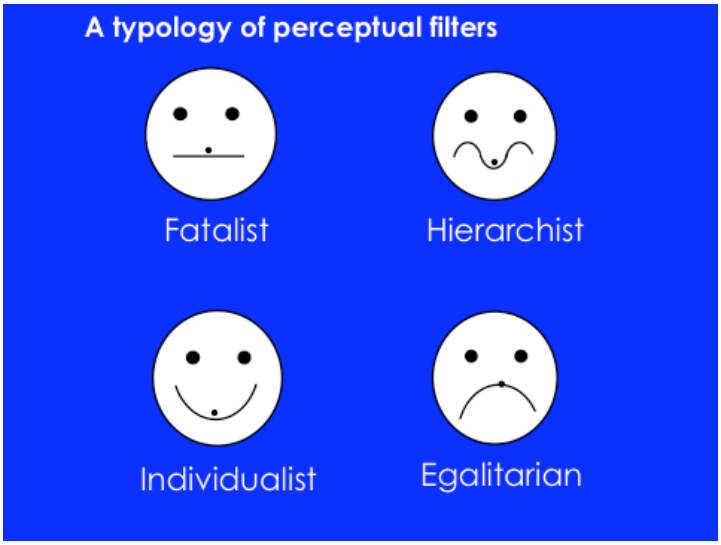
We explained that in terms of the cultural theory typology they, the Health and Safety Executive, were statutory Hierarchists. They made the rules and enforced the rules. Further we told them that for the foreseeable future they could expect to be attacked by Egalitarians – such as The Royal Society for the Prevention of Accidents, the Consumers Association, and environmental groups - complaining that they were not doing enough to protect society. And by Individualists complaining that they are over-regulating and suffocating enterprise.

As the "sub-prime crisis" with its "credit crunch" and "toxic derivatives" unfolds world wide there has been a sudden and dramatic increase in the number of commentators who have discovered that the Hierarchists – the regulators – have been asleep. The most famous Individualist convert to regulation is Alan Greenspan, formerly chairman of the United States' Federal Reserve Bank who confessed:

> "I made a mistake in presuming that the self-interests of organizations, specifically banks and others, were such as that they were best capable of protecting their own shareholders and their equity in the firms."

Cultural theory shines a revealing light on the words "self interest". There are contending interests, and those of the hedge fund managers intent on maximizing their Christmas bonuses do not necessarily coincide with those of the pensioners whose savings they are managing. The role of the hierarchist/regulator is to balance the potential societal rewards that might be achieved by untrammelled free enterprise, against the potential losses that might result from its excesses. As I write the damage of excess is the preoccupation of governments around the world. The hand of the regulator will, in the near future, almost certainly weigh heavier.

Figure 3



These cultural perspectives can also be found in Brazil. The words on the national flag "Ordem e Progresso" form a classic Hierarchist mantra. And although the DOPS

(Departmento de Ordem Politico e Social) no longer exists under that name doubtless the sentiments it embodied still linger on in orderly bureaucratic hearts. Had the DOPS been allowed to continue its work, the mantra on the flag might by now have been improved, in the spirit of Orwell's 1984, to read "Ordem **é** Progresso".

My Brazilian driver, whom I introduced at the beginning of this essay, was a classic Individualist. "Deus e Brasileiro" captures the spirit of optimism that underpins their propensity to take risks. They are gamblers because they expect to win more than they lose. They are impatient with bureaucracy that they see as the enemy of the entrepreneurial spirit, and reassure each other that "o Brasil cresce de noite enquanto os burocratas dormem".

They also have a robust view of nature as cornucopian and resilient, which brings them into conflict with Egalitarian environmentalists who view it as fragile and threatened. This conflict takes place, most conspicuously in the eyes of the rest of the world, in Amazonas. Both Individualists and Egalitarians are critical of Government (Hierarchist) action, or inaction, and both profess to be champions of the downtrodden poor, by creating employment and economic prosperity, or by protecting indigenous ways of life and the environment on which it depends.

The downtrodden poor, the Fatalists whose fate was so memorably captured by João Cabral de Melo Neto in Morte e Vida Severina, are too busy trying to survive to take much interest in academic debates about risk.

Climate change

Chapter 9 of the book is about the "the greenhouse effect". Since publication in 1995 much has changed, and much hasn't. Focused on reports of the IPPC, an apocalyptic consensus has been building around the view that global warming is real, man-made, and potentially catastrophic; unless anthropogenic emissions of greenhouse gases can be curbed dramatically in a very short space of time we are doomed.

I concluded my survey of the evidence on this subject in 1995 observing "my survey of the global warming debate has made me more open minded about the scientific evidence; I began as a firm believer in man-made global warming, and now I am much less sure. It has made me more fatalistic; ice ages and greenhouses of the past have occurred without the assistance of mankind and doubtless will again." (p. 176)

Most adherents to the apocalyptic consensus understand the science about as well as I do – not very well. I remain on this subject a fatalistic agnostic. Relative to the complexity of the problem under discussion the models upon which contending hypotheses rest still seem to me to be extraordinarily simplistic. The debate has become political, and the evidence lies mostly in the Virtual Risk circle of Figure 1. This liberates participants in the debate to argue from belief, prejudice and superstition. The less certain the science the more influential become the perceptual filters of cultural theory, and the more dogmatic become the participants in the debate.

The lack of scientific certainty has also created space in the debate for religious belief. One high-level participant, Sir John Houghton, former Director of Britain's Met Office and co-chair of the IPCC, has warned that God may induce man to mend his ways with a disaster: "God tries to coax and woo, but he also uses disaster. Human sin may be involved; the effect will be the same. … If we want a good environmental policy in the future we'll have to have a disaster."[4]

The most significant change in this debate since 1995 has been the re-emergence of the debate about "peak oil". In a book I published in 1981 I observed that "oil clearly has a severely limited future; as it becomes scarcer it will increasingly be reserved for premium uses such as transport, but ultimately, by the early part of the next century at the latest, substitutes will have to be found." [5]

I make no claim to prescience. I was simply climbing on to the bandwagon of what was then, in the aftermath of 1973 oil shock, the conventional wisdom. Oil was running out. But it was running out in particular countries at particular times. The bell-shaped depletion curve applied, of course, to particular nations or deposits, but that simply highlighted the need to find other oil-bearing nations or deposits. Now we appear to be confronting the global bell-shaped depletion curve.

I venture a prediction. Oil, in the quantity needed to keep global economic growth on its 20th century trajectory, will not be there. Substitutes will become available too little, too late. As the lights go out in developed countries used to having light on demand, the concern about global warming will be overtaken by the concern to get the lights back on.

This prediction also lies in the Virtual circle. It rests on numerous contested assumptions. But it is likely that the theory of impending oil apocalypse will be testable against hard evidence many years before the theory of impending climate apocalypse.

Risk management: where are the keys?

The mythical drunk notoriously searches for his keys not in the dark where he dropped them, but under the lamppost where he can see. This is an apt metaphor for much of what is written on the subject of risk management.

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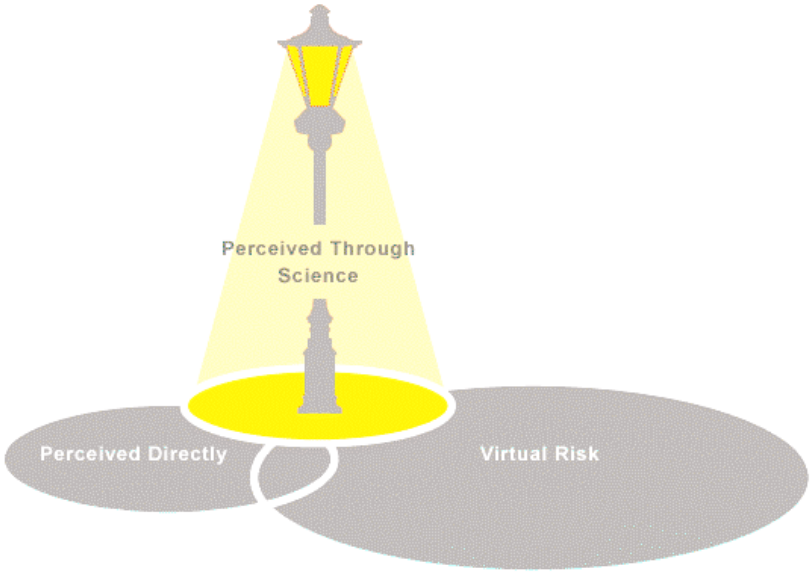
[4] Me and my God, *Sunday Telegraph,* 10.9.95

[5] *Transport Planning: vision and practice,* Routledge and Kegan Paul, 1981, p. 71.

Figure 4. Where are the keys?



Lord Kelvin famously said:

"Anything that exists, exists in some quantity and can therefore be measured."

This dictum sits challengingly alongside that of another famous scientist, Peter Medewar who observed:

"If politics is the art of the possible, research is the art of the soluble. Both are immensely practical minded affairs. Good scientists study the most important ***problems they think they can solve*** [my emphasis]. It is, after all, their professional business to solve problems, not merely to grapple with them."

Risk, as noted earlier, is a word that refers to the future. It has no objective existence. The future exists only in the imagination. There are some risks for which science can provide useful guidance to the imagination. The risk that the sun will not rise tomorrow can be assigned a very low probability by science. And actuarial science can estimate with a high degree of confidence that the number of people killed in road accidents in Britain next year will be 3000, plus or minus a hundred or so. But these are predictions, not facts. Such predictions rest on assumptions; that tomorrow will be like yesterday; that next year will be like last year; that future events can be foretold by reading the runes of the past. Sadly, the history of prediction contains many failures – from those of stock market tipsters to those of vulcanologists seeking to predict eruptions, earthquakes and tsunamis.

In the area lit by the lamp of science one finds risk management problems that are potentially soluble by science. Such problems are capable of clear definition relating cause to effect and characterized by identifiable statistical regularities. On the margins of this circle one finds problems framed as hypotheses, and methods of reasoning, such as Bayesian statistics, which guide the collection and analysis of

further evidence. As the light grows dimmer the ratio of speculation to evidence increases. In the outer darkness lurk unknown unknowns. Here lie problems with which, to use Medawar's word, we are destined to "grapple".

There is a distinction, frequently insisted upon in the literature on risk management, between "hazard" and "risk". A hazard is defined as something that could lead to harm, and a risk as the product of the probability of that harm and its magnitude; risk in this literature is hazard with numbers attached. So, relating this terminology to Figure 4, it can be seen that risk can be placed in the circle illuminated by science while the other two circles contain different types of hazard.

Typing "hazard management" into Google at the time of writing yielded 120,000 hits; "risk management", 36.6 million - 300 times more. But the number of potential harms in life to which useful numbers can be attached is tiny compared to the number through which we must navigate using unquantified judgement. The Kelvinist, approach to risk, with its conviction that everything in the outer darkness must be quantifiable, can only lead to self-deception. And following Medawar's dictum that we should confine our efforts to the quantitatively soluble, threatens to divert attention from larger, more complicated, more urgent problems with which we ought to be grappling.

Finally

Two contenders for the title of the largest, most complicated, most urgent problem facing the world today are climate change and peak oil. In the 1970s when I was worrying about peak oil, climate change did not feature as a serious environmental issue. The meteorological world was only beginning to recover from its concern about an impending ice age. But in the peak oil debate today one encounters many of the same concerns that inspired books such as *Limits to Growth, The Costs of Economic Growth, Blueprint for Survival,* and *The Social Limits to Growth.*

In the 1980s, 1990s and the early years of the 21st Century, with a few pauses, commodity prices fell and growth resumed. Were the neo-Malthusian concerns of the 1970s misguided or merely premature? Will technology and markets prove, yet again, that there are no limits to growth? Or will such limits frustrate the efforts of governments and central bankers to avert a depression? These questions are likely to receive different answers in different parts of the world. How will they be answered in Brazil? Perhaps Deus seja realmente Brasileiro?

Boa sorte!