

Risk: The Human Adventure

by Richard D North

Published by the European Science and Environment Foundation, 2001

Richard D. North is a keynote speaker at the Opening Event of the Summit for the Future 2006. See: <http://www.clubofamsterdam.com/summit2006.htm>

Contents

Introduction

Part One

Chapter One: Risk, probability and gambling

Chapter Two: Risk Society: Its proponents and opponents

Chapter Three: Risk and morality: Martyrs, military men, mountaineers and feeding the millions.

Chapter Four: Risk and profit

Chapter Five: Nature, the risk taker

Chapter Six: Trust and the political management of risk - and a proposal

Chapter Seven: Managing risk: throwing the precautionary principle to the winds

The Adventure of Risk

by Richard D North

INTRODUCTION

"Risk is the chance that something adverse will happen" – The Health and Safety Executive, UK [HSE, 1988]

"The word 'risk' derives from the early Italian 'risicare', which means 'to dare'. In this sense, risk is a choice rather than a fate" - Peter L Bernstein [Bernstein, 1996]

Risk is a lovely subject. But it is a difficult one. Still, we mustn't risk being downhearted. We must keep our nerve. We need to see who we can trust in such a tricky matter. We need to know what evidence about these matters we can believe. These are the subjects of this short book: nerve, trust and evidence. An important further message is about social responsibility: we owe it to risk-takers in the past that we are now well-off; we are now – as societies – taking further risks to get what we want. We owe it to one another not to bleat when some of the risks go wrong.

We know we can think about risk in very sophisticated ways virtually without effort. We cross roads every day, after all. Many of us find our most intense pleasure in betting shops, where risk is almost all that is discussed, and it isn't our failure to understand the nature of betting which makes us losers but our failure to understand equine quadrupedalism.

Of course, views on risk are very diverse. Our bank manager seems averse to it whenever we seek to interest him in our new ventures. Doctors one minute tell us butter is a

big risk, the next that we can wolf it down to our heart's desire. Greenpeace and others say the entire planet is at risk. They would have us eschew all research on genetically modified plants: a response to a new technology almost as silly as that of government ministers who say we shall only proceed with it when it is proved that there is no risk attached to the project.

This book does not dwell on the risks, which are the most fun: the risks of sex, sport and intoxication. It is, in a way unfortunately, about more serious matters even than those.

It argues that so far as we can guess, our age has been, and may even remain, quite a safe one. The risks we produce are much more threats to our ideas of naturalness than to our health or even to that of the planet. In other words, our equanimity is more at threat than our physical well-being.

It argues that, as members of society, we benefit hugely from much risk-taking and should try to accept the consequences of risk when they are bad as well as when they are good. It argues (Chapter Seven) that the management of risk by the government cannot be as precautionary as many fashionable voices demand, and yet could be far more intelligible and intelligent than it now is. These are issues not so much of risk, as of trust.

This is isn't a text book about the mathematical ideas of risk which underlie these minefields, though I hope newcomers to the subject will find (especially in **Chapter One**) enough of a starter's pack to get them going with the issue.

All these issues would be of interest at any time. They are of special poignancy now because, as we discuss in **Chapter Two**, there is a modern industry, comprised of media, law and campaigning NGOs - and their adjuncts in academia - which is using risk as a handle to claim attention and income. They wouldn't put it that way, of course. They claim noisily that they are pursuing the citizen's rights against overweening vested interests in industry and against the indifference of the regulatory authorities. But when they create unnecessary anxiety, rather than assuage it - they are up to no good, and it is worth pointing out the damage they are doing. They are one of the larger risks we face.

Chapter Three will put a wide range of risk-taking into a moral framework, the better to make its point that almost all risks of the kind we are supposed to worry about so much now, the risks to health, safety and the environment, are worth taking.

Chapter Four then tries to put risk-taking into an economic framework, the better to develop some ideas about how economic and health, safety and environment (HSE) risk-taking can be compared. By the way, we use "HSE" to cover almost all non-financial risk. I am taking it, therefore, to cover what might be called cultural risk, or the risk to our mental well-being.

Chapter Five addresses the way risk-taking occurs in nature, which matters especially since the emerging aversion to risk-taking stresses that modern risks are an affront to it. Nature, too often seen as an icon of stability, co-operation and fragility, is more truly seen as a world in which nerve, gambling, opportunism – risk-taking – are for ever in evidence.

Chapters Six and Seven put risk into a political context. The first of these considers how to remedy what might truly be called the modern crisis of trust. It proposes a new institution might assess risks and their regulation. The second describes how the state cannot be as cautious about risks as it is fashionable now to suppose it must be.

This short book adds to, and discusses, a burgeoning literature on risk. There is the literature of alarm, and a much smaller one of reassurance. Mine is a contribution to the latter. However, I claim that reassurance is no use in genuinely scary situations, as we discuss in Chapters Six and Seven, which look at some specific cases of the management of risk. Indeed, reassurance can be harmful, and not merely to truthfulness. I am keen to say that the world is a safer place than is commonly supposed, but I loath the creation of a false sense of security almost as much as I disparage alarmism. Still, the world is quite dangerous, and we will be happier when we accept that is the case.

I will claim that a healthy, commonsense view can still be deployed to make sense of the world we live in, and that a "reality-check" will leave us largely reassured.

The book argues that it is far too easy to assume that we should always be aiming to reduce risk. Most often, it should be *optimised*, which may not at all be the same thing. [Wildavsky, 1988] We need to be as sure as possible that we are getting a good deal from the risk-taking we are involved in. Assessing that deal will often lead us to suppose that our lives are only as risky as they more or less need to be, and that we wouldn't, actually, have it otherwise. I stress that the downside of modern risk-taking is regulated democratically, and the benefits spread very widely. Risks have been *socialised*, and that ought to make it easier for us to bear the occasional mistake, or even disaster.

The Anxiety Industry especially stresses, to the contrary, that many modern risks are involuntary and unwanted. They might have added that this is worrying because it means that some risks are not in the proper sense a gamble. Some risks, they might claim, are not offered to us in the way that a gamble should be. That is to say, many risks are imposed on us without our having the right to refuse to accept the gamble involved. But this view is in important respects flawed. Much modern risk is indeed involuntary, but quite often they are in the way that taxation is involuntary. Other risks are involuntary in the way that ill-health is: they are now a part of our world, as though they were old-fashioned natural risks. But this needn't worry us as much as is often supposed.

Risk-averse opinion stresses that people feel alienated from conventional society and conventional authority. We don't know who to trust; we feel exposed. The left and its green allies (as we discuss in Chapter Two) has always claimed that the powers-that-be are lining their pockets at our expense, and conducting power politics so as to suit the governing classes. The Anxiety Industry adds to this old case the idea that industry and government are putting us at unwarranted and unregulated HSE risks as they put their short-term ambitions before the well-being of the powerless and the unborn.

There is a useful analogy here between economic and other risks. There is a battle between those who believe that industrial capitalism is largely benign economically, and that the less regulation of it the better. There is also an argument about the role of industrial capitalism in imposing risks in the realm of HSE. Whether business is imposing economic risk or HSE risk, there is a legitimate argument about the state's role in regulating capitalism and in saving people from the consequence of risk-taking.

There is especially an argument about the equitability - the fairness - of industrial capitalism as it spreads (or fails to spread) wealth and spreads (or fails to spread) risk. The argument applies just as well in HSE as in economic terms.

Are economic and non-economic benefit and risk fairly spread in society? Are those who are put at economic and HSE risk by capitalism fairly included in the benefits, which are

supposed to accrue? My answer is a strong but qualified "yes" in both cases, which I think are much more similar than might be supposed.

Only if we look realistically at risk - at its benefits, at the difficulty of regulating it - will we begin to assess whether our own system has framed its approach well. This book will argue that the British have handled the issue rather well. But we have done it best when governments have been robust and honest. Even then, they have usually - and dangerously - added to risks because they fail to stress that risks are inevitable, worthwhile, and as much as possible a matter for the individual.

Chapter One

Risk, probability and gambling

Risk is all kinds of things one doesn't at first expect of it. It is more likeable than is often supposed. We gain more from it than many suppose. However comforting some of the things one can say about risk, it is certainly about bad things, or things we do not want. But not at all bad things are classed as risks. Death is not of itself a risk: it is a certainty. We think ourselves at risk of death only insofar as it is untimely. So we can see that where there is no element of uncertainty, there too we do not find risk.

In brief, risk is the downside of chance. And chance is the well-spring of the gambles which humans take all day, every day.

A brief history....

There is some lovely writing about risk, but perhaps the clearest modern account comes in Peter L Bernstein's *Against the Gods: The remarkable story of risk*. [Bernstein, 1996] One merit of the book is that it is aimed at a middle brow reader. There is hardly any algebra. This is an intellectual history, which comes across as a detective story. Its author is a professional investor, and he enjoys seeing the world of gambling compared with that of finance.

From this account we can understand how the mid-seventeenth century mathematicians Fermat and Pascal were engaged in getting at the numbers, which lay behind gambling. There was obvious fascination in this work, but also a sort of frustration. One mathematician, the late seventeenth century Frenchman, de Moivre, seems to be pointing to it when, as noted by Bernstein, he writes: "I wish I were capable of... applying the Doctrine of Chances to Oeconomical and Political uses...". Actually, he did, because he was consulted by insurance brokers as well as by people seeking success at the gaming table.

The story becomes thoroughly modern when it includes epidemiology, which emerges as people begin to gather data about the world around them. This was about measuring the world, but its events not the physical characteristics, which underpinned them. Francis Galton, the great British statistician, is quoted by Bernstein thus: "Wherever you can, count".

This is the emergence of a Gradgrind world, excoriated by Dickens in *Hard Times* in 1854. Gradgrind took the romance out of life, of making lists and treating people as cogs in a machine, as manipulable as their behaviour was calculable.

We can see that there are two different threads to the story. One is to uncover the mathematical expression of probability and the other is to uncover the patterns in statistics.

Much thinking about probability began with trying to find some order in the least likely place, games of chance.

Much thinking about correlations began by looking for order in statistics, often those gathered by the state. They typically concerned health: what common factors united several or many people who got ill in a particular way? The cause of an infection, say, could be traced to a particular tap because it was at the centre of the known cases of illnesses, and was the only thing in common to all the victims. Importantly, epidemiology doesn't depend on knowing much about cause and effect. It does its work by inductive reasoning from data, not by empirical scientific work on the world reported in the data.

The intellectual excitement about probability and correlation is that they are entirely to do with patterns of occurrence and re-occurrence, and not at all about knowing anything mechanical. You need not know any Newtonian physics to be a good player of black jack, craps or roulette. You wouldn't even need to know that a dice had been involved in producing the runs of numbers which allow one to predict the odds arising from them.

Similarly, it wasn't an understanding of medicine, which led researchers to the understanding that smoking lay behind a massive increase in lung cancer. The evidence was circumstantial, to do with correlations [Doll and Peto, 1981].

Peter Bernstein is especially useful when he identifies a curious paradox in thinking about risk. In the classical period, he supposes, the Gods were capricious, and a man's fate both certain and unpredictable. The medieval European mind believed in one God who was capable of anything and of absolute control, except that a man was unnervingly morally responsible for some part of God's work and purpose. Still, a degree of fatalism was understandable in man, and men did not feel they could much predict and still less control the future. Bernstein says that moderns came to realise that human beings are not totally helpless in the hands of fate, nor is their worldly destiny always determined by God.

"The Reformation meant more than just a change in humanity's relationship with God. By eliminating the confessional, it warned people that henceforth they would have to walk on their own two feet and would have to take responsibility for the consequences of their decisions.... But if men and women were not at the mercy of impersonal deities and random chance, they could no longer remain passive in the face of an unknown future. They had no choice but to begin to make decisions over a far wider range of circumstances and over far longer periods of time than ever before."

They had, that is to say, a huge interest in becoming efficient at predicting the outcome of their actions. They had to become more efficient gamblers, and they had to take the chanciness out of much of what they did.

Defining risk

Some risk specialists use the word "risk" in a way which is too difficult and unusual for it to be worth holding in our minds very long. However, it does help us see that the matter in hand has two essential elements. First, it is about assessing the probability of an outcome, its likelihood, the odds of its happening. Then, secondly, there is the degree of nastiness of the outcome, or the hazard. [Royal Society, 1997]

The specialists usually say that risk, strictly speaking, is the probability bit of this equation and that it is quite separate from the hazard part. But normal parlance uses risk as covering both the probability of an outcome and the seriousness of the outcome, and that's

how I shall go on.

From our point of view, risk will be a compound of the likelihood of a bad outcome, and the degree to which we dislike the outcome. But the specialists are of course right to see that risk has two completely different parts. Often they go in different directions. A low risk can arise out of a very low probability of quite a bad outcome, or a high probability of an insignificantly bad outcome.

Assessing risk

There is a large and useful effort to try to quantify risk. That is, there is a long tradition of attempting to study the mathematical underpinning of the idea of probability, and to refine the business of prediction and especially the business of trying to express it numerically. There is also an attempt to quantify, codify and cost the seriousness of outcomes.

Of course risks vary in their predictability, and not least in the degree to which an event is likely to occur, and then - quite separately - in the degree of their seriousness can be foreseen.

Risk as gamble

People thinking about risk will always find themselves thinking about vulgar betting as well as thinking about lofty probability. This is because an important dimension about risk is that it is not just about the downside of damage and pain, which may follow any action. There is also the crucial matter of what one hopes to gain from the action. Is its prospective positive outcome worth its hazardousness. Is it a good gamble? Is it - as we say - a good risk?

We must steer between impulses, fears, desires and above all we must weigh the probability of good outcomes against the probability of bad outcomes in absolutely everything we do. This is to say: we take gambles in all we do. This is as true of our romances as it is of our choice of profession.

Making a bet requires a prediction - often a precise, numerical one - as to the likelihood of something coming to pass in the future, whether good or bad. Secondly, making a bet always involves turning some future event into something with a risk attached. We hook our well-being to the outcome of a future event. Thirdly, a bet often betrays the degree to which one is prepared or compelled to take a future event seriously. And finally, considering risks as a bet also allows one to see how subjective and personal risk-taking is.

Interestingly, an exceptionally desperate person might be very like an exceptionally relaxed person in accepting a long shot: the anxious person might feel that only with one last dramatic gamble could his position be redeemed whilst the other might feel that only a dramatic throw imparted any excitement at all. When bookies make their odds, they attract people who read those risks in very different ways.

There is a big "apples and pears" problem with costing damage, or fretting over hazard. Is injury to fifty people worse than a death to one? And so on. Should we reach out for big gains, attached they often are to big risks, or cultivate contentment with our current lot?

However difficult these issues, we are bound to go on discussing and assessing the future, not as though it were a book written by an alien species whose codes were impenetrable from the start, but as though it were like a book in a foreign, but not perversely

and deliberately impenetrable, language. The future is a foreign country, but they do things according to rules there.

For working purposes, we can imagine and suppose that if we knew enough about the world we would know what was going to happen next. In practice, we often do not know what is going to happen next, because we cannot hold in our minds enough of the factors which would be involved in more accurate prediction, or do not know enough of the underlying mechanics anyway. However, we can do something very counter-intuitive but completely normal with unpredictability. Instead of throwing up our hands and accepting our uncertain (ie, unpredictable) and yet all too certain (ie, unavoidable) fate, we can discuss and work with the idea of probabilities.

In other words, though we know the world is uncertain, we can make a stab at working out some probabilities. We can do this crudely, by wondering whether some event or other is certain, probable or merely possible. Or we can get very precise indeed about the matter and start saying things like, "there is a one in twenty chance that such and such will happen". Sometimes we can be pretty sure that such predictions are accurate. A dice thrown enough times will behave with a degree of predictability which, over sufficient runs of throws, approaches mechanical regularity. That is, given long enough and sufficient numbers of runs, each run will produce an aggregate result which looks just like the others. Statisticians call this the "regression to the mean", and it carries with it the implication that gamblers who believe that they are enjoying "runs of luck", or are "on a roll", are fooling themselves when they believe that any appearance of a recent consistency of outcome in their favour is likely to be continued.

All the same, the outcome of any particular throw is unpredictable: within the range of possibilities, any is as likely as any other. The law of averages describes such events well and clearly, but it is a law, which only talks about the likelihood of a class of things, and not about any particular individual event. The fascination of a dice is that it is like a boring machine only if we run throws of it long enough to see the patterns that emerge, but can be incredibly exciting in its unpredictability as to the result of the next throw. We know very precisely the odds of a certain number coming up in a throw of the dice: but it is important to note that this is a matter of being precise about our degree of uncertainty of a particular number coming up.

And the excitement about these uncertainties is vastly increased, of course, according to what bet is riding on the dice. A pattern will emerge across many throws. But the next throw of the dice will remain as unpredictable as each of the others was. A very clever and lucky gambler will get rich because he understands not merely the behaviour of the dice but the folly of the people he is playing against as they judge things more wrongly than he. Mind you, it is likely he will end up poor because he loves to gamble, which is to be in love with risk itself, and leads people into, not merely the gamble they can win, but the gambles which are too dangerous to succeed. As Al Pacino, in Martin Scorsese's film, *Casino*, remarks: the house never loses if only it can keep a gambler at the table long enough.

Most judgements are far trickier than the likely outcome of one or a hundred and one throws of a uniform and symmetrical cube. Whether a nuclear power station will blow up, for instance, is far harder to predict.

This is odd, in a way. Because so much talent has been expended on the safety of power stations, I would pretty freely predict that a British nuclear power station will not blow up tonight, and will do so with greater confidence (but also greater anxiety) than I will predict the outcome of the next throw of a dice I now hold in my hand. In fact, I do know the odds of

a particular number coming up on the dice, and however clever the efforts of safety experts and of statisticians working with them in working to make power stations safe and expressing degrees of confidence in the matter, I know that I do not know the odds of a power station blowing up.

But I remain confident about nuclear power in Britain. The confidence is importantly misplaced. However hard we try, and we try very hard indeed, we have absolutely no knowledge about the future of a nuclear power station's operation, whilst we know all the little there is to know about the future of throws of dice. We can readily see that it is not merely the seriousness of the outcome of an accident at a nuclear power station, which makes it an interesting risk to think about. Of course, the outcome of the nuclear power station's going wrong is far more important than any throw of any dice I ever heard of. But at the heart of the risk is the difficulty of being quite sure enough of systems of any complexity, involving heat, pressure or toxicity - all of which are at work in nuclear power stations. The key difference here is that a gambler with dice has merely to understand a given and quite simple system, but the gambler with nuclear power is working with people who are trying to change the odds of a very complicated one.

Even beyond unpredictability, there are elements here that will lead us into very deep water later. A nuclear accident is serious out of all proportion to the seriousness of its effects on the people it directly affects. That is usually, actually, rather a small number. The worst nuclear accident we have ever seen, or know about, Chernobyl, might kill perhaps 10,000 people over the fifty years from the great explosion of April 1986.

Why do the rest of us think the risk from Chernobyl is so serious when it hasn't affected us? Presumably, the reason is that Chernobyl's going wrong symbolises to us the possibility that another, any other, nuclear power station might go wrong and be similarly serious but nearer home. Or is it that nuclear power has, well beyond the likelihood of its damaging us, a certain mythic power to frighten? Can assessing its risks better help us to see that we need to put aside at least the superstitious part of our fear so that we can address the real risk for ourselves with unclouded judgement? These matters are discussed in Chapter Five.

We certainly need to address the matter. We are at present in the grip of irrational approaches to risk, which make us unhappy. But it is not coolness or rationality alone we need here. There is an element of what might be called emotional literacy, which is in short supply, and which needs also to be called to the aid of progress. It would be fatal to this enterprise of understanding and accepting risk better if it was thought merely to flow from the intellect, and that it put at a discount the emotional makeup and needs of real people.

One of the most pernicious aspects of risk-averse greenery is that it contrives to seem decent and feeling whilst the risk-taking capitalist or the scientist is characterised as heartless. This is dangerous nonsense.

Risk and money

The gambling analogy will come up quite often, and is useful not merely because the mathematics of gambling are the same as the mathematics of risk. The insurance company gambles that your premium has been calculated to provide decent odds in their gamble with you that you won't lose your stuff or have it stolen. The life assurance company bets you that you won't live as long as you hope to. Or rather, they bet that of any thousand people they insure, no more than a certain number will be robbed or have alarmingly long lives. Of course banks and insurance houses like to festoon themselves with marble and their employees are

required to look and sound tremendously respectable, but that is because their real work is like a bookie's, and not because it isn't.

Firms need us to believe them when they say they are solid and reliable. They are, after all, crucially institutions which need us to believe they will be there in the future when we need them, and that they will be as good as their word. In these matters, their reputation for reliability is as important to their business as such a reputation is to a bookie, and for much the same reasons. They are taking our stake for various bets, and must seem likely to be able to deliver on their promises, even in the bad times.

Risk and life

There is risk, not to say gambling, all around us. When we marry, we say we will take a person for good or ill. We are throwing our lot in with their genes as they are with ours. Tests for genetic defects are merely attempts to reduce risk, and improve the odds of the bet we make about our offspring. Genetic testing, and the abortions to which it gives rise, are a form of eugenics. They are an attempt to take at least some of the chanciness out of procreation.

Interestingly, the life sciences are now likely to have a powerful effect on the insurance market. People will soon know much more clearly the risks they face, and be tempted to try to insure against them in a market they are bound to hope will remain ignorant of their case. Insurance firms, to look at this the other way up, will be bound to require potential customers to let them inspect their genetic material for the same information.

Every course of action implies an opportunity cost: we are betting that the outcome of this set of options is better than the likely outcomes of the line of options we are eschewing. This is true of absolutely everything we do in life. It is only a slightly clumsy way describing the way we arrive at an assessment of where our interests lie in almost everything we do. In some things, it is not a clumsy way of describing something simple, but an essential way of simplifying what would otherwise be dauntingly complex.

The difficulty for us in seeing life properly in this way is that it can seem so unromantic and bleak. It would rob our life of much of its romance and honour, and almost all of its glory, if our choices were seen to be calculated for their likely capability to deliver preferable rather than disliked options. We do not want our lives to be seen to be driven by a calculus of empirically-derived self-interest. We would rather be seen as living by principle or impulse. Actually, of course, we can turn this on its head: understanding risks give us a wider, not a narrower, field in which to make moral choices. That we can calculate risks better than our forebears reminds us, actually, how much courage we need to face the risks we sense ourselves bound, and honour-bound, to take. This is the subject of Chapter Three.

The use of the gambling analogy might seem inappropriate to discussion about risk, in the sense that gambling is about assessing the odds of a desired outcome and working out how much one would be prepared to lose to be in with a chance of gaining this or that reward if one's guess, hunch, assessment or punt was the right one.

Risk seems at first sight rather different. It seems just to be a way of assessing how horrible the future will be. At least, that is how those who want to warn us against taking risks would want us to see the situation. They try to persuade us that certain risks are very real, large and intolerable. But actually, riskiness is often a gamble turned on its head. Most gambles are about parting now with something you want (your money, your freedom) in exchange for the chance of something you want more in the future (larger sums of money,

security). Taking a risk is often like that: you must risk falling into the river in order to get to the other side, and you must risk dying of a new vaccine to see if it works or not. But the risks, which are more commonly of interest to us are those, which are posed as risks to the future or to other people, or to the environment which may unfold as a result of some action we want to take now.

Chapter Two: Risk Society: its proponents and opponents

The proponents of risk society

Something quite new has happened: people have found a way of getting a living out of risk and the anxiety it causes. We have seen the emergence of an Anxiety Industry, which masquerades, as a campaigning movement quite different from the protest movements of the past. Historically, these have had largely altruistic purposes: the abolition of slavery, the rights of women, the welfare of animals, and so on. In our own times, the peace movement worried about a threat to innocent people and was determined to combat it, whether it was concentrating on the H Bomb or on Vietnam. Much more recently, the human rights movement has an obviously altruistic focus. In particular, the green movement purported to defend inarticulate nature.

These causes may or may not have been pursued by grandstanders, humbugs and the vainglorious, as well as the more plainly virtuous, but they could all claim - and frequently did, many of them - to be on a disinterested quest for justice. They were often dominated by people with a political agenda, and these were almost always of a left-wing sort. But still, they were at least notionally outward looking.

Now, though, we have the Anxiety Industry. This is the industry whose product is complaint, dissidence, litigation and regulation. Its worst practitioners are professional whingers whose chief outcome is organised neurosis. Its prevailing fault is gracelessness in the midst of well-being. It is composed of a powerful triumvirate comprising lawyers, the media and campaigners. The medical profession has a walk-on role when its practitioners are prepared to lend professional weight to the cause, but where professional medical people won't be sufficiently helpful, the industry is generally happy to turn to charlatans, alternativists and freelance therapists to add noise if not substance to its litany of complaint. The movement is characterised by people who are attention-seekers in their own right, though they claim to be seeking attention for others.

There are several striking features to the Anxiety Industry, and they are captured by the idea that this is a consumer movement. It is supposed to be about us, or about a class of person amongst whom we might soon find ourselves.

It depends on creating victims and then matching them with largely manufactured villains. The modern world is not short of people prepared to characterise themselves as victims [Furedi, 1997; Furedi, 1999; Times 1998a]. It portrays life as a sort of horror story, which might unfold around any one of us at any moment. A wide range of problems which once used to be regarded as bad luck, or even one's own fault, can now be blamed on an industry or industrial process, or on institutional failure. These are seen to be worthy opponents, who in any case shelter behind a barrage of lawyers and then behind insurance firms. There is an important emerging debate about the status of scientific fact as victims claim that they have been damaged by products and processes sold or run by villains.

In the classic case, it is now widely but wrongly accepted that cigarette manufacturers

cause smoking. Pandering to a craving is now confused with causing it. More specifically, almost any act of carelessness can land a firm or institution in difficulties. [Times, 1996] In many of these cases, there are campaigns for the victim to approach for support. The campaigners will know the ways of the media, who enjoy such rows. Lawyers will quickly become involved, on a contingency or piece-rate fee basis. Many of these have to put their natural scepticism on hold as they pursue claims for which scientific evidence is wafer thin. However, if the "litigious society" seriously takes off in the UK, we can expect to see defence lawyers beginning to match the "ambulance chasers" and their eloquence. Already, some lawyers are challenging the primacy of "junk science" [Financial Times, 98].

The medical profession is augmented in pursuit of victims by academic researchers, who will often be prepared to put their reputations on the line for this or that hypothesis. Modern academics need to be famous and to be published: the funding of their departments and the flow of students depends on it. Controversy is a dangerous game for academics, but it is a deeply attractive one.

Some of this activity is merely and even laudably the expression of free people in a free society. There is even an argument that the litigious society, in which individuals seek redress from corporations and institutions, produces a cheaper form of industry regulation than would a state-run apparatus. It may be a cheaper way to control risks. Thus, it may be cheaper for society to regulate McDonalds [Times, 1996; Furedi 1999] through an individual occasionally suing it for a coffee burn, as has happened, than to make coffee-purveyors safe by a costly system of regulations and policing which raises the costs of entry into the coffee-purveying business.

But there is at least one major difficulty with this approach. It tends to produce vulnerability. It creates a situation in which being vulnerable is in general quite a useful strategy. Being stoical and resilient becomes inefficient. Self-restraint is at a discount. Composure is counter-productive.

The Litigious Society and the Blame Culture have led to a proliferation of claims, not all of them pressed to the point of legal case, arising out of a vague sense that modern life - its economy, its products, its science, its institutions, its most private familial arrangements - is somehow, and multifariously, sick. Its working life is especially supposed to be sick. [Sennett, 1998]. People believe themselves to suffer from stress, anxiety and dysfunction imposed by modern society, and to be so wherever modern society touches them. Modern life is thought, somehow, to be more demanding than was historically the case. [Telegraph, 1998a] People variously believe themselves to be in some way chronically at risk of addictions, phobias, allergies, anxieties. They seem to have caught dysfunctionality as children [Furedi, 1998], workers, and parents, from the similarly afflicted people around them, and from society in general. [Strex, 1998]

All these cases are about risk: the risk one suffers from being exposed to a sick society.

It is easy to think that this picture must be an exaggeration. But consider the language of advertisements for organic food, for health farms, for a thousand quacks and therapists, for dozens of therapies and potions, for hundreds of skin and hair care products. Consider the plethora of legal cases in which people claim damages for all sorts of suffering which even two decades ago would have seemed risible.

The crisis of expectations

The Anxiety Industry supposes that modern people endure particularly modern risks. This position does not suppose that this is a society in which people die young, or especially unexpectedly. (That would be manifestly absurd, granted that life expectancy has now risen to 85 years for men and 88 for women.) They are not presumed to live in fear, as their forebears did, of a vast range of diseases about which no-one could do anything very much. They may even live in unpolluted countryside, enjoying the fruits of an apparently well-regulated environment. Birds may sing all around them, and foxes disport themselves on their lawns. But they may yet live with an unease and an anxiety which is somehow more systemic, more endemic, more intrusive, than that known by previous generations.

We sense that many of our modern problems perversely arise out of a crisis of expectations. When one expects many advantages, a little disadvantage becomes insupportable.

There are two particular pieces of new expectation failure, which are worth mentioning here. One is people's growing inability to put up with having to wait for anything. We have so much delivered to us, and can get everything so quickly, from cakes to credit, that a queue - whether in a shop or in traffic - strikes us as irritating. This has produced its own crop of syndromes, corralled together as "rages" of one sort or another. [Times, 1999]

Second, we spend so much time consuming goods and services in the privacy and comfort of our homes that we are intolerant of the problems which arise from being amongst our fellow man, smelly, noisy, inebriated and similarly intolerant as he is, just like us on a bad day.

Modern people are not well trained to exercise the patience, or the tolerance and courtesy, which make life in private and public tolerable and enjoyable. Lacking the training, people behave inconsiderately, which compounds our sense that social life has deteriorated.

Surely these features of modern life - these failures of self-restraint - further help explain "road rage" and the other manifestations of short-fuse which afflict us? Our expectations have turned many of us into people it is rather risky to be around.

All in all, it becomes easy to believe, as many do, that we need to beware of a new HSE risk, which is endemic to capitalism. It is a risk to our psyche, and to our nervous systems. The psychologist and broadcaster, Oliver James, claims that commercially-inspired aspiration lies behind a dangerous, modern level of unfulfilled expectations and invidious social comparison. In his *Britain On the Couch* [James, 1997] he argues, "Put crudely, advanced capitalism makes money out of misery and dissatisfaction, as if it were encouraging us to fill the psychic void with material goods".

He's right, though he takes his case in peculiar directions and doesn't draw the right conclusions from it.

James' thesis supposes that capitalism encourages us to define ourselves as individuals, not members of society, and by consumption. There is something in this.

He goes much further when he says the game doesn't work in our favour because modern capitalism is also reducing the levels of serotonin, a chemical in our brain, which makes us happy.

In his view, capitalism puts us at risk because we can't consume enough to fulfil our expectations and because we now live with a constant and debilitating series of social

comparisons. Even limitless consumption fails us: it cannot make us as lovely, say, as the commercials advertising look-good products inspire us to be. These feelings of inferiority make our brain chemistry operate as though we were low-pecking order mammals, which are apparently low in serotonin. We get used, in a miserable sort of way, to this depressed state and it can indeed become chronic if we perceive our condition of helplessness to be permanent. Along the way our reduced serotonin levels makes us prone to sudden violence, hence road rage and all the rest of it.

James' thesis is a little pat. Without at all meaning to, it makes us wonder if we really are - as James supposes - that we are actually less happy than we were in the Fifties. Golden Ages are always supposed just to have ended, and for all that there is a modern problem, there is no certainty at all that it is any worse, and it may be a lot better, than whatever afflicted a previous generation which measured itself less, or had higher thresholds of self-treatment or of denial of illness. [Pearson, 1983]

There is a further key problem with the James thesis. It is glaringly inconsistent. He cites evidence that highly motivated and successful people, with the expected high levels of serotonin, describe themselves as aggressive and short-fused, just as apparently low-serotonin, criminally violent people are. Discussing evidence on young people, he says: "Thus, the higher the serotonin level, the more likely the student was to be hard-charging, competitive, impatient, aggressive, distrustful and confident". Never mind how one can be simultaneously distrustful and confident, the greater difficulty is that high serotonin people seem to be on a knife edge of despair as truly as low-serotonin people.

The more important argument against the James thesis is that it supposes that capitalism creates expectations it cannot fulfil, and that we should consider dosing ourselves with artificial sources of serotonin to compensate. It assumes that we should treat our condition chemically. This is to suppose that we cannot stand the risks of full-on capitalism without drugs.

This approach supposes that we are too morally weak, too deprived of will, to choose to ignore the blandishments of capitalists to buy their goods and services. The difficult truth of being a modern person is that we need to invoke the small moral courage lucky people have always had to display. They could hardly expect to have to display no moral courage at all. It could hardly be expected that affluence would not carry its own risks.

Risk Society

Into this scene of jumpiness, feistiness, bloody-mindedness, and victimhood, there have stepped protagonists for a new problem. Risk has now become a battleground in its own right, and is supposed to have created its own kind of fear.

It is now supposed that we live in Risk Society, a term invented by Ulrich Beck, a sociologist working in Germany and Britain. His thinking is conveniently found in *The Politics of Risk Society* [Franklin, 1998], a collection of papers from a conference organised by IPPR, the left-leaning think tank. These essays want to persuade us that modern riskiness has implications for modern democracy. They include writing by counselling specialists, by New Labour thinkers, and by academics. So there is now a cultural, sociological and political literature on the new dangers of risk, and it attempts to provide an intellectual framework which has come to the support, not to say the rescue, of older HSE thinking and campaigning from sources not normally connected with them.

In *The Politics of Risk Society*, which concentrates on the BSE crisis as an exemplar of

a more general malaise, Ulrich Beck writes that

Society has become a laboratory in which there is absolutely nobody in charge. An experiment has been inflicted on us by the beef industries, and the most ordinary decision - to eat or not eat beef - could be a life and death decision Sociologically there is a big difference between those who take risks and those who are victimised by risks others take... Risk Society begins where nature ends..... this is where we switch the focus of our anxieties from what nature can do to us to what we have done to nature.... A central paradox of risk society is that these internal risks are generated by the processes of modernisation, which try to control them.... Risk Society begins where tradition ends, when, in all spheres of life, we can no longer take traditional certainties for granted. The less we can rely on traditional securities, the more risks we have to negotiate....When we think of global warming, the hole in the ozone layer, pollution or food scares, nature is inescapably contaminated by human activity. As [Anthony] Giddens and I have pointed out....the more we try to colonise the future, the more likely it is to spring surprises on us..... We move then into the second stage of risk, which Giddens and I have called *manufactured uncertainty*. Here the production of risks is the consequence of scientific and political efforts to control or minimise them. We no longer choose to take risks, we have them thrust upon us.

This is a defiantly catastrophic and apocalyptic view. It is of course a matter of speculation whether anyone has ever been in charge of the risks innovative man has been taking since he discovered fire and before. It is unclear that the cholera which badly-plumbed cities were prone to until a hundred years ago was a product of man or nature. Certainly, the risk was a risk of civilisation: it depended on plumbing, but bad plumbing.

It is indeed possible that man's activities are now great enough to impact on huge natural systems and possibly on their capacity to support us: but the only serious contender for this case is anthropogenic global warming, whose effects are anything but clear, and possibly GMs whose deleterious effects are largely hypothetical so far.

BSE, the main risk put forward by Beck in this essay, is an odd zoonosis, to be sure, but it has killed far fewer people than plenty of others, such as black death, milk-borne TB, botulism and dozens of others. The quality of "old" risk is best perceived in any history of medicine, or – at its crudest – life expectancy tables. [North, 1995]

Beck's view is, to put it simply, seems a rather Germanic view (he disarmingly and specifically denies that is, as we shall see), and one fairly typical of the devotion to dissidence and despair of some of the green-minded, anti-bourgeois, men and women born as the heirs of Nazi Germany. It is also curiously nostalgic: it seems to hold within it a sense of grief for an older order of a trusting society. This is interesting, since a rather sensible enjoyment of the modern way of life was in part destroyed by the misinformation, extremism and hysteria of some green and health campaigners. In its devotion to angst, purity and the past, this whole strand of think is reminiscent of the Germanic visionary version of the Romantic movement (though it is of course free of the nationalism and the extremism which it might be argued flowed from that movement). [Hayward, 1995]

Anthony Giddens, director of the LSE, in his contribution, puts a somewhat milder case. He argues that we live after the end of nature. This is a concept most elegantly bruited about by a book of that title, by Bill McKibben, an American essayist [McKibben, 1991]. Giddens believes "This means that there are now few if any aspects of the physical world untouched by human intervention", a situation, which has come about mostly in the last fifty years and as a result of the intensification of technological change. Giddens goes on to argue that we live after the end of tradition, "...in a world where life is no longer lived as fate". This

is a view not unlike Bernstein's about the Reformation. But Giddens gives us a view, which gets to the core of the new sense of risk as the Anxiety Industry sees it:

"Risk is not, as such, the same as hazard or danger. A risk society is not intrinsically more dangerous or hazardous than pre-existing forms of social order..... rather, it is a society increasingly preoccupied with the future (and also with safety), which generates the idea of risk".

We can and shall argue about this supposed new sense of riskiness. There is, though, a very important aspect to the new concept which can't wait and it is to do with what the proper response to living in a Risk Society might be. Ulrich Beck writes:

In all my books I try to demonstrate that the return to the theoretical and political philosophy of simple modernity, in the age of global risk, is doomed to failure. Those orthodox theories and politics remain tied to notions of progress and benign technological change, tied to the belief that the risks we face can still be captured by nineteenth century, scientific models of hazard assessment and industrial notions of hazard and safety. Simultaneously, the disintegrating institutions of industrial modernity - nuclear families, stable labour markets, segregated gender roles, social classes - can be shored up and buttressed against the waves of reflexive modernisation sweeping the West.

Beck goes on to argue that an *organised irresponsibility* is at work. The state appears to him to be in a sort of denial. It accepts that there is too much environmental degradation and half-heartedly legislates against so much of it as it dares recognise, but can't begin seriously to address the catastrophe which is unfolding. There is, though, a decent response to the new situation, according to Beck, and it comes organically out of society. Risk is *socially explosive*: an awareness of the real riskiness of modern society

"sets off a dynamic of social and cultural change which undermines state bureaucracies, challenges the dominance of science and redraws the boundaries and battle-lines of contemporary politics."

He claims this is all to the good. It is "...not, as you might assume, one more expression of the "German angst" at the millennium. Quite the opposite. What I suggest is a new model for understanding our time, in a not unhopeful spirit".

In essence, Ulrich Beck argues there are liberating opportunities to be grasped here, and they seem to be mostly to do with getting citizens to hold power elites to account, and especially they suggest that anyone arguing for new risk-taking should be made to apply the precautionary principle. In a nutshell the burden of proof should be shifted: let whoever proposes risk defend its merit. It is in this spirit that Greenpeace was so admired in the 80s and some of the 90s: it was thought to be a liberating, charismatic rebuff to the empty and bland promises of corporate capitalism. Greenpeace has been discredited because people have grown tired of its own alternative rhetoric and promise, and its abuse of the evidence. On the Beck analysis, Greenpeace would be surging ahead as the popular expression of a cultural dynamic of change.

Both Beck and Giddens use the difficult idea of Modernity, which I think they take to mean an ordinarily technocratic view of progress, what we might call an Enlightenment view. They use something they call "reflexive modernity" to mean what happens when real moderns reflect sceptically on the nature of modernity. In light of these reflections, citizens would - in this view - want to be involved in much more dialogue about proposed new risks. According to Giddens, postmodernism supposes that politics is at an end, but reflexive modernisation

instead and more sensibly "presumes and generates a politics. That politics cannot unfold completely outside the parliamentary domain... A political party able to address them cogently would be in a prime position in the political encounters that will unfold over the coming few years."

This is surely Giddens' cry for New Labour to spot how to marshal and express the new energy. It would be channelling a sort of extra-political urge to scrutinise and control amoral science and industry, and risks in general, or – more hopefully – to humanise them. It would be a post-political enterprise, but one which the right, the empathetic, party could politicise.

Giddens' discussions, less radically anti-statist than Beck's, suppose some sort of development of a new politics of the kind he has already helped make fashionable in many of his writings and which New Labour appears to be groping toward. It is to do with suggesting that the profession of politics needs to be more truly representative of what constituents really want and feel. At its simplest it has to do with "listening to the people". Practically, it involves setting up systems for trialling political options to see how they play with voters. It is criticised as replacing leadership with marketing.

The proponents of Risk Society have put the idea of expertise on trial. The risk sociologists' prosecution case is mostly much more subtle but in its way hardly less extensive and telling than the old green argument about the failure of the Enlightenment. This supposed that Age of Reason – the 17th and 18th centuries - had produced a reductionist and elitist science which was overly confident, pro-capitalist, biased toward progress, and systematically abusive of the environment.

The new reasoning stresses, what is true, that science does not come to a monolithic and static view of facts. It does not naturally or properly arrive at a consensus on matters. But the new reasoning dislikes much of the idea of evidence that we have inherited from Enlightenment science and philosophy. If the Enlightenment saw facts as inalienable, the New Age sees them as negotiable. [Almond, 1995] Facts have been degraded so as to become dependent on who and where one is.

This case militates, rather usefully at times, against the use of phrases such as "the science". This matters because the ministerial response to, say, the BSE crisis, is to corral scientists around the issue, to bully them into finding a consensus view, and then to declare that this consensus is what "the science" says.

We will be looking at this process later (see Chapter Six), but for now it is important to note that the proponents of Risk Society rightly point out the failings of the hunt for consensus. This hunt invites scientists into a phoney agreement about what is definitely known about a risk, and that can often be bent so as to emphasise the degree to which hazard has not been proven, and to understate the degree to which issues remain not merely not known, but seriously uncertain.

Robin Grove-White, a thoughtful campaigner and academic, writes in his short contribution to the Politics of Risk Society, that science is a matter of dispute, and in particular about uncertainties.

"Contrary to the still-dominant myth in Western culture, science does not offer an unambiguous baseline of fact about surroundings. Characteristically, its processes are far more socially shaped, more tentative, indeed more creative."

Proof on many important matters will be difficult to come by. That tempts politicians to lean

toward stressing the absence of proof of harm and to be permissively reassuring when it suits them.

Robin Grove-White wonders where we should now look for trust: not, obviously, from politicians driven to offer reassurance based on "the science". He argues for a "franker *shared* sense of the new forms uncertainty...and genuine participation in the far-reaching *social* judgements (do we or do we not feel comfortable about feeding ruminants with other diseased ruminants?) to be made under such conditions of chronic indeterminacy. This calls for radical new thinking about institutional reform".

This thinking seems roughly Giddens-like, but is expressly concerned with getting beyond what the writer thinks is spurious expertise, and getting in touch instead with the intuitive good sense, or anyway a moral sense, in citizens.

Equally of course, Grove-White might have stressed, it is the absence of proof of safety which allows campaigners to stress, and often to over-stress, the need for precaution. Where safety is not proved (and safety is never proved) the Anxiety Industry feels free to stress danger. This business of the absence of proof actually ought to bite just as hard on alarming as it does on nannying the public.

Anna Coote, in another usefully moderate contribution, argues that a mature citizen shouldn't expect either politicians or scientists to be able to offer infallible utterances on difficult risks, but that not every voice is equally worth listening to on technical matters. This view seems to allow that expertise does have a value.

Coote writes,
"The implications of the Risk Society for the conduct of public policy-making is that we must grow up and develop an adult-to-adult relationship with politicians, as well as with scientists and all manner of so-called 'experts'

She advocates, instead of the present "secrecy, spin-doctoring and special pleading", a much more consultative approach with public forums, user groups, panels and citizen's juries. This would create a "high trust democracy" and help us "become skilled at planning for uncertainty".

There is already far more democracy about than these writers suppose (as we shall see in Chapter Six). Still, it makes perfect sense to ask people what they think, and it makes sense to form panels of citizens who undertake to try to learn and understand something of the issues involved before they decide what they think and want to recommend. We do not condemn murderers by plebiscite, but by use of juries required to assimilate difficult evidence. The same sorts of process might usefully be applied to technical risk assessments. Coote seems to allow plenty of space for "experts", and even Robin Grove-White might allow that a scientifically-literate "expert" might be better able to describe the uncertainties in an issue than the opinionated and half-cut man propping up the bar or the gabby woman under the hair-dryer.

Indeed, Giddens, Grove-White and Coote are not, on the face of it, proposing anything very frightening. Their views can't be accused of rabble-rousing radicalism. Rather, they are saying and proposing little that helps us. Even Coote, whose language is the most sensible and whose proposals the most ordinarily practical (and tried) may not be helping very much.

None of these proposals, even the more useful ones, hold out all that much hope of reconciling the difficulties they think we face. Even Anna Coote's proposals for citizenly

involvement will be most helpful if science and scientists are heavily involved as informants.

Actually, the case against science is not well-made by any of these writers. The proponents of Risk Society tend to claim that science makes larger claims for itself than is justified. But actually, scientists left to themselves are thoroughly disputatious, and are prone to stress the uncertainties and nuances in what they know and think. It is governments, which have corralled and coerced them, and on the whole done so with good intentions and very only sporadically bad social effects. It will take a definite, but not enormous, shift in attitude by governments toward science to rectify the problem. It will take very little change of attitude amongst the scientists themselves.

It is highly probable that the future will produce more consultation of citizens by government. But it is just as likely, if we are lucky, that government (rather as Giddens hints) will develop the means both to listen to citizens and to inform them, and not merely about certainties but also about uncertainties.

In the meantime, it may well be that asking more citizens what they think about difficult issues will produce more caution, and a more precautionary approach to policy, which most proponents of Risk Society seem to want. But it may not, and even if it does the outcome may not be desirable. The public may be as gung-ho for, or as nervous about, risk-taking as our existing supposedly non-consultative processes have been. Increased caution may prove damaging both to ecological and economic values.

It may be that the sorts of mistakes which the existing democratically-controlled and actually quite consultative regulators have been unable to avoid would continue to arise, in spite of earnest attempts further to democratise control.

Risk Society allows that modern people do not face greater risks than their forebears. They do not face an earlier or nastier death or probability of injury or disease, and they may even face actually diminished risks, but they are still in need of the ministrations of the Anxiety Industry.

People are accepted as being more emotional about such risks, new and old, as they do face, but that is not the same as being more irrational about them. They are supposed to be more aware and better informed and this new perceptiveness is supposed to cause them pain and distress.

The opponents of risk society

Even if the story of capitalism and its psychological dangers is more complicated than Oliver James suggests, it is interesting to find an analysis which supposes "We're unhappier than we were in the 1950s - despite being richer", in the words of his sub-title, and lays the blame on high expectations.

Another author, the sociologist Frank Furedi, argues that there is a modern malaise, which is a curiously mirrored image of James'. This is the "Culture of Fear". His case is strong, and nearly fulfils the claim of his sub-title to discuss: "Risk-taking and the morality of low expectation". In this view, the new world of syndromes, litigation, and hyped-up fear has led dangerously to a world in which people are no longer free to take risks. A "new etiquette" has arisen in which one is responsible for the healthiness of one's own behaviour, and further enjoined to cause no risk to others. But when Furedi does rather briefly address his subtitle, it is clear how different his terms are to James'. Furedi accepts the jamesian argument that modern are subject to "individuation and the weakening of solidarity", but draws a very different conclusion from the fact:

"...the highly fragmented individual is actually held back and restrained by a society whose main demand is that of caution and which cannot accommodate itself to the spirit of experimentation. Thus the distinct feature of society today is not the unprecedented flowering of the individual, but the weakening both of a sense of collectivity and of individual aspiration."

This view, though Furedi does not really explore its moral dimension, chimes well with thinking developed by people thinking about stress and trauma. Angela Patmore [Strex, 1998] puts forward a case that stress is a largely manufactured idea, and false one. In this view, it has no more meaning and reality than does the idea of people having "complexes", the fashionable ailment of the 60s. Besides, she says, "stress" is a very sensible and necessary thing: it is a person's valuable warning that there is danger about. It energises one, like an animal whose sense of fear enables it to fight or flee, according to circumstances. [Sapolsky, 1994; Webster, 1994] Of course, continuous stress, and especially stress about which one can do nothing, is debilitating. We can take and enjoy short bursts of fear and stress: the adrenaline flows. We can even, many of us, enjoy sustained bursts of stress and fear, provided we feel we have chosen them. It is hopelessness, powerlessness, not stress itself, which gets us down. Here, perhaps, we notice similarities with these ideas and those of James.

More obviously, we see that stress is a response to being at risk: it is a preparation for taking action to address danger. To be powerless in the face of risk and threat, to be powerless to overcome danger, or to be an actor in one's own cause, is a greater source of suffering than stress by itself. There is good evidence that heart disease, commonly associated with stress, is actually much more clearly associated with subordination. The incidence of heart disease is, for instance, closely correlated with lowliness of ranking at work. High-flyers are not prone to heart disease nearly so much as their frustrated underlings.

Those who say stress is not an illness but a mostly invaluable response, are contributing to a robustness of view which will help, say, employers, when it comes to fighting off claims that this or that person suffered illness derived from stress.

Perhaps as interestingly, it will also help people who believe they are suffering from stress. It does not say there is no risk of stress, or that the sense of being at risk does not indeed amount to stress. What it says is that stress is a good thing, and if there is too much of it, or it is too prolonged, for an individual to bear, it may not merely be the intolerable behaviour of the employer, which is at work. It may indeed be that, but it may also be that the individual should find himself a less demanding job, or manage his stress better. Interestingly, there is even evidence that the individual should seek a more demanding and apparently stressful job: he or she may need to shove harder, and get hold of some success. This is a furedian point, and the reverse of a jamesian one. It says that society and individuals are at greater risk from pressure to avoid stress – that is, one form of risk – than from maintaining their nerve and a sense of adventure.

One copes with grief as one does with stress. One doesn't condemn either. A robust line of argument is emerging about the supposed risk of trauma people endure when they are around challenging circumstances, and indeed the risk that trauma puts people at.

Angela Patmore [Strex, 1998] argues that trauma is normal, and survivable, but that it is not a condition so odd that it often needs professionals to deal with it. One can suffer, and indeed one can suffer greatly, without incurring a disease. One might add that it may even be morally important to endure trauma without complaint. There is, for instance,

growing anxiety about the costs of damages to police officers who witness hideous events. Though only some of the officers who were on duty during the Hillsborough football stadium disaster were awarded damages, superiors must now consider very seriously how to manage disasters not merely from the point of view of the public, but also from the point of view of what police mean and women may endure in dealing with them. There is conflicting evidence on how the legal system will respond to the pressure: the House of Lords and senior judges do seem reluctant to relinquish the idea that some professions by their nature involve unpleasantness. [Times, 1998b]

There is also a serious suspicion that whilst the traumas of service of this sort may not have been well handled in the past, we could now drift into a position where officers and others feel worse than they need, partly because they do not see that mental suffering is natural and proper to the kind of work they sometimes have to do. A recognition of grief and suffering seem quite therapeutic: it was reported that the outpouring of unhappiness following Princess Diana's death resulted in a reduction of depression. [Independent, 1997a]

Risk Society, enemy of the Enlightenment and the modern

Risk Society supposes that people are at particular forms of risk. Risk Society calls in aid of its view of the world a particular view of politics and science, which is particularly challenging to "The Enlightenment".

Ulrich Beck hauls most of these themes together with the greatest clarity. He calls for a "responsible modernity" in which new technologies are subject to a new "process of discussion, and a legal and institutional framework for the democratic legitimation must be developed...so what we need is nothing less than a second Enlightenment which opens up our minds, eyes and institutions to the self-inflicted endangerment of industrial civilisation".

In his essay in *The Politics of Risk Society*, Pat Kane, a journalist and musician, further describes the kind of doubt risk sociologists now seem to espouse:

"As we close this century who could deny that the moral balance sheet of scientific achievement is too close to call either way? All the discoveries that underpin the sophistication of the modern world - whether in biology and chemistry, or nuclear physics and bio-engineering, or computation and communication - also serve to subvert that very sophistication."

We here have the idea that what we might call the "first Enlightenment" has bankrupted itself and is in need of replacement. Science has been a Bad Thing, or at least a beast whose nature is unruly and has not properly met its regulatory match.

We can, in fact, defend the Enlightenment, and do so especially if we see it as a constantly evolving set of loose principles. The Enlightenment was many and contradictory things, but we mostly now take it to be a revolution in thinking, which celebrates the individual as a reasoning and autonomous being whose understanding and choices should be promoted and respected insofar as possible. It was accepted that an individual is importantly self-interested and rational.

The individual was of course a social creature, but he was making contracts with others in a spirit of enlightened self-interest. Humans knew things about the world, knew scientific facts, which changed the way they could work in the world, and which improved the world. Constitutionally and politically, humans were seen to be living in human organisations, constitutions, which should be responsive to their constituents but which produced

mechanisms by which wise people ran societies which were in sum rather wiser than many or even most of the individuals who composed them. This is what we might call "nuanced democracy": a democracy, which avoided the demotic.

For getting on for three centuries these have been the ideas which have formed Western society, and they have proved robust in spite of being pursued to dangerous extremes by revolutionaries in France and elsewhere, and in spite of being - on the contrary - mightily cursed by dissidents on what we would now call the left.

Inherent in the Enlightenment project has been a relaxed view of Progress. Neither man nor society has been seen as perfectible, but both have been seen as capable of and meriting improvement. Science, technology and reason have all seemed necessary to important parts of this enterprise. It would be hard to describe Progress as the ideology of the Enlightenment, since the Enlightenment is importantly a non-ideological enterprise. But certainly bigotry and superstition - which are as it were ignorance at work - have been eschewed as backward and regrettable, whilst rationality and open-mindedness have seemed important watchwords. Curiosity and technological development have been seen as likely to lead us forward.

The Enlightenment naturally had an ambivalent attitude to both the past and to Nature. The antique values of the Classical world were, for instance, admired, and admired in some ways rather more than Christianity. Nature was admired but also perceived as something, which needed management [Daniels, 1993].

It is hardly surprising that there has been much modern discussion which springs from the problem of the Enlightenment's having seemed to unleash such terrible forces, especially the technologies of war and oppression, but also what appeared to be unbridled pollution and occasional industrial disaster.

Raymond Tallis, in his huge and rather unwieldy, *Enemies of Hope: a Critique of Contemporary Pessimism* [Tallis, 1997] dives into the heart of this debate (rather tellingly, his book jacket boasts, as a symbol of angst, a painting by Casper David Friedrich, who embodies the German Romantic). He discusses much "cultural criticism" of the kind which supposes that we are unhappy, the victims of violence and uncertainty, in need of lessons from primitive societies, and misinformed by false science. Tallis, in short, defends progress and the Enlightenment.

He is good on the emergence of the "diagnostician of society" who tends to be "scornful, angry sorrowful. He may be paid for being a journalist, but he is in truth a minor prophet, a pocket Jeremiah, a Cassandra of the Home Counties...."

Tallis quotes J G Merquior

"That a deep cultural crisis is endemic to historical modernity seems to have been much more eagerly assumed than properly demonstrated, no doubt, because more often than not, those who do the assuming - humanist intellectuals - have every interest in being perceived as soul doctors to a sick civilisation. Yet is the medicine that necessary or the sickness that real? Perhaps we should entertaining second thoughts about it all?"

This is useful stuff. It is important to defend the idea that modern, western societies are in good heart, and it is not Panglossian to say so. The reasons for the defence are manifold. If it is true that we are quite happy, why not get on with enjoying ourselves? If our societies do a fair job at promoting well-being, why excoriate those who run them? If modern science keeps us well why not celebrate it?

Risk Society is interesting because it is the latest of many onslaughts on the Enlightenment, and on Progress, as they have been inherited by us moderns, postmoderns, reflexive moderns and all the rest of it. It does not add much to its discredited forebears. The language of both the proponents and the opponents of Risk Society is comfortingly old-fashioned, in spite of the neologisms and the jargon.

We cannot, though, dismiss the anxieties felt by people as they assert that nuclear power or GM are "bad" technologies. The people who make these claims are often the same who believe that there is crisis of pollution, which is the consequence of a corporate and scientific hegemony, which has subverted the state's ability to regulate properly. It is important, though, to see that worrying about the quality of drinking water, or believing smokestacks are unnecessarily rich in sulphur dioxide, is not the same as worrying about global warming, nuclear power or genetically modified organisms.

The difference in the cases is this. Though the risks of human suffering, or even animal suffering or environmental damage, are common to many of these issues, the nuclear, greenhouse and GM cases add something which would survive their being proved much less dangerous than they are now thought capable of becoming. The Enlightenment proposed an anthropocentric vision of progress, which tacitly courted all sorts of risks - including risks to naturalness - in the name of the human adventure of progress. The essential new feature, which suits the green movement or the Anxiety Industry is that they identify a new sort of damage, which is not necessarily to anything real or physical, but to an aesthetic or moral sense of the proper role of the natural.

The idea that nature is dead is very important. Humans can now be thought to be at risk when nature is damaged not merely because their well-being depends on the health of nature. They are at risk because the idea of naturalness is important, and perhaps even important to people's psychological health. GMOs and nuclear, in particular, offend against "nature", in this view, because we are playing God. Similarly, global warming is so powerful and insidious that it alters not merely weather, but climate, which is supposed to represent, by definition, something enduring.

The essence of this analysis is that people can rightly believe themselves to be at risk even should nuclear power, GMOs and greenhouse gases actually prove to be safe. The damage, in this view, has been done already, because it has been done to our mental wellbeing.

Of course, those of us who resist this line of anxious thinking stress that all the works of man - including nuclear power, GMOs and greenhouse gases - are natural because they are products of the human, that is the natural, world. Besides, they are all developments, which spring from working alongside nature's forces. Nature isn't dead, or history. She is merely working out, as usual.

We can do all sorts of things, which are risky, but we run no risk of being unnatural.

Of course, we do want our world to remain recognisable and we do understand the promptings of nostalgic regret. We are responsive to the Romantic reaction to the gung-ho Enlightenment.

But it remains possible and necessary to assess risks properly, and to remember the costs of indulging in Romantic dissidence. It carries its own risks, including a self-induced and almost hysterical reaction against the modern world.

There is nothing new in this problem. When Galileo redrew the workings of the universe, or Columbus redrew the oceans, when the unknown was mapped, people's world pictures were torn up and redrawn in rather same way that has to happen to moderns as they contemplate the possibility of a warming world, a world with tens of thousands of tonnes of radioactive waste to manage, or a world in which we will never quite know whether evolution or a laboratory made this or that aspect of the plants and animals we see before us.

Our equanimity is at risk in these processes of re-envisioning the world, but do we have to make the gloomiest assumptions as to our ability to survive them? Why must we assume that re-envisioning the world is necessarily only threatening rather than being exhilarating as well?

Chapter Three

Risk and morality: Martyrs, military men, mountaineers and feeding the millions.

To take a risk is to chance damaging oneself. That is why the idea of taking risks is so challenging. It is also why it is so easy to suppose, wrongly, that the main attitude to risk will always be to reduce it.

But this can't be anything like true. Obviously, there are some risks, even to oneself, which it is worth taking. Even the biggest risks often seem to be. We find people drawn to heroism (which can be self-interested, but must risk the grandly self-destructive) and martyrdom (which is often self-interested in the sense that it is about a passionately held, but above all a personal, conviction, but similarly depends on self-destructiveness).

It is obvious that many people love at least some sorts of risk. Large numbers of sensible people queue up to behave with what looks like an irrational disregard for their apparent self-interest. The papers are full of the deaths and injuries incurred by the dangerous sports, and perhaps especially those in which man pits himself against nature, or courts risk with more than usual nonchalance. [Standard, 1999a; Telegraph, 1998b; Telegraph, 1998c Telegraph, 1999]

John Adams, an important writer on risk, discusses the idea of a "risk thermostat" which catches the fact that people seem to live their lives so that each of us experiences the amount of anxiety attractive to us. Regulation of safety risks, says Adams wisely, the displacement of risk-taking. [Adams, 1999; Adams 1997; Adams 1998]

What is over and again stressed by this sort of risk-taker is that one is never more alive than when at extreme risk of death. This may be no more than a matter of a neurological fact about the human brain and nervous system: that the adrenaline and beta-endorphin kick-in a kind of ecstasy where there is terror, followed by an ecstasy of relief. People court risk because they enjoy raiding nature's own drug cabinet.

And there is a cerebral version of this pleasure. The human mind relishes existential experiences: we are so aware of our impending deaths that in some subliminal or even fairly self-alert way, we enjoy flirting with the possibility of our own extinction. Isn't that what we mean when we say that a risk-taker "cheats" death? Perhaps people are drawn to the rehearsal of death.

Certainly, we all know that people are richly diverse and peculiar about risks. Here is

an apparently timid and shy woman who will only undertake affairs with unsuitable - that is, risky - men. Here is the mild-mannered classical scholar and philosopher (I mean, Roger Scruton) who is a passionate and courageous follower of hounds. [Scruton, 1998] Here is the 7th earl (I am thinking of Michael, Lord Onslow) who writes that his father had a "good war" which left him unsatisfied with the rest of a long peacetime life: the war was his high point. Here is the happy and successful student with an entertaining present and the promise of a challenging and rewarding future who explores drug-taking to the point where simple curiosity seems to have been replaced with real recklessness.

All these have an element of the heroic, simply because there is something like a divine discontent driving such risk-taking.

There is an odd ambivalence in our attitude to risk. Those of us who are condemned by our natures to a cautious way of life often feel that it is above all because of timidity that we achieved too little. This feeling leads us to admire anyone who behaves courageously. But it is important to see that this need not be courage in a virtuous cause. We admire the gambler, the adulterer, the fast-living rock star, even the criminal, because they are all living in the fast lane. They have put themselves on the line, even though it was in the pursuit of the morally dubious or plainly bad. It may be a sneaking admiration, but that doesn't dilute its stinging force.

There may be a halfway decent explanation for our envy. I mean, that there may be a moral underpinning to our envy of those who are risk-takers, sometimes even when their courage is deployed in a bad cause. It is because we respect risk for its own sake.

Most people who achieve anything, who advance the human cause, will have displayed at least the "courage of their convictions" even if it be only in argument. We accept that the downright bad can often display courage, and we accord them the accolade of limited virtue. The virtuousness of courage is redemptive: it can wash some of the moral stain from the guilty.

Admiral Lord, Nelson, the hero and also a victim of Trafalgar, for instance, understood that he sought personal and national glory in battle. This went well beyond the mechanical need for victory and the defeat of enemies who threatened his country.

Often we find virtuous or glorious risk-taking where we do not at first expect to find them. The most milkily-virtuous female saint, say a Therese of Lisieux, is plainly far more a heroic figure than is implied by the more sentimental and cloying imagery which surrounds her life and death. Just because she herself made such efforts to portray herself as a small saint, a saint of small virtues, a saint on a domestic, female scale, we need not at all follow her in this deception. Therese courted suffering because she wanted to display commitment to Christ: she wanted to be as much at risk as He decided she should be. Therese put herself on the line no less than a Formula One driver or Nelson.

As Roger Scruton implies when he criticises drug-taking but not smoking, the only risk-taking we despise is that which imposes its cost externally. [Adams, 1999] The young son of a rich family who kills someone in his badly-driven Porsche sports car is an obvious figure for opprobrium. His father is yet more so: even if the boy had been a paragon, the present seems absurdly unwise. The reported £5,000 a year insurance his father paid was capable only of making the risk-taking legal, not admirable.

Risk and wider morality

People on the right of politics are inclined to assume that the rich can mostly benefit the poor of the third world by helping them join the high-risk game of trading with rich countries. The supposedly low risk strategy advocated by the greens and the left is that the poor should devote themselves as families and states to self-sufficiency. But the right claims that this puts them at vastly more risk than would modernisation and participation in the global economy.

The right assumes that the rich of the world can most benefit the poor by developing the freest sorts of markets and free market economies with which they can trade. High taxation, even taxation designed to produce a redistribution for the poor to cushion them from the risks of poverty, is regarded as risky both to the poor who become dependent, and to the whole wealth creation process in which they need to be a part. The right is sceptical of redistributive taxation, and often of charity as well.

This strategy is an avowedly high-risk strategy: it depends on allowing that risk-taking on a large scale by as many unfettered individuals as possible is the surest way to wealth creation, and even to wealth distribution. It supposes, moreover, that planned benevolence has far greater hazards, and especially the hazard of low growth, cronyism and worse experienced by planned economies.

A society, which tries to plan things as little as possible is likely to believe that natural resources should also be managed with as little planning as possible. It will be inclined to believe that restrictions of scientific and technological developments ought also to be as slight as possible. There will, in other words, be a free market in ideas and natural resources, even including the right to pollute within the limits imposed by "bubbles" of regulatory limits, and that property and intellectual rights will be employed to put a money value on their exploitation.

Naturally, limits will have to be drawn somewhere, and governments have to both be the final arbiter of where those limits fall, and the ring-holders of the legal systems which maintain and limit people's freedom to trade legally, or to cause pollution and resource depletion.

What is interesting here is to see the way that a moral case can be made as easily for the high-risk strategy as it can be for the more cautious green one. Both Wilfred Beckerman [Beckerman, 199 ?] and the late Julian Simon [Simon & Kahn, 1984] have argued forcefully that over-caution, especially regulatory caution, is morally harmful.

Beckerman argues that we have little responsibility toward future generations. This not because they are nothing to do with us, but because we can know so little of how any present acts of ours will effect them. What we can do, he argues, is make sure that we attend to the "mental" capital we bequeath them: in other words, we need to know as much as possible, have developed as many technologies as possible.

That way, whatever physical condition they find themselves in, they will be able to handle them as well as possible. They will also probably be richer, with all the benefits that entails, if we in our time develop our economies the better to ensure they are vibrant in the future. The implication here is that whilst we cannot judge how damaging our present actions may prove, we have a shrewd idea that the knowledge base, and the capital resources, of rich societies will hold future generations in better stead than relatively less developed economies.

Julian Simon argued a little differently. For him, inventiveness had always ensured that material constraints had been less binding on succeeding generations as time and progress went on. This argument depended on Simon's faith that human inventiveness was simply a

greater force than was normally supposed. He went so far as to suppose that the pressure of human numbers was a spur to inventiveness, and that it was so much a spur that each birth should be considered more likely to be a benefit than a deficit. His was the most purely anti-Malthusian voice.

These are grand ideas, but they also seem more morally sound than might be supposed. Human numbers have always been pressed right to the limit of the ability of contemporary technology to feed them. We live now amongst the first generations voluntarily to restrict their family size, and within a century should be witnessing a substantial decline in world populations, if that is what people alive then want. But for the time being, human numbers will probably double, probably by half way through the next century, and their demands for fuel, fuel and fun will very much more than double. The ten billion people we can assume will soon, with luck, populate the earth will have big needs and even bigger wants.

There is plenty of evidence to support the view that the risks we have taken so far have been justified by their outcome. It is also clear that we cannot yet know which risks we are now taking will be most regretted by our successors.

It is clear by now that we can never see the biggest part of risks. A gamble is necessarily uncertain, but most gamblers know what they are stand to lose and what they stand to win. Our productive gambles, the gambles we make to progress, are much more open ended. But we have a fair idea of what we hope to gain: the continuance and improvement of our lifestyle, and its spread to the unborn billions.

Chapter Four

Risk, profit and morality

Firms exist to make profits. Put this another way: they exist to put capital to work. Put it yet another way, which the firms themselves sometimes seem anxious not to dwell on: they exist to put capital at risk. The awful truth is, to a remarkable degree, they exist to take gambles with other people's money.

Along the way, they take lots of other gambles, and puts lots of other things at risk too, and perform signal service for society. But the sharpness of their dilemma is seen in the way they must take chances with other people's money and yet seem eminently sensible.

This isn't quite the obvious matter it seems just because it trips off the tongue easily enough. Practically the first lesson one learns in economics says that profit is a reward for risk. But the relationship isn't proportional, or even linear.

If life were simple, the greater the risk you took, the greater the profit you'd earn. Now, this is obviously nonsense. Big risk takers lose as well as make money. And the risk-averse can get very rich. A nineteenth century aristocratic estate owner, or twentieth century oil sheikh, may not have taken any risks at all in getting rich from the energy under his ground.

And yet the theme remains largely on-song. Capitalism is brilliant at bringing forth risk-takers and opportunists. Julian Simon, the great development economist, used to say capitalism is best seen as the system by which hundreds of people queue up to take risks with their time, energy, talent and money and by which a very few strike it rich and most fail. A further luxury is that none of us need feel gratitude or grief about either class.

Risk and the cost of profit...

The idea that profit and risk are intertwined is sound enough. Most people do have to speculate (ie, gamble, or take a risk) in order to accumulate. Indeed, firms are most clearly explained when we see them as casting around for opportunity for profit, and then working out how to understand and control - that is, to manage - the risks involved.

Curiously, perhaps, entrepreneurs would like to manage risks to destruction. Peter Drucker argues that entrepreneurs are not in fact natural risk-takers. In *Innovation and Entrepreneurship* [Drucker, 1985] he writes:

"The popular picture of innovators -half pop-psychology, half Hollywood - makes them look like a cross between Superman and the Knights of the Round Table. Alas, most of them in real life are unromantic figures, and much more likely to spend hours on a cash-flow projection than to dash off looking for 'risks'."

Drucker stresses that it is the business of entrepreneurs to manage the risks out of their enterprises. They "define and confine" risks.

It's a difficult business to formalise. There was a certain dark comedy in the downfall and subsequent bail-out of Long-Term Capital Management, two of whose founders, Robert Merton and Myron Scholes, in 1997 shared the Nobel Prize for economics for their contributions to their understanding of financial risk, entitled *Optimising commercial risk*. And then of course there was important discussion as to "the moral hazard" – let alone the financial risk – in sheltering individuals and institutions when their gambles fail. [Sunday Times, 1998a]

But the ideas are not hard to describe. The job is elegantly done in a new manual for Chief Financial Officers (CFOs), written by the (then) Price Waterhouse Financial and Cost Management Team [Price Waterhouse, 1997]. "CFO: Architect of the Corporation's Future" has a useful chapter, Integrating Financial and Business Risk Management. It makes clear the way the best way to think of business is to stress that a firm's opportunity for profit is constantly at threat. Business is discussed from the point of view of a finance director, who need not be interested in making or doing anything very concrete, or in employing anyone.

He is the person in a business who is most like a banker or a gambler. He must define risks, sure enough, and even confine them. But he cannot tame, or still less, eliminate, risks. He must aspire to optimise them.

The CFO is likely to remind the firm's managers that they are proposing lines of activity which expose the firm to unwarranted risk, or whose caution allows too little opportunity for profit. He especially will remind them that the firm should only volunteer for those risks it is in business to manage. Managing chosen risks is a good description of the negative side of what a business tries to do. It is fair definition of what a firm's "core" business really is, and firms necessarily often fail by it.

The stock market turns out to be surprisingly forgiving of such failures, at least sometimes. Research at Templeton College, Oxford's management and business graduate school [Knight & Pretty, 1998], suggests that firms which suffer a major catastrophe can gain shareholders' esteem and increase the value of their shares if they demonstrate robust management skills in the aftermath. This is a little like the habit of bankers of allowing regular debtors more overdraft than infrequent borrowers. Bankers are more frightened of people

whose behaviour under the pressure of debt is an unknown quantity.

This is all a little like saying that we only learn by our mistakes, and only those who demonstrate their capacity to survive disaster are likely to be good at averting catastrophe. It is the thinking which underlies Peter Mandelson's call for a review of British attitudes and behaviour toward bankrupts: he pointed out in a speech in New York in October 1998 that bankrupts should not be stigmatised: their experience is toughening and valuable. Reduced to a sound-bite Mr Mandelson's prescription sounds impertinent: he found himself calling for entrepreneurs to face the threat of a recession by "taking more risks, not fewer".

The CFO is the custodian of the firm's capitalism because he is the person who rents the money the firm works with. The firm, as the CFO especially knows, is not only seeking profit, but presenting itself as a source of profit to others. Its board keeps the firm in operation as a means of making money for themselves, as representatives of other investors.

A firm is always trying to present itself as an opportunity for profit, which is proportionate to the rent it will be charged for its capital. The costs it must pay for capital rise the more insecure the firm and its proposed ventures seem.

In technical terms, the riskiness to investors and lenders to the firm will affect what is called the Weighted Average Cost of Capital. [Sunday Times, 1998b] Expensive money is only worth borrowing or risky ventures worth backing if the promised profit can bear the loaded payback involved.

Then there is the Risk Adjusted Return on Capital, a concept, which assesses the reality of apparently juicy profits from a risk-prone company or division. The company or division will need in effect to pay a premium, to reward the risk-takers who invest in it.

A firm's requirement to optimise these risks and costs is ceaseless. There will always be other firms who might combine risk and security even better.

The morality of financial risk

Economic risk-taking is inevitable, indeed it is compulsory in a free market society. It becomes important to see what case can be made for its being virtuous as well.

Some of this is to do with the personal qualities risk-taking requires. Financial risk-taking is so obviously a matter of greed that it is hard to see that it is also a species of heroism. It is a selfish sort of heroism, and is thus more like the lust for glory of a military hero than the apparent self-abnegation of a religious or moral martyr. But necessary and brave and in those senses virtuous it certainly is.

A stronger justification comes from the social virtue of risk-taking. The need for risk-taking flows from our dealings with the future, and this is as true of our problems with money as it is of anything else. If there were no future, no-one would take risks with their money. They would spend it now. Believing that they have a future, and that the future is necessarily uncertain, requires that people take a view about the degree of adventurousness with which they manage the future of their money.

It is clearly immoral to be carelessly dependent on others whilst one is able-bodied and in sound mind. Equally, it is immoral not to have provision for the future. The state can undertake much of this provision for its citizens, but it can raise no revenue without taxing successful risk-taking. And private pensions obviously depend on it.

It is here that we can begin to make a moral case about the business of risk-taking, and of firms as risk-takers. As people virtuously seek to safeguard the value of their money, and if possible to make it grow, they have to set it to work in more or less risky ways. Beyond starting a firm of their own, or gambling at the track or table, they have to trust someone else's judgement.

Starting a firm on one's own is obviously risky because one is either borrowing or using one's own capital: either way money is put on the line. A new firm is best seen as certain excitement for one's present, not a certain insurance for one's future.

Most of us depend for our futures entirely on the successful risk-taking of those to whom we entrust our resources, and that will in turn depend on the successful risk-taking of entrepreneurs and managers in firms in whom they in turn invest.

It is one of the oddest features of modern life that so many people affect to dislike or despise this process, firstly as though it were nasty and secondly as though it had nothing to do with them except as making them victims, either systematically or occasionally.

An entirely reasonable way of looking at capitalism is to stress that it delivers goods and services, including a secure future, at the lowest possible prices to all-comers. It does so, moreover, by allowing them to take profit in the future roughly in proportion to the amount of risk they are prepared to bear. The interesting thing here is how well the system caters to the risk-averse. One cannot make huge profits as a cowardly investor, but considering how much risk someone, somewhere has to take in order to make any return for cowardly investors, it is amazing that the system rewards them at all.

Crucial questions arise as to the proper treatment of those who cannot undertake risk, or refuse to, or fail at it. The consensus, which bolstered the old welfare state is now threadbare. People's expectations are too high for them to trust the state to fulfil them; there is an increased belief that sooner or later, levels of taxation ought to be reduced; and there is a greater acceptance that self-reliance should take a greater place in society's moral framework and political economy. All this amounts to a greater acceptance that it is not the state's job to rob people's lives of all risk, and that its attempts to do so introduce new risks.

Fitting in the HSE risk

We need to see what tacit contract can be reached between "the people" and industrial capitalism in the matter of HSE risk. There are some real differences between HSE and financial risks. The main one is that nearly all HSE risks are imposed on people without their being invited to optimise their personal risk-taking. Whether as workers, consumers, or neighbours industrial capitalism puts us at HSE risk without asking us individually whether we accept the deal involved. Air, water and soil are not things whose quality we can much choose, but the well-being of all of them is affected by industrial activity. We can move away from a polluting chemical plant if we like, but we are likely to end up somewhere else where some other environmental risk will confront us. We can leave the city with its air pollution and move to the countryside with its pesticide pollution. To this extent, HSE risks tend to be truly involuntary.

Nor can we find ready redress for the damage risk-taking by others exposes us to. Even to say that we can sue some part or other of capitalism for the risks it poses us is spurious. Much of the pollution caused by industry damages millions of us, if any. Many of the causes are multifarious. So legal redress would often be a matter of impossibly complex class

actions against impossibly diffuse and diverse defendants.

These are amongst the reasons why the state has an even greater role in regulating the environment than it has in regulating the economy. But in the degree to which the state controls almost every dimension of HSE risk, we need to accept that these risks have been the subject of democratic process. So while it is true to say that HSE risks are largely involuntary, it is also true to say that they have been taken into the democratic maw. Citizens control the state, and through the state they are responsible for even those risks, which they perceive to be involuntary.

There are, moreover, greater similarities between our citizenly contract with financial risk-takers and with HSE risk-takers than might be supposed. We need to see that HSE risk is really quite small, and that it is as closely regulated as is consistent with the ability of industrial capitalism to provide the things we demand of it. Indeed, we need to find as many voluntary ways of regulating HSE risk as possible. Only that exercise and tendency will develop means of delivering HSE risk management which work well with the market, and inhibit economic activity as little as is consistent with controlling risk. Government needs always to be seeking the "silver bullet" of any regulation: the regulation, which does its work with as little collateral damage as possible.

We need to see that with HSE risk no less than financial risks, the idea of optimising risks is far more instructive and powerful than the idea of merely reducing them. We can properly consider how we might drive HSE risks into the ground, but we need to remember that many attempts to realise the policy would probably pose other risks. Goods and service would become more expensive; other risks would replace the ones we currently face; private entrepreneurship and public and private innovation would be stifled. We will discuss some of these issues elsewhere. But for the time being, we can merely stress that it would be as churlish and cowardly to indulge our sense of victimhood in respect of HSE risks as it is to indulge it in respect of financial risk. The Spanish proverb applies: "Take what you want", says God. "Take what you want, and pay for it". We are beneficiaries of industrial capitalism, and should take in decent part the HSE risks it imposes, just as much as we are beneficiaries of financial risk-taking and have to understand that we cannot be entirely sheltered from its hazards.

Chapter Five

The Real lessons from Nature

The greens hate risk, but nature thrives on it. Fundamentalist greens have made nature's workings into a morality tale: they have had to misread what we know of nature to make their case that we could make our economies somehow more "natural".

The fundamental green tenets depend on suggesting that natural habitats are fragile and stable. In this view of things, nature is vulnerable, and thus a natural victim. It is at great risk from that great risk-taker, man.

The greens suggest that nature is full of communities. They are strongly inclined to argue that our economies and societies should achieve the same stability, and should be worried about the culture of unbridled individualism and competitiveness the greens suppose to exist. Growth in nature cannot continue forever, they say, and neither can it in economies.

The greens believe we should look at nature as the very image of the reliable and

unchanging, a matter of balance whose composure is marvellous, provided it is not knocked about, as can easily happen. Luckily, says the green view, there is a vast amount of co-operation in nature, and there is even an uncomprehending and unconscious co-operation in the way niches among species and niche-occupying by species evolve to produce a marvellous whole, which may indeed be thought of as something like an organism, or a super-organism. It isn't clear that James Lovelock, who coined the idea of the earth as Gaia, really believes that "she" is an organism. He certainly describes Gaia as a system "that is sufficiently like a living organism to be subject to illness or injury". We find Lovelock describing man as being like an illness. He calls us such in a chapter, "The People Plague" in his luminous "Gaia: The practical science of planetary medicine". [Lovelock, 1991] "Humans on the earth behave in some ways like a pathogenic micro organism, or like the cells of a tumour or neoplasm". James Lovelock is not a Luddite, and not a fundamentalist either, and his writing is far too useful for it much to matter that his Gaia has become the watchword of people who seem to take the idea well beyond reasonableness, and certainly well beyond the allegorical use in which it is most valuable. [Lovelock, 1979]

The merit of this super-organism, say greens, is that its capacity for survival may be much greater than that of any of its parts. Man may risk knock nature about in her parts, but will be paid-back when nature is too altered to provide the circumstances for human life, and instead "destroys" man and then heads off into a new strand of development without him.

The mainstream green view has value: it is a sort of morality lesson, a parable, which may be useful to us. But the difficulty is that one might as well reverse all the propositions in it.

The writings of a rather few ecologists and science journalists capture these emerging ideas. Some of it is piecemeal stuff, as when rainforest ecologists note the capacity of the forest to thrive when partly logged, or of many altered grasslands to remain quite rich in diversity. More systematically, Daniel B Botkin, an ecologist at the University of California, Santa Barbara, described a nature in which change and chance - in short, risk - were vital in his *Discordant Harmonies, A New Ecology for the Twenty-First Century*. [Botkin, 1990] He writes about a view of ecology which has been held off and on for as long as people have written about nature: that is to say, that at the different levels at which one can look at nature - a population, a community, a much larger system - the whole must be capable of sustaining a good deal of change amongst its parts if it is to thrive for long. He notes that this view is essentially optimistic for man and nature: our understanding may blossom to the point where we can help nature accommodate to our wants and needs. Botkin notes that his view is not new, and quotes Charles Elton, a father of the discipline:

"The balance of nature does not exist, and perhaps has never existed. The numbers of wild animals are constantly varying to a greater or lesser extent, and the variations are usually irregular in period and always irregular in amplitude. Each variation in the numbers of one species causes direct and indirect repercussions on the numbers of others, and since many of the latter are themselves independently varying in numbers, the resultant confusion is remarkable."

Nature can be thought of, not as fragile, but robust; it can be seen not as primarily stable, but full of the most striking dynamism; and its communities can be seen as congregations of opportunism by which animals and other organisms within species evolve harmonised activities the better to exploit other species and to harness the opportunism of their individuals. [Budiansky, 1995]

Ecology, the science of nature, is the arena of profound arguments. These are now

conducted with models and computers as much as amongst the details and entrails of the natural world. There is much debate about stability, complexity, dynamism and diversity as scientists attempt to discover the kind of terminology and models which capture the way nature works.

Take, for example, a paper in Nature [Polis, 1998]. Its headline is: Stability is woven by complex webs. In it, Gary A Polis, an environmental scientist, discusses a paper on ecological complexity in the same issue [McCann, 1998]. He describes a famous view by an important British ecologist, Sir Robert May, now the Government's Chief Scientific Advisor that complex ecological systems are quite unstable, and simple ones are more lasting and capable of withstanding perturbations [May, 1973]. After twenty years, this deeply counter-intuitive idea is now being challenged and new literature, says Polis, "indicates that complexity provides an interwoven matrix which holds the rich tapestry of a community together". This newer view is now being reinforced by mathematical models which have modelled how predators thrive best when they have various sorts of prey in various sorts of locations, and so on. One of the important aspects of these models is that "they do not assume that this system is in equilibrium (it is clear that that processes and species abundance in most ecological systems are just as likely to be in flux as to remain constant".

So, the work of many intelligent ecologists emphasises the qualities of flux, complexity, and dynamism which are to be found in ecological systems, and which may indeed be important to the long term relative stability of the wider scene.

But then Polis seems to disappear into a "green" language, which doesn't on the face of it belong to his thesis:

"The understanding that complexity is vital to the integrity and stability of natural systems allows ecologists to argue, more coherently, why we must preserve the diverse elements and species that coexist in a healthy, sustainable and well-functioning ecological community. Indeed, as we enter what E O Wilson calls 'the century of environment', one crucial function is to provide an unbiased, scientific basis on which political and social decisions can be made about how to treat our natural environment".

There are what look like little sensible steps in this argument. Actually, they are giant illogical leaps. It is true that complexity seems to be part of stability and stability is desirable. It seems, on Polis' own argument, that complexity is a feature of multifarious interlocking opportunisms. The merit of this view is that it lets us see how a habitat may become less diverse, but yet remain stable, because within the remaining diversity, which may well be sufficient, the workings of opportunism and complexity may well lead to a rearrangement of species which adds up to viability. In other words, a proper view of complexity, dynamism and stability may let one off a slavish observance of the view that all diversity is equally good, and that none may be diminished.

It is fascinating to note that Robert May's own recent work makes the strongest possible case for a theoretical understanding that species can be diminished in number without necessarily threatening the fundamental genetic variety and viability which underlies them. [Nee, 1997; Independent, 1997b] Yet he supposes that "we are standing on the breaking tip of the sixth great wave of extinction in the history of life on Earth", and that it matters, without he making a case why this is so. He points that the International Union for the Conservation of nature suggests that 24 per cent of today's 4,500 mammal species, 12 percent of the 9,500 birds, and 6 percent of 100,000 trees and 6 percent of 250,000 flowering plants are critically endangered, threatened or vulnerable.

But the number of species and the past and recent rate of extinctions are all the subject of a good deal of debate. We have certainly lost a good deal of wild habitat to cultivation, and we will lose more. "All the indications are that these rates will speed up", says Robert May. But suppose that we have lost most of the fragile and demanding species already and that more of the remainder will prove robust: wouldn't that change the picture?

It is hard to resist the view that most ecological discussion seeks to preserve intact the view that man's activities are great, are growing and should be diminished, in intrusiveness. Man is thought to be taking unacceptable risks with nature.

A middle ground view - in which both the dynamism and the riskiness of unalloyed opportunism are recognised - allows us to note our immense power to assert ourselves, but also to incorporate a reflexive desire to minimise our impact. We want to limit our impact because we sense the aesthetic or even the practical merit of leaving nature as strongly intact as possible. We sense that nature, however robust and capable of withstanding impact it is, also has laws and limits. Our discussion is about coming to a proper understanding about those laws and limits.

The green argument would have us assume that the laws are strict and unforgiving, and the limits narrow and close. We would fear large reactions to small incursions. The alternative "opportunist" view would more stress that nature is flexible and that it adjusts and adapts to apparently major incursions.

Either way, it is helpful to see that risky opportunism of one sort or another lies behind the niche-seeking, the self-interest, the getting of a living, which drives nature so profoundly. Opportunism always entails actions, which might go wrong. Opportunities for one organism almost always arise out of, or lead to, the misfortune of another. Ultimately, there can be many win-win situations: but that is not the immediate effect as organisms jostle for advantage.

An opportunity is a challenge, a gamble.

This applies far more truly to any conscious and sentient animal, whose every action is made against a more or less sophisticated anticipation of pain or pleasure, and the need to draw up a calculus, which optimises them. Oddly enough, and it helps us understand the meaning of risk, we wouldn't say of an animal, except loosely, that it is "taking a risk". There is something in risk, which requires a degree of decision-making and of conscious assessment, the calculation - however informal - of odds. All sorts of activities can be seen by us to be risky, but which don't really involve anything like risk-taking. The idea of a plant taking a risk involves the use of the pathetic fallacy to high degree. It isn't even clear that we would think an animal can take a risk.

Of course, the most docile herd of gazelle is riven with risk. It is composed of individuals whose life is a tension between holding one's head up to stay alert to predators, and putting one's head down to graze to stay well enough to be alert. Goodness knows what terrors live in the heart of a gazelle, which knows that alongside vigilance and nourishment it is only constant anxiety, which keeps the system sufficiently fired-up for flight. Whatever a gazelle does must strike it as fearful.

But it isn't in any precise way likely to feel that it is at risk, in the sense of having a sense of the odds that this or that bite of grass is unwise.

People of course operate in a more sophisticated environment altogether. But our

environment is not so sophisticated that we are not the subject to many of the impulses of animals. Greed, hunger, lust, ambition drive us as truly as they drive animals. Fear - a sense of being at risk - inhibits us as much, too. So does the exhilarated expectation of risk-taking. Our social and individual choices are hugely more complex and sophisticated than any animal's, both as to the opportunities and the risks they present.

These strategies remain gambles: they are still about seeking opportunity and optimising risk. But it is man who triumphantly understands himself to be, in a calculated, deliberate and conscious way, making decisions about trade-offs between expected benefit to be reached out for, and potential downsides from which to flinch. Eschewing the primitive green view does not liberate man to put at huge discount the risks his actions may cause the planet, and through its natural processes, his own well-being.

The alternative, opportunist, view does however liberate man from some myths and does allow him to seek afresh where the trade-offs between risks and benefits may lie. And when he comes to the conclusion that such and such a course of action is risky and may damage this or that natural system, he can say that all of nature is full of risks.

The greens and risk

It is useful to spot how the green view is romantic about ecological problems in the same way as socialism is about economic ones. The alternative, anti-green, view of nature sees nature as quite like the free market.

The upshot of the vigorous and multiple opportunism in ecological nature is very like Adam Smith's hidden hand in economics: we see the vigour of the whole arising out of the limited self-interest of the many. In both cases, limiting self-interested can only proceed if it does not overly damage the dynamism of self-interested opportunism. Many individuals appear to lose by the dynamism of the process, and society - like nature - is seen as an arena for risk, but most individuals are seen clearly to gain, and besides it works better than anything else we can organise. Indeed, multiple opportunism is seen as the strategy, which most reduces risk, by accommodating the need for risk-taking.

The green view invites people to submit themselves to discovering as modest, as risk-free, a niche as possible within a balance they fear to disturb. This is best done, they believe, socially, and by rule: the sensible, unambitious mass must discipline the risk-taking few. The few, of course, are rich investors and their lackeys, industrialists.

The alternative, right-wing, view of what ecological life is like allows that mankind, and especially individuals, can pitch in and, using sharp elbows if need be, seek whatever role they want and can sustain. Mankind can, in other words, behave like any other species, with the difference that man's intelligence makes his niche-seeking self-conscious, deliberate, and innovative. While it is more powerful than any other has been, it is also importantly limited by moral and political considerations. Humans are the first species to care about the fate of other species, and the disadvantaged of their own, and to legislate and plot for their well-being.

Our risk-taking is circumscribed. The question now is: do we circumscribe it well?

Chapter Six

Trust and the political management of risk - and a proposal

It has sometimes seemed that the national emblem of the British should be a banana skin. The past ten years or so have seen a weary litany of accidents, scares and disasters on these shores. By the end of the 80s, the late Peter Jenkins, a political commentator, was moved to say that our islands appeared to face a Third World level of hazard. He was wrong, but hit a tender nerve.

He was after all writing when we had had the King's Cross tube disaster (1987), the Clapham Junction train crash (1988), football stadium horrors (Bradford in 1984; Hillsborough in 1989), the Piper Alpha oil rig explosion (1988), the Herald of Free Enterprise capsized (1987) and - of course - the salmonella and listeria food scares (1988). E Coli was a newspaper stalwart throughout the period. In 1988, BSE was just emerging and has never been out of our minds since. Chernobyl's radioactivity (1986), never significant in the UK, had nonetheless proved enduring beyond ministerial expectation and prediction, as it still does. We had had Camelford's water pollution (1988), and already Sellafield's causing, or not causing, masses of childhood leukaemia was a chestnut. The Braer had yet to sink (with minimal damage, in 1993), the Sea Empress yet to flounder (with hardly more damage, in 1996). The Flesh Eating Bug was still in the realms of science fiction.

All in all, the British have repeatedly been told they are a sloppy, accident-prone people who are badly governed by careless politicians who can't tell their vested interests from their public duty and are advised by dim or insensitive scientists who are co-opted by ministers and industry.

There is some double think here. The public only pretends to want to be told everything, and to be able - to have - to make up its own mind. Public consultation exercises are often flops. For good reasons and bad, in a large range of issues, the public cannot and does not want to assess and manage the risks it faces. As individuals we simply do not have time or skills to work out the risks of this or that bit of medical treatment, of this or that chemical pollutant, of this or that food additive, this or that method of signalling on the railway. Instead, we expect that the various ministries will undertake to understand the science of these issues, assess the uncertainties, and come up with a tolerable series of regulations.

The British are well served in these matters. Our governments do their rather good thinking on them to an extraordinary degree in public. And yet we do come back to one mistake again and again. It is not the mistake of under-regulation, and it is not even very often the mistake of excessive regulation, except when the EU binds us to Continental attitudes.

The normal mistake is that politicians try to indulge the public with what politicians think they want or need. The public is believed to want reassurance, and ministers indulge them. It was drink the milk (after Chernobyl), and eat the hamburger (after BSE), and (at least for a short time) drink the water (after Camelford).

It may be, but it certainly isn't self-evident, that governments reassure the public the better to keep business sweet, and the flow of goods and services unchecked. If that is in some degree the strategy it is a self-defeating one.

The comforting advice added very little new risk, it's true, but each example increased rather than diminished risk. Indeed, the most dangerous part of it all was more a matter of culture than health, safety or environment. The word "safe" should be ring-fenced and put off-limits to all ministers. Politicians should be put in unlit rooms and made to listen to a tape loop repeating the mantra: "Nothing Is Safe".

The most important thing wrong with the idea of ministers saying something is safe is that nothing ever is. So they are forced to speak untruthfully when they deny this elementary truth. Almost every example of reassurance today will add up to a reason to distrust politicians later when the reassurance proves false.

There are dangers even in the former Health Secretary, Stephen Dorrell's claim for a sort of "It's Safe, Mk II" statement, made in the midst of the BSE outrage in 1996. In his view beef was safe "by any normal use of the word". This line appeals to those of us who know that whilst nothing can be strictly, absolutely safe, all day long we use the word in a fairly relaxed but workmanlike way as meaning something like: "safe for all normal purposes", or "safe enough in a naughty world". Thus cars are clearly "safe", though they have a high potential for killing us. We feel "safe" in our houses, though they are the most likely scene of an accident happening to us. It will be nice when, one day, we can come back to this fairly cheerful and informal use of the word. But for now, we need to eschew it. It remains more important to stress that things aren't always safe, and that some manmade factors are adding to "unsafeness", than to risk false reassurance.

The final reason why ministers must try not to reassure people is that the upshot is likely to be more frightening than necessary.

Luckily, one might say, Government is not trusted: its reassurances presumably are taken with a pinch of salt. It is however very dangerous to cultivate the sort of easy dissidence, the penny arcade cynicism, which many campaigners now indulge in. The decline of deference has brought with it a decline in trust, and this has ushered in a sort of disorientation, which is as uncomfortable as it is sometimes liberating. The decline of trust in authority puts progress at risk. It invites vulgar attention-seeking from "people's" and "consumers'" causes whose cases are often superficial, almost deliberately ignorant, but spuriously attractive to a media and public disinclined to master difficult technical arguments, or listen to nuanced arguments put by officialdom, academia or industry.

Government and industry routinely operate to higher standards of evidence and truthfulness than do the campaigners whose junk science and grandstanding seems so attractive. There is a plethora of research, which suggests that a majority of the public believes they are more likely to hear the truth from non-governmental organisations than politicians, officials, or journalists. This is not as absurd a situation as one might at first sight think. Firstly, we can suggest that people do casually believe that campaigners speak the truth as they see it, whilst politicians or industrialists live in a more compromised world. To make this a case for disbelieving everything the later groups say is arguably naïve and wrong-headed, but it is not crazy. More to the point, it is arguable that many people believe that it is right and proper that there should be a force in society arguing against the norm: to this extent, one might endorse NGOs as a counterweight more than as a sole authority.

However, and usefully, when push comes to shove, people do cast aside this sort of thinking. The overwhelming majority of respondents placed their faith in regulatory authorities (rather than litigation, community watchdogs or hoping for the best) when asked what would best keep them safe whilst living near a potentially dangerous chemical plant. [Marris, Langford & O'Riordan, 1998] What is more, research shows that more than twice as many people place faith in industry's scientists as trust the science of environmental groups, and they even trust the scientists of the reviled government more than the NGOs. [O'Riordan, Marris, & Langford, 1997]

BSE and science

Had ministers simply reported the evidence on BSE as they had had it from the scientists appointed to advise us all, the public would have been better aware that the scientific view was quite clear, but also ambiguous. These are not contradictions in terms. In 1989, after it first addressed the issue of BSE and public health, "the science", in the form of the Southwood Report [Southwood, 1989], certainly did not tell us whether to feel safe or not. The scientists said, after all: that, first, there was very *unlikely* to be a risk to humans from beef. They went on to say that, second, if they were wrong the issue was very serious. The corollary of this is that there *might* be a risk, and that it was severe. The first part of the statement was trumpeted and indeed distorted, by politicians much more than by scientists, so that optimism dripped out of it. The second part of the statement - the bit about, "if we're wrong, you're in trouble", is what we needed also to hear. Of course, our responses would vary. Mine - having heard both parts of the statement - was to go on eating beef; many other people might have been rather more sceptical.

Note that the scientists - often accused of saying nothing is dangerous unless they are absolutely sure they have seen the smoking gun - left plenty of room for people to think BSE might be dangerous. It was a political failing that led to the reassurance. Sometimes scientists do get asked to give a judgement about whether something is safe: they should resist the temptation to opine.

The point here is that we are wrong to ask scientists to tell us whether we should or should not take a particular risk. The best they can do is give a rough feel for the odds, sometimes very closely (yes, it is very likely the sun will rise tomorrow), sometimes with rather great uncertainty (we think BSE won't jump from cows to people, at least not often or easily, but it's something - frankly - we know only a little about).

Assuming that human CJD turns out definitely to be related to BSE, one is reminded that scientists should be robust in standing up for their right to be uncertain, ignorant even. In July 1990, John Gummer, the agriculture minister, was saying "on the basis all scientific evidence available, eating beef is safe" and in December 1995, the Prime Minister, John Major was saying, "I am advised that beef is safe and wholesome product. The Chief Medical Officer's [Dr Kenneth Calman] advice on the point is clear: there is no evidence that eating beef causes CJD in humans". [Telegraph, 1996] That all seemed a little too strong at the time, and it has become a little bit more too strong since. Had scientists used the phraseology quoted, or been happy with the way it was used by ministers, they would have been wrong. They should have read their Karl Popper on the problem of proving a positive. [Popper, 1958]

The scientists had indeed detected a new disease in cattle. Several of them thought that the precautions that had been taken should very much reduce what was in any case believed to be a very small risk of infection of humans. There was perfectly sound case for not eating beef: it was that science had demonstrated that there was a new risk attached to eating beef. It was possibly small, remote, and so on, but it was plainly there. Other things being equal, one might rationally switch from eating British beef.

Back then to what ministers should say and do. In the case of BSE (and it is surely typical), a less engaged stance by ministers would probably have led to a short, sharp market collapse. Then there might have been quite a quick return to normal, because supermarkets would have needed to find a way to engage with the beef production process so as to be confident that they were offering their customers uncontaminated beef.

In the real world ministers are under several sorts of mutually reinforcing pressures to

reassurance. Each ministry tends to defend a trade. Thus the Ministry of Agriculture (MAFF) famously protects farmers. It is bound to and must: especially when dealing with foreigners our farming ministry naturally tries to secure our growers a good deal. Ministers are bound to try to defend British beef as best they may, even if it manifestly has a serious question mark over it. This is the old problem of government: how can it regulate what it must also promote? We call it "producer capture" nowadays.

At least now there are fewer tensions between what government must regulate and actually provide. Privatisations have gone some way to loosening this dilemma as it used to apply to water and electricity - and perhaps the same will apply to the new railway and power systems. Even very recently, the Department of Energy, for instance, had an important and compromised role in the regulation of the disposal of the Brent Spar, and that may have helped lead to the second most famous environmental debacle of the decade (the row over GMOs was a late starter but has overtaken the famous oil storage buoy).

But most important: governments are bound to defend the processes they have been regulating for a long time. It is natural that the Department of Transport would claim that it has been a good steward of railway safety, MAFF a good steward of beef. In other words, it falls to regulators as much as to anyone else to defend their record, and who can blame them?

If ministers have one sort of knee jerk reaction to these sorts of crisis, so do oppositions. They must, after all, prove that the ruling Government has failed. This prejudice leads them often, and more than half regretfully if they are wise, to denigrate government in general. It leads them to propose new institutions. In the case of food scandals, it led New Labour in opposition to demand and (and now, in government, it must deliver) a Food Standards Agency. History seems to be with them: most recently we have seen the ten year evolution of the Environment Agency, so that the former National Rivers Authority, various waste and pollution control functions - to name the core areas of the EA's operation - will now be given the appearance and some of the substance of operating at arm's length from ministers.

And yet such models should not blind us to the constitutional and political facts. Only very selected bits of the risk management process can be privatised. Only ministers and parliament can make rules and laws. Indeed, there is an irony here: the various mildly dissident, liberal voices calling for independent bodies to control food, say, or the environment, are the self-same voices which often call for greater accountability. We seem to want the politics taken out of lots of matters, and yet complain when the politics begins to be taken out of those matters. We appear to like politicians when they shoulder responsibilities, which should in fact be ours. We would resent them like crazy should they return too much of the risk and fear of freedom to us.

This is, by the way, why we should worry that the public seems to trust Greenpeace more than government (or indeed anybody else). Greenpeace is trusted but unaccountable, whilst the politician is accountable but distrusted. Both the trust and the mistrust are largely misplaced, and that's bad enough; worse is that too many of us seem to delight in the world being out of joint in this way.

So curiously, when the public, or a campaigner claiming to speak for them, calls for some food - or rail, or nuclear, or any other - safety matter to be put on an independent footing, the call is for increased Quango-isation, without the recognition that everyone will complain very much about the Quango-isation soon after it happens. The position is mirrored in the education and health fields. The general mistrust of centralised government leads to an

effort to give power over school and hospitals to local bodies. But the real risk here is that this allows different standards in different parts of the country. People don't notice that this means that what is available in one place may not be available somewhere else. The losers by these processes soon call for national standards to be re-applied, and central government obliges.

The Government will soon set up a quasi-independent Food Standards Agency [MAFF, 1998; HoC Agriculture Committee, 1998]. For a few years, probably everything will go swimmingly. The new body, with no track record, will probably make some attractive noises and recommend to ministers some interesting new rules, which might be enacted and be quite effective. It might even, though this is far less likely, suggest that some of the existing regulations are unnecessarily oppressive.

For a while the Anxiety Industry will enjoy pillorying ministers when they refuse to act on some recommendation or other of the agency. There will be calls for the agency to be given more power, and this approach will be seen as giving power to the people.

But as soon as something goes seriously wrong (a new BSE, a new salmonella), the honeymoon will end abruptly. Sooner or later opprobrium will attach to the new agency: it will have recommended safety measures which were either too expensive and bankrupted struggling cheese-makers, or some such; or it will have recommended a rather lax approach which killed someone. Perhaps - sod's law being what it is - both eventualities would arise and even coincide.

And all the time, while the agency looked like an independent regulator, actually it could only have recommended this or that approach. It would be a regulator under licence: a franchisee of government. So, the final responsibility would eventually have to find its way back to the minister, because the agency's recommendations would have been turned into law by parliament, that being what a democracy insists on - quite rightly. We saw this hunt for the location of final responsibility when Michael Howard and the Prison Service, an agency, tossed the ball of accountability for a gaol-break between each other: and Mr Howard looked unattractive when he failed to catch and hold it. But the public would feel cheated: it thought it had an independent friend; the friend turned out not to be such a chum; and then the friend's regulatory independence was exposed as a sham anyway.

One of the important misconceptions about British government is that it is secretive. Actually, its formulation of regulations on safety (and much else) are extraordinarily open. Ministers have over many decades set up an array of committees of experts to advise them on risks of every sort. On food, chemicals, safety, the ozone layer - and much else, there is a committee (on BSE there are at least two). MAFF, for instance, has at least eighteen advisory committees, nine of them strictly scientific. Many of them spawn sub-committees. The Department of Health has 36 advisory bodies, about 25 of which seem strictly scientific or ethical [North, 1995].

Advisory committee members work hard for no pay. In so far as their work is recognised at all, it mostly puts them in the line of fire of sniping journalists and campaigners. Of course, the left points out that the men and women chosen to serve are picked by the Government and often their research has been sponsored by industry. Well, yes, that is true. But it is hard to imagine a nation more prone to appointing lively and thoughtful specialists to advise it.

Indeed, it is a crying shame that the state has generally allowed a false impression to get about: namely that scientific advisory committees are somehow appointed only to serve

ministers. In fact, most of the committees publish their work, and government would be wiser to take the risk of stressing over and over again, and at the top of its voice, that the committees are there to advise the nation - and the citizens of the nation as much as its administrators.

Perhaps the public believes that the committees produce their advice in a vacuum, and that government proceeds to ignore much of it. Again this a wholly false impression: ministers almost always reply in great detail to recommendations by scientific committees.

Perhaps the public believes that when the state proposes regulations based on a scientific view, it does so magisterially and arbitrarily. Again this is importantly not so. Not only, of course, must regulations get through Parliament. What is as striking and much less understood is that hardly any scientifically contentious matter is regulated without a lengthy consultation period in which everyone and his wife is invited to add their half penny's worth to the debate, with the resulting lines of argument debated at length in the Government's responses to the consultation. Often the consultation is even more formal: the two houses of Parliament's select committees are there too, monitoring the quality of the Government's response to the science it asks for, and the Government has to respond to these second opinions, again in detail.

In other words: we can be confident we regulate risk well in this country not merely on the basis that its citizens seem to live as long as everyone else in the West. We can be confident because it is so hard to see what could be done to make the administration of risk very much better.

And yet clearly, the public isn't confident of the process.

The proposal: the Agency of Risk Assessment.

There is a simple, cheap and useful reform, which would not wave a magic wand over the situation, but would be a useful step in the right direction.

All the committees, which advise government on risk matters, should be corralled in a new Agency of Risk Assessment. Beyond the existing committee framework, the Agency would undertake its own trawls of opinion on difficult technical issues. It could also be the ring-master of trawls of public opinion, and for Citizens' Juries, which are the burgeoning technique for both informing and gauging public opinion. In an ideal world, the statistics and census services would work under the same umbrella; and why not the various ethical - as opposed to strictly scientific - advisory bodies as well?

The agency would have its own secretariat and its own public relations office. These would be its two main purposes: to service disinterested inquiry into troubling matters, and to disseminate the result.

The Agency would need a lively chairman, capable of defending its right to independence of mind. It would have its own board of trustees (appointed by Government according to some post-Nolan system of fairness). It would have its own executive. It might come to its own corporate view on some issues. On others, it might prefer merely to let an advisory committee's work speak for itself.

Most scientists currently working within ministries should also be shifted out to this agency. The Ministry of Agriculture's veterinary science specialists would work for it, and the Department of Health's medical specialists. The Health and Safety Executive's safety

specialists, and the Public Health Laboratory Services could be amongst many others to join them. There would be an important division of labour and accountability to be made. The Agency might or might not take on the management of HSE policing, but the key issue is that it should be the umbrella and defender of the independence of science and above all of risk assessment.

It should report solely to Parliament, or perhaps to the Crown, but be mandated as the Government's official source of risk advice.

Of course, ministries would need a small team of scientists of their own to assess and formulate responses to ARA's advice. That is natural, because - to repeat the obvious - the Government ministry must always formulate its own view of the legislative merit of any proposal.

Whenever ARA suggested any sort of regulation, its likely costs to society would have to be assessed by the agency. This would deter ARA from an ivory-tower propensity to command that everything be stopped in case anything was a risk.

The idea of a wholly independent risk advisory body might frighten ministers. Here, after all, would be a powerful loose cannon on the deck of the ship of state. Its recommendations would be hard to refute and shift. The body might be respected without being particularly popular, and the Government, which introduced it might therefore gain few points even in the short term.

There would, however, be substantial advantages to the body politic. At the moment, on issues from Brent Spar to BSE, and including the need for roads or the risks of surgery, the Government is the victim of some very much looser cannons than the ARA is likely to be. Attention-seeking campaigners play fast and loose with every fact, and every informed opinion, which comes to hand. Because they are generally very much less truthful and almost always much more partisan than ministers and because their proposals are often overly expensive and likely to be inadequate in reducing risk, ministers - and the public the ministers represent - have much to gain from a reform which forces the campaigners to raise their game or be exposed as intellectually deficient.

That argument is not what will clinch the matter for politicians. Chris Patten, as Environment Secretary, once put a more cogent one: he said that sooner than being endlessly bounced by this or that sudden media outcry on this or that suddenly fashionable campaign, he would rather face up to responding to well-marshalled scientific evidence, which generally evolves rather than explodes. [Private conversation] Yes, the latter might seem to tie ministers' hands; but the former is infinitely more stressful.

The facts of most matters favour the quiet, normal, level-headed sort of assessment and regulation British government is good at. Where the evidence would lead most sensible people to a conclusion different to the one natural or convenient to government (Brent Spar was probably one such case, oddly; BSE another), ministers would probably gain by knowing the lie of the issue early in the process rather than late. In other words, sometimes the public would accept the scientific view put by the agency, and at other times listen to the science and insist on ignoring it. The agency would not much mind, necessarily. It would as much be the custodian of the public's response to risk as to the scientists'. Either way, the role of science would be better enshrined: it would have a far better chance of fighting its corner.

Science would be encouraged to stick more comfortably within its proper remit than it does now. As things stand, ministers hope advisory committees will make very firm

recommendations that this or that is "safe" and does not need to be banned. These sorts of recommendations allow ministers to shelter under the defence that they recommended, say, continued use of a substance on scientific evidence.

It is important that the public realise that there is a huge distinction between marshalling and assessing the evidence about risk, and pronouncing products or processes acceptable or unacceptable. The former is a scientists' task. The latter is, finally, a matter for political - that is to say, public - judgement. A sensible person - or the politician charged with the job - listens closely to the scientist as he describes a risk; and then makes up his own mind about whether he wants to take it.

An Agency for Risk Assessment does not answer every difficulty. It would become, perhaps undeservedly, popular or unpopular as its judgements accumulated a history and were proven perhaps only modestly successful. But its strictly advisory remit might keep it free of that laager mentality that locks regulatory institutions into the defence of whatever their historical judgement had been. At least ministers and the public would know that it was the best think-tank in the country, but was not a regulator. It would have little responsibility but little power too. It would be an engine for truthfulness, which must always be worth standing up for.

One would have always to remember the fallibility of the entire enterprise. What one says about the riskiness of any human activity is very liable to be wrong. One's attempts to control risk are apt to be either unwieldy or inadequate, or both. Knowing that, the public needs to be grateful for the politician for taking on the job.

Politicians for their part need modestly to stress the hazardousness of controlling hazard, and their own fallibility. To do so would not be to induce a culture of mistrust and fear. Rather, people might begin to recognise what they do know in their heart of hearts: that life is risky. It was, indeed, only the presence of a nanny state which turned us into child-minded citizens, demanding a nursery-world cosiness - and showing a childish petulance when things went wrong. Neither nanny nor her charges are really dim-witted, and need only a little nudge to talk sensibly again.

Chapter Seven

Managing risk: throwing the precautionary principle to the winds

Minimising risk is a difficult business. It is difficult in a first order sort of way: it is practically difficult, for instance, to reduce the chances of a chemical plant blowing up. [Kharbanda & Stallworthy, 1988; HSE 1989] But there are two larger and odder difficulties, which crucially hinge on our attitude to risk.

One is that reducing one risk pretty well inevitably results in increasing another, so our willingness to reduce this or that risk depends crucially on whether we think the alternative risks we would now invite are better or worse. They will often be different sorts of risks, and perhaps involve hazard to different sorts of people.

Much of the time, deciding whether to make the switch between the risk in front of us and another about which we may know much less is not likely to be solely a matter of science, but as much a matter of taste; not of fact but of attitude. Scientific and emotional maturity will both be required in dealing with them.

When we swap one risk for another, the exchange is likely to be even more complex than, say, swapping a cancer risk for a bacteriological one. The difficulty may be more abstruse than that. We may swap a tangible risk for a less tangible one, a focussed one for a more diffuse one, a local one for a distant one, a present one for a future one, an feared but actually mild species of risk for a comprehended but nasty one. We may save ourselves a direct, physical or biological risk but in exchange incur the nameless and diverse risks of having a less affluent economy. We may shift risk from super-sensitive affluent people onto careless but poor ones.

The people who assert that we are already quite rich enough and that affluence is actually a big part of the problem are usually rich as well as impatiently anti-materialist. They habitually become highly sensitised to certain sorts of risk. Someone who is poor and sees that poverty is risky in some way (perhaps they have a child who risks under-fulfilment through not being rich enough to go to university) may see risk quite differently. Risks, in other words, may be quite complex in the way they are displaced and replaced. Environmental or health risks may seem very different according to the degree one senses oneself to be at economic risk.

The clearest cases of the risk-swapping dilemmas are well-rehearsed. Industry enjoys them, of course. There was the famous case of an outbreak of old-fashioned cholera in Peru caused partly by a reliance on a US Environment Protection Agency advisory note that chlorinating water posed a carcinogenic hazard. [Mooney & Bates, 1999] The cholera was real but the carcinogenic hazard was more or less - but not entirely - illusory.

The risk, which was widely advertised in the West may have been small and its consequences inflated, but it might be that the West could afford the attitude, and to switch from chlorination to, say, ultra-violet sterilisation. The advice did not travel well, however.

There is a wider and more worrying attitude to risk, which flows from campaigning. One of the most obvious cases is the general reluctance to invest in municipal waste incinerators of the modern kind. These recover some of the energy in much of our domestic and commercial waste and could be said to turn paper, plastic and food waste into a fuel, albeit one which is not as good as coal, oil or even - differently - uranium. Incinerators work with little pollution. But they are unpopular because green campaigners have associated them with an air pollution problem, and especially with dioxins, which actually are barely detectable in incinerator smokestacks and are not in any case quite the horrors they have been cracked up to be. [Imperial, 1997 & 1998] But it is hard to get good discussion on such realities off the ground. There is now a small but growing literature and body of opinion in favour of proper levels of evidence, and proper reliance on evidence, in coming to conclusions. [Mooney & Bate, 1999] In the case of dioxins, there has been a long tradition of respectable science suggesting that the risk is not as advertised by green alarmism. [Bate, 1997]

Now this attitude, based on prejudice and outdated information, is hard to shift and has now often become political policy, at least at local level. It sits well with a politically-correct view amongst politicians to concentrate on recycling, treatment and, at a last resort, landfill solutions to waste. Now all of these have their place and can all work well in various situations. But they present more obvious and real difficulties than does incineration.

None of the risks seem huge, in any direction. The mistakes being made are unlikely to feature in any future obituary of western civilisation. But they are real. What is worse, the way the problem is discussed makes the interested citizen feel that there is no solution to hand for the waste, which results from his lifestyle. He is on the receiving end of an attempt to make him feel guilty about his materialism, whose outcomes, it is repeated stressed to him

by campaigners, have no technical solution. Technical fixes, such as incineration, are always disliked by the greens because they allow the possibility that the core message about the ecological consequences of materialism is weaker than might be thought.

Actually, most of the pronouncements of the green movement over the years have critically involved this sort of mistake. How was it that a nice and intelligent group of people could be so wrong on matters, which they professed to have specialised in? The reason is obvious, actually. The greens were, by and large, young and inexperienced arts and biology graduates, with very little knowledge of or investment in the world of getting a living. Often affluent themselves, but only because of their parents' efforts, they set themselves to oppose the world view of a generation of industrialists, scientists and regulators which had been the heir to a long tradition of trying to do industrial processes as well as possible. There had been so much learning from mistakes and the application of so much practical caution and the balancing of so many dilemmas that it was hardly likely that the greens would discover some instant holy grail.

This does not mean that the greens were useless. They may have provided a useful reminder to the rest of us that everyone should take some sort of interest in risk and they may have sharpened the risk-makers' perception of the issues. They usefully reminded people that the gains we have made materially may have had some negative results - say in making us more materialist and dissatisfied - quite apart from the physical risks we run.

But the green claim to have alerted industry and its regulators to very much or to have proposed solutions of any great interest are flawed. And what is worse, the greens have contributed to the cultural flaw which now seems to afflict people: the sense that they are at great, new and intolerable risk.

The biggest single issue here is that there is a green tendency to suppose that our main attitude to risk should be one of reducing it. The right is inclined to argue that we would be wiser to adopt a shift toward a view, which supposed that we should optimise risk rather than reduce it.

There is now a profound political battle in play about what should be the underlying attitude of governments towards any new development that involves risk. That is to say, about all developments.

The problem for government is not merely that this has always been a difficult area. We are now having to deal with risks which previously could only be guessed at.

The greens historically campaigned about specific risks, such as acid rain or smoke, and were used, furthermore, to complain about fairly obvious effects from them. Even in the case of nuclear power, whose risks were not all supposed to be immediate or obvious, it was at least clear to the protestors that radiation was something we all should fear and whose effects vested interests were systematically underestimating and callously forcing on us. These risks were fairly direct, though some of them were what one might call modern. Low level radiation, especially, was involuntary, insidious and ubiquitous. One could not contract out of the risk; it killed, if at all, slowly; it permeated everywhere.

Even so, by and large, these specific risks, or scenarios of callous behaviour by industrial interests, and carelessness and worse by governments, have proved less terrifying and convincing to the public than the greens might have supposed. The passage of time has revealed most technologies to be manageably safe, and to have acceptable dangers attaching to their normal and occasionally flawed operation.

In the 80s the greens shifted attention toward pollutants whose effects were still highly uncertain, about which there was a good deal of ignorance. Dioxins [Bate, were typical of this new breed of risk: in humans they might or might not cause a wide range of effects, or none. They killed some rodents with incredible ease; others, they barely affected. But even dioxins lost their power to shock the public, especially when regulators diminished their presence.

The green's response has been to move onto some new risks, for instance, the gender-bending chemicals, and the organophosphates, and to discuss them in much the same way they used to discuss the now less fashionable risks. The threat of global warming caused largely by the burning of fossil fuels has taken over from the fear of running out of fossil fuels. Genetic engineering has taken over from nuclear power as an especially modern and technological risk.

These risks share a characteristic, which is very handy to the green case. Whilst the degree of risk they pose is highly speculative, it is nonetheless plausible and may be very serious.

The levels of uncertainty about these new risks are truly stratospheric. What is difficult and necessary is to explain and it makes no sense for us to accept the green logic that their old call for a cautious approach is more legitimate than ever. To do is all the harder now that an absurd attitude to risk now seems to have been enshrined in political and legislative language.

The precautionary principle, which is in one form or another commonly now stated as policy by both greens and governments, states that quite often action ought to be taken to avoid a risk even when there is incomplete scientific evidence as to its riskiness.

In *The Politics of Risk Society*, Stephen Tindale, the director of the Green Alliance, quotes Jordan and O'Riordan as defining the precautionary principle as "giving the environment the benefit of any reasonable doubt" and "shifting the burden of proof from the victim to the developer". In the case of BSE risk, he says: "The burden of proof is with the producer: the farmers will have to prove that beef is safe before people will eat it again".

It's clear what is happening here: technology and man are in the dock, and caution is the prosecutor. But the normal principle of guiltiness is to be reversed. Technology's guilt does not have to be proved beyond reasonable doubt by the greens, but rather it is assumed to be guilty until it can prove itself innocent. The difficulty is that proving oneself incontrovertibly innocent is harder than launching a plausible accusation of guilt. Indeed, it is actually impossible. We know of nothing that is safe, but we do know quite a lot of things are mildly or even very dangerous.

With such restrictions, simultaneously woolly and draconian, the whole human enterprise would have to be shut down. The greens' contentedness to use language like this is a sure sign that they are not thinking usefully.

Tindale goes on to say that of course the precautionary principle is not in practice much applied. Instead, he argues, that the "Panglossian principle" is at work. "Unless it can be categorically demonstrated that something is wrong we will assume all is well.....This is the guiding principle of most environmental policy, from global warming to dog faeces."

But this gesture to realpolitik does not bring Tindale much nearer to reality. He cites

the government's regulation of Sellafield (the renamed Windscale nuclear reprocessing plant) as being contingent upon a belief that there was no proof of harm from low level radiation. But actually, low levels of radiation are regulated as though there were extremely hazardous even in the absence of any evidence that they are. It is not carelessness or the Panglossian principle, which brings the governments of the world to international negotiations about global warming. Governments do act on the principle that there may be something in these threats, though there is only circumstantial evidence that anything is wrong or that we ought to do much about it.

Tindale is right when he goes on to suppose that it makes sense to employ the standards of civil court guilt rather than criminal court guilt to HSE issues. This implies that "the balance of probabilities" is what should be at issue, not "proof beyond reasonable doubt". But then he would have been wiser not to cite with approval the idea that developers should prove beyond any reasonable doubt that they will not harm the environment. That requires a level of proof that he won't accept when he is trying to persuade us of the guilt of a substance or process.

Indeed, it makes no sense to cancel a development just because there is a balance of probabilities that the environment will be harmed. The question here is not merely whether we believe damage is likely, but whether we believe it is worth risking. That depends on applying principles far richer than the Precautionary Principle.

The difficulty with the Precautionary Principle is that it is meaningless until it is defined. Defined as Tindale and most greens like, it is useless because it is laughably draconian.

There are two ways out of this problem, and the German government, which invented the Precautionary Principle, used the more formal of them. This is to say: the Precautionary Principle was set up in tension with another two principles, one which required government action to be "proportional" and another which required it not to be "excessive". One applied the Precautionary Principle whilst also applying the idea that regulations should not stifle human activity which was thought valuable, and one should not take regulatory sledgehammers to crack environmental nuts. [Jordan & O'Riordan, 1999]

The British government, allergic to large principles, but keen on statements, which capture nuances, usefully formulated the principle, as Tindale notes, thus:

"We must act on facts, and on the most accurate interpretation of them, using the best scientific and economic information. That does not mean we must sit back until we have 100 per cent evidence about everything. Where the state of our planet is at stake, the risks can be so high and the costs of corrective action so great, that prevention is better and cheaper than cure. We must analyse the possible benefits and costs of both action and inaction. Where there are significant risks of damage to the environment, the Government will be prepared to take precautionary action to limit the use of potentially dangerous materials or the spread of potentially damaging pollutants, even where scientific knowledge is not conclusive, if the balance of likely cost and benefits justifies it."

This sort of thing makes one proud to be British. It is admirably free of rhetoric and high flown principle. It will keep one safe from fashionable orthodoxies. It is a clarion cry to action and a whisper of caution. It reminds one, above all, that the statement of principles is seldom the end of any matter. Nothing can take the problem of risks away from us.

Ends the essay

References follow

This is reference material for Risk the human adventure

Adams, 1999 Adams, John, an essay in a useful collection (including offerings from Roger Scruton and Kenneth Minogue) from a conference mostly endorsing robust risk-taking, *The Risk of Freedom: Individual liberty and the modern world*, Institute of United States Studies, University of London, Senate House, Malet Street, London WC1E 7HU; Adams 1997 Adams, J, Cars Cholera and Cows: virtual risk and the management of uncertainty, *Science Progress* (1997), 80 (3) 253 272; Adams 1998, A "Richter scale of risk"? Scientific management of uncertainty versus management of scientific uncertainty, *Interdisciplinary Science Reviews*, 1998, Vol 23, No 2]

Almond, 1995 Almond, Brenda, Should education have positive moral aims?, *Annual Review*, St George's House, Windsor Castle, describes a tradition from Kant to Thomas Kuhn, via Wittgenstein, which suggests, as Richard Rorty suggests, that there is not so much a truth that can be found, "as an indefinite plurality of standpoints" in which "truth is made rather than found". She cites Rorty, R Solidarity or Objectivity, in *Post-Analytic Philosophy*, ed J Rachman and C West, New York, Columbia, 1985 page 10

Bate, 1997 ed Bate, Roger, *What Risk?*, Butterworth-Heinemann, Oxford, 1997

Beckerman, 1997? Small Is Stupid,

Bernstein, 1996 Peter L Bernstein, *Against the Gods: The remarkable story of risk*, John Wiley, New York, Chichester, 1996

Daniel B Botkin, *Discordant Harmonies: A new ecology for the twenty-first century*, Oxford University Press, New York, 1990

Budiansky, 1995 Budiansky, Stephen, *Nature's Keepers: The new science of nature management*, Weidenfeld and Nicolson, London, 1995

Daniels, 1993 Daniels, Stephen, *Fields of Vision*, Polity Press, Cambridge, 1993 is an excellent way into this literature.

Doll and Peto, 1981 Doll, R and Peto, R, Avoidable risks of cancer in the US, *Journal of National Cancer Institute*, vol 66 number 6, June 1981. This is cited here as a classic epidemiological paper by two classic UK epidemiologists

Drucker, 1985 Drucker, Peter, *Innovation and Entrepreneurship*, Heinemann, London 1985

Financial Times, 98 Nick Gillies wrote in *Business and the Law, Civil Litigation*, "Cases on a scientific edge", about several lawyers taking on "junk science" and recommended www.junkscience.com as a source of US material. *Financial Times*, 18 August, 1998

Franklin, 1998 ed Franklin, Jane, *The Politics of Risk Society*, Polity Press, Cambridge, 1998.

Furedi, 1997 Furedi, Frank, *Culture of Fear: Risk-taking and the morality of low expectation*. Cassell, London and Washington. This author has done more than anyone else systematically to discuss this issue.

Furedi, 1998 Furedi, Frank, Robbing kids of their childhood and teaching parents to panic, LM, September 1998.

Furedi, 1999 Furedi, Frank, Courting Mistrust: the hidden growth of a culture of litigation in Britain, Centre for Policy Studies, 1999.

Hayward, 1995 The Hayward Gallery's show and catalogue, The Romantic Spirit in German Art 1790-1990, makes clear the difference in spiritual and emotional intensity between British and German romanticism.

HSE, 1988 Health and Safety Executive, The tolerability of risk from nuclear power stations, HMSO,

ISBN 0 11 883982 9, 1998

Belying its unpromising title, this is a valuable round-up of wide-ranging risk issues.

HSE 1989 Health and Safety Executive, Human Factors In Industrial Society, 1989.

HoC Agriculture Committee, 1998 House of Commons Agriculture Committee, Session 1997-98, Fourth Report, Food Safety. The MPs said they were less convinced than some enthusiasts that the Agency would always be loved by the public, or that its advice would always be preferred to that of the Ministry.

Imperial, 1997 & 1998. The proceedings of two industry-sponsored conferences: Options for urban waste management in the 21st Century, 22 October 1997; Options for urban waste management: Costs, benefits and realities, 12 November, 1998, The Environment Office, Imperial College, London, SW7 2AZ.

Independent, 1997a Cooper, Glenda, Why death of Diana was good for our health, Independent, 16 December 1997, page 3

Independent, 1997b Nicholas Schoon, the paper's environment correspondent in "Extinction? Why it may not matter" put Nee, 1997 in a nutshell, page 7, the Independent, 25 October, 1997

James, 1997 James, Oliver, Britain On the Couch: Treating a low serotonin society, Century, London 1997.

Jordan & O'Riordan, 1999 Jordan, Andrew, and O'Riordan, Timothy, The precautionary principle in contemporary environmental policy and politics, in Tickner, J and Roffersberger, C (eds), To Foresee and Forestall: Putting the precautionary principle into practice, Island Press, New York, 1999 These authors are at the Centre for Social and Economic Research, University at East Anglia, Norwich and write rounded accounts of the debate on precaution and risk perception.

Kharbanda & Stallworthy, 1988, Kharbanda, O P & Stallworthy, E A, Safety In the Chemical Industry: Lessons from major disasters, Heinemann Professional, London, 1988. Demonstrates through many cases the kind of human error which explains most disasters, from penny-pinching through failures of imagination and attention to detail to poorly-thought-through tinkering with design.

Knight & Pretty, 1998 Knight, R and Pretty, D, The Impact of Catastrophes on Shareholder Value, Templeton College, University of Oxford, 1998.

Lovelock, 1979, Lovelock, James, Gaia, A new look at life on Earth, Oxford University Press, Oxford, 1979; Lovelock, 1991 Lovelock, J, Gaia: The practical science of planetary medicine, Gaia, 1991

McCann, 1998 McCann, Hastings, A and Huxel, G R, Nature, vol 395, pages 794-798, 1998

McKibben, 1991 McKibben, Bill, The End of Nature, Viking, London, 1991.

MAFF, 1998 The Food Standards Agency: A force for change, Ministry of Agriculture, Fisheries and Food, White Paper, Cm 3830, January 1998

May, 1973 May, Robert, Stability and Complexity in Model Ecosystems, Princeton University Press, 1973

Mooney & Bates, 1999 Mooney, Lorraine and Bate, Roger, Environmental Health: Third World Problems – first world preoccupations, Butterworth-Heinemann, Oxford, 1999

Marris, Langford & O'Riordan, 1998 Marris, C, Langford, I & O'Riordan, T, Integrating sociological and psychological approaches to public perceptions of environmental risks: Detailed results from a questionnaire survey, 1998.

Nee, 1997 Nee, Sean and May, Robert, Extinction and the loss of evolutionary history, Science, Vol 278, 24 October, 1997

North, 1995 North, Richard D Life on Modern Planet, Manchester University Press, Manchester, 1995. Page 179 and following I discussed the reasons for raised life expectancy.

O'Riordan, Marris, & Langford, 1997 O'Riordan, T, Marris, C, & Langford, I, Images of science underlying public perceptions of risk, in Royal Society, 1997

Pearson, 1983. Pearson, Geoffrey, Hooligan: A history of respectable fears, Macmillan, London 1983, is a very good account of nostalgic blindness to the faults of earlier times.

Polis, 1998 Polis, Gary A, Stability is woven by complex webs, Nature, October, 22, 1998, vol 395, page 744.

Popper , 1958 Popper, Karl, The Logic of Scientific Discovery, 1958.0

Price Waterhouse, 1997 Price Waterhouse's Financial and Cost Management Team, CFO: Architect of the corporation's future, John Wiley, Chichester, 1997

Royal Society, 1997. Science, Policy and Risk, 1997, proceedings of a discussion meeting, held at the Royal Society, March 1997, RS, 6 Carlton House Terrace, London SW1Y 5AG
This is a good guide to some of the new cultural theory thinking on the sociology of risk

Risk: Analysis, Perception and Management, Royal Society, London (see above), 1992 is a good, more technical and less sociological, account of the issues.

Sapolsky, 1994 Sapolsky, Robert, Why Zebras Don't Get Ulcers, Freeman, New York. A readable account of the role of stress hormones in animal and man.

Scruton, 1998 Scruton, Roger, *On Hunting*, The Yellow Jersey Press (Random House, UK), 1998 Naturally, this is not the author's account of his hunting courage, but that of others, amongst much else.

Sennett, 1998 Sennett, Richard, *The Corrosion of Character: The personal consequences of work in the new capitalism*, W W Norton, New York and London, 1998, describes what the author sees as a new sense of disorientation accompanying footloose capitalist enterprises.

Simon & Kahn, 1984 Simon, Julian L and Kahn, Herman, *The Resourceful Earth: A response to Global 2000*, Blackwell, Oxford and New York, 1984.

Southwood, 1989 Southwood, Richard, "The Southwood Report", Report of the Working Party on Bovine Spongiform Encephalopathy, Ministry of Agriculture, Fisheries and Food, 1989.

Standard, 1998 Evening Standard, When high spirits turn to heartbreak, 14April 1999, page 32.

Strex,1998 Angela Patmore of this consultancy firm is the author of *Killing the Messenger: The pathologising of the stress response*, commissioned by the University of East Anglia's Centre for Environmental and Risk Management and available from Strex Ltd, 44 Edmund Green, Gosfield, Essex, CO9 1US, Telephone 07050 055344. Angela Patmore organised a conference in 1998 during which Dr Rob Briner, Dept of Organisational Psychology, Birkbeck College, University of London and others presented papers debunking many fashionable ideas about stress. Speakers included Dr Yvonne McEwen, former director of the Dept of Trauma Management, Fife University, who is a pioneer voice arguing that suffering in grief is natural and necessary and that it cannot wisely be thought of something that is to be counseled away.

Sunday Times, 1998a The Sunday Times usefully discussed the fund's downfall and rescue, September 27, 1998, Business, pages 5 and 8.

Sunday Times, 1998b Matthew Lynn discusses shareholder value in these terms, Business Focus, page 10, Sunday Times, 27 September, 1998

Tallis, 1997 Tallis, Raymond, *Enemies of Hope: A critique of contemporary pessimism*, Macmillan, London and St Martin's Press, New York

Telegraph, 1996 "How politicians reassured the people", The Daily Telegraph, March 21, 1999, page 4.

Telegraph, 1998a Celia Hall reports in the Daily Telegraph, September 10, 1998 (page 13) that the government's chief medical officer believed that "modern life" and its demands were driving people to depression.

Telegraph, 1998b The Daily Telegraph, The right sort of risk can work wonders, June 10, 1998, page 21.

Telegraph, 1998c The Daily Telegraph, Helicopters lift 55 sailors to safety, December 29, 1998, page 4.

Telegraph, 1999 The Daily Telegraph, Horse riding "riskier than motor bikes", January 27, page 5

Times 1996. Michael Streeter, *The Times*, 2 July 1996, page 3, reported the case of a man awarded £750 damages from McDonald's on account of being scalded by apple pie. The case mirrored a 1994 case in the US when an 81-year old won £320,000 from the same firm after being burned by hot coffee.

Times 1998a. Alison Clarke, *The Times*, August 25 1998, Law section, page 35, reported that a teacher accepted £100,000 after being bullied by his headmistress and added that the National Workplace Bullying Helpline had received 3000 calls in two years or so, a fifth from teachers.

Times, 1998b. "Lords overturn police claim on soccer disaster", 4 December, 1998, page 3

Times, 1999 Steve Keenan reported, *The Times*, 23 January 1999, page 30, that British Airways were taking special security measures after a spate of air rage incidents which have continued to attract attention. *The Independent* had earlier reported (13 December 1998) that traffic wardens were being trained to deal with "ticket rage".

Webster, 1994 John Webster, *Animal Welfare: A cool eye toward Eden*, Blackwell Science, Oxford, 1994. A fairly cool account of animal welfare, including a discussion on stress hormones.

Wildavsky, 1988 Wildavsky, Aaron, *Searching for Safety*, Transaction Publishers, New Brunswick and Oxford, 1998 This is one of the most original and pugnacious texts in favour of an understanding that risk is necessary and vital.