What can the Science and Technology Community Contribute?

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Abstract. This Chapter explores the role attributed to science and technology in combating the global war on terror in an age when social bonds have been eroded and our sense of the need for social solutions diminished accordingly. One consequence of this is the exaggeration of risks presented by science and by terrorists to the point of ignoring the more mundane and probable threats that confront us. Prioritising technical means to build social resilience over cultural change is also likely to be counter-productive by further fragmenting the ordinary human bonds that actually make society truly resilient. A political debate over societal values is required if we are to re-engage the public and deal appropriately with all-manner of disasters, including terrorist attacks.

1. Introduction

Science and engineering have always played a part in war. The advent of new technologies has only increased this potential role. The global war on terror is no different to other wars in that regards. Many proposed options for dealing with terrorism have an explicit technological angle. These include, the need for better intelligence and surveillance, the development of new instruments for detecting chemical, biological and radiological agents, specialist clothing and equipment for emergency responders, and computer models for predicting behaviour or orchestrating responses.

It is understandable, even commendable, that well-meaning experts and professionals should wish to get involved. Further, a significant amount of social resources are being diverted to tackling the problems raised. Accordingly, those with an eye on sources of funding to explore new areas of inquiry are likely to be interested. Indeed, beyond the explicit development of technical capabilities, the war raises numerous implicit issues for scientists and engineers to deal with. Who has access to the technologies they develop? And, how much should be made available in the public domain?

Before diving in off the deep end, however, those of a more critical disposition - as any true scientist should be - would do well to examine the broader context within which these events and issues have occurred and how they have been framed. Things are rarely as they seem. The primary task of all concerned ought to be to grasp the underlying essence of what is going on. Failing to do so could lead to the development of proposed solutions that, at best, merely contain perceived threats, at worst, exacerbate them significantly, not least by undermining our own capabilities to be resilient in the long run.

Many perceived problems in the world today are driven more by their social context than by their scientific content. Scientists and engineers need to be alert to this, not least because science occupies a peculiar position in contemporary life. A diminished sense of the significance of, as well as the desire and ability to shape, social forces, has led to an increased focus on the importance and impact of science upon our lives. In response to this

elevation and exaggeration of science, society has increasingly become preoccupied with science as a potential source of new risks.

This has led to the highlighting and fetishisation of purported scientific and technological solutions to what remain essentially social problems, as well as a concomitant and distorted perception of threat from anything remotely scientific in content. A recent publication from the Royal Society, the United Kingdom's leading scientific institution, is quite apposite in this regards [1]. The report; *Making the UK Safer: Detecting and Decontaminating Chemical and Biological Agents*, is undoubtedly rigorous in scope and methodology. However, it is the unquestioning acceptance of the social context that needs examining.

In it, some of the UK's leading scientists take at face value the notion that; "Recent global events have given greater prominence to the threat of chemical and biological agents being used malevolently against civil targets", and further that; "Science, engineering and technology are central to reducing this threat". Both of these assumptions would benefit from interrogation. Indeed, questioning the axioms of a debate ought to be the first step in making it truly objective. Otherwise we may be left with a technically competent, but ultimately unscientific report.

It is not just the job of social scientists, but scientists too, to question whether this purported "greater prominence" is real. Assuming that it is, scientists true to their tradition would then start by asking what this fact represents. Whether this is a media construct, or a more deeply held social concern, across different layers of society. If it is the latter, it ought to be considered that such a concern may have little relation to the actual probability of the threat they fear. The fact that something is possible, may cause alarm, but is the best way of assuaging this to assume those fears to be real and then seek to mitigate their outcomes, or alternatively, to interrogate those fears?

Ultimately, the Royal Society report may be of use to a highly limited number of technical specialists who, in the extremely unlikely eventuality of such a situation arising, would be charged with dealing with it. However, it is not obvious what its use is beyond that, in the public domain. Surely, publication of the report itself could now serve to confirm people's exaggerated perceptions of threat? It has certainly contributed to the "greater prominence' that it originally sought to address. People might assume that if the UK's leading scientists are investigating such matters then their presumptions are more likely to be true.

2. Science and Society

The emphasis often given as to the importance of science for effecting social change is one-sided. Science can transform society, but it is also a product of society. Its advances and remit, as well as being shaped by material reality, are circumscribed by the nature and values of the society within which it develops. The ambition and imagination of that society – or lack of these – is important here. Hence, whilst the world of antiquity yielded many intellectual insights, constrained by its social structures, these proved to be of little practical consequence [2].

It was only when the largely static feudal order dissolved, through the development of trade, that new demands were raised on individuals and society. A marriage of intellectual activity with practical needs encouraged innovation and, through the accumulation of wealth, challenged the old social order. As well as delivering remarkable achievements, social and scientific developments raised expectations as to what was possible [3]. This was about more than simply an advance in scientific knowledge – it was part of a wider shift in attitudes and beliefs.

The aspiration for social progress gave humanity confidence in the power of its own reason – a factor that then proved of significant importance to the development of science. The Scientific Revolution represented the triumph of rationality and experimentation over the superstition, speculation, diktat and domination that had gone before. It was a practical battering-ram with which to challenge perception, prejudice and power. But science was merely the product of a broader social dynamism, as well as becoming an essential contributor to it.

Just as the initial dynamic behind science was social change, so social change, or more particularly the lack of it, could circumscribe it too. Initially this came from the vociferous rejection of the old religious and monarchical orders it had supplanted. Then the advent of positivism consciously sought to restore order by decoupling science from wider political aspirations to transform society [4]. This reflected the inherent limitations and world view of the new industrial elite who derived their wealth and influence from simple mechanical processes linking cause and effect by uniform rules.

However, over the course of the twentieth century a wider layer of society lost its faith in the progressive capabilities of scientific transformation. Two world wars, separated by a depression and followed by continuing poverty and conflict in the developing world generated doubts as to the possibility of universal human progress [5]. Radicals, who had traditionally championed the liberating potential of scientific advance, now came to view it with increased suspicion. They also associated the Manhattan project and the Apollo programme with American militarism.

Some now argued that aspiration itself – rather than its failure as evidenced in the collapse of confidence in social progress – was dangerous [6]. Science was seen as the amoral steamroller of a dispassionate new modernity that crushed communities and tradition. What is so poignant about the modern disenchantment with science, is that it has emerged at a time when its achievements are without precedent. Behind the current crisis of faith in science, however, lies a collapse of confidence in humanity, and hence in the desirability and possibility of social transformation [7].

The defeat of the old Left externally, symbolised by the disintegration of the former Soviet Union and its satellite states, and the taming of the Left internally, symbolised in the UK through a series of political defeats over the course of the 1980s, now led it to make new alliances, including with the environmental movement – traditionally the preserve of the romantic Right – in order to boost its numbers, and leading it to shape a new, more individual or consumer-oriented agenda. At the same time, the diminished sense of the possibility of shaping social factors also made science appear to play a more important role in determining things.

3. Social Erosion

In parallel with the gradual disillusionment of society with science, has come an equally significant process of disengagement of society from politics. For the vast majority of ordinary citizens this has been exacerbated by a growing sense of social disconnection. At both the formal and informal levels of social engagement, social bonds have been severely eroded over the last decade or so. The resultant sense of isolation and insecurity across society has become the key element shaping perceptions of risk.

At the formal level, people in advanced Western societies are increasingly unlikely to participate in the political process. This effect is most striking among younger age groups. Electoral turnouts are at an all-time low and in the few instances where these are high, emotion appears to rule over reason. Few are active, or even passive, members of political parties or trade unions as their forebears were, and there is little attempt to engage

in, or raise the standard of, debate. When people do vote, it is often on a negative basis – against an incumbent, rather than for a replacement.

At the informal level, the changes are even more striking. Many have commented on the growing pressures faced by communities, neighbourhoods and families. In his book on this theme, "Bowling Alone", the American academic Robert Putnam also pointed to the demise of informal clubs and associations [8]. Meeting up with friends, occurs less frequently than previously too. In other words, people are not just politically disengaged but also, increasingly socially disconnected. This loss of social capital has occurred and been experienced within a generation.

Not so long ago, for example, it was still possible across most urban centres, to send children to school on their own, assuming that other adults would act *in loco parentis* – chastising them if they were misbehaving and helping them if they were in trouble. Today, such a straightforward social arrangement can no longer be taken for granted. None of us ever signed a contract saying that we would look after other people's children. It was simply an unstated and self-evident social good. This loss of a social sense of responsibility makes the individual task of parenting harder [9].

In a similar way, ordinary communities, at the turn of the last century, invested a great deal of effort in establishing and running their own institutions. These took a wide variety of forms from churches, to working men's clubs, schools and trade unions. It is almost impossible to find a similar process at work within society today. This is not to suggest some kind of golden-age of community activism. Clearly, past societies were also associated with a wide manner of activities we are quite glad to have seen the back of. However, the resulting erosion of social connectedness is significant.

Being less connected, leaves people less corrected. It allows their subjective impression of reality to go unmediated or unmoderated through membership of a wider group, association or trusted community. Without a sense of the possibility of social solutions, personal obsessions grow into all-consuming worldviews that are rarely open to reasoned interrogation or debate. In part, it is this that explains our recent proclivity to emphasise or exaggerate all of the so-called risks that are held to confront us [10].

Rather than the world changing any faster today than in the past, or becoming a more dangerous, unpredictable or complex place, it may be our diminished, and more isolated, sense of self that has altered our confidence to deal with change and the problems it gives rise to [11].

Those who talk of a "Runaway World" [12], would be hard pressed to show how the pace of change today is any greater than say, over the sixty-five year period two centuries ago between the creation of Richard Trevithick's first steam locomotive and the advent of transcontinental railroads across the United States of America. Alternatively, note the pace of change over the same period a century ago between the Wright brothers first powered flight and man walking on the moon. If anything, change today appears somewhat attenuated.

Much of the focus recently has been on the largely undelivered promises of biotechnology – a technology now passed its fiftieth anniversary – and the potential of the internet. But whilst the latter may have led us to being more networked virtually, it has not driven much change in the real world. Radically overhauling existing transport networks, a transformation not currently envisaged, would most likely have greater social and scientific consequences.

In our technically networked world, we may be more aware – but we are also easier to scare, than previously. Being more isolated leaves us more self-centred, as well as risk averse. In turn, these developments reduce the likelihood of our acting for some greater common good and end up making us less resilient, both as individuals and as a society.

From BSE to GMOs; from mobile phones to MMR, all new developments are now viewed through the prism of a heightened and individuated consciousness of risk. Nor are our fears restricted to the realms of science and technology. Age-old activities and processes have been reinterpreted to fit our new sense of isolation and fear. Bullying, sun-bathing and even sex have joined an ever-growing panoply of concerns, along with maverick doctors, crime, food and paedophiles.

Worse, this state of affairs has been exacerbated by the various authorities themselves, who suffer from their own existential crisis of isolation and insecurity. As we no longer vote, so ruling parties appear increasingly illegitimate and divorced from everyday concerns. A less than 50% turnout when split two or three ways produces governments with at best a 20-25% mandate. The real figure as reflected by demographics, negative voting and actual local election results is often well below this, languishing around the 10-15% mark.

This crisis of legitimacy has been further accentuated by a certain lack of purpose that has set in since the dissolution of the old Cold War divide. Then, an ideological divide separated a supposedly socialist Left from the free-market Right. Far from the demise of the Left revealing the "End of History" [13], it actually exposed the Right's own lack of ideas and dynamism. In an age when social change has been problematised, the pursuit of profit through innovation no longer bestows moral authority as easily. Now all parties fight for the centre ground and desperately seek issues that mitigate change and will re-connect with voters.

Latching on to the general climate of fear and insecurity, politicians have learnt to repackage themselves as societal risk managers around issues such as security, health and the environment. They pose as the people who will protect us from our fears and regulate the world accordingly. But the petty lifestyle concerns they focus on, as reflected in incessant debates about smoking, smacking, eating and drinking are unlikely to inspire and engage a new generation of voters. Nor will doom-laden predictions relating to terrorism and global warming.

Indeed, the more such concerns are highlighted, the more it becomes impossible for the authorities to satiate the insecurities they create. Hence, alongside disengagement and alienation, has come a concomitant disillusionment and mistrust in all forms of authority, whether political, corporate, or scientific. Healthy scepticism has increasingly been replaced by unthinking cynicism. In many situations today, the public tend to assume the worst and presume a cover-up. Rumour and myth abound over evidence and reason.

4. Creating Fears

At a recent forum in London, a member of the security service informed an audience of bankers that, whist it was true that the probability of a chemical, biological, radiological and even nuclear terrorist attack was low, this could not be ruled out. It was suggested that groups such as Al Qa'ida may have relatively poor capabilities in such techniques but their intention to develop these was clear, and if they did the consequences might be devastating.

This, in essence, captures the logic of our times; "Never mind the evidence, just focus on the possibility". It is a logic that allows entirely vacuous statements such as that of an official after the supposed discovery of the chemical agent ricin at a flat in North London, who was reported as saying; "There is a very serious threat out there still that chemicals that have not been found may be used by people who have not yet been identified" [14].

Yet undiscovered threats from unidentified quarters have allowed an all-too-real reorganisation of everyday life. The US government has provided $3 billion to enhance

bioterrorism preparedness [15]. Developed nations across the globe have felt obliged to stockpile smallpox vaccines following a process, akin to knocking over a line of dominoes, whereby one speculative "What if?" type question, regarding the possibility of terrorists acquiring the virus, led to others regarding their ability to deploy it, and so on. Health advisories to help GPs spot the early signs of tularemia and viral haemorrahagic fever have cascaded through the UK's urgent alert system. Homes across the land have received the government's considered message for such incidents; "Go in, stay in, tune in" [16].

Like all social fears, there is a rational kernel behind these concerns. Yet this is distorted by our contemporary cultural proclivity to assume the worst. It is the fear of bioterrorism that is truly contagious, and it is a fear that distracts us from more plausible sources of danger, diverting social resources accordingly, and exposing us all to greater risk [17]. It is also a fear that has bred a cynical industry of security advisors and consultants, out to make a fast buck by exploiting public concerns, and thereby driving those concerns still further.

There is a long history of bioterrorism incidents of which the anthrax attacks on politicians and the media in the U.S. in 2001 were but the latest [18]. Corpses infected with bubonic plague were thrown over the walls of Kaffa by the Black Sea in the mid-fourteenth century. At best, these are tactical devices with limited consequence, but not strategic weapons. It is the advent of biotechnology and the more recent, if overstated, possibility of genetically engineering agents to target biological systems at a molecular level, that is now held to pose a new challenge [19].

Few commentators point to the difficulties in developing, producing and deploying biological agents. This is evidenced by the failures of the Japanese cult, Aum Shinrikyo, in this regards only a decade ago. It was this that led them to settle for the rather more limited impact produced by the chemical agent sarin, despite their resources and scientific capabilities [20]. The Tokyo subway attack that ensued had rather more impact upon our fevered imagination, than in reality.

As with the anthrax attacks, this incident suggested that bioterrorism is more likely to originate amongst malcontents at home, due to greater access and capabilities in developing, such weapons there. Advanced economies are also better placed to deal with the consequences of bioterrorism, a fact that significantly undermines their purpose, especially to outsiders. Nevertheless, suicidal foreign malefactors bent on undermining western democracies continue to be presented as the greater threat.

Recognising the extremely low probability and limited consequences of such incidents, some scientists point to the longer-term psychological impacts as being the more important [21]. There is an element of truth to this. Psychological casualties are a real phenomenon. In certain emergencies these can rapidly overwhelm existing healthcare resources and thereby undermine the treatment of those more directly affected [22]. Yet they can also become a self-fulfilling prophecy. Indeed, by increasingly framing social problems through the prism of individual emotions, people have been encouraged to feel powerless and ill [23].

The arrival of television cameras or emergency workers wearing decontamination suits act as powerful confirming triggers for the spread of mass psychogenic illness [24]. So too can psychosocial interventions, such as debriefing subsequent to an incident [25]. These can undermine constructive, pro-social and rational responses, including the expression of strong emotions such as anger [26]. Hence, despite good intentions, psychiatrists can become complicit in shaping social ills. This is because few are prepared to question the dominant cultural script emphasising social and individual vulnerability, and the need for professional intervention and support.

Rather than critically questioning the framing of the debate, many, like the scientists of the Royal Society mentioned earlier, now simply accept the possibility of chemical,

biological, radiological and nuclear terrorism as a given. There is little understanding of how our exaggerated sense of risk is both historically contingent, predating 2001 quite significantly, and culturally determining, giving shape to and driving much of the agenda.

One medical historian and epidemiologist, has noted that "experts were using the threat of novel diseases" as a rationale for change long before any recent incident, and that contemporary responses draw on "a repertoire of metaphors, images and values" [27]. He suggests that "American concerns about global social change are refracted through the lens of infectious disease". This coincides with the view of others who see bioterrorism as providing a powerful metaphor for elite fears of social corrosion from within [28].

Despite incidents since 2001 pointing to the preferred use of car bombs, high explosives and poorly deployed surface-to-air missiles, the authorities have, through their pronouncements, encouraged the media to hype weapons of mass destruction. This is despite any terrorist's capabilities being pathetic compared to our own and the consequences being more likely to devastate them than us. We have stockpiled smallpox vaccines, but notably, have run out of influenza jabs. In the extremely unlikely eventuality of an incident occurring, we assume that the public will panic and be unable to cope without long-term therapeutic counselling.

In an age readily gripped by morbid fantasies and poisonous nightmares, few surpass the pathological projection of our own isolation much better than the fear of bioterrorism. All of this rather begs the question as to who is corrupting civilisation the most. The fantasy bombers or the worst-case speculators?

5. Cultural Responses

In fact, how we, as individuals and as a society, define and respond to disasters, is only partly dependent upon causal agents and scale. Historically evolving cultural attitudes and outlooks, as well as other social factors, play a far greater role. In objective terms, risk may be defined as a function of hazard and probability, but that some product or event is perceived of as a risk, or is treated as a disaster, depends on subjective factors.

This human element is missing from mechanistic risk calculus and technical solutions. Technical definitions of risk and resilience not only omit key elements of understanding and response - such as our degree of trust in authority, in other human beings and in ourselves - but may also serve to further undermine such factors, which are crucial in responding effectively.

The contemporary cultural proclivity to speculate wildly as to the likelihood of adverse events and to demand high-profile responses and capabilities based on worst-case scenarios may, in the end, only serve to distract attention and divert social resources in a way that is not warranted by a more pragmatic assessment and prioritisation of all of the risks that we face.

Technique and technology certainly help in the face of disaster. Ultimately, however, the fact that particular societies both choose and have the capacity to prioritise such elements, is also socially determined. More broadly, it is possible to say that resilience – loosely defined as the ability of individuals and society to keep going after a shock – is most definitely a function of cultural attitude or outlook. It is not an item that can readily be purchased.

Cultural values point to why it is that, at certain times and in certain societies, a widespread loss of life fails to be a point of discussion, whilst at other times or in a different society, even a very limited loss can become a key cultural reference point. This evolving context and framework of cultural meanings explains such variations as our widespread indifference to the daily loss of life upon our roads, as opposed to, for instance, the shock

and national mourning that ensued from the loss of just seven lives aboard the Challenger spacecraft in 1986.

The loss of Challenger represented a low-point in our cultural assessment of our own technological capabilities. It was a blow to our assumption of steady scientific and technological progress that no number of everyday car accidents could replicate. It fed into and drove a debate that continues to this day regarding our relationship with nature and a presumed human arrogance in seeking to pursue goals beyond ourselves.

Hence, emergencies and disasters, including terrorist attacks, take on a different role dependent upon what they represent to particular societies at particular times, rather than solely on the basis of objective indicators, such as real costs and lives lost. In this sense, our response to terrorist incidents, such as that which occurred on September 11th 2001, teaches us far more about ourselves than about the terrorists [29].

On the whole, the history of human responses to disaster, including terrorist attacks, is quite heartening. People tend to be at their most co-operative and focused at such times. There are very few instances of panic [30]. The recent earthquake and tsunami in the Indian Ocean serve as a salutary reminder of this. Amidst the tales of devastation and woe, numerous individual and collective acts of bravery and sacrifice stand out, reminding us of the ordinary courage and conviction that are part of the human condition.

People often come together in an emergency in new, and largely unexpected ways, re-affirming core social bonds and their common humanity. Research reveals communities that were considered to be better off through having had to cope with adversity or a crisis [31]. Rather than being psychologically scared, it appears equally possible to emerge enhanced. In other words, whilst a disaster, including a terrorist attack, destroys physical and economic capital, it has the potential to serve as a rare opportunity in contemporary society to build-up social capital.

Of course, terrorists hope that their acts will lead to a breakdown in social cohesion. Whether this is so, is up to us. Civilians are the true first responders and first line of defence at such times. Their support prior to, and their reactions subsequent to any incident, are crucial. Disasters act as one of the best indicators of the strength of pre-existing social bonds across a community. Societies that are together, pull together – those that are apart, are more likely to fall apart.

Whilst there is much empirical evidence pointing to the positive elements of ordinary human responses to disaster, it is usually after the immediate danger has subsided that the real values of society as a whole come to the fore. It is then that the cultural outlook and impact of social leaders and their responses begins to hold sway. These determine whether the focus is on reconstruction and the future, or on retribution and the past. A more recent development has been the trend to encourage mass outpourings of public grief, minutes of silence or some other symbols of "conspicuous compassion".

Sadly, despite the variety of ways in which it is possible to interpret and respond to different emergencies, the onus today seems to veer away from a celebration of human spirit and societal resilience, towards a focus on compensation and individual vulnerability. In large part this is driven by a narrowly technical view of risk and resilience.

6. Technical Resilience

Since September 11th 2001 much focus has been placed upon the concept of resilience, understood as the ability to withstand or recover from adverse conditions or disruptive challenges. Politicians, emergency planners and others, talk of the need to "build", "engender", "improve" or "enhance" resilience in society [32].

Unfortunately, much of this debate is framed in the fashionable, but limited, language of risk management and risk communication. Senior officials regularly point to the central role they attribute to risk reduction. This is understood in narrowly technical terms as consisting of horizon scanning, investment in equipment, training, business continuity planning, new legislation and the like [33].

This outlook itself reveals the absence of purpose and direction in society at large. After all, risk reduction is a means, not an end. In the past, society was not so much focused on reducing risk as upon enhancing capabilities towards some wider goal. Risk reduction was a by-product of such broader purposes and activities.

Presumably, people were prepared to risk their lives fighting fires or fighting a war, not so that their children could, in their turn, grow up to fight fires and fight wars, but because they believed that there was something more important to life worth fighting for. It is the catastrophic absence of any discussion as to what that something more important is, that leaves us fundamentally unarmed in the face of adversity today. In that regards, risk management is both insufficient as an approach, as well as being fundamentally unambitious.

It is also worth noting, that in recent times, the concept of risk itself has gradually altered from one that captured possibility and engagement in the active sense of "taking a risk", to one that increasingly reflects our growing sense of doom and distance, as evidenced in growing reference to the passive phrase of "being at risk". Risk used to be a verb. Now it has become a noun.

This is a reflection of the wider passive disengagement across society at large and further drives this by gradually removing our sense of will and agency from the equation. Risks are now conceived as being entities in their own right, only minimally subject to human intervention [34]. They are inherently and implacably out there, coming our way. The best we can do is to identify them and prepare to deal with them.

Even when discussing prevention, the assumption is that we are merely anticipating and building capacity for "inevitable" challenges [35]. In the words of some senior officials, it is "only a matter of time", or "when, not if", a terrorist atrocity will occur in the United Kingdom using some kind of crude chemical, biological or radiological device [36]. The notion that it may be possible to shape conditions, or set the agenda, with a view to obtaining more desirable outcomes or altering our social mindset, independently of external forces, is rarely entertained.

Unfortunately, much of the rhetoric regarding the war on terror, far from being robust and resolute, reveals an almost resigned fatalism towards future events. There is no sense of changing *how* people will respond, simply a sense of preparing them *to* respond. This defensive responsiveness in turn can only further encourage, not just terrorists, but a whole host of other malcontents, loners, hoaxers and cranks in their activities.

At best, our strategy is one of re-acting to the presumed actions of others. They drive - we follow, or mitigate. Despite occasional references to the need to "defend our way of life" or "our values" [37], very little effort has been put into identifying what these might be. They tend to be assumed, or glossed over, in some cursory fashion. At best, tolerance, which is the passive virtue of putting up with other people's values, gets misconstrued as an active value.

No doubt, because societal aims and cultural values are deeply contested and debating these might appear to be divisive at a time when we need to act in unison, it is easier to face the other way. Yet this flagrant lack of clarification as to who we are, what we believe in and where we are heading as a society, fundamentally undermines any technical attempt to be resilient.

Real resilience, at a deeper social level, depends upon identifying what we are for, not just what we are against. That way we can orientate society and seek to build upon it,

not just anticipate what is coming and seek to respond. It is precisely by establishing our aims and values and then pursuing these, that we stand the most chance of winning hearts and minds, not just at home but also amongst the disaffected abroad.

This is not to deny the need for a small layer of highly-trained professionals in society to deal with the problem of terrorism in the here-and-now. Yet the debate about who we are and what we are for is not some abstract philosophical issue waiting for present hostilities to be over. It is most urgent and necessary right now. Without an eye on the ends, just as much as on the means, we may take decisions that drive us further from our goals than we appreciate.

What we do in the present, including the science and technology we develop, is inevitably shaped by our existing values, as well as the form of society we seek to create. There are already many signs that some of the actions that have been taken thus far have served to further exacerbate the deep mistrust and cynicism in government and authority that is already quite widely felt. Worse, despite good intentions, encouraging people to be "alert", rather than alarmed, may well further erode the very social bonds of ordinary human trust we need to depend upon if we are truly to be resilient as a society.

As identified earlier, the usual list of measures taken to enhance social resilience since September 11th 2001 consists amongst others of the need for better surveillance and intelligence, more effective models for predicting behaviour, new detection equipment and protective clothing, alternative modes for imparting information through "trusted" sources, as well as new structures of government and integrated response systems.

None of these serve to shore up ordinary social bonds and hence human and societal resilience. By encouraging the dominant paradigm of risk management in our understanding both of terrorism, as well as how to respond to it, we are encouraging a suspicion of others that effectively pushes people further apart and accentuates existing trends towards social atomisation. We have created a new bureaucracy but, as the figures show, we have failed to address the underlying insecurities [38].

Above all we have focused solely upon the form that terrorism now takes in the modern world – that relating in some increasingly tangential way, to Al Qa'ida – and largely ignored its content – a vehement anti-Americanism that rejects modernity and progress.

This reveals the real complacency of the dominant responses. One hardly needs to leave the West, to discover a whole host of other voices also expressing a hatred for America and progressive enlightenment values. This division is internal rather than external. Islamist terror is merely its most visible manifestation. Once "Stupid White Men" had become a best-seller on both sides of the Atlantic we should have been alert to a certain degree of cultural self-loathing at home [39].

Timothy McVeigh and the Aum Shinrikyo cult, pointed to our ability to create home-grown nihilist terrorism. It is well worth reminding ourselves that the 19 hijackers from September 11th 2001 had themselves all spent considerable time in the West, imbuing our values – or lack of them – and had largely been educated here.

Terrorism in every age reflects the dominant values of the most advanced societies. In the age when Western countries advanced and defended the sovereign rights of independent nation states, terrorists fought national liberation struggles. Today, in an age when it is not so clear what we truly believe in, we find terrorists that declare no aims and profess no responsibility for the carnage they create. Maybe it is time we examined ourselves more deeply rather than the final outcome of such values.

Cultural confusion as to who we are, what we are for and where we are going will undermine our attempts at instituting social resilience. Society today is less coherent than it was a generation or more ago, it is also less compliant, but above all it is less confident as to its aims and purposes. This will not be resolved by training ourselves to respond to

disasters, but by a much broader level of debate and engagement in society, not just relating to terrorism and other crises, but to far broader social issues.

7. Social Solutions

Historical comparisons of disaster, such as responses to the Second World War "Blitz", or to past episodes of flooding and epidemic disease, reveal a number of important lessons for today. Not least, is the extent and depth of social bonds and engagement at those times. During the war, there was a clear sense of the need to carry-on with normal life and everyday roles and responsibilities, rather than developing some kind of "shelter-mentality" [40], as is now encouraged through talk of stocking-up on batteries and fresh water.

However, the most striking change over the last fifty years has been in how we assume that ordinary human beings will react in a crisis. Beyond the grossly distorted belief in the likelihood of panic lies a more subtle, yet unspoken shift in cultural assumptions, that in itself undermines our capacity to be strong. That is, that in the past, the assumption was – on the whole born out by actual human behaviour – that people were resilient and would seek to cope in adverse circumstances.

Today, there is a widespread presumption of human vulnerability that influences both our discussion of disasters well before they have occurred, and that seeks to influence our responses to them long after. A new army of therapeutic counsellors and other assorted professionals are there to "help" people recover [41]. This presupposes our inability to do so unaided. Indeed, the belief that we can cope, and are robust, is often presented as outdated and misguided, or as an instance of being "in denial"'.

In some ways, this latter element, more than any other, best exemplifies and clarifies some of the existing confusions and struggles that lie ahead. If self-reliance is old fashioned and help-seeking actively promoted, for whatever well-intended reason, then we are unlikely to see a truly resilient society emerge.

This cultural shift is reflected in the figures that show that whereas in the United Kingdom, in the period of trade union militancy and unrest known as the "Winter of Discontent" of 1979, there were 29.5 million days lost through strikes, in 2002 there were 33 million days lost through stress [42].

We have shifted from being active agents of history to becoming passive subjects of it. This may suit social leaders lacking a clear agenda or direction. It may indeed be easier to manage the sick than those who struggle. Yet it also precludes the possibility of encouraging and establishing real resilience, resolve and purpose across society.

The standard way of dealing with disaster today is one that prioritises pushing the public out beyond the yellow-tape perimeter put up by the authorities [43]. At best the public are merely exhorted to display their support and to trust the professionals. Effectively, we deny people any role, responsibility or even insight into their own situation at such times. Yet, despite this, ordinary human beings are at their most social and rational in a crisis. It is this that should be supported, rather than subsumed or even subverted.

Handling social concerns as to the possibility of a terrorist attack is no easy feat. In part, this is because social fears today have little to do with the actuality, or even possibility, of the presumed threats that confront us. Rather, they are an expression of social isolation and mistrust, combined with an absence of direction and an elite crisis of confidence. Debates about the accessibility of technology and the reporting of science in the public domain have to be understood in this context, rather than being accepted and deliberated upon in their own terms.

The starting point to establishing real resilience and truly effective solutions will be to put the actual threat posed into an appropriate context. This means being honest as to the

objective evidence, as well as being able to clarify the social basis of subjective fears. Engaging the public in a political debate over societal values may be a longer-term goal than dealing with any imminent terrorist threat, but it is necessary to inform our approach as a society.

The incessant debate as to the possibility and consequences of an attack using chemical, biological, radiological or nuclear weapons, is a case in point [44]. Whilst Western societies have debated such nightmare scenarios as if they were real, terrorists have continued to display their proficiency in, and proclivity to use, conventional weapons, such as high explosives, car bombs and surface-to-air missiles.

Above-all, if as a society, we are to ascribe an appropriate cultural meaning to the events of September 11th 2001 – one that does not enhance domestic concerns and encourage us to become ever-more dependent on a limited number of "expert" professionals who will tell the public how to lead their lives at such times – then we need to promote a far more significant political debate as to our aims and purposes as a society.

Changing our cultural outlook is certainly a daunting task. It requires people in positions of authority to clarify and agree on a common direction and then to win others to it. The reluctance to engage in this fundamentally political process and the clear preference to concentrate instead upon more limited, technical goals, leaves us profoundly ill-equipped for the future. It speaks volumes as to our existing state of resilience and may serve to make matters worse.

Bizarrely, few of the authorities concerned consider it to be their responsibility to lead in this matter. Nor do they believe such cultural change to be a realistic possibility. Yet, in the eventuality of a major civil emergency, they hope that the public will pay attention to the risk warnings they provide and alter their behaviour accordingly. By then it will be too late.

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