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Restoring reason: causal narratives and political culture

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Do human societies learn? If so, how do they do it, and if not, why not? The American activist singer and song writer Pete Seeger took up the first question in the 1950s (Seeger 1955)¹ in a song whose concluding lines circled hauntingly back to its opening and whose refrain – ‘When will they ever learn?’ – gave anti-war protest in the 1960s a musical voice. Seeger’s answer was, apparently, ‘never’. Like many a pessimist before and since, Seeger saw human beings as essentially fallible creatures, doomed to repeat history’s mistakes. But modern societies cannot afford to stop with that unregenerative answer. The consequences of error in tightly coupled, high-tech worlds could be too dire (Perrow 1984). If we do *not* learn, then it behoves us to ask the next-order questions. Why do we not? Could we do better?

For social analysts, part of the challenge is to decide where to look for answers. At what level of analysis should such questions be investigated? Who, to begin with, learns? Is it individuals or collectives, and if the latter, then how are knowledge and experience communicated both by and within groups whose membership remains indeterminate or changes over time? Organizational sociologists from Max Weber onwards have provided many insights into why collectives think alike. Especially illuminating is the work on group socialization, routinization and standardization (Bowker and Star 1999; Vaughan 1996; Short and Clarke 1992; Clarke 1989; Bourdieu 1980; Foucault 1979; Weber 1946). This literature focuses on the inculcation of disciplined habits and practices among a group’s human members, leading to common

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¹ ‘Where Have All the Flowers Gone?’ was arguably Pete Seeger’s best-known song. It was inspired by a Ukrainian folk song quoted in Mikhail Sholokov’s epic 1928 war novel *And Quiet Flows the Don*. The opening lines were:

Where have all the flowers gone, long time passing?

Where have all the flowers gone, long time ago?

styles of thought and modes of behaviour. To these observations, studies of technological systems have added a material dimension. Theorists of the left, from Karl Marx to more recent scholars such as David Noble (1977) and Langdon Winner (1986a), have looked to the power of capital (or other hegemonic formations such as colonialism and the state) to explain the design of obdurate technological systems that constrain group behaviour. Everyday metaphors – such as ‘built-in’, ‘path-dependent’ or ‘hard-wired’ – underscore a widespread popular awareness that material structures can shape a society’s developmental trajectories in ways that seem, for all practical purposes, inevitable.

The problem from the standpoint of learning is that the better we get at creating and, secondarily, explaining stability in groups and systems, the harder it seems to make or to account for change. If human collectives are bound by deeply socialized practices and rituals, and rigidly constrained by the technological infrastructures of their lives, how can they break out of those iron cages to craft safer, more supple and more sustainable forms of life? How, more particularly, do new ideas find toeholds and footholds, let alone *take* hold, in settings configured by and for outworn modes of thinking and knowing, as well as their material embodiments? To make progress, it would seem, we need more dynamic models of the ways in which people arrive at common understandings of their condition, about what works as well as what has failed to work. How are such shared beliefs about the causes of success and failure constructed in advanced technological societies? And if we penetrate to the heart of that puzzle, can we also ask how systematic beliefs and forms of life may be *reconstructed* to let in new interpretative possibilities?

Put differently, stories about learning are, at one and the same time, epistemological stories. They are narratives of how people acquire trustworthy knowledge from experience – and how they either fit new knowledge to old mindsets or transform their cognitive habits, individually and collectively, so as to arrive at radically altered understandings. In modern life, moreover, those understandings encompass not only how people wish to order their relations with each other but also how they go about living with the products of their technological inventiveness.

In this chapter, I look at the nation state as an important analytic unit within which to explore the problem of such collective learning. There are several reasons for this choice. First, we know from several decades of cross-national research that risk issues are framed for public policy

through nation-specific institutional and political forces that influence what is seen as potentially harmful and how such harms should be avoided (Jasanoff 1995; Jasanoff 2005; Vogel 1986). Accordingly, learning about risk often happens within a framework structured by the dynamics of national politics. Second, the cultures or styles of decision making within nation states affect the production of policy-relevant knowledge and discourse and thereby set the habits of thought and language that shape the possibility of learning. For example, the vulnerability of US decision makers to legal challenge is associated with a preference in that country for seemingly objective and rational analytic tools, such as quantitative risk assessment (Porter 1995; Jasanoff 1986). But these techniques, in turn, frame which risks U.S. decision makers are likely to take note of and the parameters within which they will seek prevention or remediation (Winner 1986b: 138–54). Third, in a time of growing recognition that not only elites but broader publics, too, are key players in processes of learning, the nation state offers a critically important site for examining how citizens make sense of threats and disasters. Public ways of knowing, which I have elsewhere termed civic epistemologies (Jasanoff 2005), are constituted, displayed, and reaffirmed within the decision-making processes of states, including those aimed at the management of risk and prevention of harm.

To illustrate these points, I adopt a comparative approach, looking at three episodes of learning following technological catastrophes in India, Britain and the United States. On the surface, the examples chosen from each country have little substantively in common: a chemical disaster in India (Bhopal), a food safety crisis arising from industrial agriculture in Britain ('mad cow' or BSE) and a terrorist tragedy exposing vulnerabilities in civil aviation and urban infrastructure in the United States (9/11). They are, however, comparable in other salient respects that bear on learning. Each was perceived as a problem of national proportions with international ramifications, calling for solutions at national and supranational levels. Each precipitated years of public inquiry into the causes of what had happened, as well as public efforts to prevent similar disasters from occurring in the future; in that respect each event was a site of learning, as well as a site of memory.² In

² Historians use the term 'site of memory' to refer to places, including the imaginative spaces of works of art and literature, where communities repose, and reify, their memories of significant past events. While this is not the place for a fuller

each case, the power of the state was invoked in distinctive ways to organize the search for truth, with important implications for the ‘truths’ that were revealed in the process. In each, too, policy closure of a formal kind was achieved, although the underlying narratives of cause and responsibility remained significantly, and stubbornly, more open-ended.

Through a comparison of these three national policy-learning exercises, I hope to show that civic epistemology is, in a sense, foundational to contemporary political cultures and helps define the trajectories of learning within a given polity. I focus my analysis on one aspect of learning only: the efforts to determine a causal agent or agents in each instance, since identifying causes is a prerequisite to any subsequent efforts to target solutions and remedies. Who, or what, in short was held responsible for the breakdowns that precipitated each crisis or catastrophe, and how did those findings, and their ambiguities, shape subsequent policy responses? I relate the answers to these questions, in turn, to the cultures of knowledge making that steered national learning processes towards particular conclusions. A point that emerges from this comparison is that the particularity of national civic epistemologies lies, in part, in the boundary that each framework constructs between factual and moral causes or, put differently, between responsibility and blame.

India: Bhopal gas disaster

On the night of 3 December 1984, barely a month after the traumatic assassination of Prime Minister Indira Gandhi, India experienced the worst industrial accident ever recorded. The scene of the disaster was a pesticide plant run by Union Carbide in Bhopal, the capital of the central Indian state of Madhya Pradesh. Water seeping into a storage tank of liquid methyl isocyanate (MIC) – no one knew exactly how – released the chemical in a lethal gaseous form over the sleeping city. Though exact casualty figures will never be known, up to 3,500 people were estimated to have died from the immediate effects of toxic

discussion of history and memory, I note that the construction of memory is integral to the process of learning and that public policy – which is often based on an authoritative analysis of past events – therefore can be seen as an important site of memory in modern societies.

exposure and as many as 150,000 people were permanently injured or disabled.

A tragedy of this magnitude necessitated prompt remedial action by the state and the Indian government did respond quickly. Action was complicated, however, by the heterogeneity of the network within which the events unfolded, a network that joined together in an unprecedented web of cross-national interactions, corporate entities, legal systems, medical experts, regulatory authorities and countless local victims (Jasanoff 1994; on technological networks, see Bijker et al. 1987). At the level of physical causation, the story was clear to all: deadly toxic gas escaping from an identified source had killed or injured large numbers of people living in the vicinity. At a systemic or moral level, responsibility was much harder to assign.

In the days, months and years that followed the disaster, the Indian government and other affected actors had to come to grips with the complexity of the ties that bound them, and these efforts led to vastly divergent causal accounts. To what extent, for instance, was legal ownership relevant to liability and how did it intersect with blame? Union Carbide, the parent company, disavowed responsibility for events occurring at a facility managed by its Indian subsidiary, almost half-owned by the Indian state, and entirely overseen by local staff and personnel. Whose neglect or failure, moreover, had precipitated the tragedy? Union Carbide officially maintained that it was an act of sabotage by a disgruntled employee – a theory that absolved the company of any legal or moral liability (Kalelkar 1988). At the opposite extreme, many Indian critics blamed a global power structure that permitted uncaring multinationals like Union Carbide to perpetrate ‘genocide’ on unsuspecting citizens of developing societies (Visvanathan 1985). Which of these views prevailed, if either, clearly had huge implications for future policy.

Medical science, too, failed to deliver univocal answers to important issues of causation. In the chaos following the gas release, both affected bodies and their specific afflictions remained unrecorded. MIC’s irritant properties at very small doses were well known, and thousands of instantaneous deaths provided sombre evidence of the chemical’s lethal potency at higher exposure levels. But the long-term effects on people who had been more peripherally affected remained unestablished for decades. Because MIC was dangerous to handle, no studies had been done on its effects at low doses on the nervous system, the respiratory

tract, vision or digestion, let alone on the psychological effects of being a gas survivor. Then, too, national and local medical authorities clashed with the victims in interpreting their symptoms and tendering appropriate remedies. A bitter technical confrontation erupted within days of the accident, centring on whether MIC had broken down into cyanide in victims' bodies, causing symptoms that sufferers claimed were alleviated by the antidote thiosulfate (Jasanoff 1994: 185–7). Experts sent in by the Indian government denied the victims' claims of cyanide poisoning and debunked community efforts to act on an officially discredited theory. Ensuing governmental action to block thiosulfate distribution and to arrest and detain physicians offering the treatment left a legacy of distrust that persisted into the present century.

Legal disputes growing from the disaster proved as thorny as they were inconclusive. An initial descent on Bhopal of prominent American trial lawyers, scenting huge damage awards, prompted the Indian government, under the so-called Bhopal Act, to assume the sole right to represent all claimants under an extended *parens patriae* doctrine. A New York federal court refused to allow the case against Union Carbide to be tried in the United States, as India had requested, on the ground that adequate justice could be done by the Indian legal system, even though no industrial accident on remotely this scale had ever troubled the subcontinent's courts. The complex legal skirmishes led in 1989 to an out-of-court settlement of \$470 million by Union Carbide, brokered by the Indian Supreme Court. It was closure of a kind – indeed, even a vindication of sorts for Bhopal victims if measured against the substantially smaller \$180 million settlement in May 1984 in the Vietnam veterans' lawsuit against manufacturers of Agent Orange (Schuck 1986). But from the victims' social and psychological standpoint the closure was anything but settling. In exchange for money, the Indian government dropped all criminal charges against the company, thereby permanently foreclosing what many saw as the only morally supportable response to Union Carbide's negligence. The settlement swept under the carpet the political economic critique that had framed the accident as a natural consequence of deep structural imbalances in the world. For those who saw both the state and the multinational corporation as shoring up the corrupt structures of global inequality, the mere transfer of millions of dollars from one to another equally non-accountable actor brought cold comfort. Money alone could not remedy what some saw as a moral catastrophe.

The Bhopal disaster, then, opened up a nested set of possible causes – from individual malice to corporate negligence and from state failure to global political economy – without leading to a broad societal consensus on any one of these. The lack of resolution was poignantly in evidence during a field trip to Bhopal that I made with a colleague in the summer of 2004, almost twenty years after the original catastrophe.³ By sheer coincidence, only in the week of our visit did the Indian government release the last instalment of the Bhopal settlement, ending years of confrontation over whether state authorities or victims were entitled to increases in the fund through interest accumulation and fluctuating exchange rates. Local newspapers reported that the payouts would produce a short-term increase in sales of cell phones, scooters and other consumer goods, while patient groups maintained that the funds were barely sufficient to cover the long-term costs of medical treatment and rehabilitation.

The funds will be paid out in due course, but the sense of justice denied still burns strong in many of Bhopal's gas-affected citizens, some of whom were children when the disaster happened. The recently fenced-in plant sits abandoned, in a densely populated, still unmodernized part of the city, home to grazing cows and memorialized only by a nondescript stone statue of a female figure near its entrance gate. At community centres and health clinics run by veteran activists, people whose lives were permanently scarred by the events of 1984 wait for a fuller redress that may never come. One of our informants stated that, for him, this case would not truly close until Warren Anderson, Union Carbide's chief executive in 1984, served at least one symbolic day behind bars. Another activist leader focused on corporate responsibility from a different angle, describing the strategies that he and his associates were following to hold Union Carbide's new owner, Dow Chemical, responsible for environmental damage caused by the plant. *These* claims, he insisted, had not been formally extinguished by the 1989 settlement and his group was pursuing political and legal opportunities in India and the United States in an effort to bring Union Carbide, through Dow, to book for offences that had never been properly accounted for.

³ I was accompanied by Stefan Sperling, whose anthropological perspective has greatly enriched my own policy analytic interpretation of the lack of closure in Bhopal. We are particularly indebted to Abdul Jabbar and Satinath Sarangi for their time and generosity in offering personal interviews, supporting materials and introductions to others in the gas-affected communities of Bhopal.

To the extent that Bhopal victims' groups continue to assert successful claims against the Indian state, it is not so much through official recognition of their health and safety claims as through the authenticity of their suffering. Twenty years after the precipitating events, after several changes of government and the assassination of Rajiv Gandhi, during whose prime ministership the Bhopal settlement was negotiated, victims' demonstrations seem still to have power to elicit responses from the state. One activist leader described, for example, a successful hunger strike that he and two colleagues had conducted in Delhi to persuade the government that the Bhopal Act did not pre-empt private litigation against Dow for environmental damage around the Union Carbide plant. What proved compelling in this case was not a factual demonstration of how bad things are in Bhopal, but the expressive voice of a community which, through the uniqueness of its experience, gained and retains moral claims on a nation's conscience – regardless of any divergences in their reading of the 'facts'.

The tragic open-endedness of the Bhopal case so many years later speaks to features of public knowledge making in India that we will return to later in this chapter. For now, let us flag chiefly the lack of anything approaching a definitive epistemological resolution: a time and place when all the major participants came together to agree on a common understanding of what had actually happened and what should be done on the basis of that shared knowledge. In the absence of such a moment of truth, multiple narratives of responsibility and blame continue to flourish in Bhopal, on the look-out for new external audiences or events to legitimate them. Yet this very lack of resolution can be seen as a form of learning – not the kind that necessarily leads to regulatory change or institutional reform, though both did happen in the disaster's wake (Jasanoff 1994), but rather the kind that, through its very incompleteness, reveals the impossibility of taming a cataclysmic event through necessarily imperfect managerial solutions. The open-endedness of learning at Bhopal offers in this sense its own redemption, by negating the possibility of forgetfulness.

Britain: BSE, food safety and the restoration of trust

If Bhopal burst upon the stage of world history in a single night of death and destruction, Britain's bovine spongiform encephalopathy (BSE or 'mad cow') crisis crept slowly into public consciousness over the course

of much of a decade. The earliest signs of trouble appeared in the mid-1980s. Cows began to sicken mysteriously; they staggered and drooled as if gone mad and eventually died. The epidemic had affected 160,000 animals by 1996. This was bad news enough for the export-oriented British beef cattle industry, but regulators sensed the shadow of something worse around the corner. If whatever ailed the cows were to cross the species barrier and infect people, Britain might be faced with a public health disaster of unprecedented proportions. The Ministry of Agriculture, Fisheries and Food (MAFF), the agency responsible for both agricultural productivity and food safety regulation, took up the dual challenge for policy: to diagnose and stop the spread of illness in cattle and to allay the incipient official concern that people, too, might be at risk from BSE.

The second issue presented MAFF with a basic logistical difficulty. How could the ministry launch an inquiry into a public health hazard of potentially epidemic scale (beef was, after all, Britain's staple meat) without causing mass panic and so destroying an industry already burdened by the direct costs of coping with BSE in cows? Faced with this dilemma, MAFF followed the traditional British strategy of containment. A small, trusted body of experts, headed by Oxford Vice Chancellor Sir Richard Southwood, an eminent zoologist and policy adviser, was convened to recommend what actions should be taken both to assess the risks to public health and to stop the spread of infection. The committee was alarmed at the rapid and uncontrolled industrialization of animal husbandry, including the 'unnatural' practice of feeding ground meat and bone meal to cattle that most probably had caused the spread of BSE. Yet the face the state turned towards the public was one of calm reassurance, with both advisers and officials stating that the risk of disease transmission from cows to humans was too small for concern. The infective agent might have jumped the species barrier once, from sheep to cows, but the Southwood committee saw little need to worry about a second jump from ruminants to human beings (MAFF 1989).

MAFF's confidence, together with that of its advisers, that BSE would not affect humans, and could be controlled in cattle through incremental restrictions on possibly infected cuts of meat, turned out to have been misplaced. An empiricist culture of governance, never too happy with speculative judgements, could not write off the possibility of harm without seeking further evidence. British authorities began to

monitor suspicious cases of human death from an illness known as Creutzfeld-Jakob disease (CJD) and by 1996 enough instances of a new variant (vCJD) had been found to persuade them that the unthinkable had happened: ‘mad cow’ disease had crossed into people and it was essential to make that news public. On 23 March, Stephen Dorrell, the Secretary of State for Health, announced to Parliament that ten deaths from vCJD had been identified in Britain. Against earlier expert predictions, it appeared that as many as several hundred thousand unsuspecting Britons might now be at risk of an irreversible and fatal degenerative brain disease caused by the same infectious agent as BSE.⁴ The panic that MAFF had so assiduously sought to prevent suddenly gripped not only Britain but also the European Union and Britain’s non-European trading partners, most of whom immediately banned imports of British beef. Within Britain, too, the giant food industry took potentially contaminated beef off the shelves and turned to safer sources, such as Argentinian meat for use in McDonald’s hamburgers. The episode cost the UK public sector alone £4 billion. More important, if less tangible, was the ensuing ‘civic dislocation’ (Jasanoff 1997) that caused citizens to turn away from government as a source of credible health and safety information and made the restoration of trust an urgent priority for Labour following its decisive electoral victory in 1997.

If neither Union Carbide nor the Indian state had wanted to resolve the multiple factual conflicts around the Bhopal gas disaster, the same could not be said of Tony Blair’s new Labour government and BSE. The government promised a full public inquiry, Britain’s favoured mechanism for ascertaining the facts after any major breakdown or controversy. A lengthy process headed by Lord Phillips of Worth Matravers, a Law Lord, concluded in 2000 that MAFF and its technical advisers had made substantial errors of judgement, on the basis of imperfect understandings of the facts and of available policy options (Lord Phillips 2000). The inquiry identified MAFF’s culture of secrecy (exceptional even in British terms) as an underlying problem that had prevented timely disclosure of risks and aggressive pursuit of scientific knowledge and policy alternatives. These findings dealt a final blow to a ministry that had for years been under fire for its lack of transparency and close

⁴ By the end of 2002, 129 people would be diagnosed with confirmed and probable cases of the disease (Andrews et al. 2003).

ties to agribusiness. MAFF was dissolved, its responsibilities were transferred to other bodies, such as the expanded Department of Environment, Food and Rural Affairs, and a new advisory committee, the Food Standards Agency, was formed to provide more transparent, consumer-oriented advice to government on matters of food safety.

From the standpoint of public knowledge making, however, what interests us most is the Phillips inquiry's strategy for determining who was to blame for the BSE fiasco. Was it a failure of knowledge and competence, and if so of individuals or institutions? The committee was on surest ground when it concluded that MAFF and its advisers had acted contrary to widely accepted principles or easily accessible public knowledge – put differently, when people seemed to have violated canons of common sense. Thus, in one instructive passage, the committee said:

... we do not consider that the [Southwood] Working Party correctly applied the ALARP [as low as reasonably practicable] principle. Animals with BSE that had developed clinical signs of the disease were to be slaughtered and destroyed. No steps were to be taken, however, to protect anyone other than babies from the risk of eating potentially infective parts of animals infected with BSE but not yet showing signs. It is true that infectivity of the most infective tissues – the brain and spinal cord – rises significantly shortly before clinical signs begin to show. It is also true that there were reasons to think that babies might be more susceptible to infection than adults. *But we do not consider that these differences justified an approach that treated the risk from eating brain or spinal cord from an animal incubating BSE as one in respect of which there were no reasonably practical precautions that need be taken.* [my emphasis]

To empiricist judicial minds, trained in common law notions of reasonableness, it seemed obvious that infectivity could never be contained within strict physical demarcations (brain and spinal cord), any more than some beef-eating populations (adults in this case) could be declared absolutely unsusceptible to risk. Responsible experts, the inquiry concluded, should have known that risk in a population extends across a continuum, from zero to certain harm, with corresponding opportunities for graduated precautionary action. It was plainly unreasonable, then, to target for protection only the high end of the risk continuum: babies exposed to brain and spinal cord tissue from infected but pre-symptomatic cattle. Other consumers, too,

should have been provided for under the accordion-pleated principle of ‘as low as reasonably practicable’ risk reduction. MAFF’s advisers had not acted commonsensically enough.

When it came to assigning individual responsibility, however, the committee was noticeably more hesitant. Expert bodies might be held accountable to widely accepted public health principles, such as ALARP, just as they might be expected to craft regulatory responses carefully fitted to the uncertainties of the situation. But individual public servants could not be deemed at fault for errors of fact or judgement so long as they were acting in good faith, according to their best understanding of their duties. The following observations from the Phillips inquiry are instructive [paragraph numbers indicated; my emphasis throughout]:

- It is inevitable that an Inquiry such as ours focuses on what went wrong. The main point of having the Inquiry is to find out what went wrong and to see what lessons can be learned from this. *This can be harsh for individuals. Their shortcomings are put under the spotlight. The overall value of the contributions that they have made is lost from view.* We do not wish our Report to produce this result ... (Lord Phillips 2000: 1245).
- Those who were most active in addressing the challenges of BSE are those who are most likely to have made mistakes. As was observed in the course of the Inquiry, ‘if you do not put a foot forward you do not put a foot wrong.’ In this context we think it right to single out for mention Mr Meldrum. Mr Meldrum was Chief Veterinary Officer in Great Britain for almost the whole of the period with which we are concerned. He involved himself personally in almost every aspect of the response to BSE. *He placed himself at the front of the firing line so far as risk of criticism is concerned* (Lord Phillips 2000: 1250).
- *We are satisfied that where Mr Meldrum perceived the possibility of a significant risk to human health he gave this precedence over consideration of the interests of the livestock industry* (Lord Phillips 2000: 1256).
- We have criticized the restrictions on dissemination of information about BSE in the early stages of the story, which were motivated in part by concern for the export market. We suspect that this may have reflected a culture of secrecy within MAFF, which Mr Gummer sought to end with his policy of openness. *If those we have criticized were misguided, they were nonetheless acting in accordance with*

what they conceived to be the proper performance of their duties (Lord Phillips 2000: 1258).

- For all these reasons, while we have identified a number of grounds for individual criticism, we suggest that *any who have come to our Report hoping to find villains or scapegoats, should go away disappointed* (Lord Phillips 2000: 1259).

Evident in these quotations is a firm commitment to protecting public servants against undue censure for honest mistakes. This protectiveness is understandable in a political culture that values learning from experience – in which both experts and civil servants have traditionally risen to power and influence not merely, nor mainly, on the strength of technical credentials, but by showing that they have served the public interest to the best of their abilities (Jasanoff 1994, 2005). It would not do, in this context, to make ‘villains or scapegoats’ of people who may have displayed intellectual shortcomings, but only through having placed themselves ‘at the front of the firing line’ of criticism, or who may have been misguided, but were acting throughout ‘in accordance with what they conceived to be the proper performance of their duties’. To penalize such people simply because of mistakes would be to deprive the state of a cadre of dedicated public servants that the nation could ill afford to lose. Unlike some national elites, who stand *above* the people in skills and knowledge, British public servants ideally stand *for* the polity. They are people in and out of government who not only possess the virtue of selflessness but who, through experience and service, have earned the right to see and know for the wider public – who embody, in other words, their nation’s civic epistemology, its capacity for generating reliable collective knowledge.

A change of government and a major public inquiry led in Britain to serious institutional redesign, most notably through the dissolution of a long-established ministry. At the same time, as we will see below, it left untouched core beliefs about the best way to preserve trust in government and to construct credible public knowledge for purposes of collective action.

United States: 9/11, aeroplanes and the failure of intelligence

The terrorist attacks of September 11 (2001) on the United States were, on one level, vastly different in kind from the methyl isocyanate and

BSE disasters. Although the death toll of nearly 3,000 was close to the loss of life sustained in Bhopal, the event that came to be known as 9/11 was universally seen, unlike the two earlier tragedies, as having been caused by intentional human malice. The nineteen young Muslim terrorists who were among the dead that day were bent on killing Americans and destroying major symbols of American economic and political might, the twin towers of New York's World Trade Center, the Pentagon, and possibly the White House or the Capitol. The attacks were immediately compared with the Japanese assault on Pearl Harbor that brought the United States into the Second World War. Framed as an act of war, 9/11 led in turn to military retaliations against Afghanistan, the prime training ground of the Al-Qaeda terrorist network, and Iraq, a country inimical to US interests in the world but not connected, according to official findings, with the 9/11 attacks.

Yet contained within the script of 9/11 was what we may with little stretch of the imagination view as a 'normal' technological disaster in the sense discussed by Perrow (1984). It involved the use of commercial airliners as weapons aimed at large buildings – thereby subverting the normal operations of two of modernity's most foundational technological systems, transportation and urban infrastructure. Unsurprisingly, the 9/11 Commission's sweeping remit under its authorizing statute of 2002 included a look at the security of commercial aviation. One of the Commission's prime tasks was to determine how four aeroplanes could have been hijacked from three US airports and crashed into national landmarks, and how to keep such incidents from occurring again. Indeed, the final report's first chapter is entitled, in words drawn from the first transmission from the hijacked American Airlines Flight 11, "We have some planes" (9/11 Commission 2004). The chapter offers a blow-by-blow reconstruction of what happened on board each of the four doomed airliners and how aviation authorities had tracked but failed to intercept the planes.

True to the practices of a country in which open information is believed to be the cornerstone of political empowerment and rational policy making, the 9/11 Commission identified problems in the US intelligence system as the major reason for the surprise attacks. The report highlighted many institutional deficits that had prevented information from being shared in timely fashion and so had kept the big-picture threat of Al-Qaeda from emerging with the kind of clarity that might have prompted preventive action. Important among these

deficiencies, the report concluded, were the organizational barriers that kept two of the nation's foremost intelligence-gathering outfits, the Federal Bureau of Investigation (FBI) and the Central Intelligence Agency (CIA), from effectively sharing information related to terrorism. To counter those failures of coordination, the Commission recommended the appointment of a single national intelligence director, whose job would be to pull the intelligence capabilities scattered among fifteen separate federal agencies into a functioning, organic whole. It was neither the processes of information collecting, nor the nature of the information collected, that the Commission blamed. The fault was attributed instead to the absence of a single synthesizing institution that could absorb the available information and convert it into a credible, reliable assessment of the risk of terrorism.

Here and there in the report are suggestions that the Commission understood the difficulty of building such an all-seeing, or all-knowing, eye within the government. In a chapter called 'Foresight – and Hindsight', the Commission noted that the failures that had led to 9/11 included not only those of policy, capabilities and management, all of which presumably could be corrected through familiar changes in organization and governance, but also those of imagination, a far more difficult virtue to cultivate inside the routines of administrative practice (9/11 Commission 2004: 339). Observing that '[i]magination is not a gift usually associated with bureaucracies', the chapter went on to say:

It is therefore crucial to find a way of routinizing, even bureaucratizing, the exercise of imagination. Doing so requires more than finding an expert who can imagine that aircraft could be used as weapons. Indeed, since Al Qaeda and other groups had already used suicide vehicles, namely truck bombs, the leap to the use of other vehicles such as boats (the *Cole* attack) or planes is not far-fetched. (9/11 Commission 2004: 344)

But here we confront a paradox. If it did not take *much* imagination to conceive of what happened on 9/11, why did the Commission identify lack of imagination as a key factor leading to the attacks? And if the use of aircraft as weapons could have been foreseen so easily, why did the relevant authorities fail to exercise the modest amount of imagination needed to forestall that event?

The answer that emerges on the page following the above quote is telling: for imagination is here reduced, for all practical purposes, to routine administrative analysis. The Commission identifies four fairly

uncontroversial analytic steps that the Counterterrorism Center (CTC) might have taken but did not: analysis from the enemy's perspective; development of tell-tale indicators; requirements for monitoring such indicators; and identifying systemic defences within terrorist-controlled aircraft. None of these elements is presented as new or path-breaking. Indeed, they had become standard, the Commission suggests, in the years after Pearl Harbor, and CTC's error lay in not using them well or at all. The methods 'did not fail', the report concludes, 'they were not really tried' (9/11 Commission 2004: 347–8). The alleged failure of imagination, then, was little more than a failure to do conventional risk assessment in the national security arena, in accordance with long-established codes of practice.

The irony of this move – beginning with an ambitious attempt to chart new conceptual territory but returning to fighting yesterday's war on yesterday's terms – did not go unnoticed. A commentary on the 9/11 report by Judge Richard Posner, an acerbic social critic and one of America's foremost apostles of the free market, blamed the Commission for proposing a solution that did not follow from its own analysis (Posner 2004). His own suggestions, based as he said on the Commission's findings, were more modest, specifically targeted and often technological. For example, with regard to airline safety, Posner called for better passenger and baggage screening, secure cockpit doors and override mechanisms to enable hijacked planes to be controlled from the ground. He also recommended more effective border controls, including biometric screening, and improved building evacuation plans, which he felt had received too little attention.

At bottom, however, Posner's disagreements with the Commission rested on ideological foundations. Accusing the Commission of 'herd thinking' and a lean towards centralized planning, Posner charged that the proper solution to 9/11 was not a unified intelligence system of questionable efficacy that aggrandized the state. Consistent with market principles, Posner's view seemed to be that the bottom-up forces of individual or small-scale entrepreneurship would do better at producing robust collective defences than top-down state coordination of all information sources:

The Commission thinks the reason the bits of information that might have been assembled into a mosaic spelling 9/11 never came together in one place is that no one person was in charge of intelligence. That is not the reason. The

reason or, rather, the reasons are, first, that the volume of information is so vast that even with the continued rapid advances in data processing it cannot be collected, stored, retrieved and analyzed in a single database or even network of databases. Second, legitimate security concerns limit the degree to which confidential information can be safely shared, especially given the ever-present threat of moles like the infamous Aldrich Ames. And third, the different intelligence services and the subunits of each service tend, because information is power, to hoard it. (Posner 2004: 11)

Posner concluded that, ultimately, there is very little a society can do to prevent truly novel risks like 9/11; it is therefore wasteful to engage in too much front-end planning to keep such surprises from happening.

In this respect, Posner's dissent from the Commission's conclusions echoes what another market libertarian, the late political scientist Aaron Wildavsky (1988), had said almost two decades earlier about the futility of advance planning against environmental and other hazards. In both Posner's and Wildavsky's estimation, post-hoc determinations of causality, coupled with precisely targeted remedies, will serve society better than trying to predict harms in advance and predicting erroneously. Underlying both positions is a deep, and thoroughly American, suspicion of the state and its capacity to see, or know, for the people; in a culture committed to the discourse of transparency, the state arguably has no privileged position from which to see any differently than its individual members, who can see well enough for themselves.

Causal analysis and civic epistemology

What light do these three national disasters, and subsequent attempts to make sense of them, shed on our initial question: do human societies learn and, if so, how do they do it? As we have seen, all three events gave rise to long, costly, anguished efforts to identify the causes of tragedy and affix responsibility accordingly. For this purpose, it proved necessary in all three cases to produce bodies of communal knowledge that would underwrite and make plausible the causal analysis that the state wished to embrace for itself and to have its citizens endorse. In this section we ask how each effort reflected or reinforced established national approaches to public knowledge making or, in other words, each nation's characteristic civic epistemology. To what extent were

the explanations given for each event stamped or shaped by cultural commitments to particular ways of knowing?

As I have argued elsewhere (Jasanoff 2005), the credibility of governmental actions in contemporary knowledge societies depends crucially on the public evaluation of competing knowledge claims and the consequent production of reliable public knowledge. The concept of civic epistemology acknowledges the centrality of this dynamic. It refers to the mix of ways in which knowledge is produced, presented, tested, verified and put to use in public arenas. These public knowledge-ways, moreover, are not universal but are grounded in historically conditioned practices that may vary from one national context to another. Seen in this light, civic epistemology is a constitutive element of political culture. In any functioning political community, including importantly the nation state, we can identify distinctive, shared understandings among citizens and rulers about what makes some sorts of knowledge claims or modes of reasoning seem more credible than others; public explanations, in turn, achieve robustness by meeting entrenched, institutionalized, cultural expectations about how to produce authoritative knowledge.

Cross-national comparisons, conducted thus far mostly among Western countries, have shown five dimensions of possible variation in the practices of civic epistemology: (1) the dominant styles of public knowledge making; (2) the methods of ensuring accountability; (3) the practices of public demonstration; (4) the preferred registers of objectivity; and (5) the accepted bases of expertise (Jasanoff 2005). Reviewing our three cases of causal analysis in the light of these factors reveals interesting contrasts that resonate with and extend earlier comparative research. These contrasts are summarized in Table 9.1 and elaborated in greater detail below.

The organization of post-disaster inquiries in each country conformed to well-known national *styles of public knowledge making*. In India, the state took early control over medical and legal fact-finding following a disastrous accident, but, significantly, was unwilling or unable to establish a process for making those facts authoritative.⁵ In

⁵ Some of the Indian government's difficulties may relate to the complexities of being embroiled in transnational litigation against Union Carbide, but other considerations had to do with avoiding potential liability for what had happened under its watch in Bhopal. These issues bear more detailed investigation than I am able to provide within the limits of this chapter. For additional perspectives, see Jasanoff (1994).

Table 9.1: Civic epistemology: a comparative overview

	India	Britain	US
Form of post-disaster inquiry	Social protest	Judicial inquiry	Bipartisan national commission
Public knowledge making (style of)	Contentious; movement-based	Embodied; service-based	Pluralist; interest-based
Public accountability	Fluid assumptions; political	Assumptions of trust; relational	Assumptions of distrust; legal
Demonstration	Elite knowledge vs. authentic experience	Common sense empiricism	Socio-technical experiments
Objectivity (strategy for)	Contested; view from somewhere	Negotiated; view from everywhere	Analytic; view from nowhere
Expertise (basis for)	Institutional or political position	Experience	Formal analytic methods

the absence of a definitive public inquiry, multiple accounts of suffering and blame continued to circulate, prompting, as we have seen, new claims and counter-claims as much as two decades after the original tragic event. Factually as well as morally, the Bhopal disaster refused to close; indeed, it spawned a tradition of social protest that promised to outlast the immediately affected generation and to reframe a case of failed industrial risk management as a question of global inequity and injustice. In Britain, by contrast, a judicial inquiry presided over by a Law Lord produced a consensual account of the facts and broad agreement on the institutional changes needed to prevent a recurrence – most particularly, the disbanding of the seriously discredited MAFF. Unlike the BSE inquiry, which followed an adjudicatory model, the US 9/11 Commission drew its authority from bipartisan representation and a politically negotiated unanimity. Not surprisingly, the Commission's primary policy recommendation, the centralization of intelligence gathering, took the form of a managerial fix that sidelined politics and values and quickly won the approval of both major political parties.

The methods for ensuring *accountability* in public knowledge production varied as much across the three cases as did the inquiry processes. In Bhopal, the company, the government and the victims

were sceptical about each other's approaches to fact-finding and this mutual suspicion never resolved itself. Union Carbide continued to insist on the sabotage theory, although the victims ridiculed it; the government continued to deny some of the victims' health claims and pegged compensation to administrative classifications rather than to subjective assessments of harm; and the victims continued to insist that they and their offspring had been irreparably damaged in ways not fully accounted for by official medical experts or financial reckonings. In marked contrast, the BSE inquiry produced a relatively uncontested version of the facts and a correspondingly uncontroversial allocation of responsibility. It held accountable institutional actors who, like MAFF or the Southwood working party, had failed to act on the basis of common knowledge and common sense. On the other hand, the inquiry exonerated individuals who, like Mr Meldrum, had made mistakes while sincerely carrying out their duty. For the 9/11 Commission, accountability was more a matter of following the appropriate analytic routines so as to ascertain objective facts; inexcusable error lay in agencies like the CTC not using information to the fullest and not pushing analysis far enough to uncover in-principle knowable truths.

Participants in knowledge making in all three countries relied on different forms of public *demonstration* to legitimate their particular epistemologies. In India, the company and the government used formal legal procedures to reach a settlement designed to make further fact-finding unnecessary. But the settlement never completely assuaged the victims' sense of injury and as late as 2004 activist groups were still staging acts of conscience such as hunger strikes to win benefits from the state. Victims who never experienced the consolation of a day in court won instead a lifelong hearing in the courts of public opinion, in India and beyond. In Britain, the risk of interspecies BSE transmission was publicly admitted only after epidemiological research uncovered evidence of a new pathology. Similarly, British authorities proved reluctant to set upper bounds on the number of possible human infections until they had accumulated several years of data on proved and probable incidents of vCJD. On both issues, certainty was achieved only on the basis of proofs that everyone found persuasive. In the United States, the two 9/11 explanations that gained widest support were, on one hand, the massive failure of intelligence and, on the other, the lack of suitable technological fixes such as biometric passports and better baggage screening. Both are consistent with a civic culture in

which breakdowns in social order are frequently framed as technological failures. By the same token, technology, whether social (like intelligence gathering) or material, is the preferred American means of problem solving and US rulers frequently gain support by demonstrating, through public socio-technical experiments, that their policies work (Ezrahi 1990).

National strategies for establishing the *objectivity* of official fact-finding also differed among the three cases. In post-Bhopal India, the major actors each claimed primacy for their own forms of knowledge, but on divergent grounds. Thus, the Indian government used its experts to produce official counts of death and injury, but these were disputed by the victims and their representatives, who preferred to rely on subjective experience backed by community-based clinical observations. Union Carbide also stuck by the opinions of its own experts, particularly on the issue of sabotage, implying that neither Indian officialdom nor the victims could be trusted to produce an unbiased appraisal of the facts. If the Indian knowledge claims represented a view from *somewhere* – that is, from a partisan political standpoint – post-BSE Britain took pains to construct the view from *everywhere*, a consensual account that brooked no real dissent. Discernible within the inquiry findings, moreover, was an acceptance of some truths as self-evident, for example when the committee agreed that infectivity rises shortly before clinical signs of disease appear and that babies are likely to be more susceptible to infection than adults. Statements such as these bear the stamp of a culture that readily accepts the possibility of communal vision. The 9/11 Commission, too, forged a common position, but it did so by sticking close to a dry reconstruction of the events and carefully excluding areas of possible partisan contention. The faults it found, similarly, were those of inadequate analysis and information processing rather than of moral or political short-sightedness (as in Bhopal) or of ignoring obvious facts (as in the BSE case). This approach to objectivity corresponds most nearly to what the philosopher Thomas Nagel (1989) has termed the ‘view from nowhere’ – that is, a view that is self-consciously shorn of interest or positional bias.

Finally, the three case studies of causal learning illustrate different notions of what constitutes legitimate *expertise*. In the aftermath of Bhopal, it became clear that the major parties were willing neither to trust each other’s experts nor to accept any adjudication of the relative merits of their claims as dispositive. There was, in short, no shared

credibility economy (Shapin 1995) in which experts for the warring interests could negotiate their cognitive differences and arrive at a common understanding. Expertise remained irretrievably tied to the parties' institutional positions; valid knowledge, then, was not knowledge detached from political engagement but knowledge gained as an extension of politics.

The BSE case, by contrast, displayed at many levels Britain's cultural commitment to a transcendental notion of embodied expertise – that is, expertise acquired through experience, with the expert's standing deriving not only from superior technical abilities but also from a proven record of public service (Jasanoff 1997). Lord Phillips, Sir Richard Southwood and Mr Meldrum all conformed to this image of the expert who stands above special interests, and the inquiry committee's refusal to identify any 'villains or scapegoats' indicated a deep reluctance to question the merits of that kind of expertise. Individuals may have erred when they acted outside the bounds of common sense, but they were not held, for that reason, morally blameworthy. For the 9/11 Commission, which similarly blamed no individuals personally, the chief failure lay in the system's inability to process information in accordance with appropriate frameworks of analysis. Experts, under this reading, were people possessing the necessary technical skills to read the tea leaves of passing events. Their job was to foster, through impersonal analysis and appropriate organizational routines, the sort of preventive imagination that the Commission found so sadly lacking in the disastrous lead-up to 9/11.

Conclusion: learning cultures

Bhopal, the BSE crisis and 9/11 were disasters on a scale that engaged entire nations in processes of collective self-examination and efforts at preventive learning. I have suggested that these efforts unfolded within, and were constrained by, the national traditions of producing and evaluating public knowledge that I have termed civic epistemologies. These institutionalized ways of coming to terms with communal experience are a feature of contemporary political cultures. They at once provide the means of sense making in tangled circumstances and discipline, to some extent, the kinds of reasoning that are considered robust or plausible within a functioning political community. The causes identified and the people or institutions held responsible in

each case reflected national commitments to holding still, or *not* questioning, certain features of each nation's political culture, along with a willingness to undertake some forms of institutional reform or policy change.

The cases help us address a major problem identified at the beginning of this chapter: how do we account for learning within extremely stable organizational settings, including nation states, that devote considerable energy and resources to withstanding change? The answer has to do, in part, with the heterogeneity of 'culture' as displayed in these cases. Civic epistemology, in particular, is not a seamless way of knowing shared by all participants in a political community. Far from it. In India, for instance, all those who grappled with the consequences of Bhopal were engaged in producing public facts; yet their notions of how to make facts count and be authoritative were, and remained, apart. There was, to be sure, a formal financial settlement of claims, but this did not constitute closure with respect to the moral narratives of suffering and blame that continued to circulate in India long after the events of December 1984. Events as much as two decades after the date of the accident suggest that the state and its citizens recognized the power of moral arguments to spill over and outlast resolutions reached solely on the basis of factual determinations or administrative convenience.

Britain and the United States both appointed official bodies to inquire into the causes of the BSE fiasco and 9/11 respectively, but while both processes effectively shifted the ground from moral blaming to institutional failure, neither succeeded in fully closing off alternate readings of the events. Closure on facts and evidence was perhaps most complete in Britain, but even in that relatively consensual environment disagreement quickly appeared over the adequacy of the government's policy response. Criticism of the Food Standards Agency and the later vehement controversy over genetically modified crops suggest that state and citizens remained sharply divided over crucial aspects of how to produce authoritative knowledge and robust explanations in areas of high uncertainty. In the United States, Posner's dissent from the 9/11 Commission points to a similar persistence of multiple epistemologies within a single political system. Posner's argument centred, after all, on the state's capacity to serve as a consolidated nerve centre for anti-terrorist intelligence. In questioning the feasibility of that role, Posner spoke for critics from the right and left of the political spectrum

who place more faith in local knowledge and decentralized action than in centralized managerial solutions based on seeing like a state (Scott 1998).

Learning from disaster emerges out of these stories as a complex, ambiguous process – conditioned by culture, yet not easily forced into univocal, totalizing, national narratives. It is in the raggedness of accounting for tragic experience that the possibility of cultural reinvention ultimately resides. Comparisons of the sort undertaken here help reveal the cracks in the paving stones of culture from which creative gardeners can coax into bloom new shoots of understanding and self-awareness.