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Bhopal's Trials of Knowledge and Ignorance

*By Sheila Jasanoff**

ABSTRACT

The disastrous gas leak at a Union Carbide plant in Bhopal, India, in December 1984 displayed the law's tragic inability to cope with the consequences of technological globalization. This essay describes the protracted efforts of the gas victims to obtain relief from courts in India and the United States and the reasons why the settlement of their legal claims did not satisfy their demands for justice. The victims' self-knowledge, whether scientific or social, found no traction in official medical record keeping or in courts of law. Their experience highlights the structural asymmetries of technology transfer across national boundaries. Union Carbide's technology of production moved from West to East with little hindrance and, in retrospect, with insufficient regard to conditions in Bhopal. By contrast, India's attempts to transfer legal accountability back to the exporting country proved essentially impossible, as American courts insisted that claims be resolved by Indian judges under Indian law.

FOR A BRIEF MOMENT in the late twentieth century, Bhopal, the sprawling, unremarkable capital of central India's province of Madhya Pradesh, became a staging ground for the ambiguous and contested emergence of global neoliberalism. The histories of states and markets, medicine and law, social activism and corporate power violently collided in that quiet provincial city. Though the loudest reverberations from that encounter have died down, the echoes will last as long as anyone is left alive to tell Bhopal's story. What happened there in the Orwellian year of 1984 says much about the human costs of globalization. It also illustrates the incapacity of law and science to restore order when radically different cultures of knowledge and justice come together in unplanned confrontation. Just such a clash of cultures occurred in Bhopal, and the results are important not only for postcolonial historians and students of legal history but also for historians and sociologists of scientific knowledge. For Bhopal's tragedy was as much about the capacity of powerful institutions selectively to highlight and screen out knowledge as it was about maimed lives and justice denied or delayed. The resulting double failure, of law and of science, is the subject of this reflection.

Minutes after midnight on 3 December 1984, the world's worst industrial accident shat-

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tered Bhopal.¹ A cloud of heavy, deadly methyl isocyanate (MIC) gas escaped from a Union Carbide pesticide plant and spread across some of the poorest sectors of the city. Especially hard hit was the colony of J. P. Nagar, located just across the street from the plant and inhabited mostly by Muslims and low-caste Hindus. Thousands of Bhopal's citizens died instantly or within days of the accident, blinded, choked, and suffocated by the acutely toxic fumes. Hundreds of thousands more were injured, many suffering intense physical and mental distress years, even decades, after the accident. One such delayed victim was Sunil Kumar Verma, a thirty-four-year-old activist who lost his father, mother, and five siblings in the disaster. As an adult, Verma ceaselessly campaigned for justice for the survivors until he hanged himself on 26 July 2006.² He had been under treatment for paranoid schizophrenia, but whether his condition was related to the gas exposure will never be known.

That is not the only unknown that lingers over Bhopal, long after a tragedy that took more lives than did the terrorist attacks of 11 September 2001 in the United States. What, for example, caused the disaster? We know that water introduced into a storage tank containing highly reactive liquid MIC unleashed an explosive reaction, but how the water got into the tank remains a mystery. On its Web site, Union Carbide Corporation (UCC), a wholly owned subsidiary of Dow Chemical since 2001, lists this entry for 1984: "In December, a gas leak at a plant in Bhopal, India, caused by an act of sabotage, results in tragic loss of life." A link leads to a consultant's report, prepared by the Arthur D. Little company in Cambridge, Massachusetts, that rules out accident and blames the Government of India for preventing an immediate, all-out investigation. Official Indian reports never accepted the sabotage theory, and Bhopal victims continue to hold Union Carbide responsible for the gross negligence and lack of maintenance that they say led to the tragedy. The unknowns include the number of deaths that occurred in the accident's immediate aftermath, the numbers and kinds of longer-term illnesses and injuries caused by exposure to MIC, the success or failure of rehabilitation efforts, the efficacy of funds disbursed for relief, and, most recently, the extent of damage to Bhopal's soil and water quality caused by the plant's pre-1984 activities.³

Why are the disaster's causes and consequences still shrouded in such uncertainty? The events of that December night did after all lead to protracted litigation, joining for a time the legal systems of India and the United States in what might have been a mutual project of discovery and restitution. The law, we know, can be a powerful engine for uncovering facts and spurring the production of new knowledge, and law in sometimes unexpected forms came to the victims' aid promptly enough. Immediately after the gas leak, a number of prominent U.S. tort lawyers descended on Bhopal in what the legal scholar Marc Galanter describes as "the great ambulance chase"⁴: the fabled dash by entrepreneurial lawyers

¹ For a dramatic, journalistic account of the events see Dominique Lapierre and Javier Moro, *Five Past Midnight: The Epic Story of the World's Deadliest Industrial Disaster* (New York: Warner, 2002).

² K. S. Shaini, "Bhopal Activist Dies with Broken Dreams," 17 Aug. 2006, http://news.bbc.co.uk/2/hi/south_asia/4795771.stm (accessed Sept. 2006).

³ Union Carbide Corporation, History, <http://www.unioncarbide.com/history/index.htm>; and Ashok Kalelkar, "Investigation of Large-Magnitude Incidents: Bhopal as a Case Study," Arthur D. Little, Inc., Cambridge, Mass., May 1988, <http://www.unioncarbide.com/history/index.htm>. For one set of estimates of deaths in the immediate aftermath of the accident see Roli Varma and Daya R. Varma, "The Bhopal Disaster of 1984," *Bulletin of Science, Technology, and Society*, 2005, 25(1):37–45.

⁴ Marc Galanter, "The Transnational Traffic in Legal Remedies," in *Learning from Disaster: Risk Management after Bhopal*, ed. Sheila Jasanoff (Philadelphia: Univ. Pennsylvania Press, 1994), pp. 133–157, on p. 147. On the law as a spur to knowledge production see Tal Golan, *Laws of Men and Laws of Nature: The History of*

to line up victims as clients—figuratively, on their way to the hospital—in the hope that the clients' misfortunes will not only be compensated but will line the pockets of those lucky enough to represent them. With the passage of the 1985 Bhopal Act, however, the Indian government short-circuited any such hope of private gain; the state itself took over the exclusive representation of all claims arising from the disaster, under the doctrine of *parens patriae* (father to the people).

This action by no means ended the entanglement of the American and Indian legal systems, with their inbuilt, culturally specific conceptions of truth and justice. In one of several tragicomic turns, India employed Galanter, an expert in American tort law, to make the argument that Indian courts were institutionally unqualified to deal with claims of this magnitude and diversity. Galanter surveyed a decade of Indian tort cases from 1975 to 1984 and concluded that delays of *Bleak House* proportions were routine, even for cases of no great complexity, and that (unlike in America) there had been no tie-in between industrial disasters and progressive developments in tort law.⁵ Galanter's was quite possibly the first systematic study of a developing nation's lack of legal instruments to deter the careless operation of extremely hazardous imported industries. India, in his uncompromising judgment, did not possess the homegrown legal competence to handle the disastrous consequences of an eminently non-homegrown technology.

Belying the apparent ease of transferring Carbide's technology of production from West to East, India's attempts to transfer the legal sanctions for failure back to the risk-exporting country proved much less easy. Globalization is anything but symmetrical in its flows and frictions. The government's class action on behalf of Bhopal's victims never went to trial. Instead, after much legal skirmishing over where the case should be adjudicated—a question resolved in Carbide's favor by federal district judge John F. Keenan, designating India as the proper venue—the Government of India accepted Carbide's settlement offer of \$470 million in May 1989.⁶ That action not only put an end to all outstanding claims against Carbide resulting from the gas leak but also ended official inquiry into the facts. Formally, the case was closed. For the survivors, though, it was merely the end of the beginning, in a saga that brought them neither cognitive closure nor a sense of justice achieved.

For Bhopal activists, the insufficiency of scientific knowledge is inseparable from the inadequacy of justice. Their sense of things left unresolved is consistent with much writing in science and technology studies demonstrating that scientific and technical controversies refuse to close unless associated normative disagreements are also addressed and resolved; scientific and social order, and disorder, are in this sense co-produced.⁷ In the survivors' accounts, both Carbide and the Indian state were implicated in equally reprehensible acts of denial—of knowledge as well as legal responsibility. UCC, for example, denied knowing both medical facts about the toxicity of MIC and management facts about what had been happening at the plant under the supervision of its partly owned subsidiary, Union

Scientific Expert Testimony in England and America (Cambridge, Mass.: Harvard Univ. Press, 2004); and Jasanoff, *Science at the Bar: Law, Science, and Technology in America* (Cambridge, Mass.: Harvard Univ. Press, 1995).

⁵ Galanter, "Transnational Traffic in Legal Remedies," pp. 145–146.

⁶ *In re: Union Carbide Corporation Gas Plant Disaster at Bhopal, India*, 634 F. Supp. 842 (SDNY 1986). Judge Keenan's denial of India's petition to move the Bhopal litigation to the United States, on the ground that India was after all a suitable forum for an action of this kind, represented a victory for Union Carbide, which wanted the case to remain in India.

⁷ For further elaboration of this point see Sheila Jasanoff, ed., *States of Knowledge: The Co-production of Science and Social Order* (London: Routledge, 2004).

Carbide India, Limited (UCIL). The first denial left victims without any known antidotes or treatment options in the wake of the accident. The second undercut their efforts to hold UCC, the parent company, responsible for UCIL's negligence.

Indian lawyers representing the victims argued that multinationals, by virtue of their global purpose, organization, and resources, should be treated as single, monolithic agents, rather than as a network of discrete, noninterdependent units. They used this reasoning to advance a novel theory of "multinational enterprise liability" whereby liability for a subsidiary's carelessness could be attributed to the parent company. But UCC's written rejoinder, filed in December 1986 in a Bhopal district court, rejected this logic as unfounded in existing law: "The defendant submits that there is no concept known to law as 'multinational corporation' or 'monolithic multinational.'" A 1990 compilation of documents in the case by the Indian Law Institute lampooned this "ontological negation" through which UCC denied its very existence as a corporate entity operating across national borders.⁸ More strikingly, the very company that had persuaded Judge Keenan that adequate legal remedies could be found in Indian courts rejected the doctrinal innovations that might have corrected for asymmetries of power and knowledge between producers and consumers of transnational risks. Relations of dependency were inscribed twice over. Not only had India needed to import Carbide's innovations in agrochemicals technology, but now Indian courts had to accept the conceptual structure of American corporate law as controlling.

For its part, the Indian state deployed its medical and scientific resources in ways that undercut the victims' claims of illness and, in one noteworthy instance, their experiences of healing. Relief workers who arrived on the scene soon after the disaster reported that only one treatment seemed to afford exposed persons any relief. This was the chemical sodium thiosulfate, an antidote to cyanide poisoning. Government doctors, however, denied that MIC exposure could cause cyanide-like symptoms and, in an action whose sheer arbitrariness victims' groups never forgave, forcibly put an end to any large-scale efforts to administer the antidote. The Indian Council of Medical Research, among the most trusted of the government's scientific units, inexplicably ended its follow-up studies of Bhopal victims in 1994, a mere ten years after the gas release, when many children of exposed persons had not yet been born and latent diseases like cancer likely had not fully manifested themselves.⁹ A state that had in 1985 declared itself the only qualified representative of the victims' legal claims evidently felt no equivalent custodial responsibility to validate or alleviate their ongoing medical complaints.

A full-blown history of Bhopal's legal ramifications would not stop with the settlement between UCC and the Government of India. Central as the compensation case was to the lives of disaster victims, some of the most far-reaching changes in the legal and scientific culture for managing hazardous chemicals occurred back in the producer countries. In 1986 the U.S. Congress enacted the Emergency Planning and Community Right-to-Know Act, which requires emitting facilities to report releases of chemicals outside the plant to a database, known as the Toxics Release Inventory (TRI), managed by the Environmental Protection Agency (EPA). In time, the data disclosed through that reporting system built pressure for companies to reduce their overall emissions, and the 1990 Pollution Prevention Act required companies to report additional information on their efforts to manage and

⁸ Upendra Baxi and Amita Dhanda, *Valiant Victims and Lethal Litigation: The Bhopal Case* (Delhi: Indian Law Institute, 1990), pp. 61 (OCC rejoinder), xiv ("ontological negation").

⁹ Charlene Crabb, "Revisiting the Bhopal Tragedy," *Science*, 2004, 306:1670–1671.

reduce wastes at the source. On its TRI Program Web page, the EPA at once recognizes and rewrites the genealogy of these laws. A text headed “What Is the Toxics Release Inventory (TRI) Program?” begins as follows:

In 1984 a deadly cloud of methyl isocyanate killed thousands of people in Bhopal, India. Shortly thereafter, there was a serious chemical release at a sister plant in West Virginia. These incidents underscored demands by industrial workers and communities in several states for information on hazardous materials. Public interest and environmental organizations around the country accelerated demands for information on toxic chemicals being released “beyond the fence line”—outside of the facility.¹⁰

EPA’s bureaucratic imagination here reduces to practically nothing the normative distance between a catastrophic industrial disaster in India and a routine chemical release in the United States. In EPA’s historiography, both “incidents” at “sister” plants equally spurred the demands for legislation and information provision—at home, in America.

Yet the knock-on effects of Bhopal in sites far removed from the initial tragedy only highlight what we know from comparative studies of law and science. Legal and scientific changes both play out against backdrops conditioned by human expectations about what constitutes adequate knowledge, what counts as justice, and how the two are linked. These expectations, moreover, are consolidated and continually reperformed by powerful institutions, creating the stable elements of political culture that I have elsewhere termed “civic epistemologies”: that is, shared understandings about what credible claims should look like and how they ought to be articulated, represented, and defended in public domains. If Bhopal gave rise to right-to-know laws in the United States, it was in part because technical information and “trust in numbers” occupy a different place in American than in Indian civic epistemology. EPA’s description of the TRI’s aims reaffirms the close connection between ideas of cognitive and normative sufficiency—indeed, their co-production—in U.S. political culture: “The goal of TRI is to empower citizens, through information, to hold companies and local governments accountable in terms of how toxic chemicals are managed.”¹¹

Much of this story will be available to the talented historian of the late twenty-first century who wishes to look back on Bhopal as a watershed in the long march of globalization; and minds trained by the dialogue between science studies and the history of science will be particularly attentive to the co-productionist aspects of these developments—that is, to the inseparable ties between social and scientific order. But are there pieces of the story that no archive can store and that we, as witnesses and narrators of our own present, have a special obligation to record? It was in search of answers to that question that I

¹⁰ U.S. Environmental Protection Agency, Toxics Release Inventory (TRI) Program, <http://www.epa.gov/tri/whatis.htm> (accessed Nov. 2006). On some European developments see Josee van Eindhoven, “Disaster Prevention in Europe,” in *Learning from Disaster*, ed. Jasanoff (cit. n. 4), pp. 113–132.

¹¹ Sheila Jasanoff, *Designs on Nature: Science and Democracy in Europe and the United States* (Princeton, N.J.: Princeton Univ. Press, 2005), pp. 247–271 (on “civic epistemology”); and EPA, TRI Program, <http://www.epa.gov/tri/whatis.htm>. I use the phrase “trust in numbers” to refer to American political culture’s particular devotion to the objectivity of numbers, as recounted in works like Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, N.J.: Princeton Univ. Press, 1995); and Jasanoff, *Risk Management and Political Culture* (New York: Sage, 1986). For an account that contrasts civic epistemology in America, Britain, and India see Jasanoff, “Restoring Reason: Causal Narratives and Political Culture,” in *Organizational Encounters with Risk*, ed. Bridget Hutter and Michael Power (Cambridge: Cambridge Univ. Press, 2005), pp. 209–232.

visited Bhopal with a friend in the summer of 2004, nearly twenty years after the disaster. I had written about the tragedy intermittently throughout that period and had interviewed or interacted with most of the leading figures involved in the early years of litigation, but I had never been to the city itself, and I wanted to hear from the Bhopal activists how they felt their cause had fared.¹²

Coincidentally, it was during our August visit that the Indian government paid out the final installment of the relief fund to the victims, and newspapers were full of accounts of money misspent on consumer goods, such as motorcycles. Leaders of two major survivor organizations, Abdul Jabbar of the Bhopal Gas-Affected Woman Workers' Organization and Satinath Sarangi of the Sambhavna Trust, told a different story.¹³ Hospitals had been built, they said, but were mismanaged and did not provide adequate care even for the gas victims, let alone for those afflicted by chronic pollution near the long-abandoned Carbide plant. Relief funds, amounting to no more than \$1,000 per person, fell hopelessly short of paying for the real costs of lifetimes of chronic illness. In a poisoned city, the chronicle of unredressed and unacknowledged medical cases had in any case swollen to include, by 2004, a generation of children born to gas-exposed parents.

Jabbar and Sarangi followed different paths in their efforts to secure the moral closure that legal negotiations between Carbide and the Indian state had denied to victims. Jabbar's family had lived two kilometers from the plant at the time of the accident, in the line of exposure. He coughed throughout our meeting and spoke English awkwardly as he told us stories of early deaths and enduring illness. His activism, too, stayed close to home. Jabbar's strategy is to empower local residents—not so much with knowledge as with other skills—while maintaining constant pressure on the Indian government in the hope that justice will someday prevail. His center offers women training in craft skills, such as sewing and embroidery, teaching them economic and social self-sufficiency. The women had come a long way, he told us, since the 1980s, when most still wore the traditional, all-concealing burka of Indian Muslims. They could stand up for themselves now and had learned to ask for reasons and identification if police or other officials came to question them. But Jabbar's most passionate wish seemed unlikely ever to be granted: he wanted to see Warren Anderson, former chairman of Union Carbide, jailed "for one day, but at least for one day." Anderson had visited India once, just after the accident, and was briefly detained but then let go. Subsequently, he was charged with culpable homicide in an Indian court and declared a fugitive from justice, but he never returned to India and the Indian government did not press for his extradition.

Sarangi's strategy looks outward, enlisting an international network of experts and activists and soliciting attention from the media to keep pressing on the world's forgetful conscience. Workers at his clinic have documented significant growth abnormalities among sons of gas-affected parents and have published their results in the *Journal of the American Medical Association*.¹⁴ In 2004, Sarangi was spearheading attempts to hold Dow Chemical legally responsible for environmental damage resulting from UCC's allegedly negligent operations at the plant before the gas release. Health claims resulting from that earlier

¹² For earlier treatment of the Bhopal tragedy see esp. Jasanoff, ed., *Learning from Disaster* (cit. n. 4).

¹³ I draw in the following paragraphs on personal interviews with Abdul Jabbar and Satinath Sarangi, Bhopal, 9–11 Aug. 2004.

¹⁴ Nishant Ranjan, Satinath Sarangi, Steve Holleran, Rajasekhar Ramakrishnan, and Daya R. Varma, "Methyl Isocyanate Exposure and Growth Patterns of Adolescents in Bhopal" [research letter], *Journal of the American Medical Association*, 2003, 290:422–423.

contamination, Sarangi and his supporters argued, could not have been extinguished by the 1989 settlement, which covered only the gas victims. But to pursue those collateral claims before a court-ordered time limit ran out, Bhopal activists had to persuade the Government of India to declare, quickly and publicly, that its *parens patriae* role, as articulated in the 1985 Bhopal Act, did not extend to injuries caused by environmental conditions in the city before the disaster.

Under severe time pressure, the activists could find no more effective instruments of persuasion than their own bodies. In Indian political space the language of suffering bodies still possesses an authenticity and power to convince that cannot be matched by any number of published scientific articles. In June 2004 Sarangi, accompanied by two of Bhopal's most famous women—Rashida Bee and Shahid Noor—and hundreds of volunteers, began a time-honored Indian ritual of protest. They fasted on the sidewalk outside the Jantar Mantar, Delhi's famous eighteenth-century outdoor observatory. But for these bodies to speak truth to power they had to be seen to be wasting, and time was in very short supply. The Bhopalis decided on a waterless fast, so that the effects would be more speedily visible; but their goal was to move the state, not to engage in a pointless heroics of self-sacrifice. Their attending physicians saw to it that they did not risk kidney failure from rapid dehydration in Delhi's punishing summer heat. A well-coordinated campaign by phone, fax, and email kept up the pressure on government officials, who bowed to the fasters' demands within a week.

It cost the state little—other than some temporary embarrassment—to give in to the protesters this time; all the government did was clear a legal hurdle to letting the collateral action against Dow go forward. For the Bhopalis, the state's move was more consequential because it opened a new legal front, along with the chance to generate yet further scientific representations of hurt and injury that might circulate in worlds outside the axis of Bhopal and New Delhi. It is worth stressing that science, for Bhopal activists, is not an “immutable mobile” that wholly captures or translates the reality of their suffering to distant venues.¹⁵ Science is one speaking voice among many, a tool that some have used with indifferent success for talking across institutional boundaries and enhancing credibility. But what mode of representation could possibly express the activists' unending quest for proper compensation? In what discourse of persuasion could a settlement be forged, or even imagined, between radically incompatible ideas of accountability? American public reason, formally articulated through law, science, or economics? Or Indian public morality, with its symbolic demands for social justice and the assumption of responsibility by the state for a grievously harmed community?

On the third and last night of our stay in Bhopal, we were invited to join a candlelight vigil organized by the Sambhavna Trust. Together with about fifty marchers, including survivors and their grown children, we quietly circled a block in the center of the city, candles in our hands, and stood for pictures for a few minutes before dispersing into the night. The ritual seemed familiar to the other participants, though the particular focus evidently changed from one time to the next. That night, the banners held by members of our group proclaimed solidarity with the Vietnamese victims of Agent Orange, one of Dow's most notorious chemical products. At the end of the evening, our candles, now massed on the ground, outlined in flickering light the trust's logo: two figures embracing.

¹⁵ For the use of the term “immutable mobile” to describe scientific representations see Bruno Latour, “Drawing Things Together,” in *Representation in Scientific Practice*, ed. Michael Lynch and Steve Woolgar (Cambridge, Mass.: MIT Press, 1990), pp. 19–68.