



COMMENTARY

Further Thoughts on Chernobyl¹

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In the March 1992 issue of *The PSR Quarterly*, Andrew M. Davis reviewed the data now available on the "health consequences" of Chernobyl. Estimates of the death toll to date range from the official Soviet count of 31, which no one seems to take very seriously, to several hundred or even several thousand, although decades will pass before we know the fate of the "tens if not hundreds of thousands" of others exposed to potentially lethal amounts of radiation.

It seems clear, even in the absence of any real data on the subject, that a lingering dread continues to be one of the most serious health consequences of the accident. Radiation elicits an uncanny fear in most people under any circumstances, as the world is beginning to learn, but the level of anxiety may well be formidable here in this region, where the threat of cancer will hang over people for a lifetime. Or longer. If the sources Dr. Davis cites are correct, some 100,000 wanted pregnancies were aborted across Europe in the wake of the accident, presumably in fear of birth defects. One may want to pause for a moment at the term "wanted" in trying to make sense of that figure, but, even so, its remarkable size

can only be read as a stunning index to the level of dread that radiation is able to evoke.

The Chernobyl accident is clearly one of the worst of what I have elsewhere called "a new species of trouble"—meaning events in which radiation (or some other toxic substance) escapes into the environment and finds its way, at least potentially, into human tissue. I have written about the subject on other occasions, but the editors of *The PSR Quarterly* thought it may be useful for me to repeat some of those observations in this context. The levels and kinds of fear that obtain within the population threatened by Chernobyl have to be learned from direct inquiry, and the time has certainly come to begin that project. It is possible, however, to draw on observations from other experiences that might prove instructive in giving us some idea of what to expect in this context.

The first thing to be said about this new species of trouble is that it involves a danger wholly unique to human experience. Radiation and other forms of toxicity contaminate rather than merely damage; they pollute, befoul, and taint, rather than just creating wreckage; they penetrate human tissue indirectly rather than wounding the surfaces by assaults of a more straightforward kind. And the evidence is growing that they scare human beings in new and special ways. The evidence is of three kinds.

To begin with, one of the surest findings to emerge from the new field of risk assessment is that people in general find radiation and other toxins a good

0051-2438/1992/0202-0098\$03.00/0

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¹ An argument similar to the one below is found in "Toxic Reckoning," *Harvard Business Review* 1990;90:118-126; "Radiation's Lingering Dread," *Bulletin of the Atomic Scientists* 1991;47(2):34-39; and "A New Species of 'Trouble'" in Stephen Robert Couch and J. Stephen Kroll-Smith, editors, *Communities at Risk* (New York: Peter Lang Publishers, Inc., 1991)

deal more threatening than natural or technological hazards of virtually any other kind [1,2] Moreover, a number of local and national surveys conducted in Long Island in connection with the Shoreham Nuclear Power Station [3] and in Nevada in connection with the government's proposal to build a high-level nuclear waste repository at Yucca Mountain [4] only confirm what other readings of the human mood have already shown—that people have an uncommon fear of things nuclear.

And, finally, that conclusion is clearly borne out by the few experiences we have to draw on in recent history. In Goiânia, Brazil, where a small release of cesium-137 killed four persons and contaminated hundreds, officials were concerned to learn that apprehensions seemed to grow rather than decline over time among large segments of the affected population. At Three Mile Island, where there is still no evidence of lasting physical damage, levels of anxiety among some remain a good deal higher than the experience of natural disasters would give us any reason to suppose [5]. And the same can be said of a number of other sites in which toxic substances were released into the environment and threatened local populations. Some of those places, such as Love Canal, are by now well known; others—Centralia, Times Beach, Legler, Woburn—are less so [6–10]. We may soon have to add names such as Fernald, Rocky Flats, and Hanford to the list, because we are just now learning that radiation has been leaking for years from nuclear weapons plants located there. We know very little about Chernobyl, of course, but fear of radiation seems to have been strong enough there for Soviet authorities to speak rather scornfully of “radiophobia,” and one of them, as Davis reports, was quoted as saying that “the only special medical treatment the population here is in need of is psychotherapy.” Davis continues:

Some Soviet commentators noted “high tension, enhanced excitement, stress and radiophobia” in exposed populations and suggested that these conditions may be more dangerous than the radiation itself [11].

These sets of evidence, added together, are still far from decisive. Risk assessment studies remain few and scattered; surveys like the ones conducted in Long Island and Nevada are both infrequent and inconclusive, and the world can count itself fortunate that accidental laboratories of the kind found in Goiânia, Bhopal, and Chernobyl are as rare as

they have been. In that sense, the information available to us has to be seen as a few brief glances into the heart of things. They are not *findings*, then, in the sense scientists generally use the term, but hints, intimations, auguries—and ones that bear watching closely.

II

Many technical experts assume that increased experience and familiarity will act to reduce that dread and sense of mystery over time. It seems quite illogical, after all. Fifty thousand persons are killed every year in traffic accidents without provoking any deep aversion to automobiles; why should we be so afraid of nuclear power plants and toxic waste dumps, which, on the face of it, do much less damage? This thought encourages a hope on the part of some experts that people will one day become as resigned and philosophical about radiological accidents as they are now about hurricanes or earthquakes.

Perhaps. Time alone can tell. But in the meantime, as we wait for the passing of years to deliver that remote verdict, we have many reasons to suppose that toxic emergencies simply nourish dread, that they are, in their very nature, a thing of darkness and foreboding. We will dismiss this fear as irrational if, like most experts, we assess the danger by calculating the odds of an accident and then estimating the number of casualties likely to result from it. But there are other reckonings at work out there in the world. Maybe radioactivity and other forms of toxicity can be understood as naturally loathsome, inherently insidious—a horror, like poison gas, that draws on something deeper in the human mind. That may seem like odd conceptual terrain for a sociologist to be wandering around in, since social scientists have no warrant to speak of “primal fears” or “the wisdom of the body,” as psychiatrists like Robert J. Lifton are invited by the logic of their discipline to do. So let me just offer the proposition that toxic emergencies really *are* different, that their capacity to induce a lasting sense of dread is one of their unique properties.

Why should that be so?

For one thing, toxic emergencies are not bounded; they have no frame. We generally use the word “disaster” in everyday conversation to refer to a distinct event that interrupts the accustomed flow of everyday life. “Disasters” seem to adhere to Ar-

istotle's rules of drama. They have a "beginning and a middle and end." They "do not begin and end at random." They have "a certain magnitude" and yet are "easily taken in by the eye." They have *plot*, in short, which is "the first principle and as it were the soul of tragedy" [12].

An alarm sounds the beginning. It is a signal to retreat, to take to storm cellars, to move to higher ground, to crouch in the shelter of whatever cover presents itself. A period of destruction then follows that may take no more than a brief, shattering moment or may last many days. Sooner or later, though, the disaster comes to an exhausted close. The floodwaters recede, the smoke clears, the winds abate, the bombers leave, and an "all clear" is sounded either literally or figuratively. An announcement is then heard that the emergency is over and that the time is now at hand for cleaning up and restoration. The pain may last, of course; the dreams may continue to haunt and the wounds prove difficult to heal. But the event itself is over, and what follows will be described as "aftermath." "In the wake of the flood," we will say.

Toxic disasters, however, violate all the rules of plot. Some of them have clearly defined beginnings, such as the explosion that signalled the emergency at Chernobyl or the sudden moment of realization that opened the drama of Bhopal; others begin long years before anyone senses that something is wrong, as was the case at Love Canal. But they never end. Invisible contaminants remain a part of the surroundings—absorbed into the grain of the landscape, the tissues of the body, and, worst of all, the genetic material of the survivors. An "all clear" is never sounded. The book of accounts is never closed.

The uncertainty can continue for months, years, even generations. Others may look in on the scene from a safe remove in time or place and find it easy to think of the emergency as over. But the ones who were there calculate the situation differently. The two speakers below are from Three Mile Island (unpublished interview), but we may assume that many people in the vicinity of Chernobyl know these feelings all too well:

What damage would it have on me or my unborn child? What damage was done to the ground, the surrounding areas? What damage was done to the people who lived around the area at that time and still live there? . . . What reaction did it have on my

daughters, my sons? What took place over there that we are not aware of?

I had felt sure at that time that we had gotten quite a bit of radiation, and at that point you don't know if you're going to die next week . . . but because of this, was our life going to be cut short? Just exactly what was going to happen? We still don't know. Are the kids going to get it? Is my husband going to get it? It's nothing to dwell on, I can tell you, because if you dwelled on it every day you'd be crazy

Moreover, radiation and most other toxic substances are without body. One cannot taste them, touch them, smell them, see them, or apprehend them by the use of any of the unaided senses, and for that reason they seem especially ghostlike and terrifying. And they invert the process by which disasters normally do harm. They do not charge in from outside and batter like a gust of wind or a wall of water. They slink in without warning, do no immediate damage so far as one can tell, and then begin their deadly work from within—the very embodiment, it would seem, of stealth and treachery.

The widely observed prohibition against chemical warfare has relevance here. Chemical weapons, clearly, have a special place on the human list of horrors, but it is not at all obvious on the face of it why that should be so. In World War I, for example, shrapnel proved a good deal more lethal than gas, but it earned a much higher public approval rating, presumably because it does such a straightforward job of ripping through flesh and tearing bodies apart. So the moral case must lie in the way the two work rather than in the amount of damage they do. "Gas is a perfidious, impalpable, and cruel abomination," said an Allied report shortly after the war (that "hellish poison," Winston Churchill called it), and that puts the case plainly enough. It is furtive, invisible, and unnatural. In most of its forms it moves for the interior, turning the process of assault inside out and, in that way, seeming to violate the integrity of the body. A sociologist, again, may have no warrant to suggest that this aversion stems from something elemental in the human spirit, but in this instance, at least, we have historical records to draw on, for poison has always represented the epitome of evil and treachery in the way we tell the story of our past.

Toxic poisons provoke a special dread because they contaminate, because they are stealthy and deceive the body's alarm systems, and because they

can become absorbed into the very tissues of the body and crouch there for years, even generations, before doing their deadly work.

III

The second thing to be said about this new species of trouble is that it is a product of human hands. That fact may not at first glance seem all that important, but what evidence we have suggests that it looms significantly in the way people draw their accounts of the disasters that befall them. Information from Chernobyl is again scarce on this topic, but the hints are strong and consistent.

The ancients feared pestilence, drought, famine, plague, and all the other scourges that darken the pages of Revelations. These miseries trouble us yet, to be sure, but it is fair to say that we have learned ways to defend ourselves against many of the worst of them. Some (certain epidemics, for example) can now be arrested or even prevented altogether. Others (hurricanes, tidal waves) can be seen far enough in advance for people to move out of their path, thus neutralizing a good part of their lethal force.

The irony, though, is that the technological advances that have afforded us this degree of protection from *natural* disasters have created a whole new category of what specialists have come to call *technological* disasters—meaning everything that can go wrong when systems fail, humans err, designs prove faulty, engines misfire, and so on. Earthquakes, floods, hurricanes, and volcanic eruptions would be classified as “natural”; collisions, explosions, breakdowns, collapses, and, of course, crises like the one at Chernobyl belong on the roster of the “technological.”

Now technological disasters have clearly grown in number as human beings press the outer limits of their competence. We are encouraged to think that we can control both the best in nature and the worst in ourselves, and we continue to think so until the momentum of some adventure carries us beyond the edge of our own intelligence. But, more to the point, they have also grown in size. This is true in the sense that events of local origins can have consequences that reach across huge distances—as was clearly the case at Chernobyl. And it is also true in the sense that news of it is broadcast so quickly and so widely that it becomes a moment in everyone’s history, a datum in everyone’s store of knowledge—as was the case at Three Mile Island.

The distinction between natural and technological disasters is sometimes hard to draw exactly. When a mine shaft collapses in Appalachia, it is often a collaboration of a restless mountain and careless people; when an epidemic spreads across Central Africa, it owes its virulence both to tough new strains of bacillus and to stubborn old human habits.

However hard it may be to draw in actuality, though, that line usually seems distinct enough to victims. Natural disasters are almost always experienced as acts of God or caprices of nature. They happen *to* us. They *visit* us, as if from afar. Technological disasters, however, being of human manufacture, are at least in principle preventable, so there is always a story to be told about them, always a moral to be drawn from them, always a share of blame to be assigned in respect to them.

Technological accidents are almost never understood by those who suffer from them as the way the world of chance sorts itself out. They provoke outrage rather than acceptance or resignation. They generate a feeling that the thing ought not have happened, that someone is at fault, that victims deserve not only compassion and compensation but something similar to what lawyers call punitive damages. Most significant, they bring in their wake feelings of injury and of vulnerability from which it is difficult to recover easily.

The scene has become an ever more frequent one in our times. A scattering of people, unaware for the most part of the risks they were running, are damaged by the activities of some kind of corporate group—a government agency, as at Chernobyl; a private company, as at Love Canal; or a combination of the two, as at Three Mile Island. Most of the time—so often, in fact, that we can almost think of it as a natural reflex—the corporation draws into its own interior spaces and posts officials around its borders like a ring of pickets. Nothing unexpected in that surely. Anyone who reads newspapers knows how that reflex works.

Yet it always seems to come as a surprise. Those who manage corporations (or more to the point, perhaps, those who are hired to defend them) generally speak of them as if they were *things*, bloodless and inorganic. But victims of accidents rarely forget, even when responsible officials manage to, that corporate decisions are made by human beings and that corporate policies reflect the views of human beings. And it can be profoundly painful when the

people in charge at the time of a severe mishap deny responsibility, downplay the damage, offer no apology, express no regrets, and crouch out of sight behind that wall of officials.

This is not the way of neighbors, of fellow townspeople, of compatriots. It is the way of hostile strangers who treat one as if one belongs to a different order of humanity—even a different species—and it leaves people feeling demeaned, diminished, and devalued. It is hard for people to resist the sense of worthlessness that often accompanies the trauma of a disaster when other human beings whose power they once respected and whose good will they once counted on treat them with what seems like icy contempt. Radiophobia indeed! But the real problem in the long run is that the inhumanity people experience comes to be seen by them as a natural feature of human life rather than as the protective reflex of a particular agency or corporation. They think their eyes are being opened to a larger and profoundly unsettling truth.

People exposed to disasters are very apt to develop a sense of being out of control, of being caught up in forces that capture them and take them over. These general feelings of helplessness and vulnerability are so common in moments of crisis that they are recognized as one of the identifying psychological symptoms of "trauma" and a prominent feature of what is widely called "the disaster syndrome."

Those insecurities, however, can broaden into something a good deal more ominous, for survivors of severe disasters can experience not just a sense of vulnerability but a feeling of having lost a certain immunity to misfortune, a feeling, even, that something terrible is almost *bound* to happen. One of the crucial jobs of culture, let's say, is to help people camouflage the actual risks of the world around them—to edit reality in such a way that it seems manageable, to edit it in such a way that the perils pressing in on all sides are screened out of one's line of vision as one pursues one's everyday rounds. Daniel Defoe has Robinson Crusoe muse:

This furnish'd my thoughts with many very profitable reflections, and particularly this one, how infinitely good that providence is, which has provided in its government of mankind such narrow bounds to his sight and knowledge of things; and though he walks in the midst of so many thousand dangers, the sight of which, if discovered to him, would distract his mind and sink his spirits, he is kept serene and calm,

by having the events of things hid from his eyes, and knowing nothing of the dangers which surround him [13].

This kind of emotional insulation is stripped away, at least for the moment, in most severe disasters, but with a special sharpness in events like the ones we have been considering here exactly because one can never assume that they are over. And once victims reach that level of awareness, evidence that the world is a place of constant peril appears everywhere. It is a rare morning paper or evening broadcast that does not headline news of acid rain, polluted beaches, tank car derailments, newly discovered toxic waste dumps, or malfunctions at nuclear power plants, all of them items to alarm the wary. And if this is the kind of data your mind is sensitive to—the kind of data your eye, made sharp and canny by events of the recent past, is good at taking in—the gloomiest of forecasts can seem amply supported.

It will come as no surprise, surely, that people who share such an outlook can easily lose confidence in officialdom, not only in designated spokespersons but in certified experts as well. Bruce Dohrenwend, who headed the Task Force on Behavioral and Mental Health Effects of the President's Commission on the Accident at Three Mile Island, thought that the sharp decline in respect for and trust of public officials was "one of the major findings, perhaps *the major finding*" of his various inquiries, and that conclusion is certainly supported by other research [14].

People whose outlooks have been sensitized by exposure to a toxic emergency can lose faith not only in the good *will*—that's common enough—but in the good *sense* of those in charge of a dangerous universe. Nor is that feeling confined to the immediate neighborhood. *The New Yorker*, reporting 10 weeks after the catastrophe at Bhopal, when the casualty estimates had reached 2,000 dead and 200,000 injured, put it well:

What truly grips us in these accounts is not so much the numbers as the spectacle of suddenly vanished competence, of men utterly routed by technology, of fail-safe systems failing with a logic as inexorable as it was once—indeed, right up until that very moment—unforeseeable. And the spectacle haunts us because it seems to carry allegorical import like the whispery omen of a hovering future [15].

IV

The most important point to be made here, however, is that when the dread is lasting and pronounced, the spectacle of a failed technology can become the spectacle of a failed environment as well. This is an outlook born of the sense that poisons are now lodged in the tissues of the body, that the surrounding countryside is contaminated as well, that the whole natural envelope in which people live out their lives has become defiled and unreliable. "Dead ground," said one person from Three Mile Island, speaking of the land he was standing on. But he did not mean that it was inert and lifeless like a moonscape. It was, for him, alive with dangers, a terrain in which fresh air and sunshine and all the other benevolences of creation are to be feared as sources of toxic infection. He and many like him feel that something noxious is closing in on them --drifting down from above, creeping up from underneath, edging in sideways, fouling the very air and insinuating itself in all the objects and spaces that make up their surroundings.

The experience of any disaster--but most particularly a radiological one--can mean not only a loss of confidence in the self, but a loss of confidence in the surrounding community, in the structures of

government, in the larger logics by which humankind lives, and even in the ways of nature itself. ■

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