

**American Nuclear Discourse:
Narratives and Counter-Narratives**

Robert A. Jacobs

With a Book Review of R. A. Jacobs' *The Dragon's Tail*
by Dennis Riches

Introduction

On June 29, 2013, Seijo University's Center for Glocal Studies hosted a guest lecture by Professor Robert Jacobs of The Hiroshima Peace Institute (Hiroshima City University). This paper is a two-part report on the topics covered in Professor Jacobs' lecture *American Nuclear Discourse: Narratives and Counter-Narratives*.

Robert Jacobs describes himself as a "historian of social and cultural aspects of nuclear technology." In the lecture he spoke about two topics. One was his early work concerned with American nuclear narratives, which he defined as "how Americans learn to think about nuclear things" – their perceptions of nuclear weapons, explosions and energy, and of what nuclear war and survival in a nuclear war would be like. Professor Jacobs introduced his lecture by saying, "I'm not interested in what these things really are but in how people learn to think about them and talk about them, and how these ideas get changed in culture."

The other topic of the lecture was Professor Jacobs' more recent work in The Global Hibakusha Project. This project is concerned with documenting the experiences of people and communities throughout the world that have been affected by nuclear weapons tests, nuclear accidents, and the routine operations of the military and civilian nuclear industry.

The two-part report found here covers these two topics. Part 1 is Dennis Riches' review of Professor Jacobs' book *The Dragon's Tail* about American nuclear discourse. Part 2 is a recent article by Professor Jacobs on his work with The Global Hibakusha Project undertaken with Professor Mick Broderick of Murdoch University in Australia.

Readers who wish to follow up on these articles can find the video of the lecture by searching on Youtube for "*American Nuclear Discourse: Narratives and Counter-Narratives*" or by going directly to this URL: <http://www.youtube.com/watch?v=JgQ9zarIhe0>.

Part 1

Book Review: *The Dragon's Tail: Americans Face the Atomic Age*, by Robert A. Jacobs, University of Massachusetts Press, 2010, 176 pages
Dennis Riches

“There’s nothing new or original left to be said about nuclear weapons... [but] I am prepared to grovel, to humiliate myself abjectly, because, in the circumstances, silence would be indefensible. So those of you who are willing: let’s pick our parts, put on these discarded costumes and speak our second-hand lines in this sad second-hand play.” (Arundhati Roy, 1998)

In 1998, the year Pakistan tested its first nuclear weapon, and a quarter century after India’s first nuclear test, the novelist Arundhati Roy wrote the passage above in her essay *Pokharan: The End of Imagination* ⁽¹⁾. After this humble introduction, she proceeded to write something highly original - an additional 5,000 words that must be one of the most articulate and moving essays ever written against the possession of nuclear weapons. She demonstrated that while the message may be old, there are always new ways to express it and a new generation that has to learn what their elders may feel has become too tiresome to revisit.

These thoughts about Roy’s essay came to mind as I read *The Dragon’s Tail: Americans Face the Atomic Age* ⁽²⁾, by American historian Robert Jacobs. Nuclear threats are arguably as dangerous now as they were at any time in the past, so silence is still indefensible, and Jacobs too has found a way to make a fresh contribution to the history of the atomic age for a new generation.

Older people who remember the early Cold War may find this book covers familiar ground, but they must know that this book is not written for them. Knowledge of this era will die on the shelves if it is not kept alive in the minds of successive contemporary scholars and reinterpreted for each new generation. It is easy to forget that freshman university students in 2013 were born in 1995. They have no living memory of the first Gulf War, Apartheid, the collapse of the Soviet Union, and the Vietnam War. They were just starting to learn how to read when airliners crashed into the World Trade Center. People over the age of forty tend to assume these events are common knowledge, and they don’t realize how difficult it is for young people to grasp how there could have been such deep animosities across ideological lines during the Cold War.



Fig.1 *The Dragon's Tail*



Fig.2 Japanese Translation

Jacobs limits his coverage to the time between Hiroshima and the end of atmospheric weapons testing in the 1960s. The analysis of the historical events and their impact on culture is so good that readers will be left hoping for one or two sequels about the late Cold War period of the 70s and 80s, and the contemporary age consisting of threats by loose nukes, non-state entities building a bomb, aspiring nuclear states, Fukushima, and cell phones with built-in Geiger counters crowd-sourcing fallout data.

People coming of age in the 21st century are not likely to have much awareness of nuclear history because they have no link to a pre-nuclear world. They didn't live through a time when everyone was talking about this new frontier in the history of humanity, about this new danger that could destroy civilization, and much of the ecosystem, in the span of a few hours.

Nowadays, the person on the street is unlikely to know how many nuclear weapons there are in the world and who owns them. From now on, all generations will have to be consciously taught nuclear history if they are to understand the implications of the weapons (functional or not) and the waste we are leaving behind for them. 50,000 years from now, when the future inhabitants of the earth are trying to understand the

implications of their local nuclear waste dump, no one will be speaking 21st century English, or any other language now spoken. *The Dragon's Tail* and other such chronicles of these times will have to be passed down like Greek myths, translated by successive generations of scholars.

The Dragon's Tail begins with an explanation of how the atomic bomb was understood as a profound break with the past. Whereas we used to be in the hands of God, or a fate beyond our control, we now had the power to decide if Armageddon would occur today. In the social sciences, the first reaction to this problem was to dwell on the sorry, violent nature of man rather than to build the political structures that might constrain it.

From these early conceptions, the bomb soon took on mythical and magical properties. Because radiation was intangible yet so destructive, it took a role in popular culture whenever there was a need to display something transformative, awesome and powerful. The Nevada desert, home of weapons testing, came to represent the magical, other-worldliness of everything connected to the new technology (think of alien landings mythology associated with Area 51⁽³⁾, *The X-Files*⁽⁴⁾, and the two places where the Freudian id was given free reign – Las Vegas and the Nevada Test Site).

Films, comic books, novels and consumer goods all picked up the atomic motif (the 1982 documentary *Atomic Café*⁽⁵⁾ was a chronicle of this era for the previous generation). Godzilla and Spiderman are two of the familiar fictional supernatural beings created by radiation, but Jacobs describes many more examples – some well-known, others obscure and forgotten. Some are fantasies that portray radiation as having transformative powers unrelated to its real effects, while others are grounded in accurate representations of the effects of radioactivity and the implications of nuclear warfare. There are so many examples described in *The Dragon's Tail* that readers come to see the essential role that nuclear physics played in modern realistic and fantasy science fiction. These genres wouldn't exist without it, and they pushed aside traditional fantasy genres because, when writers had radiation to work with, they didn't need wizards and magic spells. The arrival of Harry Potter in 1997 might be taken as a sign that the novelty of radiation had run its course in the public imagination.

The trivia about atomic monsters is interesting enough, but this book excels in its analysis of the role that fiction came to play in real-world conceptions and understandings of the atomic era. There were official attempts to get the public to take up roles as citizen-soldiers who could survive a nuclear attack, and the public was initially receptive. For a while, a Los Angeles television station actually live-broadcasted nuclear tests in Nevada. But eventually the absurdity of public information programs became apparent, and the official appeals were weakened by their own contradictions. The hydrogen bomb tests that began in 1954 made it ridiculous to suggest that there would be anything worth living for

after a U.S.-Soviet nuclear exchange. Children wouldn't be able to just duck and cover then get back outdoors to "clean this place up" (as one famous government film reel declared). Jacobs makes it clear that it was popular culture that helped the public process their fears and honestly confront reality. Fiction gave more honest and informative depictions of the nuclear dilemma than non-fiction reporting.

Stanley Kubrick's *Dr. Strangelove* (1964)⁽⁶⁾ is a well-known example of such fiction, but Jacobs wisely steers clear of it and digs up the more obscure, and arguably more important, creations that came before it. Others have written about *Dr. Strangelove*, but who remembers a 1954 episode of the television series *Medic*⁽⁷⁾? We can thank Jacobs for reminding us that the information available wasn't all just ridiculous Department of Energy newsreels deceiving a gullible population. In this era, the American public was exposed to a diverse range of information which might compare favorably with the quality of what we presently get from twenty-four-hour cable television news.

In the episode of *Medic* (recently issued on DVD), the prime time audience was shown the suburban aftermath of a nuclear attack on a large city some distance away. Nothing in the story is sugarcoated like the information in government leaflets. The hospital is visited by irradiated, blinded children, and other children who need to be told that mommy is "still in the city." Morphine has to be denied to people with grotesque injuries so that there will be some for those patients who still have a chance of being alive in a few days.

In an episode of another television series, Rod Serling's *Twilight Zone*⁽⁸⁾, a group of superficially friendly neighbors are confronted with the news that nuclear war has started. As they fight over scarce resources and a place to shelter, bitter resentments emerge, and by the time the false alarm has been confirmed, their once-peaceful relations have been destroyed. Rod Serling appears at the end to remind the audience, "For civilization to survive, civilization has to remain civilized."

Such simple truths were nowhere to be found in the official line about nuclear weapons, which focused instead on concerns such as how to defend one's fallout shelter from the unprepared victims who might want to fight their way in. Jacobs comes to the strongest point of his thesis when he identifies the origins of the counter-culture movement in the way children of the fifties noticed the gap between propaganda and reality. Fiction shed light on a truth that the government and the older generation wanted to look away from, and this was the origin of the baby boomers' rejection of their parents' values. The counter-culture movement might seem to have stemmed from the civil rights movement and the Vietnam War, but it was the "duck and cover" safety drills of the 1950s that made the post-war generation doubt that adults could be trusted. The official pamphlets and newsreels had the opposite effect of making children feel safe. The

hypocrisies and contradictions of nuclear defense drills planted the seed of the rebellion that would come in the sixties.

Jacobs illustrates this point effectively with an analysis of a piece of sci-fi schlock that less astute observers would dismiss as an unimportant B-grade movie. Who would have thought that *The Blob* (1958)⁽⁹⁾ could really be about so much more than a small town terrified by an expanding mass of jelly? The film revealed the emerging cultural shift triggered by a totally new kind of existential threat, and the adults who were incapable of recognizing it. While the fifties are famous for television shows like *Father Knows Best* (1954-60)⁽¹⁰⁾, it was also the era of James Dean and the Beat Generation, precursors of the sixties counter-culture. Millions of people were tuning out of the square society being handed to them. In *The Blob*, a new genre emerges – that of the youth who must save themselves and the world while authority figures snooze and fumble in the face of a new threat they can't even recognize.

Jacobs' coverage is limited in this short book to the first two phases of the Cold War – the period of testing fission bombs, and the next period of testing massive hydrogen bombs. The analysis stops at the time when atmospheric testing ended, almost entirely, in 1963. Of course, the Cold War didn't end then. Weapons testing moved underground, both literally and figuratively in the collective subconscious. It was out of sight and out of mind, but the existential threat never went away. There would be a shortcoming in Jacobs' book only if it left some readers with the impression that the story was over when the baby boomers grew up and the Cold War came to its conclusion in 1991. In future studies, we can hope that Jacobs will apply his talents to a book about the culture of more recent nuclear history.

In the present age we are preoccupied with the ecological crisis, and we've grown complacent about the threat of nuclear war. It didn't happen during the worst crisis in 1962, so we have mistakenly assumed that we've figured out a way to avoid the worst in every scenario that might arise. As the Cold War heated up in the 1980s, there were new films about nuclear threats such as *War Games* (1983)⁽¹¹⁾, *The Day After* (1983)⁽¹²⁾, which is credited with changing President Reagan's thinking about nuclear deterrence, which led to drastic reductions in Soviet and American stockpiles⁽¹³⁾, *Special Bulletin* (1983)⁽¹⁴⁾, and *Threads* (1984)⁽¹⁵⁾. These confronted mass audiences (after a two-decade lull) again with serious messages about the futility of possessing nuclear weapons. Since then the message seems to have stalled. Nuclear weapons in subsequent films showed the planet-saving meteor-buster of *Armageddon* (1998)⁽¹⁶⁾, or the terrorist's ticking time bomb defused by agent Jack Bauer in *24* (2001-2010)⁽¹⁷⁾. This is the most that popular culture can come up with while we live with the aftermath of Chernobyl and Fukushima, nuclear waste that has nowhere to go, and proliferation risks that are inextricably linked to

an energy industry believed by some to be the solution to global warming.

Another false impression that readers might get from *The Dragon's Tail* is an understanding that nuclear catastrophe was avoided only because of bottom-up resistance that drew its inspiration from popular culture. Jacobs cannot be blamed for choosing this focus for his book, but there are questions to be asked about how much it was bottom-up pressures that prevented worse outcomes. What influenced Soviet and American leaders to make them realize they had to step back from the brink? When they managed to agree on a moratorium on testing from 1959-60, then on the end of atmospheric testing three years later, they might have been influenced by films like *The Blob* and *The Day the Earth Stood Still* (1951)⁽¹⁸⁾, or by citizens who had been moved to action by such stories. Another possibility is that it was initiatives by elite intellectuals that opened up East-West dialog and changed thinking in both Washington and Moscow. The Russell-Einstein manifesto of 1955⁽¹⁹⁾ led to the Pugwash Conferences (in Pugwash, Nova Scotia, Canada) where top Western and Soviet scientists met for the first time. It's also possible that the enormous expense and danger of the nuclear buildup was so obvious that Khrushchev and Kennedy didn't need rocket scientists or science fiction writers to tell them it couldn't go on. Then again, it's just as likely that the worst was averted only because of luck and chance decisions like the one made by the captain of a Soviet submarine who decided in the midst of the Cuban Missile Crisis that, despite the pressure on him to press the button, he didn't want to start World War III⁽²⁰⁾.

None of this quibbling is to take away from what Robert Jacobs has achieved with his study of the culture of the early Cold War era. *The Dragon's Tail* serves as an excellent point of entry for anyone who wants to learn about this field and related aspects of the nuclear age.

Notes

- (1) Arundhati Roy, *Pokharan: The End of Imagination*, Dianuke.org, May 2013. Originally published elsewhere in 1998. <http://www.dianuke.org/pokharan-the-end-of-imagination-arundhati-roy/>.
- (2) Robert A. Jacobs, *The Dragon's Tail: Americans Face the Atomic Age* (University of Massachusetts Press, 2010). Japanese publication: Robert Jacobs (author), Takahashi, Hiroko (editor), Nitta, Jun (translator), *kaku no anzen shinwa to amerika no taishu bunka* (Gaifusha, 2013). ロバート・A・ジェイコブズ(著), 高橋 博子(監修), 新田準(翻訳)『ドラゴン・テール—核の安全神話とアメリカの大衆文化』, 凱風社(2013刊).
- (3) Annie Jacobsen, *Area 51: An Uncensored History of America's Top Secret Military Base* (Back Bay Books, 2012).

- (4) Chris Carter, *The X-Files*, produced by Chris Carter (1993-2002; 20th Century Fox Television, 2013), DVD.
- (5) Jane Loader, *The Atomic Cafe*, directed by Jane Loader, Kevin Rafferty, Pierce Rafferty (1982; Libra Films/Docurama, 2002), DVD.
- (6) Stanley Kubrick, *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*, directed by Stanley Kubrick (1964; Sony Pictures Home Entertainment, 2001), DVD.
- (7) John Meredyth Lucas and James E. Moser, *Medic*, “Flash of Darkness,” directed by John Meredyth Lucas and James E. Moser (1955; NBC Television, Timeless Media Group, 2011), DVD.
- (8) Rod Serling, *The Twilight Zone*, “The Shelter,” created and directed by Rod Serling (1961; CBS Television, Image Entertainment, 2006), DVD. Nuclear holocaust was a recurring theme of the series in other episodes such as *A Little Peace and Quiet* and *Shelter Skelter* (from the 1985 series of the same name).
- (9) Irvin Yeaworth, *The Blob*, directed by Irvin Yeaworth (1958; Paramount Pictures, Thrill Kill, 2005), DVD.
- (10) Peter Tewksbury, *Father Knows Best*, directed by Peter Tewksbury (1954-1960; CBS Television, Shout Factory 2008), DVD.
- (11) John Badham, *War Games*, directed by John Badham (1983; United Artists, MGM, 1998), DVD.
- (12) Nicholas Meyer, *The Day After*, directed by Nicholas Meyer (1983; ABC Television and Metro Goldwyn Mayer, 2004), DVD.
- (13) Eric Schlosser, *Command and Control* (Penguin Random House, 2013), p. 451.
- (14) Edward Zwick, *Special Bulletin*, directed by Edward Zwick (1983; NBC Television, Warner Archive, 2010), DVD.
- (15) Mick Jackson, *Threads*, directed by Mick Jackson (1983; BBC, 2entertain, 2005), DVD.
- (16) Michael Bay, *Armageddon*, directed by Michael Bay (1998; Buena Vista Home Entertainment /Touchstone, 1999), DVD.
- (17) Joel Surnow and Robert Cochrane, *24*, created by Joel Surnow and Robert Cochrane (2001-2010; 20th Century Fox, 2010), DVD.
- (18) Robert Wise, *The Day the Earth Stood Still*, directed by Robert Wise (1951; 20th Century Fox, 2003), DVD.
- (19) Joseph Rotblat, “The 50-Year Shadow,” *The New York Times*, May 17, 2005.
http://www.nytimes.com/2005/05/17/opinion/17Rotblat.html?ex=1270785600&en=37bef79604f97228&ei=5090&partner=rssuserland&_r=2&
- (20) Edward Wilson, “Thank you Vasili Arkhipov, the man who stopped nuclear war,” *The Guardian*, October 27, 2012.
<http://www.theguardian.com/commentisfree/2012/oct/27/vasili-arkhipov-stopped-nuclear-war>.

Part 2

Radiation Makes People Invisible*

Robert A. Jacobs

Radiation makes people invisible. We know that exposure to radiation can be deleterious to one's health. It can cause sickness or even death when received in high doses. But it does more. People who have been exposed to radiation, or even those who suspect that they have been exposed to radiation that never experience radiation related illnesses may find that their lives are forever changed – that they have assumed a kind of second class citizenship. They may find that their relationship to their families, to their communities, to their hometowns, to their traditional diets and even traditional knowledge systems have become broken. They often spend the remainder of their lives wishing that they could go back, that things would become normal. They slowly realize that they have become expendable and that their government and even their society is no longer invested in their wellbeing.

As a historian of the social and cultural aspects of nuclear technologies I have spent years working in radiation-affected communities around the world. Many of these people have experienced exposure to radiation from nuclear weapon testing, from nuclear weapon production, from nuclear power plant accidents, from nuclear power production or storage, or, like the people in the community that I live in, Hiroshima, from being subjected to a direct nuclear attack. For the last five years I have been working with Dr. Mick Broderick of Murdoch University in Perth, Australia on the Global Hibakusha Project. We have been working in radiation-affected communities all around the world. In our research we have found a powerful continuity to the experience of radiation exposure across a broad range of cultures, geographies, and populations. About half way between beginning this study and this present moment the nuclear disaster at Fukushima Daiichi happened here in Japan. One of the most distressing things (among so many) since this crisis began is to hear so many people, often people in positions of political power and influence say that the future for those affected by the nuclear disaster is uncertain. I wish that it were so, but there is actually a deep historical precedence that suggests that the future for the people of Tohoku is predictable.

*This article is condensed from a chapter from a book manuscript in preparation on the work of the Global Hibakusha Project by Dr. Robert Jacobs and Dr. Mick Broderick (http://bojacobs.net/Bo_Jacobs/Global_Hibakusha.html).



Fig.1 Sickness and Mortality

In this short article I will outline some continuities to the experiences of radiation-affected people. Most of the following is also true for people who merely suspect that they have been exposed to radiation, even if they never suffer any health effects. Many have already become a part of the experiences of those affected by the Fukushima disaster. There are, of course, many differences and specificities to each community, but there is also much continuity.

Sickness and Mortality

Sickness and even death are the results of exposure to radiation that people expect. It is important to know that there are many different ways that people can become ill after exposure to radiation. When people are exposed to high levels of gamma radiation they can suffer from acute radiation sickness and death can come in a matter of days, weeks or months. Tens of thousands of people died of acute radiation sickness in Hiroshima and Nagasaki after they survived the nuclear attacks. A nuclear weapon gives off a very large burst of gamma radiation that only lasts a very short time, but if the whole body is exposed to high levels it can cause illness and death relatively quickly.

For those who were not close to the detonation of a nuclear weapon, or within a short distance of a disaster like the Chernobyl or Fukushima disasters, illness is often the result of internalized alpha emitting particles. With nuclear detonations this comes down as “fallout.” In the case of Chernobyl and Fukushima these came down over large areas as the plumes from the explosions settled back to Earth. Alpha emitting particles cannot penetrate the skin like gamma radiation can, but rather are internalized through inhalation or swallowing or through cuts in the skin.

These particles don’t give off a large amount of radiation, but if they lodge in the body they continue to expose a small number of cells 24 hours a day often for the rest of a person’s life. This can result in cancers and immune disorders that develop later in life – sometimes a few years later, sometimes after one or several decades. Since the plumes of the three explosions at Fukushima deposited large amounts of alpha emitters across a large area, this is the primary danger to those living in the contaminated areas. It is disingenuous when nuclear industry apologists say things like “no one died at Fukushima” since they



Fig.2 Losses of Homes, Community and Identity

are well aware that for most of the people who will eventually get sick this process will take time. We are currently in the latency period for these illnesses, a point not missed by nuclear industry PR people.

Loss of Homes, Community and Identity

Areas that experience radioactive contamination often have to be abandoned by those who live there. The levels of radiation may be high enough that continued habitation can be dangerous to health. In these cases people lose their homes; often traditional homes that may have been the primary residences for a family for multiple generations. In these cases one's identity may be deeply connected to the home and the land around the home.

For communities that have to be abandoned the bonds that have been built up and that sustain the wellbeing of the community are disintegrated. Friends are separated, extended families are often separated, and schools are closed. People who have lived in the same place all of their lives have to make a fresh start, sometimes in old age, sometimes as children, and lose the communal structures that have supported them: shopkeepers who know them, neighbors who can be relied on, the simple familiarity that we have by being known and knowing our way around.

What is lost when a person is no longer able to eat an apple from a tree planted by their parent or grandparent? With the loss of community many people lose their way of making a living. This is especially true in less industrialized places where many people have been farmers or fishers or herders for generations. When someone who has only known farming is taken from the land they have tended, when someone who is a fisher can no longer fish in areas where they understand the natural rhythms and habits of the fish, it can be impossible to start over. Often such people are forced to enter service positions or become dependent on state subsidies, which further erodes their sense of self and wellbeing. Usually, those removed from their land because of contamination are placed into temporary housing. In almost all cases this housing is not temporary, but becomes permanent. Since it is initially intended to be temporary housing it is often very shoddy and cramped.

It can become impossible for multigenerational families that have been living together for decades to remain together. This can remove care for the elderly, childcare for young families and further erodes the continuity of family identity, knowledge and support. Removal from land also is accompanied by the loss of a traditional diet. Those without access to the lands and seas that have provided food for their families for generations often begin a journey of ill health fostered by a new diet composed of processed foods. In some communities such as the small villages around the former Soviet nuclear test site in Kazakhstan the people simply continue to live in dangerously



Fig.3 Loss of Traditional Knowledge

contaminated homes. The state responsible for their exposures no longer exists and no government feels the responsibility to evacuate them. They live very traditional lives and most of their food is from their own gardens and from livestock raised on their contaminated land. Many of the long-lived radionuclides simply cycle through this ecosystem and those living here can be contaminated and re-contaminated over many generations.

Loss of Traditional Knowledge

In some remote places survival is dependent on centuries old understandings of the land. In Australia the areas where the British conducted nuclear testing in the outback are very difficult places to live. Traditional communities in these areas often have songs that hold and transmit essential knowledge about how to survive in such a harsh environment, such as – where to find water, when to hunt specific animals, when to move to various areas.

When the British relocated them to live in areas hundreds of kilometers from their traditional homes this knowledge became broken. It became impossible for the refugee population to survive living a traditional life in areas where they had no knowledge of the rhythms of the land and animals. This removal from their traditional lands led quickly to a dependence on governmental assistance and severed what had been millennia of self-

reliance. This led to the further erosion of community, familial and personal wellbeing.

Discrimination

People who may have been exposed to radiation usually experience discrimination in their new homes and often become social pariahs. We first saw this dynamic with the *hibakusha* in Hiroshima and Nagasaki who found it very difficult to find marriage partners since prospective spouses feared they would have malformed children, found it difficult to find jobs since employers assumed that they would be sick more often, and often became the targets of bullying. It became very common to hide the fact that one's family had been among those exposed to radiation.

Many people are familiar with the story of Sadako Sasaki who died at the age of twelve after being exposed to radiation from the nuclear attack on Hiroshima ten years earlier. Sadako folded paper cranes in accordance with a Japanese tradition that someone who folds 1,000 paper cranes is granted a wish. Sadako's story has become well known



Fig.4 Becoming Medical Subjects

and children around the world fold paper cranes when they learn her story, many of which are sent here to Hiroshima. While Sadako has become a symbol of the innocence of so many *hibakusha* who were victims of the nuclear attack, her father tried to hide this fact so that his family would not suffer discrimination and was upset that his daughter had become so famously afflicted.

Children whose families evacuated from Fukushima prefecture after the triple meltdowns at Fukushima found themselves the victims of bullying at their new schools. Cars with Fukushima license plates were scratched when parked in other prefectures. Often this is the result of the natural fear of contamination that is associated with people exposed to a poison. In the Marshall Islands, those who were evacuated from Rongelap and other atolls that became unlivable after being blanketed with radioactive fallout from the Bravo test in 1954 have had to live as refugees on other peoples atolls for several generations now. The Marshall Islands have a very small amount of livable land and so being moved to atolls that traditionally belonged to others left them with no access to good soil and good locations for fishing and storing boats. They have had to live by the good graces of their new hosts, and endure being seen as interlopers.

Becoming Medical Subjects

Many people who have been exposed to radiation then become the subjects of medical studies, often with no information about the medical tests to which they are subjected. *Hibakusha* of the nuclear attacks on Hiroshima and Nagasaki became medical subjects of the Atomic Bomb Casualty Commission during the American occupation of Japan after World War Two. This study has continued to this day under the now jointly US-Japan operated Radiation Effects Research Foundation. In the early days of the study Japanese *hibakusha* had no choice about being subjected to the medical exams. An American military jeep would appear in front of their homes and they had to go in for an examination, whether it was a good time or not. They were not given information about the results of their tests. This has happened in many radiation-affected communities.

In 1966 a US nuclear bomber blew up in midair and its debris fell on the small village of Palomares, Spain. Four H-bombs fell from the plane, one into the sea, and three onto the small village. None exploded but two broke open and contaminated part of the town with plutonium and other radionuclides. To this day some of the residents of Palomares are taken to Madrid each year for a medical examination as the effects of exposure on their health are tracked. They have never been given any of the results of the tests nor informed if any illnesses they develop were related to their exposures. They are subjects, not participants in the gathering and assessing of the effects of radiation on their bodies. There is no doubt that such studies contribute data to our understanding of the health

consequences of radiation exposures (the data itself is contentious for reasons that I won't go into here), however for those from whom the information is gathered, being studied but not informed reduces one's sense of integrity and agency in one's own health maintenance. Many Pacific islanders exposed to radiation by the nuclear tests of the US, the UK and France had such experiences where they were examined and then sent off with no access to the results. Many report feeling as if the data had been harvested from them.

Anxiety

Often the first thing that those exposed to radiation are told is that they have nothing to worry about. Their anxieties are belittled. Radiation is a very abstract and difficult thing to understand. It is imperceptible – tasteless, odorless, invisible – adding to uncertainty that people feel about whether they were exposed, how much they were exposed to, and whether they and their loved ones will suffer any health effects. The dismissal of their anxieties by medical and governmental authorities only compounds their anxiety. When other members of their community develop health problems, such as thyroid cancer and other illnesses years later it can cast a pall over their own sense of wellbeing for the rest of their lives. Every time that they run a fever, every time that they experience pain in their stomachs, nosebleeds, and other common ailments this anxiety rears up and they think, “this is it, it's finally got me.” These fears extend to their parents, their children and other loved ones. Every fever that their child runs triggers horrible fears that their child will die. Sadako was healthy for nine years following her exposure to radiation when she was two years old in Hiroshima. Then suddenly her neck began to swell and she was soon diagnosed with leukemia. This is the nightmare world that the parents of children exposed to radiation experience on a daily basis. Every ailment can rip them apart.

Radiophobia and Blaming the Victim

Since it is often the case that who is and isn't exposed to radiation, especially to internalized alpha emitting particles, is unknown, large numbers of people near a nuclear detonation, a nuclear production plant, a nuclear power plant accident, a uranium mining location and countless other sources of exposure to radiation worry about their health and the health of their loved ones. Among this group, some have been exposed and some have not. The uncertainty is part of the trauma. Often, as is currently the case for the people of Northern Japan, all of these people are dismissed as having undue fear of radiation, and are often told that their health problems are the result of their own anxieties. In some cases that may well be true but it is beside the point.

For those who have experienced some radiological catastrophe, who may have been removed from their homes and communities and lost those bonds and support systems,



Fig. 5 Memorial to the victims of atomic bomb tests at Semipalatinsk, Kazakhstan (formerly in the USSR)

who are uncertain as to whether each flu or stomach ache is the harbinger of the end, and who cannot be certain that contamination from hard to find alpha emitting particles is still possible when their children play in the park, anxiety is the natural response. Even if it does cause health problems, it is not their fault: forces outside of their control have upended their lives and they now must live a life of uncertainty and often experience discrimination. Of course they are going to suffer from the anxiety that this situation produces. To blame them for this is to blame the victims in the situation and is a further form of traumatization.

Conclusions

Radiation makes people invisible. It makes them second class citizens who no longer have the expectation of being treated with dignity by their government, by those

overseeing nuclear facilities near to them, by the military and nuclear industry engaged in practices that expose people to radiation, and often by their new neighbors when they become refugees. People exposed to radiation often lose their homes, either through forced removal or through contamination that makes living in them dangerous. They lose their livelihoods, their diets, their communities, and their traditions. They can lose the knowledge base that connects them to their land and insures their wellbeing.

Radiation can cause health problems and death, and even when it doesn't it can cause devastating anxiety and uncertainty that can become crippling. Often those exposed to radiation are blamed for all of the problems that follow their exposures. After a nuclear disaster we count the victims in terms of those who died but they are only a small fraction of the people who are truly victimized by the event. Countless more suffer the destruction of their communities, their families, and their wellbeing. The devastation that a nuclear disaster truly wreaks is unknowable.

The lives of those exposed to radiation, or those in areas affected by radiation but uncertain about their exposures, will never be the same. As Natalia Manzurova, one of the "liquidators" at Chernobyl said in an interview published two months after the Fukushima triple meltdowns: "Their lives will be divided into two parts: before and after Fukushima. They'll worry about their health and their children's health. The government will probably say there was not that much radiation and that it didn't harm them. And the government will probably not compensate them for all that they've lost. What they lost can't be calculated."