

Toxic Wars and Bodies Exposed
A Political Ecology of Health Analysis of Gulf War Syndrome

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Abstract: Gulf War Syndrome (GWS) has received widespread coverage in the media for its debilitating effects on veterans who have reported patterned but vague constellations of symptoms which scientists and health care providers find difficult to diagnose or trace to any particular environmental exposure. Nonetheless, as with similar illnesses associated with exposure to chemical and radioactive toxins, GWS is as much a social disorder, as a health disorder, because those who suffer find their bodies, identities, and relationships with institutions and the state fundamentally changed by the experience. In this paper, I draw on narratives from people who have been exposed to war-related toxins in differing ways to show how social roles and relations, and differing relationships to the environment in which people are exposed to toxins, contribute to unequal access to health resources. These relationships further shape differing explanatory models of the causal factors effecting health and thereby treatment options. I conclude by considering how a political ecology of health framework can recast concepts of “Gulf War Syndrome” as “Toxic War Illnesses,” to illuminate the global linkages that draw diverse illness categories together under shared concepts of degraded bodies and environments.

Note to Reader: This paper emerged from research I conducted on environmental-health concerns related to depleted uranium which I initiated in 2005 as an Assistant Professor of Cultural Anthropology at the University of Tennessee. The research was to have been published as a book, *Weapons of Dust: Cultural and Scientific Battlefields of Depleted Uranium*, in the fall of 2008 with Left Coast Press. The research has involved interviews with veterans, activists, weapons scientists, health scientists, policy makers and others with expertise or experience related to uranium production and exposure. In the course of this research, I conducted dozens of interviews and established on-going relationships with residents, community leaders, public health professionals, and former workers of the Oak Ridge weapons complex (where uranium was first separated during the Manhattan Project) regarding exposure to uranium and other toxins associated with weapons production.

Shortly after beginning my research in Oak Ridge, a student joined the graduate program in our department and began her doctoral studies under my direction. She jokingly and often said that she had been sent by the DOE to “spy” on me, and although she never selected a topic for her dissertation, she took all my classes, visited and dined in my home, and met with me regularly to discuss her studies and potential research topics, which ranged from studying local schools to the embedded anthropologists in Iraq. In the spring of 2008, she enrolled in an independent Research Design course under my direction, then inexplicably stopped meeting with me and changed advisors, which was understandable given their mutual interests. Because she had failed to work with me on the Research Design course through the semester, however, I suggested to her at the close of the semester that she take an incomplete and offered her a number of possible research topics to work on over the summer. Among my suggested topics were

the environmental and health concerns related to proposed DOE uranium transport and storage which she had broached as a possible topic of study. The issue was in the local and national news at the time, and public hearings were scheduled. Without comment, she then reported to the university the false allegation that I had been actively seeking classified government documents on uranium since she had begun her studies, I had engaged in extortion by way of offering her a higher grade for information on uranium transport and storage which she claimed was classified (despite national media attention and local public hearings pertaining to the issue), and that she feared if I did not obtain the “classified” information from her, I would obtain it from someone else and “frame” her. Although we had never once had a disagreement, and I had multiple e-mails to her new advisor and to the department chair expressing my concerns about her sudden refusal to meet with me and do any work for her final grade, I received no response from either of them. She then reported to the department chair that she was calling for a Homeland Security investigation of me. Without my knowledge, the university referred the matter to the police, and they in turn referred the matter to the DOE Anti-Terrorism Task Force and the FBI Joint Terrorism Task Force (FBI-JTTF), which partners with Homeland Security in domestic surveillance of political groups and individuals suspected of terrorism.

That same week, another student in my course on the Anthropology of Warfare and Violence, who indicated she had been communicating with this student, reported that she had been told to submit “things in writing” to my department head, and said that I had announced to my class on warfare that I was going to build a bomb and drop it on three colleagues, offered students a list of human and building targets if they were interested, and was “always talking about bombs.” Although by that time I had alerted the university to my concerns about student and faculty conduct that I found increasingly weird, no one asked me about these bizarre allegations. Only after they had alerted local and federal law enforcement to these claims, did the university tell me I was under a Homeland Security investigation based on reports from my students. They would not, however, tell me the nature of the charges or who had made them, despite numerous requests that they do so or at least speak with me about the matter. Although the accusations were spread among students and faculty in the department, and throughout the university community and to several external reviewers who had recently evaluated my tenure dossier, which was then under consideration, I was suddenly isolated from the university community and only knew that the accusations involved claims of terrorism and bombing and that they had been referred to the FBI-JTTF and DOE Anti-Terrorism Task Force.

I was subjected to four different levels of law enforcement investigations, and remained under federal investigation and surveillance for at least one month with no knowledge of the accusations against me. Neighbors informed me that my house was being watched by “men in hats” and people entered and left my house when I was not at home. All my files on my Oak Ridge research disappeared from my home. In May, and in the presence of my ten year old daughter (who was also reported to the FBI for intent to cause bodily harm involving a plate of chocolate chip cookies) I was interrogated by the FBI-JTTF about my interest in bombs, whether I had plans for building a hydrogen bomb, why I was interested in uranium, if I had ever attempted to obtain classified nuclear secrets, if I maintained lists of buildings and people I intended to bomb or otherwise kill, if I intended to blow up the football stadium, whether I would attend anti-war rallies, what my political views were, whether I maintained contact with my law-abiding family, and other such questions. The FBI-JTTF special agents assured me they had no further interest in the matter and they closed the case. The FBI-JTTF Special Agents have told me that they cannot reveal the extent of the searches and seizures I was subjected to, although on several occasions I discovered my office and computer searched, and many other serious violations of my security and privacy, the details of which I cannot wholly reveal at this time. DOE Counsel has assured me that they have no concern about the allegations made against me, although I have never spoken with any investigators from the DOE. As a result of having been subjected to the provisions of the Patriot Act, the university has revoked my research clearance and indicated that I cannot use any of the data that I have collected over the last four

years, until the FBI can confirm that neither I, nor any of my research subjects, are under federal investigation which the FBI cannot and will not do (and to identify my research subjects to the FBI, to the extent they don't already know them, would potentially subject the people I've interviewed to adverse risk).

I submitted hundreds of pages of documents to the university attesting to my innocence of all charges, but have never been given the opportunity to be interviewed or heard in person by university officials on the matter. Nonetheless, without my knowledge and in full possession of the documents demonstrating my innocence, after the close of the FBI-JTTF investigation the university contacted my students and solicited statements from them, asking them about any knowledge they had about my intent to build and use bombs, target people or buildings, advocate violence, and similar questions. All students interviewed signed statements forcefully condemning the accusations and attesting to my innocence and praised the class as challenging, enlightening, and inclusive of multiple perspectives with no suggested violence of any sort; one student went so far as to describe the departmental climate that he had witnessed as resembling "McCarthyism." Despite my having a record with the university for excellence in teaching and service, a recent university evaluation of my graduate advising as "outstanding," and exceptionally strong external review letters testifying to the significance and continued productivity of my scholarship, while ranked by my department head as "critical to the success" of the cultural core of our department and "indispensible," just months before these events, the university denied my tenure due to these reports, without any opportunity to discuss the allegations or accorded the right to a hearing on the charges in accordance with university policy. My research clearance for this project remains revoked, and the university has declined to take steps to protect my academic freedom and help restore my research clearance.

Thus, in what follows, in an effort to comply with the restrictions on the use of my human subjects data, I have relied exclusively on empirical data from the public domain or unpublished data which I have previously presented in differing versions at professional conferences prior to the termination of my IRB clearance. Unfortunately, by omitting key testimony, it denies many individuals I have been working with a voice and visibility in this paper, while limiting many significant reports to support my analysis. But by way of prefacing what follows with the revelations of the investigations and punitive measures I have been subjected to in the course of this research (as well as teaching on the topic of warfare, weapons, secrecy and toxic landscapes), and the limitations these actions have made on what data I can safely disclose to support my analysis, I hereby disclose this personal but discomfoting legacy of "The Secret City." Although it is a city I have come to cherish and honor in many respects, the secrecy of environmental and human degradation from weapons production has also facilitated, in part, a cultural ethos of authoritarianism and secrecy within the institutional setting of the nearby university which funded and sponsored this research. I consider disclosure of my personal injuries suffered in association with this research project to be salient to discussion on political ecology by way of illuminating how power relations shape how knowledge is produced, interpreted, and put into practice.

Toxic Exposures and Disclosures

On a hot Sunday evening in October, 1992, dozens of undocumented African immigrants who were living in a low-rent apartment complex of high-rise buildings in the Bijlmermeer district of Amsterdam excitedly gathered before their television sets to watch a soccer match. As women prepared dinner in their kitchens and the animation and festivities gained momentum in

living rooms throughout the complex, the pilot of an Israeli cargo jet was desperately trying to return to the nearby Shipol airport from where he had just taken off, hoping to make an emergency landing. But just minutes from its destination, the plane took a sharp right turn and careened out of control, the pilot of El-Al Flight 1862 frantically radioing his last words, “Going down, going down, going down.” The jet exploded into two of the Bijlmer apartment buildings, instantaneously incinerating dozens of apartments and the men, women and children who were inside them. The immense heat of the building seared the flesh of others who leapt to their deaths with a repetitive thudding sound which witnesses recalled, years later, their voices breaking into sobs at the recollection of the screaming humans jumping to their deaths. The official death toll was 42, including three crew, and 39 residents, but because the majority were undocumented residents, and their bodies burned to nothing more than a fine particulate matter of eternal dust, no one will ever know how many died.

“They had no papers, no one knew how many were there, or who they were. They were just disappeared. Just gone. Not even their families could be told. They were just no more, poof, they stopped existing,” one lone Nigerian survivor said to me in the summer of 2006 as we stood at the site, now a memorial decorated with a mosaic of children’s drawings in the midst of the remaining buildings of the apartment complex.

Residents of the complex were promised treatment for trauma following the crash, and assured that the plane was just an ordinary cargo plane carrying “perfume and gifts.” But when night fell and witnesses noticed workers in hazmat (hazardous materials) suits arriving in the dark to search through the debris with brightly-lit lanterns, they became alarmed. Activists with the Dutch anti-nuclear foundation LAKA quickly responded, and discovered that the Boeing 747 which was heading from the U.S. to Tel Aviv had been built – like all early models of the 747’s – with a ballast made of the radioactive heavy metal, depleted uranium (DU). DU is the “waste” of the enrichment process of natural uranium. With the highly fissionable U-235 isotope removed, what is left is primarily U-238, which is forty percent less radioactive than natural uranium. Yet DU is still a low-level radioactive and chemically toxic heavy metal and its environmental and health hazards remain more speculative than known – thereby contributing to public fears and volatile debates regarding its production, transport, use and disposal. When LAKA activists explained to residents that they had been exposed to a radioactive and

chemically toxic form of uranium with the explosion of the jet, residents who associated radioactivity with the atomic bomb were understandably alarmed. Nearly two dozen people responded to LAKA's efforts to have the blood and urine of exposed residents tested, only to find that many of the samples were reportedly lost or compromised by one of the private testing centers in the U.S. Other samples reached a private clinic in Los Angeles, where it was reported that residents showed a high level of what appeared to be a biological mycoplasma related to HIV, suggesting the jet may also have been carrying biological agents for use in warfare (Emmer 1999).

As time passed and residents began reporting a range of neurological, dermatological, respiratory, gastro-intestinal, musculoskeletal and cognitive disorders, along with fatigue and sleep disorders, LAKA activists reconsidered the possibility that DU was the exclusive cause of their disorders. Not only were the missing samples raising questions for many of the anti-nuclear activists about the professional integrity of one of the independent testing centers, but the 1998 revelation by the Dutch newspaper *NRC Handelsblad* that Flight 1862's cargo manifest indicated the jet had been carrying 10 tons of toxic chemicals, including hydrofluoric acid, isopropanol and dimethyl methyl-phosphonate (DMMP), three of the four primary chemicals used to produce sarin nerve gas (Ostrovsky 1998; Smith 1999-2000), the possible cause of what became known as "Bijlmer Syndrome" was more difficult to establish. "Once combined, the chemicals aboard Flight 1862 could have produced 270 kilos of sarin – sufficient to kill the entire population of a major city," journalist Gar Smith (1999/2000:2) reported. But the entire city of Amsterdam was not killed, nor were any of the survivors or witnesses of the air crash. Nonetheless, when it was revealed that the chemicals were produced by Sokatronic Chemicals, Inc. of Morrisville, Pennsylvania, and destined for the Israeli Institute for Biological Research near Tel Aviv, which is reputed to be engaged in biological weapons manufacturing (Ostrovsky 1998), questions about why the United States was manufacturing and shipping these chemicals to Israel heightened concerns that exposed residents might never know exactly what they were exposed to, and what harm it might cause their bodies. Sixteen years later, survivors continue to seek an explanation for their illnesses, which include rashes, gastrointestinal disorders, chronic fatigue, musculoskeletal pains, headaches, and cognitive disorders. Yet they find little or no medical recognition of their constellations of symptoms – symptoms which for some, treating and suffering consumes their lives.

In the case of the Bijlmer exposures, access to health resources is not a concern; the Dutch government provides universal health care. But not knowing precisely what residents were exposed to, or having an informed understanding of the health effects of the multiple chemical exposures, treatment options remain experimental while those who suffer find that their efforts for an explanation and accountability for their suffering an added strain on their health. Moreover, because the area was cleaned up, at least to some extent, and because most residents have relocated, toxic degradation of “local” environments is no longer the source of their health concerns.

Not long before the El-Al air crash in Bijlmer, on March 10, 1991 in the southeastern city of Khamisiyah, Iraq, the U.S. ordered the demolition of a munitions depot, which some allege was known to contain nerve gasses. Iraq notified the Central Intelligence Agency in 1996 that sarin and other nerve agents were indeed stored in the munitions pit. While denying prior awareness of the presence of the chemical, the CIA has confirmed that up to 99,000 troops may have been exposed to “low-levels” of nerve gasses from the plumes (Central Intelligence Agency 1997).

Among those exposed was Denise Nichols, a nurse who served along the border of Iraq and Saudi Arabia when the Khamisiyah cache was destroyed. In her testimony before the House Committee on Veterans’ Affairs on July 26, 2007, in her capacity as Vice Chairman of the National Vietnam and Gulf War Veterans Coalition, Nichols reported:

I can tell you now that the symptoms of Gulf War illness began to appear when we hit Riyadh and then as we moved forward thru KKMC to our forward location. We just were not fully aware of what the symptoms were representing at the time. We had rashes, visual sensitive [sic] to light, joint aches, urinary urgency, and diarrhea occurring. When you are in a desert environment and you are at war your job and duty comes first. . . . The symptom that I believe we all missed was the mental irritability/mental cognitive/neurological functioning changes that began to surface when we hit Riyadh. This showed up in weird behavior that I now can attribute to behavior much like brain concussion cases where you have a change in mental cognitive and behavior functioning. This was not PTSD! (Nichols 2007, available on-line at <http://veterans.house.gov/hearings>).

Indeed, veterans have found it very difficult to receive recognition for their symptoms, and frequently find it far easier to get treatment for PTSD than for Gulf War Syndrome.¹ Yet just as survivors of the El-Al crash, as well as nuclear sector employees and others exposed to chemical toxins, stress or other psychological disorders are frequently the most common diagnosis.

Nichols continued with her testimony:

This is also a condition that had previously been studied in Chronic Fatigue patients Why not read the current work on Chronic Fatigue . . . and start testing every Gulf War veteran at that facility [for] blood work on adrenal, pituitary, thyroid, and hormones. . . . Why is research being treated separate and distinct from clinical testing and care? These two areas should be interlinked . . . The veterans [who] have developed symptoms of ALS [Amyotrophic Lateral Sclerosis or Lou Gehrig's Disease] or MS [Multiple Sclerosis] often have to be told to go outside the VA to get tested to find out if they have that diagnosis . . . We have asked repeatedly that the VA provide data on all known diagnosed illnesses that are being experienced by Gulf War veterans to include all diagnoses including on the top of the list all neurological autoimmune type diagnoses, cancers of all types kidney diseases, thyroid diseases, liver diseases, respiratory diseases, the whole picture of organ diseases (Nichols 2007, available on-line at <http://veterans.house.gov/hearings>).

Agreement as to what symptoms and signs are related to “Gulf War Syndrome” is difficult, given the vast and vague array of health problems that exposed people face (see Brown 2007 for more detailed discussion). While the term, “Gulf War Syndrome” is well-recognized by the public, the Veterans Administration (VA), other policy makers and scientific communities avoid the concept of “syndrome.” Instead, they use the term “Gulf War Veterans’ Illnesses,” or “Gulf War Illnesses” to describe the high rates of such a wide range of health problems presented by veterans. And although Nichols critiques the failure of the VA to tie clinical care and testing, and to include multiple diagnoses when conducting research on the health problems facing veterans, the VA’s Annual Report to Congress (2008) does indeed recognize such a link. But the links remain weak, given the difficulty and complexity of first, assessing and linking exposure to specific health problems and second, of linking such an array of diagnoses in any clinically and epidemiologically useful manner. Yet from the perspective of many of those suffering from

¹ Two of my students, both Gulf War Veterans, volunteered to assist in my research. Given the task of finding what resources were available to veterans suffering from Gulf War Syndrome, they both concluded that they could only find treatment for PTSD at the Veteran’s Hospital in Johnson City, a ninety-minute drive from Knoxville and therefore not accessible to many low-income veterans who lack transportation or money for gas.

illnesses they attribute to the Gulf War, their bodies are sufficient “evidence” of the sacrifice they made in the service of their nation.

Exposures as Explanatory Model

Understanding the cause of one’s suffering is a critical component to not only restoring health, but it also reflects an existential quest to make sense of why something bad has happened and why it has happened to the particular one who suffers. *Why me?* And *how* did this happen? are fundamental questions raised in the quest for therapeutic treatment in any sickness encounter. These epistemological quests lead to conflicting, if not colliding, belief systems of causation which range from spiritual (an act of God, forest spirits, ancestors) to social (local conflicts or violations of taboos leading to acts and accusations of witchcraft; economic inequality that disproportionately affects health and nutrition) to biological (a genetic predisposition, a “chemical imbalance,” a compromised immune system) to ecological (“tropical diseases,” biocultural forms of adaptation to one’s environment). Yet it is clear to both scholars and non-scholars, that there is rarely, if ever, any single causal factor that explains why a particular person suffers from a particular health disorder. Nonetheless, science and human cognition tend toward single-cause explanations. Scientifically, it is much easier to determine linkages between a single environmental toxin and a single health effect. Cognitively, humans seek clear and understandable answers to their suffering; identifying the cause of their illness is central to the quest for therapy, and the more the cause can be attributed to a single factor, the more empowered the sufferer is likely to feel in being able to combat the disease, or at the very least, make sense of it. Thus, it is no surprise that in their efforts to understand and treat Gulf War Syndrome, many sufferers look to a single source of their suffering. If they are able to identify what caused their illness, they may be better positioned to not only treat their illness, but to prevent others from suffering the same fate. Moreover, public health models are best suited to these same single-source explanations, because the greater the complexity of environmental, biological and social factors shaping disease, the more difficult it becomes to formulate effective public health policies. The inability of science and public health policy to make clear and objective linkages between exposure to multiple environmental toxins and the illness constellations that are reported among such socially and biologically diverse humans, has led to

volatile and tenacious debates concerning the environmental-health concerns emerging from the Gulf War.

In their quest to understand why they are ill, veterans of the Gulf War increasingly challenge the state they once defended in warfare, and which now denies that their bodies have been damaged by focusing on a singular cause. Among those causes which have raised alarm have been the experimental vaccines or the PB [pyridostimide-brombide] pills [to protect against nerve gas] that they were compelled to take into their bodies. Yet the illnesses associated with service in the Gulf War are increasingly attributed not to the vaccines or pills, or even to sarin or other chemical exposures, but more commonly to the radioactive depleted uranium.

“I have been treating *hibakusha* [survivors of the atomic bomb] for sixty years,” Dr. Shintaro Hida announced in August, 2006 at the International Coalition to Ban Uranium Weapons (ICBUW) in Hiroshima, Japan on the 61st anniversary of the dropping of the atomic bomb,” . . . and I am probably the only living medical doctor treating *hibakusha* since the bombin.” Depleted uranium weapons are not the same thing as the atomic bomb, he explained through an interpreter to the large audience of scientists, activists, veterans, policy makers and reporters, but he noted many similarities to what he was hearing have been reported by physicians treating cancer patients in Iraq, and among veterans seeking treatment for Gulf War Syndrome.

“DU is a *nuclear* weapons,” Herbert Reed, a disabled veteran of the Gulf War proclaimed at the conference, “the difference is, with DU, the horror is on the inside, while with the atomic bomb, the horror is on the outside. *We are hibakusha!*” His remarks were greeted with loud applause, in the epicenter of a city that just six decades before – not so very differently from the Bijnmer buildings hit by the jet plane – was instantaneously reduced to ashes.

Depleted uranium (DU), first produced at Oak Ridge as a “waste” product from the separation process of the highly fissionable U-235 isotope from natural uranium, and comprised primarily of the non-fissionable U-238 isotope. In the early sixties it transformed from “waste” to “resource” when its military properties and economic value were recognized. DU is a heavy metal, far denser than lead and thus, a superior alloy for armor and weapons that is nearly impenetrable by other metals, and which aerosolizes into a nano-particulate upon impact. When it enters the atmosphere it is easily inhaled ingested, and settles into the earth and water where it remains with a half-life of 4.5 billion years. This long half-life – which provokes fear given its virtual eternity of contamination – actually means DU breaks down slowly, releasing its

radioactivity and toxic byproducts very slowly. But because its environmental and health hazards remain more speculative than known, the use of the heavy metal contributes to public fears and volatile debates regarding its production, transport, use, and disposal.

Ray Bristow, a British veteran of the first Gulf War who was stationed in Saudi Arabia and was never in Iraq, walked slowly to the stage and with the aid of an aluminum walker. As the audience waited in silence until he reached the podium, Bristow held up a large white, disposable diaper. “I am not proud to be standing here today,” he said, his voice nearly breaking as he struggled to hold back his tears, “holding up this diaper to tell you . . . “ Bristow paused to retain his composure before the film crews and the audience who watched in silence, “that I now only need to wear it at night when I got to bed.”

Bristow and Reed who publicly attribute their health problems primarily to their exposure to DU, are not alone in their willingness to present their bodies as testaments to the suffering they and their fellow veterans have endured, and as Native Americans, Marshallese Islanders, and others exposed to fallout from nuclear tests have suffered (Johnston 2006; Kuletz 1998; Masco 2006). Those most active in anti-DU activism commonly use DU as a symbol of the human body transformed through warfare, of environments degraded and poisoned by radioactivity, and language and images of the distorted bodies of babies and children, to simultaneously promote political ideologies, and forge social identities of good verses evil – a ploy that not only those who oppose DU exercise, but one the Department of Defense (DoD) itself has used to send its message that DU is as harmless as the yellow cake that uranium miners were once told was safe enough to sprinkle on their breakfast cereal (e.g. Rostker 2002). And these symbols have infused the explanatory models of Gulf War Syndrome, in the same ways as the illnesses of downwinders, nuclear-sector employees, and workers and residents in the chemical corridors of our nation, have joined together, reflecting the power relations and broader political and economic structures that constrain and produce the fissions and fusions of local communities.

Explanatory Models of State and Scientific Institutions

The National Academy of Science's Institute of Medicine (OIM) convened in Washington, D.C. in June, 2007, to assess the scientific findings regarding the health effects of DU and its relationship to Gulf War Syndrome. The event was marked by conflicting reports that ranged from claims that DU poses no significant health effects to humans (McDiarmid 2007) to demonstrated evidence of toxic and radiological effects in animal studies (Hahn 2007). One of the invited speakers was Dan Fahey, a tall blonde man in his late-thirties dressed in a stylish dark suit, standing before the somber group to present his findings.

Fahey, who grew up in up-state New York working on his family's apple cider mill, worked his way into the prestigious liberal arts college of Notre Dame, paying his tuition through the ROTC program – until with the sudden onset of the Gulf War, he unexpectedly found himself being trained to fire Tomahawk missiles, learning to fire cluster bombs, high explosive charges, or a nuclear warhead if need be.

I was in Tomahawk school the day Operation Desert Storm began. As I watched CNN's coverage of the cruise missiles exploding in Baghdad, a battle was raging inside me. I felt an acute tension between my obligation to the Navy and the obligation to my conscience, which was forcefully telling me that I could never fire a nuclear missile at anyone, regardless of the provocation or cause. And if I couldn't fire a nuke, would I be willing to enforce U.S. foreign policy by firing a missile filled with cluster bombs or high explosives? (Fahey 2006:96).

Fahey, who is currently a doctoral candidate in environmental policy at UC Berkeley, applied for and was eventually granted Conscientious Objector status, and returned to the U.S. with an honorable discharge. It was while working for the San Francisco-based Swords to Plowshares Veterans' Rights Organization, that he gained national prominence in the mid 1990s when he brought the issue to international attention through his advocacy and media appearances through *Sixty Minutes*, *Vanity Fair*, *Rolling Stone*, a number of documentary appearances and other venues. Initially vilified by the DoD for his public charges that DU was contributing to a range of health disorders among veterans who were not being adequately tested, diagnosed, treated, or monitored (Rostker 2002), Fahey's activism has led to an international expertise on the issues that even the Pentagon now recognizes. But as he gained credibility and respect among these scientists and policy makers with his prolific and empirically-based research, a small but vocal sector of the very social movement he helped launch began to demonize him as a traitor, when he published an article calling on activists to avoid delusionary accusations and

unfounded claims about depleted uranium and to base their claims on the empirical evidence which he found sufficient cause for concern (Fahey 2003). Thus, Fahey was now speaking before the nation's most authoritative group of scientific experts on the issue of Gulf War Syndrome, many of whom had cast him as a trouble-maker just a few years before, their eyes now fixed on him with guarded curiosity.

At the National Academies meeting, Fahey broke with the culture of consensus that prevailed at the workshop, and firmly but respectfully charged that the VA's DU Follow-Up program was methodologically flawed and has not reported all its health findings (Fahey 2007). And while the authoritative scientific institutions and reports emphasize DU's probable safety, the DoD's Michael Kilpatrick, Deputy Director of the Office of Assistant Secretary of Defense for Health Affairs for U.S. Forces, who is responsible for providing the DoD with medical facts, acknowledges that there are many uncertainties and concerns about Gulf War Syndrome and the health consequences of DU. Though once voted by comic Keith Oberlin as "The Worst Person in the World," for changing the definition of "casualty" during Operation Iraqi Freedom, which thereby lessened our nation's casualties considerably, Dr. Kilpatrick was frank and pleasant, not at all the worst person in the world, I was fairly certain. But he has been one of the most vocal authorities defending the safety and continued use of DU. Nonetheless, he did concede:

I think that as we have learned more about the particulate [matter], we have a lower level of concern, but I think as we continue to take a look at tissue culture studies and [studies] going on into other animals, we have to keep an open mind scientifically to say that *this is not a closed issue*. . . . Certainly Iraq would be a key place to be able to pursue that, to look for environmental contamination and environmental effects in people, when the time is right, but that's going to be hard to predict (interview with Harper 8-1-07, emphasis added).

Kilpatrick's concern about the difficulty in conducting the appropriate scientific research to assess DU's health effects, and thus reach consensus on the issue of "closure," is echoed by Dr. Frederick "Skip" Burkle, a physician and epidemiologist who was the first Interim Minister of Health in Iraq appointed by the Bush administration. Within days of establishing himself in Iraq, Burkle realized that the health consequences of the war were vast, and he identified the elderly and those with chronic health conditions as among the most vulnerable to health risks. His first act was to propose kicking off with a rapid surveillance system throughout Iraq to obtain

base-line epidemiological data by which to assess the health impacts and needs of the conflict on the Iraqi population (Burkle and Noji 2004; Burkle interview with Harper 8-23-07). But his recommendations were ignored, and after only two weeks on the job, the Bush administration replaced him with James Haveman, a social worker from Michigan and close to Laura Bush (Washington Post 2007).¹ Burkle told me about how public health policy immediately changed:

Haveman . . . said ‘we don’t need a surveillance system because . . . we know what we have to address. We know where we have to put our resources.’ Which I think is the most anti-public health statement I have ever heard. . . . You can’t guess and you can’t assume anything. Surveillance studies always show people that it’s not what you think it is, because it *does* reveal the ground truth. . . . And as a matter of fact, his emphasis was on a smoking-cessation program. Well, where in God’s name did that come from?”²

Tying this issue to the relative concern of DU exposure to the more urgent health concerns in conflict and post-conflict zones, such as devastation of the health care infrastructures and traumatic deaths and injuries from bombing and attacks, Burkle (interview with Harper 8-24-07) pointed out:

When the ramifications of what’s been happening in Iraq occur, it sort of dilutes everything, doesn’t it? . . . It sort of puts everybody in an emergency kind of mode, so you get even more centered in on what’s happening that day . . . I’m as concerned about issues like the possible consequences of depleted uranium as I was about the very first thing I was concerned about, and that was no medications for the elderly people who are chronically ill. Well, they fell off the radar screen as well. I suspect that many of them died; it’s, you know, it’s like any other chronic disease. We don’t tend to think of that in the same way . . . You can almost put it in the same category as the depleted uranium because I think the typical reaction is, well, let’s put that on the back burner, we’ll talk about it later or we’ll see whether we can study it or something else like that. It’s just one of these ramifications that goes on a very, very long list of things that concern us when there is . . . modern war, and when there is prolonged destruction of the public health infrastructure. . . . I mean, you couldn’t even study, right now, the ramifications on the elderly population without their medication and you couldn’t

¹ Prior to his appointment as Minister of Health for Iraq, Haveman, who had political connections to the Whitehouse, had been a social worker from Michigan who directed a Christian adoption agency that discouraged abortion, and whose international experience was largely focused on faith-based health care promoting conversion to Christianity (Chandrasekaran 2006; Washington Post 2007).

² This point is supported by the Washington Post (2007) which reported that Haveman’s health policy focused on an anti-smoking campaign and dispensing with the Iraqi policy of providing essential medicines for free.

study the ramifications of depleted uranium. The system won't allow it, it's shot to hell. There's no way of doing any surveillance or any studies. It just doesn't exist anymore.

Burkle's comments point to the ways in which public perceptions of science are shaped by the ways in which the state and its institutions control the scientific process directly and indirectly, and impose an element of secrecy that facilitates fears and uncertainties about risk for some, while simultaneously providing a sense of security and safety for others, depending upon their social roles and their illness experiences.

The VA was initially reluctant to recognize Gulf War Syndrome as a legitimate illness until 2002, when media coverage pressured them to shift their classification of the syndrome from a stress disorder to a registerable illness for which afflicted veterans can be compensated. This denial of Gulf War Syndrome, along with the denial of adverse health effects from DU (despite scientific studies showing a link between exposure and tissue, neurological, and immunological damage, kidney dysfunction and respiratory disease) have contributed to growing concern by many veterans that the government and its authoritative scientific institutions cannot be trusted to provide timely and accurate information to the public concerning DU's adverse health effects, or its link to Gulf War Syndrome.

Paradoxically, this distrust has forged alliances among unlikely citizen groups. Most of the veterans who suffer from Gulf War Syndrome are in most cases staunch nationalists who regard their illnesses as sacrificial wounds of war, while many anti-DU activists view Gulf War Syndrome as symbolic of the state's use of citizen/soldiers as experimental targets of imperialist ambition, and repudiate nationalist sentiment vehemently through public rallies, conferences, and listserv discussions. If there is any symbol that comes to flash symbolically its conflicting meanings for the DU issue, it is not so much a yellow radioactive triangle, but is, instead the American flag. And the explanatory models of Gulf War Syndrome incorporate this flag in contrasting ways, whether as a symbol of democracy through which sufferers seek and expect equal access to health care resources, or as a symbol of imperialist disregard for those who are exposed to the toxic weapons of conquest.

Forging Communities and Identities

The coalitions that have formed to address the DU issue have drawn on local-level contamination sites as focal points for global environmental and peace-building objectives. By transcending the spatial boundaries of local sites and effected populations, these coalitions have used the internet to create strategic networks of citizens, scientists and veterans to creatively engage themselves in the policy making process and, perhaps more effectively, to influence media representations of depleted uranium in order to shape public perception of the environmental and health risks of depleted uranium. But as these “cyber-cultures” (to draw on Escobar’s [2002] term for internet activism) have proven to be an effective means of participatory action, identity formation, and a strategic tool for empowerment of socially marginalized groups, the rapid-fire nature of internet communications also has a power all its own to shape the very nature of how cyber-cultures are organized and how the electronic medium through which information about health and environmental contamination is conveyed frames both the content and the perimeters of debate.

With the ability to access, transmit, and selectively distribute vast amounts of information with the stroke of a send button, who controls the distribution of this information, who dominates the internet discourse and who is excluded by way of instantaneous and global damnation, deprecation, defamation, and dismissal become powerful mechanisms through which new hierarchies of knowledge and power are used to challenge and resist dominant institutions of power. At the same time, however, among those marginalized groups which the internet empowers with access to knowledge, these newly empowered citizen groups are also able to exercise their own control over knowledge production at the local levels.

Thus, in its efforts to use depleted uranium as an explanatory model for a range of health problems, the anti-depleted uranium movement has used the internet to both democratize science and to silence it, as a cyber-leadership has emerged from diverse sites of contamination and activism. This leadership has been particularly successful at shaping its message in such a way that citizens in contaminated sites, or among exposed populations -- what Adriana Petryna (2002) terms “biological citizenship” – people whose biological damage marks their membership in a group – are presented with a narrow set of explanatory models from which to articulate their sufferings, ascribe its origins, and perceive the potential environmental and health effects of contaminated sites.

Yet the social movements condemning depleted uranium as the single causal factor in Gulf War Syndrome have been ironically ineffective in articulating a shared view regarding the extent to which DU poses harm to human health and the environment. For some, any suggestion that DU is not genocidal, is not a nuclear bomb, and that there is no evidence it causes grotesque birth deformities or is the sole environmental toxin affecting the health of those exposed, leads to accusations of being a traitor, a spy, evil, naive, an imperialist agent, and a host of other venomous, and at times, libelous accusations. As a result, the anti-DU movements in the United States, Europe and Japan have often been as toxic as any heavy metal, and have led to cleavages among many of the founding members and others, contributed to a fading movement – at the very time that policy is beginning to respond, with state-level legislation calling for testing of veterans, and the United Nations rapidly responding to investigations into its use in Lebanon. Yet paradoxically, these policy initiatives are a response, in large part, from those outside of, or marginalized from, the anti-DU movements.

I suggest that these cleavages which have divided and handicapped the anti-DU movements have been deepened, in part, by shifting from its origins as an environmental health issue, to framing the issue through anti-war and anti-imperialist perspectives (a point Dan Fahey and others have also raised). Building on a political ecology of health approach, tied to environmental justice perspectives, DU can be understood as a powerful symbol of how the relationships between ecological degradation and human health shift and take on new meanings as they move from local, to national and international levels. In so doing, the perception of risk from toxic weapons of war gains greater significance in understanding how modern warfare may potentially contribute to intensified social and armed conflicts throughout the world as chemical and radioactive toxins transcend the boundaries of time and space.

If depleted uranium is viewed as a weapon disproportionately used against the poorest of the poor and people of color, then an environmental justice framework is appropriate. But it remains insufficient. As Heyman (2005) has shown in his discussion of the political ecology of consumption, and as Nordstrom (2004, 2007) has demonstrated in her studies of the “shadow networks” of wartime resources, invisible but intricate interconnections weave together the production, distribution, and use of not only resources, but populations themselves as they cross borders and zones of contamination, thereby making it difficult to examine local level contaminations and exposed populations simultaneously – because those who are exposed may

very well live and seek strategic health resources in sites distant from their original exposure, just as those who remain in such sites have other pressing needs that may limit their willingness to treat their environments as contaminated or degraded.

Yet conceptualizing environmental toxins as a form of land degradation is a legitimate approach to understanding how warfare changes the ecology in which populations live and access resources. As Peluso and Watts (2001) have suggested, degradation of land takes many forms, and raises issues of how “environmental security” is conceptualized. While environmental toxins associated with warfare may well jeopardize environmental security, this security is uneven in both space and scale. At the local level, exposures may extend to all social groups – for example, depleted uranium and other toxic weapons have been tested and used in affluent Chesapeake Bay at Aberdeen Testing Grounds in Maryland, and well-paid professionals such as chemists can be as potentially exposed as the maintenance worker who cleans out the hexafluoride tanks in which it is produced. But because the most poor and marginalized are more likely to depend upon subsistence from their local resource base, and the least likely to have access to health resources to address health problems as they emerge or to have the resources to relocate, at the international level DU may well be an environmental justice issue. And those who have the least access to proper nutrition, clean water, and the ability to relocate, are not only the poorest, but are disproportionately women, children and elders.

But these are the very populations that scientists, policy makers, and activists focusing on Gulf War Syndrome and depleted uranium have paid the least attention to. Just as scientific studies of Gulf War Illnesses have disproportionately focused on male service men, and scientific studies have too often done the same, exposed populations are often treated as homogeneous populations by social movements which focus on exposure as an explanatory model. By way of adopting a sense of group solidarity, membership in the group is often dependent upon narrowly-defined social identities or by political ideologies which are characterized in terms of their relationship with, or resistance to, the state – leaving little space for the differing ways in which one’s multiple social roles and relations within and among groups shape their exposures, their illnesses, and their access to institutional and health-care resources.

For example, while women’s voices are among the most vocal on the internet, potential consequences to women’s health from DU contamination has been conspicuously absent beyond

cursory mention in the thousands of internet postings that the DU issue has spawned. Where women's health has been raised as an issue of concern, it is almost always as wives of exposed soldiers or as repositories of contaminated wombs from which deformed babies are alleged to have formed. The impact on women veterans, women workers, and women who have been exposed through testing in the U.S. or by living in post-conflict zones, have received very little attention from both activists, scientists, and policy makers. Yet as a political ecology framework so clearly demonstrates, gendered social roles are important variables affecting exposure, as well as one's ability to access resources to treat their health disorders.

One of the central concerns in the discourse about depleted uranium has been the effects of exposure on veterans of the first and second Gulf Wars who were exposed to DU particulate when struck by friendly fire, or in post-conflict zones immediately after battle, when DU-contaminated sands, shrapnel and military ordnance and combat vehicles were inspected by troops. The Department of Defense identified those troops most likely to be exposed to DU in this manner, by the strategic positions the troops were assigned in their missions. Those on the front-lines of battle have been regarded as high-risk for DU production, and therefore, provided with training and protective gear to limit their exposure. Anti-DU groups have protested loudly, in large part led by Major Doug Rokke, who was assigned by the U.S. Army to clean-up DU in the first Gulf War and who later went public with his charges that the Army suppressed his findings and covered up the health effects and exposures of thousands of troops who did not fit neatly into the tidy categories of high risk populations.

Yet neither the anti-DU groups nor the U.S. Department of Defense have included women's exposure and women's health as a category of risk distinct from those of other troops. With occasional features by women veterans in the many documentaries that have emerged from the anti-DU groups which include their stories of how they were exposed and the chronic health concerns they have suffered since returning from service, gender is conspicuously absent as a variable in either exposure or health effects related to service in the Gulf War. Instead, women are almost always presented as undifferentiated from men when debating the environmental and health effects of both the Gulf War and of DU, despite distinct differences in how they are exposed, and how they suffer.

One of the primary ways in which women as a group have differed from men has been by way of their role as nurses, Emergency Medical Technicians (EMT's), and other first-line

providers of health care on the front-lines of combat – a position which has placed them in the front-lines of exposure to DU and other chemical toxins, while at the same time exempted them from classification by the DoD as a high-risk group. The DoD identified three levels of exposure to DU – level one is the highest exposure group, which includes those soldiers who were in, on or near combat vehicles struck by DU, or who were hit with DU shrapnel. This group is the group which has received the highest level of medical follow-up and study, along with the highest level of training about DU and protection from it. Yet Kilpatrick (personal communication, July 18, 2007) acknowledges that in identifying this group of “soldiers,” nurses, EMT’s and other health practitioners who were not only on the front lines, but remained on the front lines long after soldiers were reassigned or dispatched to hospitals, were not included in either training, provision of protective gear, or health-care follow up. This group is disproportionately comprised of women, for whom health problems have been debilitating since their return to the U.S., while recognition of their exposures and research into the effects of exposure on women’s biology has been lacking.

Denise Nichols, who served with the Air Force as a nurse for over twenty years before being deployed to the first Gulf War, was an early organizer of the anti-DU movement, and remains an important founding leader of the movement. Nonetheless, her concerns have been increasingly silenced within the anti-DU movement as it has shifted from its initial beginnings as an environmental-health issue to its current focus on DU as a symbol of U.S. imperialism, thereby casting the DU issue as a powerful symbol of anti-war movements and shifting attention from its health implications.

Like so many who served in the armed forces and later developed health problems, Nichols was a staunch supporter of U.S. military objectives and considered herself a die-hard patriot throughout her two decades of service. But following her service in the Gulf War, where she was subjected to experimental vaccines, pills, and other shots, and a host of other environmental toxins while stationed on the front-lines of combat, she began to suffer severe and increasingly crippling health effects. Among her concerns, which she noted many of her fellow nurses were suffering, were reproductive health problems, including excessive menstrual bleeding, early menopause, and hormonal abnormalities. Yet as she sought assistance from the VA to address her health problems, because her exposure was not recognized as a “level one,” she found it impossible to get her health problems acknowledged and addressed. And whereas

males who have been frustrated in the VA's reluctance to acknowledge their health concerns, typically drawing on images of weakened bodies, with their masculinity, strength and manhood (reflected in symptoms of burning semen, fertility problems, and urinary tract disorders) symbolically deployed as the casualties of warfare, Nichols articulates her sufferings – and her futile efforts to seek health care – as a form of “rape” by her government and its agents. In this way, the penetration of her body by the weapons of war – such as, depleted uranium – is viewed as a form of violence and assault against her very biological organs which mark her as a woman (see Peluso and Watts 2001 for discussion of “violent environments”).

Yet in a cyber-culture which has enabled the rapid-fire distribution of information, misinformation, facts, fictions and truth-claims (see Fahey 2003), emotion fuels how data are presented and articulated. This emotional appeal makes simplistic representations of the effects of DU as a devastating radioactive weapon on par with the atomic bomb, a far more effective message through which to elicit support in opposition to its use – or conversely, to discredit the claims made by anti-DU activists as unfounded. In this way, the distinctive ways in which women's bodies have been, or potentially could be, affected by DU exposure become problematic to both sides. For those opposing DU, presenting DU as causing chromosomal damage – a message which is accompanied by photographs of deformed babies allegedly caused by DU exposure – the representation of women as nurturers, rather than warriors, is emphasized. Thus, specific discussion of DU's effects on women soldiers and women military nurses is lost in the shadows as women's maternal responses to the threat of deformed babies are highlighted.

And whereas Denise Nichols points to the walls of DU-contaminated sand that blew like waves over their MASH units and did so in areas that the DoD alleged were not contaminated by DU – but later found to contain high levels of DU – and she links these exposures to patterns of reproductive problems among service women, the DoD resists acknowledging women's reproductive health as a specific concerns about DU. The anti-DU movement itself, having increasingly defined itself as an anti-war movement, likewise down-plays the roles women are increasingly playing as agents of war – a position which Nichols' argument highlights.

Similarly, while the anti-DU movement focuses on exposure to civilians in combat and post-conflict zones, it draws on emotional appeals of an earth portrayed as permanently made uninhabitable by contamination from DU – despite the fact that millions of people live in such contaminated zones. But by drawing on this image of deformed babies, permanently

uninhabitable landscapes, and populations of targeted citizens whose DNA and communities are forever damaged, women's wombs are stigmatized as unfit for child-bearing, depositories of the horrific deformities that will emerge from their bodies, and the food which women grow and serve and consume are presented to the world as radioactive nutrients unfit for human consumption.

Sites of Destruction and Production: Surviving on Degraded Lands

If survivors of the Bjlmer disaster remain sick and embattled with state authorities to learn what they were exposed to and seek effective treatment for their health, and Gulf War veterans present unprecedented disability claims for a range of vague or inexplicable symptoms, what of those who live in zones of conflict and must subsist on the soil, water and air that has been so contaminated by radioactive and chemically toxic weapons? Is Gulf War illness a concern of those most exposed?

As Skip Burkle pointed out, the citizens in Iraq are in emergency mode. For them, a devastated infrastructure, poor sanitation, escalating malnutrition and water-borne diseases, along with a newly privatized health system, have made what medicines were available now out of reach to all but a few. Access to these resources necessary for basic health are far more pressing concerns than are potential illness syndromes, or even cancers or genetic damage that may eventually emerge in the wake of environmental contamination. This is not to say that the toxic and radioactive saturation of the local environment is not a critical health issue for those living in post-conflict zones. Just as the health consequences of weapons manufacturing were of little concern to nuclear-sector employees until the close of the Cold War and the revelation of the health consequences of worker exposure led to federal and loosely-organized community efforts to clean up sites of weapons production and treat exposed workers (Harper 2007), so might there be future social concerns for contaminated landscapes of warfare when hostilities have ceased. But even then, addressing such public health issues will require institutional capacity for conducting adequate health studies, as well as the national and international will to address these issues.

Access to institutional and health care resources, however, is likely to remain uneven, with the poorest and most marginalized by the violence of war less likely to have access to

strategic resources necessary to safeguard and improve their health. Thus, without the ability to relocate, toxic landscapes are likely to be viewed by those who inhabit them not as contaminated or degraded lands, even if empirical evidence demonstrates that they are indeed unhealthy. While many exposed residents and workers of Oak Ridge and other weapons facilities devote their lives to collecting evidence of their exposures and the sufferings of their bodies, other residents condemn them for stigmatizing their communities. At Oak Ridge, a lush landscape of radioactive greenery and streaming rivers of inedible fish enchant tourists and residents alike, while a high-tech mobile CT-scan is permanently parked outside the union hall to test workers for tumors, and chelation therapy is provided to the sick at metal folding tables set up inside the union hall. This visual contrast reflects divisions which prevail between those who view their bodies as degraded from the environment in which they live, and those who view their own good health as testament to how harmless weapons production is. Not surprisingly, these latter groups are disproportionately represented by management and other skilled workers, who had less exposure to radioactive and chemical toxins than did janitors, unskilled laborers, and others who were sent to the front-lines of production and clean-up in Oak Ridge (Harper 2007). Similarly, those who continue to live on the front lines of post-conflict zones, are more likely to view themselves as survivors of the violence of war and their environments as sacred spaces of conquest and resistance, demonstrating the fundamental principle of political ecology that considers social relations to be central to determining access to health care and environmental clean-up.

By stigmatizing their homes and bodies as poisoned and uninhabitable, those who focus on depleted uranium – similarly to those who focus on environmental contaminants associated with illnesses of nuclear sector employees or chemical manufacturing facilities (Harper 2004) – are viewed by some as either over-reacting to insignificant threats, or blaming their idiosyncratic aches and pains on a state they seek to exploit for a monthly stipend. At best, they are seen by many as worsening an unfortunate trade-off the community has made for its economic survival, and any potential health hazards are considered best just left alone unless there is some definitive proof of harm. In this way, explanatory models for complex constellations of symptoms that may or may not have objective, verifiable diagnoses, have more to do with perceived moral values of the individual, than they have to do with the experiences of suffering of communities – whether communities of place, or communities of occupation or warfare.

Conclusion: From Gulf War Illnesses to Toxic War Illnesses:

In the course of this research project which has taken me from the idyllic landscapes of Oak Ridge, Tennessee to the modern metropolis of Hiroshima and beyond, I met with a variety of people exposed to war-related toxins in a multiplicity of ways and a range of decades. Regardless of their differing social positions, among the themes that wove through all the narratives I recorded were ideas of power – the loss of it, the use of it, or the tensions and battles over it. Whether at sites of production where janitors swept up uranium, nickel, and beads of mercury; chemical workers who inhaled beryllium; Gulf War veterans who ate and smoked in clouds of depleted uranium and were exposed to nerve gasses and an array of unknown drugs in the form of vaccines or pills; or policy makers manufacturing authoritative accounts or actively making policies to address health concerns arising from the use of depleted uranium in warfare, they were all fundamentally changed by their experiences with the toxic weapons of war. Significantly, for those exposed to war-related toxins, their bodies became testaments to their pain, their fears, and their anger at feeling unheard, silenced and betrayed by the nation for which they had sacrificed their bodies in such unexpected ways.

As political ecology has so elegantly demonstrated, the complexities of linking local to global levels of analysis may not fit tidily into epidemiological or ecological models of exposures, populations, risk and morbidity. Nonetheless, through a political ecology of health approach, these multiple levels provide a lens through which to view the lived realities of differing people to better understand how they live in their environments, move through differing ecological zones and become exposed to multiple environmental toxins, access and distribute essential resources, and experience, conceptualize and treat their health concerns. But science, medicine, and policy tend to focus on singular diagnoses which make it difficult to fully understand the overlapping diagnostic categories that assail people exposed to the chemical and radiological toxins related to war. “Gulf War Illness” is a useful analytical construct for understanding whatever unique exposures were associated with that particular war and in that particular place. But the temporal and spatial boundaries of the term limit a more comprehensive understanding of how contaminated environments associated with the commodity chain of weapons production have consistent patterns as they move through time and space and are embedded in complex social relations to produce chronic and progressive degradation of

environmental landscapes and toxic bodies. Thus, perhaps a more useful term to encompass these multiple diagnoses, and which illuminates the way in which the exposures and ensuing illnesses associated with warfare economies drastically alter relationships between citizens, institutions and states, might be “Toxic War Illnesses.” Such a conceptual term would embrace those exposed to the chemicals and radioactive materials related to weapons production, as well as those exposed through transport, testing, disposal, use and even clean-up.

Moreover, I would also argue that we can effectively apply the framework of feminist political ecology (e.g. Rocheleau, Thomas-Slayter and Wangari 1996) to understand how women are differentially exposed to the weapons of war depending upon their social status, roles and geographical location. Yet social justice movements, where one would expect the environmental injustices confronting women and other groups marginalized from the centers of power to be most forcefully articulated, do not necessarily recognize the complexity of social marginalization and differentiation. For example, the cyber-culture of DU draws on essentialized views of women as wives, mothers, peace-makers and nurturers to frame the debate through emotional appeals that limit our understandings of the distinctive ways in which women are exposed, and suffer from, environmental hazards associated with weapons production. Thus, it may be more effective to abandon essentialized views of women as inherently peaceful, nurturing, and exposed to toxic weapons through their roles as wives of soldiers, and examine instead how women actively engage in combat, silence and suppress dissent in favor of emotional appeals which reproduce images of women as peacemakers and contaminated wombs. If we explore instead the differing standpoints and social roles of varying populations as they are viewed through health care systems, cyber-cultures, and in global networks of science, technology and warfare, we may be better positioned to see beyond explanatory models of illness that emerge from singular causes (such as DU) or singular syndromes (such as GWS).

Finally, is it credible to associate DU or any other war-related toxin with environmental justice when there are multiple causal factors that can explain land degradation and health problems? Adopting a political ecology approach in which one examines the structural forces which lead to the use and proliferation of DU, nerve gasses, chemicals, or biological agents, on formal and illicit markets – might better help us to understand that DU is not another form of nuclear war, or sarin another form of chemical war, but these toxic weapons constitute another form of cultural currency that will continue to be used and condemned as long as they have

symbolic value – and long after their military value on the battlefield has been deflated through the development of new technologies. Who has access and control to resources such as toxic weapons or components, and to the symbolisms surrounding them, may be more relevant to analysis than whose health they most affect, for the simple fact that science cannot make definitive linkages between such diverse exposures and diverse illnesses.

As Forsyth (2003) has argued in his conceptualization of a “critical political ecology,” science and politics are co-produced, and policies based exclusively on orthodox science devoid of the social and political factors shaping local level practices and perceptions, cannot address the complexities of environmental degradation as perceived and experienced at local levels. Extending his argument to environmental-health analyses, I would suggest that for those effected, health and a secure environment are of more value than scholarly analysis, and necessitate new ways to conceptualize the boundaries not only of place, but of populations and bodies that absorb the toxic contaminants of violence and violated landscapes in differing, but nearly always unseen, ways.

References

Brown, Phil (2007) *Toxic Exposures: Contested Illnesses and the Environmental Health Movement*, New York: Columbia University Press.

Burkle, Frederick and Noji, E. (2004) “Health and Politics in the 2003 War with Iraq: Lessons Learned,” *The Lancet*, October 9.

Caldicott, Helen (2002) *The New Nuclear Danger: George W. Bush’s Military-Industrial Complex*, New York: The New Press.

Central Intelligence Agency (CIA) (1997) “Modeling the Chemical Warfare Agent Release at the Khamisiyah Pit,” General Report, Persian Gulf War Task Force, Report 555, September 4, 1997.

Chandrasekaran, Rajiv (2006) *Imperial Life in the Emerald City: Inside Iraq’s Green Zone*. New York: Random House.

Emmer, Jan-Kees (1999) “Blood Deviation by EL-AL Disaster: Genetic Manipulated Bacterium Mycoplasma” in *The Telegraaf*, February 13, 1999.

Escobar, Arturo (2002) “Gender, Place and Networks: A Political Ecology of Cybeculture,” in Development: A cultural Studies Reader, edited by Susanne Schech and Jane Haggis, Blackwell.

Fahey, Dan (2003) "Science or Science Fiction? Facts, Myths and Propoganda in the Debate Over Depleted Uranium Weapons," March 12, available on-line at www.antenna.nl/wise/uranium/pdf/dumyths.pdf.

Fahey, Dan (2006) "The 2 to 7 Watch," in *Veterans of War, Veterans of Peace*," Edited by Maxine Hong Kindgton, pp. 94-103, Kihei, Hawi'i: Koa Books.

Fahey, Dan (2007) "DU and Veterans' Health: A Flawed Testing Process and an Undersized, Politicized Study Limit Evaluation of Exposures and Effects," presented at the Institute of Medicine of the National Academies, Gulf War and Health: Updated Literature Review of Depleted Uranium, June 28, 2007, Washington, D. C.

Farmer, Paul (2003) *Pathologies of Power: Health, Human Rights and the New War on the Poor*, Berkeley: University of California Press.

Forsyth, Tim (2003) *Critical Medical Anthropology: The Politics of Environmental Science*, New York: Routledge.

Hahn, Fletcher (2007) "Toxic and Radiologic Effects of Uranium: Animal Studies," ,” presented at the Institute of Medicine of the National Academies, Gulf War and Health: Updated Literature Review of Depleted Uranium, June 28, 2007, Washington, D. C.

Harper, Janice (2004) "Breathless in Houston: A Political Ecology of Health Approach to Understanding Environmental Health Concerns," *Medical Anthropology* 23:295-326.

Harper, Janice (2007) "Secrets Revealed, Revelations Concealed: A Secret City Confronts its Environmental Legacy of Weapons Production," *Anthropological Quarterly* 80:1:39-64.

Heyman, Josiah McC. (2005) "The Political Ecology of Consumption: Beyond Greed and Guilt," in *Political Ecology Across Spaces, Scales, and Social Groups*, Edited by Susan Paulson and Lisa L. Gezon, pp. 113-132, New Brunswick: Rutgers University Press.

Johnston, Barbara Rose, editor (2006) *Cold War Legacies: Cautionary Tales of Life and Death in the Nuclear Hot Zones of the World*. Santa Fe: School for American Research Press.

Kuletz, Valerie (1998) *The Tainted Desert: Environmental and Social ruin in the American West*, New York and London: Routledge.

Masco, Joseph (2006) *Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico*, Princeton: Princeton University Press.

McDiarmid, Melissa (2007) "DU Exposure and Health Effects in Gulf War Veterans," ,” presented at the Institute of Medicine of the National Academies, Gulf War and Health: Updated Literature Review of Depleted Uranium, June 28, 2007, Washington, D. C.

- Nordstrom, Carolyn (2007) *Global Outlaws: Crime, Money and Power in the Contemporary World*, Berkley: University of California Press.
- Nordstrom, Carolyn (2004) *Shadows of War: Violence, Power and International Profiteering in the 21st Century*, Berkley: University of California Press.
- Ostrovsky, Victor (1998) "Crash of Cargo Plane in Holland Revealed Existence of Israeli Chemical and Biological Weapons Plant," *Washington Report on Middle East Affairs*, December 1998, pp. 19-20.
- Peluso, Nancy Lee and Michael Watts, Editors (2001) *Violent Environments*, Ithaca: Cornell.
- Petryna, Adriana (2002) *Life Exposed: Biological Citizens After Chernobyl*, Princeton: Princeton University Press.
- Rocheleau, Dianne, Barbara Thomas-Slayter, and Esther Wangari, Editors (1996) *Feminist Political Ecology: Global Issues and Local Experiences*. London: Routledge.
- Rostker, Bernard (2002) *Depleted Uranium: A Case Study of Good and Evil*, RAND Research Paper.
- Scheper-Hughes, Nancy and Philippe I. Bourgois, Editors (1993) *Violence in War and Peace: An Anthology*, Oxford: Blackwell Publishing.
- Smith, Gar (1999/2000) "What Was Aboard Flight 1862?" *Third World Resurgence*, No. 112/113, December/January.
- United States Department of Veterans Affairs (2008) *Annual Report to Congress: Federally Sponsored Research on Gulf War Veterans' Illnesses for 2007* Deployment Health Working Group Research Subcommittee, Washington, D.C.
- Washington Post (2007) "Ties to GOP Trumped Know-How Among Staff Sent to Rebuild Iraq," Rajiv Chandrasekaran, September 17.
- World Health Organization (WHO) (2001) *Depleted Uranium: Sources, Exposure and Health Effects*, Geneva, Switzerland, April 2001.