Chapter 9
More Than Skin Deep: Situated Communities and Agent Orange in the Aluoi Valley, Vietnam

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Abstract I build upon feminist arguments for situated knowledge and pragmatist arguments for experimental inquiry to articulate and argue for an approach that I refer to as situated communities. This approach seeks to generate effective and ethical scientific research practices by asking that researchers focus on communities in their complex environment as subjects of study instead of relying primarily on clinical trials and laboratory research. Communities should be recognized as situated epistemic agents and as changing, evolving centers of life. Doing so requires that these communities are understood in their materiality through bodies that are aged, gendered, abled/disabled, raced, classed, colonized, bordered, materially advantaged and disadvantaged, engaged in particular daily practices within a complex environment.

To illustrate my argument I analyze the effects of Agent Orange on communities in the Aluoi Valley, Vietnam and the accompanying research on Agent Orange. I argue that when studied through the situated communities approach instead of in the isolation of the laboratory, it becomes much more obvious why Agent Orange can cause the congenital anomalies, cancers, and other diseases the Vietnamese claim it does. I focus especially on women in this region because they carry the largest social burden of the effects of Agent Orange due to their role in agriculture, housework, childbearing, breastfeeding, and caring for children and adults affected by Agent Orange.

Keywords Agent Orange • Communities • Dioxin • Pragmatism • Situated knowledges

Mainstream philosophy of science and mainstream science obscure the practical social and political significance of scientific knowledge practices by idealizing the

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laboratory and the clinical trial as models for objective knowledge acquisition. Our daily lives are mediated by magazine ads, commercials, and news blips that report the latest clinical trial of the latest drug or the most recent results of experiments on the toxin that happens to top our list of social concerns. We absorb this knowledge rather passively because we are taught to believe that this data tells us something, something about what our lives would be like if we take this drug or whether we are safe from the effects of this chemical. Few of us question whether the methodology used to gather this information is the best or only methodology to give us the knowledge that we need to live well and act effectively. We rarely think about how this particular knowledge-making practice drives policy and action. Nor do we consider that there may be other, equally effective or more effective methodologies to generate scientific knowledge and action.

Feminist philosophy of science and pragmatist perspectives have challenged the orthodoxy of scientific practice on numerous levels, such as the neutrality and objectivity of scientific methods, practitioners, and knowledge. They have also challenged claims of epistemic individualism, the fact-value distinction, and the qualitative distinction between the natural and social sciences.[1] In this paper I build upon feminist arguments for situated knowledges and pragmatist arguments regarding experimental inquiry to formulate a position that I am calling situated communities. This position entails a move back to some of the values endemic to scientific practice by calling for a reorientation of contemporary science. It first requires an engagement with the everyday world in which we live to generate scientific knowledge and action instead of relying on the primacy of laboratory experimentation and clinical trials. Second, situated communities requires an increased awareness and attention to the ethical consequences and social outcomes of scientific methodologies. Both of these are practices that pragmatists argue were and should continue to be an intrinsic part of the values of science. I argue that the situated communities approach not only provides us with a better epistemic lens and a more effective methodology, it also provides the knowledge that we need to practice responsibly. I use the case of Agent Orange in Vietnam as an example of the inability of predominant scientific methods to provide substantive knowledge about the effects of Agent Orange in these Vietnamese communities, thus reflecting an inability of these methods to responsibly address the health and social needs of Vietnamese victims of Agent Orange. I point to more situated methods that are employed in examples of research that work outside of the predominant model. This situated approach provides a better understanding of the effects of Agent Orange and directions to act responsibly.

I begin by recounting an experience I had in Vietnam that led me to the situated communities argument and finish by coming back to Vietnam to use the situated communities approach to assess the evidence for Agent Orange causing congenital anomalies, cancers, and other serious health effects in the people living in the Aluoi Valley.

[1] See for example, Dewey (1925, 1929), Harding (1986, 1991, 1998), Longino (1990, 2002), Nelson (1993), and Seigfried (1996).

9.1 Being in Vietnam

The Tu Du hospital in Ho Chi Minh City is Vietnam's largest women's hospital. When I went Vietnam summer of 2004 with a group to study how the change to a market economy, Doi Moi, affected the Vietnamese, we were asked to visit the hospital and to tour its Peace Village. I knew little about Peace Villages, little about Agent Orange, and little about the destruction that I was about to see.

As I walked out of the offices, a clinical space that revealed very little about what I was about to experience, I was troubled that two generations after the American war children were being born with an alarming rate of congenital anomalies in the communities having the highest levels of exposure to Agent Orange. The director of the hospital said they suspect there are genetic changes occurring at the somatic level, in utero, as well as the at the germ cell level, the level of the sperm and egg. What little I knew about research done on Agent Orange and U.S. Vietnam veterans indicated that dioxin could not have genetic effects on these levels; dioxin was supposedly unable to bind with or alter the structure of DNA.[2] Yet, I didn't know how else to explain the effects they were describing to me.

As I approached the Peace Village housed within the hospital I began to be challenged in a new way. I saw what was literally a village, set up with the goals of community interaction in mind, nothing like the sterility and false sense of safety generated in U.S. hospitals' common space. This was a space that reflected the needs of an impoverished community. Most of the patients housed in the Peace Village came from rural areas; many were from the Central Highlands and were poor. The village reflected energy and life, unlike U.S. hospitals that feel lifeless, literally and metaphorically.

As we walked through the village, we acquired an escort. He was a young man who several years earlier had been separated from his conjoined twin. He was dynamic, spoke to us in English, (typically American, none of us spoke Vietnamese) and did not seem overly hampered by the loss of the leg he shared with his twin. His vibrancy did not prepare me in anyway for what I was about to experience as he escorted us up the elevator into the rooms that housed the other children in the Peace Village. What I saw can't be described well. The best I can say is I saw bodies and lives destroyed in a way that was beyond my experience, beyond the experience of most westerners. This was a war zone, but 30 years after the American war ended. It hit me at a gut level that is hard to describe.

A Vietnamese-American woman came walking out of a room I was about to enter. She was carrying a child who suffered from hydroencephalitis, a swelling of the brain and cranium. The little girl also had no eyes, her eye sockets were fused shut, her mouth and palate were severely deformed, as were her arms and legs.

[2]Like many people in the U.S. who heard about Agent Orange, my knowledge came primarily from the 1978 lawsuit, settled in 1984, by U.S. Vietnam veterans against the manufacturers of Agent Orange. Until recently the claims by the U.S. government and the chemical manufacturers dominated the public and scientific opinions on the effects of Agent Orange.

The woman's name was Trinh Kokkoris. The name didn't mean much to me and it wouldn't have to most U.S. citizens, but it should have. The name Kokkoris meant a lot to the Vietnamese. In January of 2004 her husband Constantine Kokkoris had filed the first class action lawsuit against 37 chemical companies on behalf of the Vietnamese victims of Agent Orange. Though the children in this room were not named in this legal suit, these children and countless children and adults like them would be beneficiaries if damages were awarded.

The physical evidence that I was seeing and the claims of the hospital's doctors didn't fit with the physical laboratory claims made by researchers who worked on the effects of dioxin. I want to emphasize that for both claims there was evidence, but they were different types of evidence, from different settings. One was in the clinical setting of the laboratory and one was here, in the living, situated environment of Vietnam, a physical and social environment in which Agent Orange existed and has existed as part of daily life since it was first sprayed in 1961. Scientists tend to dismiss evidence from the 'wild' nonclinical setting because this evidence doesn't accord with predominant scientific methodologies, like toxic risk assessment or randomized control trials, which rely upon isolating substances to understand their effects or isolating organisms to understand how they are affected. These methods are thought to ensure a more purely objective body of evidence because of their isolation from the complexity of the everyday world, which ironically is the setting in which life takes place and we actually experience things.[3] My visit to the Tu Du Hospital helped me to recognize a gap in what many scientists and lay people want from science, for it to generate knowledge to improve human living, and, in this case, its ability to do so. I began to question whether our current scientific methods could meet the needs of communities that are situated outside of dominant culture and experience multiple impacts, such as from poverty, poor access to medical care, environmental contaminants, stress, war, racism, colonialism, and sexism. From this experience I began to formulate the argument for situated communities.

9.2 Knowing One's Place: Situated Knowledges and Concrete Engagements

The view that all knowers and knowledge are situated is one of the most important and tangible insights generated in feminist science studies. It has resulted in epistemological and methodological reframings of scientific practices and has led to ongoing critical work in feminist science studies and feminist epistemology. Though Donna Haraway was the first to use the term 'situated knowledges' in her 1991 essay 'Situated Knowledges: The Science Question in Feminism and the Privilege of

[3]Code also works to drive this point home in *Ecological Thinking*. This is especially evident in her discussion of the knowledge Rachel Carson generated from turning to the world for her knowledge instead of to reports from laboratory testing.

Partial Perspective,' it has been developed more fully in feminist epistemology in recent years by such writers as Sandra Harding, Patricia Hill Collins, and Lorraine Code.[4] At its most basic level, situated knowledge is the claim that all knowledge is generated from a knower's particular location, which consists of the complex unfolding of one's social, material, epistemological, gendered, lived bodily experience. There is no purely objective knowledge in the sense that there are no individual purely objective knowers, i.e., epistemic subjects who are totally free from values, biases, and background assumptions.[5] All knowers are situated within and through their experiences and this bears upon the knowledge they acquire. Though Haraway's argument for situated knowledges was primarily epistemological, methodological implications were implicit. With the development of the epistemological components of situated knowledges in feminist science studies, there also came an increasingly explicit emphasis on its methodological import.

The move toward viewing situated knowledges as both epistemic and methodological is important. It provides the tools for not only understanding how knowledge functions, but also what we can do with knowledge that is situated. In other words, this move provides a way for knowledge to be transformative. In the second edition of *Black Feminist Thought* Patricia Hill Collins is particularly careful to distinguish between epistemology and methodology. As she points out, epistemologies give us accounts of truth, standards for knowledge, and tools to assess that knowledge. Methodologies are the 'principles of how to conduct research and how to interpret' the frameworks we use to understand the world (2000, 252). Methodologies are also those means we use to interact with the world and people in the world.

'Situated knowledges' is both epistemological and methodological. It is epistemological in that it is a theory about how to gain more accurate or more objective knowledge and it explains how individuals and groups have particular epistemological worldviews based on their material location. It is methodological because, as I argue below, it becomes a tool to generate knowledge about the world and to provide better means for our interactions with the world.

Sandra Harding's standpoint epistemology also has argued for both the epistemological and methodological salience of location. As early as her 1986 book *The Science Question in Feminism* and in more detail in her 1991 book *Whose Science*, *Whose Knowledge*? Harding argued that all knowledge is generated from a standpoint, i.e., from a particular social and historically mediated perspective. All knowledge is generated from a location, and some knowledge and starting points for generating knowledge, those of women, are better at developing objective

[4] Among other feminists that have influenced the direction of situated knowledge arguments are Chela Sandoval (2000), Sarah Hoagland (2001), and Chandra Mohanty (2003). In this paper I don't take up their work on situated knowledges because I am focusing on feminists whose work has most directly influenced discussions in feminist philosophy of science. In my project, *Actions Which Change the Face of the World*, I develop and utilize a broader range of work in feminist epistemology to address the situated nature of knowledge.

[5] See for example Collins (1986), Longino (1990), Haraway (1991), and Harding (1991) for nuanced discussions of the subjective nature of individual knowledge.

knowledge because of the standpoint from which they originate. Harding argued that not only should we recognize the situated nature of all knowledge, we also need to employ location or situation as a methodology from which to start thinking. Just as standard scientific methods ideally sought to gain objective knowledge, Harding's standpoint approach sought to maximize scientific objectivity. She argued that because '[w]omen are valuable "strangers" to the social order,' scientific questions should be initiated from women's perspectives (1991, 124).

In *Science and Social Inequality*: *Feminist and Post-Colonial Issues* (2006) Harding continued to develop the situated nature of standpoint theory by drawing on the work of feminist ethnoscientists, such as Vandana Shiva (1989a, 2000), and feminists working on gender and development, such as Rosi Bradiotti (1994) and Drucilla Barker (2000). The work in these areas provided significantly more context for the experiences that shape particular women's lives and knowledge; among these are gendered practices, governmental involvement, economic influence, environmental conditions, and women's access to basic resources, including food, water, fuel, and medical care. Harding's attention to the particularities of situation allowed her to employ standpoint theory to more directly address issues of gendered, global injustice. She asks her readers to '[c]onsider for example, the different interests of women concerned with the relation between apparent increases in cancer and living "downstream" from toxic industries and, in contrast, tribal or peasant women living on the edge of the expanding Sahara desert, who experience decreasing supplies of water, food, and fuel, which they must supply to their communities' (2006, 99). The standpoints and needs of these women differ, but so do the methods necessary to address these related but particularly different examples of injustice. We can't engage these issues by thinking of women's lives only collectively. Instead we must also understand that women's experiences, standpoints, and needs differ based on the material conditions of their lives. This recognition puts situated knowledges in a more effective position to tackle issues of global injustice.

The increased focus on materiality and concrete nature of situation and its epistemological and methodological importance is especially apparent in Lorraine Code's argument for ecological thinking. In *Ecological Thinking*: *The Politics of Epistemic Location* (2006) Code emphasizes the importance of place, as habitat and as an epistemological location. She argues that a significant aspect of situated knowledge is that it is not just a place from which to interrogate knowledge or from which to generate knowledge; location – social location and physical location/habitat – is a place to be interrogated. Code views situation or 'habitat as a place to know' (2006, 37) and emphasizes that, like all living things, humans are ecological subjects. Just as ecology must take into account all the interactions an organism engages in, experiences, and is affected by, ecological thinking 'builds on the relations of organisms with one another and with their habitat, which comprises not just the physical habitat or the present one, but the complex network of locations and relations, whether social, historical, material, geographical, cultural, racial, sexual, institutional, or other, where organisms – human or nonhuman – try to live well, singly or collectively' (2006, 91). Code's work generates an epistemology from the methodologies in ecology. She then uses this epistemology to generate a methodological

approach to knowing the world. Thus, ecological thinking offers a way to know 'us', humans, in the world, and provides a fuller accounting and direction for engaging in the world than less situated modes of philosophical practice have provided.

Given the analysis generated in this section, the following claims can be attributed to arguments for situated knowledges:

1. Situation is an epistemic location, i.e., a place from which to know.
2. It is a vital location, that is socially, materially, and historically salient to its members.
3. It is a place to know or a place to interrogate.
4. It is also a methodological location from which to initiate critical, transformative practices, practices that are informed by location.
5. It is a place whose conditions are transformed by its own methodology as well as a place that methodologically transforms epistemology.

9.3 Pragmatism as Methodology: Experimental Inquiry and Practice

Situated knowledge arguments provide an important framework for thinking about the ways that gender and material location shape epistemologies, methodologies, and needs. The power of situated knowledges can be honed by combining it with the insights of classical pragmatism, which, through the work of John Dewey, championed experimental knowing/inquiry as the most promising method for doing philosophy as well as for doing and critiquing science. By tying situated knowledges to pragmatism and experimental inquiry I ground situated knowledges in a practice that was intrinsic to the rise and success of scientific practice. Thus, as I argue below, because of its emphasis on goal driven, physical and ethically responsible engagements with the world, this pragmatic direction is able to provide a more critical method by which to assess if science has been able to meet values and goals that were set out in science's development.

In *The Quest for Certainty* (1929) Dewey argued against the passive, distanced epistemological inclinations endemic to philosophy, which he labeled the 'spectator theory of knowledge,' in favor of the epistemological practices developed in the rise of science in the early modern period, what he called 'experimental knowing' or 'experimental inquiry.' Experimental knowing, which served as a model for all knowledge acquisition, 'is [a] mode of doing, and like all doing takes place at a time, in a place, and under specifiable conditions in connection with a definite problem' (1929, 102). Furthermore, unlike the passivity of the spectator theory of knowledge, experimental inquiry is directed. It gains knowledge by varying conditions and directing its inquiry toward a goal, not passively receiving information (Dewey 1929, 123). Dewey argued that what really marks the difference between the methodologies of philosophy and experimental inquiry is the emphasis that experimental inquiry places on physical doing or activity; in other words, it emphasizes a targeted, physical engagement with the world to create change and understanding

through *altering* conditions and relations. Thus experimental inquiry intentionally opens the door for further engaged inquiry and transformation, within the physical and social world, where philosophy had, effectively, shut the door.

Experimental knowledge is concerned with the materiality of the world, or as Dewey put it 'with the world in which we live, the world which is experienced' (1929, 102). Experimental knowledge initiates its inquiry from the 'things of the environment experienced in our everyday life, with things we see, handle, use, enjoy and suffer from…' (1929, 103). As a practice or 'mode of doing' it situates its activities in terms of a specific problem or question, within a specific location, set of conditions, and time, and sees the everyday world as offering opportunities for inquiry and challenge. Dewey argued that the problem with which we are working determines what particular methodologies or operations we are to use, unlike philosophical methods that determine what kinds of questions to ask given what kinds of methods are at our disposal. We know that our ideas and thoughts are well-founded when they direct our activity toward what is required, i.e., what we hope to solve, achieve, or change. Our ideas matter in the sense of how they can help us to 'rearrange and reconstruct in some way, be it little or large, the world in which we live' (1929, 138).

For all Dewey said about the efficacy of experimental inquiry coming out of science as a model for inquiry, he was concerned that science was not living up to its own standards. Not only did science fall back into some of the same problems that the spectator theory did, it also pushed aside those sciences – the biological sciences – that were concerned with human needs. Through relying upon physics as a model for all science, resulting from the prominence of logical positivism and unity of science programs at the turn of the twentieth-century, science distanced itself from the needs of the everyday world. This resulted in an approach to science that was 'remote from any significant human concern' and 'at the expense of all that is distinctly human' (1929, 196).

The biological sciences then began to model the physical sciences by moving away from experimental inquiry, toward the model of the physical sciences that was becoming more dominant. They sought to limit the sphere of inputs for knowledge, which resulted in generating knowledge that did not necessarily reflect human living nor could guide us in changing the conditions of living. The biological sciences, thus, now rely upon an isolated mode of laboratory experimentation and clinical trials as norms instead of experimental inquiry. For example, the rise of Evidence-Based Medicine (EBM) since 1992 and its emphasis on randomized control trials as the 'gold standard' (Sackett et al. 1996, 71) for generating evidence is indicative of the relevance of Dewey's target of criticism in contemporary science and medicine. Dewey argued that the move away from experimental inquiry is a significant loss for experimental human sciences and results in a distancing of research from the concrete situations pertinent to it, and thus from useful knowledge that can create change. As Kravitz et al. argue in 'Evidence-Based Medicine, Heterogeneity of Treatment Effects, and the Trouble with Averages,' the standard methods of EBM indicate treatment for the average person, but patients 'who deviate far from the average trial participant…may behave differently' when treated (2004, 675).

Thus the people whose lives are the most complex may be those the least likely to benefit from therapies indicated by EBM. On the contrary, embracing experimental inquiry as a framework for scientific and medical investigation has the potential to do the kind of work that the human sciences seek to do: to improve the material conditions of people's lives by providing an accurate and full understanding of human living. Thus, through his pragmatic philosophy, Dewey asked scientists to return to the methodology of experimental inquiry and reintegrate it into scientific practices.

Embracing experimental inquiry does not make 'soft' science nor is it anti-science. It is the very foundation of how we came to do science. However, it does illustrate that contemporary scientific methodology, which holds as its predominant methods laboratory research and randomized control trials, is not the only way to engage in scientific practice or to engage the world. Dewey's insights recognize that science, good science, can be done through the concrete practice of experimental inquiry and that good science has always been deeply tied to the achievement of human good and human values. Dewey is not asking for anything new to be added to science. He is merely asking researchers to reengage the practices that initially gave science its distinctive methodological power.

9.4 Situating Communities: A Pragmatist Feminist Approach to Scientific Research

Situated knowledge arguments focus on the situated nature of the epistemic agent. Thus, the philosophical import of these arguments lies in recognizing the situation of the knower, not what is being known. I characterized situated knowledges as moving toward increasingly particularized engagements and becoming increasingly methodological in import. I build from these insights to provide another way of thinking about situation by linking it to experimental inquiry. I argue that if our goals are to acquire accurate knowledge that we can act upon to improve human living, then we need to emphasize the situatedness of the communities that are studied by scientists and recognize that communities need to be studied in this complexity.

Dewey isn't telling us anything new when he articulates his despair that the natural and human sciences now rely primarily on methods that are 'most remote from any significant human concern.' Though we recognize that clinical trials are designed to be distant from how we actually do live, they are part of our daily vocabulary and we treat them as if they give us certain knowledge. We are inundated with reports of the efficacy of the most recent weight loss pill or depression medication. Whether we listen to these carefully or not, what has become normalized in our culture is the assumption that these tell us something, something significant and that if we too take pill X, we will experience similar results. Laboratory experimentation, though not as much a part of popular press, too instills us with the same confidence. When we find through toxic risk assessment that, with all other variables eliminated, that chemical Y couldn't harm humans in any context, we tend to believe it, because this type of methodology has come to signal to us the epitome of pure, accurate knowledge.

Because the laboratory environment intentionally is distanced from the outside world and free from complex factors that are thought to complicate results, the knowledge generated also is thought to be free from bias, accurate, and universal.

It shouldn't take Dewey to make us see how relying primarily on these two modes of investigation is problematic, but those within the sciences, and the public who has been habituated see these methods as the mark of good science, view data from the 'wild' non-clinical, non-laboratory setting with suspicion. I am not arguing that we should do away with laboratory experimentation or clinical trials, but that we need to study living situated communities *also* if our goal is to acquire knowledge that is accurate, effective, and ethical. We require knowledge that helps us to understand the complexity of the world, and knowledge that helps to better direct our engagements with this world, both epistemologically and with an eye toward social justice. These are values that we should return to in scientific inquiry. Experimental trials and laboratory experimentation do provide a certain degree of epistemological success, i.e. they provide us with some information about the world and guidance for action. For example, randomized control trials of birth control pills indicate that birth control pills have a 99% effectiveness in preventing unwanted pregnancies. What these trials don't indicate is that women taking birth control pills are not exercising the same input control that women in clinical trials are screened for and directed to employ. Studies that were initiated because some women more typically conceived while on birth control have now found that birth control pills are less effective for overweight and obese women (OBGYN and Reproductive Week 2005). Furthermore, women don't necessarily live in a world where birth control pills can be taken at the same time every day, thus diminishing their effectiveness. Trials do indicate how birth control pills work in a controlled setting, but they don't indicate how birth control functions in the complexity of women's lives. If the goal is to help women prevent unwanted pregnancies, then we need to know not only how birth control pills function in an idealized setting, but how they function practically in the lived, complex uncontrolled lives of those women that are meant to benefit from them. Thus, these trials do generate knowledge; they just don't provide the complex array of knowledge that is needed to help women live well. Starting from the everyday world of women's lives would have initiated a more complex array of questions and a more complex mode of study.

Furthermore, the communities that are studied by researchers and are impacted by science and medicine develop and are situated by the pertinent conditions and social heritages the members share.[6] Location, health, environments, histories of marginalization, race, gender, sexuality, class, ability, and age shape and form communities. These same factors serve to situate communities, not only by generating specific knowledge or ways of being, but also by marking them in historically, socially, and physically distinct and significant ways. Not only do people come to see the world in a way that is mediated by their situation, i.e., they occupy specific epistemological perspectives, but people live in transaction with these pertinent

[6]See Anderson (1983), Dewey (1954), Du Bois (1995), Mohanty (2003).

conditions. In other words, these conditions continually shape communities and communities continually shape their conditions. Communities are occupied by humans who are embodied and in transaction with their environment. Communities so understood are thus the subjects and objects of knowledge; to borrow from Dewey, they are the knowing and the known.

Experimental knowing starts from the conditions of a community, the conditions of 'the world in which we live, the world which is experienced' (1929, 102) and initiates its inquiry from the 'things of the environment experienced in our everyday life, with things we see, handle, use, enjoy and suffer from' (1929, 103). It thus starts inquiry from the situatedness of the community. This means that we need to ask different sorts of questions than the sciences have been asking. My case example of Agent Orange in the Aluoi Valley will provide an illustration of the type of questions that need to be asked according to a situated communities approach, along with some of the answers.

If, according to a situated communities approach, research is to be initiated from the complexity of the everyday world, researchers must be in intimate contact with the communities whose lives they are intending to benefit. Though researchers do come with a knowledge-set about their study and the subjects of their study, depending on how they are situated they may not necessarily have insider knowledge of the intricacies of a community and the lives of its members that comes from being situated in and through a community.[7] Nor are researchers likely to have the knowledge of what it is like to live with a particular contaminant or illness. They lack the embodied, authoritative knowledge that can only come from direct lived experience. Only through prolonged conversation, careful listening, and recognition of members of the community as epistemic agents can researchers learn what kind of questions they need to ask, obtain, and understand the answers to these questions, and observe factors that may not come up through dialogue. Scientific research has long functioned through an epistemology of distance. Through the study of situated communities it will need to employ an epistemology of intimacy.[8]

Within the current climate of mainstream philosophy of science and mainstream science, the approach I am advocating here is likely to be cast as anti-science.[9] Yet given the historically held scientific goal of understanding and improving human living (knowing and doing), especially in the case of the biological sciences, and given my argument's foundation in experimental inquiry, it is difficult to cast it

[7] See Collins (1986, 2000).

[8] See Lugones (2003) and Frye (1983) for insightful arguments on arrogant perception and loving perception. In a different version of this paper, I address how these relate to science and my argument.

[9] Arguments that seek to create change in science frequently are cast as reactionary and designed to denigrate science when their actual goal is to improve how science is practiced. For example, feminist science studies was 'feminist critiques of science,' but 'critique' was viewed by mainstream science studies, scientists, and popular press as anti-science even though these early analyses were largely generated by female scientists whose goal was to develop better scientific knowledge, not to dismantle science.

in this manner. Dewey admits that we don't know if in every case experimental inquiry will give us sure results. Because this approach is built upon experimental inquiry, which focuses on the outcomes of our actions, we can't determine what the result will be each time we approach something from the perspective of situated communities. Yet, this also is the case with clinical trials and laboratory experimentation. And, as Dewey, points out, this is the very point of experimental inquiry – it is to be tried (1929, 271).[10]

From this situated communities perspective, I am going to provide a case analysis of the effects of Agent Orange on a particular set of communities in Vietnam. The argument I have set out for situated communities becomes more apparent when it is put in to action. This should not be surprising considering this exactly what feminist and pragmatist arguments indicate: it is in the doing that we see the import.

9.5 Agent Orange in the Aluoi Valley

9.5.1 From Operation Ranch Hand to Dioxin Reservoirs

In 1961 the U.S. government launched Operation Ranch Hand, formerly called Operation Hades, on the land and people of Vietnam. From 1961–1971 the U.S. government sprayed areas of southern and central Vietnam with chemical defoliants to eliminate forest cover hiding Vietnamese soldiers and food sources for soldiers and civilians. Spraying continued by the South Vietnamese military, at lower quantities, until 1975. Most of these chemical defoliants contained a type of dioxin labeled TCDD (2, 3, 7, 8-tetrachloro-dibenzo-para-dioxin), which is the most toxic human-made substance.[11] The Vietnamese consider the use of Agent Orange by the U.S. government chemical warfare and to quote Dr. Tran Xuan Thu, the 'first war

[10] I consider implications of the situated communities approach in my manuscript *Actions Which Change the Face of the World*. Among these are whether the situated communities approach is time consuming and therefore burdensome, issues of epistemic authority, the limits and extent of our knowledge, the ethical and epistemic consequences entailed with speaking for, with and to marginalized groups, issues of epistemic honesty and humility, the challenges of pluralism, and structural constraints with funding more situated projects.

[11] Agent Orange was not the most toxic of these chemical defoliants sprayed in Vietnam, Agent Purple was. However, Agent Orange is the most referenced of these and of the most concern because it was the most heavily sprayed defoliant through aerial and hand spraying as well as the highest source of contamination through leakage in and around former U.S. military bases, areas that are in immediate proximity of Vietnamese hamlets. Data collected in 2003 increases the U.S. government's post-war estimate defoliant spraying by seven million liters (Stellman et al. 2003, 1) and contamination by dioxin from an estimate of less than 170 kg to greater than 600 kg (Dwernychuk et al. 2005, 998). This does not include containers leaks at U.S. bases, which are the location of the most heavily contaminated dioxin sites in Vietnam and the rest of the world.

of eco-destruction in the world history' (2006, 1).[12] It is estimated that 4.8 million Vietnamese were exposed to Agent Orange and three million have or are experiencing the effects of Agent Orange. Thu reports that '[a]ccording to data collected from certain provinces, among victims, half were civilians and 85% of households had two or more victims, 3% [had] five [victims]' (2006, 10).

Most research on Agent Orange's effects on humans has relied heavily on animal testing in the laboratory setting. Until relatively recently, the consensus among scientists has been that the evidence to support health effects experienced by U.S. Vietnam veterans and their children from Agent Orange are at best inconclusive if not just plain false.[13] However, recent assessments of animal studies have questioned the denial of the mutagenic toxicity of dioxin. The National Institutes of Health report on Agent Orange, *Veterans and Agent Orange*, *Update* 2004 provides a meta-analysis of research on Agent Orange. They report that the toxicity of TCDD results from two manners through which it interacts with the body (NIH 2004, 44, 55). The first is through the way TCDD is routed in the body, absorbed, distributed through tissues, transformed, and eliminated (NIH 2004, 44). The second manner is through its ability to bind with and alter the action of AhR (aryl hydrocarbon receptor), a gene regulatory protein. It is speculated that cell cycle control is affected through TCDD-bound AhR, which leads to cell death as well as the 'inappropriate' cellular and hormonal responses and increased oxidative stress (2004, 66). The NIH report finds that human developmental effects and cancers resulting from TCDD exposure are 'biologically plausible,' yet cannot be determined with anything near certainty because of the differences in the way various species are affected by TCDD (2004, 340, 397). That is, because all studies assess the effects of TCDD on nonhuman animals, no claim can be made about its effects on humans. Though this distinction may seem trivial, this argument was used in dismissing the suit brought forth by the Vietnamese against the manufacturers of Agent Orange.[14]

The situated communities approach that I am advocating does not suggest that we throw out these studies, but reasons that we need an additional approach for generating effective knowledge, knowledge that can better develop our understanding of the effects of dioxin on humans in a particular community. It seeks to understand the ways that TCDD interacts with and affects human bodies in the manner described by the NIH as biologically plausible and in, perhaps, other ways not considered by this research. But, unlike the studies that initiated their inquiry from the conditions of the laboratory, this approach starts inquiry from the

[12]This sentiment is echoed by an article in *Nature*: 'In 1961, for the first time in the history of mankind, large-scale chemical warfare was started in South Vietnam by the Kennedy Administration' (1982, 114).

[13]See, for example, Lathrop (1983), Gough (1986), American Council on Science and Health (1981).

[14]See the court documents Memorandum, Order and Judgment: Agent Orange Product Liability Litigation, 10/3/2005 and the epilogue to this paper.

situatedness of the community, directly considering how particular communities and particular members of these communities can be affected.

Like all inquiry, the situated communities approach begins inquiry from a series of questions. Unlike approaches that are more common to the sciences that intentionally limit contextual influences and multiple inputs when beginning inquiry, these questions start from the conditions of the community – its particular location, the lives of community members, the local environment, the social and historical context – and seeks to gain knowledge from this situated approach. The questions a researcher should ask in the case of Agent Orange in the Aluoi Valley in the Central Highlands of Vietnam would be: How long were/are the members of this community exposed? How long would it exist in the ecosystem of the Central Highlands of Vietnam that has particular rainfall patterns, soil, vegetation, and animal life? How does spilled and leaking Agent Orange interact in the environment differently than Agent Orange that was sprayed four decades ago? What practices and occupations of this community are conducive to exposure to dioxin? Practices include diet, food preparation, length of infant and child nursing, bathing, recreation, transportation, and home construction. Furthermore, what does it mean to live with a toxin? Unlike U.S. soldiers who had acute exposure, the Vietnamese have experienced generations of lived exposure. What role does gender play in exposure? Does the higher body fat of women make them more susceptible to dioxin than men? Does the dioxin in their body fat affect ovum, fetal growth, and nursing infants? How are children, the elderly, and the infirmed differently affected by dioxin than healthy adults? Each of these questions is united by the need to understand the situatedness of these communities in order to develop an understanding of the effects of dioxin with the goal to improve lives and the lives of future generations.

9.5.2 Situating Agent Orange in the Aluoi Valley

The material I use to address these questions is generated by Vietnamese, U.S., and Canadian researchers. Some projects were collaborative efforts, others were not. All of the scientific research is from 2001 to 2006. The researchers rely heavily on working with the communities not only to get the samples needed but to understand their ways of living. Operating outside of the predominant scientific paradigm, these research projects, when considered together as a whole, provide one model for the situated communities approach that I advocate.

The Aluoi Valley has been the subject of study because it was heavily sprayed by U.S. forces and there were three U.S. military bases in the valley with large amounts of Agent Orange leakage from barrels left at the end of the American War. Though it has been labeled an Agent Orange ‘hot spot’ because of heavy aerial spraying, at this point, overall, the region does not contain high levels of dioxin in the soil (Dwernychuk et al. 2002). This is attributed to ‘tropical rains, erosion, and chemical degradation’ (Dwernychuk et al. 2005, 998). But in this area there are hot spots that are the result of heavy hand spraying, spillage and leakage from containers

of Agent Orange stored on U.S. bases during the war (Dwernychuk et al. 2002, 118). Such hot spots are marked by contamination of the soil, the ground water, the food, including fish (which are the most highly consumed protein source and the most contaminated), frogs, ducks, chickens, pigs, various greens and root vegetables, and breast milk, which feeds Vietnamese children well into and through their toddler years. Contamination includes the dirt that makes of the floors of the house, the wood used to make cooking tools, houses, boats, sleeping pallets. The majority of people living the Aluoi Valley belong to one of three Vietnamese ethnic minority groups, the Pa Co, Ca Tu, and Ta Oi. Like many of the ethnic minority groups in Vietnam these groups are physically and socially isolated, poor, and live as a subsistence society through farming. The isolation of these communities and their status as minority groups in Vietnam makes living with dioxin even more dangerous, because, as I will argue later in the paper, they lack access to medical and informational resources, in addition to having to rely upon their immediate environment for subsistence.

When dioxin contamination is studied in this valley, in a living environment, it is hard to not see the destruction that the U.S. caused with its use of Agent Orange. Most soil samples from the studied area show high levels of dioxin, levels that exceed the U.S. EPA guidelines for safe residential housing (Dwernychuk et al. 2002, 123). Considering that the members of these communities live in houses with dirt floors, frequently walk barefoot, and through farming and general food production are in close contact with the soil, U.S. guidelines for safety are inadequate to ensure the safety of these people (Dwernychuk et al. 2002, 125). If the soil in this area exceeds U.S. safety guidelines, it is probably significantly more dangerous for this community considering the key differences between their daily lives and those of Americans.

In terms of food, the highest levels of contamination are in fish and duck fat, two significant sources of protein for these communities. This is not surprising considering these are fish cultivated in human-made ponds, dug out of contaminated soil and filled with water that is contaminated (Dwernychuk et al. 2002, 125). The bodies of the ducks and fish accumulate and magnify the dioxin that they ingest, which then through consumption is concentrated and magnified in human bodies (Dwernychuk et al. 2002, 127). Furthermore, animal fat is a delicacy as well as a necessity in Vietnam because of its high caloric content. In a community that physically labors to meet subsistence standards and is still frequently undernourished, high caloric foods represent an important part of the diet. But, due to the bioaccumulation and biomagnification of toxins in fat, these important food sources pose a serious risk for the Vietnamese.

Studies show that older people had higher concentrations of dioxin in their blood, accumulated through years of lived exposure and bioaccumulation, as well as exposure at particularly acute times during and following the American war. If women bear children, they have lower levels of dioxin than men. This can be attributed to the 'offloading' of toxins that occurs when women breastfeed.[15] Dioxin leaves the mother's body through nursing and goes directly to the infant's body.

[15] So, though women's bodies accumulate more dioxin because of their higher body fat (dioxin is lipophilic, i.e. accumulates in fat), they also lose the dioxin from breastfeeding.

Firstborn infants are more greatly affected than latterborn, though all receive contaminated breast milk. In the Aluoi Valley the firstborn infants of women receive an average daily intake of dioxin up to 27 times the amount considered safe by the World Health Organization (Dwernychuk et al. 2002, 130). In one particular hamlet it exceeded this guideline by 47 times.

Compared to men, women socially and physically experience the effects of Agent Orange to a greater extend. This is due to their role in the household and reproduction. In rural areas, Vietnamese women do 76% of the agricultural labor (Longino 2002, 6), such as rearing livestock and fish, working in the fields, gathering foodstuff, tending the family garden (Ha 1997, 66) and almost all of the housework, including washing clothes, preparing food, caring for children and ill members of the household, house cleaning, and educating children. They also are responsible for aiding in the care of sick and elderly members of the community (Ha 1997, 66).

In the Aluoi Valley these activities situate women in such a way that they are more likely to be exposed to dioxin. For example, fish carry high loads of dioxin because they live in water that is contaminated with it. It follows that the women who are farming the fish are not only exposed by consuming fish, but also by coming into contact with the dioxin in the water.[16] Similarly, if the dirt flooring in homes is contaminated by dioxin, not only are women exposed to it by walking on it and living with it, as are all members of their household, they are also exposed through the dust generated by sweeping and cleaning. Most of the activities the women engage in, because they are in such immediate contact with soil and water contaminated with dioxin, increase women's risk of exposure and increase the risk of fetal exposure. Furthermore, women are the caregivers to those who are ill from the effects of Agent Orange, both inside and outside the family, again increasing the effects, in this case the social effects, of Agent Orange.

Vietnam has the highest abortion rate in the world. 'It is estimated that 40% of pregnancies are terminated' (Asian Development Bank 2002, viii). Thus, there are 2.5 abortions per women (Asian Development Bank 2002, viii). When I was speaking with the director of the Tu Du hospital in Ho Chi Minh City she attributed the high rate of abortion partly to selective abortions for infants with congenital anomalies that are attributed to dioxin exposure.[17] In the Central Highlands when infants are born suffering from the effects of Agent Orange, not only do women have the primary responsibility in caring for them, they are frequently doing so without adequate medical care and information. Though health care in rural areas has improved in recent years, village clinics in remote areas are not equipped to deal with the types of illnesses that can result from exposure to Agent Orange. Urban hospitals receive a vast majority of the government funding allocated for

[16]Dioxin is hydrophobic so it rests on top of the water. Thus people working on or in the water easily come in contact with it.

[17]There certainly are other reasons for this high rate, but the director of the hospital was clear that selective abortion because of congenital anomalies was an important contributor to their high abortion rate.

medical care (Binh 1997, 10). This means that adults and children in rural and remote areas can't be cared for well.

Even with this brief bit of data I have presented, it is not hard to see how in a living, situated community, Agent Orange can cause the kind of damage the Vietnamese claim it does, at the same time as results in the laboratory, the space Dewey describes as most remote from human concerns, are found to be inconclusive. What I presented thus far shows for specific communities in the Aluoi Valley a history of lived exposure in locations that have been designated Agent Orange hot spots. We know that in the valley there are high levels of soil, water, and food contamination that have resulted from documented Agent Orange leaks. We also know from the empirical data that there are high levels of Agent Orange in human tissue, blood, and breast milk. Furthermore, in areas of Vietnam where there is very low dioxin contamination in the soil, they also do not have high levels of dioxin in human tissue, blood, and breast milk (Schecter et al. 2001). So thus far I have established a consistent level of exposure and pattern of bodily toxicity.

A meta-analysis of Agent Orange studies that was published in the *International Journal of Epidemiology* in 2006 found that the rate of congenital anomalies among civilian families in this region compared with nonexposed civilian families was 3.27% greater (Ngo et al. 2006, 1220). This number does not include miscarriages – 47.03% in the Highlands compared to 5.77% in Northern samples – or stillbirths, which occur at a higher rate in this area, or abortions (Vietnam Courier 2003, 76). Thus there are 3.27% more congenital anomalies in live births among the exposed people than there are among unexposed civilians in other areas of Vietnam. Furthermore, adult and childhood cancers and skin diseases occur in these areas at a significantly higher rate than in noncontaminated areas of Vietnam (Thu 2006, 14). Thyroid cancer, ovarian cancer, and Hodgkin's disease occur at a statistically higher rate in this region as do multiple, but seemingly unrelated cancers (Thu 2006, 14). Furthermore, developmental problems in children occur at a higher rate, which may be the result of exposure to contaminated breast milk or exposure in utero (Ngo et al. 2006, 1224). When this data is viewed in light of the above evidence, one can see a correlation between exposure to dioxin, bodily toxicity, and disease.

9.5.3 From Evidence to Obligations

It is important to ask ourselves what kind of evidence we need in order to make the claims that dioxin has caused disease in this community and that the U.S. has a responsibility to these communities. Do we need to understand the specific mechanisms of dioxin's interaction with human bodies or does this more situated approach provide a robust enough series of connections to allow us to make correlations between dioxin exposure and significant health effects? When studying Agent Orange in a living situated environment, we see a correspondence between exposure and disease, a pattern that can't be made apparent in the laboratory. Though I am unable to show the direct biological mechanisms that lead from exposure to dioxin

to disease, I am able to show a correlation between disease patterns and exposure. This correlation emerges from the ability to critically track dioxin from the soil, water, and food to the body through samples of blood, skin, and breast milk, and then trace correspondingly high levels of disease in these specific communities, diseases that we would expect from a toxin that alters DNA leading to cellular death as well as 'inappropriate cell activation.'

Experimental inquiry indicates that the problems that we work with determine the methods we ought to use. In the case of Agent Orange in Vietnam, laboratory experimentation cannot deal on its own with the problems that need our work, and it constrains our ability to answer the question whether Agent Orange causes the health effects described by the Vietnamese. But with a pragmatist feminist focus it becomes obvious that if we employ experimental inquiry and the evidence that can be generated by the situated communities approach, then the data pointing to a correlation between dioxin and disease is enough to determine that we do have scientific knowledge about the health effects of Agent Orange. This knowledge ties the U.S. government and the 37 chemical manufacturers to obligations, both moral and legal, to improve the lives of those affected by Agent Orange and to change conditions to mitigate exposure to dioxin in the future. Again, knowledge to improve human living is an important goal of science. I am not asking for anything more than goals that science had already set for itself.

9.6 Conclusion

In this paper I have argued that our epistemologies tie us to methodologies that allow scientists to engage communities more or less responsibly. The methodologies that are indicative of predominant scientific practice rely on understanding conditions that are remote from how communities actually do live. The situated approach that I am advocating not only provides a fruitful way of understanding communities in a more nuanced and complex manner, it also allows researchers to recognize how these communities' health needs may not be met by the type of evidence that results from their methods. When researchers look to the everyday world to understand how communities live with diseases, toxins, poverty, and oppression, it presents opportunities for them to ask questions that not only provide greater epistemic success, but also point in the direction of how to responsibly engage these communities.

In the case of Agent Orange in Vietnam, the stakes are high. One type of epistemological worldview indicates that in fact we have no obligations to the Vietnamese. Because researchers can't make claims about dioxin beyond what is found in toxic risk studies on animals, they can't make any claims about what dioxin does to humans. But the situated communities approach asks us to look at the lives of the people of the Aluoi Valley and to engage science from the perspective of their lives, in their place. In doing so it becomes apparent that there is a significant correlation between high disease rates and high levels of environmental

and bodily dioxin contamination. In this situation it is difficult to deny that the U.S. does have ethical obligations to the Vietnamese to, at minimum, assist in cleaning up the local environment and providing means to meet their health and social needs. The U.S. government and the 37 chemical manufacturers also may have obligations that reach beyond these basic ethical obligations to include financial remuneration, much like that awarded to U.S. Vietnam war veterans. As Dewey so adamantly asserted, with the responsibility of engaging in scientific practice, comes obligations that go far beyond the practice of science. It includes the responsibility of helping others to live well in their situation.

9.7 Epilogue

It has been 6 years since I was in Vietnam. I am still haunted by what I saw and by the intentional and ongoing harm created by the U.S. and U.S. chemical companies. I was horrified all over again in March of 2005 upon learning that Judge Weinstein had thrown out the petition filed on behalf of the Vietnamese victims of Agent Orange. In the 233 page legal decision Weinstein cited numerous references to toxic risk assessments and other forms of laboratory experimentation. These showed no or dubious connections between dioxin and illness other than chloracne. Very little evidence came from people working in Vietnam, studying Agent Orange in its environment. He argued that there was insufficient evidence that Agent Orange caused birth defects, miscarriages, stillbirths, and cancers. In reality what was insufficient was the methodology used to gather the information. How we study Agent Orange and dioxin matters to three million people. Because predominant scientific methods prioritizes evidence gathered in settings 'most remote from any significant concern' over evidence that comes from a living, situated community, the people of the Aluoi Valley will lack the social, medical, and financial resources to care for themselves and their communities, and they will not have the resources to change the physical structure of their community to reduce their exposure. Thus, the victims of Agent Orange continue to be victims of how we do science.

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