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"But I Know It's True": Environmental Risk Assessment, Justice, and Anthropology

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Few social issues depend as heavily on scientific information as environmental problems. Yet activists, governmental officials, corporate entities, and even scientists agree that much of the science behind environmental risk assessments is controversial and uncertain. Using a low-income African-American neighborhood as a primary case example, this paper illustrates in concrete terms how environmental risk assessments can exclude the experiences of the poor and people of color. Further, race and class experiences intensify a community's susceptibility to, and perceptions of, risk. These experiences and perceptions underpin the ways that communities contest scientific biases in everyday practice. After discussing alternative approaches to contemporary risk assessment that combine ethnographic research with other kinds of scientific expertise, I conclude by offering a four-fold model for resolving some of the problems raised by this essay. This model draws upon multiple kinds of knowledge bases and includes research, advocacy, policy recommendations, and theoretical innovation.

Key words: environmental justice, science and culture, racism, United States

In September 1993, over 200 residents living in the Hyde Park area[1] of Augusta, Georgia gathered in the Jenkins Elementary School cafeteria. Residents had come together that night to attend a meeting with officials from the Environmental Protection Agency (EPA). The meeting's purpose was to announce the results of a $1.2 million EPA study of the area's air, groundwater, and soil. Data from this study had provided the basis for a health consultation, compiled by the Agency for Toxic Disease Registry (ATSDR), the results of which were also to be discussed that evening. The health consultation was of primary concern to meeting attendants, as it would determine whether and to what degree their health was at risk from environmental contaminants. Although most of the people living in the area were homeowners, they could not afford to move unless they sold their homes for a competitive price. Rumors of contamination and the area's general economic and social decline (Hyde Park was especially known to be a drug-dealing hub) made selling homes extremely difficult. The results of the ATSDR's risk assessment would determine whether or not residents would find assistance—either from the U.S. government or through legal action—to move out of a neighborhood that they firmly believed was contaminated by the surrounding industries.[2]

The EPA's Field Investigation divided the Hyde Park area into five neighborhoods. Investigators found high levels of arsenic, chromium, and dioxin in the surface soils and groundwater of two of those. In all five neighborhoods, they found significant levels of PCBs and lead. However, the ATSDR announced that night that these chemicals did not constitute a significant threat to residents' health unless they "inadvertently ingested it on a daily basis for many years" (Health Consultation Final Release 1994).[3] Residents received this news in a fury. At one point in the meeting, one man presented the EPA's division director with a four-gallon bucket of sludge he had just taken from the ditch in his backyard. Offering the EPA official the sludge, the man asked him to smell it and then say whether he would want to live anywhere close to it. The crowd in the packed cafeteria shouted, "Answer, answer," and the official replied, "No." Over the next few minutes, tensions continued to escalate until one man threw a chair onto the Jenkins stage, marking the culmination of three year's worth of mounting frustrations, tensions, and fear.

When they tell this story, Hyde Park residents shake their heads and chuckle. They argue for a little while over who threw the chair. Yet, eight years later, they still puzzle over why the EPA and its sister agency, the ATSDR, are unable to correlate unusually high levels of contaminants with high

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local rates of certain illnesses. "But I know it's true" is the oft-repeated refrain of environmental justice communities across the country, who similarly find dangerous chemicals in their soil, air, or water. Although these people know that they and their neighbors suffer from uncommon health problems, they have been unable to secure scientific proof that the chemicals are the cause. Because governmental and legal decision makers rely on environmental science to determine whether they are going to assist environmental justice communities, scientific methods and procedures are for some people, a matter of "life and death."

Over the past two decades, the environmental justice movement has called attention to the disproportionate siting of hazardous waste facilities in neighborhoods of color. In so doing, environmental justice activists have expanded their definition of the environment to include all of the resources (i.e., adequate housing, education, employment, etc.) to which they have historically been denied access (Adams, Evans, and Stein 2002; Checker 2002, 2005; Cole and Foster 2001; Novotny 2000). Similarly, environmental risks include an array of social categories—health, justice, science, and community—all of which are culturally contingent and socially constructed (Haenn 2003). Because it is beyond the scope of this paper to address all of these categories in depth, I limit my focus to science, environment, and justice. From that vantage point, I also problematize the ways that hazards and risks are currently defined. It is my contention that, as it is currently practiced and conceptualized, environmental science does not necessarily serve environmental justice (Brullel and Pellow 2006).

Few social issues depend as heavily on scientific information as environmental problems (Kriebel et al. 2001). Yet activists, governmental officials, corporate entities, and even scientists agree that many scientific aspects of environmental risk assessment are uncertain, mainly because they are based upon probabilistic information (see Cutter 2002; Finkel 1994; Israel 1995; Kroll-Smith and Floyd 1997; Montague 2003; Scoones 1999). Such uncertainties are all too clear to members of communities struggling for environmental justice, whose perceptions of risk contrast sharply with official evaluations of risk. In recent years, environmental anthropologists have begun to examine the subject of risk more closely. In particular, much important work has been done on how different societies (especially on a national level) perceive, categorize, and prioritize risk.[4] Fewer anthropologists, however, have entered debates over risk-assessment methodologies and practices.[5]

This paper demonstrates how an ethnographic methodology complements studies of risk analysis and risk perception. Ethnographic research cannot replace epidemiological studies. However, as I will show, it sheds light on some of the biases that shape risk assessment and environmental science. Such research becomes a valuable tool in developing less biased, more accurate assessments of risk (see also Brown 1992, 1995; Brown and Mikkelsen 1997; Brullel and Pellow 2006; Clapp 2002; Griffith 1999).[6] Using a low-income African-American neighborhood as a primary case example, I first illustrate how risk assessments often fail to account for the experiences of poor people and people of color. Second, I show how, aside from varying internationally, risk perceptions also vary intranationally, according to socioeconomic factors. More specifically, I contend that race and class experiences intensify a community memebers' susceptibility to risk and their risk perceptions. By demonstrating how such experiences underpin the ways communities contest environmental science, I illustrate the cultural contingency of conceptions of environmental justice.

I conclude that eventually, environmental justice necessitates the reformulation of certain environmental science practices and conceptualizations. I thus finish the paper by exploring how anthropologists can build upon and facilitate the efforts of community groups in developing more holistic and comprehensive means of assessing environmental risk in contaminated communities. While we work to reform risk assessment, I also propose that anthropologists and other environmental scholars draw upon their combined research and knowledge to theorize new paradigms that obviate the need for risk assessments and find alternative, realizable avenues for an environmentally just society.

Anthropological Perspectives on Risk Assessment

Hyde Park residents joke that they live on the wrong side of *two* tracks. In other words, their neighborhood is lined on both its east and west sides by railroad tracks. For approximately 30 years, a large, unsightly junkyard abutted the backyards of residents living on Walnut, Hyde Park's westernmost street. Just down the street from the junkyard is a Georgia Power plant, and beyond it rises a large smokestack belonging to Thermal Ceramics, an industrial ceramics factory. About a half a mile away lies the site of a former wood preserving factory, which closed in 1988 several years after it was found to be leaking chemicals into its immediate vicinity. Two auto repair shops and a brickyard complete the neighborhood's industrial perimeter. Inside that perimeter, the homes of approximately 200 mostly low-income African-American families spread across seven streets. It is no wonder that Hyde Park residents refer to their neighborhood as a "toxic donut."[7]

Hyde Park's development began in the 1940s. Only six miles from the heart of downtown Augusta, the neighborhood lay on the edge of the city and was within walking distance of a number of local industries. Because the land was swampy and had extremely low value, African-American sharecroppers from nearby rural areas could afford to buy it. Lots were relatively large, and families were able to raise enough vegetables to sustain them while working in the surrounding factories, or as domestics in Augusta's wealthier neighborhoods. As people settled in, they invited relatives from the country to join them, and many households in Hyde Park remain "kin" to one another.

Despite its proximity to downtown, Hyde Park did not have running water, gas lines, streetlights, or paved roads until 1970. Residents pumped their own water and used outhouses. This lack of infrastructure, however, paled in comparison to the fact that the neighborhood would flood with each heavy rain. Floods were so bad that residents could not get in or out of the neighborhood and children could not get out to attend work or school until the waters receded. In 1968, one resident initiated the formation of a neighborhood association called the Hyde and Aragon Park Improvement Committee (HAPIC) to lobby for improved living conditions. Within two years, HAPIC had made itself known to county commissioners and other local lawmakers and successfully secured running water, paved streets, street lights, sewer lines, and drainage ditches.

Throughout the 1970s and 1980s, however, as the blue collar jobs that had helped keep Hyde Park families afloat left Augusta, the neighborhood began to decline. In 1998, approximately 61 percent of Hyde Park's 200 families owned their homes; yet, 77 percent of them earned less than $20,000 per year (Sociology Research Methods Students 1998). Some younger residents had turned to drug dealing, and the neighborhood became a popular place to purchase crack cocaine. Hyde Park also appeared rundown: while some houses were freshly whitewashed, others had fallen into startling states of disrepair.

In 1988, routine soil tests at Southern Wood Piedmont (SWP), a wood preserving factory located approximately one-half mile from Hyde Park, revealed unsafe levels of arsenic, chromium, and lead in the soil surrounding the plant (Governor's Task Force 1996). Soon after, the EPA ordered a major cleanup of the factory area. Some time around 1990, HAPIC leaders discovered that the mostly white residents of Virginia Subdivision (another neighborhood bordering SWP) had filed a lawsuit charging SWP with contaminating their properties. The plaintiffs in this lawsuit had just received a small settlement. Recognizing that ditches from SWP's property ran directly into Hyde Park, HAPIC leaders began alerting their neighbors to possible contamination. Soon after, two local attorneys approached them and started to organize a class action lawsuit. Hyde Park residents believed that they had been left out of the initial settlement because they were black.[8] HAPIC, which had always considered itself a civil rights organization, now made environmental justice its main priority.

Methods

Eight years later, in September 1998, I began 14 months of fieldwork in Hyde Park. During that time, I volunteered as a full-time staff member for HAPIC and focused my research on that organization. I found that in maintaining the broad definition of the environment I described earlier, HAPIC tackled a host of neighborhood problems including education, unemployment, crime, and drug trafficking. They also held after school tutoring and summer youth programs for children, neighborhood cleanups, and holiday food giveaways. In short, nearly all residents of the neighborhood came into contact with HAPIC in one way or another. Although, HAPIC's membership is open to anyone, most of its participants live in Hyde Park.[9]

Participation in the group tends to wax and wane. For example, the 1993 meeting I described earlier was packed. In 1998 and 1999, when public officials were scheduled to appear or when large-scale projects (such as a $200,000 EPA Brownfield Grant, which I will describe later) were addressed, as many as 50 members attended. On the other hand, when there were no specific or pressing issues being discussed, I attended meetings with a dozen people. In all, a cadre of approximately ten residents stayed consistently active.

As a volunteer staff member, I participated in all of HAPIC's events and spent many hours working and socializing in the neighborhood. My volunteer position also allowed me access to HAPIC's records, including meeting minutes, notes, past newsletters, flyers, and correspondence. During fieldwork, I got to know many members of the Hyde Park community, as well as a number of environmental justice activists from across the United States (and especially the South), with whom HAPIC had affiliations. Since the official end of fieldwork in 1999, I have returned to Hyde Park eight times to continue my research. I have also continued to develop my relationships with environmental justice activists in other parts of the South and Northeast. In addition to numerous informal conversations about the matters discussed here, I have conducted approximately 26 interviews with key informants, several of whom I have interviewed two or three times. Interviews have taken place in people's homes, in the Hyde Park community center, and over the telephone. With permission, all interviews have been tape recorded. To develop my history of environmental justice in the area, I collected newspaper articles on neighborhood events both past and present and analyzed them along with examining HAPIC's archival records. The critique I turn to in the following section is based upon this ethnographic and archival research, as well as academic literature on environmental risk assessment.

Risky Business: Critiquing Environmental Science Methodologies

When the EPA conducted its 1993 study to determine the degree to which Hyde Park had been contaminated, testers took 93 soil samples and 14 groundwater samples. They then isolated the chemicals they found and measured them. Next, they compared chemical levels to EPA/ATSDR standards for toxicity. While most levels fell below the toxicity threshold, one area had an arsenic level of 59 mg/kg (ATSDR 1994). The ATSDR has determined that a cancer risk exists at 1.5 mg/kg of arsenic, ingested per day; however, their final assessment was that there were not enough instances of levels in the hazardous range to constitute a significant health risk. The agency based its conclusions upon a typical four-stage risk

assessment methodology: hazard assessment or identification; hazard characterization or dose-response analysis; exposure assessment; and risk characterization. The final stage in this process deals with consolidating and communicating the findings of the first three, which are ostensibly its most objective. Yet, as I will argue in the following section, each of these phases can be biased or based on uncertain assumptions.

Lab v. Real World: Determining Which Chemicals are Hazardous

Hazards identification determines whether a particular substance causes a disease or other adverse health effect. Generally, hazard identification focuses on one health effect at a time, called an "endpoint." Endpoints can include cancer, reproductive and developmental disorders, central nervous system symptoms, trauma, infections, and rashes (Israel 1995:483). Currently, it is up to individuals (who may be subject to a variety of influences) to decide which endpoint to use. For example, because it tends to be particularly sensitive, is easy to identify and is a prominent public concern, cancer is frequently chosen as an endpoint over other possible harms (Anglin 1998; Israel 1995).

The next stage of the risk assessment process moves to a lab to study dose response. These experiments are primarily based on animal studies and then extrapolated to humans, despite the fact that animals and humans can react very differently to chemicals. The tests are also performed at high doses and then extrapolated to low dose situations; yet, this process, too, is plagued with uncertainty. First, because the costs of such tests are high, only a few hundred animals are used. Second, individual chemical sensitivities vary widely in both animals and humans—many chemicals often leave large segments of a population untouched (Dark 1998; Tesh 2000:27-28). The smaller the pool of animals, the more difficult it is to spot adverse health effects. Third, many lab rodents are bred to be genetically similar. This uniformity makes them even less comparable to genetically and geographically diverse people (Douglas and Wildavsky 1982; Schettler, et al 2002;).

Most studies extrapolate using healthy white male workers as a standard (Israel 1995:486). The ATSDR study on Hyde Park, for instance, analyzed fish samples from a nearby fishing pond. Estimating the likelihood that a 70 kg adult who consumed 18 grams of fish a day for more than one year would get sick, they found that the fish posed no danger (Agency for Toxic Disease Registry 1994). However, it is well-known that people of color (including children, the elderly, and sick people) consume closer to 20 to 24 grams of fish per day (West et al. 1992). In other words, standard comparison techniques fail to provide information on the range of ways women, children, elderly, or already sick people—far more susceptible subgroups—might react to a chemical.

Fourth, environmental hazards are studied under "normal" conditions in laboratories rather than as they are released or disposed of. As a result, scientists often base their assessments of risk on conditions that are actually very different from those a particular community is experiencing (Novotny 1998:141). Finally, high dose studies concentrate on immediate responses to exposures. But, many diseases have long latency periods and their link to harmful chemicals may not become evident for many years. For example, birth defects have especially delayed onsets, and many cancers do not show up for 20 to 40 years. Thus, it is difficult to estimate a chemical's potential for harm without studying it over long periods of time (Fitchen 1988). In sum, although scientists might be able to establish cause and effect relationships between one chemical and one disease under controlled conditions, the chances of establishing definitive cause and effect relationships in the real world are slim (Montague 2003).

A Matter of Multiplicity: Assessing Exposures

As difficult as it is for scientists to resolve the precise level at which a chemical will pose a risk to humans (Wigley and Shrader-Frechette 1996), perhaps the most significant problem with risk assessment comes in its third phase—exposure assessment. When asked to evaluate environmental exposures in a particular community, environmental scientists follow the same procedures I mentioned earlier, isolating data and focusing on one chemical at one time (Anglin 1998; Bryant 1995; US EPA 2003; Wigley and Shrader-Frechette 1996). This procedure thus emphasizes the determination of whether one chemical is harmful, at what dose it is harmful, and whether community members are exposed to the chemical at that dose (Kriebel et al. 2001). However, many environmental justice communities are exposed to dozens of different chemicals from a number of different existing and abandoned factories, not to mention particles emitted from cars, trucks, and trains (Novotny 1998).

For example, because Hyde Park is located between two sets of railroad tracks and adjacent to a highway, its residents inhale truck and car emissions on a daily basis. As I mentioned, approximately six factories and plants surround Hyde Park, and nearly all of them produce some kind of toxins. In addition to living in the middle of these factories, many residents have worked in them. According to these people, their working conditions were far from hazard-free. For example, those who worked in the industrial ceramics factory report leaving their jobs covered in a fine, white dust. As one man said, "black as I am, I used to come out white." Others who worked at the wood preserving factory complained of frequent headaches and suspicious tasting water at the plant.[10]

Up until 1970, when the neighborhood received access to public utilities, a common chore for Hyde Park children was to go into SWP's field, gather leftover creosote-treated wood chips, and then take them home to fuel wood-burning stoves. And, until Hyde Park got its water lines, residents pumped bathing and drinking water from underground wells in their backyards. Annie Wilson, one of Hyde Park's first residents recalled: "That water one year, it was stinking. And we really hadn't paid it that much attention.... In Aragon Park, my niece

was living over there, one time, that water was so stinking they couldn't take a bath in it."[11]

Regular exposure to groundwater occurred outside of people's homes as well as inside. As I mentioned, Hyde Park is a flood plain, and major floods have been so bad that residents have literally had to leave the neighborhood by boat. Particularly severe floods often left suspicious debris in their wake. Hyde Park resident David Jackson remembered: "My yard used to flood out more than anybody in this whole area because all the water from the junkyard would flow right in my yard. And when it leave, it leave all kinds of grease-filled and black looking dirt with the oil and stuff that just shot up in here."

Jackson and his neighbors, however, did not seriously question the effects of these floods and their debris for a number of reasons. First, they had grown used to the inconveniences of living in a neighborhood surrounded by industry. Second, historically, issues other than the environment have traditionally been a priority issue for African Americans (Checker 2002, 2005). Third, the industries producing flood debris and odiferous water had for many years, put food on residents' tables and paid their bills.

However in 1990, a particularly bad flood swept over Hyde Park and left in its wake a foul smelling bluish-white mud and houses full of corroded furniture. Johnnie Mae Brown remembered the "high water" of 1990: "Most people in the neighborhood didn't even think about [the environment] until we had that flood. After the flood we knew that something was wrong because that water, everything that the floodwater touched, it was no good no more." Hyde Park residents were thus exposed to chemicals in their workplaces, in their homes, and outside of their homes over a period of several decades before they began to agitate for environmental justice.

The reason for this is that many residents did not link the everyday nuisances described above to local health problems. Often, residents told me they "were too busy trying to live" to address such issues. In addition, activists of color traditionally did not prioritize the environment on their agendas for social change–rather, they were more concerned about housing, schools, and employment (Checker 2002, 2005). However, once they heard about the wood preserving factory's closing, Hyde Park residents realized that their natural resources were subject to the same discrimination as other urban resources. Thus, they began to frame "the environment" as another civil rights issue. As I demonstrate later in this essay, these framings then shaped how residents disputed scientific claims and interacted with agency officials. For now, I will return to my arguments about the biases of risk assessment procedures.

Not only do risk assessments generally overlook the kinds of multiple exposures that Hyde Park residents faced, but even if those exposures were included, scientists are still only beginning to learn about the cumulative effects of toxins. In recent years, the EPA has acknowledged the need to address cumulative risk, and has begun to develop mechanisms for its inclusion in the risk assessment process (these steps are discussed later in this essay). However, the EPA also recognizes that it has only taken initial steps, partly because methodologies for the quantification of combined risks are only in their nascent stages (US EPA 2003).

Making things even more complex, the illnesses that many environmental justice communities like Hyde Park complain of, such as developmental disorders, asthma, and circulatory and respiratory problems generally result from a range of genetic, environmental, and social factors. Indeed, in some cases, they may not be directly related to a particular chemical; but these health disorders are exacerbated by toxic exposure. For example, two common health problems in low-income African-American communities are hypertension and diabetes. Hypertension can lead to kidney disease, and diabetes creates metabolic impairments. Both situations then inhibit the body's ability to process toxic exposures (Israel 1995:506). In sum, measuring whether the level of contaminants in one ditch on one particular day is linked to one particular disease provides little insight into the cumulative picture of whether, and to what degree, a community's health is at risk, especially if that community faces a host of other risks related to their socioeconomic status.

Scientific Slants

Despite all of the uncertainties and biases I have mentioned, our social valuations of science persistently overestimate its abilities to provide an objective resolution to issues like environmental risk assessment. In part, because capitalism underlies the production of scientific knowledge (especially in the area of hazards research), its accumulation is both materially and socially valued (Escobar 1994). Moreover, societies that place a high value on science see scientific knowledge as a one-way process, where information flows from scientists to passive recipients (Martin 1984). Rather, as environmental justice activists frequently point out, science is embedded in power relations and subjective interests (Brullel and Pellow 2006:103). Questions about the neutrality of science are not new (Bryant 1995; Dove 2001; Franklin 1995; Haraway 1989, 1991; Janasoff et al. 1995; Nelkin 1987, 1992; Satterfield 1997). However, it is worth briefly revisiting this well-trod terrain to reiterate the degree to which environmental science, in particular, can be influenced and thus biased by cultural, political, and economic factors.

As mentioned earlier, much of environmental science is based on probabilities that certain chemicals will cause harm. But as Mary Douglas and Aaron Wildavsky emphasize in their classic cultural analysis of risk, "There is a delusion that assigning probabilities is a value-free exercise" (1982:71). Other studies clearly affirm this point. For example, in addition to choosing which endpoints to study, risk assessors also choose from a variety of toxic indices as they develop their analyses. A recent study conducted by several geographers and reported in the *American Journal of Public Health* applies six toxic indices to the same area and finds that they yield widely varying results. The study concludes that "comparing

findings across studies and developing generalizations about levels of risk to low-income and minority populations is difficult, if not impossible" (Cutter et al. 2002:420). The fact that individual risk assessors can choose which indices and models they will base their evaluations on raises important questions about cultural constructions of science and the biases that may lie hidden in those constructions (Oliver-Smith 1996:320). For instance, when assessors estimate the risk that a contaminant poses to a community, in addition to making assumptions about the age and size of the "typical" exposed individual, they must also presume what kind of clothes that person wears and how sensitive he or she will be to that pesticide. If assessors are unfamiliar with the community they are evaluating, they may rely upon cultural stereotypes when determining such factors.

More concrete biases also underlie risk assessments and the development of research on toxic chemicals more generally. For example, most risk assessments are prepared when a business, an agency, or a corporation seeks to initiate or continue a hazardous activity. These entities hire the risk-assessment agency to conduct their evaluations, making assessors highly vulnerable to pressure (O'Brien 2000). Political motivations can also weight scientific testing. In 2006, this issue came to an unprecedented head when union leaders representing EPA scientists issued a letter to the EPA administrator alleging that pesticide-industry officials and agency managers were pushing them to skip steps in their testing, compromising "the integrity of the science upon which agency decisions are based" (Fialka 2006: ; Griffith 1999).[12]

If politics and economics can substantially influence the evaluation of a community's environmental risks, it is not surprising that we find significant disjunctures between community risk perceptions and official risk assessments. The next section addresses those disjunctures and how one local community contested them.

Through the Magnifying Glass: Local Perceptions of Risk

Over the years, Hyde Park residents have recognized that environmental science can be biased. Early on in their environmental justice struggle, they realized that, as Revered Charles Utley said, "If I set up the test and the test instrument, I can pretty well dictate the outcome." Accordingly, HAPIC activists disputed environmental science in a variety of ways. Such challenges exemplify how residents and activists of Hyde Park perceive environmental risk through the lens of their race and class experiences.

Challenging and Critiquing Science

HAPIC activists did not passively accept the EPA's 1993 test results. First, they investigated the consulting firm that conducted the study and discovered it had contracted with the polluting factory in the past. They then filed a complaint with the EPA. Second, the EPA designed its tests according to the protocols I have described, which do not generally include community input. Hyde Park residents immediately called attention to this fact, arguing that it skewed the test's results. For instance, in many cases, in collecting surface soil samples, testers had actually sampled new dirt that residents had imported and put over their old, contaminated dirt. David Jackson explained, "They sent out some people to do that testing out here and they scooped a little bit of dirt with spoons on the ground. Hey, I done put dirt on top of dirt trying to get rid of the floods and things we been having out here for years." As Jackson describes, he "put dirt on top of dirt" to protect his home and his family. After this instance, Hyde Park activists found their own testing agency and conducted another set of soil studies to counter the EPA's. This time, they directed boring depths and locations, indeed, these tests yielded much more dangerous chemicals levels, which were later determined to be hazardous to human health. Here, activists recognized the limitations of scientific objectivity and accuracy; yet they also recognized that science is often best contested on its own terms.[13] By combining local knowledge with scientific expertise, they believed that, at the very least, they could raise the level of the tests' accuracy.

Activists also found that health officials seemed to be biased against them. Reverend Bobby Truitt, for example, described how at an early visit to the Richmond County Health Department, officials acted "hostile" and told residents that their health complaints were "a figment of [their] imagination." Similarly, other environmental justice activists I have worked with find that health officials often allow stereotypes about the poor eating, smoking, and exercise habits of low-income minorities to cloud their willingness to link health problems with toxic contamination (Checker 2001). As one man succinctly put it, "Often those [health officials] who are passing judgment on the community do not live in the community."

In 1991, Richmond County hired an African-American health commissioner. Activists immediately believed that, because he was black, the new commissioner would be more sympathetic to their situation. Indeed, after presenting him with their case, they convinced him to conduct a mortality study that compared death rates in Hyde Park to those in other neighborhoods with similar socioeconomic demographics. The study concluded that Hyde Park had higher than average death rates due to cancer and circulatory and respiratory diseases (Dever 1991). Activists also lobbied their black elected officials on a local and national level with some success. In 1992, state representative Ron Brown persuaded the governor to appoint a 13-member task force to look into the Hyde Park situation. Brown oversaw the appointing of task force members. He assigned the new health commissioner as its chair and included four neighborhood residents along with several doctors and a member of the Georgia Environmental Protection Division.

In the end, the Task Force concluded that it could not find sufficient evidence to support claims of contamination.

However, an appendix to the report, which is almost as long as the report itself, contains 10 rebuttals—half are written by physicians or researchers and one is from the Task Force Chair himself. In that rebuttal, the health commissioner notes that he has "heard about too much illness and observed too much death" in the Hyde Park area. He also criticizes the EPA's soil testing study pointing out that EPA scientists themselves implied that their model may have been inadequate. And he highlights the fact that initially the ATSDR found no exposure from well water, but after community complaints, the agency retested the water and reversed its findings. Finally, the commissioner pointed out flaws in environmental science more generally. He asks,

> Has it occurred to anyone that, just maybe, science is too far behind to adequately address the effects that hazardous chemicals have on humans?...Is 10 parts per million (ppm) of a chemical normal for me who weights 195 pounds and also my daughter who weighs 40 pounds, and is normal the same whether we are exposed one year or ten years? (Governor's Task Force 1996:2).

In his official recommendations to the governor, the health commissioner calls for a full medical evaluation of the residents of these neighborhoods, and for their relocation while the studies are conducted. Subsequent to the report's publication, he applied for and received a grant from ATSDR to conduct a long-term health study.[14]

A Heavy Knot

The fact that HAPIC activists found African-American health officials and politicians more supportive of their cause was not surprising to them. Nor were they surprised to recognize scientific expressions of bias. As their difficulties in securing water, sewer, and gas lines illustrate, residents were used to not receiving governmental assistance without concerted and sustained agitation for it. This history, combined with the daily struggles they continue to face as poor, black Americans, lead Hyde Park residents to perceive their risks as multiple. In other words, not only are they being exposed to toxic chemicals on a daily basis, but also, due to biases against them, they do not believe that they will find much relief or remedy for their problems.

Toxic exposures and institutional barriers to accessing relief from those exposures are only two aspects of the total risks that Hyde Park residents faced. For instance, when they develop asthma, or experience skin conditions from lupus or arsenic keratosis, many residents have to rely on Medicaid, which in Augusta is inefficient and does not usually cover the full cost of expensive inhalers or skin creams. In addition, as the years wore on and they increasingly realized that they were unable to leave a neighborhood which they strongly believed was contaminated, residents' mental health was compromised. Certain activists, who had devoted themselves to the cause of relocation throughout the 1990s, fell into severe depressions. In the late 1990s, mental health disorders in the neighborhood were becoming of such concern that the health department added psychiatric studies to its health assessment.

Ill health in Hyde Park also led people to lose educational and employment opportunities. Developmental delays and severe bouts of asthma caused some children to miss school. In turn, parents had to stay home from work to care for sick children. One mother, whose middle child developed a rare cancer at the age of seven and whose youngest child was born with debilitating asthma, quit a stable job in 1996 to care for her children and lived on public assistance. Finally, as I mentioned earlier, with news of contamination the property that Hyde Park residents had invested in became valueless. Residents had extreme difficulty selling their homes, and they complained that they had problems getting home insurance as well as bank loans.[15] Because many people either worked in low-wage jobs or lived on fixed incomes, they teetered on the edge of impoverishment. In short, Hyde Park residents face a "heavy knot" of risks that derive from both ecological and social circumstances (Cernea 2000:31).

Economically and politically marginalized communities like Hyde Park often depend upon social institutions, especially those that might bring them out of their current environmental predicament. One resident said, "When we first heard about the EPA study, it was like the cavalry was coming in." Instead of controlling their risks, however, these institutions compound them by denying community claims. As a result, residents' extant mistrust of governmental agencies increases. For instance, in 1990 and 1999, when they spoke about their distrust of scientists, some people brought up the notorious Tuskegee syphilis experiments. Anthropologists have termed this magnification of mistrust "risk perception shadows," which can be defined as "a predisposition to distrust projects involving potential adverse health or social impacts and to doubt agency or company statements regarding the potential dangers associated with these projects" (Stoffle et. al 1988:6). Given their historic exposures as poor, black Southerners, such shadows certainly loomed over Hyde Park and were only darkened during the risk communication process. Moreover, their experiences of race and class exclusions were foundational to activists' ideas that environmental justice meant engaging in a participatory and holistic process.

Yet agency communication tends to be unidirectional. In other words, not only do they deny community claims, but they neglect to solicit community input or recognize the value of local knowledge (Liebow 1988; Wolfe 1988). "Risk perception shadows" and cultural experiences then combine with agencies' top-down communication techniques to fuel community-agency conflagrations like the one I described at the beginning of this essay. The need to avoid such debacles is all too clear to governmental officials. Over the past few years, the EPA and the ATSDR in particular have taken steps to improve risk communication and to develop somewhat more holistic accounts of community environmental problems. In the following section, I discuss some of these steps and how environmental justice activists have responded to them.

Towards Remedies

As early as the late 1980s, the EPA began to develop a comparative risk assessment methodology for prioritizing and addressing risk situations. This method evaluates two or more risks simultaneously to prioritize the allocation of resources to control or manage that risk. Data used in comparative risk falls into two categories—"hard" and "soft." The former focuses on quantifiable factors such as predicted numbers of fatalities, or the size of affected areas, and then compares them to the costs of reducing those risks. In contrast, the latter is premised on the idea that risk is multidimensional and socially constructed; thus, it gives public values equal weight to scientific facts, and it includes factors such as mistrust and the equity of how various subgroups bear each risk (Finkel 1994a:7-8). Although comparative risk is mainly used to set priorities for allocating governmental resources, and reports find that the EPA continues to rely more heavily on hard than soft data (Finkel 1994b:336-338), in its combination of data comparative risk illustrates some significant institutional shifts toward a broader conception of risk.

In 1993 these shifts took shape again in the EPA Brownfield Redevelopment program. Brownfield grants generally fund environmental assessments of unused, abandoned sites, and they facilitate cleanup and redevelopment plans. The grants are geared toward low-income areas and they include job training, community outreach, and environmental justice components. Significantly, the program defines brownfields as having "actual or perceived contamination and an active potential for redevelopment or reuse" (Governor's Task Force 1996: Appendix C). That this definition includes *perceived* contamination comes as the result of heavy lobbying by national environmental justice activists. Indeed, it has opened doors for some communities like Hyde Park, which are in officially indeterminate situations. In 1999, Hyde Park activists persuaded the city of Augusta to apply for a Brownfield Pilot Grant to assess and redevelop the scrap metal yard that bordered their neighborhood. The application was successful and although the project, which is still underway, does not provide residents with their ultimate goal of relocation, it has facilitated the cleanup of the scrap yard, which initial investigations found to be highly toxic.[16]

Further inroads have been made in the area of cumulative risk assessment. Responding to several reports (including the National Research Council's 1994 report "Science and Judgment in Risk Assessment" and a 1997 report by the Presidential/Congressional Commission on Risk Assessment and Risk Management entitled "Risk Assessment and Risk Management in Regulatory Decision-Making") as well as to sustained pressure from grassroots environmental justice groups, the Clinton administration began exploring cumulative risk assessments. In 2003, the EPA released the results of this exploration in its "Framework for Cumulative Risk Assessment," which offers guidance for the cumulative risk assessment process. In acknowledging the importance of understanding the accumulation of risks from multiple environmental stressors, the document represents a critical first step. However, it does not lay out protocols; nor is it attached to any regulatory requirements. The framework also notes that some of the methodologies and techniques for doing the risk analysis discussed may not yet exist (U.S. EPA 2003:17).[17]

To reiterate, sustained pressure and input from environmental justice groups has expedited progress on cumulative risk assessments. The National Environmental Justice Advisory Council (NEJAC), which provides advice, consultation, and recommendations to the EPA administrator leaders on matters related to environmental justice[18] (and includes national environmental justice leaders), designated two working groups to address some of the issues raised in this essay. One of them proposed ways for the EPA to implement Cumulative Risk Assessments. The other has recommended ways "to achieve more effective, integrated community based health assessments, intervention and prevention efforts" as well as how to improve communications with community members and how to consider socioeconomic and cultural factors in community health assessments.[19] Among other things, the work group recommended that the government let affected communities know how it can help them, even if a causal relationship between health and environmental toxins cannot be proven. The work group also called for the consideration of socioeconomic and cultural factors in community health assessments. It is interesting to note that the crux of the NEJAC Work Group's recommendations is the implementation of all the findings and plans set up in the various workshops, reports, and guidelines I have mentioned. In other words, reports sit on shelves and change happens extremely slowly, if at all. Many environmental justice activists have thus concluded that reforming risk assessment is a dead-end and declined to serve on NEJAC.[20]

Instead, some people have devoted their energies toward advocating alternatives that would reduce our reliance on the science of risk assessment and emphasize more participatory and citizen-centered conceptions of justice. For instance, a number of activists promote the implementation of the Precautionary Principle. Very briefly, the principle is based upon the idea that precautionary measures should be taken when an activity raises threats of harm to human health or the environment, even if scientific cause and effect relationships are not fully established. Importantly, the initiator of such an activity bears the burden of proving that an activity is safe. This reverses the current standard, where the public must prove that a particular activity is risky (Montague 2003).

A second alternative is an autonomy paradigm that capitalizes on local knowledge and self-determination by advocating for local communities' rights and abilities to manage and protect natural resources themselves. Pena, for instance, cites a successful example in Colorado where local farmers formed a partnership with their county government in the design and implementation of a long-term watershed monitoring system. In addition, they received EPA funding to develop restoration ecology projects (Pena and Valdez 1998; Pena 2003). Another successful and oft-cited autonomy model is the case of the

Dudley Street neighborhood in Boston, Massachusetts, where in the late 1980s, activists convinced the city government to grant them the power of eminent domain. Under community control, the neighborhood has been able to transform over 1,300 abandoned parcels into affordable housing, gardens, and public spaces.[21]

Those activists still participating in NEJAC certainly agree that prevention and autonomy models are a necessary and important part of the environmental justice process, and they have worked hard to ensure that such principles are included in NEJAC documents. But, they also recognize that proposed alternatives do not necessarily address the immediate needs of communities like Hyde Park, which are desperate to move out of their contaminated circumstances. Therefore, they are not yet willing to relinquish the idea of risk reform. Concurrently, NEJAC members note that EPA-generated reforms are only half the battle: The rest will consist of convincing industries to accept changes in risk-assessment procedures and of making sure that regional EPA's enforce them.[22] Fundamental to this latter effort is the valuing of local knowledge equally with expert "facts." In other words, what is required is a far more holistic and comprehensive approach to science itself.

As environmental justice activists work toward engendering paradigmatic shifts in the prevention, management, and control of environmental risks, and as government agencies move toward broader conceptions of risk, anthropologists have ample opportunities to contribute by combining their expertise with those of others. The next section describes some specific ideas for such applications.

Into the Breach: Roles for Anthropologists

Anthropological research demonstrates how ethnographic information can offer an important complement to the risk-assessment process (Griffith 1999). Anthropologist Michael Cernea, for instance, studies risk among refugees and displaced people in various parts of the world and calls for on-the-ground assessments that account for the multiple contexts in which people experience risk. As Cernea cautions, however, risk identification is not enough: it must also lead to risk reversal (Cernea 2000). Accordingly, Cernea has developed the impoverishment risks and reconstruction (IRR) model, which has a dual emphasis on assessing risks to be prevented *and* on implementing reconstruction strategies and policies (ibid:20). I would argue that we might address environmental risk assessment in the United States from a similar perspective and add to it a third component of theoretical innovation. Below, I outline my recommendations for a three-pronged anthropological approach to the problem of risk assessment and environmental justice.

On the reform side, anthropologists can continue to advocate for the expedited implementation of cumulative risk assessment strategies. In other words, until federal officials relinquish the idea of risk assessment, and while environmental justice communities continue to reside in life-threatening conditions, anthropologists can work together with environmental scientists to develop more comprehensive and accurate assessments of risk. One means of doing this is to facilitate the pairing of scientific and lay expertise in developing risk assessments (Brown 1992, 1995; Brown and Mikkelsen 1997; Brullel and Pellow 2006; Clapp 2002; Dove 2001; Scoones 1999).

For, not only do community members hold invaluable local knowledge about their risk exposures and histories, but they also have the greatest motivation for compiling that knowledge and monitoring their environmental conditions. As anthropologists Ben Wisner (1997:277) writes, "Residents themselves are not only capable of contributing considerably to [hazard identification and mitigation], but in many cases they are the primary actors by default." In Hyde Park, community residents could be trained to collect cumulative exposure data, create records of neighborhood health complaints and illnesses, and track signs of contamination such as foul odors, discolored water, or changes in local fauna.

In addition, residents and scientists could partner to draw random samples, design questionnaires, and collect and analyze data according to more empirical traditions (Brown 1992, 1995; Brown and Mikkelsen 1997; Brullel and Pellow 2006; Bryant 1995:589; Clapp 2002; Kroll-Smith and Floyd 1997). Community members can then present the final research product to the EPA and ask it to reconsider their eligibility for federal assistance. The end result is that residents share control of the research process.[23] A community-based, participatory research model not only improves the quality of the risk assessment, but it also increases community members' environmental literacy. In other words, participating in environmental research equips community members with the knowledge and awareness they need both to remedy their current conditions and to develop prevention strategies.

Another benefit of participatory research is that it can help communities improve their relations with governmental agencies. As they conduct research in partnership with scientific and governmental agencies, greater understandings between communities and officials will develop and solidify. But, more immediately, anthropologists can strengthen the quality of community-agency communications to prevent scenes like the EPA meeting debacle I described earlier. For instance, federal and state offices are highly segmented and can only address specific issues. However, community members often grow frustrated that various departments and agencies do not cooperate with one another to create more effective resolutions. When governmental officials encounter such frustrations, they may view community members as irrational, overly angry and/or uninformed. One way that anthropologists can apply their research to this problem is by "studying up," or investigating the practices of scientists, extension agents, field managers, and governmental officials (Scoones 1999: 479).[24]

Returning to Hyde Park, for example, there is much to learn about the various entities—Georgia Environmental Protection Division, EPA Region IV, the ATSDR, and

industries—that affect the neighborhood's situation. Ethnographic study with these entities enables the researcher to gain a greater understanding of how environmental issues are conceptualized and acted upon. The tools of ethnography are especially important here in that they elicit a diversity of perspectives that may not be evident in more quantitative surveys and questionnaires. Anthropologist Terre Satterfield (2002:170) notes, environmental values are "typically articulated discursively; they are embedded in the contextually, emotively, and morally rich stories and conversations through which we define ourselves and our actions in relation to natural systems" (see also Griffith 1999). After developing a better understanding of all aspects of a particular issue, anthropologists can work with each side to find some basis for negotiation and compromise.

Once again, the kinds of intervention I am proposing here represent only a first step toward building the communication capacity of both communities and agencies. Community members can and should speak for themselves. However, until federal, state, and local officials are willing to value community perspectives and voices to a much greater extent than they currently do, some communities may still find it helpful to have a mediator. At a recent environmental justice workshop I attended, for instance, one grassroots African-American activist from Chicago explained that she and some of her neighbors have backgrounds in science, so they understand the technical words that EPA officials use, and they can "translate" them back to other community members who do not have scientific backgrounds. At the same time, this activist pointed to the need for education on the EPA's side so that officials might better understand community perspectives. Often, such insights come from outsiders. Or, as Hyde Park activists have argued, because I do not live in the neighborhood and have not grown up there, my analysis of its conditions pulls more weight with various institutional bodies.[25] Simultaneously, anthropologists and residents can lobby for the meaningful inclusion of community members in environmental decision-making processes. For, as other anthropologists have noted, efforts to incorporate a diversity of "stakeholder" voices in such decisions often fail because the standards for which voices are heard are determined by those setting the terms of discussion (Brosius 1999; Satterfield 2002).

This move toward more inclusive, democratic action leads to the policy arena, which constitutes the final prong in Cernea's reform-oriented research model. Here, anthropologists can combine their research findings with those of "hard" scientists and residents and work preemptively to make specific recommendations and strategies for how to reduce a community's current risk exposure. Creative and preventive policy solutions are a particularly important component of risk-assessment reform. If we succeed in convincing decision makers and corporations to accept cumulative assessments of risk that give local knowledge equal status with scientific knowledge, it follows that a far greater number of communities will be classified as "at risk." In turn, such classifications mean that some entity becomes responsible for alleviating that community's risk—a potentially expensive process. We may stand a better chance of substantively reforming risk assessment, therefore, if we can develop and promote less costly ways to relocate or clean up communities.

Finally, innovative policy solutions serve as a point of departure for new theories of environmental justice. In this paper, I have problematized conceptions of both science and justice and presented ways that each is culturally contingent. However, we have much more to learn about how "justice" is constructed cross-culturally if we are to develop new environmental justice paradigms.[26] Here again, by investigating how different groups of people understand and perceive justice, anthropological research can combine with other forms of local and professional scientific expertise to contribute to broadly conceived and workable solutions for abating disproportionate environmental risk and creating a more environmentally just society.

Notes

[1]The five adjacent neighborhoods that comprise what I refer to as "the Hyde Park area" have no official designation. Individually, they are Hyde Park, Virginia Subdivision East, Virginia Subdivision West, New Savannah Road and Gravel Pit Road. Together, they comprise approximately a three-square mile area just south of downtown Augusta.

[2]Some of the information in this article is also found in Checker 2005.

[3]Although this "term of art" is commonly used, the African American residents of Hyde Park interpreted it as a racial slur, implying that they routinely ate dirt.

[4]See for example Cernea and McDowell 2000; Douglas and Wildavsky 1982; Griffith 1999; Stoffle, et. al. 1988; Pollnac 1998; Wolfe 1988. See also Renn and Rohrmann 2000 for a more psychological perspective on cross cultural risk perceptions.

[5]For some exceptions to this see Dove 2001; Gerlach and Rayner 1988; Fitchen 1988; Liebow 1988.

[6]Griffith's study notably offers a counterpoint to many of the examples provided in this paper. In the case of Pfiesteria, Griffith argues that local and pervasive ideas about the organism's danger prevailed over scientific evidence about its relative safety.

[7]It should be noted that this term was originally coined by Hazel Johnson of People for Community Recovery, a grassroots environmental justice organization in Chicago, Illinois.

[8]Southern Wood Piedmont representatives disagree with this assumption and contend that the Hyde Park neighborhood has in no way been affected by wood preserving chemicals.

[9]The organization does not require dues, so no official membership records exist.

[10]It should be noted that there is no conclusive evidence that SWP workers were exposed to harmful toxins in the workplace.

[11]Aragon Park used to be part of Hyde Park until the early 1950s and the building of the Gordon Highway, which divided the neighborhoods in two.

[12]See also Griffith 1999, detailing how politics similarly influenced scientific outcomes in the case of Pfiesteria.

[13]For further information on the use of science by environmental activists, see Brown 1992, 1995; Brown and Mikkelsen 1997; Brullel and Pellow 2006; Clapp 2002; Satterfield 1997.

[14]The Study's main conclusion was to call for further study.

[15]See Governor's Task Force 1996, Appendix C.

[16]Some cities have also recently taken serious steps towards recognizing the problems with risk assessment methods. In 2003, both the city of San Francisco and Berkeley adopted Precautionary Principle resolutions stating that if there is reasonable suspicion of harm and scientific uncertainty, then anticipatory action must be taken to prevent harm.

[17]These can be found at http://www.epa.gov/OSP/spc/2cumrisk.htm.

[18]See http://www.epa.gov/compliance/environmentaljustice/nejac/.

[19]This quote is taken from the cover letter to the National Environmental Justice Advisory Council's report entitled, "Environmental Justice and Community-Based Health Model Discussion: A Report on the Public Meeting Convened by the National Environmental Justice Advisory Council, May 23 - 26, 2000." The letter and the report, itself, are available at www.epa.gov/compliance/environmentaljustice/nejac.

[20]Interview with Devon Pena, November 11, 2003.

[21]For more information on Dudley Street, see their website www.dsni.org. For a more scholarly account of the neighborhood's transformation, see Medoff and Sklar 1994.

[22]Interview with Connie Tucker, November 13, 2003.

[23]For a similar research model whereby residents of contaminated neighborhoods collect their own health data, see Brown's (1992) description of "popular epidemiology".

[24]This idea stems from a short, untitled presentation given by Professor Bunyan Bryant at a workshop entitled, "Crossing the Divide: Anthropologists and Effective Environmental Justice Policy Intervention" held at the 2003 American Anthropological Association Annual Meetings.

[25]See also Halperin 1998 for a more detailed discussion of the anthropologist's role as advocate.

[26]For a notable effort in this direction, see Haenn 2003.

References

Adamson, Joni, Mei Mei Evans, and Rachel Stein, eds.
2002 The Environmental Justice Reader: Politics, Poetics, & Pedagogy. Tucson: University of Arizona.

Agency for Toxic Substances Disease Registry (ATSDR)
1994 Petitioned Public Health Assessment Addendum, Southern Wood Piedmont Augusta, Richmond County, Georgia, Appendix 3-March 1994 Health Consultation.

Anglin, Mary
1998 Dismantling the Master's House: Cancer Activists, Discourses of Prevention, and Environmental Justice. Identities 5:183-217.

Brosius, J. Peter
1999 Green Dots, Pink Hearts: Displacing Politics from the Malaysian Rain Forest. American Anthropologist 101:36-57.

Brown, Phil
1992 Toxic Waste Contamination and Popular Epidemiology: Lay and Professional Ways of Knowing. Journal of Health and Social Behavior 33:267-281.
1995 Popular Epidemiology, Toxic Waste and Social Movements. *In* Health, Medicine and Risk. Sociological Approaches. Gabe J. ed. Pp.91-112. Oxford: Blackwell.

Brown, Phil and Edwin J. Mikkelsen
1997 No Safe Place: Toxic Waste, Leukemia, and Community Action. Berkeley: University of California Press.

Brullel, Robert and David Pellow
2006 Environmental Justice: Human Health and Environmental Inequalities. Annual Review of Public Health 27: 103-124.

Bryant, Bunyan
1995 Pollution Prevention and Participatory Research as a Methodology for Environmental Justice. Virginia Environmental Law Journal 14: 589-611.

Cernea, Michael M.
2000 Risks, Safeguards, and Reconstruction: A Model for Population Displacement and Resettlement. *In* Risks and Reconstruction: Experiences of Resettlers and Refugees. Michael, M. Cernea and Christopher McDowell, eds. Pp. 11-55. Washington, D.C.: The World Bank.

Cernea, Michael, M. and Christopher McDowell, eds.
2000 Risks and Reconstruction: Experiences of Resettlers and Refugees. Washington, D.C.: The World Bank.

Checker, Melissa
2001 "Like Nixon Coming to China": Finding Common Ground in a Multi-Ethnic Coalition for Environmental Justice. Anthropological Quarterly 74:135-146.
2002 'It's in the Air': Redefining the Environment as a New Metaphor for Old Social Justice Struggles. Human Organization 61:94-105.
2005 Polluted Promises: Environmental Racism and the Search for Justice in a Southern Town. New York: New York University Press.

Clapp, Richard W.
2002 Popular Epidemiology in Three Contaminated Communities. The Annals of the American Academy of Political and Social Science 584:35-46.

Cole, Luke and Sheila R. Foster.
2001 From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement. New York: New York University Press, 2001.

Cutter, Susan, Michael S. Scott, and Arleen A. Hill
2002 Spatial Variability in Toxicity Indicators Used to Rank Chemicals. American Journal of Public Health 92:420-422.

Dark, Alx
1998 Public Sphere Politics and Community Conflict Over the Environment and Native Land Rights in Clayoquot Sound, British Columbia. Ph.D. dissertation, New York University.

Dever, G.E. Alan
1991 A Health Status Assessment of Residents Living in the Virginia Subdivision Hyde Park Area, Augusta, Georgia. Augusta, Georgia: East Central Health District.

Douglas, Mary and Aaron Wildavsky
1982 Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers. Berkeley: University of California Press.

Dove, Michael
2001 Interdisciplinary Borrowing in Environmental Anthropology and the Critique of Modern Science. *In* New Directions in Anthropology and Environment: Intersections. Carole Crumley, A. Elizabeth Van Deventer, Joseph J. Fletcher eds. Pp.90-112. Lanham, Md.: Alta Mira.

Escobar, Arturo
1994 Welcome to Cyberia: Notes on the Anthropology of Cyberculture. Current Anthropology 35:211-232.

Finkel, Adam
1994a Should We—and Can We—Reduce the Worst Risks First? *In* Worst Things First?: The Debate over Risk-Based National Environmental Priorities. Adam Finkel and Dominic Golding, eds. Pp. 3-20. Washington, D.C.: Resources for the Future.
1994b Afterthoughts. *In* Worst Things First?: The Debate over Risk-Based National Environmental Priorities. Adam Finkel and Dominic Golding, eds. Pp. 335-339. Washington, D.C.: Resources for the Future.

Fitchen, Janet
1988 Anthropology and Environmental Problems in the U.S.: The Case of Groundwater Contamination. Practicing Anthropology 10:5, 18.

Franklin, Sara
1995 Science as Culture, Culture as Science. Annual Review of Anthropology 24:163-84.

Gerlach, Luther and Steve Rayner
1988 Culture and the Common Management of Global Risks. Practicing Anthropology 10:15-18.

Georgia Governor's Task Force
1996 Governor's Task Force on the Long-Term Health Care Needs for Southern Wood Piedmont Residents. Augusta, Georgia. Author's Files.

Griffith, David
1999 Exaggerating Environmental Health Risk: The Case of the Toxic Dinoflagelllate Pfiesteria. Human Organization 58:119-128.

Haenn, Nora.
2003 Risking Environmental Justice: Culture, Conservation, and Governance at Calakmul, Mexico. *In* Social Injustice in Latin America, Susan Eckstein and Timothy Wickham-Crawley, eds. Pp. 81-102. New York: Routledge.

Halperin, Rhoda
1998 Practicing Community: Class, Culture and Power in an Urban Neighborhood. Austin: University of Texas Press.

Haraway, Donna
1989 Primate Visions: Gender, Race and Nature in the World of Modern Science. New York: Routledge.
1991 Simians, Cyborgs, and Women: The Reinvention of Nature. London: Free Association.

Israel, Brian
1995 An Environmental Justice Critique of Risk Assessment. New York University Environmental Law Journal 3:469-522.

Janasoff, Sheila
1993 What Judges Should Know About the Sociology of Science. Judicature 77:77-82.

Kriebel, David, J. Tickner, P. Epstein, J. Lemons, R. Levins, E. L. Loechler, M. Quinn, R. Rudel, T. Schettler, and M. Stoto
2001 The Precautionary Principle in Environmental Science. Environmental Health Perspectives 109:871-876.

Kroll-Smith, Steven and Hugh Floyd
1997 Bodies in Protest: Environmental Illness and the Struggle over Medical Knowledge. New York: New York University Press.

Liebow, Edward
1988 Permanent Storage for Nuclear Power Plant Wastes: Comparing Risk Judgments and Their Social Effects. Practicing Anthropology 10:10-12.

Martin, Emily
1994 Flexible Bodies: Tracking Immunity in American Culture—from the Days of Polio to the Age of AIDS. Boston: Beacon Press.

Medoff, Peter and Holly Sklar
1994 Streets of Hope: The Fall and Rise of an Urban Neighborhood. Boston: South End.

Montague, Peter
2003 Environmental Justice Requires Precautionary Action. Testimony before the California Environmental Protection Agency Advisory Committee on Environmental Justice.

Nelkin, Dorothy
1987 Selling Science. New York: Freeman.

Nelkin, Dorothy, ed.
1992 Controversies: Politics of Technical Decisions. 3rd ed. Newbury Park, Calif.: Sage Publications.

Novotny, Patrick
1998 Popular Epidemiology and the Struggle for Community Health in the Environmental Justice Movement. *In* The Struggle for Ecological Democracy: Environmental Justice Movements in the United States. Daniel Faber, ed. Pp. 137-158. New York: Guilford.
2000 Where We Live, Work and Play: The Environmental Justice Movement and the Struggle for a New Environmentalism. Westport, Conn.: Prager.

O'Brien, Mary
2000 Making Better Environmental Decisions: An Alternative to Risk Assessment. Cambridge, Mass.: MIT Press.

Oliver-Smith, Anthony
1996 Anthropological Research on Hazards and Disasters. Annual Review of Anthropology, Vol. 25, Pp. 303-328.

Peña, Devon and M. Mondragon Valdez
1998 The "Brown" and the "Green" Revisited: Chicanos and Environmental Politics in the Upper Rio Grande. *In* The Struggle for Ecological Democracy: Environmental Justice Movements in the United States. Daniel Faber, ed. Pp. 312-48. New York: Guilford.

Pena, Devon
2003 Autonomy, Equity and Environmental Justice. Lecture. Brown University, April 21.

Pollnac, Richard B.
1998 Thresholds of Danger: Perceived Risk in a New England Fishery. Human Organization 57:53-59.

Renn, Ortwin and Bernd Rohrmann
2000 Cross-Cultural Risk Perception—A Survey of Empirical Studies. New York: Kluwer Academic Publishers.

Satterfield, Terre
1997 "Voodoo Science" and Common Sense: Ways of Knowing Old-Growth Forests. Journal of Anthropological Research 53:443-459.
2002 Anatomy of a Conflict: Identity, Knowledge and Emotion in Old-Growth Forests. East Lansing: Michigan State University.

Schettler, Ted Katherine Barrett, and Carolyn Raffensperger
2002 The Precautionary Principle: Protecting Public Health and the Environment. *In* Life Support: The Environment and Human Health. Michael McCally, ed. Pp. 239-256. Cambridge, Mass.: MIT Press.

Scoones, Ian
1999 New Ecology and the Social Sciences: What Prospects for a Fruitful Engagement? Annual Review of Anthropology 28:479-507.

Sociology Research Methods Students, Kim Davies, Robert Johnston, Ernestine Thompson, Robin Bengtson, Sarah Firman, Albert Jimenez, Karen Jones, and Regina Murray
1998 The 1998 Hyde Park Neighborhood Survey Report. Department of Sociology, Augusta State University, Augusta, Georgia.

Stoffle, Richard W., Camilla L. Harshbarger, Florence V. Jensen, Michael J. Evans, and Paula Drury
1988 Risk Perception Shadows: The Superconducting Super Collider in Michigan. Practicing Anthropology 10:6-7.

Tesh, Sylvia Noble
2000 Uncertain Hazards: Environmental Activists and Scientific Proof. Ithaca, N.Y.: Cornell University Press.

U.S. Environmental Protection Agency, Risk Assessment Forum
2003 Framework for Cumulative Risk Assessment. Washington, D.C.: U.S. Government Printing Office.

West, P.J. Fly, M., Larkin, F., and Marans, R. W.
1992 Minority Anglers and Toxic Fish Consumptions: Evidence from a Statewide Survey in Michigan. *In* Race and the Incidence of Environmental Hazards: A Time for Discourse. Bunyan Bryant and Paul Mohai, eds. Pp. 100-113. Boulder, Colo.:Westview Press.

Wigley, Daniel, and Kristin Shrader-Frechette
1996 Environmental Racism and Biased Methods of Risk Assessment. Risk: Health, Safety and Environment 7:55-88.

Wisner, Ben
1997 Environmental Justice, Health and Safety in Urban South Africa. *In* Life and Death Matters: Human Rights and the End of the Millennium. Barbara Rose Johnston, ed. Pp.265-286. Walnut Creek, Calif.: Alta Mira.

Wolfe, Amy
1988 Risk Communication: Who's Educating Whom? Practicing Anthropology 10 (3-4):13-14.