Introduction

Bioinsecurity and Human Vulnerability

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The new millennium is already rife with rapid-fire "high alert" responses, an increasing trend that is especially pronounced in the United States (though most certainly felt elsewhere, too), where past catastrophes shape expanding perceptions of imminent danger. September 11, 2001, looms as an inescapable spectral presence, defining an important baseline for the ramping up of biosecurity measures. Nevertheless, one need only consider a cursory list of other calamities—some of which are decades old—to realize the propensity by the late twentieth century for localized dangers to go global. The AIDS pandemic, Hurricanes Katrina and Sandy, mad cow disease, avian and swine flus, the tsunami of 2004, and the Chernobyl and Fukushima nuclear crises—all instigated security measures on a grand scale before and after 2001. Beneath the aegis of a new world order of disaster awareness, human safety is conceived of as tenuous at best.

Today, "biosecurity" has ballooned into an everyday and increasingly mundane aspect of human experience, serving as a catchall for the detection, surveillance, containment, and deflection of everything from epidemics and natural disasters to resource scarcities and political insurgencies, enabling newly conceived mandates in nation-states to police citizens, migrants, and refugees; to reconfigure urban zones, rural landscapes, and border zones; and to regulate precious—albeit basic—goods and services, such as food, water, land, medicines, and biofuels. The bundling together of security measures, their associated infrastructure, and their modes of

governance, alongside response times, underscores a new urgency of preparedness; a growing global ethos ever alert to unforeseen danger; and actions that favor risk assessment, imagined worst-case scenarios, and carefully orchestrated, preemptive interventions.

Biosecurity is thus envisioned and increasingly managed on a grand scale. Global initiatives—frequently involving such behemoths as the Department of Homeland Security, the Centers for Disease Control and Prevention, the United Nations, and the World Health Organization—all rely on the long arm of bureaucracies empowered not only to determine the scale of imminent danger but also to calculate the values assigned to populations deemed to be at greatest risk or harm. Resources (assessed as valuable, scarce, abundant, or expendable) invariably play into this calculus of life. Biosecurity measures necessitate predictability, model making, preemptiveness, and flexibility, in which anticipated danger, inter- and intranational responsibilities, and global threats are elaborately intertwined. Even the term itself demands flexibility: today, "biosecurity" can be employed as a noun, an adjective, and a verb ("biosecuritize").

Such porousness, or the ability to encompass new contexts, dangers, and scenarios, renders the concept of biosecurity extraordinarily difficult to define, although the category has a complex yet still traceable history. Moreover, the vagueness of its definition facilitates its proliferation: in the United States especially, one seems to know inherently that new dangers threatening the safety of human populations all too naturally belong under the aegis of biosecurity. Whereas in the pre-9/11 era, epidemics required generally short-lived coordination efforts of local or sometimes national public health personnel for control and containment, post-9/11 responses embody heightened threat and emergency (symbolically embedded in 9-1-1 itself). Epidemic dangers are no longer merely about pathogens or carelessness, but deliberate intent. Policing national borders and surveillance are part and parcel of control measures. Such concerns are hardly confined to the United States. For instance, during avian flu epidemics, watchers both inside and outside China carefully tracked the circulation of H5N1 and other infectious agents across provincial and national borders, and several European nations have taken drastic measures to contain zoonotic epidemics through massive culls of livestock that are important sources of food throughout the region. The rhetoric of globalization and the porosity of boundaries of bodies, of nations, and of communications media (Appadurai 2001; Martin 1994) insist not only that surveillance measures track diseases but also that such technologies remain in place long after epidemics or other dangers have subsided, have been contained, or have been squelched.

In this volume, we understand biosecurity to be an already formulated convention that links national identity with the securitization of daily governance. Lakoff and Collier (2008:12) point out that "new assemblages of organizations, techniques, and forms of expertise" continue to reconfigure biosecurity as part of living with risk in daily life. Beyond public health concerns, Lakoff (2010b) thoughtfully addresses how disasters also lead to national and state formations in order to mitigate risk. Our collective intent here, however, is to write against biosecurity as the new status quo by focusing instead on its underbelly; that is, on vulnerability and especially how vulnerability increases in the shadow of biosecurity. Instead of the acceptance of surveillance measures or security interventions as necessities of life in the new millennium, bio*in*security defines the focus of this volume.

As the now classic work by Ulrich Beck, *Risk Society* (1992[1986]), reveals, by the late twentieth century, risk aversion and anticipatory forms of intervention emerged as pervasive qualities of daily life under a new world order. More recently, risk aversion has assumed an Orwellian aura of surveillance. One need only track the proliferation of hidden cameras in the United Kingdom, the United States,[1] and elsewhere (for example, see Rouse's discussion of Ghana in chapter 7, this volume) to realize the rapid normalizing of practices that pair "safety" with visibility, evident, for instance, in public signage in the United States bearing such warnings as "If You See Something, Say Something," "Stay Alert, Stay Alive," and "Call or Text Against Terror." Even more important, seemingly remote or isolated events—for example, outbreaks of such zoonoses as "avian" or "swine" flu—herald and draw swift, internationally coordinated efforts to contain both human and animal species. Thus, although threats associated with pandemics, terrorism, and natural disasters are hardly new, they are increasingly collapsed together as similarly destabilizing forces that endanger us all.

Set against the relatively newly imagined "global economy," which presumably links all lives with one another, such framing breeds new anxieties regarding the containment and movement of danger within and across boundaries, or what Beck (2000:219) has described as "this border-transcending dynamism of the new risks," entailing "a metamorphosis of danger which is difficult to delineate or monitor." Today, the bodies of international travelers can harbor silent killers; militarized insurgents can sneak across borders to infiltrate and terrorize those in other territories; contaminated products and sickly migratory species can easily and rapidly infect global foodways; and natural disasters evolve and move unpredictably, with shattering consequences that reach far beyond their points of

origin. All boundaries are permeable (Martin 1990, 1994); all bodies are potentially at risk (Beck 1999, 2000; Douglas and Wildavsky 1982); all are locked together on a grand scale devoid of hope (Mattingly 2010) and are caught up in a whirlwind of anxiety, threat, danger, and fear.[2]

Despite the intensification of bureaucratic control and coordination within national boundaries and beyond in international arenas, the quotidian aspects of far more basic forms of human suffering and vulnerability are, sadly, all too often overlooked, devalued, or reframed as irrelevant or unsolvable. Put another way, global security is paramount, but individual or community survival is not.[3] As a result, the well-being and security of local populations and individual bodies prove especially vulnerable in the face of wide-sweeping bureaucratic measures that presumably target stability on a grander global, rather than a locally grounded, scale. This volume seeks to redress these discrepancies by foregrounding small-scale yet vital human concerns alongside critiques of global initiatives of preparedness and fear, or what we understand as the proliferation of bio*in*securities, which include structural violence, suffering, and dispossession.

The authors in this volume collectively address the erasure of quotidian forms of deepening vulnerability that proliferate under biosecurity but that are unattended to because they affect individual lives and life on the ground. That is, they too frequently involve lives deemed unworthy of security measures. One then begins to wonder, what truly counts as risk, whose vulnerability matters, and who is worthy of protection? For example, in the contexts of avian, porcine, and bovine diseases, the mass extermination of flocks and herds renders farmers, whether large or small, exceedingly vulnerable, and culling, even in the name of national, regional, or global security, may drive individual households toward economic collapse. Such measures are not necessarily an issue of the expendability of the few for the salvation of the many. Instead, those who are poor, rural, or slum bound figure increasingly as individual and collective lives that are not worth saving.

Our advanced seminar originated as a small panel titled "Bio*in*securities," organized by Chen and Sharp for the annual meeting of the Society for Applied Anthropology in Santa Fe, New Mexico, in March 2009. From this modest effort emerged several critical perspectives that then framed a week-long intensive retreat called "Bioinsecurity and Vulnerability" hosted by SAR (School for Advanced Research) in October 2011 and involving the ten participants who have contributed to this volume. Throughout our week together, we probed these questions: What are the historical antecedents of biosecurity? How might we put the "bio" back in biosecurity by focusing on the vulnerability, or threats to the well-being, of human bodies living beneath the aegis of contemporary biosecurity measures?

If biosecurity is in part about protecting scarce resources, what sacrifices, fears, and consequences are at stake, and how might the scramble for these resources generate other forms of bioinsecurity and vulnerability? Of what relevance is the market in shaping biosecurity measures, and how do such measures affect the daily survival of local populations? What insights emerge when biosecurity is understood in temporal terms? Finally, what are biosecurity's moral dimensions, and what possibilities exist for more ethically and socially engaged alternatives?

It is worth noting, given the militarization of biosecurity, that the Los Alamos National Laboratory is a mere thirty-three-mile drive from the Santa Fe Plaza, casting a long shadow in this region (and, at times, on our discussions)[4] as a site steeped in the history of nuclear arms research and more recently refashioned as a center for "national security science."[5] That the onset of the Occupy Wall Street movement coincided with our arrival at SAR likewise added special poignancy to this seminar's gathering. Associated sites of activist involvement not only arose in New York City (where Sharp and Susser dwell) and Oakland, California (not far from where Chen and Watts each live and work), but also included a small yet earnest local and well-established band of protesters on a busy street corner in front of the Bank of America in Santa Fe, underscoring for all of us how biosecurity and vulnerability are indeed intertwined, daily experiences in which the global is read as intensely local. Throughout our week together, we were, unquestionably, *pre*occupied with vulnerability as a crucial yet neglected byproduct of biosecurity measures. Agamben's (1998) notion of *bios*, as set against *zoe*, or "bare life" that is exiled to a state of exception, served as an important reminder that suffering must remain front and center in our deliberations. As the two editors (Chen and Sharp) concluded, though, Agamben's framework could take our seminar's efforts only so far. The authors represented here demonstrate that vulnerability is not merely about suffering, nor, indeed, is it exceptional. In addition, the chapters in this volume seek to expose the subtler, shallow promises of "resilience," uncovering informed, persistent, and effective examples of resistance.

It is safe to say that our seminar proved to be a constant source of delight for all, marked by lively discussion and debate in which all members adroitly juggled the simultaneous pairing of theoretical critiques with grounded, ethnographic inquiries. We are fortunate—and deeply thankful—to have had the opportunity to work with such a friendly and rigorous group of scholars. The participants' wide-ranging expertise encompassed the history and ideological underpinnings of biosecurity as initially conceived in arenas demarcated by military initiatives, structural adjustment, and

public health; combined long-term ethnographic experience in Africa, South and East Asia, the Middle East, and the Americas; and demonstrated an exquisite mastery of the biopolitics of basic human needs and survival, including food and water security, climate change, urban land tenure, the politics of genetically engineered crops and animals, oil exploitation, health care access, and the dangers associated with tainted goods, kidney sales, and such zoonotic threats as anthrax and porcine retroviruses.

The ten chapters that compose this volume reflect a wonderfully productive and intensive week of working together. The overlap and complementarity of the chapters made it difficult to disentangle them as representative of distinct sections within a collection. Nevertheless, we have clustered them under three central themes that reflect our more significant, shared conclusions: first, how might we (re)frame biosecurity in reference to its historic origins (and, now, broader scope) rather than presume that it is solely about militarization; second, what sorts of critical resources exemplify locally grounded efforts to secure daily survival in contradistinction to global initiatives; and, third, how might we put the human factor, or what we reference as the "bio," back in biosecurity? As a group, we were struck by the pervasive erasure of the evidence of daily struggles to survive, so with SAR's blessing, we have also included a three-part photo essay that offers visual evidence of the seminar's concerns.

The ten chapters are organized with three overarching thematic premises in mind, under the part headings "Framing Biosecurity: Global Dangers," "Critical Resources: Securing Survival," and "Vulnerability and Resiliency: The 'Bio' of Insecurity." The first chapter in each part serves as an anchor of sorts, presenting simultaneously overarching historical developments and theoretical premises alongside quotidian concerns that emerge more prominently in the accompanying chapters.

It is worth noting that all participants agreed early on that Masco's work, which opens part I and which is so firmly grounded in the military framing of biosecurity, was an important anchor for the volume as a whole, and we are grateful to him for sharing the breadth of his expertise. Masco's chapter 1 is especially relevant to Vine's (chapter 2) ongoing research on the global proliferation of US military bases, which is placed in part I alongside Sharp's (chapter 3) interrogation of moral responsibility and the management of potentially lethal zoonoses by experimental scientists determined to develop transgenic organ "donor" swine as a cure-all for the global scarcity in transplantable human parts. Together, the chapters in this first part reframe biosecurity in order to establish a new foundation so that we may then, throughout the remainder of the volume, critically engage with vulnerability and challenge presumptions that define

the dominant understandings of the securitization of everyday life. In this sense, the three parts of the book demonstrate, in Vine's words (after Johnson 2004a), the "blowback" of security measures.

Stone's chapter 4 provides an important anchor for part II. Framed by Beck's *Risk Society*, Stone probes the relevance of scientific ignorance as encapsulated in the concept of "agnotology," or the "science" of "unknown knowns," an approach that ultimately destabilizes mainstream notions of danger and risk. Although Stone writes specifically of genetically modified (GM) crops, his framework proves fruitful in other spheres too, most notably, where the scarcity of such vital resources as food, medicine, water, and land figure prominently. This is demonstrated clearly by Chen's (chapter 5) discussion of the hazardous consequences of contaminated foods and medicines in China, set against the historicized knowledge of famines and droughts—both of which define sites of pronounced anxiety in China—and within a broader, contemporary landscape of engagement with the cutting-edge world of Asian biotech. Caton (chapter 6) offers a disturbing account of the international mismanagement of water in Yemen, a vital resource now subsumed within biosecurity discourse, a new governmentality from which emerges new forms of blame, doomsday scenarios of scarcity, and, further, the demonization of the local growing—and chewing—of *qāt*. Finally, Rouse (chapter 7) provides a stirring account of political power, the quixotic nature of land tenure, and short-lived yet devastating community violence in a coastal Ghanaian community. Together, the chapters in part II collectively engage with complex entanglements of resources and human needs that deepen vulnerability and carefully consider highly localized, quotidian examples of bioinsecurity.

Watts, in chapter 8, anchors part III. A geographer heavily outnumbered in the seminar by anthropologists, he consistently offered refreshing critiques that spanned the full spectrum of our debates concerning the well-being of human populations, both globally and historically. His insights helped to refine group discussions of the sociopolitics in disaster discourse (for instance, climate change, famine, and fossil fuels). Further, he argued convincingly for the long-standing positioning of Africa as a "laboratory" for testing (bio)security and resilience, thus assisting us all in refining our individual assessments of the calculus of life and death. More specifically in the context of part III, the concept of "resiliency" enabled us to requestion the significance of other locales studied by the contributors (e.g., Central America for the staging of US military and CIA efforts, Ghana as a long-term test site for the economic restructuring of post-independence nations, and Yemen as a secure base of operations for evolving theories and associated practices that target resourcefulness and self-sufficiency).

Watts's chapter 8 likewise serves as an important backdrop to Susser's (chapter 9) daunting accounts of the gendered nature of failed infrastructure in South Africa and Moniruzzaman's (chapter 10) meticulous tracking of organ sales in South Asia. More generally, all authors included in part III underscore the neglect of "bio" as a signifier of life and the effort to interrogate whose lives are at stake beneath the shadow of biosecurity measures as they play out on the national or global stage.

(RE)FRAMING BIOSECURITY AS BIOINSECURITY

Several key texts inevitably figure in discussions of biosecurity. Above, we make note of works by Lakoff, Collier, and other scholars who address the formations that have come to be known as biosecurity. As should also be evident from the preceding discussion, Beck's groundbreaking work on the sociology of risk provides a language for interrogating proliferation as a defining principle that dominates the contemporary global landscape (see Beck 1992[1986], 2000; Douglas and Wildavsky 1982). Beck's arguments demonstrate uncanny and prophetic qualities decades after his *Risk Society* first appeared: without question, risk analysis and prevention drive the proliferation of military installations, public health initiatives, and antiterrorist interventions. As Beck's arguments imply, the unknown dimensions of imagined danger feed a wide range of bureaucratized responses. He asserts, "presumptions of causality escape our perception" such that "they must always be imagined, implied to be true, believed. In this sense…risks are *in*visible. The implied causality always remains more or less uncertain and tentative. Thus we are dealing with a *theoretical* and hence a *scientized* consciousness, even in the everyday consciousness of risks." Further, risks "presume a *normative horizon* of lost security and broken trust." As localized phenomena, risks must be believable, yet they also project "objectified negative images of utopias" (Beck 1992[1986]:27–28).

This SAR volume most certainly draws inspiration from Beck's arguments. Our collective critiques are focused more precisely on the imaginative work that informs anxiety and fear; on risk's invisibility and its institutionalized consequences; and on the manner in which an associated "scientized" consciousness is demonstrated by the ongoing proliferation of biosecurity measures. When framed in these ways, biosecurity is not simply dystopic: it simultaneously feeds longings for an idealized past while denying any possibility of return. Such conditions facilitate the ramping up of biosecurity measures, even though, as Masco (chapter 1) demonstrates, biosecurity breaches are in fact exceedingly rare. Given that biosecurity nevertheless privileges preventative measures on a grand scale, an extraordinary amount of work goes into imagining, building, and maintaining

infrastructures deemed necessary should a catastrophic event ever occur. Thus, we must always be on the alert for impending, large-scale calamities, which then obscures the problems of quotidian existence. A significant danger that informs our thinking throughout this volume is that such efforts neglect, devalue, and erase human needs crucial to daily survival, a framework Paul Farmer and others identify as structural violence (e.g., Farmer 1997; Galtung 1969).

The two chapters by Vine and Sharp enable us to probe specific consequences of the disaster ethos. First, as Vine (chapter 2) demonstrates, the escalation in the number of US military bases exposes a logic all its own. Key here is the invisibility of military proliferation, illustrated in especially striking ways by Soto Cano in Honduras, a base that is a staging site (or "lily pad" operation) for US activities in Honduras yet whose presence is erased by claims of its nonexistence. As Vine's work elsewhere demonstrates, Honduras is only one of myriad installations worldwide and a relatively modest example of a staggering array of militarized US activities driven (or legitimated) by the fears propagated by biosecurity in the new millennium. Embedded within such interventions are dangers that Vine identifies as "blowback," in which clandestine security efforts (such as CIA investment in oppressive regimes) can backfire and compromise future US "security" in a region.

One encounters still other forms of erasure in Sharp's chapter 3. She describes the "*scientized* consciousness" of medical risk in the context of futuristic transplant research, whereby involved geneticists and immunologists regard highly experimental efforts to generate hybrid species as a profoundly moral project that might one day save thousands of lives. Here, transgenics (currently involving the blending of porcine and human genetic material) drives a scientific imagination intent on eradicating the insecurity of human organ supplies and the suffering—and, thus, vulnerability—of human patients currently dependent on scarce supplies of replaceable parts. In this new calculus of life and death, the potentially lethal dangers associated with porcine zoonoses are obscured through deliberate "translational" work designed to disarm ethical concerns about transpecies contagion. The scientific desires that foreground the pig's promissory qualities as preemptive measures (while silencing discussions of human vulnerability and endangerment) may herald disease threats that could activate a radically different sort of biosecurity blowback were a lethal zoonosis to jump the species barrier. These sorts of possibilities already loom large in the collective imagination in the form of BEV, SARS, AIDS, and H1N1.

Other dangers associated with daily survival surface within realms circumscribed by public health. Whereas advocates for more basic health

initiatives (i.e., neonatal care, obstetrics, dentistry, surgery, emergency medicine, vaccination programs, potable water, sewers, and plumbing) have long struggled to acquire adequate financing and personnel across the globe, those who target "high-risk" pandemics may now garner generous funding. In their wake, large-scale biosecurity measures also sweep aside essential infrastructural support. As Susser's work (chapter 9) so poignantly demonstrates, even where medications or medical services might already exist, poorly maintained or nonexistent roads, limited access to transportation, the lack of electricity to refrigerate medications, and the paucity of safe, affordable water for cooking and cleaning together render health and well-being impossible for much of the world's poor and, even more precisely, for poor women who, as she puts it, "have landed in the crosshairs of the AIDS epidemic." The expendability of certain categories of human beings thus figures heavily in this calculus of life and death. Still other examples include efforts among Chinese consumers to navigate markets rife with contaminated goods (Chen, chapter 5) and a willingness among Bangladeshis to risk their lives making clandestine border crossings so that they can sell their own kidneys (Moniruzzaman, chapter 10) and then invest in more hopeful (though frighteningly tenuous), alternative futures.

RESOURCES CRITICAL TO SECURING SURVIVAL

Such gross discrepancies are most certainly deeply entrenched in local and global markets, foregrounding the disturbing reality that human bodies—and especially those of the poor—are increasingly reduced to sources of biocapital (Franklin and Lock 2003; Rose 2007; Rose and Novas 2005; Sunder Rajan 2006). It is here that our book diverges from previous edited volumes, most notably, the impressive efforts by Lakoff and Collier (Lakoff 2010a; Lakoff and Collier 2008; see also Schrag 2010).[6] In particular, Lakoff and Collier's *Biosecurity Interventions* (2008) laid important groundwork for our seminar, foregrounding global health as an important domain of "security in question." Our volume moves forward from and beyond these works: whereas these authors make convincing cases for active involvement and the orchestration of biosecurity measures to protect humans across the full social spectrum from harm, we tack in another direction, asking what logics inspire biosecurity measures in the first place and what destruction or silencing lies in their wake.

In terms of our seminar's goals, health unquestionably was an important domain requiring intensified scrutiny (as demonstrated especially in part III). Our efforts were infused with a shared frustration with how discussions of public health concerns in others' studies neglected, again

and again, the proliferation of new injuries and sicknesses (funding, for instance, for SARS surveillance, control, and eradication but not for TB, prenatal care, or chronically endemic tropical diseases), and how studies bracketed out equally important domains of daily survival, including water safety, housing, transportation, affordable fuels, and safe and sustainable food sources. Furthermore, *Biosecurity Interventions*, alongside Lakoff's subsequent edited collection *Disaster and the Politics of Intervention* (2010a) take disaster at face value: the contributing authors were most interested in the nature of "public-sector intervention" *after* calamities have occurred. Here, catastrophe management stands against a backdrop of very real, local crises (e.g., wildfires and terrorist attacks) and international events (e.g., the global financial crisis), each of which "provoke[s] calls for urgent intervention." At stake, then, are a "politics of intervention" and the "galvanization" or "failure" to respond (Lakoff 2010b:1–2). Our volume should not be read as mounting a challenge to these previous efforts, but as offering a much needed counterbalance in which the logic of care is most concerned with increased human vulnerability and invisibility as preemptive biosecurity measures are imagined and activated.

The repercussions of security failures generated visceral responses for the editors of this volume. Chen and Sharp spent their childhoods in Louisiana, a state hard hit by and then abandoned in the wake of Hurricane Katrina. In the midst of writing the first draft of this chapter, Sharp (and Susser) witnessed firsthand the aftermath of Hurricane Sandy in Sharp's hometown of New York, eleven years after the 9/11 attacks on the World Trade Center in that same city. We concur with Lakoff that there is most certainly a need to ask what "the relative roles of the state, the private sector, and nongovernmental organizations (NGOs) [are] in ensuring collective security" (Lakoff 2010b:3) in hopes of working toward "more resilient critical systems and more sustainable practices of disaster management" (5). In the context of our seminar, however, we emerged as a group whose members share a deep interest in less tangible forces (alongside deep skepticism regarding the rhetoric of sustainability; see especially Caton, chapter 6, and Watts, chapter 8). Without ever discrediting the very real forms of suffering that disasters cause, as a group, we were fascinated with the ideological premises that drive preemptive policies, programs, and practices in the name of a special risk aversion now known as "biosecurity."

This volume insists, then, on interrogating the assumptions that drive biosecurity measures, through careful ethnographic investigations of grounded suffering. The breadth and depth of knowledge offered in these pages derives from long-term involvement in a range of sites; equally crucial has been a richly textured, comparative perspective that would have

been impossible had we all claimed expertise, for instance, in the same geographic or cultural region. As the individual chapters demonstrate, the world engages with biosecurity measures in very different ways, and associated military, economic, health, and resource initiatives play out on the ground very differently, too. Invisible formations of capital, knowledge, and power similarly come together in highly varied—and potent—ways. What make such formations so new, and so troubling, are new forms of erasure and silencing. Indeed, in the months leading up to our final editing of this volume, daily news accounts tracked the search for and capture, arrest, and/or trial of Julian Assange, Edward Snowden, and Chelsea (Bradley) Manning. Accused of leaking classified documents, all three offer thought-provoking reminders of the importance of secrecy to national security. The chapters in this volume are about secrecy as intrinsic to biosecurity; about new forms of market capital and the expendability of certain human lives; and about how vital material resources—water, food, medical care, transportation, and fuel—are beyond the reach of or denied to those who need them the most, and increasingly so in the name of securing the future elsewhere. We thus ask, whose future and for whose own good? Biosecurity is indeed dependent on erasures, on this separability of worthy and worthless, and on newly imagined categories of expendability and vulnerability.

In our seminar and in this book, we strove to "surface" (Janelle Taylor 2005) the lived conditions of neglected quotidian contexts that foreground radically different experiences with risk. All the participants were struck from the start by the paucity of contemporary scholarship that could draw linkages beyond militarized zones and large-scale efforts at policing, containment, and control and to daily efforts to survive. That is, we hungered for work that drew clear connections between infrastructural intent and the life-and-death consequences of biosecurity initiatives. It is for these reasons that an overarching theme throughout our week together was bioinsecurity and vulnerability. This cause-and-effect relationship between biosecurity writ large and bioinsecurity on the ground embodies Vine's notion of the blowback factor and, for Sharp, the "temporal morality" of scientific logic that facilitates the erasure of harm.

Although current biosecurity literature views 9/11 as a foundational event, the concept itself is much older, narrower, and perhaps more benign than the unquestionably militarized agenda of today. Biosecurity originates with animal husbandry and food safety measures that extend back to the early decades of the twentieth century (Boyd and Watts 1997). It has emerged as a newly crafted (and largely) American framework of risk that involves, in Masco's words, a "folding in" of "new logics" of danger that in turn radiate out from the United States, encompassing an

ever-widening circle of imagined threats deemed significant on a global scale. We all agreed as well that biosecurity, as currently conceived, must be read against a backdrop of neoliberalism and crippling structural adjustment policies and is all too often framed by its architects in terms of a neo-Malthusian model of personal responsibility. On an increasingly mundane level, personal responsibility is clearly conveyed in antiterrorism warnings now pervasive in the United States, such as Homeland Security's "See Something, Say Something" campaign, encountered on the New York subway system and elsewhere.

It is one thing to speak of personal responsibility in reporting an abandoned backpack in a subway car; it is yet another to struggle ceaselessly to satisfy the basic needs of daily survival for oneself, kin, neighbors, and community. This is precisely the point driven home in this volume's second part, in which Stone, Chen, Caton, and Rouse each foreground instances when the politics of knowledge production play out on the ground. As already mentioned, Stone's notion of agnotology, or the "making of ignorance" (after Proctor 2008), defines a common core of analysis for these four chapters. Stone asserts that whereas public (and, more specifically, ecologists') fears focus on the dangers embodied in genetically "engineered" (or genetically "modified") crops, the imminent risk in fact lies, first, in scientific ignorance of the compounding effects of gene splicing and, second (and most important), in newly conceived institutionalized practices that inhibit such research, such as patents and other forms of intellectual property that undermine transparency. That is, the danger lies not in the technology itself, but in "new types of alliances between industry and academy…[that are] active in blocking potentially uncomfortable research." In short, agnotology itself surfaces as a potent source of bioinsecurity in which the sociomoral logic (see Sharp, chapter 3) of scientific ignorance foregrounds very different sorts of danger.

The chapters by Chen, Caton, Rouse, and Sharp offer ready evidence of "agnotological projects," each plagued by "many questions that for the sake of our biological security should be answered" (Stone, chapter 4), yet, in each case, specific structures prevent necessary research (and, we would add, action). As in Stone's account of the rise of GM crops, all four of these chapters trace the "origin stories" (Sharp, chapter 3) or "genealogies" (Chen, chapter 5) of expert knowledge that shapes perceptions of present dangers associated with food, medicines, aquifers, and land. Such findings drive one to ask, how do citizens, communities, and nations ensure biosecurity in the face of counterfeits, misdirected aid programs, highly experimental science, and conflicting forms of governance?

Chen, for instance, drawing on her encounters in Beijing in 2012,

describes how "extremes of affluence and expansive growth coexist with bare life and disparity across the country." Here, one encounters a different "proliferation" of new brands and kinds of foods, including successive waves of scandals about tainted food and drugs, set alongside both benign and toxic counterfeits. The paired themes of safety and danger assume a special urgency in twenty-first-century China, a nation that now boasts a burgeoning presence in the global economy, enabled by the "double helix" of the state and market, whose "spiraling consequences" foster new quotidian forms of vulnerability and endangerment. Chen uncovers the urgency with which Chinese consumers must be able to discern safe from counterfeit, tainted—and potentially lethal—goods in their search for everything from foodstuffs to infant formula and basic medicines. As she shows, ersatz goods are so pervasive and fakes so convincing that one remains dangerously vulnerable in spite of being a well-informed and ever-vigilant consumer. Whereas Stone emphasizes agnotology in the GM arena, Chen describes how the aggressive development of GM products in China is driven by efforts to overcome Malthusian-style forces in hopes of feeding a growing nation. That is, GM foods—and, most notably, less water-hungry rice—and other innovative biotechnologies figure prominently in a newly crafted, national vision of biosecurity.

In these contexts, one encounters conflicting moral logics that foreground certain desires while obscuring associated hazards. In China, the new morality is, in Chen's words, one of "fearful consumption": in pursuit of "the good life," one experiences the pairing of desire for new goods and anxiety about contamination. Against such a backdrop, Chen probes the interconnectedness of food safety and food security, a twinning that most certainly translates to myriad other contexts. For instance, this same moral reasoning permeates, on a much smaller scale, scientists' efforts to fabricate transgenic swine for organ transplantation (Sharp, chapter 3). That is, potential (or, as Stone would say, unknown) risks and vulnerabilities are set aside within the architecture of a larger sociomoral logic of good.

Parallel questions arise in the contexts analyzed by Caton (chapter 6) and by Rouse (chapter 7), both of whom offer especially poignant examples of poorly maintained infrastructures (a theme that resurfaces in Susser, chapter 9). As Caton details, Yemen's "water problem" is an issue viewed elsewhere (especially in the United States) as one of *global* security. Yet again, we encounter Malthusian reasoning, this time imposed upon a country by a cabal of foreign interests (including the US Department of State, Coca-Cola, the Nature Company, and Procter & Gamble), creating what Caton identifies as a "tight nexus of national policy and scientific expertise." Yemen ultimately shoulders the blame for an impending "crisis

in water security," a moralistic stance that effectively erases the evidence of hegemonic mismanagement of foreign (US) origin, and Caton uncovers evidence of US bullying in those sectors of the world it "perceives as vital to its own security" through "the newly emergent water security paradigm." All of this occurs against an obscured backdrop of corporations buying up global water sources and the World Bank and IMF pushing for water privatization (see also Susser, chapter 9). One cannot help but wonder whose security is truly at stake in this new world order. Poorly informed, misdirected, naïve, yet forceful, foreign neoliberal "development" initiatives directed at poor countries once again (Ferguson 1994) undermine *local* biosecurity. In Yemen specifically, local aquifers are not at risk of depletion from long-standing local farming techniques, but from foreign insistence on growing what have proved to be "water-thirsty" grains and fruits bound for sale in a global marketplace. The new "doomsday scenario" is now embodied in the "demon qāt"—a plant that has become a "lightning rod" for discourses that entangle water security, public health, and Yemen as an irrational, primitive nation. These logics work together to obscure the joint hegemonic aspirations of the United States and corporate interests, which are indicative of a new sort of global resource governmentality.

How, then, do "regime[s] of governance translate into concrete political practices on the ground?" asks Caton, a query that is of equal relevance to Chen's chapter 5 concerning food and medicines, Rouse's chapter 7 on land tenure, and Susser's (chapter 9) work on health care access. Rouse asks related questions about eruptions of violence in a Ghanaian coastal community where ongoing anxieties of economic vulnerability generate "ontological insecurity," as evident in local narratives about rights to land, food, money, and education within a "two-headed" system of local and state power. Rouse interrogates the false premise that "happiness" is linked to access to consumer products. In a community where assaults have targeted local authorities involved in land redistribution, it seems clear that land—an increasingly privatized and thus inaccessible "commodity" or right—is in fact a more precious source of biosecurity (not unlike food and water). Rather than embrace a common trope that violence is endemic to Africa, meted out by disenfranchised youth (Comaroff and Comaroff 1999; Cruise O'Brien 1996), Rouse explores the moral logic of the attacks within the larger framework of trust, social justice, community vulnerability, and local responsibility, tracing the historical origins of land insecurity as local, state, and now international interests vie for control over real estate. Against this backdrop of what she identifies as "cartographies of vulnerability," Rouse notes the unsettling irony of heavy investment in security measures at Accra's once sleepy international

airport, now a multimillion-dollar infrastructure that effectively demonstrates the "unevenness of security." Her findings resonate with Vine's work in Honduras and Susser's activities in South Africa.

HUMAN RESILIENCY AND THE "BIO" OF INSECURITY

As the above discussion demonstrates, whereas the United States may envision itself as deeply committed to global biosecurity measures (albeit in its own interest), other nations and regions are regularly identified as sources of danger (notably, China, as a presumed epicenter of zoonoses and tainted goods), desperation (namely, South Asia and Africa, sites dominated by tropes of hunger, sickness, and political violence), and resource vulnerability (characterized, for instance, by oil reserves and dwindling water supplies in the Middle East and West Africa).

As the anchor for part III Watts's chapter 8 explores an ever-widening domain where security and danger are enfolded within a framework of "catastrophism" (a concept that encapsulates virtually all the topics analyzed in this volume; cf. Law 1991; Schrag 2010; Stark 2011). Watts unpacks the underlying logic of a "science of planetary disaster," driven by a pervasive grammar of urgency, grave danger, and radical forms of uncertainty. In essence, the entire world is in a state of emergency. As Watts's chapter insists, particular sites offer evidence of how deeply entrenched they are as "laboratories," and here, Africa figures especially prominently in long-standing efforts to test theories of human vulnerability. Watts hones in on the drought- and famine-prone West African Sahel as a means to disaggregate the presumptions that drive the logic of "resiliency," an emergent form of "biopolitical security" that has arisen in the face of mounting food, climate, and fuel emergencies. "Resiliency" facilitates the shifting of blame and responsibility to the shoulders of the most vulnerable, often with dire consequences. As Watts demonstrates, the Sahel, with its "deep history" of vulnerability, has long been circumscribed as a "laboratory for environmental ideas" (cf. Tilley 2010). Today, the Sahel circulates within "the biosecurity paradigm of 'resiliency'" (a critique of equal relevance to Caton's [chapter 6] assessment of the politics of water in Yemen). We have thus moved from the labs of biotech (see Sharp, Stone, and Chen, chapters 3, 4, and 5, respectively) to *social* laboratories, evidenced, for example, in Vine's (chapter 2) assessment of Central America as a testing ground for military operations, CIA operatives, and regional security and in Caton's discussion of Yemen as a testing site for economic transformation and diplomacy in an era when the Middle East is overshadowed by US-based fear of terrorist aggression. In this same vein, Susser asks at the opening of her chapter, "why consider South Africa?"

Given that the broader scholarship of several participants is grounded in medical anthropology (Chen, Moniruzzaman, Rouse, Sharp, and Susser), health care interventions were a pronounced field of interest throughout the seminar, especially where the vulnerability of bodies was concerned. Susser's chapter 9 is pivotal here, offering a complex portrait of South Africa as a testing ground for public health initiatives and, more precisely, HIV/AIDS prevention and treatment that specifically target women in a woefully inadequate infrastructure, a context Susser identifies as among "the less dramatic forms of bioinsecurity facing poor populations…[of] new democratic states."

In Susser's chapter, we revisit many of the themes already mentioned: reliable sources of water (Caton), intellectual property (Sharp and Stone), effective medications (Chen), innovative medical practices (Sharp), and even airports as targets of significant funding (Rouse) while essential road networks are sites of woeful neglect. In these instances, global concerns (embodied, as Watts demonstrates, in the neoliberal discourses of "resilience" and "flexibility") trump local biosecurity. In response to Susser's leading question, we see that not only does AIDS, long understood as a global pandemic, figure prominently in biosecurity discourse, but it is also a quotidian aspect of life for many South Africans and thus a significant site of vulnerability. In a nation burdened by soaring rates of HIV/AIDS infection, clinic supplies nevertheless remain sporadic, hospitals are grossly understaffed, and even the most basic forms of infrastructure (including adequate roads, reliable and safe buses and trains, electricity, and running water) are woefully inadequate or nonexistent. Susser demonstrates how world trade agreements regarding drug generics and associated patent violations (as specified in TRIPS) privilege global profits over affordable disease prevention and treatment and discusses the internationalization of the politics of reproductive health and pregnancy prevention in which funding sources impose moral interventions, ensuring that women bear the heaviest social burdens and blame (translated, as Watts asserts, into a discourse of "resilience"). As Susser explains, "people with AIDS are trapped between two logics, one promoting universal access for treatment for AIDS and the other, the privatization of public goods." Through the lens of Susser's research, we realize that the biosecurity of local survival is habitually constrained—and rendered ever more vulnerable—by global concerns, a definitive example of what Watts (after Berlant 2007) identifies as the "actuarial imaginary."

If South Africa can lay claim to the dubious status of "laboratory" (as evidenced in a deeply entrenched history of resource extraction, racist politics, life-threatening labor practices, and, now, pharmaceutical trials),

South Asia stands out as an emergent site of what Moniruzzaman (chapter 10) identifies as "a novel form of bioviolence against the poor" (after Kellman 2007), intersecting in turn with what Chen and Ong identify elsewhere as "the ethics of fate" (Ong and Chen 2010). Here, the Malthusian abstraction of the expendability of the poor falls apart; instead, we encounter the stories of individuals willing to sell parts of themselves as a strategy for survival, a twisted "bioexpendability" in which parts of persons are quite literally alienated from their bodies, a grotesque form of labor that transforms living humans into precious sources of biocapital (Sunder Rajan 2006). Moniruzzaman's meticulous tracking of sellers' and brokers' movements in chapter 10 reveals a chilling "futures market" (cf. Sharp, chapter 3) of "fresh" human flesh. Here we come full circle in regard to the realm of highly experimental xenoscience, where scarcity is likewise a driving force. Moniruzzaman's examples from Bangladesh and India are a far cry from the scientific imaginary pervasive among the scientists Sharp describes, who hope that ongoing lab experiments with transgenic animals will eliminate the moral dilemmas, anxieties, and desires resulting from a presumed global scarcity of human organs.

RENDERING THE INVISIBLE VISIBLE

As should be clear by now, "biosecurity" does not simply foreground themes of danger and vulnerability; it also incessantly insists upon erasures amid discussions of resiliency against attacks, pandemics, and scarce resources. Biosecurity involves a bulking up of new forms of vulnerability within invisible spheres; such efforts must also be understood as deliberate erasure and calculated neglect. There is nothing new about this: one need only consider the historical effects of conquest, colonization, and war to reach this conclusion. Yet, we argue here that the contemporary paradigm of biosecurity involves a ramping up of newly imagined economies of abandonment and, in response, localized pushback. We reject biosecurity as a unanimously agreed-upon formation in which bioinsecurity is our collective form of push-back.

In response, throughout the course of our week-long seminar, we regularly strove to invert the dominant premises of risk, anxiety, and danger, drawing on evidence from grounded contexts where survival and resiliency are paired in very different ways. To borrow phrasing from Masco, preemptive measures are about "securing life on all scales." Rather than offer a purely cynical response, we insist on "imaginative techniques" that might generate alternative "visions of future dangers so terrifying that they need to be warded off in the now."

According to Beck (2000:213–214), visual imagery serves to dramatize

risk and render it "real," and biosecurity more particularly can be understood as a potent, imaginative project, pulling future dangers into the immediate present, a process Masco (chapter 1) asserts is dependent on the invention of "new imaginaries" (cf. Watts, chapter 8, and Sharp, chapter 3; also Guyer 2007). Throughout our week together and subsequently in this volume, we sought to reverse this trend by rendering invisible realities visible. This material evidence is exemplified in the photos that we open each part with, and, in so doing, we take to heart Arthur and Joan Kleinman's joint critique of "absent images." As they explain, when such evidence is suppressed, "the possibility of moral appeal through images of human misery is prevented, and it is their absence that is the source of existential dismay" (Kleinman and Kleinman 1997:16). Consider, for one, the US military's lily pad approach to building bases, which Vine describes in chapter 2, a newly conceived type of militarized land grab (one might compare Rouse, chapter 7). Operating as "covert biosecurity," these militarized sites are described officially as remaining under local control, nevertheless projecting US power regionally and globally. This "new way of war" is evidenced in Vine's account of Soto Cano in Honduras, a burgeoning yet silent historical chapter of US military occupation. Susser (chapter 9) in turn provides a striking juxtaposition of a state-of-the-art railway system that services an international airport, set against the dilapidated roads and decrepit transport system that are the lifeline of the poor. In turn, uncannily similar images provided by Rouse (chapter 7) and Moniruzzaman (chapter 10), writing from different global sites, expose the rawness of embodied forms of violence. Finally, Watts's work with photographer Ed Kashi (Watts and Kashi 2008) dispels any fantasies one might have of the cleanliness or environmental friendliness of oil extraction in the Niger Delta.

As demonstrated by Vine's chapter 2, although US military bases proliferate worldwide, their presence remains unmarked on maps and unknown to those who live or work nearby or, even, within their fenced-in boundaries. Moniruzzaman (chapter 10), writing from South Asia, demonstrates the obscured relationship between kidney seller and buyer: transplant patients in India rarely know or meet their "donors" from Bangladesh. The latter nevertheless risk life and limb to cross international boundaries in hopes of selling parts of themselves, their bodies thus defining an emergent category of extraction, or, in Moniruzzaman's words, "a steady supply of surplus life." Several other authors demonstrate the high stakes of scientific knowledge. As Stone argues in chapter 4, the obstacles associated with agnotology, or the muting and blocking of knowledge regarding the values and hazards of genetically engineered crops, are evident in how understandings of safety are hobbled both by proponents and

opponents of biosecurity measures. This theme is aptly demonstrated in Sharp's (chapter 3) work on xenografting: experts strive to translate discussions of potential dangers into benign forms of moral reasoning, and, further, a "disappearing subject" in human form is overshadowed by the transgenic pig's own promissory qualities. Caton (chapter 6) demonstrates the life-and-death consequences of misplaced, misinformed, poorly implemented, and reactionary responses to water use and qāt production in Yemen. More generally, although vulnerable bodies are easily caught in the net of contemporary biosecurity measures, personal experiences of suffering rarely appear in accounts of preventative infrastructure (Susser, chapter 9, and Rouse, chapter 7), culling of diseased animals and imposed human quarantine (Sharp, chapter 3), or mass development projects designed ostensibly to stave off food, fuel, and other shortages (Watts, chapter 8, and Caton, chapter 6). Throughout our week together, we became especially interested in probing the significance of the invisibility of biosecurity decision making, policies, and practices; the neglect of infrastructure; and the silencing of dissent.

THE PUSH-BACK

It is absolutely crucial to recognize that biosecurity measures generate new infrastructures of power that ignore daily events and human experiences at the bottom *and* the top. An especially pronounced theme to emerge from our seminar discussions was the widespread erasure of individual lives that evidence intense suffering, and we identified the overwhelming preponderance of Malthusian thinking as especially irksome. In response, throughout this volume, we surface forms of suffering hidden by biosecurity measures. Further, all ten authors push through or expose more subversive approaches set on identifying "radical" forms of uncertainty where the impending biothreat is not about terrorism, but about the terrors of daily human survival. In this light, the arena of health care is an especially rich domain for discerning the disparities between efforts to secure daily needs and the often oppressive weight of biosecurity initiatives, which either overlook or devalue human efforts to survive in the most basic sense. One wonders, too, where room might be carved out for local knowledge, or "vernacular science" (Watts, chapter 8), and in turn radically different forms of resiliency.

In the face of the all too often oppressive constraints of biosecurity measures, the presumably vulnerable do indeed push back. Consider, for instance, the protest that opens Vine's chapter 2; animal rights activists in a range of countries, whom Sharp (chapter 3) has encountered, who challenge the safety of xenografting; and still others, described by Susser

(chapter 9), who transform customary laws in South Africa that previously sanctioned gendered violence, as well as the women who now lay claim to positions of authority previously reserved solely for men. Chen (chapter 5) likewise documents the rise of consumer activism among Chinese "netizens." And one cannot help but stand in awe of potential kidney (and other organ) sellers in Bangladesh who, though desperately trying to escape dire poverty and heavy debt (sadly, and ironically, tied in part to microcredit programs exemplified by the work of the Grameen Bank), back away from selling—alongside still others in need who can afford to, yet on moral grounds refuse to, buy—"fresh" flesh in the international body bazaar (cf. Andrews and Nelkin 2001). Perhaps no chapter in this volume as much as Moniruzzaman's (chapter 10) demonstrates so clearly the vastly troubling border zones of bioinsecurity.

TEMPORAL MATTERS

Finally, given the historical—yet often forgotten—antecedents of contemporary biosecurity measures, an important conclusion for our seminar was that temporality matters.[7] We asked repeatedly, what of biosecurity past, present, and future? As Beck asserts, risk reverses the temporal order: the past loses its power to determine the present, and the process instead insists upon "discussing and arguing about something which is *not* the case, but *could* happen if we were not to change course" (Beck 2000:213–214). As we conclude this introduction, we ask, how, then, might *we* change course?

The specific ways that biosecurity has been refashioned in the twenty-first century shaped our joint efforts to analyze key moments when earlier forms of security were practiced. Among our most striking findings—deeply inspired by several participants' long-term ethnographic involvement in specific locales—was that particular sectors of the globe, as favored laboratories, generated favored biosecurity narratives, too. The history of public health, resource extraction, agricultural development, the rise of biotech, and the often blatant attitudes, policies, and processes that evidence the expendability of human life throughout the globe proved especially instructive, disturbing, and comparatively valuable. Temporal thinking enabled us as a group to ponder the invisible consequences of securitizing life and certain futures when suffering, and premature death, prove inevitable for far too many inhabitants of an insecure world.

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Notes

1. See, for instance, the report by the American Civil Liberties Union, "NYCLU Report Documents Rapid Proliferation of Video Surveillance," December 14, 2006, http://www.aclu.org/technology-and-liberty/nyclu-report-documents-rapid-proliferation-video-surveillance-cameras; and "How Much Surveillance Do You Need?" *Economist Online*, April 3, 2010, http://www.economist.com/blogs/gulliver/2010/04/security_cameras.

2. For others' discussions of risk, resiliency, and "capacity building," alongside the relevance of "hope," see Douglas and Wildavsky 1982; Law 1986, 1991; Mattingly 2010; Mol 2008; Mol, Moser, and Pols 2010; Schrag 2010; Stark 2011; van Kammen 2003.

3. The scale of "community" is flexible: consider, for instance, that during the days following 9/11, the island of Manhattan was thrown into virtual quarantine when all bridges, tunnels, and neighboring airports were shut down.

4. The laboratory's history is reflected in local place names: nestled just off the town's main street of Trinity Drive, its own street address is Omega Road. The larger

town sits atop a mesa, and its lights can be seen from many sites in Santa Fe on a clear night.

5. See http://www.lanl.gov/index.php.

6. Andrew Lakoff was originally slated to be a seminar participant, but conflicting demands, regrettably, prevented this.

7. See especially Ferry and Limbert 2008; Guyer 2007; and Sunder Rajan 2006:107ff on "vision and hype: the conjuration of promissory biocapitalist futures."

