The Scale Politics of Emerging Diseases

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ABSTRACT

The concept of scale politics offers historians a useful framework for analyzing the connections between environment and health. This essay examines the public health campaign around emerging diseases during the 1990s, particularly the ways in which different actors employed scale in geographic and political representations; how they configured cause, consequence, and intervention at different scales; and the moments at which they shifted between different scales in the presentation of their arguments. Biomedical scientists, the mass media, and public health and national security experts contributed to this campaign, exploiting Americans' ambivalence about globalization and the role of modernity in the production of new risks, framing them in terms that made particular interventions appear necessary, logical, or practical.

"DISEASE KNOWS NO BORDERS"

In 1994, international health expert Milton Roemer wrote, "[I]n the modern world, the claim that 'disease knows no borders' has become a cliché that no mature health leader repeats." Roemer described a new approach to international health:

> Towards the end of the twentieth century . . . inequities became a major concern of international health work—a far cry from the original narrow focus on border quarantine. . . . The goal today is now to assure within all countries—rich and poor, large or small—the full health benefits of modern science and civilization. "One world" should mean not merely to eliminate the need for border quarantine, but to endow each country with the resources and strategies to achieve maximum health for all its people.[1]

Roemer was optimistic about the likelihood of success for this new approach—with good reason. In 1974, an international convention at Alma Ata in the former

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[1] Milton I. Roemer, "Internationalism in Medicine and Public Health," in *The History of Public Health and the Modern State*, ed. Dorothy Porter (Atlanta, Ga., 1994), 421. Roemer had a distinguished career in public health research and practice, serving in the New Jersey State Department of Health and briefly as chief of the Social and Occupational Health Section of the newly formed World Health Organization, and publishing the comprehensive survey *National Health Systems of the World*. Among other awards, he received the American Public Health Association's Sedgwick Memorial Medal for Distinguished Service in Public Health and the Lifetime Achievement Award of the association's International Health Section.

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Soviet Union declared that primary health care and social and economic justice should be the foundations of international public health. This declaration and documents such as the Lalonde Report on Canadian health and the Ottawa Charter for Health Promotion have been cited as evidence of a "third public health revolution." Instead of investment in health care and disease prevention efforts aimed at border control and modification of individual behaviors, "health promotion" and "population health" approaches emphasized research into the upstream determinants of health, provision of primary health care and political empowerment, and a self-consciously global strategy of "capacity for building health" in developed and developing nations.[2]

Yet even as Roemer proclaimed the demise of the truism that "disease knows no borders," a public health campaign that readily embraced it was well underway. This campaign argued that recent political, economic, and technological changes were giving rise to "emerging diseases": newly discovered pathogens such as the Ebola and Hantaviruses, and newly resistant strains of bacteria such as *Mycobacterium tuberculosis* and *Streptococcus pneumoniae.* With increasing international commerce and travel, emerging diseases could be rapidly transmitted from one country to another, thus constituting a global threat that demanded immediate response. As journalist Laurie Garrett observed in 1996, under the subheading "Diseases without Borders," "[G]eographic sequestration was crucial in all postwar health planning, but diseases can no longer be expected to remain in their country or region of origin."[3]

In this essay, I will sketch a brief history of the emergence of this campaign, which, despite some similarities, represented a pragmatic alternative to Roemer's idealistic vision of "one world." I will pay close attention to the *scale politics* of this campaign, particularly the ways in which different actors used scale as a resource: how they employed scale in geographic and political representations; how they configured *cause, consequence,* and *intervention* at different scales; and the moments at which they shifted between different scales in the presentation of their arguments.

In focusing on scale politics, I will be following the work of geographers Erik Swyngedouw and Neil Smith, who argue that scale should not be regarded as an ontologically given geographic territory or a priori unit of analysis. Instead, it is the outcome of a historically contingent political process, in which actors construct *scalar narratives* that invoke places and spaces at different geographic scales to explain events, enlist allies, and attract attention and funding.[4] Both Roemer's vision and the truism that "disease knows no borders" are forms of scalar narratives.

Historians and sociologists of science have also drawn attention to this category. Bruno Latour has argued that manipulation of scale was an integral part of Louis Pasteur's ability to secure alliances among his contemporaries and to convince others that in order to solve their problems, they must first "pass through" his laboratory. Part of

[2] See the articles in the March 2003 issue (vol. 93) of the *American Journal of Public Health,* especially I. Kickbusch, "The Contribution of the World Health Organization to a New Public Health and Health Promotion" (383–8); and D. Kindig and G. L. Stoddart, "What is Population Health?" (380–3).

[3] Laurie Garrett, "The Return of Infectious Disease," *Foreign Affairs* 75 (Jan./Feb. 1996): 69.

[4] Erik Swyngedouw, "Neither Global nor Local: Glocalisation and the Politics of Scale," in *Spaces of Globalization: Reasserting the Power of the Local* (New York, 1996), 137–66; and Neil Smith, "Geography, Difference, and the Politics of Scale," in *Postmodernism and the Social Sciences,* ed. Joe Doherty, Elspeth Graham, and Mo Malek (New York, 1992). See also Andrew E. G. Jonas, "The Scale Politics of Spaciality," *Environment and Planning D: Society and Space* 12 (1994): 257–64.

the social power of science lies in its ability to work at a small scale and to convince others that this scale is simple, efficient, and effective.[5] In a review of the literature on "Big Science," James Capshew and Karen Rader have urged historians to avoid the romanticized "drama of scale," which contrasts "huge machines, large organizations, and massive expenditures found in some contemporary research projects with the stereotyped lone investigator of the past."[6] Instead, Capshew and Rader advocate a synchronic investigation of the epistemological, institutional, and political conditions that make changes in scale possible.

This essay briefly reviews some of these conditions and concludes with reflections on the importance of scale in historical analysis. The emerging diseases campaign employed a strategic and historically resonant scale politics, making it attractive to journalists, biomedical researchers, activists, politicians, and public health and national security experts. Campaigners' identification of causes and consequences at particular scales were a means of marketing risk to specific audiences and thereby securing alliances; their recommendations for intervention at particular scales were a means of ensuring that those alliances ultimately benefited specific interests. Through their scalar narratives, campaigners exploited Americans' ambivalence about globalization and the role of modernity in the production of new risks and framed them in terms that made certain interventions appear necessary, logical, or practical. The truism that "disease knows no borders" was not just a convenient cliché for describing microbial transgression; it was also linguistic shorthand for the political production of scale.

STEPHEN MORSE AND THE EMERGENCE OF "EMERGENCE"

Concerns over the appearance of new diseases are centuries old, and the term "emerging diseases" can be identified in the medical literature at least as far back as the 1960s.[7] However, not until the 1990s did emerging diseases appear as a coherent concept and the intellectual kernel of a broad public health campaign. The person generally credited with originating it is Rockefeller University virologist Stephen S. Morse, who chaired the 1989 conference "Emerging Viruses: The Evolution of Viruses and Viral Disease" and published several articles on the topic during the early 1990s.[8]

Writing in the shadow of HIV/AIDS, an epidemic that had taken the biomedical

[5] Bruno Latour, "Give Me a Laboratory and I Will Raise the World," in *Science Observed: Perspectives on the Social Study of Science,* ed. Karin Knorr-Cetina and Michael Mulkay (London, 1983), 141–70. I disagree with Latour's assertion that smaller scales are inevitably simpler. No such a priori case can be made—intervening at the molecular level is not inherently simpler than intervening at the level of global political economy. Such distinctions are politically determined, not ontologically given.

[6] James H. Capshew and Karen A. Rader, "Big Science: Price to the Present," *Osiris* 7 (1992): 19.

[7] All the following publications foreshadowed contemporary concerns, the latter two identifying (ironically enough) chronic diseases as "emerging": Alfred S. Evans, "The Instant-Distant Infections," *Journal of the American Medical Women's Association* 21 (1966): 210–6; Richard M. Krause, *The Restless Tide: The Persistent Challenge of the Microbial World* (Washington, D.C., 1981); Eric Cassell and Wilson G. Smillie, "New and Emergent Diseases," in *Human Ecology and Public Health,* ed. Edwin D. Kilbourne (New York, 1969); and Paul F. Basch, *International Health* (New York, 1978), 221–2. I thank David Jones for bringing the Cassell-Smillie reference to my attention.

[8] Stephen S. Morse, "Emerging Viruses: The Evolution of Viruses and Viral Diseases," *Journal of Infectious Diseases* 162 (1990): 1–7; idem, "Regulating Viral Traffic," *Issues in Science and Technology* 7 (fall 1990): 81–4; idem, "Emerging Viruses: Defining the Rules for Viral Traffic," *Perspectives in Biology and Medicine* 34 (1991): 387–409; and idem, "Global Microbial Traffic and the Interchange of Disease," *American Journal of Public Health* 82 (1992): 1326–7. Papers from the 1989 conference were collected in Morse, ed., *Emerging Viruses* (New York, 1993).

sciences by surprise and resisted effective intervention for more than a decade, Morse focused on the appearance of apparently novel viruses. He was careful to distinguish between "truly new" viruses resulting from major evolutionary changes via mutation or recombination and existing viruses transferred unchanged or with slight variations to the human population. These latter "emerged" through a two-step process, first crossing over from an animal host to humans, then infecting and spreading within the human population.

Morse argued that while it was almost impossible to predict the evolution of new viruses, tracking and anticipating the emergence of pathogens was feasible given a proper understanding of the basic mechanisms of interspecies transfer and viral spread. He called these the "rules of viral traffic" and advocated a program of "viral traffic studies," incorporating virology, molecular genetics, field and evolutionary biology, ecology, and the social sciences. This synthetic approach would provide a comprehensive map of the biological, social, and ecological forces that govern the appearance and circulation of new viruses in human populations.

Morse's description of viral emergence established direct causal links between the largest and smallest scalar extremes. Urbanization, environmental degradation, war, migration, and commerce on a global scale had profound impacts on the microbial level, altering the evolution of microorganisms and the patterns of viral traffic. As these activities increased, viral emergence accelerated, rendering a comprehensive research program on emerging viruses urgent: "Like every other kind of traffic, viral traffic is increasing. . . . As deforestation progresses worldwide, as human activities continue to alter the environment, as population influx into Third World cities continues unabated, as every part of the world becomes more accessible, one would expect disease emergence to accelerate."[9]

For Morse, proper intervention against emerging diseases depended upon understanding the universal molecular and ecological laws underpinning the interaction between humans and diseases. In the introduction to his edited volume on emerging viruses, he called for a comprehensive program with virology at its core:

> What are the resources needed for anticipating and controlling emerging diseases? Most of all, we will need trained people, and active laboratory facilities and research programs in which training can take place. . . . These areas include viral ecology, viral traffic analysis, driving forces and constraints in viral evolution, technologies for detection, and increased understanding of how viruses cause disease and how they interact with their hosts and with host cells (viral pathogenesis and immunology).[10]

As Morse acknowledged in his early essays, and the chapters in this volume ably demonstrate, the concept of emergence had intellectual roots in older understandings of environmental and disease ecology.[11] In this respect, it resembled the antimodernist sentiment Charles Rosenberg has characterized as "the idea of civilization as risk."[12]

[9] Morse, "Defining the Rules" (cit. n. 8), 405.

[10] Stephen S. Morse, "Examining the Origins of Emerging Viruses," in *Emerging Viruses* (cit. n. 8), 25.

[11] See Warwick Anderson, "Natural Histories of Infectious Disease: Ecological Vision in Twentieth-Century Biomedical Science"; and Helen Tilley, "Ecologies of Complexity: Tropical Environments, African Trypanosomiasis, and the Science of Disease Control in British Colonial Africa, 1900–1940." (Both this volume.)

[12] Indeed, an editorial by Joshua Lederberg contended that "many aspects of emerging infections can be viewed as diseases of civilization." Lederberg, "Infection Emergent," *Journal of the American Medical Association* 275 (1996): 244.

Rosenberg argues that this narrative draws its enduring social power from its fluidity, its holistic insistence on considering both biology and society in explaining disease, and its emphasis on the dynamic balance between humans and their environment.[13] Like this narrative, the concept of disease emergence was immensely flexible and would appeal to a wide variety of analysts and advocates in turn-of-the-century America. It, too, emphasized the interaction between biology and society, and it, too, insisted that disease can only be tamed if dynamic ecological balance is reached. A long history of holistic and ecological inquiry laid the groundwork for the emergence of a scalar narrative linking large-scale environmental and economic change, microbial evolution, and disease outbreaks in specific locations.

However, Morse's work was notable in its identification of "civilization" not only as the *cause* of new risks but also as the source of their *solutions*.[14] In this respect, he presented a scalar narrative, invoking different scales to describe the causes, consequences, and proper points of intervention in viral emergence. By altering viral traffic patterns, the introduction of modern agricultural or industrial technologies in one location—"local" causes—might produce an international epidemic or pandemic—"global" effects. However, since the "laws of viral traffic" were universal, monitoring and intervening need not be bound to the same scales as either cause or consequence. Addressing "global" risks entailed making ecological changes legible to laboratory investigation or information processing in multiple locations, often far removed from the specific site of disease outbreaks.

INSTITUTIONALIZING EMERGENCE: THE 1992 INSTITUTE OF MEDICINE REPORT

Morse's call did not go unheeded. In 1991, the National Academy of Science's Institute of Medicine (IOM) convened a committee of scientists and public health experts, which included Morse and was cochaired by his colleague Joshua Lederberg, a geneticist and microbiologist. Their report, *Emerging Infections: Microbial Threats to Health in the United States* (1992), was the most comprehensive and influential statement of the effects of global change on American health and security in the 1990s. This report transformed Morse's ideas into a civic advocacy campaign, distilling a complex constellation of ideas into a coherent yet flexible discourse intended to convince policy makers of the national consequences of global change.[15]

While Morse's essays gave the concept of emerging diseases intellectual coherence, the IOM report supplied a political rationale and a blueprint for building a network of institutions to study them. Written while the public health community, infectious disease researchers in particular, was reeling from decades of budget cuts, the report identified a novel threat that justified funding, and provided specific recommendations for how those funds should be spent. Like Morse's work, it sought to draw lessons from the sudden appearance and tenacity of HIV/AIDS and linked the global and microbial scales in a description of the *causes* of disease emergence.

[13] Charles Rosenberg, "Pathologies of Progress: The Idea of Civilization as Risk," *Bulletin of the History of Medicine* 72 (1998): 728–30.

[14] Ulrich Beck, *Risk Society: Towards a New Modernity* (London, 1992).

[15] I borrow the term "civic advocacy" from Paul Rutherford, *Endless Propaganda: The Advertising of Public Goods* (Toronto, 2000).

However, the IOM report focused more narrowly on the *consequences* at a national scale, targeting American policymakers and framing its arguments in terms of American public health and national security. It began:

> As the human immunodeficiency virus (HIV) pandemic surely should have taught us, in the context of infectious diseases, there is nowhere in the world from which we are remote and no one from whom we are disconnected. Consequently, some infectious diseases that now affect people in other parts of the world represent potential threats to the United States because of global interdependence, modern transportation, trade, and changing social and cultural patterns.[16]

Defining emerging diseases as "clinically distinct conditions whose incidence in humans has increased," the report identified more than fifty emerging viruses, bacteria, and other microorganisms. It also discussed a broad range of "factors in emergence" that were responsible for the appearance of new pathogens and the growing problem of antimicrobial resistance. These factors included population growth and migration; changes in individual behaviors such as sexual activity and substance use; new medical technologies such as radiation therapy, immunosuppressive drugs, and antibiotics; economic development and changes in land use such as dam building, deforestation, and global warming; international travel and commerce; microbial adaptation and change; and the breakdown of public health measures such as sanitation, immunization, and vector control.[17]

The report also addressed interventions. Recommendations fell into four broad categories: surveillance, training and research, vaccine and drug development, and behavioral change. Arguing that "the key to recognizing new or emerging infectious diseases, and to tracking the prevalence of more established infectious diseases, is surveillance," the IOM committee recommended the development of a comprehensive, computerized, global epidemiologic surveillance network.[18] This network would depend on four components: the training of clinicians in standardized reporting guidelines, so data would be uniformly reliable; a network of laboratory facilities capable of identifying specific strains of individual pathogens; sophisticated information-processing systems, so data could be efficiently analyzed; and a reliable international communications network, so the data could then be rapidly disseminated.

Like Morse, the IOM stressed the importance of research and training, although its recommendations were more specific than his, focusing on scientific research into the biology, pathogenesis, evolution, and epidemiology of infectious agents. It devoted the most space to discussing the importance of pharmaceuticals, recommending the development of stockpiles of selected vaccines and "surge" capacity for rapid development and production in case of emergency; a commitment to developing new vaccines and antimicrobial drugs, which could include public financing and expedited approval of privately developed pharmaceuticals; and a commitment to the development of pesticides useful in suppressing vector-borne diseases. Finally, the report included a brief discussion of the need to support public health

[16] Joshua Lederberg, Robert E. Shope, and Stanley C. Oaks Jr., *Emerging Infections: Microbial Threats to Health in the United States* (Washington, D.C., 1992), v.
[17] Ibid., 34 (definition), 34–112 (list of factors in emergence is condensed).
[18] Ibid, 113.

education and community health measures, although it did not specify the mechanism for doing so.

During the next ten years, the IOM's vision of emerging diseases became the centerpiece of a broad campaign as its advocates engaged in activities that historians of science recognize as the early stages of discipline-building: issuing reports and other publications reiterating their themes; holding conferences; persuading existing institutions to adopt its framework of risk and response; developing independent institutes and funding streams; and establishing a journal dedicated to the topic.[19] The Centers for Disease Control and Prevention (CDC) and Cabinet-level National Science and Technology Council (NSTC) issued reports repeating the IOM's analysis with little modification.[20] In 1995 alone, meetings of the IOM and the New York Academy of Medicine were devoted to the topic; the CDC launched the online journal *Emerging Infectious Diseases;* and the World Health Organization (WHO) established a Division of Emerging and Other Communicable Diseases Surveillance and Control.[21] In October, the U.S. Senate convened a hearing on the topic, during which Lederberg warned that "the microbe which felled one child in a distant continent yesterday can reach your child today and seed a global pandemic tomorrow," and the WHO's James LeDuc stated that "infectious diseases, like the environment, do not recognize national boundaries."[22]

The following year, at the behest of the editors of the *Western Journal of Medicine,* the *Journal of the Norwegian Medical Association,* and the *Journal of the American Medical Association,* thirty-six medical journals in twenty-one countries devoted all or part of their issues to emerging diseases. In one of the lead editorials for this "global theme issue," Lederberg presented a pragmatic argument for funding emerging diseases prevention efforts, obliquely contrasting it to the approaches stressed by proponents of the "third public health revolution":

> World health is indivisible, [and] we cannot satisfy our most parochial needs without attending to the health conditions of all the globe. One line of social thought would argue that the only answer is a fundamental convergence on population and poverty. Even were the will to do so to exist, and that will needs every encouragement, the history of social experiment in the 20th century would leave one in despair. Health is also a precondition to economic development, so that more modest and selfishly motivated measures can be a great beneficence to the overall human condition.[23]

Lederberg's list of interventions closely followed those in the IOM report: global and domestic surveillance, entailing "the installation of sophisticated laboratory

[19] On discipline-building, see Susan Greenhalgh, "The Social Construction of Population Science: An Intellectual, Institutional, and Political History of 20th Century Demography," *Comparative Studies in Society and History* 38 (1996): 26–66.

[20] Centers for Disease Control and Prevention, *Addressing Emerging Disease Threats: A Prevention Strategy for the United States* (Atlanta, Ga., 1994); Committee on International Science, Engineering and Technology, *Global Microbial Threats in the 1990s: Report of the Committee on International Science, Engineering and Technology's Working Group on Emerging and Reemerging Infectious Diseases* (Washington, D.C., 1995).

[21] World Health Organization, *Emerging and Other Communicable Diseases: Strategic Plan 1996–2000* (New York, 1996), http://www.who.int/emc-documents/emc/whoemc961c.html.

[22] Ironically, attendance at this hearing was extremely low, due to a concurrent debate on Medicare. U.S. Senate Committee on Labor and Human Resources, *Hearing on Examining the Threat and Risk of Certain Old and New Infectious Diseases on the Nation's Health,* 104th Cong., 1st sess., Hrg. 104–298, 1996, 3, 21.

[23] Lederberg, "Infection Emergent" (cit. n. 12), 244.

capabilities"; vector management and monitoring of safe food and water; public and professional education; basic scientific research; and the promotion of private pharmaceutical development through the institution of proper regulatory and incentive structures.[24]

By the end of the decade, the basic premises of the emerging diseases campaign had gained acceptance in many American governmental agencies and international health organizations. In 1998, the CDC released its second comprehensive plan on the topic, *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century.* Closely following the IOM's 1992 recommendations, the CDC—identifying the IOM report as the source of "a new consensus"—emphasized the need for better surveillance technologies to "detect, investigate, and monitor emerging pathogens"; applied research in laboratory science and epidemiology; and the ability to "ensure prompt implementation of prevention strategies and enhance communication of public health information about emerging diseases."[25] Three years later, another CDC plan argued that American biomedical and information technology were instrumental to the achievement of global health:

> Promoting international cooperation to address emerging infectious diseases is a natural role for the United States, whose scientists and business leaders are important members of the biomedical research and telecommunications communities that provide the technical and scientific underpinning for infectious disease surveillance and control. The United States can continue to lead from its strengths in medical science and technology to help protect American and global health.[26]

These reports used scale as a resource for transforming Morse's conceptual argument into a pragmatic political campaign, providing American policy makers with a rationale for funding international health. Ostensibly "global" causes produced "local" (American) consequences, as the proliferation of international transportation and trade networks threatened to spark epidemics within U.S. borders. In this respect, the emerging diseases campaign did not significantly deviate from previous international health efforts, which similarly equated national self-interest with global humanitarianism.

However, even as campaigners sought to convince Americans of the appeal of this equation, by mobilizing two universalizing scalar extremes—the "global" and the microbial—it reformulated other "local" interests in American terms. Identifying emerging diseases as the consequence of globalization, campaigners associated it with an ineffable and complex phenomenon. The solutions they offered had the advantage of immensely reducing the scale of intervention, from global political economy to laboratory investigation and information management. Whether the object was "global health" or national security, interventions would involve "passing through" American laboratories, biotechnology firms, pharmaceutical manufacturers, and information science experts.

The emerging diseases campaign also drew on previous campaigns to promote Big Science projects, endorsing basic research as both a value in its own right and a gen-

[24] Ibid, 245.

[25] Centers for Disease Control and Prevention, *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century* (Atlanta, Ga., 1998), 14.

[26] Centers for Disease Control and Prevention, *Protecting the Nation's Health in an Era of Globalization: CDC's Global Infectious Disease Strategy* (Atlanta, Ga., 2001), 16.

erator of practical results and advocating greater collaboration between the private and public sectors. This vision of Big Science, however, differed from that of highly centralized projects shackled to huge machines and requiring industrial management of thousands of collaborators. Instead, it involved a decentralized, horizontally integrated network of small projects—academic researchers, private vaccine and drug developers, epidemiologic surveillance projects and field laboratories—whose coordination is made possible by information-processing and communications technology.[27]

MEDIATING EMERGENCE: RICHARD PRESTON, LAURIE GARRETT, AND THE NEW "VIRAL PANIC"

Emerging diseases quickly became an object of interest for the mass media and culture industries. Discipline-building activities such as meetings and publications, often announced by accompanying press releases, provided mass media with "pseudo events" worthy of coverage in their own rights.[28] Morse's 1989 conference (to take one example) was covered by *Bioscience, Medical World News,* and *Science News* and leading science journalists, including *The New York Times*' Lawrence Altman and *Newsday*'s Laurie Garrett.[29] Integral to the emerging diseases campaign was a program of "media advocacy" designed to publicize the release of the IOM report and promote changes in public policy.[30]

More generally, the concept of emerging diseases offered journalists a powerful scalar resource for characterizing individual outbreaks as incidents of global significance. The mass media incorporated this scalar narrative into their coverage of other events, acting as both outsiders reporting on a campaign and participants actively shaping content and meaning.[31] Two of the most important reporters were Richard Preston and Laurie Garrett.

Preston's 1992 *New Yorker* article, "Crisis in the Hot Zone," described a 1989 outbreak of Ebola hemorrhagic fever among laboratory monkeys at a primate quarantine unit in Reston, Virginia. Although eventually contained through the efforts of the CDC and the United States Army Medical Research Institute for Infectious Diseases, the outbreak led to the euthanization of several hundred monkeys and resulted in four subclinical infections among human workers.

Preston emphasized the global consequences of minute microbial changes and

[27] For historical antecedents of this version of Big Science, see Capshew and Rader, "Big Science" (cit. n. 6), 20–3.

[28] Sharon M. Friedman, "The Journalist's World," in *Scientists and Journalists: Reporting Science as News,* ed. Sharon M. Friedman, Sharon Dunwoody, and Carol L. Rogers (New York, 1986); and Dorothy Nelkin, "Managing Biomedical News," *Social Research* 52 (1985): 625–46.

[29] Lawrence K. Altman, "Fearful of Outbreaks, Doctors Pay Heed to Emerging Viruses," *New York Times,* 9 May 1989, C3; Laurie Garrett, "Emerging Viruses, Growing Concerns," *Newsday,* 30 May 1989, 1.

[30] Vicki Freimuth, Huan W. Linnan, and Polyxeni Potter, "Communicating the Threat of Emerging Infections to the Public," *Emerging Infectious Diseases* 6 (2000): 337–47; Robert J. Howard, "Getting It Right in Prime Time: Tools and Strategies for Media Interaction," *Emerging Infectious Diseases* 6 (2000): 426–7.

[31] Sharon Dunwoody, "The Scientist as Source," in Friedman, Dunwoody, and Rogers, *Scientists and Journalists;* Nelkin, "Managing Biomedical News"; Friedman, "Journalist's World" (all cit. n. 28); and Bruce V. Lewenstein, "Cold Fusion and Hot History," *Osiris* 7 (1992): 135–63. I thank Lynn Nyhart for her challenging comments on the role of the media and for bringing the Lewenstein essay to my attention.

concluded his account by noting that the IOM report (released earlier that year) considered the Reston episode to be a "classic example" of disease emergence.[32] After detailing the report's recommendations, Preston drew explicit connections between Ebola, HIV, and other emerging viruses. Interviewing Morse, Preston asked whether an emerging virus "could wipe out our species." Morse cautiously speculated on the possibility of an aerosolized form of HIV causing a pandemic of a hybrid "AIDS-flu": "The human population is genetically diverse, and I have a hard time imagining everyone getting wiped out by a virus. . . . But if one in three people on earth were killed—something like the Black Death in the Middle Ages—the breakdown of social organization could be just as deadly, almost a species-threatening event."[33] By casting the Ebola-Reston incident as an example of disease emergence, Preston shifted the scale of his account upward, transforming an anticlimactic account of a small, successfully contained outbreak in one primate facility into a narrowly averted disaster and a harbinger of pandemics to come.

Preston's article had considerable impact, receiving critical acclaim from other journalists and touching off a bidding war among producers eager to adapt it into a screenplay.[34] He immediately set to work on a book based on the story. *The Hot Zone,* published in September 1994, was a multiweek bestseller, garnering Preston several awards and a $3 million advance for his next book. The *American Scientist* would later name *The Hot Zone*—along with Morse's *Emerging Viruses* (1993)—as one of the "100 or so Books That Shaped a Century of Science."[35]

Preston's book expanded on his article's linkage of the microbial and global scales. Using a metaphoric association between global ecology and individual immunology, he concluded with a warning about the transgression of the borders between humans and nature:

> The emergence of AIDS, Ebola, and any number of other rainforest agents appears to be a natural consequence of the ruin of the tropical biosphere. The emerging viruses are surfacing from ecologically damaged parts of the earth. . . . In a sense, the earth is mounting an immune response against the human species. It is beginning to react to the human parasite, the flooding infection of people, the dead spots of concrete all over the planet. . . . Nature has interesting ways of balancing itself. The rain forest has its own defenses. The earth's immune system, so to speak, has recognized the presence of the human species and is starting to kick in.[36]

The Hot Zone was not the only major work on emerging diseases published in 1994. From 1992 to 1993, while a fellow at the Harvard School of Public Health, former *Newsday* correspondent Laurie Garrett was conducting basic research on the subject. Having previously covered the 1976 Swine Flu "epidemic that never was," as well as the HIV/AIDS pandemic in Africa and the United States, Garrett had long been interested in the science and international politics of infectious disease.[37] She was also

[32] Richard Preston, "Crisis in the Hot Zone," *New Yorker,* 26 Oct. 1992, 80.

[33] Ibid, 81.

[34] Thomas Kunkel, "A Friend Writes," *American Journalism Review* 20 (1998): 18–20; Eric Utne, "Tina's New Yorker," *Columbia Journalism Review* 31 (1993): 31–6; Marshall Fine, "A Contagious Fascination with Infections: An 'Outbreak' Sweeps through Hollywood," *USA Today,* 28 Feb. 1995, 4D.

[35] Philip Morrison and Phylis Morrison, "100 or so Books That Shaped a Century of Science," *American Scientist* 87 (1999): 543–53.

[36] Richard Preston, *The Hot Zone* (New York, 1994), 287–8.

[37] Background information on Garrett can be found in James Kinsella, *Covering the Plague: AIDS and the American Media* (New Brunswick, N.J., 1989), 225–41.

familiar with Morse's 1989 conference and the Ebola story, having covered possible bans on importation of research monkeys as a result of the Reston outbreak. Upon learning of Preston's book contract, she accelerated work on her own book so that it would be released simultaneously. The publication of *The Coming Plague: Newly Emerging Diseases in a World Out of Balance* contemporaneously with Preston's book gave her 750-page work an improbably large audience.

In contrast to Preston's romantic account of environmental transgression, Garrett argued that emerging diseases resulted from decades of declines in public health, increasing economic inequality, and widespread social injustice. She concluded *The Coming Plague* with a similar meditation on the causal interplay between the microbial and global scales:

> Ultimately, humanity will have to change its perspective on its place in Earth's ecology if the species hopes to stave off or survive the next plague. Rapid globalization of human niches requires that human beings everywhere on the planet go beyond viewing their neighborhoods, provinces, countries, or hemispheres as the sum total of their personal ecospheres. Microbes, and their vectors, recognize none of the artificial boundaries erected by human beings. . . . In this fluid complexity human beings stomp about with swagger, elbowing their way without concern into one ecosphere after another. The human race seems equally complacent about blazing a path into a rain forest with bulldozers and arson or using an antibiotic "scorched earth" policy to chase unwanted microbes across the duodenum.[38]

In its depiction of the proper scale of intervention, Garrett's scalar narrative departed from those produced by Preston, Morse, and the IOM. While recognizing the value of simplifying international health problems so that they might "pass through" laboratories, she also recommended that large-scale interventions in international environmental policy, political economy, and social justice be coupled with biomedical research and technological innovation. As she argued in the introduction to a later book, *Betrayal of Trust: The Collapse of Global Public Health:*

> Yes, scientific and medical tools invented in the twentieth century will form a vital basis to global public health efforts in the twenty-first century, as will bold innovations based on altering human and microbial genetics. But the basic factors essential to a population's health are ancient and nontechnological: clear water; plentiful, nutritious, uncontaminated food; decent housing; appropriate water and waste disposal; correct social and medical control of epidemics; widespread—or universal—access to maternal and child health care; clean air; knowledge of personal health needs administered to a population sufficiently educated to be able to comprehend and use the information in their daily lives; and, finally, a health care system that follows the primary maxim of medicine—do no harm.[39]

Following Garrett and Preston, authors along the continuum of science communication sought to capitalize on emerging diseases.[40] The culture industries responded in kind. After a competing production was canceled, Warner Brothers released

[38] Laurie Garrett, *The Coming Plague: Newly Emerging Diseases in a World Out of Balance* (New York, 1994), 618–9.

[39] Laurie Garrett, *Betrayal of Trust: The Collapse of Global Public Health* (New York, 2000), 13.

[40] I borrow the term "continuum of science communication" from Lewenstein, "Cold Fusion" (cit. n. 31), 137. See also Paula Treichler, "AIDS, Homophobia, and Biomedical Discourse: An Epidemic of Signification," *October* 43 (1987): 31–70.

Outbreak, which opened at number one in 1995. Though it wasn't a direct adaptation, the movie's central conceit—a rogue general threatens to use an African monkey virus called Motoba for biological warfare—bore strong resemblances to the main theme of Preston's original article. Two months later, NBC aired *Robin Cook's Virus,* a TV movie about a CDC researcher's encounters with Ebola and other viruses.

Though the latter film was derided by one reviewer as "so harebrained it commands a kind of perverse attention," two days later reports began filtering into the United States that seemed to justify its alarmist speculations.[41] On May 10, American media reported an outbreak of Ebola in the village of Kikwit, Zaire (now the Democratic Republic of Congo). Science journalists, including Altman and Garrett, rushed to the scene. For the next three weeks, they reported on the progress of the epidemic through the small central African village. Weekly magazines published cover stories on the outbreak, network news programs such as ABC's *Nightline* and PBS's *Nova* devoted special episodes to it, and CNN aired a special report, "The Apocalypse Bug."[42]

Many members of the media used their coverage of the Kikwit outbreak as a springboard to discussions of emerging diseases. *Newsweek*'s cover featured a pair of gloved hands gripping a test tube labeled "E.Bola" (sic) and the text "KILLER VIRUS. Beyond the Ebola Scare—What Else is Out There?" The accompanying article argued, "Ebola is a potent emblem of the microbial world's undiminished power over us. But it's not the only one. New viruses have emerged with terrifying regularity in recent decades."[43] This warning proved prescient, as each succeeding year seemed to bring with it the emergence of exotic new or newly drug-resistant diseases, assiduously tracked in the popular and medical literature: Hantavirus, Lyme disease, the Asian "bird flu," West Nile Virus, E. Coli, BSE/CJD, multidrug resistant tuberculosis, SARS, and the "flesh-eating bacteria," *streptococcus* A.

Some critics saw coverage of Ebola and emerging diseases as evidence of a media-driven "viral panic" or "viral paranoia." In its July 1995 issue, *The New Republic* devoted its cover—which read "Paranoia Strikes Deep. Ebola, *Outbreak, The Hot Zone* and the new panic about plagues"—to Malcolm Gladwell's review of Preston's and Garrett's books. Gladwell argued that the United States was "in the grip of paranoia about viruses and diseases" and blamed the entertainment industry for stimulating this "paranoia." He reserved some of his harshest criticism for Preston: "It is safe to say that it is because of the success of *The Hot Zone* that *Outbreak* was made, that the Ebola outbreak in Zaire was covered as feverishly as it was, that the idea of killer viruses has achieved such sudden prominence. In the epidemic of virus paranoia, *The Hot Zone* is patient zero."[44] Many critics agreed with Gladwell's assessment, condemning the media for exaggerating the threat of individual outbreaks or emerging diseases more generally.[45]

[41] John J. O'Connor, "Television Review: A 90's Kind of Predator, via Robin Cook," *New York Times,* 8 May 1995, C16.

[42] Several scholars have analyzed media coverage of the 1995 Kikwit outbreak. The most comprehensive review is Sheldon Ungar, "Hot Crises and Media Reassurance: A Comparison of Emerging Diseases and Ebola Zaire," *British Journal of Sociology* 49 (1998): 36–56. See also the critique presented in chap. 2 of Susan D. Moeller, *Compassion Fatigue: How the Media Sell Disease, Famine, War, and Death* (New York, 1999).

[43] Geoffrey Cowley, "Outbreak of Fear," *Newsweek,* 22 May 1995, 52.

[44] Ibid, 39.

[45] Among others, see Stephen Budiansky, "Plague Fiction," *New Scientist,* 2 Dec. 1995, 28–31; and John Schwartz, "Media's Portrayal of Ebola Virus Sparks Outbreak of Wild Scenarios," *Washington Post,* 14 May 1995, A3.

These critiques underscored the ambivalent role of the media in the emerging diseases campaign. The emerging diseases concept allowed otherwise "local" stories to take on a "global" significance, persuading an American public notoriously uninterested in disease outside its own borders to pay attention to infectious disease. While some critics derided coverage of individual outbreaks as overblown, that coverage ensured a steady stream of publicity that gave emerging diseases an ominous immediacy. Popular representations of emerging diseases also allowed scientists and public health officials to distance themselves from irrational "hype." While clearly benefiting from (and in many ways contributing to) this publicity, scientists portrayed themselves as more sober, judicious, and reasonable than their excitable counterparts in the media and entertainment industries. At issue was the relative cultural authority of the narrators; the scalar narratives presented by scientists and journalists were virtually identical.

BIOTERRORISM

The summer-fall 2001 issue of the *Georgetown Journal of International Affairs* featured a forum titled "Bioalert: Disease Knows No Borders." In his introduction to the forum, former WHO consultant James M. Wilson praised the essays, in which "leading infectious disease experts . . . challenge the reader to consider the problem of transnational movement of pathogens—either through 'natural' or 'intentional' mechanisms—and how this can affect U.S. national security."[46] The section included articles by experts from the WHO, CDC, and the World Bank who argued that emerging diseases and biological terrorism presented similar threats to American health and security.

The appearance of this issue of the journal coincided with the national panic over the October 2001 anthrax outbreak in several eastern states. However, the essays' mobilization of the familiar cliché and association of emerging diseases with biological terrorism were far from novel. Discussions of the threat of bioterrorism during the opening years of the twenty-first century were shaped by the emerging diseases campaign that closed the twentieth, and discursive similarities between the two were supported by strong personal and institutional linkages.

The use of the threat of an imminent biological weapons attack to justify funding for public health infrastructure had roots in the cold war. During the early 1950s, CDC (then the Communicable Disease Center) chief epidemiologist Alexander Langmuir capitalized on American anxieties about biological warfare to channel defense funds into laboratory investigation of infectious diseases, communicable disease control, and the creation of the Epidemic Intelligence Service (EIS). As Langmuir told Donald Henderson in a 1979 interview, "Part of the justification . . . was that biological warfare defense was a very hot issue, it was a major propaganda issue in the Korean War. . . . I argued that if there was anything to this, there was a need for epidemiologists . . . and by winning that, we had the clear charge to recruit and train epidemiologists for civilian and military needs."[47]

[46] James M. Wilson, "Prevention is Key," *Georgetown Journal of International Affairs* 2 (2001): 4.

[47] Alexander D. Langmuir, "The Alpha Omega Alpha Interview with Alexander D. Langmuir, MD, MPH," interview by D. A. Henderson, videotape, Bethesda, Md., National Library of Medicine, 1979. See also Elizabeth Fee and Theodore M. Brown, "Preemptive Biopreparedness: Can We Learn Anything from History?" *American Journal of Public Health* 91 (2001): 721–6; and Elizabeth W. Etheridge, *Sentinel for Health: A History of the Centers for Disease Control* (Berkeley, Calif., 1992), 36–42.

Henderson, one of Langmuir's recruits to the EIS and later his deputy at the CDC, went on to lead the WHO campaign to eradicate smallpox and later became dean of the Johns Hopkins School of Public Health. In the 1990s, he became a forceful advocate of bioterrorism preparedness, founding the Johns Hopkins Center for Civilian Biodefense Studies in 1998. In November 2001, he was appointed director of the newly created Office of Public Health Preparedness. Like his mentor Langmuir, Henderson argued that epidemiologic surveillance was the core of biodefense.[48]

Other figures in the emerging diseases campaign were active in public discussions of biodefense. Joshua Lederberg had argued since the 1970s that basic biomedical research was necessary to address the threats presented by both biological weapons and natural epidemics.[49] During the 1990s, he reiterated his argument in a number of articles and an edited collection on the subject and served as a member of President Bill Clinton's 1998 ad hoc committee to discuss bioterrorism.[50] Stephen Morse, who had advocated global epidemiologic surveillance as a means of monitoring adherence to international weapons conventions as far back as 1992, left his university position to join the Defense Advanced Research Projects Agency as manager of the Unconventional Pathogen Countermeasures program.[51]

Richard Preston also turned his attention to bioterrorism, reporting on the Russian biological weapons program and possible links between an outbreak of West Nile Virus in New York City and Iraqi biological weapons testing.[52] His 1997 book, *The Cobra Event,* a fictional account of bioterrorist attacks in New York City and Washington, D.C., was cited by Bill Clinton as one of the motivations for his interest in the topic. In addition, Preston testified in front of the Senate during hearings on biological weapons.[53] Laurie Garrett published several articles and devoted a chapter of *Betrayal of Trust* to the topic, warning that the close association between public health and national security might hurt the credibility of the former.[54]

The incorporation of bioterrorism into the emerging diseases campaign sharpened two aspects of the campaign's scalar narrative. It accentuated the view that "global" causes begat "local" consequences and that international transportation, trade, and information networks threatened the health and security of the nation-state.[55] Drawing on a centuries-old logic encapsulated in the slogan "disease knows no borders,"

[48] D. A. Henderson, "Bioterrorism as a Public Health Threat," *Emerging Infectious Diseases* 4 (1998): 488–92; and idem, "The Looming Threat of Bioterrorism," *Science* 238 (1999): 1279–82.

[49] Joshua Lederberg, "Our CBW Facilities Could Help against Pestilences," *Washington Post,* 7 March 1970, A15.

[50] Joshua Lederberg, ed., *Biological Weapons: Limiting the Threat* (Cambridge, Mass., 1999); and idem, "Infectious Disease and Biological Weapons: Prophylaxis and Mitigation," *J. Amer. Med. Ass.* 278 (1997): 435–7.

[51] Ali S. Khan, Stephen S. Morse, and Scott Lillibridge, "Public-Health Preparedness for Biological Terrorism in the USA," *Lancet* 356 (2000): 1179–82; and Stephen S. Morse, "Epidemiologic Surveillance for Investigating Chemical Biological Warfare and for Improving Human Health," *Politics and the Life Sciences* 11 (1992): 28–32.

[52] Richard Preston, "The Bioweaponeers," *New Yorker,* 9 March 1998, 51–65; idem, "The Demon in the Freezer," *New Yorker,* 12 July 1999, 44–61; and idem, "West Nile Virus Mystery," *New Yorker,* 18–25 Oct. 1999, 90–108.

[53] U.S. Senate Judiciary Subcommittee on Technology, Terrorism, and Government Information, *Chemical and Biological Weapons Threats to America: Are We Prepared?* 105th Congress, Hrg. 105–710, 1998.

[54] Laurie Garrett, "The Nightmare of Bioterrorism," *Foreign Affairs* (2001): 76–89; and idem, *Betrayal of Trust* (cit. n. 39), chap. 5.

[55] I have addressed these issues in more depth in Nicholas B. King, "Dangerous Fragments," *Grey Room* 7 (2002): 72–81.

emerging diseases campaigners argued that national security and international health were closely connected and that America had a "vital interest" in the health of other nations.[56]

At the same time, the campaigners sought to persuade American policy makers that intervention in "global" phenomena necessitated a particular set of large- and small-scale responses. Expanding on Langmuir's cold war logic, they translated parochial national defense concerns into a justification for large-scale international epidemiological surveillance projects, as well as smaller-scale interventions at the levels of state and local public health infrastructure and laboratory investigation. National security would thus have to "pass through" the laboratory and the epidemiologic database.

ABSTRACTION AND THE POLITICS OF SCALE

Detailing all of the reasons for the emergence and success of this campaign is beyond the scope of this essay.[57] Nevertheless, I hope I have demonstrated that its scale politics played a significant role in making it attractive to a variety of actors, including biomedical scientists, public health and national security experts, and the mass media. While these actors presented different scalar narratives, they all depended upon the principle of scalar equivalence first introduced by Morse: the universality of the laws of viral traffic allowed one to bypass the messiness of specific locations in jumping from vast transportation networks to individual microbes and back again. In contrast to Roemer's idealistic vision of global health, the emerging diseases campaign presented a set of scalar tools for reframing "international" problems in language palatable to American interests.

Understanding the emerging diseases campaign as an example of the political production of scale might also offer insight into the process of historical reconstruction. Historians and sociologists of science, no less than the actors I have described, construct narratives that often involve weaving together cause and consequence at different scales. As we turn our attention toward the interaction between environment and health, we might pay special attention to the multiple scales that both "the environment" and "health" can signify and to the hidden arguments contained within the seemingly neutral terms "global" and "local."

[56] Institute of Medicine Board on International Health, *America's Vital Interest in Global Health: Protecting Our People, Enhancing Our Economy, and Advancing Our International Interests* (Washington, D.C., 1997), 1.

[57] Nancy Tomes, "The Making of a Germ Panic, Then and Now," *American Journal of Public Health,* 90 (2000): 191–8.