Dangers to Avert

America the Vulnerable. The Threat of Chemical and Biological Warfare. JOSEPH D. DOUGLASS, JR., and NEIL C. LIVINGSTONE. Lexington (Heath), Lexington, MA, 1987. xviii, 205 pp. + plates. $19.95.

Gene Wars. Military Control over the New Genetic Technologies. CHARLES PILLER and KEITH R. YAMAMOTO. Beech Tree (Morrow), New York, 1988. 302 pp. $22.95.

Clouds of Secrecy. The Army's Germ Warfare Tests over Populated Areas. LEONARD A. COLE. Rowan and Littlefield (Littlefield, Adams), Totowa, NJ, 1988. xii, 188 pp. $21.50.

The 1980s have witnessed a new emergence of concern about biological warfare, a development the more confusing and disturbing because of fundamental disagreements as to the character of the danger. There is one school of thought that locates the danger in the advances of biotechnology itself, believing that military applications will prove irresistible unless steps are taken to inhibit them. A second school of thought locates the main danger in the perfidy of one or the other superpower, either indicting the Soviet Union for conducting a secret, illicit program of biological weapons or attacking the United States for undermining the 1972 Biological and Toxin Weapons Convention by expanding sponsored research in gray areas where knowledge is equally relevant to "defensive" and "offensive" uses. Other thinkers combine the two sets of concerns and regard the interplay between the new biotechnology and the suspiciousness of rival governments as needlessly inducing an unpredictable biological arms race, including the likelihood of rapid proliferation of biological weaponry to virtually any nation and to private political groups as well.

The current debates mingle ideology, misperception, alarmism, and legitimate concerns. It is unfortunate that some politicians and journalists here in the United States obscured the real issues by mounting a propaganda campaign against the Soviet Union that rested upon a series of unsubstantiated and exaggerated charges, the most sustained of which were allegations that the Soviets supplied the Vietnamese with toxins for use in Southeast Asia, the so-called "yellow rain controversy." (For an account of that controversy see J. Robinson, J. Guillemin, and M. Meselson, "Yellow rain: The story collapses," *Foreign Policy* **68**, 100–117 [fall 1987].) Even when such charges collapse, their impact is to produce an impression that it is prudent to be prepared in the event that enemies secretly move ahead in developing biological weapons. Such preparations, even if genuinely undertaken for "defensive" purposes, arouse anxieties elsewhere and raise the specter of a "poor nation's atom bomb." And it stretches credulity to suppose that offensive military options will not be explored if the research situation permits. Surely, a rival government would conclude that such explorations were a part of so-called defensive or medical research. These uncertainties about effects of research make careful analysis especially important, both to reduce the prospects of a biological arms race and to discourage irresponsible allegations and speculation.

Each of the books considered here addresses an aspect of this complex situation. *America the Vulnerable*, by two veteran writers on military matters, is sensationalist writing of the worst sort—inviting exaggerated fears by a mixture of anti-Soviet polemic and feverish and ill-grounded assertions. Its tone is suggested by the statement that "the Soviet Union has dedicated billions of rubles and the energies of literally thousands of its most brilliant scientists to perfecting terrifying new C/B agents against which the United States and the rest of the free world will be defenseless" (p. 169). Rather than substantiating their argumentation the authors lamely announce that "the material contained in this book is not footnoted, so as not to leave a roadmap for would-be terrorists" (p. xv). At least Douglass and Livingstone do not call upon the United States to retalitate in kind against the putative Soviet effort; indeed, they acknowledge that such a reaction would be worse than any "option" other than doing "nothing" (p. 5). What they propose is a multipurpose extension of counter-terrorist thinking to the context of chemical and biological warfare, involving enhanced intelligence and internal security activities, a "crisis response team" (modeled on the Nuclear Emergency Search Team), a covert strike force to attack preemptively overseas biological weapons facilities, improved research and development of "defensive" capabilities, repudiation of both the 1925 Geneva Protocol and the 1972 Biological and Toxin Weapons Convention, and restrictions on technology transfer (steps outlined on pp. 169–181).

Most analysts of the situation would regard two basic assumptions underlying Douglass and Livingstone's approach as wrong-headed. Rather than seeing the Soviets as ahead of the West in biotechnology, the general assessment places them at least several years behind the United States, and in no imminent position to carry out any significant biological warfare. And, contrary to Douglass and Livingstone, who see the United States as having been lulled into complacency by a treaty regime that has failed to restrain Soviet behavior, most experts on the military potential of biotechnology believe that the existing regime is useful and should be strengthened. Indeed, if the U.S. government were to follow the course proposed in *America the Vulnerable* it would almost certainly set off alarm bells around the world, not only in Moscow, making an all-out biological arms race virtually inevitable.

Gene Wars by Charles Piller and Keith R. Yamamoto, a fruitful collaboration between an investigative journalist and a molecular biologist, argues in a somewhat opposite direction from *America the Vulnerable*, but more responsibly and skillfully. It is, first of all, helpfully informative, providing a useful introduction to the history of gas warfare, developments in biotechnology, and efforts to establish regulatory regimes at the international level. The authors are critical of the Pentagon for creating a climate of fear about Soviet behavior based on unproven accusations regarding yellow rain, Sverdlovsk, and a hidden, illegal research-and-development program for biological weapons. They contend that these accusations have been relied on as rationalizations for expanding the U.S. research activities relating to biological weaponry, including some ambiguous projects on viral substances with potential military applications. The basic argument of *Gene Wars* is that the dangers of biological warfare are growing serious as a result of rapid progress in genetic engineering combined with irresponsible conduct by governments, especially our own.

Piller and Yamamoto propose strengthening the 1972 convention, urging "aggressive support of an informed public, particularly in the face of an often reckless and apparently cynical U.S. administration" (p. 179). Further, they advocate three specific measures: elimination of all secret research; termination of research on medical defenses (restricting research and development to clothing impervious to chemical and biological agents, so-called "passive" defense); and transfer of all biological research now fund-

ed by the Department of Defense to the National Institutes of Health. They also urge efforts to instill a greater sense of social responsibility in molecular biologists and encouragement of public interest lawsuits to challenge governmental activities in the biological warfare sphere. Piller and Yamamoto have their doubts about official reassurances regarding biological weapons and give considerable evidence to support their skepticism, especially pertaining to the Reagan years. They believe that restoring confidence in existing legal regimes of prohibition and taking steps to close loopholes provide our best hope of preventing the genie from escaping. Unlike Douglass and Livingstone, Piller and Yamamoto do not believe that biotechnology is advanced enough to pose immediate problems of military application (although they predict such a capability early in the next century), and they put the main burden of restoring confidence on Washington, not Moscow. Their reasoning and mastery of the subject matter make *Gene Wars* the best book now available on the subject. Its only weakness is a failure to develop a coherent, sustained framework of analysis, to present a fuller assessment of the Soviet record in chemical and biological weaponry, and to consider the activities of countries other than the United States and the Soviet Union. There is evidence, for instance, of biological weapons research activities in 10 to 12 countries. Will these programs pose serious threats, and if so, what should be done?

Gene Wars refers briefly to the open-air testing of certain biological agents secretly done the U.S. Army in the 1950s and '60s. *Clouds of Secrecy* is devoted entirely to that enterprise, drawing out its disturbing implications.

The full extent of these test programs has not yet been disclosed, but information revealed under the Freedom of Information Act and in connection with a lawsuit by a relative of someone allegedly killed by the testing does tell a compelling story, even if it is incomplete. Available information establishes that during the 1950s the Army Corps of Engineers, in conjunction with scientists at Stanford University and at a California corporation, conducted tests aimed at assessing the vulnerability of America to biological attack in the urban environments of Minneapolis, St. Louis, and San Francisco, as well as the New York City subway system. Some of these tests evidently used aerosols containing zinc cadium sulfide, "a fluorescent powder intended to approximate bacterial agents used in biological warfare" (Cole, p. 60). In other tests, actual bacteria were used, but not of a kind thought at the time to be harmful to the general population. Cole criticizes these tests because no efforts were made to monitor health effects on those exposed or to avoid exposure of vulnerable sectors of the population (the young, the old, the sick).

Apparently, millions of American citizens were exposed to these tests without being informed, and Cole shows that some individuals were probably harmed as a result and that the government continues to claim prerogatives to undertake such tests. Recent disclosures of decades of suppression of exposure of millions of Americans to radiation in the vicinity of nuclear weapons facilities suggest that our government in invoking national security is not to be trusted in relation to health hazards inflicted on its own citizens. Many people have complained about "covert operations" against overseas targets, but Cole's careful narrative illustrates a covert operation carried out at home against individuals who were selected at random and were completely "innocent."

Cole's book addresses a serious structural problem of constitutional democracy. He is less convincing concerning the degree of danger posed by the specific tests undertaken, and he does not establish whether in the setting of the early Cold War those who conducted the tests had reasonable grounds for believing some sort of clear and present danger of a Soviet attack plan with bacterial weaponry existed. It is also not clear that the biological agents used were at the time known to put those exposed at serious risk. Such clarification would help us decide whether the government acted in ignorance or in disregard of the risks involved. Nevertheless, Cole's exposé illustrates reliance on an unconditional version of the national security rationale—for the sake of military preparedness, citizens were treated as experimental subjects without opportunity to object or consent, and government officials acted without having been delegated authority to do so. If nothing else, *Clouds of Secrecy* suggests one more setting in which democracy and secrecy cannot be reconciled. It is obvious from a reading of *Clouds of Secrecy* that the public should demand more protection and Congress should mandate it.

These books taken together are disturbing, but for quite distinct reasons. *America the Vulnerable* is an irresponsible provocation, promoting a view that, to the extent it is persuasive or indicative of a mindset of government officials concerned with these issues, weakens prospects to stave off a biological arms race. In contrast, both other books make significant contributions by pointing up serious problems that need to be addressed. *Gene Wars* gives us an overview of why we need to take biological warfare seriously and what can be done, especially here at home, to reduce the risks. *Clouds of Secrecy* reinforces a central thesis of *Gene Wars* by its powerful demonstration that citizens cannot rely upon the forebearance of government in these matters and must find ways to oversee government activities. A beginning toward improvement in this regard would be a determined assault on the largely unexamined claim of necessity for official secrecy. A further step would be to impose stiff punishments upon those in government who covertly, knowingly, or incompetently expose citizens to health hazards. An additional step might be the designation of a trained corps of investigators mandated to protect the rights of the public against governmental abuse.

We are at a time when biological warfare may still be avoided, but only if determined action is taken here, in other countries, and on an international level. The scientific community obviously has a particular calling—to assess carefully the dangers from biotechnology, neither overstating nor understating the prospects, and on this foundation to find principles and procedures that permit social and medical gains from expected scientific advances without creating conditions likely to produce a biological arms race. These books under review, for what they do and do not say, help us fashion appropriate responses.

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Life in Danger

Biodiversity. E. O. WILSON, editor. FRANCES M. PETER, associate editor. National Academy Press, Washington, DC, 1988. xiv, 521 pp., illus. $32.50; paper, $19.50. Based on a forum, Washington, DC, Sept. 1986.

An unusual set of circumstances enabled me to read this book in an appropriate setting—Barro Colorado Island and the nearby Panamanian village of Gamboa. Here I was able to experience rich biological diversity at first hand, and also, within only a few kilometers, some of the factors that lead to its irretrievable loss. Though we all can experience biological diversity near our homes, the tropics are special, for here both diversity and threats to its continuance are overwhelming.

People are coming to understand that there is a crisis in respect to the diversity of life on Earth. Knowledgeable field biologists agree that we are about to witness a mass extinction that may rival those evidenced in the paleontological record, and a