BOOK REVIEW

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No Fire, No Thunder: The Threat of Chemical and Biological Weapons
by Sean Murphy, Alastair Hay, and Steven Rose
Monthly Review Press, 1984
145 pages; $23.00; $7.50 paper

Environmental Warfare: A Technical, Legal and Policy Appraisal
edited by Arthur H. Westing
Taylor and Francis, 1984 107 pages; $27.00

Herbicides in War: The Long-Term Ecological and Human Consequences
edited by Arthur H. Westing
Taylor and Francis, 1984 210 pages; $33.00

reviewed by Sheldon Krimsky

The growth of the world's nuclear arsenals has neither resulted in stable deterrence nor diminished in importance a role for other instruments of mass destruction. The concept of an ultimate weapon speaks only to its unprecedented destructiveness and not to its capacity for rendering other weapons obsolete. While the world awaits progress in U.S.-Soviet arms talks, allegations persist that a chemical and biological weapons race is taking place under the nuclear shadow.

Last spring, the *Wall Street Journal* published a series of special reports charging that the Soviet Union was responsible for the use of chemical weapons in Afghanistan and Southeast Asia. Citing Soviet emigres as its primary source, *the Journal* also alleged that the Soviet Union was in violation of the biological weapons convention of 1972.

On the other hand, the United States has been cited for its wanton use of chemical herbicides in Vietnam which destroyed millions of acres of forests and agricultural land and contaminated the soil with dioxins. More recently, concerns have been raised by American scientists and members of Congress that, by expanding its biological weapons research program, the U.S. Army may be contributing to an escalation in a biological weapons race. The Army requested and received funds for constructing an aerosol testing laboratory at Dugway Proving Grounds in Utah for handling large volumes of toxic biological agents. The need for an ultra-high-containment laboratory has been questioned on the grounds that the Army's biological research program is designed exclusively for improving U.S. defenses against baaerioiogical or toxin weapons. Behind these questions is the contention that toxic biological agents can be studied for prophylaaic purposes through nonhazardous simulants. Any initiative leading to the development of

prototype agents, such as organisms genetically engineered with toxin genes, is said to blur the offensive-defensive research distinction stipulated by the treaty and to risk provoking a race for a new generation of biological weapons [see Susan Wright, "The Military and the New Biology," *Bulletin,* May 1985].

The three books reviewed here cover chemical, biological, and environmental warfare from different perspectives. *No Fire, No Thunder oHers* a historical and political analysis with a particular emphasis on the development of binary chemical weapons. *Environmental Warfare* provides a technical and legal discussion of the Environmental Modification Convention of 1977. And *Herbicides in War* examines the ecological and human effects of chemical herbicides inflicted on Vietnam and its people by U.S. military operations during the "Second Indochina War."

The books share a common theme: the world still lives under the specter of non-nuclear technologies of mass destruction. Continued vigilance and cooperation are necessary for building sounder verifiable treaties to protect civilian populations and the ecological resources of the planet from the actions of desperate nations during military conflicts.

In No *Fire, No Thunder,* the authors ai^ue that we are in the midst of a chemical and biological arms race encompassing research, development, production, and stockpiling of weapons. More than half the book highlights the historical development of chemical and biological weapons (CBW) since World War 1. Remaining sections address contemporary topics such as "yellow rain," allegations of Soviet violations of the Biological Weapons Treaty, and the U.S. binary weapons program. The book draws attention to a growing paranoia between the United States and the Soviet Union about CBW supremacy and defense. It states that "the U.S. still envisages biological warfare as a distinct possibility in spite of the 1972 Convention."

The authors' implications notwithstanding, there is no credible evidence at this time that the United States is contemplating the development or stockpiling of biological weapons in violation of the Convention. But it is eminently clear that the defense establishment believes the Soviets are violating the Convention. In the fall of 1984 Caspar Weinberger wrote Tennessee Senator James Sasser: "We continue to obtain new evidence that the Soviet Union has maintained its offensive biological warfare program and that it is exploring genetic engineering to expand their program's scope. Consequently, it is essential and urgent that we develop and field adequate biological and toxin protection."

Paradoxically, programs that aim to protect troops against biological warfare, if they involve the creation of new strains of viruses or bacteriological agents, may be just what it takes to ignite a biological arms race.

Authors Murphy, Hay, and Rose find particularly grave the U.S. development of binary weapons and prospects of their deployment in Europe: "We insist that Europe does not become a theater for chemical weapons." The book ends with a call to action —the CBW equivalent of the New Zealand "allergy" to nuclear weapons. Although there is little primary information in this work, it serves a useful purpose by summarizing the historical record of CBW for a

popular audience while reminding us that the European disarmament movement is beginning to gain popular support for a ban on chemical weapons.

Both *Environmental Warfare* and *Herbicides in War* evolved from international symposiums and were published under the aegis of the Stockholm International Peace Research Institute (SIPRI). *Environmental Warfare* focuses exclusively on the Environmental Modification Convention of 1977. One of the least known of the modem warfare treaties,the Convention prohibits widespread, severe, or long-lasting changes to the environment in the cause of war.

Consisting of a series of contributed essays, this scholarly and informative work has two main functions: it assesses the technological feasibility of a variety of environmental modification scenarios, and it provides a detailed review of the legal and policy aspects of the Convention. The mere consideration of such grotesque environmental modifications as melting the polar ice caps, inducing volcanic activity, earthquakes, and tidal waves or redirecting asteroids reinforces a profound message: modern technology makes war outmoded.

Richard Falk's contribution to this work on international law is both comforting and disturbing. He argues that very few environmental modification techniques have military significance and the ones that do are not covered by the Convention: "The Convention is a half-measure, for it prohibits only those techniques which are covered by other treaties, or do not exist, or are the subjects of scientific speculation, or which, if proved feasible, could hardly be used as rational weapons of war."

Surely, if the treaty were truly effective it would outlaw the use of nuclear weapons. Moreover, it would seem contradictory for those nations that possess nuclear weapons and have signed the Convention not to declare a "no first use" policy.

Herbicides in War represents the first effort by the world community of scientists to understand the effects on the ecology and the indigenous population in Vietnam of the massive, indiscriminate use of chemical herbicides. Virtually nothing has been written about this in the United States, where the discussion has focused almost entirely on injuries to U.S. veterans. After years of struggle by American servicemen to receive compensation for victims of Agent Orange, the herbicide most widely used in Vietnam, a partial resolution is in sight. A class action suit against U.S. herbicide manufacturers is likely to result in modest cash payments to veterans and their families.

While many expect that this settlement will draw the Agent Orange debate to a close. *Herbicides in War* shows us another side to the human tragedy of chemical defoliants. About 350,000 hectares—10 percent of South Vietnam—were sprayed with 91 million kilograms of herbicides contaminated with high levels of dioxin. The chemicals entered the food chain, were consumed by an inestimable number of people, and affected the ecological, agricultural, and human reproductive cycles.

The collection of scientific essays comprising this book evolved from an international symposium held in HoChi Minh City in January 1983. Most of the contributions are from

Vietnamese scientists. The essays are exceptionally clear and understandable even to a nonscientific reader. Conclusions stand out boldly, unobscured by complex experimental designs. Comparisons were made of the flora and fauna of sprayed and unsprayed zones. Before-and-after photographs and satellite images were compared for regions where herbicides were used. And data on reproductive effects were obtained by following the births of children of Vietnamese men who had been exposed to aerial spraying. The results are staggering: over 40 percent of the most productive mangrove habitat was destroyed, with an estimated permanent loss in plant and animal species of 3 to 4 percent. Significant alterations in the animal ecology were reported for certain regions. Cause-and-effect relationships are suggested for an increased incidence of liver cancers in the exposed population. It was tentatively concluded that when males who had been exposed to herbicides mated with unexposed females, children born of the resulting pregnancies would have significantly higher congenital malformations, and up to a fivefold increase in spontaneous abortions was reported.

Regrettably, many of the studies that provide the most useful information about human health effects were poorly funded, and partly for this reason the data bases are too small for statistical evaluation. The contributors themselves call for broader and more comprehensive ecological and epidemiological studies. It is also unfortunate that the book, which maintains its dispassionate perspeaive throughout, neglects to consider the moral and scientific reasons why more extensive studies should besupported by the world community in general, and the United States in particular.

Vietnam was chemically raped. Surely, now that the war is long over, the United States should recognize its obligation to ease the medical and psychological impacts on the herbicide victims. More extensive scientific studies would help the Vietnamese to a greater understanding of changes in the patterns of morbidity and birth defects. Better scientific data might provide opportunities to counsel prospective American and Vietnamese fathers who were heavily exposed to the herbicides. A full accounting of ecological and human effects of dioxins in Southeast Asia would also contribute to a greater understanding of chemical defoliants which are increasingly used in nonmilitary settings. And finally, dioxins are found in all parts of the industrial world. The knowledge gained from a systematic prospective and retrospective epidemiological study of dioxin exposure in South Vietnam would be invaluable to the international public health community. *Herbicides in War* is an important work and a tribute to the cooperation of SIPRI, the United Nations Environment Program, and the world community of scientists.

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