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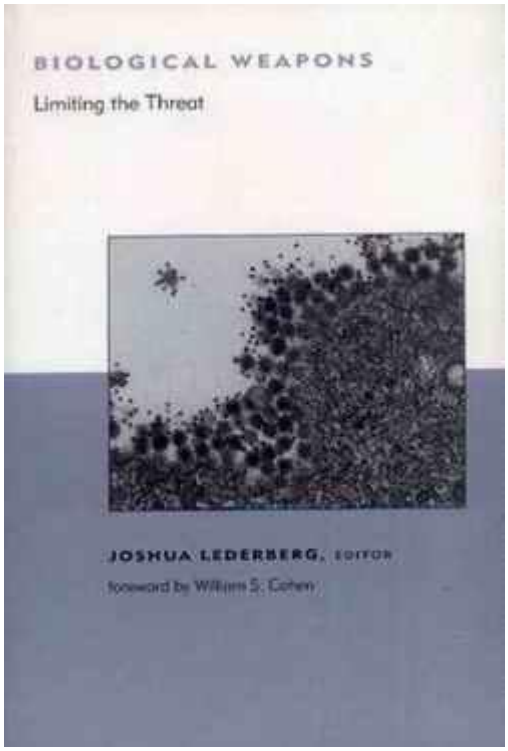
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Book Reviews: Technical Books Section

HIGHLY RECOMMENDED

Biological Weapons, Limiting the threat, [A book from the "BCSIA (Belfer Center for Science and International Affairs) Studies in International Security" series], edited by Joshua Lederberg, paperback, 6" x 9"
The MIT Press, Massachusetts Institute of Technology, Cambridge, Massachusetts 02138: xvi + 351 Pages: Publication Date: 2001: ISBN 0-262-62128-2: Price $22.95

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"Today we were unlucky, but remember, we only have to be lucky once. You will have to be lucky always."

***-Irish Republican Army**, after failing to assassinate Prime Minister Margaret Thatcher in 1984*. (Page 248)

Weapons of mass destruction pose an enormous threat to the civilization as a whole. During the last century or so the dramatic change in social and cultural values have affected the relations of the countries with each other resulting in a gradual shift of weaponization from conventional to unconventional Weapons of Mass Destruction.

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For centuries human beings have tried to use methods of killing the enemy by a variety of diverse weapons such that the effect of the attack could be severest and precise. In the pursuit of finding such means, states have used certain modified weapons. Even before the discovery of the power of nucleus and the method of using that power, chemical and to a certain extent biological weapons were there in place.

The present book is a comprehensive account of the state of biological weapons in the present world. It consists of 18 chapters divided into six parts. The paperback edition of this book is worth buying. The book is suitable to medical doctors, policymakers, students and journalists and those in the field of weapons research and development and those who are interested in knowing the relatively new world of WMDs. The book covers various papers which appeared in the Journal of the American Medical Association's (*JAMA*) theme issue on biological warfare (published August 1997).

W. S. Cohen, the US secretary of state, in his foreword, expresses great apprehension about these biological and chemical weapons and highlights the possible threats the entire world is currently facing from them.

He clearly brings up US own experiences in Operation Desert Storm (sustained aerial bombardment against Iraq in the Persian Gulf War beginning Jan. 16-17,1991) stating that proliferation is a very intricate problem, not easily prevented (page xi). He is absolutely right in saying that these weapons of mass destruction may be used by those who believe they cannot win in a conventional war against such superpowers.

Discussions about the problems related to these bio-weapons are described in detail under several headings. Various policies and other steps that have been taken by the US, policies concerning the response of US department of defense, prevention, deterrence, detection and defense against these weapons, etc., have been clearly pointed out.

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Chapter 2: Why should we be concerned about biological warfare?

We all know that bio-weapons have been developed by many nations. The reasons for having the agenda on these weapons have been rationalized successfully by the authors in the form of three principals.

"There are three principal reasons. First, because defense against a biological attack is both unfamiliar and difficult, there is a natural tendency to put it aside in favour of problems that are more comfortable. This is abetted by a second factor: the belief that because biological weapons have never been used, they therefore never will be. And this is in turn buttressed by a sense that a regime can be deterred from using biological weaponry if we make it clear that this would invite nuclear retaliation."

The general characteristics about biological weapons are also very important to consider since these weapons have the ability to affect the masses. Characteristics like low visibility, high potency, relatively easy delivery, etc., make these weapons extremely dangerous. For example, one millionth of a gram of anthrax constitutes a lethal inhalation dose (page 9, 10).

Today's modern world is so very dynamic that use of bio-weapons may cause disasters of unthinkable proportions. The biggest contributing factor is the frequent movement of people from one place to another. The recent SARS epidemic is still fresh in our memory. These biological attacks would not only affect the population adversely by causing diseases but also greatly affect the economy of the whole region and consequently the entire world.

...during the siege of Kaffa (now Feodossa, Ukraine) in 1346, the attacking Tatar force experienced an epidemic of plague. They attempted to convert their misfortune into an opportunity by catapulting the cadavers of their deceased into the city to initiate a plague epidemic. An outbreak of plague was followed by the retreat of defending forces and the conquest of the city...

It is often very difficult to rightly ascertain the nature of biological attack. It is difficult to differentiate it from a natural occurrence. Consequently the appropriate response would be very difficult. These and other reasons compel us to study further to understand the use of bio-weapons and their effect on human population. The US department of defense is constantly working on such problems and is trying to develop a comprehensive program to dissuade any major disaster by these agents. These comprise the effective use of bio-detectors, investment in vaccines and antibiotics, research, intelligence improvement, training etc. (page 12)

Chapter 3: Biological warfare-A historical perspective

This chapter is very interesting since very little is known about the use of biological weapons use in the past. This account illustrates the use of unconventional warfare agents like bio-weapons in the past. Amphibian-derived toxins used as poisons or Curare for the same purpose are examples of this type.

Early attempts of bio-weapons use are given under separate heading in this chapter. The use of such weapons dates back in the 14^{th} century as said by the author.

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Modern era of Microbiology unearthed several possibilities in the field of biological warfare agents' development and use. The chapter describes an interesting incident indicating the use of biological entities in the guise of weapons for saving several human lives in Poland in 1945.

" The German army avoided areas with epidemic typhus by using the Weil-Felix reaction for diagnosis. Consequently, physicians used formalin-killed proteus OX-19 as a vaccine to induce biologic false-positive tests for typhus in an area of occupied Poland. Residents were protected from deportation to concentration camps."

…By the late 1960s, the US military had developed a biological arsenal that included numerous bacterial pathogens, toxins, and fungal plant pathogens that could be directed against crops to induce crop failure and famine…

The authors in this chapter have also candidly discussed the biological warfare program of the United States. As per the information provided by the authors United States had developed huge arsenal of biological warfare agents.

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The controversy about the use of these bio-weapons in the Korean war and during the cold war is discussed along with the topics of disarmament and the development after 1972 convention. The whole discussion conclusively proves that no law or convention can prevent the spread of biological weapons procurement and use; instead a wide-ranging approach has to be taken to achieve the desired results.

The world today needs a comprehensive program initiating at different possible places simultaneously against these weapons programs. Perhaps the biggest limitation for the society against these weapons is their inability to wedge the technical knowledge necessary to produce such materials since such knowledge is frequently used in medical research for the benefit of the human population. In addition to this, the relatively cheap infrastructure, less cost and less time required to produce these agents compared to conventional weapons systems further dilute our hopes to obliterate these programs effectively. This issue has been raised a number of times in the book.

Chapter 4 entitled *Clinical recognition and management of patients exposed to biological warfare agents* is a very interesting and extremely useful chapter. This chapter discusses several biological agents that are commonly used for warfare purposes. These range from Anthrax to Plague to Q-fever, etc. A comprehensive account on the clinical features of infected patients, their diagnosis (tests) and the treatment recommended has been suitably given. For example:

" Botulinum toxins are proteins of approx. 150,000 molecular weight..... aerosol attack is most likely scenario for the use of botulinum toxins .Botulinum toxins are the most toxic compounds known..... 15,000 times more toxic than the nerve gas VX and 100,000 times more toxic than Sarin..."

…The disease pattern that develops is an important factor in differentiating between a natural event and a terrorist or warfare attack. In most naturally occurring epidemics, there is a gradual rise in disease incidence, as people are progressively exposed to an increasing number of patients, vectors, or fomites that spread the pathogen. In contrast, those exposed to BW attack would all come in contact with the agent at approximately the same time…

Several other such interesting details have been integrated in this chapter. Chemotherapy used against these agents is also emphasized in managing the patients. For e.g., it has been stated that,

" all naturally occurring strains of Anthrax have been found to be sensitive to erythromycin, chloremphenicol, ciprofloxacin, etc.,..."

All such information in this chapter is meticulously given in a comprehensive table in an easy to understand format. Epidemiology of BW or terrorist attack is a very informative discussion.

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Chapter 5 entitled *Biological Weapons and the US law*, discusses various laws in the US related to Biological Weapons and their implications which might not be of much interest to the common reader. But anyone interested in legal aspects of biological weapons would be greatly benefitted by this.

The real hardcore discussion is given in the **chapter 6** entitled *Biological Weapons Control: Prospects and Implications for the Future*. This chapter focuses on profound prospects and future insinuations of the subject. However, in discussing these issues, the authors do not clearly mention the problem of likelihood of Russian mafia occupying these weapons. Certain Islamic states also promote terrorism and are currently looking forward to occupy these weapons for terrorist purposes.

These are the issues, which need to be focused on in the present state of affairs. The number of terrorist organizations has increased in the last couple of decades. Their ability to execute severest and most heinous crimes has increased enormously. Countries like India, Srilanka, Afghanistan, US, Russia, etc are all affected by terrorism. The terrorist organizations have a strong nexus working internationally. They are currently the biggest threat to the existence of mankind.

...Very little is known about Iraq's bio-weapons program, even after several reports from various experts and agencies. These reports have constantly been questioned. Today, most people, even in the US, believe that Iraq did not have WMDs...

The focus should be shifted to study these organizations, their mode of operation and their capabilities. Countries affected by terrorism must unite and come up to create an intelligent network to assess these organizations so that another 9/11 should not happen. There is a pressing need for quick strong collective measures to stick and whip those countries, which are responsible for the promotion of terrorism. Several countries promoting terrorist operations under the garb of freedom struggle should be besieged with restrictions and a constant vigil should be instituted. Unless these shortcomings in our global political policies are scored through, our goal to accomplish peace and accord in the world would not become a reality.

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The book however, has two separate **chapters (8, 9)** on Iraq's bio-warfare programs. Ironically, these chapters do not conclusively prove any significant finding of such type. It has been indicated in the chapters that the capability of Iraq's bio-warfare program was negligible if anything. These

chapters are worth reading in the present day scenario since the world seen has the whole episode of the UN weapons inspection team and resignation of its leader.

Chapters 10, 11 and 12 are case studies of different instances of biological agents use. All the chapters have detailed statistical analysis of these cases with appropriate charts and graphical representation. The analysis includes the background, methods, case definition, outbreak investigation, lab methods, environmental studies, criminal investigation, results and conclusions. Researchers of the relevant field and doctors must read these pages carefully. They show how such cases are approached. An insight into the true investigation is worth reading.

W. Seth Carus has written **chapter 13**. The chapter deals purely with research on unlawful acquisition and the use of biological agents. Since the description is highly technical, readers of the relevant field would find these pages interesting. He raises certain very significant points, as indicated in the following passage.

" Despite efforts to enhance controls on biological agents, it is unlikely that any determined perpetrator will be prevented by legal constraints. First, only a relatively small number of agents are subjected to the most stringent controls. Second, many agents actually used in criminal or terrorist acts remain uncontrolled and extensively available. Third, it remains possible to steal the agent from a legitimate user. Finally, the supply of biological agents is global, and controls on them are unlikely to be enforced with equal vigor everywhere in the world."

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He has included the methodology and criteria of research work that has been carried out. The issue of bio-terrorism and biocrimes has also been impressively discussed with the help of suitable tables.

Part VI of the books raises certain issues related to policies for the response of biological warfare threats.

Chapter 14: Biological Terrorism: preparing to meet the threat

This is a commentary on biological terrorism including in it various topics like tactics and targets, response to BW terrorism and the future policy choices of the United States.

".Rather, the most likely BW terrorist tactic will be to release BW agents-anthrax spores, botulinum toxin, ricin, or other deadly agents-into the air as a biological aerosol, a stable cloud suspended microscopic droplets of bacterial or virus particles.."

The episode mentions the problem of state sponsored terrorism; religious extremism and criminal conduct in a noteworthy manner. The validation behind the concern over bio-terrorism has critically been accentuated.

".. If a terrorist believes that acts of violence are not only politically but also morally justified, there is a powerful incentive for any type of terrorist attack."

Chapter 15: The threat of biological weapons: prophylaxis and mitigation of psychological and social consequences

As the name suggests, the stuffing in this part is all about psychological reactions among the people, their assessment and responses that need to be taken. Acute psychiatric interventions include preclusion of panic among different groups, rapid estimation of degree of medical impact and its management, effective risk communiqué, etc.

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Chapter 16: Potential Values of a Simple Biological Warfare Protective Mask

Keeping in mind the dangers inherited in the biological warfare to the masses it is mandatory to search for a rather infallible method of protecting civilian populations from these agents in the case of an attack. This problem might pose serious limitations to this honest purpose of safeguarding our people.

The remedy however is around the corner - the protective mask. This simple looking apparatus offers a variety of promises not only in case of biological warfare attack but also in case of chemical and nuclear attack as well.

The chapter hovers around the idea of implementing these masks for the masses and discusses at length the usefulness of these masks. This chapter is specially meant for the general reader who aspires to inquire about the protective methods available to him in such high-risk incidences. To judge the effectiveness of these masks one needs to understand first the nature of attack it is used against. Biological weapons attack might be a frustratingly troubling attack. For example, a small plane can spray 6.5 kilograms of aerosolized anthrax tens of kilometers away from the target city in a crosswind line and upwind of the city, the effect can be seen within 48-72 hrs (page 265).

These and other such factors are imperative to consider. The protection available at the target like, vaccines, post-exposure medication and simple protective masks and their availability has been aptly discussed. Besides these the authors have also talked about another interesting point of gauging the residual threat by BW when masks are available. They have identified that to poison a city the usually required amount of anthrax needed is 6.5 kg. However, in case the population is protected with masks and is inside the protective houses then the requirement raises substantially to 65,000 kg. This amount creates various difficulties for the perpetrators, as stated,

".. Substantial number of delivery vehicles would be required. The numbers of such delivery vehicles could be raised yet further by defenses developed by the allies. If, for example, missiles had to be employed to deliver the 65,000 kg anthrax attack and an anti-tactical ballistic missile system that could limit the number of missiles reaching the target city to 10% were present, then at least 650,000 kg of anthrax payload at a target city would require the equivalent of more than 3,250 Scud missiles, an absurd proposition."

The entire chapter is very informative and spot on in discussing these issues from the intelligence agencies' perspective.

...permit me, now, to ask a rhetoric question: Can we establish a world order that will, in effect, protect "you," as representative of the global community, from the subversion of the scientific advances to which my own peers and myself have dedicated their careers?...

Chapter 17: Bioterrorism: Threats and Responses

A summary type discussion on the problem of biological terrorism, assessment of threats, the kinds of agencies involved, and the implications of bio-warfare attack has been discussed in a good length chapter. This is a comprehensive summarization of all the available knowledge about various terrorist agencies. Various trends in bioterrorism, the kinds of perpetrators, the acquisition of these agents and the counter terrorism strategies thereafter are given in detail. The author has discussed few newer trends like millenarian cults, "amateur terrorists," etc.

".with more than one hundred terrorist organizations active around the world today,... dozens of militant groups exist in the world, including Identity Christians, Islamic fundamentalists, ultra nationalist Jews, radical Sikhs and New Age cults,.."

The Nobel genius comes up yet again in the end to sum up the entire book. He is extremely fluent throughout the chapter and raises certain burning issues and forces our minds to rediscover our science and philosophy. In his own words,

"Permit me, now, to ask a rhetoric question: Can we establish a world order that will, in effect, protect "you," as representative of the global community, from the subversion of the scientific advances to which my own peers and myself have dedicated their careers?.... I do not have to tell you of the worldwide attack on science, the flight from reason that has tempted so many young people and makes so may dilemmas for those of us in university life..in conclusion, let me say that some of the speculations I have mentioned are ones that all of us must fervently hope will never materialize."

To summarize the book encourages us to put in consistent efforts towards making this planet a safer and habitable place to live on. We must ensure that people who believe in the power of such weapons and chose to resort to such revolting means are not allowed to accomplish their evil objectives.



-Prateek Pandya
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