

Agents of destruction

An in-depth look at the state of biological-weapons programmes across the world.

Deadly Cultures: Biological Weapons Since 1945

edited by Mark Wheelis, Lajos Rózsa & Malcolm Dando
Harvard University Press: 2006. 479 pp.
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Biological weapons have received considerable attention in the media and in the scientific community since the terrorist attacks of 11 September 2001 and the mailing in the United States of letters laden with *Bacillus anthracis* spores. Today, the debate about bioweapons is often characterized by unscientific prophecies and unlikely doomsday scenarios, a lack of discrimination between biowarfare, bioterrorism and biocrime, and a lack of uniformly accepted definitions for the terms biosafety, biosecurity and biodefence.

The threat of biological attacks has existed for many decades. Germany, for instance, established a biological sabotage programme as long ago as 1915 with the aim of incapacitating or killing military livestock of the Allied forces. Other countries, including Britain, Canada, France, Japan, the United States and the Soviet Union, initiated bioweapons research and development (R&D) programmes in the 1920s and 30s to develop weapons targeting animal, human or plant populations.

Historians and political scientists are well aware of these events. One of the most compelling and comprehensive scholarly books on the history and goals of these programmes, *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945*, edited by Erhard Geissler and John Ellis van Courtland Moon, was published in 1999 by the Stockholm International Peace Research Institute (SIPRI). Scientific treatises on offensive programmes of individual nations after 1945 are also available, but a book contrasting all the known programmes in one volume has been conspicuously absent. *Deadly Cultures* aims to fill this gap. In fact, the editors view the book as a sequel to the acclaimed SIPRI volume.

The first nine chapters describe the history of bioweapons programmes in Canada, France, Iraq, the non-Soviet Warsaw Pact countries, South Africa, Britain, the United States and the Soviet Union. The next chapters describe national efforts to develop weapons aimed at killing crops and animals, as well as 'non-lethal'

weapons, and there are detailed analyses of alleged biological attacks. Further chapters describe legislation aimed at preventing the proliferation of bioweapons. Finally, to address the concerns of recent years, there is an analysis of biological terrorism, and a comparison of it with national biowarfare initiatives.

Deadly Cultures proves to be a worthy successor to the SIPRI volume. The authors are renowned experts from various countries. Most of the chapters draw mainly on primary sources, many of which are recently declassified documents. Individual chapters are not mere summaries of more elaborate books on a particular programme published by the same authors, but glimpses into ongoing research with new information. References to popular science books, unverified personal accounts of former bioweaponeers or defectors, and newspaper articles only appear when sufficient access to primary sources was not yet possible.

What do we learn from the book? Before 1945, several countries started biowarfare programmes because of a perceived but essentially non-existent biological threat from Nazi Germany. In a similar way, bioweapons research surged in Canada, Britain and the United States shortly after 1945 because of a perceived threat from the Soviet bioweapons programme. The West's activities did not go unnoticed by Soviet intelligence, however, and eventually the Soviet Union transformed

its limited activities into the world's largest bioweapons R&D programme, partly in response to the growing threat from the West.

Learning from this, van Courtland Moon concludes that current activities at the US Department of Homeland Security, which might challenge the international conventions that prohibit bioweapons development, could in effect "give the United States a modern offensive [bioweapons] capability", at least in the eyes of nations not friendly with it. Martin Furmanski and Mark Wheelis agree that current biodefence activities could "provoke reactions that reduce international security". In a final analysis chapter, the editors, along with Graham Pearson and Julian Robinson, emphasize that states "would be wise to review their biological defense programs from the point of view of other states, which might form incorrect perceptions" and begin offensive programmes based on incorrect threat assessments.

Deadly Cultures explains that in the years after 1945, military planners on all sides viewed bioweapons to be equal in their destructive potential to nuclear devices. However, within the next 20 years, extensive field trials with simulants on often unsuspecting civilians demonstrated that bioweapons could hardly reach the devastating effects of actual weapons of mass destruction. Today, one often hears about the threat of biological weapons of mass destruction again. This notion is based

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Dangerous delivery: the anthrax scare from spores being mailed in the post raised fears of bioterrorism.

on the idea that such weapons could now be developed because modern methods would overcome previously insurmountable technical obstacles. But by describing how difficult and costly it was to develop any functional bioweapons before the 1990s, the book could emphasize the false nature of the frequently repeated idea of bioweapons as a 'poor man's atom bomb'.

We also learn that the idea of terrorist 'sleeper cells' goes back to 1951, when the CIA suspected that Soviet saboteurs were living unnoticed on US soil while waiting for an order from Moscow to launch a biological attack. Reading on, I was surprised to learn that Hungary probably undertook some offensive bioweapons activities before 1945, and that this programme might have had ties with a clandestine, yet-to-be-described Italian programme. The equally new revelation that Czechoslovakia might have kept stocks of variola virus up to 1994 is, if proved correct, stunning and frightening. Smallpox (the disease caused by this agent) was eradicated in the late 1970s, and official stocks of variola virus have since been permitted in only two laboratories, one in the United States and one in Russia.

The chapter on bioweapons R&D in Iraq provides a fascinating comparison of official Iraqi statements with the actual findings of the United Nations Special Commission, the UN Monitoring, Verification and Inspection Commission, and the Iraq Survey Group. Once again it is emphasized that no evidence of bioweapons development was found in Iraq after 1996, that the UN monitoring regime was very effective, and that its negative findings were correct.

The description of South Africa's bioweapons programme, which began in 1981, shows that only 'crowd control' and assassination weapons, rather than weapons of mass destruction, were developed, and that the programme was not using sophisticated molecular biology. In discussing the allegations of bioweapons use by the United States in Korea and China in 1952, and by the Soviet Union during the war in Afghanistan, Furmanski and Wheelis take into account most available data on these allegations from either side so that assessment could not be misconstrued as parochialism or ill-conceived patriotism. They conclude that most allegations are probably false.

Deadly Cultures is written eloquently and has been edited superbly. The chapters have a uniform style and organization; scientific and political terminology is used in a consistent and correct manner throughout; and abbreviations are used only where absolutely necessary. In contrast to most other books on bioweapons, the editors have almost always used up-to-date taxonomy of biological agents, as well as the differentiation of agents and the diseases they cause. The authors also included the original names of all institutes involved in bioweapons R&D. This is not a trivial point as French, Iraqi or Russian institute designations

have been translated differently in the past, and were also frequently changed during decades of reorganization, confusing both analysts and interested laymen.

I wish the book contained more references to biological anti-material weapons. Research activities on, for instance, rust-inducing, oil-degrading or asphalt-destroying agents are increasing and possibly challenge the 1972 Biological and Toxin Weapons Convention. Also, a chapter analysing the suspected motives (or lack thereof) of 'bioterrorists' would have been helpful, as it is by no means clear that terrorist organizations actually consider using

weapons that would target politicians, civilians and themselves alike. Finally, in the chapter on legal constraints on bioweapons, there was no reference to the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques. These minor concerns aside, however, *Deadly Cultures* is informative, meticulously researched, important in its message, and a fabulous read for both scholars and interested scientists. ■

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What is it like to speed date?

Conversations on Consciousness

by Susan Blackmore

Oxford University Press: 2005. 288 pp.

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Adina Roskies

The hard kernel of the mind-body problem — how we get first-person experience out of a purely physical object like the brain — was famously articulated by Thomas Nagel in a paper entitled 'What Is It Like To Be A Bat?' (*Phil. Rev.* 83, 435–450; 1974). The question of 'What is it like?' concerns the phenomenality and subjectivity of experience, and has come to be known as the hard problem of consciousness. This is the central focus of Susan Blackmore's latest book, *Conversations on Consciousness*, a compendium of 20 interviews she conducted with major figures in the field of consciousness studies. The illustrious but motley crew includes philosophers of radically different stripe such as David Chalmers, Pat and Paul Churchland, Daniel Dennett and John Searle; psychologists V. S. Ramachandran, Kevin O'Regan and Daniel Wegner; neuroscientists Francis Crick and Christof Koch; and explorer of altered states Stephen LaBerge.

The experience of reading Blackmore's book is the intellectual analogue of what it must be like to participate in the popular institution of speed dating, that maximally efficient method of meeting a potential partner. Blackmore devotes roughly 13 pages to each interview transcript, which reads roughly like a 10- to 15-minute conversation. Just as you might expect when interviewing potential romantic partners, some encounters with Blackmore's interviewees leave you wanting more, whereas others fail to connect and would be excruciating but for their merciful brevity.

In the course of Blackmore's discussions about how subjective experience might result from the operation of the three-pound hunk of meat that is our brain, she explores her subjects' disagreements with others' theories, their views about free will, and their opinions about the value of meditation and Eastern religious practices (the intellectual equivalent, I take it, of "What's your sign?"). She also poses personal questions to the interviewees, such as why they were drawn to studying consciousness in the first place, and whether their work has influenced the way they approach their own personal experiences.

Researchers have often wondered how we can get first-person experience from the matter that makes up our bodies.

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