Biological Weapons During the Cold War

Lecture No. 4

1. Outline

- At the end of World War II
  - Slides 2 - 3
- The US Programme
  - Slides 4 - 11
- The Anti-Crop Aspect of US Activities
  - Slides 11 - 16
- The Soviet Programme
  - Slides 17 - 20

2. At the End of the War

- Canadian concerns
  - "…in the spring of 1944…intelligence reports indicated that the German military had added botulinus toxin to its arsenal…"
  - "…Canada's military leaders were also impressed by …experiments which had demonstrated why botulinus toxin was an effective weapon…"

3. Botulinum Toxin as a Biological Weapon

- “Botulinum toxin is the most poisonous substance known….the toxin is a zinc proteinase that cleaves 1 or more of the fusion proteins by which neuronal vesicles release acetylcholine into the neuromuscular junction.”
- “…In a large outbreak of botulism, the need for mechanical ventilators, critical care beds, and skilled personnel might quickly exceed local capacity and persist for weeks or months…”

4. Stages of the US Programme

- Research and Planning (1946 – 49)
- Expansion during the Korean War (1950 – 53)
- Reorganisation (1954 – 58)
- The Limited War Period (1959 – 62)
- Adaptation to Counter insurgency (1963 – 68)
- Disarmament and Phased Down (1973 – 77)

5. 1946 - 1949

- “When World War II ended, the CWS (Chemical Warfare Service) had as its major mission preparedness for CW and BW in the context of a policy of retaliation only…”
- …Activities were concentrated on BW agent research and defensive aspects; some applied research on dissemination devices; the collation and digestion of the large scale R&D effort carried out during World War II; and the formation of sound research and development program frameworks...”

6. 1950 - 53

- “The first limited BW retaliatory capability was achieved in 1951 when an anticrop bomb was developed, tested and placed in production for the Air Force…”
- “…The first large area vulnerability test was conducted in San Francisco Bay in September 1950 using the simulants BG, and flurescent particles…”

7. 1954 – 58 (i)

- "…in July 1953, construction of the BW production plant at Pine Bluff Arsenal (PBA), was nearing completion….It became operational in the spring of 1954 with the first production of *Brucella suis* (the causative agent of undulant fever). Large scale production of the lethal agent *Pastuerella tularensis* (tularemia) began a year later."

8. 1954 – 58 (ii)

- "…The Working Group on Civilian Biodefense considers *F tularensis* to be a dangerous potential biological weapon because of its extreme infectivity, ease of dissemination, and substantial capability to cause illness and death."
- "…In the 1950s and 1960s, the US military developed weapons that would disseminate *F tularensis* aerosols…"

9. 1954 – 58 (iii)

- "…The Soviet pronouncements clearly stated the tenet that **CW and BW weapons would be used for mass destruction in future wars.** In 1956, a revised BW/CW policy was formulated to the effect that the US would be prepared to use BW or CW in a general war to enhance military effectiveness…" (original emphasis)

10. 1959 - 62

- “By the end of 1959, the Chemical Corps mission reached a height of emphasis unprecedented since WWII. The military Services were submitting requirements for BW munitions, which included dissemination means for artillery, missiles, drones, and other lesser weapon systems…”
- “In the summer of 1960, the CW/BW national policy…which had been revised from ‘retaliation only’ in March 1958 was revalidated…”

11. 1963 - 68

- “The overall emphasis in Defence programs during this period was on supporting the Vietnam War….The primary…BW efforts were directed towards meeting production requirements of antipersonnel and anticrop agents. Production facilities at Pine Bluff Arsenal were completed and between 1964 and 1967, the plant produced several different BW agents. Various types of BW munitions hardware were delivered to PBA, filled, and stored there…”

12. The Anti-Crop Aspects of US Activities

- Origins
- Research
- Testing
- Agents
- Targets

13. Aspects of US Activities - Origins

- Intelligence and press speculation regarding possible German BW attacks against agriculture in Europe lead to increased (Anglo) American urgency in developing a retaliatory anti-crop capability.
- Further impetus to develop such a capability came from uncertainty expressed in US intelligence reports of Soviet anti-crop biological warfare capabilities immediately after the war.

14. Aspects of US Activities - Research

- The following summarises the microbial anti-crop programme in the US which began in the early 1940s and endured for a period of 25 years:

  "strain selection…,development of optimal growth conditions and harvesting techniques and preparation in the form suitable for dissemination."

15. Aspects of US Activities - Agents and Munitions

- By 1949 it was reported that production by the US of plant pathogens was feasible: “one ton of spores may be harvested from 80 acres of infected cereal growth…[and] sufficient quantities of plant pathogens to carry out retaliatory strikes [could be] acquired in …six months”.
- 5 fungal anti-crop pathogens were produced in large quantities and stockpiled. A range of weapons, including particulate bombs, balloon bombs, cluster munitions and missiles were available for deployment.

16. Aspects of US Activities - Targets

- “By the 1950s the US capability was considered to offer both strategic advantage and deterrence in the face of communist aggression from the former Soviet Union and China.
- In respect of the USSR, one report noted that, a large fraction of the diet is threatened if wheat can be successfully attacked…”
- Another noted that, “mainland China appears to be particularly vulnerable to anti-rice warfare…”

17. The Soviet Programme (i)

- “It is generally believed that the Soviet Union had the largest, most extensive biological weapons program of any country. The highly secret program, which was expanded on the basis of a decision taken in 1973 by the Central Committee of the Soviet Communist Party continued until at least 6 March 1992…. The program reportedly involved the development and fielding of both tactical and strategic BW systems. Estimates of the number of people employed…are generally put at between 25,000 and 60,000…”

18. The Soviet Programme (ii)

- “Over a twenty-year period….through our covert programme, we stockpiled hundreds of tons of anthrax and dozens of tons of plague and smallpox near Moscow and other Russian cities for use against the United States and its Western allies.”
- “What went on in Biopreparat’s labs was one of the most closely guarded secrets of the Cold War.”

19. The Soviet Programme (iii)

- Plague
  - "…Soviet scientists were able to manufacture large quantities of the agent suitable for placing into weapons. More than 10 institutes and thousands of scientists were reported to have worked with plague in the former Soviet Union…"
  - "…There have been assertions that Russian scientists have engineered multi-drug resistant strains of *Y pestis*, although there is as yet no scientific publication confirming this.

20. The Soviet Programme (iv)

- “…The former Soviet Union…produced large quantities of Marburg, Ebola, Lassa, and New World arenaviruses….Soviet Union researchers quantified the aerosol infectivity of Marburg viruses for monkeys, determining that no more than a few virions are requires to cause infection….Arguments asserting that the absence of effective antiviral therapy and vaccines would make these viruses too dangerous to develop are not supported by the historical record.”

Sample Questions

1. Outline the evolution of the U.S. biological warfare programme in the three decades before the agreement of the Biological and Toxin Weapons Convention of 1972. Why did the policy for the use of biological weapons change at different times?

2. In what ways can the U.S. use of the synthetic plant bioregulator – Agent Orange – in Vietnam be seen as an indicator of what future biological warfare could be like?

3. What were the critical scientific and legal differences between the U.S. biological warfare programme and that of the former Soviet Union during the Cold War period?

4. Discuss what still need to be done to improve defensive measures in regard to any two of the anti-personnel agents known to have been weaponised in the biological warfare programmes of the 20th century.

References

(Slide 1)

Mark Wheelis, M., Rózsa, L., and Dando, M. R. (Eds.), (2006) *Deadly Cultures: Biological Weapons since 1945*, Massachusetts: Harvard University Press

(Slide 2)

Avery, D (1999) 'Canadian biological and toxin warfare research, development and planning, 1925–45', In Geissler, E., and van Courtland Moon, J. (Eds.) *Biological and Toxin Weapons Research, Development and Use from the Middle Ages to 1945* (SIPRI Chemical & Biological Warfare Studies No. 18). Oxford: Oxford University Press. pp. 190-213

(Slide 3)

Arnon, S. S., Schecter, R., Inglesby, T. V., Henderson. D. A., Bartlett, J. G., Ascher. M. S., Eitzen, E. M. Jr., Fine, A. D., Hauer, J., Layton, M., Lillibridge, S., Osterholm, M. T., Toole, T. O'., Parker, G., Perl, T. M., Russel, P. K., Swerdlow, D. L., and Tonat, K. (2001) 'Botulinum Toxin as a Biological Weapon: Medical and Public Health Management', *JAMA* 285(8), pp. 1059-1070

(Slide4)

Laughlin L.L., (1977) *U.S. Army Activity in the U.S. Biological Warfare Programs*, Volume 1, p. 4-2. Cited in Simon Whitby (2001) 'The Potential Use of Plant Pathogens against Crops', *Microbes and Infection*, 3. pp. 73-80

(Slide 8-10)

Dennis, D. T., Inglesby, T. V., Henderson. D. A., Bartlett, J. G., Ascher. M. S., Eitzen, E. M. Jr., Fine, A. D., Friedlander, A. M., Hauer, J., Layton, M., Lillibridge, S., McDade, J., Osterholm, M. T., Toole, T. O'., Parker, G., Perl, T. M., Russel, P. K., and Tonat, K. 'Tularemia as a Biological Weapon: Medical and Public Health Management', *JAMA* 285(21), pp. 2763-2773

(Slide 11)

National Research Council (2006) *Globalization Biosecurity, and the Future of the Life Sciences*, Washington, D.C.: National Academy Press. Chapter 1 is available from http://books.nap.edu/openbook.php?record_id=11567&page=15

(Slide 14)

Whitby, S., and Rogers, P. (1997) 'Anti-crop Biological Warfare – Implications of the Iraqi and US Programs', *Defense & Security Analysis*, 13(3), pp. 303 – 317. Available from http://www.informaworld.com/smpp/ftinterface?content=a783124233&rt=0&format=pdf

(Slide 17)

Hart, J. (2006) 'The Soviet Biological Weapons Program', In: Mark Wheelis, M., Rózsa, L., and Dando, M. R. (Eds.), (2006) *Deadly Cultures: Biological Weapons since 1945*, Massachusetts: Harvard University Press. pp. 132-156.

(Slide 18)

Domaradskij, I. V., and Orent, W. (2003) *Biowarrior: Inside the Soviet/Russian Biological War Machine*, New York: Prometheus Books.

Alibek, K., and Handelman, S. (1999) *Biohazard: The chilling True Story of the largest Covert Biological Weapons Program in the World—Told from Inside by the Man Who Ran it.* New York: Delta

(Slide 19)

Inglesby, T. V., Dennis, D. T., Henderson. D. A., Bartlett, J. G., Ascher. M. S., Eitzen, E. M. Jr., Fine, A. D., Friedlander, A. M., Hauer, J., Koerner, J. F., Layton, M., McDade, J., Osterholm, M. T., Toole, T. O'., Parker, G., Perl, T. M., Russel, P. K., Schoch-Spana, M., and Tonat, K. (2000) 'Plague as a Biological Weapon: Medical and Public Health Management', *JAMA* 283(17), pp. 2281-2290

(Slide 20)

Borio, L., Inglesby, T. V., Peters, C. J., Hughes, J. M., Jahrling, P. B., Ksiazek, T., Johnson, K. M., Meyerhoff, A., Toole, T. O'., Ascher. M. S., Bartlett, J., Breman, J. G., Eitzen, E. M. Jr., Hamburg, M., Hauer, J., Henderson. D. A., Johnson, R. T., Kwik, G., Layton, M., Lillibridge, S., Nabel, G. J., Osterholm, M. T., Perl, T. M., Russel, P. K., and Tonat, K. (2002) 'Hemorrhagic Fever Viruses as Biological Weapons: Medical and Public Health Management', *JAMA* 283(18), pp. 2391-2405