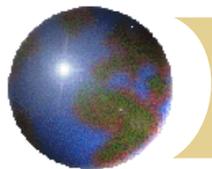


# *Ypres, 22 April 2015*

## *Can it Be Avoided?*

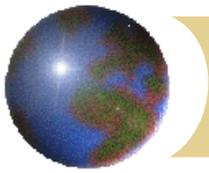
**Dr Jean Pascal Zanders**  
**BioWeapons Prevention Project**

1915: Innocence Slaughtered  
International conference, Ypres, 17-19 November 2005



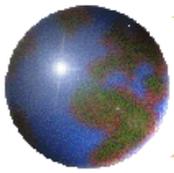
## *22 April 1915: Confluence of several trends*

- ⊕ Emergence of chemistry as a science
  - ⊞ End 18th century; rapid development in 19th century
  - ⊞ Development of new analytical and production methods
  - ⊞ Toxic chemicals are manufactured; not derived from nature
- ⊕ Discovery and synthesis of new chemicals
  - ⊞ Chlorine: first preparation in 1774
  - ⊞ Phosgene: first preparation in 1811
  - ⊞ Mustard gas: compound (olefines) and its effects first described in 1860
- ⊕ Industrialization
  - ⊞ Second industrial revolution in the 2nd half of the 19th century
  - ⊞ Commercial application of chemistry
  - ⊞ Integration of science and large-scale production based on economic rationale
- ⊕ Education
  - ⊞ Permeation of science and technology throughout society
  - ⊞ Impact on problem identification, analysis, and application of technical solutions in all sectors of society
- ⊕ World War 1
  - ⊞ Industrialization of warfare (total war)
  - ⊞ Forced integration of science, industry and military art



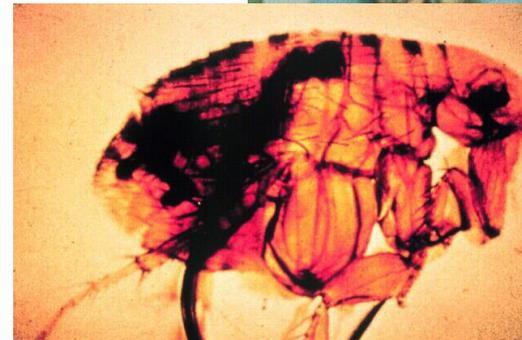
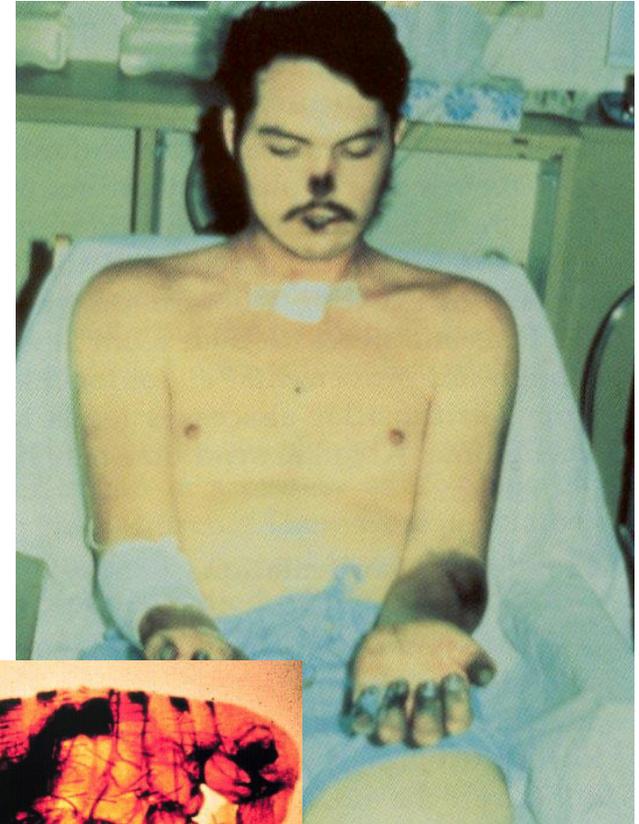
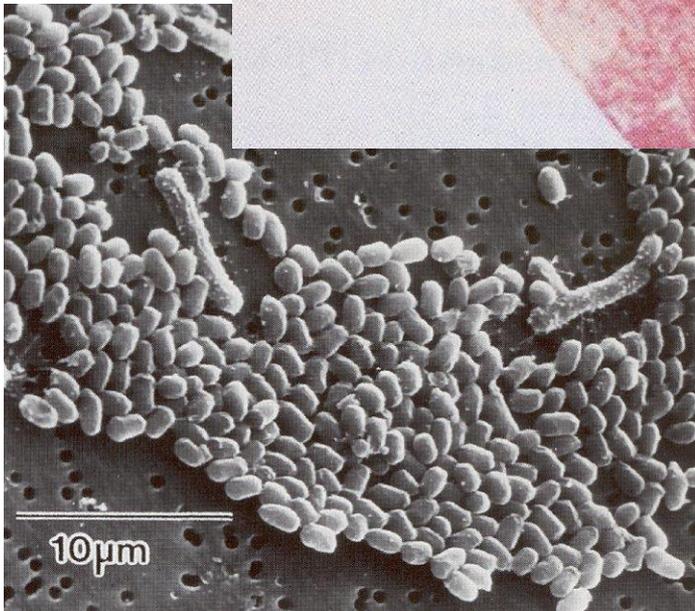
# *What is biological warfare?*

- ❖ Biological warfare is the intentional application against humans, animals or plants for hostile purposes of
  - ❖ disease-causing micro-organisms (e.g., bacteria);
  - ❖ other entities that can replicate themselves (e.g., viruses, infectious nucleic acids and prions)
  - ❖ Toxins, poisonous substances produced by living organisms (and their synthetically manufactured counterparts), including
    - micro-organisms (e.g., botulinum toxin),
    - plants (e.g., ricin derived from castor beans),
    - animals (e.g., snake venom), and

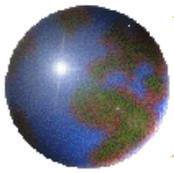


# *Visions of Biological Warfare*

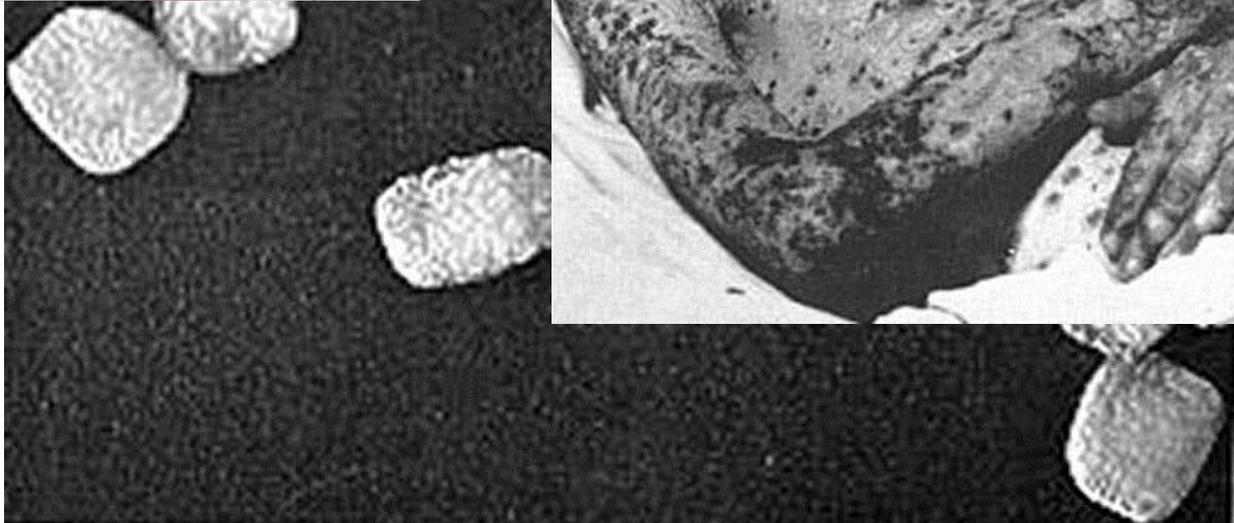
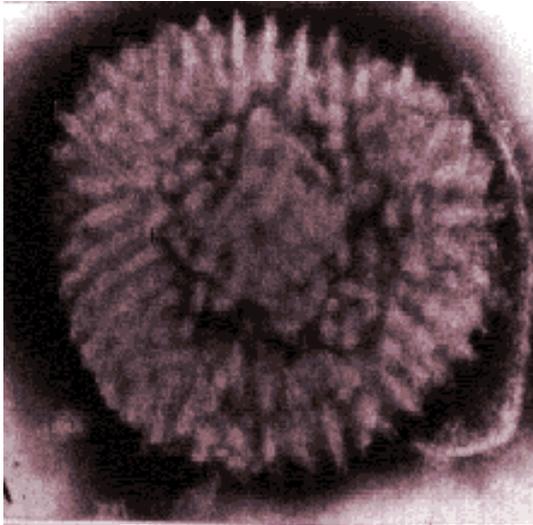
Anthrax



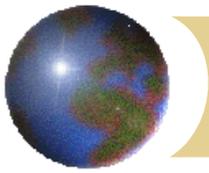
Plague



## *Visions of Biological Warfare — 2*

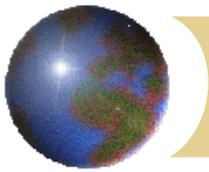


Smallpox



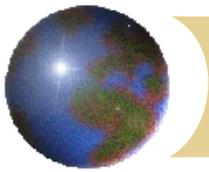
# *Current concept of biological warfare*

- ❖ Three critical characteristics of disease uncovered in 19<sup>th</sup> century:
  - ❖ Infectious disease is caused by an agent (pathogen)
  - ❖ The agent can be transmitted from one living organism to another (infectiveness)
  - ❖ One agent is responsible for one disease only
  
- ❖ Furthermore, it requires the ability to manipulate the pathogen
  - ❖ Isolation
  - ❖ Cultivation (while maintaining its infectiveness)
  - ❖ Production in large quantities
  - ❖ Effective dissemination



# World War 1

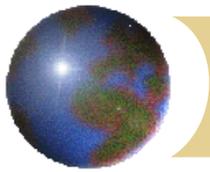
- ⊕ Given application of science and technology in warfare, no surprise that it was first applied in World War 1
  - ⊞ Germany
    - sabotage acts in USA against draft animals and livestock intended for Allies in Europe and Middle East (1915-16)
    - sabotage preparations in Romania against animals (1916)
    - indications of anti-animal sabotage programme in Spain (1915-18)
    - indications of programme against reindeer in Norway (late 1916)
    - sabotage programme in Argentina targeting animals and grain supplies (1915-17)
    - possible operations against French horses behind frontline (March 1917)
  - ⊞ France
    - Confirmed BW programme around 1917
- ⊕ Characteristics of the German activities
  - ⊞ Against animals and plants
    - Anthrax
    - Glanders
    - Botulinum toxin
    - Fungi
  - ⊞ Small-scale operations without mass dissemination techniques (e.g., inoculation of individual animals)
  - ⊞ Mostly in neutral countries
  - ⊞ Appears to have been motivated by Allied sea blockade, which gave Allies exclusive access to critical war resources
- ⊕ After WW1: BW research programmes in Allied countries based on false intelligence



# *International law against chemical and biological warfare*

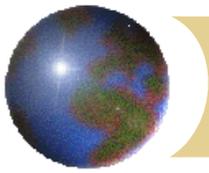
- ⊕ 1899 and 1907 Hague Conventions Respecting the Laws and Customs of War on Land
  - ⊗ Belligerents do not have unlimited power to injure an enemy
  - ⊗ Explicit prohibition on the use of poison and poisoned weapons
  - ⊗ Poisoning was understood by contemporaries to involve toxicants and pollution of environment with living organisms (e.g., carcasses in wells)
  
- ⊕ 1899 Hague Declaration (IV, 2) Concerning Asphyxiating Gases
  - ⊗ 'to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases'
  - ⊗ Asphyxiating and deleterious gases understood to be product of modern science and industry
  - ⊗ Contested legal document, notably by USA

**US delegate Captain Alfred T. Mahan:** [...] it was illogical, and not demonstrably humane, to be tender about asphyxiating men with gas, when all were prepared to admit that it was allowable to blow the bottom out of an iron-clad at midnight, throwing four or five hundred into the sea, to be choked by water, with scarcely the remotest chance of escape. If and when, a shell emitting asphyxiating gases alone has been successfully produced, then, and not before, men will be able to vote intelligently on the subject.



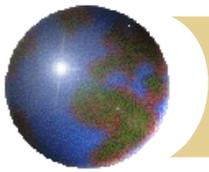
## *Today's sources of the norm against BW*

- ⊕ 1925 Geneva Protocol
  - ⊠ Bans the use of CBW in war
- ⊕ 1972 Biological and Toxin Weapons Convention (BTWC)
  - ⊠ Bans development, production and stockpiling of BW and toxin weapons
  - ⊠ Ban on use explicitly referred to at 4<sup>th</sup> Review Conference (1996)
- ⊕ 1993 Chemical Weapons Convention
  - ⊠ Bans development, production, stockpiling and use of toxin weapons
- ⊕ National laws
- ⊕ Professional and scientific codes of ethics and conduct



# *Evolution in the BW threat*

- ⊕ Threat aspects
  - ⊗ Against humans
  - ⊗ Against animals and plants
  - ⊗ Economic and societal disruption
  
- ⊕ Developments in biology and biotechnology
  - ⊗ May make the effects of biological agents more controllable
  - ⊗ May produce agents with higher infectivity or ability to overcome current medical defences
  - ⊗ Allow for the manipulation of disease on the sub-cellular level (genetics, biochemical processes, etc.)
  - ⊗ Interference with the natural immune system rather than dissemination of pathogen may become new mode of biological warfare
  - ⊗ May contribute to novel ways of agent dissemination (aerosol techniques; targeting of specific genes)
  - ⊗ Application of nanotechnology in agent design or dissemination technology
  
- ⊕ Some of the new potential agents fall in between biological and chemical agents



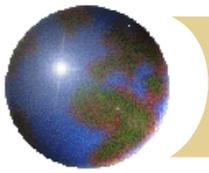
# *Challenges to international law*

## ✦ Nature of the biological weapon

- ✦ BW is the only weapon category in which the agent is central to both offensive *and* defensive preparations
- ✦ Civilian and military science and technology can not easily be separated from each other
  - Most weapon technologies have a final, unambiguous 'single-use' phase
  - This is essentially lacking with regard to biological agents

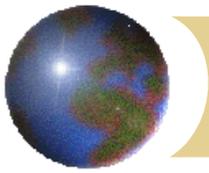
## ✦ Scope of application of prohibition different between BTWC and CWC in some areas

- ✦ Toxins covered by both conventions, but may be allowed for law enforcement, including domestic riot control under CWC (not BTWC)
  - E.g., pepper spray
  - Use fentanyl by Russian forces in Moscow siege
- ✦ CWC is preferred to BTWC today because of its strong verification and compliance enforcement regime
  - Differences in regimes is being used to legitimize development of biochemical 'non-lethal' weapons
  - Argument: 'What can be used against own citizens, can be used against enemy'
  - Danger: preserves knowledge of doctrinal application of chemical and biological weapons



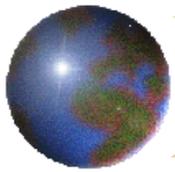
# *Remedies to Counter the Threat*

- ❖ Active involvement by states in the strengthening of existing international norms and development of new ones
- ❖ National implementation of international treaties
  - ❖ Application of international obligations to sub-state entities
  - ❖ Accountability of sub-state entities (companies, researchers, etc.)
  - ❖ Preventive measures against terrorism
- ❖ National measures to counter the threat
  - ❖ Disease surveillance
  - ❖ Rapid diagnostics
  - ❖ Emergency preparedness
  - ❖ Assess what is probable, not just what is possible
  - ❖ Regional cooperation arrangements

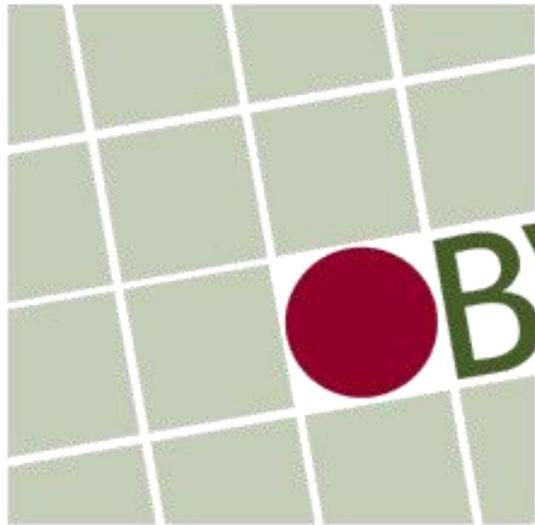


# *Preventing 22 April 2015*

- ⊕ Today, there is awareness of the threat
  - ⊞ But not equally in all relevant societal constituencies (military, politicians, scientists, industry, etc.)
  
- ⊕ Military application of new scientific and technological developments has become commonplace
  - ⊞ Pressures to exploit new biology and biotechnology for military goals will grow
  - ⊞ Many arguments in favour framed in humanitarian discourse (e.g., so-called non-lethal weaponry)
  - ⊞ Current threat perceptions drive bio-defence programmes; however, difference between offensive and defensive research may be minimal
  
- ⊕ Need to act by governments *and* individuals
  - ⊞ Updating of the norm in the light of scientific and technological developments
  - ⊞ Generation of transparency and confidence
    - Active reporting under the CBMs agreed under the BTWC
    - Openness about activities relating to biology and biotechnology
    - Transparency regarding technology imports
    - Openness about bio-defence programmes
  - ⊞ Development of ethical principles and codes of conduct by scientific and professional organizations



# ***BioWeapons Prevention Project***



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