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Preserving the norm against chemical weapons: A civil society initiative for the 2018 4th review conference of the chemical weapons convention

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ABSTRACT

Acceleration of the applications of cutting edge science is often most likely in situations involving conflict and warfare between different groups. That is the focus of this paper. It asks what we know of the past, present and possible future applications of advances in our understanding of the brain in the development of chemical weapons, and what might best be done to moderate the most dangerous aspects of that process at the present time, particularly by members of civil society. The paper therefore begins by examining this possibility of hostile manipulation of the brain in some detail. It then briefly reviews the current state of the chemical and biological arms control and disarmament regime as embodied in the Biological and Toxin Weapons Convention (BTWC) and the Chemical Weapons Convention (CWC) following the 2016 8th Five Year Review Conference of the BTWC and in the lead up to the 2018 4th Five Year Review Conference of the CWC. Finally, our civil society initiative to assist in achieving a successful outcome of the 2018 CWC Review Conference is described. This initiative involves the production of a multi-authored edited book, to be published in advance of the Review Conference by the UK Royal Society of Chemistry that explores many of the critical issues facing the CWC States Parties as they seek to agree effective measures to prevent the development and use of chemical weapons, as the life and chemical sciences advance.

1. Introduction

Catastrophic risks to the human species obviously can take many different forms, but the risks usually discussed involve the possible demise of the species. In this paper the risk considered is not the demise of the species, but its modification, as a result of the application of the ongoing advances in neuroscience, to forms that would not be seen as acceptable to many of us today. Such 'Brave New World' possibilities have certainly been considered in this century¹ but accounts have frequently dealt predominantly with civil applications of neuroscience where there is the possibility of societal reflection on the implications of the applications and therefore mitigation of unacceptable aspects of the impacts on society. However, acceleration of the applications of cutting edge science is often most likely in situations involving conflict and warfare between different groups of the human species. So that is the focus of this paper. In short it asks what we know of the past, present and possible future applications of advances in our understanding of the brain in the development of chemical and biological weapons, and what might best be done to moderate the most dangerous aspects of that process at the present time, particularly by members of civil society.

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¹ Michael Bess (2016) *Make Way for the Super Humans*. Icon Books, London

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While this issue has not received the attention that for example misuse of synthetic biology, gain of function experiments and Artificial Intelligence have received, is important because it could be the initial stage in a longer-term process of degeneration. As Professor Matthew Meselson argued at the turn of the century²:

“...During the century ahead, as our ability to modify fundamental life processes continues its rapid advance, we will be able not only to devise additional ways to destroy life but will also become able to manipulate it – including the processes of *cognition*, development, reproduction and inheritance.... *Therein could lie unprecedented opportunities for violence, coercion, repression, or subjugation...*” (emphases added)

In particular, he argued further that:

“...Unlike the technologies of conventional or even nuclear weapons, biotechnology has the potential to place mass destructive capabilities in a multitude of hands *and, in coming decades, to reach deeply into what we are and how we regard ourselves*. It should be evident that any intensive exploitation of biotechnology for hostile purposes could take humanity down a particularly undesirable path. (emphasis added)

The paper therefore begins by examining this possibility of hostile manipulation of the brain in some detail. It then briefly reviews the current state of the chemical and biological arms control and disarmament regime as embodied in the Biological and Toxin Weapons Convention (BTWC) and the Chemical Weapons Convention (CWC) following the 2016 8th Five Year Review Conference of the BTWC and in the lead up to the 2018 4th Five Year Review Conference of the CWC. Finally, our civil society initiative to assist in achieving a successful outcome of the 2018 review is described. This initiative involves the production of a multi-authored edited book, to be published in advance of the review by the UK Royal Society of Chemistry that is intended to consider many of the critical scientific issues facing the States Parties at the Review Conference.

2. Implications of a mechanistic neuroscience

The early Stockholm International Peace Research Institute (SIPRI) study of *The Problem of Chemical and Biological Warfare*³ noted that at the beginning of the United States’ incapacitating chemical agents research programme in the 1950s and 1960s many different ways of producing what one participant called selective malfunctions of the human machine⁴ seemed to be possible. The SIPRI study noted that the US Army Chemical Corps pointed out at least a dozen such possibilities and gave details on some of them and the agents that might be used (Fig. 1).

The strenuous efforts made to find effective chemical incapacitating agents during the Cold War period was neatly summarized in the 1997 version of the United States *Textbook of Military Medicine: Medical Aspects of Chemical and Biological Warfare*⁵ which stated bluntly that ‘[V]irtually every imaginable chemical technique for producing military incapacitation has been tried at some time.’ Yet the difficulty of finding an agent that could be used effectively without the risk of killing some of those affected by the agent is well known. As the U K Royal Society pointed out in its 2012 study of *Neuroscience, Conflict and Security*, in addition to the potential side effects of the agent used to incapacitate⁶:

“...when considered as a complete weapon system in an operational context, uncontrollable variables such as the size, health, age etc., of the target population, secondary injury (e.g. airway obstruction), and requirement for medical aftercare introduces further challenges to the development of a safe incapacitating chemical agent.”

Nevertheless, efforts were made to discover such agents. One particular aspect of this search was noted, by the Scientific Advisory Board of the OPCW, in its report for the 3rd Review Conference of the CWC in 2013⁷:

“...The types of chemicals and pharmaceuticals, known to have been considered as incapacitants from open literature sources, were discussed. Most are centrally acting compounds that target specific neuronal pathways in the brain. All of them emerged from [civil] drug programmes undertaken from the 1960s to the 1980s, as far as can be judged by the research that has been published.”

We are seeing here is what has become known as the *dual-use problem in the life sciences* in that cutting edge civil scientific work is then used by the military for hostile purposes. Yet despite all the efforts these programmes were not based on a good enough understanding of the CNS for an effective chemical incapacitating agent to be produced. The problems were illustrated by the death of 125 of the 900 hostages when a mixture of fentanyl derivatives was used to break the 2002 Moscow theatre siege.⁸

² Meselson, M. (2000) Averting the hostile exploitation of biotechnology. *The Chemical and Biological Weapons Conventions Bulletin*, July, 16–19.

³ Stockholm International Peace Research Institute, *Volume II: CB Weapons Today*. Almqvist & Wiksell Stockholm, 1973, Chapter 4. Research and development: Implications for the future of CBW, pp 260–332.

⁴ D. Lindsey (1960) Selective malfunctions of the human machine: New horizons in chemical warfare, *Military Medicine*, 1960, 125, 598.

⁵ Ketchum, J.S. and Sidell, F.R. (1997) Incapacitating Agents, pp 287–306 in *Textbook of Military Medicine: Medical Aspects of Chemical and Biological Warfare*, eds F. R. Sidell, E. T Takafuji and D. R. Franz, Office of the Surgeon General, Department of the Army, United States, Washington D.C., 1997.

⁶ Royal Society (2012) *Neuroscience, conflict and security*, Brain Waves Module 3, Royal Society, London, February.

⁷ OPCW (2012) *Report of the Scientific Advisory Board on Developments in Science and Technology for the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention*, RC-3/DG-1, OPCW, The Hague, 29 October.

⁸ Riches, J. R. et al. (2012) Analysis of Clothing and Urine from Moscow Theatre Siege Casualties Reveals Carfentanyl and Remifentanyl Use. *Journal of Analytical*

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