

M. Crowley and M. Dando, *Toxin and Bioregulator Weapons: Preventing the Misuse of Chemical and Life Sciences*, Palgrave, 2022, 330 pp.

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This timely book examines the evolution and current state of the international regime that prohibits the development, proliferation, and use of chemical and biological weapons. Crowley and Dando concentrate on advances in the study of toxins and bioregulators to demonstrate the relevance of the management of dual-use research in chemical and biological sciences to the effective implementation of the 1975 Biological and Toxin Weapons Convention (BTWC) and 1997 Chemical Weapons Convention (CWC). The authors put forward a compelling argument through “a series of illustrative country case studies highlighting areas [of research and related activities] where concerns or misperceptions may arise” (p. 2). They further explore options for strengthening the international chemical and biological disarmament and non-proliferation regime to ensure that cutting-edge scientific and technological advances are not utilised for purposes that are inconsistent with the goals of the two Conventions. This book contributes to an established interdisciplinary scholarship on chemical and biological security in the field of peace and conflict research.¹

Crowley and Dando’s book appears at a time when the CWC and BTWC are facing considerable challenges. The past decade has witnessed the renewed use of chemical weapons both on the battlefield and in targeted assassination attempts. A growing body of evidence indicates that the Syrian armed forces continued to carry out chemical weapon attacks following the country’s accession to the CWC.² To date, Syria has failed to guarantee that all of its chemical weapons and related production facilities are declared and destroyed.³ The chemical warfare nerve agent Novichok was used in the poisoning of Sergei Skripal and his

daughter, Yulia in 2018, and in that of Alexey Navalny in 2020.⁴ Amidst piling evidence that the Russian intelligence service orchestrated and carried out these attacks, Russia has systematically denied any involvement and at times, has even questioned the fact that the victims were poisoned at all. Following the invasion of Ukraine, Russia launched a high-level political and media campaign to accuse Ukraine and the US of developing biological weapons.. To advance its case, Russia used the mechanisms available both within the UN Security Council and the BTWC.⁵

Against this backdrop, the book highlights several important issues regarding the integrity of the CBW prohibition regime within the context of a rapid scientific and technological change and increasing political polarisation. First, Crowley and Dando draw attention to two categories of mid-spectrum agents – toxins and bioregulators – that fall within the scope of both the BTWC and the CWC.⁶ Toxins are not expressly defined by either of the Conventions, but Article 1 of the BTWC refers to “microbial or other biological agents, or toxins”, and Schedule 1 of the CWC features ricin and saxitoxin.⁷ For the purposes of the book, the authors adopt the Code’s definition of toxins propounded by the United States: “toxic material of plants, animals, micro-organisms, viruses, fungi, or infectious substances, or a recombinant molecule, whatever its origin or method of production” (p. 4). Bioregulators are “naturally occurring chemicals produced within living organisms”, which are involved in the regulation of core body functions (e.g. sleep, blood pressure, temperature). Bioregulators vary in terms of their structure and composition. Many bioregulators are peptides and some are involved in the functional chemistry of the brain. Both toxins and bioregulators can find application in weapon development and certain agents have previously been studied or used for

such purposes. Taken together, toxins and bioregulators offer an expanding wide range of weapon agent candidates with a potential to fuel a biochemical arms race.

Second, the authors examine the possible use of toxins and bioregulators for developing “less lethal” weapons for purposes that are not prohibited by the CWC, notably “law enforcement and domestic riot control purposes”. Crowley and Dando analyse three categories of “less lethal” weapons – namely, riot control agents; malodorants; and incapacitating chemical agents. A riot control agent (RCA) is any chemical not listed in the CWC Schedules which can rapidly produce sensory irritation or disabling physical effects in humans which disappear within a short time following termination of exposure. The CWC prohibits the deployment of riot control agents as a method of warfare but it does not address in detail their permissible use, including “the quantities of RCA that can legitimately be employed for law enforcement purposes nor the types of RCA means of delivery suitable for such purposes” (p. 215). Malodorants are “naturally occurring and synthesised chemicals affecting the human olfactory receptors, employed to elicit short-term and temporary physiological effects or behavioural responses” (p. 217). The authors note that “to date, no OPCW policy-making organ has determined whether malodorants should be considered as toxic chemicals and/or riot control agents under the CWC” (p.217). Incapacitating chemical agents, also called central nervous system (CNS)-acting chemical agents, are intended to cause prolonged but non-permanent disability or incapacitation such as “loss of consciousness, sedation, hallucination, incoherence, paralysis, disorientation, or other such effects” (p.12). In 2021, the Conference of States Parties (CSP) to the CWC adopted a Decision clarifying that at least one method of delivery of CNS-acting chemicals, that is,

their aerosolised use is inconsistent with law enforcement purposes as a “purpose not prohibited” under the CWC.⁸

Persisting ambiguities within the context of the CWC concerning the development and use of “less lethal” weapons can and in effect, does impact how States interpret and implement the provisions of the Convention. If left unchecked, diverging interpretations of what is permissible, in what context, and for what purposes, run the risk of easing the international prohibition on chemical weapons.

Third, Crowley and Dando discuss the implications of dual-use research on toxins and bioregulators for upholding the general purpose criterion enshrined in the BTWC and CWC. The general purpose criterion allows the use of biological agents, toxins, and toxic chemicals for purposes that are not prohibited by the two Conventions, as long as their types and quantities are consistent with such purposes. Dual-use chemical and life science research is, by definition, legitimate research that could also be misused to cause harm, including through the development of novel chemical and biological weapons. Moreover, such research could also be “construed as being intended to facilitate weaponization of such agents, or for other malign[ed] purposes, for use against human beings” (p. 2) especially when it is carried out in military or defence-related settings. The authors reflect on both of these nuances. For example, their proposed list of factors that may indicate research and development activities of potential concern (Table 1.3, p. 22), includes “dual-use work undertaken under the auspices of research establishments controlled, directly or indirectly, by defence, security, or law enforcement organisations, or that receive significant funding from such organisations”, as well as “dual-use research and/or development undertaken involving the

discovery and characterisation of novel toxins and bioregulators with potential weapons utility”. Dual-use research on toxins and bioregulators that could facilitate the development of “less lethal” weapons is particularly problematic, not least because States could see the existing ambiguities in the regulation of such weapons as an opportunity to bolster their security and military capabilities.

Each of these three themes is considered through six country case studies developed through empirical research: China, India, Iran, Russia, Syria, and the United States. The authors note that country choices were in part conditioned and limited by such factors as the availability of sufficient open-source material, particularly in English. They further note that the amount and quality of open-source information available for each country varies, and is in part “dependent upon the mechanisms established by that state to ensure oversight and accountability of relevant research and development activities, particularly those conducted or funded by military, security or law enforcement bodies, and the degree to which such measures facilitate reporting and transparency to the legislature and the public” (p. 21). One aspect that the book does not address in great detail concerns “the contextual factors that are important in understanding motivation behind state research and associated activities of potential concern” (p. 23). Developing this line of research could have important implications for improving the governance of dual-use chemical and life science research, to ensure that emerging advances in these fields are used only for peaceful purposes and the benefit of humanity and environment.

This book is a must-read for scholars and practitioners specialising in International Relations, Law, Political Science, and Strategic Studies, who wish to gain an in-

depth insight into the dynamics of chemical and biological disarmament. The added value of the book is that it enables the reader to engage with the issue of dual-use research through the use of concrete examples. As such, it can also be of interest to professionals within Chemical and Life Sciences.

Endnotes:

- ¹ Works that explore similar issues include, for example, Jonathan Moreno, *Mind Wars: Brain Research and National Defense*, Washington DC: Dana Press, 2006; Alexander Kelle et al. *Preventing a Biochemical Arms Race*, Stanford CA: Stanford University Press, 2012; Jonathan Tucker (eds.) *Innovation, Dual Use, and Security: Managing the Risks of Emerging Biological and Chemical Technologies*, Cambridge MA: MIT Press, 2012; Maurizio Martellini and Andrea Malizia (eds.), *Cyber and Chemical, Biological, Radiological, Nuclear, Explosives Challenges: Threats and Counter Efforts*, Springer, 2017.
- ² As a result of a Decision of the Conference of the States Parties to the CWC, the Organization for the Prohibition of Chemical Weapons (OPCW) has set up an Investigation and Identification Team (IIT) to identify the perpetrators of specific instances of chemical weapons use in the Syrian Arab Republic. To date, the IIT has issued three Reports which identify the Syrian Arab Republic's armed forces as perpetrators in the following cases of chemical weapons use in Syria: three cases in Ltamenah in March 2017; one case in Saraqib in February 2018; and one case in Douma in April 2018. All IIT reports are publicly available. See OPCW, Investigation and Identification Team (IIT), 2023, <https://www.opcw.org/iit>, Accessed on March 22, 2023
- ³ OPCW, "Conference of the States Parties adopts Decision to suspend certain rights and privileges of the Syrian Arab Republic under the CWC", *Press release*, 22 April 2021 at <https://www.opcw.org/media-centre/news/2021/04/conference-states-parties-adopts-decision-suspend-certain-rights-and>, Accessed on March 22, 2023
- ⁴ OPCW, Incident in Salisbury, 2023 at <https://www.opcw.org/media-centre/featured-topics/incident-salisbury>; OPCW, Case of Mr Alexei Navalny, 2013 at <https://www.opcw.org/media-centre/featured-topics/case-mr-alexei-navalny>, Accessed on March 22, 2023

- ⁵ See "United Nations Not Aware of Any Biological Weapons Programmes in Ukraine, Senior Disarmament Affairs Official Tells Security Council", Press Release, United Nations, 27 October 2022 at <https://press.un.org/en/2022/sc15084.doc.htm> Accessed on March 22, 2023; "Biological Weapons Convention – Formal Consultative Meeting", 5-9 September 2022 at <https://meetings.unoda.org/meeting/65052/documents>, Accessed on March 22, 2023
- ⁶ Graham Pearson, "The Idea of a Web of Prevention", in Simon Whitby et al. (eds.), *Preventing Biological Threats: What You Can Do*, University of Bradford, Bradford, 2015.
- ⁷ The CWC features an Annexure on Chemicals which is used for implementing the verification provisions of the Convention (Article VI). The Annexure on Chemicals comprises three Schedules (categories) of toxic chemicals. Schedule 1 lists toxic chemicals that have been developed, produced, stockpiled or used as chemical weapons and that have little or no use for purposes that not prohibited under the CWC. See Chemical Weapons Convention, Annexure on Chemicals at <https://www.opcw.org/chemical-weapons-convention/annexes/annex-chemicals/annex-chemicals>. Accessed on March 22, 2023
- ⁸ OPCW, "Conference of the States Parties, Decision: Understanding Regarding the Aerosolised Use of Central Nervous System-Acting Chemicals for Law Enforcement Purposes", C 26/DEC.10, 1 December 2021, at <https://www.opcw.org/resources/documents/csp26>, Accessed on March 22, 2023