Book Review

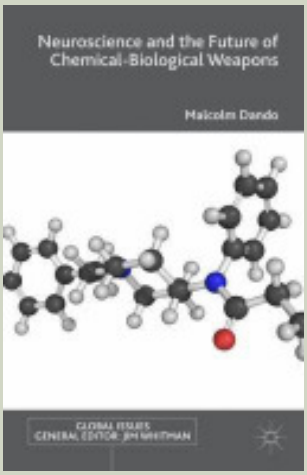
Dando, Malcolm, (2015), *Neuroscience and the Future of Chemical-Biological Weapons*, London, Palgrave Macmillan , ISBN: 978-1-137-38181-1, 2015

Arul R

The author is a researcher at IDSA in the field of Cybersecurity.

Summary

The recent developments in the field of Neuroscience possess a scope for efficient delivery of Chemical and Biological Weapons. The book seeks to educate and create awareness on the weapons conventions and the role that the scientific community at large needs to play.



The weapons that affect the nervous system are so relevant among the defence community that the researches on those weapons which started post World War are still continuing. The latest use of chemical weapons (nerve agent sarin) in Syria is a shocking reminder of the existence and the damages it could do to humanity. Malcom Dando's book *Neuroscience and the Future of Chemical-Biological Weapons* attempts to capture the potential of neuroscience in the weapons in making and advocates awareness to the readers of the uses and misuses. The author acknowledges the recent developments in the field of science and technology like nano-technology that has expanded the scope of research by promising efficient delivery mechanisms. The book focuses on the core theme that the author wants to drive home to the scientific community-Dual Use Research Concern (DURC): The research that could be used for beneficial proposes and at the same time misused for harmful purposes. The author interestingly notes that it is mostly the beneficial research of providing solutions for brain related disorders and mental illness that is carried forward for military purposes.

The book is divided into three parts; the past, present and the future of neuroscience. This has been discussed with the help of twelve chapters with relevance to the weapons conventions. The two major ongoing projects - One by the United States called the 'US BRAIN Initiative' and the other by the European Union called the 'The EU Human Brain Project' delineates the past from future. The author has enriched the content by quoting a number of researchers as well as various reports from the field of neuroscience.

The Part I of the book which covers four chapters that talks about the history of

neuroscience research, the chemical and biological weapons and its types, the summary of weapons convention and introduces the user about the DURC. Chapter I of the book introduces the user to the field of neuroscience and provides a brief introduction of the chemical weapons, biological weapons and toxins. Chapter II talks about structure and functions of the brain is the only purely technical chapter that stand out from others - explains how Neurotransmitters like noradrenaline and acetylcholine are manipulated to produce adverse effects in humans. It exposes the readers to how weapons that impact the nervous system could cause adverse effects. Chapter III introduces the readers to the non-proliferation regimes related to Chemical and Biological Weapons. It deliberates on three international agreements - the 1925 Geneva Protocol, the 1975 Biological and Toxin Weapons Convention (BTWC) and the 1997 Chemical Weapons Convention (CWC) with major focus on the latter two. Chapter IV introduces the challenges that neuroscience research faces in the form of DURC. Two major DURC experiments that find mention are the gain-of-function experiments and mouse pox experiment. Two reports relating to dual-use are discussed in detail - the Fink committee Report titled *Biotechnology Research in an Age of Terrorism* and The Lemon-Relman Report titled *Globalization, Biosecurity, and the Future of the Life Sciences*. The Fink Committee's first recommendation of 'Educating the scientific community' is what precisely the book is intending to do.

Part II of the book covers five chapters and discusses how modern advances in neuroscience could be misused. Chapter V of the book highlights the modern developments in civil neuroscience. The two current research projects that seek to explore the intricacies of the human brain are explained in detail. The 'US BRAIN Initiative' seeks to understand how the brain produces a particular behaviour and 'The EU Human Brain Project' seeks to construct a supercomputer that could simulate a brain. Both the projects could be misused for malignant purposes and this is precisely what the author is concerned about. He notes that there is no mention of the Chemical and Biological Weapons convention and its possibility of misuse. Chapter VI examines the novel neuro-weapons and their concerns. The author is apprehensive of the increasing interest and development of non-lethal weapons and incapacitating chemical agents. Chapter VII is an add-on to the previous chapter where the author is concerned about the possible manipulation of human behaviour considering the advances taking place in the field of neuroscience. The chapter focuses on neuroparasitology where knowledge on malign manipulation of host behaviour by parasites could lead to advances in human behaviour manipulation. Chapter VIII deals about incapacitants, a continuation of what the author discussed in Chapter VI. The dual-use nature of such incapacitants are also discussed. Chapter IX talks about toxins and bioregulators and other mid-spectrum toxins and bioregulators which do not fall into either CWC or BTWC. The author also introduces the readers to the Australian Group regime which regulates toxins. Part II of the book discusses current research in the field of neuroscience and dwells less on weapons convention.

Part III of the book covers three chapters and dwells on how the conventions have catered with the scientific and technological developments and what it could offer in the future. Chapters X and XI examine how well the BTWC and CWC have incorporated the scientific developments like nanotechnology, bioregulators, peptides and have handled the dual use concerns. The author continues on the history of Chemical and Biological

Weapon conventions that was partly discussed in Part I of the book and discusses in detail of the five yearly Review Conferences including the latest 2013 third review conference of CWC and the 2011 Seventh Review Conference of BTWC. In analysing the Conventions the author identifies more scope for effective policies that could protect misuse. In the final Chapter XII, the author examines on how to tackle the problem of dual-use. He stresses on the increased role of neuroscientists in tackling the biosecurity problem and emphasises the significant role played by the scientific community that led the US to abandon its offensive biological weapons. The author identifies areas where the work is still incomplete - like the bringing Other Chemical Production Facilities under verification, restricting the interpretation of 'peaceful' uses of weapons under the General Purpose Criterion clause of CWC and BTWC. The author concludes the book with a few recommendations - Educating neuroscientists on dual use research, Careful publication of research to avoid misuse of the same, helping in policy-making by guiding the policy/decision-makers in creating an environment that does not unduly restrict research and at the same time impede possible misuse.

The book is enriching in content and well analysed. The literature review is comprehensive as it covers a lot of reports and includes the opinions of neuroscience researchers in the field. The content focuses on three major areas - neuroscience, chemical and biological weapon regimes and the dual-use nature of research. The author's approach to compartmentalise the content into Past, Present and Future overspills at a few places. Part I of the book is the only part which gives equal importance to all the three areas. The introduction of the Australia Group regime in Part II (Present), evaluating the regimes in Part III (Future), explaining the technicalities of neurotransmitters in Part I (Past) is a disconnect in the flow of the book. The role played by neuroscientists to prevent misuse of research, though discussed in the concluding chapter, seems more generalised. It is to be acknowledged that the book, seeks to disseminate knowledge on the dual-use of neuroscience that the scientific community should be aware of, citing many reports, adds value to the literature.

The book contains rich source of information about neuroscience as well as the Weapon Convention regimes that any scholar working or researching in the field needs to know - be it scientists, policy makers, biologists or students of International Relations. The author who is a biologist and a practitioner in arms control and disarmament, has used his expertise in both the areas to write the book. The book is as a significant contribution to the existing literature on the given subject.