

Susan L. Smith. *Toxic Exposures: Mustard Gas and the Health Consequences of World War II in the United States*. New Brunswick, New Jersey: Rutgers University Press, 2017. Pp. 210.

Today's armed forces, at least in Canada at any rate, put great emphasis on the well-being of their people. A plethora of programmes that encourage both mental and physical health strive to keep personnel fit, both during and after service. Debate sometimes surrounds whether these initiatives are the best, or enough in number, or adequately funded, but people now more than ever are the focus. It is not for nothing that the first chapter of Canada's new defence policy, *Strong, Secure, Engaged*, focusses on serving members and their families alongside other people-centric topics; if the document's table of contents is any guide, funding, the global context and operations are all follow-on considerations.¹ And there is something to this ordering, for without trained, motivated and supported personnel, it matters not how large a nation's defence budget is or in what areas of the world it wishes to engage. The value now placed on people, as individuals in their own right, is a relatively new development and Susan Smith, a professor of history at the University of Alberta, makes this more than clear in her exceptionally interesting *Toxic Exposures*.

In light of the legacy of the Great War, when gases such as mustard, phosgene and chlorine turned battlefields into chemical ones, Allied nations prepared during the Second World War for another war of gas; a war, thankfully, that never materialised. Part of this preparation included human experimentation by the United States, Britain, Australia and Canada on the effects of mustard gas using their own soldiers and sailors as test subjects.² Many in the medical and military establishments wondered if different racial groups—Caucasian, African-American, Japanese-American (*nisei*) and Puerto Rican—possessed different tolerances for, even immunity against, mustard. Presumably, if one had been detected, the unlucky racial group would be thrust to the centre of the gas war, while the

¹ Canada, Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy* (2017), http://publications.gc.ca/collections/collection_2017/mdn-dnd/D2-386-2017-eng.pdf.

² *Toxic Exposures* is by no means a comparative study since the American experience receives the greatest attention, being the focus of the book, followed by the Canadian, British and Australian histories.

remaining groups would play a supporting role in order to limit their exposure!

Smith does an excellent job relating how experimentation proceeded along these lines, describing a series of experiments over a number of years that ultimately inflicted considerable physical and mental injury on those who “volunteered.” An underlying idea that she explores is the degree to which army and navy personnel in a hierarchical, coercive power structure actually volunteered. Such wartime chemical research was predicated on the belief that by harming a few, many might be saved. She is also careful to note that research was not undertaken to better protect personnel from the effects of gas, but rather to help fight the gas war more effectively; the aim of the research was offensive, not defensive. In the end, none of the identified racial groups possessed any appreciable resiliency to chemical agents, thus making the military applicability of the research extremely limited.

With significant stocks on hand of chemical weapons at war’s end, and in the absence of funding for proper storage or destruction, Allied nations soon began to dispose of these unwanted munitions (and those captured from the enemy) by dumping them into the ocean, what others have called the “ultimate Dumpster” (p. 73). From the 1940s to 1970s, sea disposal continued in all of the world’s oceans, with the Baltic Sea being the most polluted of all. What is so troubling for governments, as Smith observes, “is that in most cases they do not know exactly where all of the ocean disposal sites are, what is in the sites, or whether the materiel has moved” (p. 89). And therein lies much of the irony that is explored in this book: weapons that were developed to meet the temporary demands of total war have long-lasting, in some cases permanent, repercussions and continue to pose a very real threat to environmental and human health.

In spite of the terrible picture that Smith convincingly paints of wartime human experimentation and postwar disposal, there is at least one redeeming aspect of this tragic story, if one can be so generous. Following investigations into the release of toxic agents at Bari, Italy (explained below) and further tests on human subjects—this time, though, with end-stage cancer patients for whom little hope remained—derivatives of mustard gas became first-generation chemotherapy treatments. Some of these agents, like *Mustargen*, are

still in use today.³ Ironically, compounds that were originally intended to incapacitate during wartime were “civilianised” afterwards, assuming a therapeutic rather than a destructive function. Smith’s decision to offer this discussion as her concluding chapter is effective, not only because it follows chronologically and helps bring the narrative up to the present, but because it reinforces many themes that are evident throughout: the militarisation of medicine and medicalisation of war, the oftentimes deep interconnectedness between military and civilian research, and the collaborative and interdisciplinary nature of advances in medical knowledge. *Toxic Exposures* is an enlightening if somewhat depressing read, yet the concluding chapter makes the sun shine just a little brighter. “As the history of mustard gas reveals,” she notes sagely, “the impact of war is ever present and everywhere” (p. 94).

Notwithstanding the above statement that experiments were offensive in intent, it would seem from Smith’s account that at least some studies conducted during the war were designed to investigate the efficacy of various prophylactic measures, like an ointment to reduce mustard gas penetration of the skin, as well as clothing impregnated with chemicals to defeat gas and, naturally, masks. It is unfortunate that she does not directly discuss the results of what might be called “equipment” tests. Her narrative in the first two chapters focusses exclusively on human experimentation, but by omitting the results of tests of various types of protection, even in cursory form, there is no way to know if the physicians and scientists were better able to protect Allied troops against gas. One must assume that preventative measures were generally ineffective given the horrific wounds suffered by the test subjects, wounds that ranged from the acute to the chronic. Either way, whether they were ultimately successful or not—and again, one must suspect the latter—a discussion of the experiments’ outcomes would have aided her thesis. If better defensive capabilities were indeed developed, then an argument could be made, however grotesque, that the tortuous experiments served a valid purpose and better prepared friendly forces for a gas war. They could, in other words, have been justified by the exigencies of total war. If, on the other hand, the experiments failed and yielded no substantive advantage, then such useless human suffering would only compound the tragedy

³ Lundbeck Inc., Product Monograph, “Trituration of Mustargen” (11 September 2009), https://pdf.hres.ca/dpd_pm/00008727.PDF.

about which she writes so convincingly, making her claims stronger in the end. Without knowing, though, readers may very well feel that only part of the story has been told. In comparison, she expends a good deal of effort in noting that all test subjects, regardless of racial typology, suffered ill effects from mustard gas and that no one race had a natural immunity or resistance.

And this is not the only place where underdeveloped ideas can be found either. Many instances occur throughout *Toxic Exposures* in which additional explanation of certain key points would have been beneficial.⁴ In such a short work as this, the space was certainly available to elaborate on a number of issues that would have added further narrative richness. For instance, in discussing the devastating release of mustard gas from an American merchant ship following a German attack on 2 December 1943 in the harbour of Bari, in Puglia, Italy, she quotes another historian, Glenn Infield, who claimed in his *Disaster at Bari* that this incident prolonged the war and led to greater casualties in Normandy some months later.⁵ Really? How so? Such a provocative and interesting statement as this surely deserves more than a standard Chicago Style footnote. Incidentally, the gassing of soldiers, sailors and civilians at Bari on the Adriatic coast was the only time during the Second World War that mustard gas caused casualties on a mass scale; a bitter irony that the gas the Americans had brought to the Italian theatre to respond to a German gas attack ultimately harmed their own, their allies and innocent civilians.

Smith's work, which is comprehensively researched, makes a valuable addition to the literature of various disciplines. Historians of and researchers in different fields—military, medical, social and technological, including ethicists and environmentalists—will find something of interest within its pages. Its strength also lies in its relevance for today. The tons of chemical munitions dumped into the world's oceans as an expedient disposal solution remain a threat to human and ecological health, too many have need of chemotherapeutic

⁴ In addition to the example discussed below, see also p. 50 where she states "US policy since 1942 had supported retaliation with gas weapons but no first use." Such a statement leaves too many unanswered questions that could have been addressed: What was the policy before 1942? Why the change? What were the "politics" surrounding this decision? How did the military feel about this policy? Was it a purely civilian decision or did the military have input, either for or against? Did the attack at Pearl Harbor play a role?

⁵ Glenn Infield, *Disaster at Bari* (New York: Macmillan, 1971).

agents, and chemical weapons themselves have of late been used with troubling frequency—mustard against Iraqi Kurds at Halabja in 1988, Sarin in Tokyo’s subways in 1995, and Novichok against father and daughter Skirpal in 2018 Salisbury. If chemical weapons were largely absent from the Second World War, they have by no means disappeared in the seventy-five years since, thus making Smith’s work an important chapter in the overall narrative stretching from the First World War to the present.

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