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Toxic Exposures: Mustard Gas and the Health Consequences of World War II in the United States by Susan L. Smith.

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Historian Susan Smith (Univ. of Alberta) continues her research on the health effects of war in *Toxic Exposures*.[1] Its premise, based on existing archives and recent findings alike, is that Americans "engaged in poisoning themselves in the name of saving lives" (3). Painfully aware of the impact of mustard gas in World War I and expecting chemical warfare during World War II, Allied and Axis nations tested the effects of mustard gas exposure on human subjects. The author explores the medical, environmental, and moral legacies of those experiments.

In her introduction, Smith notes that the first use of mustard gas in World War I (July 1917) initiated the unleashing of an array of chemical weapons by both sides that killed or injured over a million soldiers during the war. Some sixty thousand US troops were subjected to experiments involving mustard gas during the Second World War. These tests became public knowledge only when the US Army conducted a study in 1959. By the late 1980s, veterans were filing claims for medical compensation and the National Research Council's Committee on Toxicology published findings on the long-term impact of toxins on those exposed to them.

At a public hearing sponsored by the National Academy of Sciences in 1992, some 250 military veterans testified about their mustard gas experiences during World War II. A year later, an influential NAS study documented the consequences of the experiments. In 2015, National Public Radio broadcast reports about the gas experiments and their aftereffects.

Part I of the text describes the mustard gas experiments conducted on American, Canadian, Australian, and British servicemen. After the First World War, the Chemical Warfare Service became part of the US Department of War. American officials did not, however, ratify the 1925 Geneva Protocol banning biological and chemical weapons until decades later. Knowing that Germany, Italy, and Japan had chemical warfare programs, the United States conducted medical experiments on chemical weapons using animals in the interwar period. During World War II, testing was done in the United States, Canada, Australia, and Panama. Participants cited several reasons for taking part: patriotism, extra pay, leave privileges, boredom, and combat avoidance. Though the US government created posters and films to inform soldiers about chemical warfare, men who took part in the experiments agreed that there had been insufficient warning of the risks involved and inadequate follow-up care.

According to Smith, at least nine studies investigated the relation between mustard gas exposure and race; these involved African and Asian Americans, Puerto Rican Americans, and POWs.

1. An installment in Rutgers Univ. Press's "Critical Issues in Health and Medicine" series. Smith's previous publications include *Japanese American Midwives: Culture, Community, and Health Politics, 1880–1950* (Urbana: U Illinois Pr, 2005) and, with Dawn D. Nickel, "Nursing the Dying in Post-Second World War Canada and the United States," in *Women, Health and Nation: Canada and the United States since 1945*, ed. G. Feldberg et al. (Montreal: McGill-Queens U Pr, 2003) 330–54

Though the tests were justified as a byproduct of the militarization of science, the military's use of minority groups for medical research continued a woeful historical pattern of racial discrimination and stereotyping.

Part II highlights the environmental and health legacies of World War II mustard gas experimentation. The disposal of the gas and other chemical weapons in the world's oceans "reflected a view of the sea as a convenient sewer. It was commonplace because it was a cheap and easy solution to the problem of military waste" (73). The numbers are startling: from 1918 to 1970, the US military dumped chemical weapons in oceans seventy times, including thirty-two thousand tons of mustard gas and nerve agents. Much of this occurred abroad, but it also took place close to the eastern and western American seaboards, in the waters around Hawaii, and in rivers in Mississippi and Louisiana. The United States was hardly alone in this: as much as half of the five hundred thousand tons of chemical weapons manufactured globally during World War II was deposited in the sea. Initiatives to halt ocean dumping of hazardous military waste have included legislation, international agreements, and raising public awareness. Smith cites actions by the US Congress in 1969, 2001, and 2006; international treaties in 1972 and 1993; and major documentaries calling attention to the practice.

"During the Second World War, medical scientists developed cancer chemotherapy from mustard agents because these were the poisons they knew best" (95). Indeed, many well-known postwar cancer researchers emerged from the wartime generation, ironically demonstrating the overlap of laboratory and battlefield. It was a case of making people sick in order to make people well.

The book's conclusion delineates the long struggle of veterans involved in mustard gas experiments for recognition, treatment, and benefits. They have had to acquire necessary, still-classified documentation of their inclusion in gas experiments and induce the government to admit the link between these activities and various medical ailments. Among the belligerent nations of World War II, Great Britain has done the most to compensate servicemen injured in gas experiments. The United States, for its part, has implemented stricter rules for the use of human subjects in research and declassified relevant documents. And the administrations of presidents George W. Bush and Barack Obama have pledged to complete the elimination of land-based chemical munitions.

The publication of *Toxic Exposures* marks a sad centenary. Yet, despite prohibitions endorsed by the Chemical Weapons Convention, Syrian dictator Bashar al-Assad has very recently deployed chemical weapons against his own fellow citizens. And the (in the event baseless) fear that Saddam Hussein might go beyond killing only his countrymen with chemical and other "weapons of mass destruction" precipitated the long, frustrating US war in Iraq.

American servicemen were encouraged in 2016 when Sen. Claire McCaskill (D-MO) sponsored legislation to help veterans prove cases of mustard gas exposure. While it is too early to claim success, Susan Smith's closing observation bears repeating: "Surely, the history of the mustard gas experiments during World War II provides a powerful lesson in why such medical experimentation necessitates public scrutiny and public debate" (130). *Toxic Exposures* is a welcome reminder of that lesson.[2]

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2. Several earlier books have examined the impacts of mustard gas and chemical weapons: Robert Harris and Jeremy Paxman, *A Higher Form of Killing: The Secret Story of Gas and Germ Warfare* (1982; rpt. NY: Random House, 2002); Jonathan Tucker, *War of Nerves: Chemical Warfare from World War I to al-Qaeda* (NY: Pantheon, 2006); and Ulf Schmidt, *Secret Science: A Century of Poison Warfare and Human Experiments* (NY: Oxford U Pr, 2015). Geoff Plunkett, *Death by Mustard Gas: How Military Secrecy and Lost Weapons Can Kill* (Sydney: Leech Cup Books, 2015), details the aftermath of a 1943 chemical accident in Australia.