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in the Humanities & Social Sciences

Robert Kenner, dir.. *Command and Control.* Based on Best-Selling Book by Eric Schlosser. PBS American Experience Series. Boston: WGBH Educational Foundation, 2016. www.shoppbs.org. $19.99. DVD. 210 mins.

Eric Schlosser. *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety.* New York: Penguin Publishing Group, 2014. 656 pp. $18.00, cloth, ISBN 978-0-14-312578-5.

Reviewed by David Palkki

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Commissioned by Margaret Sankey (Air University)

The American public and its elected representatives are appallingly ignorant about the US nuclear arsenal. A 2004 poll found that the average American respondent believed that the United States had only two hundred nuclear weapons—a far cry from the correct number at the time of approximately six thousand.[1] President Donald Trump and many congressional representatives seem no better informed.[2] This widespread ignorance is troubling, in part, since policymakers are soon to make key decisions about the size and scope of the arsenal. Knowledgeable leaders have been calling for years for a "national conversation" on whether and how to modernize the US nuclear arsenal.[3] This well-written book and engaging documentary film, which is based on the book, have risen to the occasion.

Eric Schlosser has produced a thoughtful, at times frightening, account of nuclear policies and accidents in the US Air Force (USAF). Much of the book (as well as the movie) is focused on recreating, in minute detail, the story of the September 1980 explosion of a Titan II missile near Damascus, Arkansas. It all started when a young air force technician accidentally dropped a socket wrench that bounced off the ground and pierced the rocket's fuel tank, causing the highly flammable liquid fuel to leak. Eight hours later, the fuel tank exploded with such force that it launched the missile's nine-megaton thermonuclear warhead several hundred yards into a ditch.

A key point that the book and movie drive home is that "normal accidents," with unpredictable consequences, are inevitable in tightly coupled, interactive systems, such as a nuclear weapons system. If we are willing to live with nuclear weapons, this line of reasoning goes, we must be willing to accept the ever-present risk of nuclear accidents. The point isn't novel. As Schlosser acknowledges, Charles Perrow and Scott Sagan (***The Limits of Safety: Organizations, Accidents, and Nuclear Weapons*** [1993]) deserve credit for their widely acclaimed scholarship on nuclear accidents several decades ago. This lack of theoretical originality, however, by no means reduces Schlosser's merit. Beyond what appears to be fine investigative work into the story line surrounding the explosion of the Titan II (and other accidents), Schlosser and Robert Kenner, the director of the film, have done a masterful job of

packaging their argument for mass audiences. It is powerful watching footage of Bob Peurifoy, the former director of weapon development at Sandia National Laboratories, and Bill Stevens, the former head of nuclear safety at Sandia, explain how nuclear accidents could have ended with mushroom clouds.

Unfortunately, the power of these interviews is clearly lost on Amazon.com, which may be the largest distributor of the DVD. Amazon delivers a frontal assault on the claim that the explosion of the Titan II missile could have eventuated in a thermonuclear detonation. In Amazon Prime's "goofs" section for this movie, drawn from the movie reference site IMDb.com, one reads, "Factual Error: It was never possible for an accidental Titan missile explosion to unleash a nuclear detonation. The worst scenario would have been the deaths of the crew in the affected silo.... The premise that a fuel leak at a Titan missile silo could have caused a thermonuclear disaster is both deeply flawed and physically impossible."[4] No source is provided. By contrast, in the documentary, Peurifoy says very clearly that it was possible. When asked, "Was there a chance that that bomb [near Damascus] could have detonated," he answers "Yes." The documentary ends with Peurifoy warning, "Nuclear weapons will always have a chance of an accidental detonation. It will happen. It may be tomorrow, or it may be a million years from now, but it will happen."

The portions of the book dealing with the Titan II, though nonfiction, are written as an action thriller, with the author taking readers from one character's experiences and perspectives to the next. Some readers may find this approach disjointed and unsettling, though the author may have done so precisely to elicit a sense of unease with the material at hand. In any case, where else can one read a well-researched, well-written, historical account involving nuclear weapons, accidental explosions, and Arkansas state politics under Governor Bill Clinton? ***Command and Control***, in book as well as in documentary film, will educate a broader swath of Americans than earlier treatises on nuclear accidents. This is important and timely.

Schlosser praises individual airmen in the US nuclear weapons enterprise "who helped to avert a nuclear holocaust," yet he holds no punches in criticizing the air force more broadly (p. xii). He repeatedly accuses the USAF and Department of Defense of being dishonest about the likelihood of accidental nuclear explosions. Excessive secrecy, he notes, undermined civilian control of Strategic Air Command (SAC) and of the efforts of weapons designers to avert accidents. The US military resisted incorporating permissive action links and various other safety features, he writes, for fear that these might hinder the US ability to retaliate after a Soviet first strike. Readers, particularly newcomers to the study of nuclear weapons, will find his treatment of the always/never debate enlightening and frightening. For instance, he documents how SAC objections to permissive actions links and other safety devices led it in the late 1970s to set the required eight-digit codes at each of its Minuteman sites to "00000000" (p. 371). On the flipside, he writes, at the height of the Cold War, Lawrence Livermore National Laboratory made its W-47 warheads ***too*** safe. A routine examination in 1963 found that roughly 75 percent of these warheads, placed atop the navy's Polaris missiles, would not work. Livermore tried for four years to fix these warheads, unsuccessfully, before it replaced them (p. 314). I know of no better evidence suggesting the desirability of a US triad (or at least dyad) than this dangerous failure in the navy's nuclear deterrent.

It is unclear how broadly Schlosser's and Kenner's work will influence the public debate, though it has begun making its way into syllabi in civilian academia as well as in the US professional military education system. I assign significant portions of the book and the film to senior military officers at the USAF Air War College, the ma-

jority of whom are air force officers and a fair number of whom have worked with nuclear weapons. My students, unsurprisingly, criticize Schlosser for spending so many pages on accidents in the USAF and so few in the navy. They fault him for focusing heavily on accidents in the United States as opposed to a more balanced study including accidents in Russia, Pakistan, and elsewhere. And they wish he had focused more attention on changes within the air force to correct earlier errors. But they enjoy learning from him. Schlosser and Kenner are to be commended for presenting such accessible and important accounts of our nuclear past.

Notes

[1]. Steven Kull with Clay Ramsay, Stefan Subias, and Evan Lewis, "Americans on WMD Proliferation," The PIPA/Knowledge Networks Poll, April 15, 2004, 18-19, www.pipa.org/OnlineReports/WMDProliferation/WMD_Prolif_Apr04/WMDProlif_Apr04_rpt.pdf (accessed June 15, 2017).

[2]. Josh Rogin, "In Debate, Trump's Lack of Nuclear Knowledge on Display," ***Washington Post***, September 28, 2016; Lisbeth Gronlund, "How Many Nuclear Weapons Does the U.S. Have? Don't Ask Congress...," Union of Concerned Scientists (blog), December 17, 2013, http://blog.ucsusa.org/lisbeth-gronlund/how-many-nuclear-weapons-does-the-united-states-have-347 (accessed June 15, 2017); and "New Video from Global Zero Exposes Widespread Ignorance in Congress about Nuclear Weapons," Global Zero, June 20, 2013, www.globalzero.org/press-media/press-releases/new-video-global-zero-exposes-widespread-ignorance-congress-about-nuclear (accessed June 15, 2017).

[3]. See, for instance, Mac Thornberry's statement in Paul D. Shinkman, "Top GOP Lawmaker: US Must Consider Building New Nukes," ***U.S. News and World Report***, June 23, 2015.

[4]. Amazon Prime app via IMDb.com, http://www.imdb.com/title/tt5598206/ (accessed June 16, 2017).

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