



## Book Review

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### Command and Control

**Eric Schlosser**

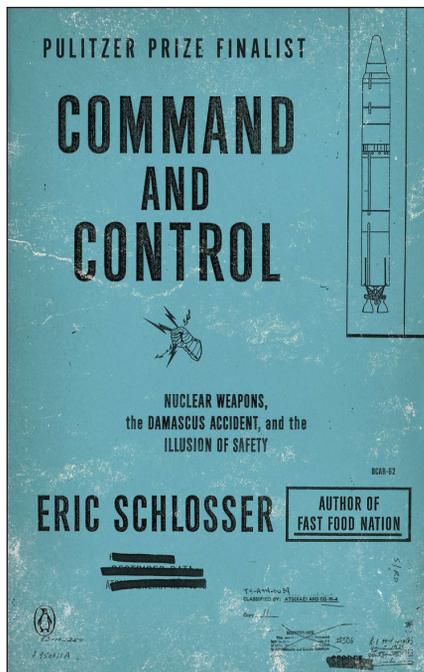
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How fortunate has mankind been that despite frequent and numerous mistakes, accidents, and misfortunes of varied kinds, we have never experienced an unplanned nuclear detonation either within the borders of the United States or in a foreign land that is over-flown with U.S. nuclear weapons or where they are stored? Damned fortunate indeed. Eric Schlosser admits that weapons safeguards have worked. But flaws in the system continue to exist. Nuclear weapons professionals have devoted and endangered careers fighting to point these flaws out. But here we are with nuclear weapons still on hair trigger alert; still reducing response, communication, and decision-making time to dangerously short periods that argue for a nuclear disaster and the creation of a “future history making event.”

Schlosser emphasizes the narrow margin we have traversed between disaster and self-preservation. It's the story of the battle between advocates of weapons safeguards and those who believed anything that slowed or undermined weapons response times was unnecessary and potentially detrimental to the nation's defense. It's also the story of the occupational dangers faced by U.S. Air Force personnel who routinely confronted aircraft crashes, fires,



hazardous fuels, and chemicals all involving or in close proximity to nuclear weapons. *Command and Control* is a historical journey covering the nuclear near misses and missed opportunities to safeguard weapons, from their inception to the present day. Schlosser's narrative includes the major nuclear weapons personalities from the past seven or so decades—dipping occasionally into their own personal historical accounts to yield their perceptions of nuclear weapons deployment, use and meaning. A message about the U.S. government's and in particular the military's lack of transparency about the dangers maintaining, securing, transporting, and flying missions with nuclear weapons becomes most obvious in the book's epilogue but is part and parcel of Schlosser's chronicle throughout. This secrecy and the associated

misinformation spawned the concentration of weapons decision-making power into the hands of the very few. The by-product of this policy and the lack of public scrutiny exacerbated the problems associated with nuclear weapons safety.

The book is also the story of U.S. Air Force personnel confronted with a disaster in the making at an underground Titan II missile complex a few miles outside of Damascus, Arkansas, USA. This story of young men and their superiors emphasizes the everyday occupational dangers they faced working with lethal fuels in remote underground silos compounded and magnified by the presence of the most powerful destructive force on the planet. Damascus was an unprecedented accident in 1980 that resulted in an explosion that popped a nuclear warhead out of its silo and fortunately caused only two Air Force personnel fatalities—all started by a fuel leak that was initiated by a dropped wrench during a scheduled maintenance call. This deftly personalizes the danger of nuclear weapons, putting the reader inside the silo with the men struggling with twentieth-century technology to understand and respond to the alarms and signals that confusingly indicated the potential for a lethal chemical explosion in the midst of nuclear weapon.

An investigative reporter who needs to reach a lay audience about a complicated a technological and domestic policy issue such as nuclear weapons is confronted with a mighty challenge. But Schlosser's writing is outstanding.

It is easy-going and sincere yet carefully crafted to be personal and human. He very effectively conveys the cataclysmic danger of the many formerly unknown or untold nuclear weapons mishaps. This is multi-layered storytelling. Schlosser periodically pokes into the Damascus arc throughout the historical narrative that focuses on other worldwide nuclear near-accidents and the geopolitics that prevailed at the time. The result: history becomes the landscape against which the Minuteman disaster is painted. But that landscape is itself so very rich and textured. It is replete with the important personalities who made nuclear history and the weapons policies that they championed. It runs deep with the efforts of those who perceived the fine line between nuclear catastrophe and nuclear security. It is in short a book about heroes and those driven by their convictions. Although there are many personalities—so many that one may need the twenty-page index and the “cast of characters” list he provides at the start of the book to occasionally reference them, the reader can feel empathy for all of those who battled the cultural intransigence of the military in a quest to prevent a nuclear cataclysm. These are not all well-known names. They were weapons lab engineers who recognized the safety vulnerabilities but whose voices were largely ignored—men like Bob Peurifoy and Bill Stevens of Sandia National Laboratories and their Los Alamos colleague, Harold Agnew. Here too the reader encounters the mission-driven and better known military leaders such as General Curtis LeMay and his successor General Thomas Power, both of whom were driven to create and strengthen the ultimate bulwark against Soviet nuclear attack—the nuclear-armed Strategic Air

Command and who sought to thwart any delay, compromise, or subversion of its mission to utterly destroy the enemy.

As we move through the post war decades, Schlosser uncovers and describes in horrifying detail the many accidents that nearly brought the nuclear house down. He describes everything from totally inadequate guarding of nuclear bombs in Europe (literally chain link fences and a single guard), all-consuming fires on nuclear laden B-52 bombers, and safety kill switches in bomber cockpits that were but the single barrier between arming a weapon or not. Delivery of the weapons was everything. In the years before and just after ballistic missiles were developed, bombers played pivotal roles in nuclear weapons conveyance. Yet, they repeatedly crashed (on the order of once every 20,000 hours of flight time), endangering not only their crews who readily accepted risk as part of their jobs but also U.S. citizens and allied populations who made no such covenant. These aircraft had been designed in an earlier time and not for carrying nuclear weapons. But they routinely toted nuclear weapons in and around friendly territory.

The Palomares, Spain, incident in 1966 is perhaps the most famous of these accidents. Four hydrogen weapons were spilled from the guts of a B-52 when the bomber bumped a refueling plane and broke apart on a flight from North Carolina to Spain’s southern coast. Three weapons were recovered quickly—the fourth required weeks to find in the half-mile deep Atlantic including two attempts to bring it to the surface. Plutonium was spilled from two of the bombs when they crash landed to earth necessitating an expensive clean-up and the shipment of 30,000 cubic feet

of soil to Aiken, South Carolina, USA, for burial. Despite the mitigation effort, the U.S. and Spanish governments denied that the plutonium posed a health threat. When it was said and done, the Pentagon had endured two and half months of bad press and the Spanish government prohibited the U.S. to fly nuclear weapons in its air space. Many other perhaps less famous but nearly as deadly accidents abound in Schlosser’s account. Schlosser describes another refueling mishap nearly as riveting as the Damascus incident. With its crew attempting to bale (two of the four perished in the crash), nearly every safety feature save one failed. Had this final ready/safe switch been in the wrong position, a four-megaton bomb would have deposited lethal fallout on Washington DC, Baltimore, Philadelphia, and New York City, and this not three days after President Kennedy’s inaugural speech vowing to “pay any price...to assure... the success of liberty.” And thus, this book is also about the courage and sacrifice of the dedicated military people who faced deadly circumstances routinely, flying missions in World War II aircraft, in support of the continuous airborne alert policy of General LeMay’s Strategic Air Command—often with deadly circumstances and too often a hair’s breath away from a domestic or allied nuclear catastrophe.

The story is also about dedication, persistence, and inquiry, perhaps no better personified than by the unheralded efforts of Fred Ilke, a RAND analyst who began a thorough investigation of the possibilities of accidental and unauthorized nuclear weapon detonations. His 1958 report, “On the Risk of an Accidental or Unauthorized Nuclear Detonation,” was the first well-researched independent



analysis of nuclear weapons safety in the U.S. It concluded that the risk wasn't negligible. It was exacerbated by the technical challenges of nuclear weapons and plagued by human error and possibly even sabotage. The risk of accidental war might have been low, but an accidental detonation might prompt an adversary to retaliate in mistaken conclusion that an attack had begun. The report coincided with the initiation of SACs airborne alert program. Spawned by the launch of Sputnik that instigated fear of ballistic missile attack and championed by General Power, it meant B-52s in flight around the clock carrying nuclear weapons. Keeping a portion of the air force in flight at all times meant that a missile attack could not destroy them all. But it also meant the probability of a nuclear detonation over friendly territory would rise.

Schlosser did not shy away from describing the engineering aspects of nuclear weapons. This is a book for popular consumption but he achieved a good balance between techno-babble and well constructed prose. Readers will be interested in the technology surrounding Minuteman silos, weapons firing systems, and weapons safety mech-

anisms, "common mode failures" and the "one-point safe" concept. Prompted by the development of sealed pit boosted tritium weapons, the concept of one-point safety meant essentially, that in an accident, an implosion of the weapon material would not occur thus preventing a nuclear disaster. When revealing the difficulties the responder to the Damascus incident faced, Schlosser does an outstanding job describing the pre-computer era technology that added to their misfortune. Explanations of the lack of adequate radio-communications, the cumbersome 1980s era personnel protective gear and the inability to properly analyze the conditions inside the compromised silo are handled deftly. A diagram of an underground Titan II missile complex accompanies his well-informed account.

Schlosser's book is a Pulitzer Prize finalist selection and it shows. He has taken a complicated subject and placed into a form for an easy and agreeable read. It is the type of book that once started is difficult to put down. Nuclear scientists of all disciplines and specialties will find it more than informative. They will find it engaging. As a bonus,

Schlosser provides recommendations for background reading on the subject in his nearly 100 page notes section. This is supplemented by a twenty-nine-page bibliography.

Human beings are imperfect. They miscalculate. They make poor judgments. They make mistakes. Yet Schlosser tells us, not one of the 70,000 nuclear weapons that the U.S. built has ever detonated by mistake. The supporting policies and safeguard technologies have worked thus far. However, as the author understates in his final chapter, even one accidental detonation would be "unacceptable." The long development of successful nuclear weapons management in the U.S. saw many mishaps and narrowly averted catastrophes over the past seventy years. Nations seeking nuclear weapons should think again about acquiring them. If Schlosser's book has any message beyond the shortcomings of human performance it is that perfection of nuclear weapons command and control is absolutely and unremittingly required—but in no uncertain terms is such vigilance eternally guaranteed.