MICHIGAN WAR STUDIES REVIEW
MiWSR.COM

2015–020

Patrick Coffey, *American Arsenal: A Century of Waging War*. New York: Oxford Univ. Press, 2014. Pp. 328. ISBN 978–0–19–995974–7.

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The purpose of *American Arsenal* is threefold. First, to illustrate "the unplanned nature and the unintended consequences of America's military transformation" (5); second, to "tell the story of America's military evolution from isolationist state to super-armed superpower" (front cover flap); third, to tell "the story of how the novice nation [United States] ... became the superpower of today" (Oxford Univ. Press publicity release). Unfortunately, the book fails in all three of these purposes.

The book consists of fifteen vignettes/chapters, each telling a story about a different weapon. Author Patrick Coffey, a physical chemistry professor,[1] has not attempted to provide a comprehensive narrative of the rise of the United States as military superpower: "The transformation—from isolationist state to superpower—has been unplanned, undesired by many, and enormously expensive.... The change is too large for a comprehensive history, and this book describes it selectively" (4). The vignettes are meant to demonstrate that "All history is selective, this book more than most" (5). Consequently, the vignettes are mostly disconnected, apart from reflecting Coffey's special interest in chemical and nuclear weapons and airpower. Five deal with nuclear weapons and their delivery systems, three with chemical weapons, and the rest with various other weapons. But, beyond airpower, no common theme is apparent.

The strength of the book lies in its clear explanations of the complex technical details of weapon systems. Its readers will learn just how poison gas and nuclear weapons were developed and functioned. Although Coffey offers adequate discussions of the controversies that surrounded each weapon, his knowledge of history in general and military history in particular appears to be limited.

Beyond the absence of an overarching theme, several serious historical flaws mar the book. Discussing why Britain considered using poison gas in World War II, Coffey states that "During the period between the fall of France and Pearl Harbor, Britain stood alone against the Axis" (150). But the Soviet Union and Greece were fighting the Axis before December 1941, and Britain had the support of several of its former colonies—Canada, Australia, New Zealand, and South Africa, among others.

Writing of the "sorry state" of the American military in 1950, Coffey claims that "Without a military draft, the quality of enlisted volunteers was poor" (176). But the United States *had* a draft in 1950. The author also contradicts himself when he states that "The American public got its first look at smart bombs on January 17, 1991" (272), after writing twenty pages earlier that, when President Richard Nixon increased bombing in North Vietnam, the "New laser-guided 'smart' bombs allowed American bombers to strike targets that had been inaccessible in Johnson's Rolling Thunder campaign four years earlier" (252). In addition, though he discusses the United States' attempts to develop smart bombs during the World Wars and its use of German scientists like Wernher von Braun after the Second World War, he does not count the Germans' V-1 and V-2 rockets, used *during* the war, as smart weapons.

Coffey's unfamiliarity with military history is painfully apparent when he misleadingly states that "Military technology has always been important, but the outcome of nineteenth-century wars did not depend on new weapons being developed while the war was under way" (3–4), seemingly oblivious of the fact that most nineteenth-century conflicts between industrialized nations after the Napoleonic Wars were rather short. The exception was the US Civil War, during which the development of, for example, the new ironclad ships by both the Union and Confederacy had a major impact on the war. Although the Confederacy lagged

1. Presently a visiting scholar in the Office for History of Science and Technology at the University of California, Berkeley. He is also the author of *Cathedrals of Science: The Personalities and Rivalries That Made Modern Chemistry* (NY: Oxford U Pr, 2008).

in this area, it did develop and deploy torpedoes (mines) to limit the reach of Union ironclads. In addition, the North's innovations in breech-loading and repeating rifles gave some federal units a distinct advantage over opposing Confederate forces. Another novel weapon that had an effect, though not a decisive one, was the submarine (CSS *H.L. Hunley*) the Confederacy built in hopes of breaking the Union blockade.

Coffey also neglects the concept of technological uncertainty. Philip Scranton[2] has convincingly argued that "normal technology" shifted after World War II to one reliant on continual experimentation and innovation. This had many implications for military contracting in the United States, including unreliable cost estimates and constant redesigns, with resultant operational and political uncertainties. Coffey should have addressed in some detail this critical aspect of post-World War II technological development.

Too often, the author makes sweeping, unsupported claims that seem to reflect only his own personal beliefs. He states, for instance, that Gen. Curtis LeMay "was World War II's most influential air commander" (6), simply omitting both US Gen. Henry "Hap" Arnold and British Marshal Sir Arthur "Bomber" Harris on the Allied side, and Reichsmarschall Hermann Göring on the Axis side.

Turning to post-World War II history, Coffey asserts that "nothing short of nuclear weapons would have made the North Vietnamese abandon their goal of a unified Vietnam" (250), but cites no statements whatever by North Vietnamese leaders to that effect. He also maintains that "Even though SDI [Strategic Defense Initiative] was impossible and enormously expensive, no president could just say 'Never mind' and walk away" (268–69). However, SDI is, in fact, becoming more technically feasible. At one time, many scientists doubted that a nuclear bomb could be created. Who is to say that SDI will never be achieved?

The most grievous oversimplification (of far too many) in this book is Coffey's contention that the transformation of the United States from isolationist state to superpower was inevitable (4). This ignores the strong internal opposition to the United States joining NATO and to the implementation of the Marshall Plan. The rise of America to military hegemony seems inevitable only in hindsight.

In summary, then, despite *American Arsenal*'s superb, lucid discussions of the creation and operation of modern scientific weaponry and profiles of the men and women who built them, its many historical errors prevent me from recommending it to either specialists or interested lay readers.

2. In "The Challenge of Technological Uncertainty," *Technology and Culture* 50 (2009) 513–18.