

22 years of flying. The airframes were not made of stealth materials; there was no simplified GPS navigation. There were no “smart bombs”; however, a later mission did employ AGM-45 Shrike missiles against Argentinean air defences. Vulcan 607 carried twenty-one 1,000-pound general-purpose bombs, struck the Port Stanley Airfield from 10,000 feet and employed its H2S radar to guide the munitions toward their target.

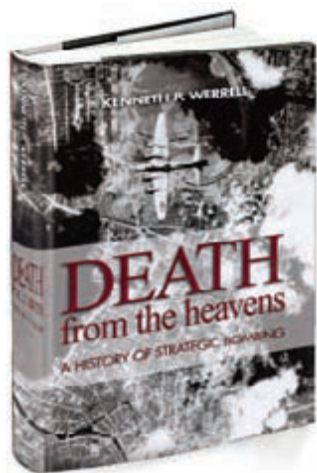
Included with the book are numerous useful maps, diagrams that explain the in-air refuelling plan as well as technical drawings and specifications for the main aircraft involved in the mission. Finally, two full-colour sections of photos give the reader plenty of companion material to consider and enjoy while reading

this history. Overall, very well researched and well supported with firsthand interviews and accounts, White’s *Vulcan 607* makes both an interesting and enjoyable read for those interested in either the Falkland Islands War or the late cold war air power era in general. ■

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Notes

1. The nickname given to the Royal Air Force’s 617 Squadron.



**DEATH FROM THE HEAVENS:  
A HISTORY OF STRATEGIC BOMBING**

BY KENNETH P. WERRELL

ANNAPOLIS:  
U.S. NAVAL INSTITUTE PRESS, 2009  
332 PAGES ISBN 978-1-59114-940-8

Review by  
Dr. James R. McKay

**D** *Death from the Heavens* is another work by the well-known scholar of air power, Dr. Kenneth Werrell. Some of Werrell’s other works include studies on ground-based air defence, air power in the Korean War, cruise missiles and strategic bombing. Werrell graduated from the United States Air Force Academy in 1960 and flew WB-50 Superfortresses (weather reconnaissance variant) before obtaining his MA and PhD from Duke University.

The book is unusual. First, one would not normally expect the Naval Institute Press to publish a work devoted to a topic that has been the *raison d’être* for the existence of a number of the world’s air forces. This will be discussed in greater detail later in the review. Second, the author stated that this was the result of a career’s worth of research on aviation history with a focus on the United States Army Air Forces (USAAF) and United States Air Force (USAF). This could lead one to draw

the conclusion that this might be his final work. Last, the book is devoted to answering the question of whether strategic bombing has fulfilled its promise; is it decisive in winning wars and why?

Werrell addresses the perpetual definitional issues surrounding air power and strategic bombing early in the book. He uses a very inclusive definition for the term “air power,” stating that it would “. . . include all uses of air vehicles as well as missiles and space vehicles . . .”<sup>1</sup> This conveniently focuses on the use of the aerospace medium as opposed to more parochial definitions, which set the stage for some of the later chapters. Interestingly, he uses a negative definition for the term “strategic bombardment”:

It is neither tactical operations, the attack of enemy troops (close air support), nor interdiction, the attack of enemy supplies that sustain the troops. Instead, strategic bombardment strikes the enemy’s homeland, bypasses its armed forces, and directly hits the source of its power, be it physical targets, such as war industry (munitions’ plants, for example, economic targets (fuel, transportation, or electricity), or psychological targets (the enemy’s civilian morale).<sup>2</sup>

This definition relies on the combination of the attacker’s intent and the nature of the target set to delineate between the tactical and strategic. This is a useful definition given the stated purpose of the book—to test the promise of decisiveness in war.

Werrell deserves praise for his methodological honesty. He notes early in the work that the sections on non-American air forces, such as the Royal Air Force (RAF), the *Luftwaffe* or Soviet Air Force, relied on secondary sources, whereas the Americans relied largely on primary sources. This is reasonable given that he had a much greater degree of access to archives in the United States than he would have overseas. The methodological candour is tied to the admission that the work focuses

largely on the American experience as opposed to others. While some might object to this, given the history of strategic bombing, the most prolific practitioner over time has been the United States.

The book traces the evolution of the ideas, technology and application of both to the practice of strategic bombing. While objectionable to some, the coverage of the well-trodden territory of the early history of flight in a work devoted to strategic bombing is necessary to maintain the continuity of the relationship between the ideas and technology. Werrell makes this point well in the early chapters by tracing the development of the early air raids in the First World War, such as the Zeppelin raids or efforts to strike at Germany. Due to the technological limitations on range and the ability to deliver ordnance accurately to targets, the majority of the so-called strategic bombing efforts were tactical in nature. Yet the idea of strategic bombing survived and came to be encapsulated in the doctrines of at least one air force in Europe.

The interwar years saw the growth of aviation, rapid development of technology as well as the transmission of persistent beliefs about strategic bombing (i.e., the effect on civilian morale). Werrell implicitly argues that the interwar experience made the larger campaigns of the Second World War possible. This argument was subtly presented, but was clear nonetheless; the transition over time to larger metal monoplanes increased the range and payload of bombers and this came at the same time as the ideas of various advocates of strategic bombing came to light.

Werrell devotes the majority of the book to the Second World War and separates the experiences of the major air forces (the *Luftwaffe*, the RAF, the USAAF in Western Europe [as part of the Combined Bomber Offensive] and the USAAF in the Pacific Theatre) into specific chapters. The reason for the focus on this period is that it represents the application of strategic bombing in a period of total war

and places the various efforts into context. For example, Werrell describes the *Luftwaffe's* efforts as “puny” and is right to do so given the relative tonnages of bombs dropped by the *Luftwaffe* (78,000 tons) compared to the combined efforts of the Allies’ air forces (1.4 million tons).<sup>3</sup>

Like a number of others, Werrell treats the British (and by default, the Commonwealth) and Americans in conjunction despite their different approaches to strategic bombing. He reserves judgement on the effectiveness of either campaign until he discusses both, and then the Combined Bomber Offensive. He notes that while strategic bombing efforts have been described as “decisive” in other fora, he argues that the primary, but not the only, contribution was to focus the *Luftwaffe's* efforts on air defence and ultimately destroy it, thus removing one of the key enablers of German combined arms warfare on land.<sup>4</sup> He argues that the sheer costs in aircrew and planes means that strategic bombing proved to be a war of attrition in the skies over Western Europe, and ultimately did not support the promises of its advocates.

He then proceeds to examine the strategic bombing campaign in the Pacific Theatre. This, he argues, was more indicative of what strategic bombing could achieve, but this was due to specific conditions. For example, the nature of Japanese urban construction and planning made them vulnerable to the effects of incendiary bombing, the Japanese air defences were not as extensive as those in Germany, and the effects of the blockade against Japan all made the country more vulnerable. The primary and secondary effects of bombing were more significant as a result. Werrell is careful to state that it was more “efficient,” but does not state that it was effective, in contrast to the USAAF’s official history. His argument is simple: Japan was a case where the country became demoralized as a result of the strategic bombing.<sup>5</sup>

The next chapters in the book focus mainly on the effect of technological developments like the transition from propeller-driven bombers to

jets and/or missiles, with some discussion of the conflicts in Korea and Vietnam. Werrell raises the argument that a series of technological developments effectively blurred the distinctions between tactical and strategic activity in the air. A number of innovations coincided to change the nature of strategic bombing, such as atomic weaponry, radar, jet propulsion, and air-to-air refuelling. The last two had the greatest influence by enabling global reach and signalling the death knell of propeller-driven bombers. After the Korean War, jet propulsion became the standard for bomber aircraft and Werrell spends a significant amount of time in the book discussing various development programs and efforts.

The chapter on Vietnam is a useful yet succinct treatment of the furtive and more deliberate American attempts to deal with North Vietnam through strategic bombing. Of greatest interest are comments about the two *Linebackers*. First, he argues that *Linebackers I* was primarily an interdiction campaign, and while successful, it was not necessarily strategic.<sup>6</sup> Second, *Linebackers II* was not as successful as normally described given the number of relatively limited objectives and the number of American casualties, of which the majority were due to advancements in ground-based air defence weaponry.<sup>7</sup>

The author spends the rest of the book on technology. While he could be excused for this due to a succinct yet detailed treatment of the topic, the omission of even a short discussion of attempts at strategic bombardment through missiles during the Iran-Iraq war is somewhat of a gap. His final chapter is the most interesting. While he addresses the end of the cold war and its effects, he also discusses John Warden’s theories and their application during the 1991 Gulf War. He discusses the post-cold war era briefly to illustrate the importance of air power in a series of crises, but the choice of term is critical. Where there were some attacks against strategic targets, these were not cases of strategic bombing and this may augur for the future of the practice.

The conclusion addresses the question posed earlier in the book. Thoughtfully and understanding his potential audience, Werrell seeks to ask if the idea of strategic bombardment had been put to a “fair test.” He argues that this only occurred in the Second World War, as it was the last “total” war. The results, however, cast doubt on the idea of wrecking morale and the applicability of the economic node theory. He concludes by noting that despite the series of technological advances, strategic bombing has not delivered on the promises of its advocates. The reasons for this, he argues, are political restraint and inadequate intelligence. This suggests that Werrell believes that strategic bombing would work best in conditions of little restraint and significant intelligence effort, hence his observation on total war. The key to victory, he argues, was air power’s ability to be flexible and adapt to a series of constantly changing situations.

Overall, the book is definitely worth reading to get a holistic view of the ideas and varying means by which strategic bombing has been carried out. The discussion of technological matters is much stronger than the discussion of the ideas and given the author’s previous works, this is hardly surprising. The balance of both is useful, and as Werrell himself notes, there are far fewer cases available of the practice

of strategic bombing by which to assess the promises. A fair judgement is only obtainable through the full story of the ideas, the technology and their application over time. Werrell provides us with a great view of all three. ■

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RAF	Royal Air Force
USAAF	United States Army Air Forces
USAF	United States Air Force

### Notes

1. Kenneth Werrell, *Death from the Heavens: A History of Strategic Bombing*, (Annapolis: Naval Institute Press, 2009), xv.
2. *Ibid.*, xv.
3. *Ibid.*, 127.
4. *Ibid.*, 125.
5. *Ibid.*, 153.
6. *Ibid.*, 220.
7. *Ibid.*, 224.