

How Carriers Fought: Carrier Operations in World War II

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are useful practical exercise solutions, a wargaming “gateway exam,” and an insightful set of eight wargame case studies.

Overall, this is an excellent primer on the science and art of war games: what they are, what they are not, and what they can provide—when properly designed and executed. Please read, mark up, refer to often, and aggressively employ *The Craft of Wargaming*, and thereby build better commanders, leaders, planners, and staffs.

DONALD J. THIEME



How Carriers Fought: Carrier Operations in World War II, by Lars Celandar. Havertown, PA: Casemate, 2020. 281 pages. \$22.95.

Lars Celandar is passionate about aircraft carriers. He loves writing about aircraft carriers; he loves explaining how aircraft carriers work; he loves thinking about aircraft carriers and posing sometimes esoteric questions about aircraft carriers. As a result, reading *How Carriers Fought* is a bit like being at a party and bumping into a guest who cannot wait to share his most enthusiastic passion. As the conversation continues, you may be impressed by the speaker’s passion, knowledge, and insights, but eventually the talk turns to arcane debates and hypotheticals. In the end you may walk away feeling enlightened, or you may feel that you now know rather more about the topic than you ever wanted.

Celandar’s book takes a comprehensive look at most aspects of carrier warfare in World War II. He does not focus exclusively on U.S. carriers and their Japanese counterparts, although not surprisingly the carrier battles of the Pacific dominate the discussions.

However, if a nation put a carrier to sea, that carrier is at least mentioned.

Part 1 of the book is devoted to carrier operations. Technical issues and developments—for example, fighter direction, arresting gear, and ship-to-plane communications—are examined. There even is a paragraph devoted to the humble flight-deck tractor, which, as U.S. aircraft grew heavier, became more and more important to flight-deck operations. Operational and tactical concepts such as defense in depth using fighter combat air patrol and the anti-aircraft capabilities of escorting ships are looked at in some detail.

Some of the explanations Celandar provides will be exceptionally useful to the lay reader. As an example, the vital question of cycle times is explained in some depth. This includes a description of why crash barriers were essential to allowing some navies to conduct simultaneous takeoffs and landings.

Operations and battles are the key ingredients of part 2. The author begins with the early missions of scouting and raiding, then looks at the Battles of the Coral Sea, Midway, the Eastern Solomons, the Santa Cruz Islands, and the Philippine Sea; Leyte Gulf is the last examined. This section also includes a look at Operation PEDESTAL, in which a Royal Navy, multicarrier force escorted a convoy across the Mediterranean to Malta in August 1942. Although Celandar claims he takes a new look at these conflicts, it is unlikely that knowledgeable readers will find anything that is truly original or new. This is not to say that the accounts are not useful or illuminating, for there are interesting facts, such as the difficulties U.S. dive-bombers had with their bombsights and windshields fogging up.

It would appear that Celandier had the most fun writing part 3, in which he looks at the evolution of carrier warfare. His engineering background shines forth as he takes the reader through a series of comparisons. Was concentration or dispersion of carriers more effective? What was the proper mix of bombers and fighters? One of Celandier's more intriguing speculations pairs a lone battleship against a lone carrier. The author concludes that, by the later phases of the war, the odds were with the battleship; however, he acknowledges the very great unlikelihood of such an encounter ever occurring. While this may seem an esoteric question, Celandier is just getting started.

Celandier spends significant time examining the effectiveness of seaborne antiaircraft guns. At several points he reminds readers that American efforts to develop reliable proximity fuses were extraordinarily expensive yet disappointing in their results. He also looks at the effectiveness of large-caliber guns when deployed against aircraft. After painstaking analysis, Celandier concludes that the U.S. Navy would have been served far better if every five-inch gun mount had been removed from carrier escorts and replaced with quad 40 mm mounts. As the solution to an interesting thought experiment, the effort is convincing, but this is, in the end, an exercise performed on something like the famous frictionless plane of physics. A battleship's or cruiser's secondary batteries had more to do than just provide antiaircraft fire; in a surface action, the five-inch batteries would engage in direct combat with enemy ships, in addition to providing illumination. During shore bombardments the same batteries would provide a wide variety of explosives

to handle a spectrum of targets. The quad 40 mm gun well may have been the best surface-based aircraft killer in the inventory, but that was not the five-inch gun mount's only job.

The book concludes with something of a hodgepodge of topics. Celandier comes out in favor of armored flight decks and single hangar decks. He suggests that carrier air wings of the future should be composed of drones and manned aircraft, and those manned aircraft should be subsonic turboprops along the lines of the Super Tucano. He also concludes that in application John R. Boyd's "OODA loop" is more useful than Alfred Thayer Mahan's principles of naval warfare.

With all that said, Celandier does the reader at least one tremendous service. His meticulous accounting illuminates the very great risks that naval aviators took and the extreme losses they endured, particularly American pilots during the first two years of the war. Technological limitations and operational realities all too often resulted in these young men being expended like flesh-and-blood ammunition. Their willingness to accept long odds and their dedication in performing their missions represent one aspect of carrier operations during World War II that never should be forgotten.

RICHARD NORTON



In the Claws of the Tomcat: US Navy F-14 Tomcat in Combat, 1987–2000, by Tom Cooper. Warwick, U.K.: Helion, 2021. 80 pages. \$29.95.

As a junior officer in the U.S. Navy's F-14 Tomcat community, I routinely heard three explanations for why the