

the three early jet engines, call signs of the early experimental aircraft, biographical information about the main proponents, comprehensive notes that provide additional background to each chapter, and a superb bibliography for further reading. Individuals interested in the early history of the turbine engine should definitely add *The Jet Race* to their libraries. I am sure they will read it more than once.

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Rockets and People, vol. 1, and **Rockets and People: Creating a Rocket Industry**, vol. 2, by Boris Chertok. NASA History Office (<http://www.hq.nasa.gov/office/pao/History/index.html>), 300 E Street SW, Washington, DC 20546, 2005, 402 pages, \$42.00 (hardcover) (vol. 1); 2006, 669 pages, \$25.00 (hardcover) (vol. 2). Available free online at <http://history.nasa.gov/SP-4110/vol1.pdf> and <http://history.nasa.gov/SP-4110/vol2.pdf>.

In this initial two-volume set, Boris Chertok chronicles Soviet air and space development through approximately 1960, drawing on his six decades of experience as one of Moscow's foremost air and space engineers, engaged in nearly all major projects. The National Aeronautics and Space Administration plans to publish volumes three and four (concerning Moscow's space program in the early-to-mid 1960s and the moon shot in the late 1960s, respectively) in 2008–9. Translated from the original Russian (published in Moscow as *Rakety i lyudi*, 1994–99) and substantially revised, the series is edited by noted space historian Asif Siddiqi. In these volumes, Chertok offers unique historical insights and documentary references, many previously unavailable in the West, thus giving the reader penetrating views into an era in which “rocket-space technology became one of the determining factors in the politics of the leading nations” (vol. 1, p. 8).

In one interesting revelation, Chertok writes that China is not the only nation to have conducted a live test of a nuclear warhead atop a missile (as suggested in *Thread of the Silkworm*, Iris Chang's biography of Qian Xuesen, the father of China's missile program, p. 222). A decade earlier, on 2 February 1956, the Soviet Union fired a nuclear-armed R-5M missile 1,200 miles to create a nuclear explosion near the Aral Sea (vol. 2, p. 284). Chertok later recounts a proposal, fortunately abandoned, to “deliver an

atomic bomb to the Moon and detonate it on its surface” (vol. 2, p. 440).

Volume one covers Chertok's early career, including his assistance in relocating Soviet aeronautical infrastructure to the Urals to avoid Nazi attacks and his assessment and extraction of Nazi rocket expertise in postwar Germany. He recounts early Soviet development of aviation, which Stalin regarded as a critical industry in the 1930s and renewed support for during World War II. Chertok acknowledges that despite this prioritization, many important Soviet military leaders did not fully appreciate the military significance of rockets and aircraft at the war's outset. Later they reversed their position and inhibited space developments, fearing that they interfered with the progress of weapons systems.

Volume two details Chertok's return to Moscow in 1946 to fulfill Stalin's charge to develop a missile program and his subsequent role in establishing Baikonur Cosmodrome in Kazakhstan. Chertok also records the development and launch of such satellites as Sputnik (in 1957) and of lunar and interplanetary probes. In addition to these successes, he acknowledges such failures as the R-16 rocket explosion in 1960 that killed Marshal Mitrofan Nedelin, head of Soviet strategic missiles, and scores of top engineers. Throughout volume two, Chertok recounts relations with former boss and chief designer Sergey Korolev, long recognized as having led the Soviet space program until his untimely death in 1966. The author offers probing insights into the political system that facilitated Nazi Germany's cutting-edge missile advances, which in some ways actually helped Hitler lose World War II by diverting resources from the development of aircraft and atomic capability.

Some will undoubtedly disagree with Chertok's views concerning many critical issues of his time, particularly his somewhat utopian characterization of technocratic policies as a panacea and of Soviet militarism as primarily a reaction to provocative American policies. In Chertok's assessment, Moscow “won the nuclear missile race, but lost the moon race” (vol. 1, p. 27). The latter point will meet with little disagreement in the West, but his insistence that “according to some indicators, we passed the United States in terms of nuclear missile armaments” (vol. 1, p. 27) seems insufficient to support the former statement, given Moscow's inability to sustain funding for its inefficient military-industrial complex. Chertok arguably exaggerates the benefits of centralized technological development in iso-

lation from the West, insisting that his country “by the end of the 1970s . . . had the strongest technocratic elite in the world” (vol. 1, p. 7). He minimizes unduly the contributions of German engineers to Soviet rocket development—German V-2 technology was essential to the Soviet Union, just as it was to the United States. Many veterans of the Apollo program would also differ with Chertok’s assessment that the structure of Moscow’s centralized design bureau was superior to Washington’s private-contractor system, which “wasted weeks coordinating complex issues between companies and drawing up protocols” (vol. 2, p. 513).

Nevertheless, Chertok is to be commended for his frank acknowledgement of many of the Soviet Union’s shortcomings, such as those of its political system. These included the terrible cost of purges, stifling ideological repression, censorship of key technological knowledge, falsification of rocket-reliability figures, and systematic suppression of even the most talented Jewish technocrats under Stalin: “Even scientific problems that were far removed from politics and ideology, such as matters of rocket stability, could acquire political overtones” (vol. 2, p. 64). Later, even under Khrushchev, a major supporter of rocket development at the expense of aviation, superficial space spectaculars were prioritized, often with unrealistic deadlines, and “the fate of intercontinental . . . missiles was decided at such a high governmental level and at such a low scientific and military technical level” (vol. 2, p. 236).

At the same time, Chertok’s minute detail helps explain not only the failures engendered by the Soviet system but also the many air and space successes. Specialists striving to understand why China has yet to emulate Soviet development of manifold, relatively sophisticated indigenous weapons systems will notice (1) Moscow’s significant human and natural resources, which it harnessed—particularly following World War II—in the development of a massive scientific, technical, and industrial infrastructure; (2) the postwar emergence of a generation of technocrats with formidable prestige and power to administer this prioritized establishment; and (3) following Khrushchev’s courageous de-Stalinization efforts, the relative protection of the best Soviet minds from repression and turmoil—provided that they did not, like foremost nuclear physicist and later Nobel Peace Prize-winning dissident Andrei Sakharov, seek political change. Of particular note are the significant financial and material incentives provided to the

best Russian experts and even the German specialists who initially served them. Chief designers such as Korolev not only were authorized substantial bonuses by the Council of Ministers but also were empowered to confer modest cash awards on subordinates.

Despite the staggering amount of data conveyed, Chertok’s numerous technological analogies and vivid anecdotes make for lively, accessible reading. He thus succeeds in his mission to document the contributions of a cadre of Soviet men and women to humankind’s initial steps into the heavens, despite great turmoil and trials back on Earth. While it is tragic that communist policies prevented many of these talented and dedicated individuals from being recognized internationally during their own lifetimes, Chertok has ensured that their legacies will not be lost to history.

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George C. Marshall: Rubrics of Leadership by

Stewart W. Husted. Army War College Foundation Press and Stackpole Books (<http://www.stackpolebooks.com>), 5067 Ritter Road, Mechanicsburg, Pennsylvania 17055-6921, 2007, 300 pages, \$23.95 (hardcover).

Prof. Stewart Husted’s book on George C. Marshall is a college leadership textbook based on the general’s life. The “architect of America’s Victory” in World War II, Marshall served as secretary of state and, later, secretary of defense. His plan to rebuild Europe after World War II earned him the Nobel Peace Prize in 1953.

The general’s long and successful career includes many examples of leadership. Drawing on Marshall’s life, Husted selects between four and nine rubrics of leadership for each of the 11 chapters of the book. The 71 rubrics offer excellent material for initiating class discussions.

Such discussions could emphasize Marshall’s life or some of the more current historical events mentioned in the book. Students could apply and debate the American traditions of military leadership that Husted covers, such as courage, self-discipline, integrity, civilian control of the military, and the importance of military members taking a nonpartisan view of political issues. The author includes both positive and negative examples from Marshall’s career so students can discuss and learn from his successes as well as mistakes.