BOOK REVIEWS

THE CONSEQUENCES OF NUCLEAR PROLIFERATION

Utgoff, Victor A., ed. *The Coming Crisis: Nuclear Proliferation, U.S. Interests, and World Order*. Cambridge, Mass.: MIT Press, 2000. 319pp. $22.95

The Coming Crisis is a series of essays by noted scholars in the field of national security affairs examining the effects of continued nuclear weapons proliferation and the potential for regional nuclear crises. While one can argue that use of nuclear weapons by a rogue state today is more likely than it was during the Cold War, discussion of what the United States could and should do if deterrence fails has been noticeably absent in recent years. The authors revive this discussion and, in doing so, contribute significantly to the study of proliferation.

The first half of the book addresses the underlying pressures that cause states to consider acquiring and potentially employing nuclear weapons. It makes the case that there are many reasons why a state may develop nuclear weapons, reasons that may have only a peripheral relationship to security issues. A highlight of this section is Caroline F. Ziemke's essay on the strategic personality of Iran. She asserts that the behavior of a "rogue state" often has roots in national myth. These nations may not be as unpredictable and as roguish as we might surmise at first glance.

The second part of the book consists of five essays that examine how nuclear crises might develop between the United States and a regional nuclear power, and what the consequences might be. Stephen Peter Rosen and Stephen M. Walt each examine the impact of proliferation on alliances and coalitions, but they come to contradictory conclusions. Barry R. Posen conducts a hypothetical analysis of a Gulf War with a nuclear-armed Iraq. His conclusion is that, faced with such a crisis, the United States should not and probably would not hesitate to intervene to defend vital interests.

Two essays focus on what the United States might do following a first use by a regional aggressor. George H. Quester argues that a U.S. response in such a case would be driven more by American norms of law enforcement than by Cold War theory. Quester believes that criminals are punished for four distinct reasons: to disarm, to make an example, to impose revenge, and to reform. He states that once a regime with a modest nuclear capability has used nuclear weapons, it will be seen as "too dangerous to live

with . . . but not too dangerous to defeat."

Similarly, Brad Roberts discusses regional nuclear war termination, arguing that the United States would have not only to address the immediate problems presented by the war but also to ensure that longer-term U.S. interests were served by "winning the peace" that follows. The United States has to avoid being perceived as a "nuclear bully" whose power must be counterbalanced, but neither can it come off as a "nuclear wimp," unwilling to confront an aggressor. Instead, the course of action chosen must show the United States to be a responsible and just steward of the international good.

In the concluding chapter, Victor A. Utgoff contends that in response to a regional nuclear threat the United States would likely be far more resolute than others have suggested and would likely respond in kind to a first use of nuclear weapons by an aggressor. He concludes with a number of policy implications.

The fundamental premise of this book is that sooner or later the proliferation of nuclear weapons is going to lead to a confrontation between the United States and a nuclear-armed state. While there are many points of disagreement between the authors, all concur that such a confrontation will be a seminal event and will define not only the role of nuclear weapons but also that of the world's only superpower in the post–Cold War era. All students of national security policy owe it to themselves to consider the policy implications of this premise. *The Coming Crisis* will be valuable to them.

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Lavoy, Peter, Scott Sagan, and James Wirtz, eds. *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons.* Ithaca, N.Y.: Cornell Univ. Press, 2000. 270pp. $45

The title says it all. This book is a compilation of empirical and analytical data on the strategic evolution of nuclear, biological, and chemical (NBC) agents and weapons in the twenty-first century. A central theme of the book is how new regional players (states and nonstate actors) are likely to convert prevalent conventional military doctrine and training into nonconventional means of warfare. The book is very ambitious in its scope; it attempts—overall, successfully—to address systematically conceptual problems in the integration of such weapons into the military infrastructure, delivery systems, command and control procedures, and war plans. More importantly, the editors and the authors of the various case studies utilize a theoretical framework to explain and predict future trends of behaviors, intentions, and capabilities among very diverse players. Realism and neorealism, organizational theory, and culture are used to flesh out these unique differences in approach as well as in the implementation of NBC programs and doctrines.

Except for the conclusion and the chapter on terrorism, the chapters are case studies, focusing on Iraq, Iran, Israel, India, Pakistan, and North Korea. The authors are specialists who devote a great deal of effort to describing the relationship between strategy and policy, on one hand, and between national security and national military strategy, on the other. The result is a complex web of relationships, behavioral manifestations, and decision-making processes involving an amalgam

of scientific, bureaucratic, and military institutions and forces. In the chapter on Iran, for example, Gregory Giles eloquently argues that Iran was reluctant on moral and religious grounds to use chemical weapons during the first few years of the Iran-Iraq War (1980–87) but that its policy changed abruptly as a result of rising Iranian casualties and fear of Iraqi chemical-warfare preponderance. Hence, realism became key to explaining the Iranian NBC doctrinal shift after 1987. Although Iran ratified the Chemical Weapons Convention within a few months of its coming into force, Iran has opted to pursue a clandestine NBC program. Such weapons are the subject of intense debate within the increasingly factionalized, institutionalized, and secularized Iranian political elite today. This has given rise to "multiple actors playing roles in a key strategic program[,] . . . [ensuring] that there will be continued bureaucratic competition for resources, missions, and influence." More significantly, such competition has far-reaching political, economic, and military implications, associated primarily with command and control mechanisms. Israel (a chapter by Avner Cohen) and India (by Waheguru Pal Singh Sidhu) also utilize NBC secrecy and ambiguity to enhance their conventional deterrence capabilities—Israel to keep its Arab adversaries off balance and to avoid American nonproliferation pressure, and India to keep China, not Pakistan, in check. Pakistan (Zafar Iqbal Cheema), however, apparently sees the development of its NBC program as a necessity—not a choice—because in the "absence of conventional security alternatives and nuclear security guarantees . . . [such] weapons were viewed as a necessary counter [to] a perceived threat from India."

The chapter by Jessica Stern analyzes the dynamics of terrorism in the twenty-first century. She argues that the potential for nonstate actors to acquire, develop, deploy, and use NBC weapons is growing. Stern may be correct in her concern. Yet, although there is a precedent, in that terrorist groups such as the Japanese Aum Shinrikyo have used such devices, there is no hard empirical data to support a sustained argument that terrorists will be going the NBC route, at least in the near term. Terrorism has become complex indeed; acquiring, assembling, deploying, and using NBC agents does not mean that the selected device will be *workable* or *effective*. Moreover, the cost of embarking on such a program for terrorist causes will almost certainly outweigh the benefits. Terrorists, at least for now, will continue to opt for conventional weapons, albeit at more sophisticated and lethal levels. There is evidence, however, of more credible linkages between terrorism and technology, and between terrorism and international finance.

Ultimately, one cannot escape the fact that among the newly emerging NBC players there is a diversity of doctrines and command structures. This will admittedly make it harder to predict possible political and military outcomes; more significantly, it means that the NBC genie cannot be put back in the bottle. Will the current U.S. debate on the Strategic Missile Defense Initiative exacerbate this already volatile situation?

If there is one criticism to make of this book, it is that it sometimes suffers from a lack of consistency in terms of units of analysis under examination (nuclear, biological, and chemical agents vary remarkably in scale of effects, timing, etc.); some essays weigh more heavily on one agent at the expense of the others.

Comparative analysis should instead generalize, with rigor, about similarities and differences with respect to *common* phenomena. This book is, however, a valuable addition to the complex body of literature on strategy, national security, and comparative political and military dynamics.

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Mauroni, Albert J. *Chemical-Biological Defense: U.S. Military Policies and Decisions in the Gulf War*. Westport, Conn.: Praeger, 1998. 226pp. $59.95

Although we lived with the dangerous specter of nuclear attack for more than fifty years during the Cold War, concerns about the proliferation of weapons of mass destruction (WMD) have virtually exploded into our consciousness in the past decade. Since the demise of the former Soviet Union—once referred to as our "malefactor partner in the concept of mutually assured destruction"—our fears seem to focus far less on the threat of nuclear holocaust, and more on the threat of attack by chemical or biological agents. The logical point of departure for this shift in focus seems to be the Persian Gulf War, when the world learned of a rogue nation seemingly bent on proliferating these weapons of mass terror.

In this book, Albert J. Mauroni attempts a historical recounting of U.S. efforts to deal with chemical and biological warfare agents on the modern battlefield. Mauroni, a former U.S. Army Chemical Corps officer who currently works as a management consultant specializing in Department of Defense chemical and biological defense programs, provides a detailed look at what was essentially a "cold start" go-to-war effort on behalf of the U.S. armed forces. The consistent premise throughout this work is that no one in the Department of Defense (with the exception of the Army's Chemical Corps) was even remotely prepared for an encounter with chemical or biological agents as it readied for war with Iraq. Convinced at the onset of Operation DESERT SHIELD that Saddam Hussein would indeed use WMD against U.S. and coalition forces, the Pentagon began what Mauroni describes as a "mad scramble" to train and equip U.S. forces to operate in the presence of WMD agents. He reviews the preparation to defend against exposure to these agents, and assesses U.S. efforts to protect its forces against a highly lethal asymmetrical threat. In addition, Mauroni devotes a chapter to the issue of "Gulf War illness," providing a fairly meticulous and forthright discussion of this controversial subject. He concludes with substantive recommendations on where the future focus of U.S. efforts to deal with the burgeoning threat of chemical and biological agents should lie. At a minimum, Mauroni's work at dissecting the policies and decisions of the Gulf War is important if only as a lesson that the United States must never again be so fundamentally ill prepared to operate in the asymmetrical environment.

There are criticisms to be made of this book, however. At the surface level, Mauroni uses far too many acronyms for the book to be easily decipherable for the non-Army (and especially nonmilitary) reader. Although he includes a list of abbreviations at the beginning to assist with the veritable "acronym soup" of abbreviations, it becomes confusing and tiresome to refer back constantly to a

glossary to understand what one is reading.

Additionally, Mauroni's use of the term "chemical-biological" can lead one who is uneducated in the specific characteristics of chemical and biological agents to believe that there is no readily discernable difference between the two types of WMD agents. In reality, there is nothing farther from the truth. Chemical and biological agents are so different in their properties and potential effects on the human physiology that discussions about countering or mitigating their effects should remain separate. By consistently lumping them together, Mauroni gives the reader the impression that the measures taken for defense and consequence management against chemical-agent exposure will be essentially the same as those for coping with a biological threat.

Of greater concern, however, are statements made by the author in the first chapter. He describes his purpose in writing the book: "Only if CB weapons were used on civilians and population centers would they truly be 'weapons of mass destruction.' On the military battlefield, these weapons, shorn of the ridiculous air of menace given to them by politicians and the media, are merely another tactical-operational factor like enemy air attacks or unforeseen terrorist attacks; military forces can and do take steps to minimize the effects of chemical-biological contamination. If a military force invests a small amount of time and funds in planning, defensive equipment and training, the immediate threat of mass casualties is avoided, and chemical-biological weapons become merely 'weapons of mass *disruption*' [his italics] instead of destruction."

I find these comments both naïve and dangerously out of touch with the reality of WMD agents, and certainly contradictory to U.S. efforts at counter-proliferation throughout the Department of Defense. Although we have taken steps to deal with the possibility of chemical exposures among our operational forces (which should be construed as tactical events in the scope and scale of their effects), calling a biological agent a "weapon of mass *disruption*" ignores its potential for strategic impact. The World Health Organization (which currently offers the most widely accepted casualty estimates for biological agents) predicts that the United States could incur more than 250,000 casualties in a targeted population of 500,000 from only fifty kilograms of weaponized anthrax; such an event could hardly be usefully characterized as a "disruption."

There are other places where the reader may take exception to Mauroni's statements—most notably, his comment in chapter 3 that in 1990 the "official U.S. policy was to reduce the likelihood of enemy chemical weapons use by threatening retaliation with similar munitions." The United States never considered the use of chemical weapons in the Gulf War, since it had long before decided not to use chemical weapons as retaliation in kind. The author's footnote in chapter 4 regarding the requirement for a company of bakers to augment a medical unit is flatly derogatory to the medical professionals who did so much to ensure that health-protection measures were in place during the Gulf War. His claim that the medics were ill trained and ill prepared to deal with contaminated casualties since "these practical issues had never surfaced in the minds of the medical community" is patently false. Several hundred volumes published since the First World War deal with the medical

handling of chemically contaminated casualties.

In the end, this work comes off as not much more than a "*hoo ah*" for the Army Chemical Corps, who are billed as having redeemed the Department of Defense's collective ineptitude with respect to chemical or biological attack. While Mauroni does offer an accurate overall accounting of the Army Chemical Corps's efforts to deal with the asymmetrical threat of chemical and biological agents on the battlefield, he gives little more than a passing nod to the overall efforts of the other services and their collective attempts to counter or mitigate this omnipresent threat. Readers familiar with the subject of WMD should be cautioned that there is much with which to find exception in this work. Readers unfamiliar with the subject should be careful not to conclude that the capabilities of the Department of Defense are so uniformly one-sided.

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Khalilzad, Zalmay M., and John P. White, eds. *The Changing Role of Information in Warfare*. Santa Monica, Calif.: RAND, 1999. 452pp. $25

Is there need for yet another book on the role of the military in the information age? To judge by this volume, a collection of essays published under RAND's Project Air Force, the answer is yes—but this may be twice the book we need. In this case, more than enough is not necessarily better.

The Changing Role of Information in Warfare is part of RAND's Strategic Appraisal series, and it primarily addresses the effects of information technology on American military planning and operations. The fifteen chapters provide a useful review of the dangers and opportunities that information technology presents to U.S. military forces. While originally intended for the Air Force, the work should interest a wider professional audience, especially because it includes a broad spectrum of views, ranging from techno-optimists to info-war pessimists.

The editors are well regarded authorities: Zalmay Khalilzad is a former assistant deputy under secretary of defense for policy planning, and John White is a former deputy secretary of defense. Many of the articles were written by well-known writers on strategy and information warfare, and the foreword is by Andrew W. Marshall, Director of Net Assessment, Office of the Secretary of Defense; he is considered by many to be among the foremost thinkers in the U.S. government on future threats and strategies.

However, roughly half the articles cover ground familiar to anyone who has been following the discussion in recent years about the importance of information in warfare and the dangers of computer warfare. These chapters might be useful, for example, to someone looking for a review of the various ways computer hackers can disrupt military operations. But because so much has been written on this constantly changing topic, the more technical chapters do not cover much new territory and are already slightly outdated.

The chapter on information-age terrorism, for instance, warns that future terrorist attacks may take the form of "cybotage" aimed at information infrastructure. This may be true, although it hardly is a new idea; moreover, so far in the information age, old-fashioned terrorism remains dominant, as the attack on the USS *Cole* reminded us.

Similarly, the chapter on U.S. strategic vulnerabilities discusses the tentative steps being taken at the national level to deal with the information warfare threat—but it has been dated by more recent efforts at information warfare defense, including the Clinton administration's National Plan for Information Systems Protection, published after this book went to press.

Luckily, only about half the book discusses the familiar territory of information systems and technology. The second half examines many of the broader questions involved in how the U.S. military is adapting to the information age.

One of the best chapters is "The American Military Enterprise in the Information Age." The late Carl H. Builder argues that the most important effect of the information revolution may not be the application of technology to existing missions but the need for the military to adapt to, and find, new and different missions.

For Builder, it appears that the American military's "enterprise"—its primary purposeful activity—is no longer (if it ever was) to "fight and win our nation's wars." Deterrence and forward defense will not play the central roles they did in twentieth-century conflicts, he speculates, so the military may find itself reduced to providing constabulary and expeditionary capabilities, while keeping the military arts and sciences alive for the future.

Jeremy Shapiro takes a skeptical approach to the entire concept of an "information revolution." He argues that the information age is not producing the sort of wholesale change we would expect from a revolution, either in military affairs or in society at large. He cites the work of Stephen Biddle and others who have described the "productivity paradox"—the idea that the outlays for information technology have not as yet led to the increases in productivity that would be expected in a social and economic revolution.

If the change is not revolutionary, Shapiro argues, the U.S. military should not hasten to make radical organizational or other changes. He quotes approvingly Eliot Cohen's observation that the creation of a corps of "information warriors" today might make as little sense as would the creation of a corps of internal-combustion warriors in the last century.

A chapter by Stephen T. Hosmer offers a welcome look at psychological operations (PSYOP), an important aspect of information warfare that is usually neglected by all but the U.S. Army. Army PSYOP advocates may not like what they read here, however. Hosmer argues that although psychological effects are indeed vital, history shows that actual PSYOP efforts are not nearly as effective in reducing the enemy's will to fight as are well-planned combat operations. Standard measures of psychological warfare effectiveness, such as the numbers of enemy surrenders and desertions, do not correlate directly with the intensity or quality of PSYOP efforts but closely reflect the nature of combat operations.

Military commanders can best produce catastrophic disintegration of enemy resistance, Hosmer writes, not through leaflets and loudspeaker broadcasts but by sustained, weeks-long air and artillery attacks combined with deliberate efforts to deprive the enemy of food, and ultimately with ground operations aimed at exploiting the enemy's weakened morale. His advice may appear obvious, but it suggests that commanders may be paying too much attention to technical PSYOP efforts and not enough to the psychological

effects of combat operations. In addition, his research seems to suggest that sustained, well-planned strikes may be more important than the sudden mass attacks designed to produce "shock and awe" that are heralded by many network-centric-warfare advocates.

Additional useful chapters review the ethical considerations arising in information warfare and examine whether or not such mechanisms as arms control and export regimes can apply to information warfare technologies. An article by Francis Fukuyama and Abram N. Shulsky reviews the lessons (familiar to a Naval War College audience) that the military can learn from business in adapting to the information age.

One minor complaint—the book does not offer biographical sketches of the contributors. A few pages devoted to that information would be more useful than the largely unnecessary listing of abbreviations and acronyms. Overall, this collection is useful, but a better introduction to many of these concepts is found in an earlier RAND work by John Arquilla and David Ronfeldt, *In Athena's Camp: Preparing for Conflict in the Information Age* (1997) [reviewed in the Spring 1999 issue].

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Szayna, Thomas S. *Identifying Potential Ethnic Conflict*. Santa Monica, Calif.: RAND, 1998. 329pp. $25

Since 1989, the U.S. military has been involved in a number of intrastate conflicts integrally related to ethnicity. These ethnic conflicts have been devastating to those involved; the conflicts contributed to regional destabilization; and they have been assumed to breed international terrorism. Most saliently, they have virtually destroyed the hope of peace benefits that were predicted to accrue at the end of the Cold War.

The intelligence community was tasked by the State and Defense Departments to provide explanations for ethnic conflict. Indications-and-warning systems were to be developed and used to alert policy and military decision makers to impending crises. It was assumed that good analysis and prediction would contribute to policies and practices designed to prevent, manage, or contain ethnic conflict and thereby minimize damage to international peace and stability. A number of studies were conducted internally or were outsourced. The task was apparently, but deceptively, simple—produce a predictive model of ethnic conflict. The criterion for a successful model was equally simple—did it work? That is, did the model provide more information of a critical nature than could be provided by country experts, and was it available in a timely fashion?

Identifying Potential Ethnic Conflict is the public report of research sponsored by the deputy chief of staff for intelligence of the U.S. Army. It was produced by a group at the top level at RAND Corporation in Santa Monica, California.

The stated purpose of the project was to help the intelligence community order its thinking about the logic and dynamics of ethnic conflict and to systematize information-collection requirements. The authors did not provide a comprehensive explanation of ethnic conflict but attempted to answer the questions of how ethnic mobilization occurs and under what conditions it leads to violence.

The research was based on the assumption that reliance on static indicators and simple statistical correlation (as found in many other models) did not adequately account for change. Change was assumed to be the political mobilization of "ethnic factors used to aggregate and articulate group grievances." Political mobilization was assumed to be found in changes between and among groups in economic, political, and social spheres of life activities. In other words, they were looking for specific changes in the relationship between group and state that could signal future conflict.

Three stages were identified: Potential for Strife, Transformation from Potential to Likely Strife, and From Likely to Actual Strife. The potential for strife was identified in processes associated with closure, that is, the reification of group boundaries, the strengthening of "us-them" thinking. The transformation from potential to likely strife—critical to the conceptual framework—was found in the mobilization of ethnic-political identity influencing the balance of power between a group and the state. This transformation was assumed to be found in factors associated with emerging leadership, mobilization of group resources, and a series of "tipping" events (similar to the "trigger mechanisms" found in other studies). Change from likely to actual strife occurred through an interactive strategic bargaining process; this was portrayed by assessing the group preferences and capabilities of the state and the contending ethnic groups, presented in tabular form. The model was then applied to Yugoslavia, South Africa, Ethiopia, and Saudi Arabia.

The best part of the model is its focus on change and process. The authors probably have that right—most ethnic groups, under most conditions, live in relative peace and harmony; changes in relationships are generally associated with competition and conflict under conditions of relative scarcity. But, however good this assumption, the model was not adequately developed to test the hypothesis on a variety of cases. The variables, as discussed in this publication, were very general; they need further specification and elaboration. The four case studies, which purported to apply the model, were written by situation experts. They are very informative and make good reading. Nevertheless, the writing seemed to reflect the authors' expertise and perspectives as much as any application of the model.

If, then, the goal was to provide a model that could apply statistical methodology to comparative data and thereby contribute to predicting future ethnic conflicts, it was not accomplished. Most of the conclusions seemed drawn from the analyses provided by RAND's experts and not produced by the operationalization of the concepts or an application of the model to the four cases. Perhaps because this was a public document, the actual data lies elsewhere and the model has greater specificity and applicability than appear in this short text.

The critical test of any model is whether it works—whether it provides more predictive power than an informed observer. In this case, it is hard to say, because as the authors note, "the model needs further specification and elaboration." This will not be the final book on ethnic conflict.

As the consultants' favorite saying goes: "Progress has been made, but further research is necessary."

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Swaine, Michael D., and Ashley J. Tellis. *Interpreting China's Grand Strategy: Past, Present, and Future*. Santa Monica, Calif.: RAND, 2000. 283pp. $20

Michael Swaine, author of the outstanding *The Military & Political Succession in China* (1992), and his fellow RAND analyst Ashley Tellis have written a very good book about Chinese security in both historical and future perspective. It will certainly be of interest to the policy community, as it should be to all who work on Asian security.

Swaine and Tellis define grand strategy as a country's "basic approach to political-military security." China's grand strategy seeks to preserve domestic order, defend against external threats, and eventually attain "geopolitical influence as a major, and perhaps, primary state." These bland objectives become vibrant when viewed in historical context—many centuries ago, with strong leadership and domestic order, China dominated the region not only, or even primarily, militarily but also in cultural, political, and economic ways that elicited deference and reduced the need for military capability. Subsequent periodic weak leadership and domestic disorder reduced China's ability to resist persistent threats from beyond its long, vulnerable border and diminished its political strength, so China has been united as a single entity under Chinese rule for only about half of the last 1,800 years. Today, China is pursuing a pragmatic strategy that emphasizes "the primacy of internal economic growth and stability, the nurturing of amicable international relations, the relative restraint in the use of force combined with increasing efforts to create a more modern military, and the continued search for asymmetric gains internationally" (e.g., entrance into the World Trade Organization as a developing, rather than developed, economy). Assuming that no catastrophic revisions of this strategy are forced on China, Swaine and Tellis expect it to continue through 2015–2020, which they identify as the minimal time frame in which the Chinese economy and military might develop sufficiently to allow China to become globally preeminent. If this strategy is not derailed (and that is a major if), Swaine and Tellis argue, there are three plausible long-term scenarios: that China becomes domestically chaotic, internationally cooperative, or internationally assertive, perhaps to the point of global preeminence. Where the United States is the hegemon today and for the foreseeable future, China may seek to be the hegemon some decades hence.

Swaine and Tellis focus on hegemony based on economic and military power. However, as China may know from its earlier experience as a hegemon in East Asia, there is more to it than economic and military power. The United States became hegemonic in the West after World War II, when it possessed both economic and military power, and an attractive liberal ideology that provided profound economic and social benefits. It led a coalition against a militarily powerful, ideologically expansionist Soviet Union; when the Soviet Union collapsed, in part because its ideology was not functional in practice and its empire was held together by force, the United States found itself with a global stature of nearly hegemonic scope. Since 1991, U.S. ideology has reduced the opposition by other countries against the United States that might have been expected had the order it represents relied on military and economic power alone. While many voices, some in Mandarin, complain about U.S. hegemony, it provides a robust and

functional order in which states like China can develop in reasonable peace. Though it may not want to acknowledge the fact, China benefits from the hegemony of U.S. order, and from its enforcement by American naval and air power.

Unlike the United States after World War II, China does not appear to offer a globally compelling ideology; in the absence of such an ideology, increasing Chinese power and assertiveness may frighten countries to resist China by generating power internally or externally. Internal power might take the form of developing nuclear weapons. Most likely, external balancing would take the form of intensified ties with the United States, though Taiwan, Vietnam, and India all might have reasons to become better acquainted with each other; even a weak Russia might contribute to a China-constraining coalition. Increases in Chinese power—if only for defensive purposes, like looking after China's energy interests abroad—might lead to resistance, because no country could be sure that Chinese intentions would not change. Counterbalancing would likely become more intense if China were to seek to move from regional hegemony to "geopolitical preeminence on a global scale." The absence of an adequate consideration of such "balancing" may be the most significant weakness in this book. However, this is an impressive study of China's grand strategy, and it is worthy of serious examination.

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Woolley, Peter J. *Japan's Navy: Politics and Paradox, 1971–2000*. Boulder, Colo.: Lynne Rienner, 1999. 166pp. $49.95

In 1971 James Auer published *The Postwar Rearmament of Japanese Maritime Forces, 1945–1971*, "a book that [was] meant to challenge certain assumptions surrounding post–World War II Japan and its military, in particular its maritime forces." Thirty years later, in post–Cold War Japan, some of those same suppositions persist. Of particular note, beliefs that Japanese rearmament is an American initiative, that Japan seeks only to provide for its own internal security while the United States is responsible for all external threats, and that militarism is returning to Japan, result in conflicts within Japan and among its Asian neighbors.

To many, the U.S.-Japan alliance both protects Japanese security interests and provides the cork that keeps Japanese militarism in the bottle. To students of Asia, the alliance follows a natural evolution resulting from the congruence of interests of two maritime nations as Japan reasserts its regional influence. To the prescient, the U.S.-Japan alliance is the bedrock for stability in a region rife with competing interests, developing conflicts, and unresolved animosities.

Peter Woolley, a professor of comparative politics at Fairleigh Dickinson University, has studied and written extensively on Japanese maritime development. He has written the next volume in this continuing story of Japan's defense-system evolution, masterfully picking up where Auer left off. Woolley provides a concise analysis of the Japanese Defense Forces' role in a world awakening to the transitional peace of the post–Cold War era.

His focus is an examination of the development and potential of the Japanese navy in the context of the U.S.-Japan Defense Security Alliance.

Rising from the ashes of World War II to become a legitimate regional power, Japan has developed the "second most powerful naval force in the world's largest ocean." This has led the United States and others to press Japan to contribute more to the security of the democratic and free-trading world, while its neighbors closely watch for signs of militarism that would signal resurgent nationalism and imperialism.

Through comparative analysis, Woolley presents the development of the Japan Maritime Self-Defense Force (JMSDF), and the Japan Self-Defense Forces (JSDF) generally, in decision-making models developed within each of the book's seven chapters. He sees the efficacy of Japan's military might and fear of its potency as catalysts that will awaken the long-dormant Japanese aim for regional hegemony and dominance.

Woolley begins by examining the cultural implications of the expanding role of the JMSDF, followed by the institutional dimension of the legal constraints imposed by the Japanese constitution on JSDF activities. In subsequent chapters, he traces the impact of strategic purpose on the development of these forces as Japan accepted the role of defending its sea-lanes out to one thousand miles. Woolley follows with an examination of the domestic and international implications of Japan's expanding capabilities and operations as it sent minesweepers to the Persian Gulf in 1991, and how the incremental changes in Japan's defense policy over the last three decades resulted in tacit international and domestic acceptance of its participation in peacekeeping operations. Woolley concludes with a valuable discussion of Japan's changing defense posture and its relevance to aiding the United States in protecting shared vital interests in Asia.

Well researched and meticulously documented with an extensive bibliography, this book is an excellent reference for anyone wanting to understand Japanese defense policy and the forces that affect it. However, it is more than a book about the development of the JMSDF in the last three decades. It is also about the development of Japan's national defense policy and the forces that move Japanese policy makers. It is a concise treatise that effectively uses maps and tables to help the reader understand key points.

Thus, the reader should be cautioned that the title of this book does not accurately convey its value as an examination of the strengths and weaknesses of the Japanese defense forces—not just the JMSDF—nor does it suggest the richness of the author's analysis of Japanese policy making. This book provides much more, and it can serve as an excellent resource for gaining insight into the most important bilateral relationship of the United States.

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Lavell, Kit. *Flying Black Ponies*. Annapolis, Md.: Naval Institute Press, 2000. 376pp. $32.95

Flying Black Ponies is an effective combination of combat narrative, squadron history, and personal memoir, telling the story of Light Attack Squadron 4 (VAL 4, or the "Black Ponies"), a naval aviation squadron stationed in the Mekong Delta

during the Vietnam War. During most of the war, the U.S. Navy made an intense effort with its Mobile Riverine Force to interdict enemy arms and supplies that flowed, primarily from Cambodia, across the Mekong Delta into the area surrounding Saigon. Kit Lavell's book is a readable account of the Black Ponies' important role in this hazardous interdiction campaign.

The Mekong Delta is not an easy place to conduct any type of military operation. It is a lush, steaming, tangled waterscape of swamps, soggy plains, and rice paddies crisscrossed with thousands of miles of rivers, streams, and canals. The canal-interdiction war in the Mekong was limited in 1968 in part by the inability to sustain close air support. The "Swift boats," river patrol boats, SEAL teams, and the overstretched squadron of Navy attack helicopters (HAL 3, or the "Seawolves") that were already in place clearly needed assistance. The new Commander, Naval Forces Vietnam, Vice Admiral Elmo R. Zumwalt, Jr., decided that air firepower was needed that could reach station quickly and remain there for several hours. The Black Ponies became operational in the Mekong during April 1969 in order to give fixed-wing aircraft punch, mainly with five-inch Zuni rockets, to the fight for control of the strategic river delta.

The book follows VAL 4 from its commissioning in San Diego, in January 1969, until its last mission and decommissioning in April 1972. The narrative also contains useful summaries of Navy tactics in the Mekong Delta, briefly describing MARKET TIME, GAME WARDEN, SEA LORDS, GIANT SLINGSHOT, DUFFLE BAG, ACTOV, and other operations in which the Black Ponies were involved. Lavell also weaves numerous other elements of the squadron's experiences into his account. Lavell was one of the Black Pony pilots, flying 234 combat missions in the OV-10 Bronco aircraft during his tour with VAL 4. He effectively describes the frustration of being at the very end of the line of the Navy's support and supply organization in Vietnam, and of dealing with rear-echelon staff administrators. He also pays deserved tribute to the enlisted maintenance and ordnance crews who worked long hours in the heat and humidity to keep the squadron aircraft safely airborne and armed. He portrays the sometimes humorous and somewhat disrespectful escapades of junior officers, particularly as the pullout from Vietnam neared in 1972.

Most importantly, however, this book is about the pilots of VAL 4 and their combat experiences. In three years of flying in the Mekong Delta, the squadron compiled a unique and impressive record. The Black Ponies' ability to "scramble" when the Riverine Force made contact with the enemy continually resulted in direct air-ground firefights. The combat action is sharply drawn, evoking the tension, complexity, and confusion of delivering air strikes, especially in close proximity to friendly forces on the ground. When strikes took place at night and in bad weather (which they often did), the descriptions are even more harrowing. Several of the stories of the aerial fighting are effectively paired with personal memories of the same engagement by other personnel involved—river patrol boat crews, SEAL teams, and Riverine Force troops on the ground.

As Steven Coonts notes in his foreword, *Flying Black Ponies* can be read as a characteristic example of the way America fights its wars. Coonts describes the volunteers that fought the air war—young men of

blue-collar or decidedly middle-class background, mostly from farms or small towns. Their story is an important one, and the first-person accounts of individual sacrifice and aircrew heroism are a needed addition to the narrative of the Navy's nearly forgotten war in the Mekong Delta.

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Gentile, Gian P. *How Effective Is Strategic Bombing? Lessons Learned from World War II to Kosovo.* New York: New York Univ. Press, 2001. 273pp. $36

The issue of strategic bombing's effectiveness is vitally important to political and military leaders. U.S. Air Force doctrine has argued for decades that airpower's ability to operate directly and immediately at the strategic level of war is its unique and defining characteristic—a characteristic that must be exploited. Many disagree, so the debates have been long and heated.

Gian Gentile, a serving Army officer, now adds to the literature on this important subject. Unfortunately, he never really comes to grips with the key issue of effectiveness implied by the title of his book. Rather, he has chosen to replow some old ground, looking anew at the U.S. Strategic Bombing Survey (USSBS), chartered by President Franklin Roosevelt to examine and report on the effects of strategic bombing in World War II. Measuring bombing's effectiveness and examining the workings of the USSBS that studied bomb effects are two different things.

The story of USSBS has been told before. In many ways it is a typical tale of wartime America. A need is identified, resources and personnel are mobilized, vast amounts of energy and material are expended, and notable gains are achieved. At the same time, the path to success is not a straight line—there is much inefficiency, debate, and compromise. Sausage is being made.

Gentile does not contest the findings of USSBS. Indeed, virtually no one has attempted to do so in the five-plus decades since they were released. The reason is simple: no one has the time, stamina, resources, or expertise to review the mountain of data collected and analyzed by the thousand individuals who conducted the USSBS.

Instead, Gentile seeks to discredit the survey's findings by revealing flaws and inconsistencies in the survey itself. Primarily, he argues that Army Air Forces (AAF) leaders were so interested in forming a separate air force after the war that they induced bias into the USSBS. He is unable to make this charge stick. The survey was led by noted industrialists, bankers, economists, lawyers, and other professionals, most of whom had had little or no direct involvement with aviation prior to their work with the survey. Gentile admits that General Henry "Hap" Arnold, the AAF commander, stressed to these civilian leaders the need for objectivity, impartiality, and truth in the survey's findings. Yet he treats such admonitions as duplicitous, despite the statement by the USSBS head that "at no time has there been the slightest inclination to interfere with us."

In truth, it is difficult to imagine that men like John Kenneth Galbraith, Paul Nitze, and George Ball could have been manipulated and pressured to distort their findings. Common sense and logic tell us it is more likely that these men—and their hundreds of colleagues on the survey— examined thousands of

documents, interviewed hundreds of witnesses, visited scores of bombed sites, and then concluded that strategic bombing had indeed been a decisive factor in the Allied victory, as they reported.

Alas, such a conclusion is unacceptable to Gentile. He must find nefarious schemes and schemers, and so he repeatedly questions the motives and veracity of the participants. For example, when General Curtis LeMay testified before Congress that he did not believe airpower could "win the war" and that a balanced mix of land, sea, and air forces was necessary for victory, Gentile dismisses his statement as a "shrewd and bureaucratically astute" tactic to manipulate his civilian superiors.

The USSBS has been controversial ever since it was written. Small wonder—attempting to measure the effects of strategic bombing in World War II was a massive undertaking, conducted at a time when the techniques of systems analysis were in their infancy. Gentile finds it troubling that survey members were not in total agreement. This should hardly come as a surprise. If the unfolding of historical events were simple and uncontested, our libraries would be far smaller.

His concluding chapter, dealing with the survey that analyzed the air campaign of the Persian Gulf War, is less tendentious. Here again, however, the author presents little that is new, and, more importantly, he does not attempt to address the book's ostensible focus—the efficacy of strategic bombing.

Measuring the effectiveness of strategic air attack is one of the greatest challenges facing military planners today. It is an enormously complex and difficult problem that defies easy solution. Yet as airpower becomes increasingly dominant as a foreign-policy tool, such measurement is essential. This poorly reasoned and highly parochial book will not help us find answers to that pressing need, nor will it foster understanding among the services.

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Jordan, Robert S. *Norstad: Cold War NATO Supreme Commander—Airman, Strategist, Diplomat*. New York: St. Martin's Press, 2000. 329pp. $49

Lauris Norstad was a major Air Force leader during the defining years of the Cold War, and except for Dwight Eisenhower, he was the most prominent of all the Supreme Allied Commanders Europe (SACEUR) since that position was established in early 1951. Surprisingly, up to now, nothing definitive had been written on his role as SACEUR. Robert Jordan, a professor at the University of New Orleans and an authority on Nato, has filled that gap.

Norstad grew up in a small town in Minnesota and graduated from West Point in the class of 1930. Transferring to the Air Corps in 1931, he was one of that relatively small group of regular-officer aviators who provided air force leadership during World War II. When the war began, Major Norstad was serving on an air staff in Washington, D.C. He came to the attention of General Henry "Hap" Arnold, who headed what had become in June 1941 the Army Air Forces. In 1942 Arnold established a select group of young officers, the brightest he could find, to work in his immediate office. Norstad was one of them—he was on the way up.

That summer Arnold sent Norstad to England to serve as operations chief of the Twelfth Air Force—Eisenhower's air arm for Operation TORCH, the November 1942 invasion of North Africa. In his war memoir, Eisenhower had this to say about Norstad: "[Norstad was] a young air officer who so impressed me by his alertness, grasp of problems, and personality that I never thereafter lost sight of him." Before long, Brigadier General Norstad was operations chief for the Allied Air Forces Mediterranean. In the fall of 1944, Arnold returned Norstad to Washington, D.C., as chief of staff of the Twentieth Air Force, charged with planning the strategic bombing campaign against Japan. By war's end, Major General Lauris Norstad, though not one of the top combat heroes of the Army Air Forces, was definitely one of its top comers.

From the end of World War II until the Korean War, the leadership of the reduced American armed forces struggled with new questions. Two of the most important were the role of nuclear weapons and how the U.S. military should be organized. With Eisenhower serving as chief of staff of the U.S. Army, and Norstad his deputy for operations (G-3), Norstad was involved in both issues, particularly in developing the compromises that led to the 1947 legislation resulting in the National Military Establishment, and ultimately to a separate Department of the Air Force. Subsequently, Lieutenant General Norstad, operations chief for the Air Force, played a major role in organizing the Berlin Airlift during the crisis of 1948–49. In the fall of 1950 he became commander of U.S. Air Forces Europe. The main focus of Jordan's book concerns Norstad's subsequent twelve years of service in Europe, in particular the last six, when he served as SACEUR.

The author analyzes in detail three major issues confronted by Norstad that were most significant: the role and employment of nuclear weapons in alliance defense, the Berlin crises of 1958–59 and 1961–62, and the problem of balancing SACEUR's roles as both an international and an American forces commander.

The nuclear weapons issue was complicated by the fact that the British had their own weapons, the French wanted theirs, and the West Germans, having none, were not quite certain they would be fully defended if the alliance had no recourse other than nuclear war. As Jordan demonstrates, Norstad was an able diplomat who succeeded in developing an alliance consensus on the role of nuclear weapons in deterring the Soviet Union.

Since Berlin was inside the Soviet-occupied zone of Germany, it became an ideal location for the Soviets to apply pressure on the alliance—by denying, or threatening to deny, access to the city. Though the issues were extremely complex, in a clear and interesting fashion Jordan explains Norstad's role as diplomat and strategist in meeting Nikita Khrushchev's challenge.

It is in his examination of SACEUR's conflicting roles as an American and simultaneously an international commander that Jordan makes his major contribution. This issue came to a head for Norstad with the arrival of the Kennedy administration in 1961, with its secretary of defense, Robert Strange McNamara. The substantive issue was the nature, role, and control of nuclear weapons as an element of Nato strategy. The process issue was that the administration found it hard to accept SACEUR's dual role, tending to

view Norstad as an American commander only. The details cannot be developed within the confines of a review, but in the end Norstad was forced to walk the plank—though the final jump was delayed for a period of two months by the administration's need for his assistance during the 1962 Cuban missile crisis.

Robert Jordan has produced an important work that is thoroughly researched, nicely written, and most insightful. No doubt it will be the definitive biography of Lauris Norstad—Cold War airman, strategist, and diplomat. The book will also be of interest to those involved in the study of civil-military relations, especially in these years of increased commitment of U.S. military forces in multinational or international interventions.

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Crane, Conrad C. *American Airpower Strategy in Korea, 1950–1953*. Lawrence: Univ. Press of Kansas, 2000. 252pp. $35

Conrad Crane is a research professor for military strategy at the Strategic Studies Institute, U.S. Army War College, and formerly a professor of military history at the U.S. Military Academy. Crane previously wrote *Bombs, Cities, and Civilians: American Airpower Strategy in World War II* (1993), which is widely respected for its rich and adroit analysis. *American Airpower Strategy in Korea, 1950–1953* is a comprehensive, thoroughly researched treatment of the many issues that the newly constituted U.S. Air Force faced as a result of having to fight its first war as an independent service—a war that it was not doctrinally or materially prepared for, and that the service had neither anticipated nor especially wanted to fight. Crane logically takes the reader through the war from the prehostilities period, which generally set the stage for the limited character of the war and specifically established the character of the Air Force's contribution; the opening moves and initial setbacks; the miraculous end-around at Inchon and subsequent march to the Yalu; the bitter winter of 1950–51; and finally to the stalemate along the thirty-eighth parallel.

Crane analyzes the performance of the Air Force in conducting air warfare in a regional, limited conflict at a time when the service was focused on strategic nuclear war and restricted by government policy as to the resources that could be allocated to Korea. It was a condition that the Air Force would again confront in Vietnam. The Korean War presented the Air Force with a myriad of challenges, not the least of which was the attempt to meet high expectations for operational effectiveness based on results obtained during World War II.

However, the very nature of the new conflict constrained that effectiveness. A classic example of the limited nature of the Korean War was the prohibition against crossing the Yalu River to engage enemy forces or interdict lines of communication. Crane also takes great pains to highlight how austere were the resources made available to the Korean area of operations, because the Air Force was required to maintain the bulk of the active component in a ready status to respond to other worldwide threats. This requirement was the catalyst for many issues that arose during the conduct of the war, among them the decision to recall to active duty large numbers of aircrewmen who had served in World War II and

were in many cases not keen to leave their families and jobs to serve in an undeclared "police action."

In addition, Crane recognizes, the Air Force was challenged by interservice rivalry with the Army and the misunderstanding of its role in battlefield air interdiction, and to a lesser degree by negative perceptions created by strategic bombing at the expense of close air support for the Army. He points out that the frustration felt by Army commanders was exacerbated by the effective and dedicated close-air support provided to the Marines by their air component. The Army continually questioned why the Air Force could not provide for it the same level of effective support.

Crane also rightly recognizes the effective leadership and operational genius of the Far East Air Forces (FEAF) planner, Brigadier General Jacob Smart, who was able to produce a coherent interdiction strategy which he skillfully "sold" to the Army. Smart recognized the difficulty of conducting tactical interdiction operations against an entrenched enemy who did not require much in the way of supply. He reoriented FEAF's interdiction efforts away from cutting tactical lines of communications to striking such operational targets as hydroelectric facilities, supply distribution centers, and other "deep" targets, all with some effect.

Crane's book is a valuable compilation of the contributions of the Air Force in the prosecution of the Korean War. Crane reveals the warts but also gives glowing credit where it is due. Much more than a mere chronology, this is an insightful book that is a must-read for critical students of this conflict.

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Gardner, W. J. R. *Decoding History: The Battle of the Atlantic and Ultra. Annapolis, Md.: Naval Institute Press, 1999. 263pp. $34.95*

For thirty years after the Second World War, historians said very little about the role of signals intelligence in the Battle of the Atlantic—because either they did not know about the Allies' remarkable code-breaking successes, or they could not write about what they did know. That changed in 1974, when revelations about ULTRA exposed the full extent of the Allied penetration of Germany's signals. Unfortunately, in the subsequent rush to rewrite the history books to include ULTRA, its significance was frequently inflated.

In this study of ULTRA and the Battle of the Atlantic, Gardner offers the most fully developed case yet that monocausal explanations for the Allied victory in this campaign are inadequate—that ULTRA was only one critical factor among many. Gardner provides two case studies to support his argument. The first demonstrates that Britain's growing ascendancy over the U-boat in 1941 had many causes, most of which were unconnected with ULTRA. Just as important as code breaking, if not more so, was the tightening up of the convoy system and the German decision to shift U-boat operations westward in order to avoid the increasingly hostile environment around the British Isles. The greater availability of escort vessels and growing American assistance also played an important part in turning the tide in Britain's favor in 1941. It is therefore a mistake to suggest, as some have done, that ULTRA alone may have saved as much as two million tons of shipping during this period.

Gardner's second case study covers the period from mid-1942 to mid-1943, the final turning point in the campaign. Once again, he makes a strong argument that factors other than ULTRA were essential for the Allies' success, most importantly the closing of the mid-Atlantic "air gap" and the increasing number and effectiveness of Allied escort vessels. By 1943, Gardner notes, it was more hazardous than ever for the Germans to attack convoys. At the same time, the growing number of U-boats operating in the mid-Atlantic made the evasive routing of convoys extremely difficult for the Allies, even when ULTRA was available on a timely basis.

These case studies cover periods when ULTRA was most valuable because Germany was employing its U-boats in "wolf pack" attacks on convoys. When U-boats operated individually rather than in groups, which was the case for nearly two-thirds of the war, ULTRA's value was much less. Gardner also emphasizes that there were lengthy periods when German signals were being read only after considerable delay. For much of the war, he concludes, ULTRA's principal use was to enable the Allies to build up a general picture of the size and methods of the German U-boat fleet. It seldom had any impact on the Battle of the Atlantic at the operational or tactical levels.

This book deliberately focuses on the turning points of the campaign and the broad relationship of ULTRA to other factors; it does not provide either a blow-by-blow account of the Battle of the Atlantic or a systematic examination of ULTRA's employment by Allied commanders. The period from June 1943 until the end of the war is largely ignored. However, Gardner devotes a considerable portion of this book to background information about the Battle of the Atlantic, including the importance of economic factors, the role of technology, Germany's own code-breaking activities, and the workings of convoy. This material should be useful for the general reader even if it offers little for the specialist.

Gardner's broad conclusions are carefully reasoned and well balanced. The Battle of the Atlantic would have been a harder and costlier struggle without ULTRA, but the Allied victory cannot be solely attributed to code-breaking successes. *Decoding History* will not be the final word on signals intelligence and the Battle of the Atlantic, but it may put an end to the wildly exaggerated claims that are sometimes made for ULTRA.

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Reynolds, Leonard C. *Dog Boats at War: Royal Navy D Class MTBs and MGBs, 1939–1945*. Gloucestershire, U.K.: Sutton, 1998. 260pp. $35

There are few untold stories left from World War II, but the actions of the Royal Navy's Coastal Forces can be described as little known and unappreciated. Serving in small plywood craft much like the more famous American PT boats, the Coastal Forces wreaked havoc with Axis forces in British and foreign waters. Operating from small harbors and primitive forward bases, theirs was a war of small, close-knit crews and close action with the enemy. They did it all, from convoy escort to shipping interdiction, clandestine landings to reconnaissance operations, and finally, distant screening for invasion forces. Coastal Forces were a ubiquitous presence in the

European theater. Wherever there were Axis forces in coastal waters or areas, the Royal Navy dispatched Coastal Forces to counter them. Yet strangely, little has been published about these deadly fast-attack craft and their courageous crews. *Dog Boats at War* redresses some of that shortfall in naval literature.

Written by a wartime motor gunboat commander, Leonard C. Reynolds, this book tells the Coastal Forces' story with an authenticity that can only be produced by one who was there. Reynolds focuses on the actions that took place during his service in 1942–45, and on the class of boat in which he served, the Fairmile D-class motor-torpedo and motor gunboat (MTB and MGB, respectively). The title, *Dog Boats at War*, is derived from the nickname given to the rather blunt-looking Fairmile fast-attack craft.

The Royal Navy entered World War II with two flotillas of underpowered MTBs. They proved woefully inadequate against the German *Schnellbooten* and Italian MAS torpedo boats. The Admiralty tasked Noel Macklin of Fairmile to develop a fast-attack boat to compete with the enemy boats. Macklin's design was ready by March 1941 and was put into production six months later after a rushed but successful testing program. The first boats entered service in the English Channel by early spring 1942. Originally intended as motor gunboats for convoy escort, they were converted to torpedo boats while under construction. Equipped with two twenty-one-inch torpedo tubes instead of a six-pounder cannon, the MTBs proved very effective at intercepting German convoys transiting off the Dutch and French coasts.

The "dog boat" was a simple and robust design, but its performance was not extraordinary. Its 115-foot hull had a blunt semi-hard-chine design and used four Packard 1,250-horsepower engines to achieve a maximum speed of thirty-two knots—some five knots slower than its German or American counterparts. The dog boats were also small in comparison to their opponents but rode better in a seaway. Their superior stability often proved decisive in the rough waters of the English Channel and off the Norwegian coast. In the end, however, it was the crews that made the difference.

It took a special kind of sailor to man a plywood boat filled with five thousand gallons of highly volatile aviation gasoline. The Royal Navy found their early crews among the yachtsmen, racing enthusiasts, and fishermen who populated Britain's coastal towns and villages. These early recruits shaped the force that followed. The dog boats went to war with small crews of thirty to thirty-two men commanded by young Royal Navy Volunteer Reserve officers, many drawn from the Commonwealth. The commanding officers were generally in their twenties, and most had at least two years of experience in fast-attack craft. The crews were also either reservists or "wartime only" ratings. The average age of the crewmen was between eighteen and nineteen, with perhaps one career regular petty officer on board to provide experience. The result was a tightly knit, young, and aggressive crew—ideally suited to the unconventional fighting that characterized warfare in fast-attack craft. Survival depended on the commander's judgment and the crew's teamwork. It was a successful formula that served the boats well from Norway to the eastern Mediterranean.

The Royal Navy's Coastal Forces operated in a style not unlike that of light

forces of the Napoleonic era. Some of the actions described here are worthy of the best adventure fiction. Many boats ran agents, supplies, and weapons to the underground forces resisting Nazi occupation. For example, the 30th MTB Flotilla's boats often hid in caves along the Norwegian fjords or crept along dark "leads," dodging German patrols while seeking contacts and recruits among the occupied population. MTBs carried the kidnapped German general Werner Kreipe off Crete and transported him to Egypt for interrogation. They also played a deadly game of hide and seek with the Axis navies and the Luftwaffe in the Aegean Sea and among Yugoslavia's coastal islands. Wherever they served, the dog boats were the force of choice for engaging the enemy closely—and they paid dearly for it, losing 273 officers and men killed in action.

Some 228 dog boats were built between November 1941 and April 1945. They fought in over three hundred actions, sinking and damaging innumerable Axis vessels while losing some thirty-seven of their own. On the basis of eight years of research in official records and interviewing people involved, Reynolds has compiled as complete and accurate a record of the dog boats' actions as humanly possible. *Dog Boats at War* is a brilliant, if occasionally dry, treatment of an important and all but ignored part of the Royal Navy's history in World War II. It is worth its price, and I hope it will be followed by similar works on the Coastal Forces' other elements.

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Anspacher, William B., et al. *The Legacy of the White Oak Laboratory*. Dahlgren, Va.: Naval Surface Warfare Center, 2000. 503pp. (Available by e-mail at mrspat@gateway.net or by phone [301] 439-3140). $42

The Navy has had a remarkable and productive group of in-house research and development laboratories. Sadly, with the drawdowns of the post–Cold War era, many have been closed, among them the "White Oak Laboratory"—the Naval Ordnance Laboratory at White Oak, Maryland. WOL, as it was popularly known, gave the Navy a tremendous legacy of technology, weapons, and people. Fortunately, that legacy has been preserved by William Anspacher, Betty Gay, Donald Marlowe, Paul Morgan, and Samuel Raff in this richly detailed account of the laboratory's history.

First, the required disclaimer: this reviewer spent twenty years of his midcareer with WOL. And good years they were.

The laboratory was built in 1946 in what was then remote suburban Maryland, where ordnance testing would presumably not disturb the neighbors. It was an outgrowth of the Mine Building at the Washington Navy Yard, and mine development was the core of its original work. From it came the Navy's postwar mines: the Mark 50 series, CAPTOR, the submarine-launched mobile mine, and the Destructor series.

In 1948, high-mach-number wind tunnels captured at Peenemunde, Germany, were installed at WOL and became operational. With these, the laboratory began a new line of technological development for the Navy. From those first tunnels grew a series of hypersonic wind tunnels that gave engineers the ability to test reentry vehicles at speeds up to Mach 14.

In addition to military work, the tunnels were used by the space shuttle program to study reentry forces. The laboratory became the nation's center of excellence in hypersonic aerodynamics.

White Oak was never a "big systems" center, and in that lay the roots of its ultimate demise. Rather, it was a technology center, focusing on ordnance and system components.

From 1946 on, the laboratory created extensive expertise for the Navy in explosives, warhead design, fuzing, metallic and nonmetallic materials, magnetic silencing, nuclear weapons effects, and underwater acoustics. The authors devote substantial chapters to each of these—the people, the anecdotes, the products, and the fleet applications. Describing them all is beyond the scope of this review; that pleasure is saved for the reader. Fleet-savvy readers will recognize many WOL-developed components in the systems they use today.

Magnetic-silencing research necessitated the construction of a unique building made entirely of wood and nonmagnetic metals. Up close it looked more like the work of a cabinetmaker than a government-contracted building. Magnetic-signature and degaussing work at WOL led to the development and fielding of the drive-through deperming facilities for submarines at Kings Bay, Georgia, and Bangor, Washington.

The Naval Science Assistance Program, under whose aegis laboratory scientists were assigned to major fleet commands to solve technical problems and introduce new technical concepts, was created and managed at WOL. Two generations of Navy scientists went to sea, wrung salt water out of their socks, gave the Navy new tricks, and returned with solid understandings of their ultimate customer.

Technology developed at WOL spun off new and unanticipated applications in the civilian world. Nitnol, a metal alloy with temperature-stimulated memory properties, found use in orthodontics. Research in the mathematics of nonlinear systems led to techniques for controlling heart arrhythmia, making a chaotic heartbeat a regular one.

The legacy of the laboratory for the fleet is in the technology and hardware now deployed; the legacy in the hearts of the alumni and alumnae (and there are many of the latter) is in the people and the images. Fortunately, the authors have done them all full service. The book is generously illustrated and filled with the people, from the recipient of two Nobel Prizes in physics to the fellow who liberated a fire truck from another government installation—White Oak didn't have one.

Beyond being a fine institutional history, the book is a valuable study in public administration as practiced for military research and development. The authors have unearthed and analyzed an impressive amount of bureaucratic history involving all the players in the Navy's research and development hierarchy.

In their analysis, the White Oak Laboratory suffered from not having a platform-based mission. As an ordnance and technology laboratory, it was not the creature of any of the Navy's controlling baronies—air, surface, or submarine. The laboratory served them all but had the prime responsibility for no platform-based major weapon system. Thus it was always just outside the door, looking through the window but not sitting at the table.

In 1974 the White Oak Laboratory was merged with the Naval Weapons Laboratory at Dahlgren, Virginia, to become half of the Naval Surface Warfare Center, and it found itself in the surface warfare community. A long, painful, but inexorable decline in the laboratory's fortunes began. The authors' detailed and insightful treatment of this period, with all its bureaucratic infighting and personalities, is an important part of the book. At its core, the lesson in public administration is that pure technology and elegant components alone are not a sufficient raison d'être in the military research and development world. Such an institution must have a clearly defined customer base and serve it with comprehensive integrated systems.

In 1996, the White Oak Laboratory was closed, and its people and projects were sent to other naval centers. At this writing the grounds and main buildings are expected to become new laboratories for the U.S. Food and Drug Administration. This is not unfitting. A plaque in the lobby will remind everyone of what was once accomplished there for the Navy.

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