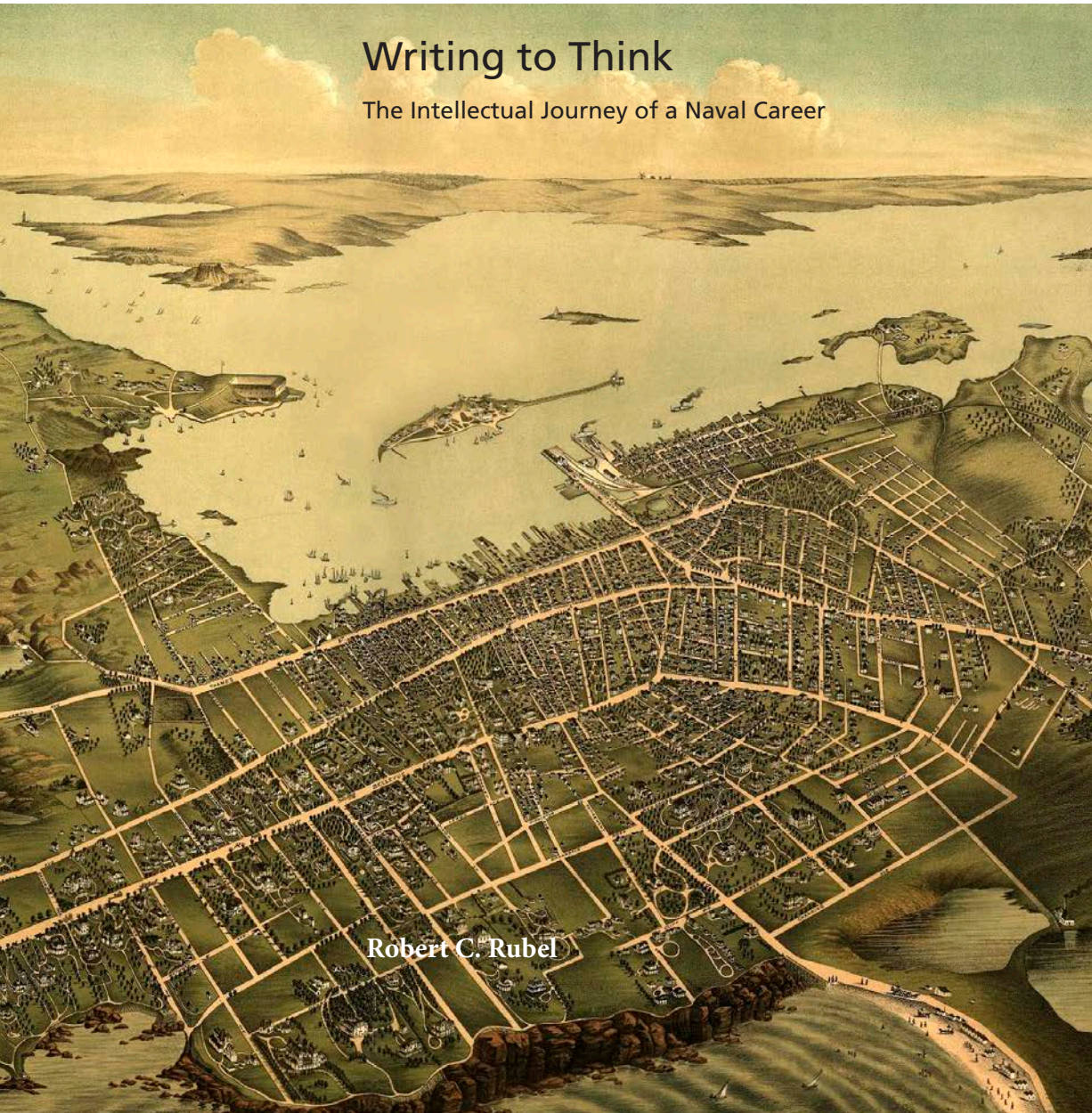
NAVAL WAR COLLEGE NEWPORT PAPERS 41

Writing to Think

The Intellectual Journey of a Naval Career



Robert C. Rubel

Cover

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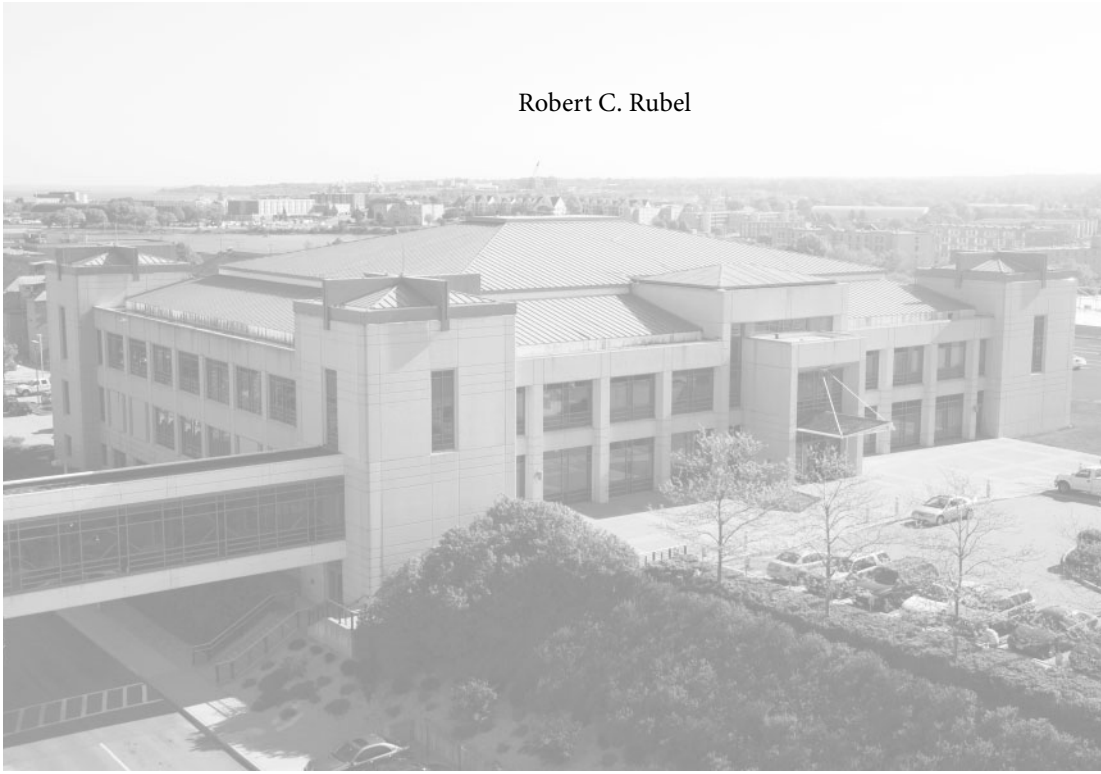
Robert C. Rubel



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Foreword

The purpose of this volume is to honor the work and thought of Robert C. Rubel, Captain, U.S. Navy (Ret.). Since his retirement from the Navy, Robert (a.k.a. "Barney") Rubel has held senior positions in the Center for Naval Warfare Studies (CNWS), in the Naval War College, in Newport, Rhode Island—first as deputy dean, then as chairman of the War Gaming Department, and finally (since 2006) as dean. During this period, not only has he presided effectively over a complex (and in many ways anomalous) institution, but he has found the time to create a substantial body of published writings about naval warfare and war, or strategy generally. In the process, he has quietly established himself as one of the Navy's most innovative and wide-ranging thinkers. This volume brings together a selection of Rubel's short papers from over the last decade and a half. Many of these have appeared in the *Naval War College Review,* but others are scattered and less accessible. Viewed as a single body of thought (Rubel himself indicates in his introduction that his basic views have not appreciably altered over these years), they gain in weight from being read and considered together. It is hoped, therefore, that this volume will provide a basis for a better and more enduring appreciation of Rubel's contribution to the intellectual capital of today's Navy.

Perhaps the key characteristic of Rubel's writings is their self-conscious return to the classical naval strategists—especially the American Alfred Thayer Mahan and the Briton Julian Corbett—as guides to the concerns of military analysts of the present and near future. While he nowhere directly addresses methodological issues, Rubel clearly intends to distinguish his own approach from the only too prevalent tendencies of analysts to follow fads of the moment, to overrate the importance of technology, and to embark on futuristic speculations detached from political and historical context. Mahan—though widely regarded as obsolete and today little read, even (or especially) by naval officers—is particularly valuable for Rubel, in two respects. First, he offers a sophisticated understanding of the political and economic dimensions of naval strategy. Mahan wrote toward the end of the nineteenth century, in what may be called the first era of globalization, extending to the outbreak of World War I. Since the end of the Cold War, we are living in a second age of globalization, and Mahan provides important guidance to reordering naval or maritime strategy in this geoeconomic context (see especially chapters 5 and 6). Second, Mahan and Corbett are essential in helping us rediscover concepts that have withered, if not vanished, in American naval strategic thought since the disappearance of a peer naval adversary following World War II.

The recent emergence of the People's Republic of China as a formidable challenger to the United States in the maritime domain makes it imperative, according to Rubel, to rethink the meaning of command or control of the sea under contemporary geographical and operational conditions (see chapters 3 and 4).

To consider all this an exercise in backward-looking, navalist nostalgia would be to make a serious mistake. Rubel is careful to give due weight to what is different or unique in our contemporary strategic environment. Nor can he be accused of any kind of parochial advocacy. A former aviator himself, Rubel is so far from championing the aircraft carrier as the Navy's capital ship in the traditional manner that he has been one of the most influential voices in calling for a rethinking of its core missions and a lessening over time of our reliance on it (see chapters 8 and 9). Indeed, one of his persistent themes is the continuing problem of the Navy's community-centrism and the need to develop a more sophisticated "combined arms" approach to naval operational art and tactics. Further, he is fully in tune with the need for the Navy to work in harmony with and support of the other services (chapter 12).

The last eight years have seen major transformations at the Naval War College. Many of these have involved a strengthening of the institution's ties with the fleet and the Navy Staff. Rubel has had a key role in this respect. As he indicates, the high point of his tenure as dean of CNWS was its support of the development of the document that was eventually published in 2007 under the signature of the chiefs of the Navy, Marine Corps, and Coast Guard, entitled "A Cooperative Strategy for 21st Century Seapower." Since that time, Rubel has been tireless in his explication of this text (see especially chapters 1 and 2). More clearly than anyone else, he has spelled out its implications not only for the Navy but for American foreign policy, or grand strategy generally. Though not without its foreshadowing in Mahan, this vision of global maritime cooperation between the United States and allied or friendly maritime forces is a radical departure from the past and one that has already generated significant dividends for the nation. It can only be hoped that this development—and Rubel's part in it—will become better known over time.

CARNES LORD
Director, Naval War College Press
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Introduction

It was my third flight as an operational squadron pilot. Just four days before, I had reported to Attack Squadron 66 (VA-66) on board USS *Independence,* which was sailing in the eastern Mediterranean. There was no time to get me trained up before I was pressed into service on an operational mission. My A-7 Corsair was loaded with live five-hundred-pound bombs, and the ship was operating in "emission control"—that is, not radiating any electronic signals. This was because the United States had gone to Defense Condition Three, owing to the potential for a showdown with the Soviet Union in the eastern Mediterranean as a result of the Fourth Arab-Israeli War. I was supposed to be flying on the skipper's wing this day, being the new guy, but our rendezvous point was over a hundred miles from *Independence.* It was a very lonely flight, staying at two hundred feet above the water until I reached what I thought was that point. My relief was almost painful as I spotted the skipper's aircraft. I would not have to decide on my own whether World War III had started.

Our mission was to "bird-dog" Soviet warships, orbiting overhead and eyeing their decks, looking for the smoke of a missile launch. If we saw it, we were supposed to get out a "Zippo" call, a broadcast in the blind that the Soviets were shooting. We were in a highly vulnerable position, being directly overhead of Soviet destroyers and cruisers, at a slow loiter speed at ten thousand feet—right in the sweet spot for their surface-to-air missiles. Had they launched, we would be dead just after we made our Zippo call, if not before we could make it. This sucked, but the U.S. Navy, in October 1973, had neither antiship weapons (at least for carrier aircraft) nor antiship tactics. The Yom Kippur War and the Soviet response to it had caught us by surprise. The Soviet ships were well armed with antiship cruise missiles, and, we learned after the Cold War, they had a doctrine for using them. We had our subs, but that was cold comfort to us aviators who were staring down at Soviet surface-to-air missile launchers.

The crisis blew over, but it was a wake-up call for the Navy. Work began on antiship missiles (Harpoon and Tomahawk were the eventual products) and on antiship tactics

for carrier air wings. However, Harpoon and Tomahawk were some years off, and until they arrived we had to make do with what we had—dumb bombs, Shrike antiradiation missiles, and some TV-guided bombs left over from Vietnam. Mostly, we had to develop tactics that would allow us to get close enough to drop iron bombs hardly any different from those of World War II. We came up with a low-level coordinated maneuver, in which five to seven aircraft split up just after breaking the radar horizon and attempted to get in close for bomb release within several seconds of each other, coming in from different angles. The hope was that at least one aircraft would get through and get a hit. It seemed to me we were going to lose four or five aircraft for each ship we struck—a bad economic proposition given the number of ships the Soviets would flush to the Med. Thank God, no more crises flared up.

For the better part of the next two decades I flew off carriers that had been sent storming into crises of various sorts. As luck would have it, in none of them did I get a chance to fly into actual combat. As a junior aviator, I wondered why the Navy was still so unready for the situation it had encountered in the eastern Mediterranean in October/November 1973. I wondered why we botched the hostage-rescue attempt in 1980, and I wondered why we were not ready to execute theater air warfare in the summer of 1990 (I was by then in command of a Hornet squadron on board USS *Eisenhower* in the Red Sea). I also wondered why we kept losing so many aircraft to accidents (I myself lost over a dozen friends to accidents). All of these questions drove me to read and study. I lobbied to be a student at the Spanish Naval War College and later the U.S. Naval War College, in Newport, Rhode Island, both times in spite of sage advice from my seniors that doing so would be career suicide. I figured that if answers were to be found, it would be in those places.

Over the years of operating off carrier decks and, later, of teaching operations at Newport, the answers started to emerge; I felt I was getting a grip on why the United States and its navy operated aircraft carriers in the way they did and why those carriers were either ready or not ready for the missions they were assigned. In developing these answers I necessarily had to understand naval strategy writ large and how it supported or did not support national strategies and interests. The answers I came up with did not necessarily correspond to either conventional wisdom or that which is found in famous books on warfare. Eventually I started writing.

The articles in this Newport Paper are a selection of those that I have published (all but one of them) over the years in various publications. I did not write them to "get published"; I wrote them because I am a true extrovert—I have to talk, or write, in order to think. I do it in a particular way—I write with pencil on graph paper. This seems to lubricate the flow of thoughts from my head to the paper, or maybe it's the other way around. I'm not sure. In any case, I have a desk drawer with a fat file folder full of the

handwritten versions of these articles and a lot of others that I have not seen fit to submit for publication. I write, as I say, to think, and if the end result seems sufficiently lucid, I submit it to a journal. I am not a trained academic scholar, nor have I been a naval officer with an agenda. Nonetheless, as the dean of the Center for Naval Warfare Studies at the Naval War College, I have been deeply influenced by the work of my faculty, and a number of my articles on naval strategy are attempts to "fly high cover" on their ideas—most of their work being classified.

To paraphrase Vince Lombardi, timing isn't everything, it's the only thing. Whatever purposes God has, he has elected to keep me alive when I should have died in an airplane, and he has repeatedly plunked me down in positions of opportunity in which I could leverage the answers to the operational and strategic questions I have asked and answered for myself over the years. The most prominent case was when I was made acting dean of the center, just weeks before Adm. Mike Mullen asked for a new maritime strategy in 2006. The Naval War College was tasked to support the Navy Staff in developing it, I was put in charge, and in that moment, I knew exactly what to do. I laid out a program of workshops and games, along with some rules for how the project would be focused and conducted. Our project produced a set of options for the Navy Staff, who combined them, along with several key concepts we came up with, into "A Cooperative Strategy for 21st Century Seapower." This document was catalytic in creating a functioning global maritime partnership to ensure that the seas could not be used by terrorists. As I write this, it is still the national maritime strategy, in effect for the last six years. The first article in this Newport Paper gives my perspective on the creation of this document—the capstone of my career in the Navy, both in uniform and as a civilian.

That I was in that place at that time was a function in part of my decision to commit myself to the Naval War College. Factoring out the various acts of God and turns of fate, my ability to serve the Navy from the banks of Narragansett Bay hinged on the good offices of three people. Capt. Frank Snyder, USN (Ret.), was my first boss at the College. Director of the Planning and Decision-Making branch of the College's Joint Military Operations Department, he introduced me to the world of command and control, and he did me the decisive favor of directing me to develop a teaching session on campaign planning. This was in the mid-1980s, when the U.S. Army had just constructed its operational-level-of-war theory—and the Navy had no inkling of what that meant. I found a number of answers to my questions as I did research for that session. Frank later was also decisive in bringing me back to the College after a command tour. He pulled off that trick by appealing to Rear Adm. Joseph Strasser, then President of the College. Admiral Strasser, the College's longest-serving president, was to throw his weight behind keeping me there on several occasions. Finally, Dr. Ken Watman, then chairman

of the War Gaming Department (later my predecessor as Dean of Naval Warfare Studies), decided that I would make a good leader of an analytic cell he was building within his department and hired me as a civilian. In our years of collaboration at the College I found him to be a highly effective intellectual mentor.

The presence of these men at the College was no accident; the institution attracts people who like to think. Founded by Rear Adm. Stephen B. Luce, an archetypal reflective practitioner, the institution has remained true to his vision for almost 130 years, as a place where naval officers can come to explore the higher reaches of their profession—to answer questions they have developed over their years of service. Seen by many as simply a schoolhouse, the Naval War College is really an incubator of thought. Whereas the other service colleges perform structural educational functions for their respective services (Leavenworth produces staff officers, Maxwell turns out airpower advocates), the Naval War College has no such function beyond rendering the joint-education credentials mandated by Congress. The Navy, in fact, has had at best mixed feelings about the institution. Receiving little in the way of rudder orders, the College has been free to structure itself to fulfill Luce's vision as conditions have changed over successive generations. It continues to constitute the intellectual soil in which the seeds of thought, sown by reflective naval officers, can germinate.

A key fertilizer (to risk overusing a metaphor) in the College's intellectual soil is war gaming. It was introduced at the direction of Luce, and its practice at the College since then has become almost legendary. It was thus inevitable that I would become deeply involved in it over my years at the College, as variously a game sponsor, game designer, game director, game umpire, and game analyst, and ultimately chairman of the War Gaming Department. As has happened in everything else I have done, participation in war gaming produced questions in my mind, specifically about how and why it is done. One of the great advantages of gaming in Newport is that because of the institutional characteristics mentioned in the previous paragraph, games here can be designed and played for the right reasons, something much more difficult to achieve elsewhere. With regard to *how* it is done, one of the achievements that satisfies me most is the conversion of the War Gaming Department from a staff culture to a faculty culture. The civilian war-gaming faculty does not simply conduct games—it professes war gaming; I too professed war gaming. In doing so one must determine how the discipline or technique can produce valid knowledge. This is the subject of the last chapter of this collection, and it is perhaps a most fitting tribute to the institution that has nurtured my intellectual journey.

The chapters lay out the various answers I have developed for myself concerning naval strategy, naval aviation, joint operations, and war gaming. They are not in chronological order, so the reader will see no progression in thought or in writing style. I do not

believe I have changed my outlook over the years such that later articles contradict what I said in earlier ones. In total, though, they represent a window into my brain, extrovert that I am. I was never satisfied with pat answers or with the authority of famous writers on military theory. I have always looked for the deeper patterns, the deeper motivations. I hope that readers use what I write to stimulate a search for their own answers.

This Newport Paper is a benediction of sorts on my naval career, spanning in various forms forty-eight years. This being the case, I beg the reader's pardon for taking the opportunity to offer some recognition and thanks. I will start with someone who, I am sure, never thought he would see his name in a book introduction, Lt. Lynn "Pipper" Trowbridge. Pipper was not the kind of guy the Navy would consider an example of an officer and gentleman. When he was my flight lead, I could not join on him fast enough to catch him without a cigarette in his mouth. Why he never toasted his lungs in the cockpit I will never know. However, he was a talented attack pilot and fanatically meticulous about understanding the smallest details of the A-7 weapons system and the armament it carried. I learned from him the benefits of digging deep for an understanding of how things worked. Another person who deserves recognition is Charlie Cook, the guy who taught me how to be a landing signal officer—and who was the best one I ever met. Nobody was cooler on the platform, and I learned from him how to keep my wits when everything seemed to be going haywire. Sad to say, there were few others I met in my naval career, other than the three gentlemen mentioned previously, to whom I could point as positive role models, though I developed great respect for some—such as now-senator John McCain, who was my commanding officer in VA-174. I would not choose his leadership methods, but he was the most effective commander I ever met.

The real factor in my success as a naval officer is my wife Donna. On our first date I picked her up in a Piper Cherokee borrowed from the University of Illinois (she was attending Eastern Illinois University, fifty miles to the south). The girl got in the airplane with me, and right then and there I knew she had the right stuff. Decades of naval service revealed that I had been a good judge of character; she has endured the separations, the repeated memorial services for fellow aviators, and all the vicissitudes of Navy life without ever complaining or asking me not to get in an airplane—even on certain occasions when we both knew pretty well I might not be coming back. She is a natural leader herself and is actually the best role model I have had. Thanks are simply not enough. Among her leadership feats is raising our two sons virtually as a single parent for way too much time. Testimony to her success in this is the fact that both boys have grown into outstanding fathers and family men whose adaptability in our years of moving around is now being passed on to their children. If it does not kill you, the Navy makes you strong.

I am grateful to Chief Yeoman (and Dr.) Carissa Pokorny-Golden (USNR) for editing and obtaining the necessary permissions for this work. Finally, I offer my thanks to Dr. Carnes Lord and Mr. Pelham Boyer for the great gift of this publication. Their management of the Naval War College Press has been magnificent and has made oversight from the dean's position both simple and pleasurable.

PART ONE

Naval Strategy

CHAPTER ONE

The New Maritime Strategy
The Rest of the Story

The U.S. Navy's new maritime strategy is contained in a fairly terse ten-page document that speaks in broad terms about how sea power should be used through the next ten to fifteen years to defend the nation and its global interests. Soon after its release, analysts, pundits, and naval officers began to offer criticisms and interpretations. A number of the articles, blogs, and e-mails demonstrate a clear misunderstanding of the strategy, or at least a failure to understand what the strategy is meant to do. The author, as the Dean of the Center for Naval Warfare Studies at the Naval War College, was in charge of the project to develop maritime strategy options and analyses for the Navy Staff. Without engaging in a defense of the strategy as written, this article will leverage its author's perspective to provide a deeper understanding of the strategy by discussing the findings that emerged from the workshops and games that produced the options, as well as some of the background logic that governed our approach to the project. It will also offer some personal analysis of the strategy's underlying intent.

It should be emphasized from the outset that the maritime strategy was written by a combination of officers on the staff of the Deputy Chief of Naval Operations for Information, Plans, and Strategy (N3/N5) and some participating civilian academics and contractors. The Naval War College delivered to them a series of options, to be discussed later, which they used as raw material in the composition of the strategy document. Throughout the development process, everyone avoided ascribing ideas to individuals, so that positions would not harden because of "ownership." Thus, while no particular person can be pointed out as the strategy's progenitor, a clear intellectual audit trail winds through the developmental events, including a war game and workshops, to the published strategy.

In June 2006, during the Secretary of the Navy–sponsored Current Strategy Forum at Newport, the Chief of Naval Operations (CNO), Admiral Michael Mullen, called in his

keystone speech for the development of a new maritime strategy. He called for a strategy "of and for its time" and enjoined us to "elevate the discussion." Within two weeks after this speech, Vice Admiral John Morgan, the Deputy CNO for Strategy and Operations, visited the College to provide more detailed tasking. He specified that the strategy development process was to be a "competition of ideas" and was to be open and collaborative. These parameters were themselves rather revolutionary in the history of maritime strategy development, but two even more important pieces of guidance emerged from our discussions as well. When asked whether the project should be internationalized, he said yes. When asked if we were really working with a blank sheet of paper, with no a priori assumptions of fleet size or policy constraints, he said yes. This set of instructions put in train a strategic logic vector that heavily influenced project design and the nature of the final product.

From the outset, this project would not simply derive from existing strategic guidance, such as the National Security Strategy or the National Defense Strategy. This may seem somehow subversive to those who are used to military planning processes in which guidance from higher headquarters is regarded as holy writ. However, consider our situation—the project was undertaken at the end of the Bush administration and our requirement was to look ahead twenty years. We could not responsibly make the assumption that current U.S. security strategy would remain in place, and there was no adequate way to predict the direction of the next administration's policies. Our solution was to postulate four different potential strategy vectors of a future administration, which resulted in having four U.S. teams in a strategic war game we conducted. The first team represented a "Primacy" strategy, in which the United States would attempt to maintain its near-hegemonic status in the world. The second team adopted a "Selective Engagement" posture, in which the United States would focus its efforts on averting conflict among major powers. The third team played a "Cooperative Security" strategy, in which the nation committed itself to seeking security through multilateralism and international institutions. The fourth team represented an "Offshore Balancing" strategy, in which the United States retracted certain security guarantees and caused major powers to balance each other.

As the project transpired we attempted to find maritime strategy options that would be valid across two or more of these policy futures. Frankly, freeing ourselves from the dictates of current policy allowed us to perceive and accept gaming outcomes we might otherwise have missed. War games tend to "whisper" to you—that is, they produce subtle results within the context of their play that can be ignored easily, especially if they are things that defy conventional wisdom or are threatening to the game's sponsors.[1] Our strategic foundations game did indeed provide whispers, and we were able to hear them.

One of the things that improved our hearing was an initial workshop in which we brought together some of the "old hands" who had participated in the development of the 1980s Maritime Strategy (capitalized here to distinguish it from the current effort).[2] In that workshop, one of the participants asserted that what that strategy had had, and what had been missing since the end of the Cold War, was context. What he meant was that the Maritime Strategy told naval officers who they would fight, why, and where, in addition to how. The ". . . From the Sea" series of white papers issued in the 1990s had not—they had been more doctrinal in nature. The Navy needed to rediscover context if its strategy was to be compelling and useful. Another thread of discussion involved the need to "reglobalize" the Navy. There was no intellectual glue that linked operations in the Philippine Sea with those in the Persian Gulf or the Caribbean, although most participants in the workshop, as well as those in a number of different games in recent years, instinctively felt that what happened in one part of the world had important ripple effects in other parts. Thus, as we designed and played our strategic game, we were alert for any indications of what might constitute a new context for maritime strategy and a basis for global vision.

The Strategic Foundations Game took about six weeks to play and involved the four U.S. teams, one for each potential policy future, and five "strategic entities," countries and nonstate groups selected for detailed play. Teams were directed to develop grand strategies for the next twenty years that would maximize their security, aspirations, and interests. Non-U.S. teams were not required to demonstrate hostility to the United States unless that made sense in terms of their grand strategies. This represented a departure from normal gaming, in which worst-case scenarios are the rule. In the open adjudication sessions in which each team proclaimed its strategy, a compelling central thread emerged. Each state had an intrinsic interest in the effective functioning of the global system of trade, even such "rogue" actors as Iran and North Korea. Only al-Qaʿida and associated groups had endemic hostility to the system. This insight produced the "big idea" that the protection of the existing global system of trade and security (as opposed to the process of globalization) provided both the context for the new strategy and the intellectual glue that tied together all regions of the world. Thus the notion of system security and defense figures prominently in the maritime strategy document, both "up front," in its introduction, and in the description of the maritime strategic concept. This could not have been more important—even, in its way, more revolutionary. It provided a basis for not only a maritime strategy but a national grand strategy not aimed against a particular country or threat but positive, without being aggressive. The strategic concept upon which the maritime strategy is based—defense of the global system of commerce and security—offers the opportunity for future administrations to adopt a

clearly articulated grand strategic defensive posture, with all the political advantages that brings. As a defensive strategy, it makes global maritime cooperation much easier to attain.

While the game and workshops had no trouble identifying current and future threats, except in the case of Islamic extremists, these threats were either nascent or equivocal. Is China a true threat? How about a resurgent Russia? Iran and North Korea, while clearly potential aggressors, were not existential threats, and at least at this juncture did not seem poised to attack anyone. Moreover, glimmers of progress in reining in their aggressive tendencies seemed to exist. Thus it was difficult to pursue traditional threat-based planning convincingly. In developing the strategy, we realized that one of the real dangers, especially with regard to emerging powers, is that considering them hostile for planning purposes could be self-fulfilling. Thus we tried not to engage reflexively in threat-based or capabilities-based planning, techniques that would naturally assume the breakout of war. Instead, we realized, we had opportunities to disrupt the flow of events toward war. Accordingly, the new strategy reflects what I call "opportunity based" planning—positioning the maritime services to take positive actions to prevent war, protect the global system, and create a better peace.

The injunction to elevate the discussion also greatly affected the development process and the nature of the end product. The Navy has been afflicted in the past few years with a controversy of sorts over force structure. One camp asserts that there are new mission sets, such as homeland defense, the Long War, and humanitarian assistance, that require new kinds of forces. The other camp holds that the Navy should only build high-end combat forces and that these can be effectively used for less "kinetic" missions. A solution could not be found if the "dialogue" continued at the level of forces; therefore, the strategy project banned any discussion of force structure. Participants mostly followed this rule, and the options presented to the project's executive committee, consisting of flag-level representatives from the Navy, Marine Corps, and Coast Guard, contained nothing that would provide stimulus or opportunity for those who equate strategy with force structure to drag the discussion in that direction. As a result, the staffing and vetting process forced the "three stars" and "four stars" to respond in kind, and this appears to have generated both a new level of dialogue in the Navy and a new strategic consensus. There are many who are frustrated that the new strategy makes no mention of force structure, but it does seem to provide an overarching logic from which future force structure could be deduced. At the very least, it is a consensus document that has to some degree knit the Navy together.

At this nexus of force structure and strategy, it is useful to interpret the strategy in light of the ideas of the two greatest maritime strategy theorists, Alfred Thayer Mahan and Sir Julian Corbett. In a sense, the new strategy is very "Corbettian," in that it requires

that control of the seas—at least in the new sense of maritime security and maritime domain awareness—be exercised day in and day out. Corbett described two traditional concentration points for the Royal Navy, one near the French island of Ushant off Brittany to control the Channel, and the other in the Downs (a roadstead near Dover) to guard against invasion threats from the North Sea. These concentration points were established because Britain's proximity to them afforded little geographic strategic depth. However, fleets concentrated there could disperse for "systemic" sea-control duties, being always ready to regroup if a major threat developed near home.[3] Similarly, the new maritime strategy prescribes two concentration points, one in the Arabian Gulf and the other in northeast Asia, where important economic elements of the global system are near potentially aggressive states.[4] Per current U.S. Navy practice, these "combat credible" forces will "starburst," or disperse, for engagement purposes but can regroup quickly in case of need. Corbett said that commercial shipping elsewhere could be protected by cruisers and the "flotilla"—smaller ships that could deal with most threats short of first-class forces—types not normally encountered in the far-flung reaches of the empire. The analog today is the "thousand-ship navy," the loose network of navies cooperating for maritime security. The U.S. part of that flotilla will be those units assigned to Global Fleet Stations and other, more ad hoc deployments to catalyze greater levels of cooperation. The key word is *catalyze*. We would not build a fleet of patrol craft to do other nations' jobs for them. We would dispatch ships and other kinds of forces that would help other navies and coast guards adopt congruent strategies and provide them with the training and perhaps equipment to implement them. The exact types and numbers of forces required are not self-evident and need to be the subject of analysis and gaming.

The notion of two deployment hubs where strong naval forces are concentrated follows the logic of system defense. Just as Corbett acknowledged the necessity for concentration points in the home islands due to their proximity to threats emanating from Europe—that is, a lack of strategic depth—so too does this maritime strategy prescribe fleet concentrations in areas where there is little geographic space in which to absorb an attack. The oil fields of Iraq, Kuwait, and Saudi Arabia are uncomfortably near Iran; Seoul is within artillery range of North Korea; and Taiwan is only a narrow strait away from the power of the People's Liberation Army. Certainly the oil fields of the Persian Gulf and the productive capacity of South Korea and Japan are key organs of the global system and must be protected. If deterrence fails, we must be ready and able to defend these areas. Again, the exact type and nature of forces needed to do this is not self-evident, especially since rapid technological development overseas has significantly morphed the kinds of sea-denial threats we will face. They must, however, be the most robust type of high-end combat forces.

The strategy has its Mahanian aspects too. One aspect of Mahan's writing that is widely ignored or misunderstood is his focus on deterrence. Mahan's world was characterized by the existence of great powers overseas that had navies capable of conducting operations in the Western Hemisphere. Mahan worried about the defense of the soon-to-be-opened Panama Canal and about other European adventurism in Latin America. His prescription for a strong battle fleet and its deployment was based as much on deterring outside intervention in the Americas as it was on protecting American interests overseas.[5] This notion of deterring a range of major powers through a strong, high-end fleet is an intrinsic part of the new strategy. Moreover, Mahan's prescription for a consortium of cooperating navies belonging to like-minded powers has a strong echo in the new strategy. In Mahan's era, Britain was the preeminent naval power, but there were others on the rise, including Germany, Japan, and the United States. Mahan could see that even the Royal Navy might not be able to police the world in an era where capital ships were becoming ever more expensive and any single nation might not be able to keep the seas free around the world. Thus he proposed that the navies of several nations act in concert (not necessarily in alliance) to make sure regional powers could not close off large parts of the ocean to trade.[6] Today, even though the United States enjoys a measure of naval relative advantage Mahan could not have dreamed of, the world is still too big for a single navy to act as sheriff of the seas. Therefore, the new maritime strategy advocates a consortium of navies and coast guards working together to assure maritime security, the new manifestation of sea control.

The strategy also implies a return by the U.S. Marine Corps to its expeditionary roots. The global distribution of forces for catalyzing cooperative relationships, preventing or containing local disruptions before they impact the global system, and for rendering various kinds of assistance is a recipe for the kind of flexible maritime maneuver for which the Marines are famous.

Prevention of war is a naturally deduced mission from the concept of system protection. Throughout history, nothing has been more disruptive to the free movement of global trade than war among the major powers. Niall Ferguson in his *The War of the World* makes the case that the world was globalizing in the decades leading up to World War I. It was a world of multiple great powers that enjoyed unprecedented levels of prosperity but that was also infected by nonstate actors with various agendas. This world slid into a ruinous global war whose consequences afflicted it for more than seventy-five years.[7] One can make the case that, at the dawn of the twenty-first century, the world is just now getting back to globalizing in the way it was before the Great War tore it apart. Mark Twain famously said that history does not repeat itself but rhymes. Thus, in this globalizing world that is populated by one big navy and a number of growing ones, an

implicit aim of the new maritime strategy is to help prevent a future slide into global catastrophe such as that of 1914.

There was another element of thought that attended the design of the strategy development process. The focus on grand strategy had not only to do with elevating the discussion in order to untangle force-structure controversies. More broadly, there was a feeling among several researchers in key positions that since the Cold War the United States had lacked a concept around which a coherent national grand strategy could coalesce. In the author's personal view, the concept of containment that had guided American policy and strategy throughout the Cold War had not been replaced with anything of similar geostrategic rationality. Most importantly, because the global conceptual glue mentioned earlier has been missing, American policy and strategy have tended to view the world as a collection of regions, each of which can be approached as an independent entity. The result has been that the United States, through successive administrations, has backed its way into a de facto Eurasian continentalist grand strategy, in which it has committed vast resources to projects of the kind one would expect to see from a major Eurasian land power attempting to establish buffer zones, almost as if California butted up against Iran. These projects included the enlargement of NATO to the east, the "'Stans' project" to secure bases and influence in the heart of Eurasia, establishment of ballistic missile defenses in Poland, and the invasion of Iraq. The danger of this rather ad hoc and inadvertent grand strategic vector is that it is leading to strategic overextension. There has been no compelling alternate vision or concept to deflect its thrust. The new maritime strategy does not, in and of itself, constitute that alternate vision, but our goal in helping formulate it was to find the kernel of an idea that could translate into a global concept that does not require the United States to intervene everywhere it sees trouble and that provides criteria upon which the advisability of potential projects could be judged. Neither the Weinberger nor Powell doctrine possesses suitable breadth of vision to serve in this role.[8]

It should be said at this point that the strategic logic expressed above was not meant to be a recipe for disengagement. "Offshore Balancing" was indeed one of the four U.S. policy futures examined, but in the end nobody thought that the United States should retreat from its strategic alliances or from its forward engagement, and especially not from the forward-deployed posture of its forces. Rather, it is meant to be an injunction to look at the world as a whole. At the global level, because the world is 70 percent water, grand strategy necessarily takes on a maritime flavor. Moreover, Eurasia is just one land mass; there are others. The United States is about to establish Africa Command. Africa is second only to Eurasia in size, and if Eurasia can absorb all the strategic resources of a powerful nation, then Eurasia, Africa, South America, and North America can overwhelm any power that seeks to use land superiority to assure its security. Leverage

must be sought, maneuver on a global scale made possible, and criteria for investment and risk established. Only a global, and therefore maritime, grand strategic concept can provide the needed perspective and guidance. Thus it was from hopes of at least initiating a new dialogue on national grand strategy that the maritime strategy development process took its cue.

As it turned out, the Strategic Foundations Game and the several workshops did not produce the maritime strategy options in a straightforward way. Naval War College researchers were left with a considerable body of data, but the planned events produced no clear definition of options. Thus they set about trying to deduce strategy options from the four policy futures. This work produced five options. The first, called "Winning Combat Power Forward," was derived from the Primacy policy future and called for strong, war-winning forces to be deployed in the northern Arabian Sea and in northeast Asia. The underpinning assumption was that since deterrence could not be relied upon and sufficient strategic depth in these areas was lacking, strong forces must be positioned where they would be needed. The second option was based on the Offshore Balancing policy future and called for U.S. naval forces to be forward deployed only in the Persian Gulf. The rest of the Navy would remain in home waters, in a "surge" status. Monetary savings of this posture would be used to increase force structure or to transform the Navy. The third option called for a focus on securing the global commons as a key element in the health of the global system. This option seemed to have relevance across most of the policy futures. The fourth option, one that came "over the transom" from outside the College, called for high-end forces to combat anti-access capabilities in northeast Asia and low-end forces for the Long War and engagement elsewhere. The final option, another one that came in from an outside source, was an outgrowth of the Selective Engagement policy future and called for raising war prevention to the same level of importance as war winning. Prevention was to be achieved through a combination of deterrence through strength and widespread engagement to reduce the causes of discontent, resource competition, and failed governance that could spawn wars.

These five options were offered to the Executive Committee. These were quickly winnowed down to three: war-winning power forward, securing the global commons, and war prevention. These three were carried forward for staffing and, eventually, were all combined into a single strategy—the one that has been published.

In looking at the completed document, an important aspect to note about the strategy is that it is meant to operate continuously. In this respect it is very different from contingent warfighting strategies of the past that would only be invoked in case of war. It is also different from the doctrinal strategy contained in the ". . . From the Sea" white papers. This strategy is meant to prevent wars and ensure a better peace by deploying and operating forces in a systemic fashion. Some have termed it a policy, not a strategy, and

that may be true, but in my view it constitutes a way of achieving strategic ends, which makes it a true strategy.

Another way to assess strategies is to consider how they use force to achieve their goals. Some are meant to achieve definitive checkmates of an enemy, either through brute force or maneuver. Others are coercive, posing threats or imposing destruction in order to extract concessions. This strategy is catalytic; its aim is to get our maritime services, our future administrations, and indeed all governments and navies of the world thinking in terms of cooperating to protect the global system.

The new strategy was announced in October 2007, and already there has been considerable analysis and critique. In reviewing the articles and blogs on the strategy, I have observed two principal criticisms or objections to it. The first is that it does not identify specific threats. A number of commentators feel that the strategy should have specifically mentioned China, Iran, and North Korea, at a minimum, as threats that need to be countered. My answer to this is that if the strategy's purpose is to prevent war among major powers and generate the widest possible maritime cooperation, why create hostility by singling out specific countries as threats? That is especially the case with China, with which we have a deeply interdependent economic relationship and which is working hard on conducting a "peaceful rise" foreign policy. It turns out that the strategy is getting some favorable reviews from the Chinese, which seems to me to be a small step forward that would not have taken place had we listed that nation as a threat. As the UNESCO preamble says: "Since wars begin in the minds of men, it is in the minds of men that the defenses of peace must be erected." To this end the Naval War College has already started implementing the strategy, by hosting a workshop with the Chinese navy on cooperation and avoidance of incidents. I think that remarks made concerning naval cooperation between the United States and China by a Chinese scholar in attendance at the workshop bear repeating here: "Thus, cooperation on noncompetitive issues may lay the interactive and cognitive basis for further joint efforts to mitigate the consequences of maritime and naval competition."

Another criticism is that the strategy does not prescribe force structure. As I already mentioned, the controversy over force structure that exists in the Navy cannot be solved by simply declaring a particular fleet size or composition in the strategy. For starters, such a strategy would have never survived the staffing process. By focusing on global strategic issues and ways, the strategy provides a basis for evaluating the utility of future force-structure proposals and avoids "taking sides."

No strategy document of ten pages can adequately explain the complex thinking that spawned it. It is clear to those who worked on developing the document that it can be easily misinterpreted, which is the price for being concise. It is also the price of

producing a consensus document based on a highly collaborative development process. But we hope that separate explanations, such as this one, can help people better interpret what the maritime strategy document is really saying.

Notes

1. For this and other gaming phenomena, see the author's "The Epistemology of War Gaming," *Naval War College Review* 59, no. 2 (Spring 2006), pp. 108–28, esp. p. 124ff.
2. For the development of that strategy see John B. Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy, 1977–1986,* Newport Paper 19 (Newport, R.I.: Naval War College Press, 2004).
3. Sir Julian Corbett, *Some Principles of Maritime Strategy* (London: Longmans, Green, 1918). See part 2, chap. 3, for a discussion of concentration and dispersal; see part 2, chap. 2, for a discussion of the roles of cruisers and the flotilla.
4. U.S. Navy, *A Cooperative Strategy for 21st Century Seapower,* pp. 4–5, available at www.navy.mil/maritime/MaritimeStrategy.pdf and reprinted in the *Naval War College Review* (Winter 2008), at www.usnwc.edu/Publications/Naval-War-College-Review/2008---Winter.aspx.
5. Alfred Thayer Mahan, *Naval Strategy* (Boston: Little, Brown, 1918), pp. 18–19. See also his *The Interest of America in Seapower Present and Future* (Boston: Little, Brown, 1918), pp. 182–83.
6. Mahan, *Interest of America in Sea Power Present and Future,* pp. 110–16. Interestingly, Mahan talks about the need not to force alliances but to let common interests, in this case between the United States and Great Britain, lead to a natural naval cooperation. This very much reflects the logic of today's Global Maritime Partnership—formerly known as the "thousand-ship navy."
7. Niall Ferguson, *The War of the World* (New York: Penguin, 2006), p. 73.
8. The Weinberger Doctrine, enunciated in 1984, and its derivative successor the Powell Doctrine (really a neologism concocted by journalists, but see Powell's article "U.S. Forces: Challenges Ahead" in *Foreign Affairs* for Winter 1992/1993) pose a series of questions that should be answered in the affirmative before military action is deemed both appropriate and practicable. The first question—Is a vital national security interest threatened?—reveals the shortcoming of both, as neither offers any geostrategic concept that would help an administration answer it clearly.

CHAPTER TWO

The Navy's Changing Force Paradigm

The recently issued *Cooperative Strategy for 21st Century Seapower* reflects an institutional response to America's changed strategic circumstances and embodies a logic that suggests a significant change to the Navy's force structure paradigm.[1] However, because the document is broadly worded, the service still has a lot of work to do to achieve an internal consensus on the implications of this logic for its future force structure. There is considerable intellectual "churn" associated with this shift, and the Navy has yet to come fully to grips with its implications for force structure. This article will attempt to describe the broad outlines of the paradigm shift and assess some of the programmatic implications, including the need for additional numbers of general-purpose surface combatants.

A naval force paradigm is a theory of how various types of ships and weapons available to a navy should be organized for warfare. The paradigm is governed by the characteristics of the principal naval weapons of the day and by the maritime strategy a nation pursues. In this nation's early days, the principal weapon was the naval cannon, which could hurl a twenty-four-pound shot about half a mile with effectiveness. The strategy of early administrations not to be drawn into European wars, coupled with their determination to protect American merchant shipping, produced a force paradigm of a small fleet of highly capable frigates, operating independently or in small squadrons. At the dawn of the twentieth century, as the United States elected to widen its strategic perspective and become a player on the world stage, its force paradigm shifted to a battleship-centric fleet, reflecting the governing weapon of the day, the large-caliber naval gun. With the advent of the airplane and the impetus of the Japanese attack on Pearl Harbor, the battle-line paradigm shifted to one of circular formations centered on fast aircraft carriers. In all of these paradigms there was a central ship type that supported the principal weapon. Other ship types supported the central type or performed such collateral, systemic duties as convoy escort, amphibious operations,

or minesweeping. As the Navy built budgets for submission to Congress, each type of ship, as well as its characteristics and numbers, could be justified based on its role in the existing force paradigm.

Of late, the Navy has come under fire from Congress and various pundits and think tanks for its inability to provide adequate justification for the proposed "DDG-1000" advanced destroyer, as well as for its decision to cut production of that type to three ships. Much blame is laid at the feet of current Navy leadership, especially as this issue is regarded as symptomatic of a larger problem with the service's shipbuilding plans. The call for a 313-ship navy by the Chief of Naval Operations (CNO), Admiral Gary Roughead, is regarded in some quarters as unaffordable and in others as based upon a number, be it too high or too low, that is supported by insufficient analysis. Part of the Navy's current difficulty with programmatics may indeed be institutional and procedural, consisting, in various degrees, of failures in concept development, cost estimation, and program management. However, the perceived credibility problem also stems from the fact that the Navy is in the initial stages of a fundamental naval force paradigm shift, one with implications for force structure that are not unlike the shift from a battleship-centric force to an aircraft carrier–centric force. Today, the increasing effectiveness of antiship missiles, along with the increasing lethality of antiaircraft defenses, is about to make necessary a shift from a force centered on "big deck" aviation platforms to one that is more distributed and oriented around missile-firing platforms—most prominently, submarines and surface combatants. In the process, the Navy will shift from a force paradigm it adopted in 1942 and has employed in a refined version since the end of the Cold War.

The ". . . From the Sea" Era

In September 1992 the Navy issued ". . . From the Sea," a white paper that responded to the radical alteration in global strategic conditions caused by the collapse of the Soviet Union.[2] With its only competition on the high seas gone, the U.S. Navy faced the prospect of losing its justification for being. As Samuel Huntington pointed out in 1954, a military service requires a viable strategic concept in order to generate the public support needed to secure funding for it.[3] ". . . From the Sea" represented that new concept: the Navy and Marine Corps would focus on projecting power ashore in support of joint operations. In a post–Soviet navy era, the United States was left as sovereign of the seas, and its navy, as the white paper asserted, "can afford to deemphasize some efforts in some naval warfare areas."[4]

The area that was deemphasized was sea control. Gradually, over the course of the next fifteen years, the Navy structured itself in alignment with the logic embedded in " . . . From the Sea" and its two successors.[5] However, this realignment was rather

easy, as the forces in existence at that time, especially the Navy's aircraft carrier and amphibious forces, were, by and large, suitable for the execution of joint warfare in an uncontested littoral. The force drawdown of the 1990s consisted mostly of disposing of various classes of sea control–focused surface combatants; the force settled upon a set of carrier strike groups (CSGs) and expeditionary strike groups (ESGs), oriented around big-deck aviation platforms. The transition was made all the easier because the Navy's dominant community at the time, carrier-based aviation, remained at the center of the new paradigm.

During the succeeding fifteen years, nearly to the present, the Navy could concentrate geographically as well as functionally. Deployments gradually narrowed to two focal areas, the Persian Gulf and Northeast Asia, where "rogue states" might commit conventional aggression against U.S. allies. The lack of serious naval threat and the emergence of precision-strike munitions in time allowed the Navy and Marine Corps to establish the idea of a "sea base" (a concept that has since been raised to a quasi-paradigm status), whereby American operations ashore in hostile or undeveloped areas would be supported from the sea, without the need for much infrastructure on land. Perhaps the apotheosis of this concept was Operation ENDURING FREEDOM, whose initial phase was supported almost entirely by a naval task force some seven hundred miles from the landlocked scene of operations in Afghanistan. Starting in the late 1990s, advocates of network-centric warfare (NCW) added momentum to the Navy's littoral focus by claims that dispersed, networked forces could generate higher levels of combat effectiveness with smaller, cheaper platforms. Vice Admiral Arthur K. Cebrowski, a key oracle of NCW, promoted "Streetfighter," a small, fast, networked ship that eventually emerged as the Littoral Combat Ship (LCS). This was only part of the transformation. DDG-1000, starting life conceptually as an "arsenal ship," was to be a survivable platform, mounting a high-tech gun, that would provide significant naval gunfire support to forces deep inland. As "The Navy Operational Concept: Forward . . . From the Sea" said in 1997: "We will be able to deliver a large volume of firepower through new ways of achieving very high aircraft sortie rates and new weapons and platforms for delivering joint fires."[6]

However, even as the Navy adopted this new force paradigm and aligned itself institutionally to focus on joint warfare in the littorals, factors were emerging—technological, economic, and political—that would eventually force it to reconsider. Among the factors most relevant for the present discussion were the progressive development and proliferation of ballistic-missile technology, potentially including antiship capability; the ability of American cruisers and destroyers to conduct midcourse intercept of some kinds of ballistic missiles; the emergence of China as an economic power and its construction of a capable navy; the terrorist attacks of 9/11 and their downstream effects; and the resurgence of an economically viable and potentially hostile Russia. As

these factors progressively manifested themselves, Navy admirals became increasingly uncomfortable with their service's institutional vector. This discomfort culminated in 2006 with then-CNO Michael Mullen's call for the development of a new maritime strategy. When it appeared in October 2007, the new strategy, while perhaps overly terse and virtually silent on the particulars of force design, contained a new logic that ran counter to the force paradigm set by the ". . . From the Sea" series of white papers.

The new strategy calls for "combat credible" forces (to be concentrated in Northeast Asia and the Persian Gulf regions), "globally distributed, mission-tailored forces," and a global maritime-security network—all welded together to prevent or limit regional conflict, render disaster relief, and provide other services necessary to foster and defend commerce and security. Viewed in the context of emerging blue-water navies, terrorists bent on smuggling weapons of mass destruction into the United States and allied nations, increasing exploitation of ocean resources, and interregional ballistic-missile threats, this new strategy strongly suggests a navy very unlike the one that has emerged since the Cold War.

A New Force Paradigm

It is, therefore, as a result of a changed strategic environment and a new but broadly worded strategy that the Navy is now attempting to accommodate a fundamental force-paradigm shift. In the past, years and much experimentation with ship types have been required to make the transition. There have been blind alleys. Whether battle cruisers or small aircraft carriers, these blind alleys were functions of conceptual uncertainty as to what the new governing weapon would be. That same uncertainty exists today; the Navy is struggling to find ways to make its current force more secure against missile and submarine attacks while at the same time its analyses are finding that a different approach may be necessary. In order to make sense of what is occurring and to develop a level of institutional confidence in its new direction, the Navy has reinstituted "Title X" war gaming, an arena it abandoned in 2001, and has developed a new strategic planning process meant to provide guidance to programmatic processes.[7]

As has been the case for the past 120-plus years, the service has turned to its war college to help think through the problem. Studies conducted at the Naval War College in Newport, Rhode Island, over the past few years have concluded that the combination of emergent weapons technology, political realignments, and economic trends points to a fleet that should possess different characteristics from the one in the water today—different even from some planned designs, like DDG-1000. These studies suggest that Navy forces should adopt a different style of war fighting, one that is more dispersed and flowing, not oriented to defensive bastions around sea bases of CSGs or ESGs. Moreover, the access-denial problem is fundamentally different in the Persian Gulf from what it is

in Northeast Asia, suggesting that the Navy should tailor its force by region and mission area. Further, studies suggest, the Navy does not necessarily need to design every ship for integration into a battle group. These findings are based, in some cases, on more than five years of continuous, iterative, and highly detailed war gaming, but even so they are still preliminary and must be subjected to additional gaming and analysis.

One kind of force paradigm that can be inferred from the results of these studies is a navy that consists of four principal segments. The first segment, an "access generation" force, would focus on employing missiles. The targets for these missiles would principally be opposing access-denial forces, whether ships, submarines, aircraft, or ballistic-missile sites on the shore. Given the difficulty of defending against modern missiles, this force would adopt a highly dispersed and covert posture in order to prevent the enemy from targeting it and to maintain combat credibility even in the most difficult crisis and brink-of-war situations. The exact constitution and operational doctrine of this force would be different in Northeast Asia from what it would in the Persian Gulf, due to the fundamentally different natures of the opposing forces and the maritime terrains. Generally speaking, this force would be centered on submarines, especially the converted *Ohio*-class SSGNs (formerly SSBNs) and surface ships such as the *Arleigh Burke* (DDG 51) class of guided-missile destroyers and the Littoral Combat Ship. The key will be generating targeting data for the missiles these platforms carry, but that is a better combat problem to have to solve than the defense of a carrier battle group.

Currently, the Navy relies on carrier-based strike fighter aircraft to perform the bulk of its sea-control and power-projection missions. The Chinese and others understand this and are working on ways to neutralize U.S. carriers and their embarked tactical aviation. To date, the Navy's response has been to focus on developing better defenses for carriers against submarines and cruise missiles. Such an approach, while logical and understandable, has always been problematic. History has shown that tactical defense is the most disadvantageous type of sea fight. If the Chinese are able to perfect an antiship ballistic missile, the problem could get worse. One solution is to disperse striking power among greater numbers of platforms that are hard to find and hit. The SSGN, with its ability to house 155 strike missiles, is a promising candidate. A strategy employing a "grid" populated with DDGs, submarines, and LCSs and using advanced missiles for both sea control and land attack might negate and neutralize investments in carrier-killing systems. Such an approach would make an overall naval operation more robust, as there would be no key ship type, the loss of one or two of which would unhinge the overall operation. Such an approach would also increase opportunities for deception, instilling doubt in the minds of potential opponents. This would be especially valuable in crisis situations. Concentrated and vulnerable naval forces can quickly turn into political liabilities, removing instead of adding to options. A hard-to-target force

packing lethal missiles would be much more likely to provide the necessary deterrence and influence.

The second force segment would be the "power projection" force, which would look much like what the Navy has today: CSGs and ESGs centered on big-deck aviation ships. However, instead of being the ubiquitous arbiter of naval power they are today, they would become a specialized role-playing force, not unlike the U.S. Seventh Fleet in World War II, which in effect constituted General Douglas MacArthur's "sea base" in his campaign up the Solomons and New Guinea toward the Philippines. That force was capable of anything but confronting the main Japanese fleet. The new power-projection force would generally operate in permissive environments but could support the access-generation force in certain instances.

The third force segment would be the "maritime security" force. Frequently supported by elements of the first two segments, this force would have specialized units conduct patrols for terrorists and criminals and help to catalyze a global maritime security partnership through extensive engagement. Other units, such as hospital ships, high-speed vessels, and others, would conduct systematic operations to establish a stable political and economic environment throughout the oceans and in the littorals. A recent Global War Game at the Naval War College that involved international naval officers as players revealed that our potential partner navies, especially those in Africa, regard any kind of grey-hulled ship as threatening. Therefore, new (and cheaper) types of vessels should be considered for global maritime partnership missions. Another insight gained from that game was that a broad cross section of international navies consider their principal mission to be law enforcement. This might seem a U.S. Coast Guard function, but because of severe limitations on the Coast Guard's size and because these partner services are navies as such, with defense missions in addition to law enforcement responsibilities, the U.S. Navy will have to find ways to engage in this arena. Therefore, this force segment is as much characterized by the sailors who man it as by the nature of its platforms.

The fourth force segment would be the series of maritime operations centers (MOCs) that is now being established around the world. These centers represent a force element in themselves, not simply command-and-control "overhead" for afloat forces; they will carry out various kinds of information operations that are critical to maritime security, power projection, and the screening of access-generation forces. In today's networked and media-saturated world, information is a weapon, much more than it was in the past. Obtaining and denying information are central operational capabilities, as is the ability to process and assess the meaning and significance of the avalanche of information available to naval forces. It is no longer sufficient for naval staffs to generate plans and issue orders; they must function as information clearinghouses and as operational units

in their own rights. As an indication of this changing warfare environment, the Navy is contemplating embedding task force commanders within the MOC and standardizing its task force structure on a global basis to make networked and interconnected staff operations more coherent. Another indication is the establishment of a maritime staff operators' course to train the personnel who will operate the MOCs.

Calculating Force Size

Traditionally, the overall size of the Navy has been determined principally by calculating the forces needed to fight the major theater wars that could most likely occur (Iraq, Iran, Korea, etc.), with some additional forces for "presence." Multipliers for maintenance and training cycles were added to arrive at the total force. However, this force is focused on the Middle East and East Asia. Its ability to generate engagement, humanitarian assistance, and disaster relief as well as ballistic-missile defense in other areas is marginal. However, the new maritime strategy is supposed to provide for the defense of global commerce and security on a continuous basis. Therefore, force-size calculations must now shift to a different basis. Some writers have discussed "high/low" mixes and different "modes." Under the new force paradigm, some traditional ship types, such as amphibious ships and aircraft carriers, will be employed at various times in operations undertaken by the access-generation and maritime-security elements. Thus it is neither accurate nor useful to talk about high- and low-end operations. The real question in terms of programmatics under the new paradigm will be how much capacity is needed in each element of the force. To use an old paradigm as an easy example, the Navy would not have wanted to overspend on battleships if it was to be able to buy enough cruisers and destroyers necessary for screening the battleships, let alone the logistic forces necessary for the fleet's successful forward operation. Moreover, there would have been a point of diminishing returns at which the incremental naval power generated by the next new battleship would not be worth its marginal cost. In this new paradigm, a careful calculation must be made of how much access-generation, power-projection, missile-defense, engagement, and disaster-relief capacity is needed worldwide. Clearly, the traditional major combat scenarios (major combat operations, or MCOs) will figure in the calculation of access-generation forces, but the Navy will have to establish a defendable criterion for force sizing outside this framework if the new force paradigm is to be achieved.

The new maritime strategy contains potentially useful logic for capacity calculations, even if that logic is as much implicit as articulated. The fundamental premise is that defense of the global system under current strategic conditions depends more than ever on the collective and cooperative action of nations and their navies. In order to catalyze and capitalize on this cooperation, the Navy must have at its disposal certain

capabilities—such as ballistic-missile defense, disaster relief, and partner capacity building—in all regions of the world. Each region's exact requirements would be a bit different from those of the others, but the steady-state peacetime defense scenario in each would be treated like an MCO for force planning purposes. If we assume that a transformed access-generation force will require fewer power-projection capabilities for MCO purposes, trade-offs can be made that would shape the force without much, if any, total growth in the overall tonnage, or at least overall cost, of the U.S. Navy.

To some this may sound like the Navy would be blunting its sword, but in an age of antiship missiles and advanced surface-to-air missiles, its current principal ship type, the *Nimitz*-class aircraft carrier, and its principal weapon, the tactical strike fighter, may not constitute as sharp an edge as they used to. The cost of keeping this ship type viable as an access-generation tool is probably all out of proportion to investments by others in threatening it. Recognizing the shift to the missile age is as difficult today for some officers as many officers in the 1930s found it to recognize that the airplane had superseded the large-caliber gun. But the last thing the Navy or the nation needs is a naval defeat like Pearl Harbor or the sinking of HMS *Repulse* and *Prince of Wales* in 1941 to bring home the lesson that times have changed.

The Centrality of DDG 51

One potential connecting link among the elements of the new force paradigm is the guided-missile destroyer. There are a number of reasons why the future Navy should be populated with a relatively large number of these warships. First, neutralizing ballistic missiles, whether they are aimed at shore or sea targets, is a critical function worldwide. This notion is supported by increasing Navy component commanders' calls for the stationing of ships with this capability in areas outside normal naval-presence hubs. Since sea-based ballistic-missile defense is a proven capability, the Navy should procure enough ships that can do it, not only to defend and support CSGs and ESGs but also to establish a viable ballistic-missile defense posture in virtually every region of the world. The key is to have enough of them to provide theater commanders flexibility in responding to emergent situations, including timeliness of response. For various tactical and technical reasons, they should operate in this role in pairs. *Arleigh Burke* guided-missile destroyers are also useful for signaling and other forms of naval diplomacy, as recently illustrated by the dispatch of USS *McFaul* (DDG 74) to deliver humanitarian supplies to Georgia. The logic of the move, as delineated by a Stratfor.com analyst, reveals the utility of the ship type:

> It is interesting, therefore, that a U.S. warship delivered humanitarian supplies to the Georgians. The ship did not use the port of Poti, which the Russians have effectively blocked, but Batumi, to the south. That the ship was a destroyer is important. It demonstrates that the Americans have a force

> available that is inherently superior to anything the Russians have: the U.S. Navy. A Navy deployment in the Black Sea could well be an effective counter, threatening Russian sea lanes.
>
> While it was a warship, however, it was only a destroyer—so it is a gesture, but not a threat.[8]

One of the key aspects of U.S. maritime strategy since the end of the Second World War has been the maintenance of naval forces forward, so as to keep them available to support American interests quickly. Timeliness of response has been a factor in a number of situations, ranging from the invasion of South Korea by the North in 1950 to the arrival of aircraft carriers in the Red Sea and the northern Arabian Sea in response to the Iraqi invasion of Kuwait in 1990. Significant lag times in arrival of naval forces can lead potential aggressors to think in terms of a "window of opportunity."[9] There is evidence that in 1982 the Argentine junta made its final decision for invasion of the Falklands on the basis of a report that the British nuclear submarine HMS *Conqueror* had just been dispatched from the Mediterranean to the South Atlantic. Once it arrived, the junta felt, nothing would be possible; therefore, it calculated, the interval between the ship's departure and its estimated arrival on the scene represented a window of opportunity, one that could not be wasted.[10] This logic suggests that U.S. naval forces be positioned such that no potential aggressor can perceive an operationally useful interim before they can be on station. This kind of responsiveness defines the necessary capacity—that is, the numbers of ships—the Navy should possess. Given the ship-by-ship superiority of U.S. Navy forces over their potential opponents, be they sea or shore based, the United States does not need to dispatch a fleet or battle group; in many cases a small, tailored squadron, even a single DDG 51, would suffice.

In today's world, inherently peaceful operations like humanitarian assistance may be threatened by cruise missiles. The fact that Hezbollah was able to surprise and hit an Israeli patrol boat with an Iranian-provided C802 coastal-defense cruise missile should be a warning flare to all nations with navies that such weapons can be obtained by nonstate actors and secretly positioned almost anywhere. Thus, nonmilitary or auxiliary ships sent for peace operations may require missile-defense escorts, at least until the security of the operations area can be assured.

Assuming that the capabilities of DDGs would be useful enough in every region for theater commanders to want at least two continuously available, and also that most cruisers would be assigned to group defense, a minimum of seventy-five DDGs would be needed for battle-group support, ballistic-missile defense, and independent missions. The Navy has programmed sixty-two; a force growth of thirteen would be feasible. However, the total number needed may grow even more if the Navy adopts the new force paradigm outlined above in order to overcome the increasingly formidable antiaccess force the Chinese are building.

The general tone of thinking laid out in this article has, in part, I believe, caused senior Navy officers to revise their positions on DDG-1000 and the DDG 51 class. This sea change in the Navy indicates the early stages of a paradigm shift away from a force centered on big-deck aviation platforms. Although assault ships (LHDs) and nuclear-powered aircraft carriers (CVNs) will continue to constitute a critical power-projection capability for the United States into the foreseeable future, the Navy will increasingly shift to dispersed but integrated surface and subsurface operations to constitute the credible combat power required by its new maritime strategy.

CNO has justified DDG-1000 as a technology demonstrator, and this corresponds well with the decision to build only three of them. Despite the current advantages of *Arleigh Burke* in system configuration and cost, and its projected utility, it is still a gas-turbine-powered destroyer that employs chemical-based weapons. As the technologies of rail guns, electromagnetic-discharge defenses, and electric drive develop, there will come a time when a new class of vessel is needed to take full advantage of them. DDG-1000s will provide the Navy and defense industry with valuable education in how to take some of these technologies to sea. In the meantime, the *Burke* class and the LCS will help make the paradigm shift for the U.S. Navy.

Fighting for Information

The new naval force paradigm will also feature a doctrine of fighting first for information. Not only must it be able to overcome opposition to get information (that is, to conduct "opposed ISR"),* but it must be able to fight to deny information to the enemy. Future sea fights for information will not be localized (the Chinese doctrine of "localized and limited wars under informatized conditions" holds that although the direct combat space of wars will be limited, the "related war space" will be expanded), and they will begin well before any overt outbreak of traditional hostilities.[11] The protective covertness that surface fleets have traditionally enjoyed is being threatened by new combinational arrays of ISR technologies including satellites, unmanned systems, over-the-horizon radars, the Internet, etc. The reach of these systems and networks will be global, so the information fight will be global, even if the "kinetic arena" is geographically constrained. An indicator that the Navy is starting to understand this can be seen in its initiative, mentioned above, to establish a network of interconnected maritime operations centers that will be capable of coordinating the information fight on a global scale. Under the new force paradigm, the MOCs will be a "screen" for naval forces. Given the immense advantages in range and endurance of unmanned aerial vehicles (UAVs), it is quite possible that aircraft carriers also will be part of the protective screen for distributed surface and subsurface forces, launching from safe distances arrays of UAVs that

* ISR: intelligence, surveillance, and reconnaissance.

will scout, relay, deceive, and even strike to help the subsurface and surface grid deliver its killing missile power.

The information fight will affect all three elements of the new naval force. Beyond its effects on the access-generation force as just discussed, the information fight is central to global maritime security. Maritime forces around the globe, from all nations, must have information on what and who is out there—on, over, and under the seas—in order to prevent terrorism, drug running, human trafficking, and poaching. Although current efforts are encountering political obstacles, eventually a global maritime picture will emerge. Here again, the centrality of the Navy maritime operations centers becomes evident as they become clearinghouses for maritime situational awareness. When functioning as staffs for joint force maritime component commanders, the MOCs will play a key role in the information fight associated with joint power projection. Thus the MOC represents a distinct element in the new naval force paradigm.

The new force paradigm described here is not a technological fantasy. It is most fundamentally a conceptual shift, one that will be useful in steering experimentation and investment along more affordable, and ultimately more useful, lines. We have in place a maritime strategy that can be used to establish a defensible basis for force-capacity calculations. The Navy has at its disposal, as it did in 1992, forces that can be readily adapted to the new paradigm, and it has already begun changing its command-and-control structure to accommodate the full range of operations called for in the new strategy. What remains is for the Navy to make the intellectual and emotional shifts to the new force paradigm.

Notes

1. Reprinted in *Naval War College Review* 61, no. 1 (Winter 2008), pp. 7–19; also available at www.navy.mil/maritime/MaritimeStrategy.pdf.
2. U.S. Navy Dept., ". . . From the Sea: Preparing the Naval Service for the 21st Century." For the publishing history of this white paper and the various sources posting or reprinting it, see John B. Hattendorf, ed., *U.S. Naval Strategy in the 1990s: Selected Documents,* Newport Paper 27 (Newport, R.I.: Naval War College Press, 2006) [hereafter Newport Paper 27], pp. 87–88 and notes, available at www.usnwc.edu/press/newportpapers/documents/NP27.pdf.
3. Samuel P. Huntington, "National Policy and the Transoceanic Navy," U.S. Naval Institute *Proceedings* 80, no. 5 (May 1954), p. 483.
4. U.S. Navy Dept., ". . . From the Sea," p. 1.
5. See Newport Paper 27.
6. See Newport Paper 27, pp. 159–60 and notes. The quote appears on page 12 as originally issued.
7. So named for Title X of the U.S. Code, which establishes the legal basis for the roles and missions of the services. See "President's Forum," *Naval War College Review* 61, no. 3 (Summer 2008), pp. 7–11.

8. S*trategic Forecasting Geopolitical Diary: U.S. Aid to Georgia Raises a Question for Russia,* 25 August 2008, Stratfor.com, www.stratfor.com/geopolitical_diary.

9. Margaret Thatcher, *The Downing Street Years* (New York: HarperCollins, 1993), p. 174. Thatcher clearly understands the logic of this when she says, concerning British decision making prior to the Argentine invasion of the Falklands, "Most important perhaps is that nothing would have more reliably precipitated a full scale invasion, if something less had been planned, than if we had started military preparations on the scale required to send an effective deterrent."

10. Lawrence Freedman and Virginia Gamba-Stonehouse, *Signals of War* (Princeton, N.J.: Princeton Univ. Press, 1991), pp. 65–78.

11. For Chinese doctrine, Peng Guangqian and Yao Youzhi, eds., *The Science of Military Strategy* (Beijing: Military Publishing House, 2005), pp. 415–17.

CHAPTER THREE

Talking about Sea Control

The year 1990 was a significant one in naval history. It marked the transition from a world in which the oceans were contested to one in which one navy had uncontested command of the sea. The evidence for this shift is that during the run-up to the first Gulf War with Iraq, the U.S. Navy positioned half of its total aircraft carrier striking power in narrow seas, splitting it between the Red Sea and the Persian Gulf. If there was any conceivable threat, such a move would have constituted strategic Russian roulette. The incipient demise of the Soviet Union and the evaporation of its fleet, along with Iran's decision to stand aside, made the only threat to U.S. ships the stub oil platforms in the Persian Gulf and some mines in the gulf's northern reaches.

In the two decades since, the U.S. Navy has enjoyed total command of the sea, so much so that it has stopped talking about sea control, even to the extent of forgetting *how* to. With the emergence in China of a robust area-denial force of great range and a navy capable of reaching beyond home waters, the time has again come to talk about sea control. This article will try to support the dialogue by discussing naval operational concepts that navies have used in the past and relating them to today's environment.

Naval Operational Concepts

The first thing to understand about naval warfare is that it almost never occurs between two evenly matched navies or fleets. There is always some imbalance, and it is the degree and nature of the imbalance that spawn the naval operational concepts admirals employ to squeeze the most strategic value out of their fleets. Thus the following discussion will be organized against a presumption of imbalance, starting with the concepts used by a fleet with great superiority and ending with those used by the weaker side. Also, it should be noted at the outset that it is hard to separate naval operations from merchant shipping; naval operational concepts frequently involve acting against another's sea commerce. This point will be blended in rather seamlessly in the concepts discussed below. A third factor underlying this examination is sanctuary. Because naval

warfare is characterized by the dominance of the tactical offense (he who shoots effectively first generally wins—a principle articulated by Wayne Hughes), sanctuary is needed to prevent the enemy from getting off a first shot or engaging in the first place. In an age of aircraft, missiles, and nuclear bombs, sanctuary is harder than ever to achieve.[1]

Blockade. A fleet that has great superiority may choose simply to bottle up an opponent's fleet and his commerce by stationing forces off his ports. The goal may be economic strangulation, or it may be simply to keep his fleet from getting to sea. This worked well in ages before aviation, when ships could operate out of shore artillery range (i.e., the enemy's sanctuary). Aircraft greatly complicate the problem, missiles and submarines even more. At some point a distant blockade becomes ineffective in a military sense and turns into commerce raiding, in an economic framework. Moreover, in an age where merchant ships have flags of convenience, multinational crews, international ownership, and cargoes that may change hands several times during a voyage, economic blockade becomes problematic.

From the Sea. A fleet that enjoys command of the sea (that is, establishes conditions in which the other navy cannot come out and challenge), or at least local sea control, but does not have the possibility of land-based aviation support can nonetheless bring with it everything it needs to project power ashore. In current terms, this is sea basing. The Leyte Gulf operation in World War II is an example. Given today's long-range aircraft, it is doubtful that there will be any more pure "from the sea" operations, although the initial operations in Operation ENDURING FREEDOM approximated such an undertaking, with the important exceptions that land-based tankers and reconnaissance aircraft were available. The British operations in the Falklands in 1982 also came close. Smaller-scale sea-basing operations might be mounted purely from the sea, and the modern expeditionary strike group is well designed for such a concept.

Air-Sea Battle. The stronger fleet, whether or not it encounters opposition, may be supported by land-based aircraft to a significant extent. General Douglas MacArthur's Southwest Pacific campaign in World War II constituted a good example; his operational jumps reached only as far as the operational radius arcs of his land-based fighters. Today it is hard to imagine any major naval operation that would not represent some form of this concept.[2] Of course, we can blend space and cyberspace into this concept too—and surely will. The defensive converse of this concept would be the operation of an area-denial force, like that which the Chinese are building, in the littoral. The idea would be, using a combination of ballistic missiles and shore-based aircraft in conjunction with submarines and surface ships, to present the U.S. or other navy with a multidimensional threat that would be too hard to deal with. In both the offensive and

defensive versions, the coordination of land-based and sea-based forces is critical, but that is something that has not often been satisfactorily achieved.

Decisive Naval Battle. In a contest for control of the oceans between two capable navies, a decisive battle has been the goal of the stronger. This is what Nelson sought in 1805 as he chased the combined Franco-Spanish squadron, and it is what Yamamoto sought in 1942 at Midway. Generally speaking, the weaker force will attempt to avoid such an engagement, but every once in a while circumstances conspire to precipitate one. Trafalgar was produced by Napoleon's ordering Admiral Villeneuve to sortie, and Midway was produced by Chester Nimitz's recognition that an ambush was possible. There might have been one off the Falklands in 1982, had there been sufficient wind for the Argentine carrier to launch its strike aircraft and had the aircraft then inflicted damage on the British carriers. In today's world there is little or no chance of such an engagement, except possibly among two smaller navies.

Fleet-in-Being. A navy that is strong but reluctant to roll the dice on a decisive battle might elect to avoid engagement but still present a threat to the stronger navy that would keep it from doing what it wanted (like projecting power ashore). In 1690 Lord Torrington, commanding the Anglo-Dutch fleet, adopted such a concept by keeping his fleet upwind of the French. Although suffering a defeat at the battle of Beachy Head, he kept his fleet intact, such that it constituted a threat to any invasion operation (which would compromise the mobility of the French force) but could not be brought to battle. Thus it achieved its strategic goal of preventing an invasion. The key to making a fleet-in-being strategy work is sanctuary. Today sanctuary is hard to find. However, diesel submarines might constitute a fleet-in-being if they went to sea and "got lost." If they could avoid detection they might constitute a sufficient threat, at least for a while, to keep the stronger navy (presumably American) from projecting power as it wished. A lone Argentine Type 209 submarine almost did this in the Falklands; the British task force used up almost all its antisubmarine weapons on false contacts. Other sources of sanctuary might be political alignments or dense umbrellas of missiles and aircraft.

Commerce Raiding. A navy that is not strong enough even to constitute a fleet-in-being might try commerce raiding (also known by the French term *guerre de course*). The Germans resorted to it in both world wars. This concept requires sustained and systematic operations and therefore sanctuary for the bases of the raiders (since the early twentieth century, usually submarines). In an age of jet bombers and missiles, achieving such sanctuary is hard to imagine today, except perhaps for the U.S. Navy. Moreover, the same factors that complicate blockade make commerce raiding almost infeasible in the

current environment. In any case, if the U.S. Navy attempted to interdict Chinese commerce, nuclear escalation could become an issue.

Delay, Disruption, Denial, and Demoralization. If a navy is not strong enough for anything else, it can attempt "delay, disruption, denial, and demoralization" (D4) operations. That is, it can send out units to try to do enough damage to the stronger force (which is presumably attempting to project power or blockade) to cause that force to abandon the operation or at least delay it, giving the weaker power some strategic breathing space. The effects of the "hits" may be physical, such that the operation cannot continue, or they may be demoralizing, either to the force itself or the attacking nation's public or leadership. The Argentine strategy after its fleet retreated to port was of this nature, and it almost worked when the containership *Atlantic Conveyor* was sunk by an Exocet. The Japanese SHO plan in World War II was also a D4 strategy. One of the elements that make a D4 strategy dangerous and potentially effective is the resolute acceptance by its implementer of the prospect that what it sends out will not come back. A D4 strategy is normally not sustainable unless—and this is a big *unless*—the weaker side has some kind of sanctuary that enables it to hide its forces until they are used and thereby meter them out over time. Mines and coastal submarines are potentially effective D4 tools. Such operations that are maintained for a substantial length of time essentially constitute "irregular warfare" at sea.

Maritime Security. Though not universally recognized today as a true area of naval warfare, maritime security has nonetheless been raised to a naval strategic imperative by the possibility that terrorists might sneak nuclear or other weapons into the United States or a friendly nation by sea. Given the economic and political disruptions caused by the 9/11 attacks, a seaborne insertion of weapons of mass destruction could be regarded as having the strategic importance of a conventional invasion. Maritime security thus occupies the same level of importance for the U.S. Navy as did fleet-based defense of the hemisphere in Alfred Thayer Mahan's time. Maritime security in today's world requires an almost seamless blanket of awareness and cooperation over all the world's oceans. Thus it is inherently an international naval mission; the U.S. Navy's job is to help catalyze this cooperation. In fact, as an operational concept, maritime security today is different from the others in that it is absolutely dependent on the integrated operations of both strong and weak navies.

Bastions and Maneuver. If the principle of dominance of the offense at the tactical level holds true, which it has for the majority of naval history, logic says that trying to establish strongpoints or bastions at sea is a losing proposition. Two exceptions—where the defensive at sea has worked—have, by their rarity, the effect of proving the rule.

The first is the clash between USS *Monitor* and CSS *Virginia* in March 1862, during the American Civil War. These ships being the first ironclads, naval guns and shells that could pierce armor did not yet exist, and thus the cannonballs of each bounced off the other. Less than a century later, the battle of the Philippine Sea in June 1944 was a triumph of integrated air defense due to the slowness of Japanese bombers and to the American use of radar to direct fighters, as well as of VT (proximity, or "variable time") fuses on antiaircraft shells. Today, although U.S. cruisers and destroyers carry the incomparable Aegis weapons system, modern antiship missiles have capabilities and characteristics that make them very hard to detect and shoot down. Submarines and mines are still very difficult to find. Naval leaders must still consider very carefully the fact that if "the other guy" knows where to find you, he can likely find a way either to evade or saturate any defensive scheme. If nothing else, he may just get lucky. Therefore, when there is a sea-control threat, maneuver is a requirement until that threat is neutralized.

That point raises the issue of the modern "sea base," essentially a stationary strongpoint at sea. In some U.S. Navy publications, the definition of the term is stretched to include almost any grouping of ships at sea, regardless of how they are arranged or maneuvered. Such definitions have more relevance to inter-service budget competition than actual utility in naval operational art. A sea base is intrinsically a group of ships supporting an operation ashore. Accordingly, its scope of operational maneuver is highly restricted, as is the degree of tactical maneuver that can be tolerated if support to the shore is to remain effective. But history has taught navies not to get themselves into situations in which they must risk a disaster ashore in order to avert one at sea, or vice versa. This was Admiral Frank Jack Fletcher's dilemma right after the Guadalcanal landings in 1942: he felt constrained to remove his "sea base" of aircraft carriers before it could be attacked by the Japanese, since his carriers were the only operational ones in the Pacific. Thus, in theory, a navy should not attempt to project power ashore until it has achieved sea control. But the theory almost never holds. A smart opponent will wait until the attacker is lodged ashore and cannot maneuver without invoking the dilemma above. This was the Japanese plan at Guadalcanal (from which resulted the first battle of Savo Island, disastrous for the Americans), Saipan (and the battle of the Philippine Sea), and Leyte (the SHO plan). The same dynamic was illustrated with the Argentine D4 operations during the British landings at the Falklands. Attempting to create and defend bastions at sea entails risk.

Aircraft Carrier Doctrinal Roles

If there were no sea-control threat, there would be no need to discuss the doctrinal roles of carriers. As a new and uncertain modern world emerges, it is time to review how

aircraft carriers have been used during their history. They are high-value units, and accordingly their use has always been governed by the degree of risk it is appropriate to incur; the doctrinal roles for carriers are centered on this aspect of their operations.

Eyes of the Fleet. The original use envisioned (at least by battleship admirals) for carriers was behind the battle line, out of harm's way, sending aircraft to scout and spot for the battle line. Interestingly, this may be a future role for our carriers. They stay far out at sea, beyond the range of missile-based access-denial systems, and send in ultra-long-range unmanned aerial vehicles for intelligence, surveillance, reconnaissance, and communication relay in support of a grid of submarines, destroyers, and other craft "inside the arena."

Cavalry. In early 1942, aircraft carriers supported the Doolittle raid on Tokyo, as well as a number of hit-and-run raids meant to disrupt Japanese operations. In these, the carriers relied on the protective cover of a large ocean. The missions were such that the carriers, if detected, could immediately run for safety; standing and fighting would have been suicidal. So long as a carrier can remain unlocated, it can speed around and deliver quick pulses of aerial bombardment.

Capital Ship. When in World War II a decisive naval battle became possible, as at Midway, carriers would stand and fight. Nimitz's definition of calculated risk nicely captures the logic of committing capital ships to a desperate fight: "You will be governed by the principle of calculated risk, which you shall interpret to mean the avoidance of exposure of your force to attack by superior enemy forces without good prospect of inflicting . . . greater damage on the enemy." Any capital ship is a "consumable" in such a fight, but not cannon fodder. Thus, when there was a prospect of inflicting greater damage to the other fleet, carriers could be risked, and of course some were lost. By the way, a capital ship is that ship type that is most capable in a fight for sea control and around which the tactics of the fleet are centered. "Capital ship" is thus a doctrinal term related to sea control, not a general phrase describing any big, expensive naval ship.

Nuclear Strike Platform. After World War II, in the "Revolt of the Admirals" era, the Navy pressed its carriers into service as nuclear strike platforms. This was due not only to interservice fights with the Air Force but also to genuine concern that the slow B-36 bombers might not get through. The carriers had to survive to get to their launch positions; after that, all bets were off. Carriers retained their nuclear missions until the 1980s, when the evolving global situation made the massive Single Integrated Operational Plan obsolete.

Air Base at Sea. When carriers provide continuous support to operations ashore, they are functioning as air bases at sea—that is, as a kind of sea base. As such, they are constrained in their maneuvering and thus cannot tolerate any risk from sea-control threats. This is the mode in which aircraft carriers have been operating for virtually the whole post–Cold War era. Trying to use them in this mode in a sea-control situation almost guarantees they will take hits. During the Falklands War, the British had to use their carriers as sea bases, but because there was a sea-control threat from the Argentines, the carriers had to be kept out of harm's way. This meant that their short-legged Harrier jets could not provide adequate air defense for the San Carlos beachhead, and a number of destroyers and frigates were lost as a result. When carriers try to function as air bases inside the range arcs of sea-control threats, they must try to erect bastions around themselves. As previously discussed, this is a debatable proposition.

Water Colors

Reference is heard in naval circles to three metaphorical "colors" of water: blue, green, and brown. They denote generally the proximity of land: "blue" water, the oceanic, reaches farthest from land; "green" water is the oceanic littoral; and "brown" water comprises rivers, bays, and estuaries. In the Cold War, these colors had more specific meanings. Blue water meant those areas of the ocean in which only other naval forces could confront one's own. Green water denoted those areas of the ocean in which naval forces could be confronted and affected by land-based aircraft. Brown water was that zone of the ocean that could be covered by ground-based artillery. This distinction had some vague planning value, but the advent of long-range jet bombers carrying antiship cruise missiles made virtually all of the oceans "green." In the era of total U.S. Navy dominance after the Cold War, the "colors" of water all but disappeared, other than in characterizations of a navy as "blue water," which meant oceangoing, capable of more than purely littoral operations. With the emergence of very capable sea-denial forces and oceangoing navies that might turn out to be adversaries, there is utility to readopting this shorthand, but with new definitions. The new basis of definitions would be the kind of naval forces that can operate at an acceptable degree of risk in water of each color.

Blue water would denote those areas of the ocean in which naval forces structured around high-value units (usually aircraft carriers or large amphibious ships, but perhaps in the future such things as arsenal ships as well) can operate. High-value units (HVUs) concentrate a substantial proportion of the force's offensive combat power in a single ship, the loss of which would likely unhinge a whole operation or at least significantly reduce the odds of its success. These ships are normally surrounded by a screen of cruisers and destroyers, as well as perhaps submarines operating in more distant support;

the idea is to create a defensive bastion around the HVU that can fend off attacks by submarines, aircraft, other surface ships, and missiles. An HVU-centered naval formation relies on not only defensive firepower and electronic countermeasures but also maneuver to defeat attacks. Such maneuver seeks to deny detection and targeting as well as to force enemy units, especially submarines, to engage in such disadvantageous actions as speeding up in order to attack. If an HVU and its escort are far enough out at sea, the odds will be in their favor: they have plenty of room for maneuver, and an opponent can muster fewer forces against them. Blue water comprises those areas of the ocean where both of these conditions obtain. The weaker the opponent, the closer to shore blue water exists.

If an opposing nation possesses powerful antiaccess forces, especially if they consist of capable submarines, aircraft, surface vessels, and missiles, there comes a point at which the ability of the screen protecting an HVU risks being saturated. Depending on the sophistication of the antiaccess force—in terms of advanced missiles that are hard to shoot down, numerous tactical aircraft, robust sea surveillance and targeting, etc.—the distance at which saturation could occur varies. A small boat–based force can reach out only a few miles; one possessing antiship ballistic missiles can reach out hundreds. As an HVU-centered force moves inside the range arcs of various antiaccess systems, the defense problem becomes more difficult. Instead of just submarines and long-range bombers, the screen now has to deal with surface vessels (like fast missile boats), land-based tactical aircraft, and shore-launched missiles. Threats become not only more diverse but also more numerous. As the force moves in, the likelihood of "leakers" (missiles, aircraft, submarines, etc., that survive screen defenses to get a shot at the high-value unit itself) increases. Depending on the strategic and operational situation, there is a point at which the risk to the HVU becomes incommensurate with the nature and value of its mission. It is at that point that blue water would turn green.

Green water, in the new scheme, would embrace those areas of the ocean into which it is not rational to send HVUs. In green water, a different approach to naval warfare would have to be taken; offensive power must be dispersed into a number of vessels that have sufficient stealth and other characteristics that make them capable of operating in these areas, where antiaccess systems are capable of "ganging up" on high-value units. At first glance, this may seem to mean only submarines could enter green water, but certain kinds of surface combatants might be usable as well. What seems clear is that the offensive weapons of necessity in these waters would be missiles, torpedoes, and mines (be they launched from manned or unmanned vessels). The "names of the game" in green water would be hiding, deception, countertargeting, and ambush—and also, conversely, reconnaissance, targeting, and communicating. Given the lethality of modern antiship missiles, torpedoes, and mines, naval forces entering green waters

would be at significant risk, whether attacking or defending. As space, missile, and other technologies improve, the proportion of green water in the world will expand.

Brown water, in the new order of things, would not simply be "worse green water" but zones in which oceangoing units could not operate effectively at all. Generally speaking, this would mean waters that are too shallow, narrow, or infested with mines. In brown water, only smaller craft could operate effectively, whether or not there was any actual opposition. While brown water clearly denotes rivers and some bays, it would not necessarily be limited to them. Depending on opposition and other conditions, certain seaward littoral areas, as well as straits and other choke points, might be regarded as brown water.

These new definitions, if they became widely accepted, would represent a useful shorthand for planning and discussing sea control. The very fact of acknowledging that green water, as just defined, even exists would lead necessarily to force-structure decisions that would in turn produce a naval force that is at least a bit less centered on high-value units than at present. Moreover, determining where potential naval missions exist in brown water might yield a force that was not simply "riverine" in nature. Using these water colors, with the proposed definitions, could enhance dialogue on sea control and point to a force more usefully adapted to the emerging strategic and operational environment.

The Discipline of Sea Control

When a navy's sea control is challenged, life is more difficult. That navy cannot assume free access to the littorals, and it may face the prospect of being attacked far out at sea, depending on the particulars of a dispute. Since the best protection for a naval force is to be unlocated in the vast ocean, the force must not only develop measures for achieving this condition in wartime but must set things up accordingly in advance, in peacetime. Thus a navy that contemplates opposition must attain an operational discipline that includes not only tactics and weapons but also command-and-control doctrine and nodes, as well as integration with diplomatic circles. The U.S. Navy allowed this discipline to erode in the Vietnam era, when it focused all its energies on power projection. Consequently, when a true sea-control challenge arose, in the form of the Soviet Fifth Eskadra during the Yom Kippur War in 1973, the U.S. Navy had neither the weapons nor the tactics to deal with the situation.[3] Only after the crisis (mercifully) blew over did the Navy take up rediscovering sea control. Since 1990, however, the Navy has again focused on power projection and, again, has lost the discipline of sea control. Perhaps this article will stimulate a new rebirth of this discipline before the Navy is confronted with a new challenge for which it is unprepared.

Notes

1. Wayne Hughes, *Fleet Tactics: Theory and Practice* (Annapolis, Md.: Naval Institute Press, 1986), p. 25.
2. For a theoretical, doctrinal, and historical examination of the nature, planning, and conduct of major naval operations generally, see Milan Vego, *Major Naval Operations,* Newport Paper 32 (Newport, R.I.: Naval War College Press, September 2008), available at www.usnwc.edu/press/.
3. For this episode see Lyle J. Goldstein and Yuri M. Zhukov, "A Tale of Two Fleets: A Russian Perspective on the 1973 Naval Standoff in the Mediterranean," *Naval War College Review* 57, no. 2 (Spring 2004), pp. 27–63, available at www.usnwc.edu/press/.

CHAPTER FOUR

Command of the Sea
An Old Concept Resurfaces in a New Form

Whosoever commands the sea commands the trade; whosoever commands the trade of the world commands the riches of the world and consequently the world itself.

SIR WALTER RALEIGH

For in war . . . the common sense of some and the genius of others sees and properly applies means to ends; and naval strategy, like naval tactics, when boiled down, is simply the proper use of means to attain ends. But in peace, as in idleness, such matters drop out of mind, unless systematic provision is made for keeping them in view.

ALFRED THAYER MAHAN

The last great sea battle occurred in 1944. Since then the world ocean has been open to free navigation by all nations as a matter of American policy. The ability to enforce this policy—or perhaps better said, the absence of serious challenges to this policy—has been in significant part a product of the superiority of the U.S. Navy. Despite a latent and partial challenge during the Cold War by the Soviet navy, since World War II the degree and persistence of U.S. Navy superiority have led most people to take it for granted and have caused the old term "command of the sea" virtually to disappear from the naval lexicon.[1] However, the emergence of a powerful Chinese navy and an associated land-based sea-denial force is stimulating a new focus on sea control and overcoming anti-access/area-denial efforts. New concepts, such as "AirSea Battle," are being developed and investments made in platforms, weapons, and systems. This activity is critical to American strategic interests and prospects, and it must be informed by an understanding of command of the sea as a foundational concept of sea power. A reconsideration of command of the sea is all the more necessary as political, economic, and technological developments have significantly changed the nature of how sea power influences the

dynamics of geopolitical interactions. This article will argue for an extended definition of the term and its renewed application to naval strategy and doctrine.

The Evolution of the Term

"Command of the sea" denotes a strategic condition, and it is from this actual condition that the logic flows, whatever words are used to describe it. Since ancient times, navies have sought to control communications on the sea. Such control might be general—such as the Romans and British achieved at various times—or it might be local and temporary. In either case the object of such control has been to protect one's own commerce, disrupt the enemy's, move one's own army, and prevent the movement of the enemy's. At various times and places belligerents have built substantial navies to carry out these missions and in the dynamics of their competitions the notion of command of the sea emerged. "Command" denoted a relative strength relationship between two or more navies in which one enjoyed a significant superiority such that the freedom of action of the others to carry out the four basic missions of sea power was constrained and that of the stronger navy enhanced.

By the time the American naval historian and theorist Alfred Thayer Mahan wrote about sea power, international trade as a foundation for a nation's economy had become an inherent element in the concept of command of the sea. Although Mahan did not use the term directly, his notion of "that overbearing power on the sea which drives the enemy's flag from it, or allows it to appear only as a fugitive; and which, by controlling the great common, closes the highways by which commerce moves to and from the enemy's shores" encapsulates the strategic condition in which not only is the enemy's navy unable to interfere with the movements of one's own army but his sea commerce is so constricted as to starve his economy.[2]

Mahan was an advocate of keeping the U.S. battle fleet concentrated in order to counter any European adventurism in the Western Hemisphere.[3] However, this was a tacit admission that the United States of the late nineteenth century did not enjoy command of the sea on a global scale. That belonged to the Royal Navy of Great Britain. Sir Julian Corbett was a British historian who also developed naval theory. In his view, command of the sea, conferred by the defeat or blockade of the enemy's battle fleet, allowed one to disperse one's own naval forces to exercise sea control in specific areas as the need arose.[4] The dispersed fleet could also perform other functions, such as showing the flag and projecting power ashore. Fleet dispersal highlights the other side of the naval strategy coin—sea control. Whereas command of the sea denotes a specific kind of general superiority, "control" is delimited in space and time. Command is associated with capital ships and the main battle fleet; if the enemy cannot challenge one's main battle fleet, then one has some degree of command. Control is usually, but not always,

fought for and exercised by smaller, more numerous combatants. This distinction tends to be lost on many who see these terms as synonymous. Command has been traditionally about the relative strength of fleets, whereas control was and is about the condition of a water space.

The introduction of the submarine and aircraft in the world wars threatened the idea of command of the sea. If the enemy always has the ability to contest control in any area of the sea, whether or not he has a viable battle fleet, there is nothing available to the stronger navy beyond a rather tenuous and local sea control. However, the unconditional surrender and occupation of the Axis powers in 1945 eradicated their air and subsurface threats. The fact that no other viable hostile navy existed at the time gave the navies of the United States and the United Kingdom command of the sea by default. The absolute magnitude of this command added yet another dimension to the concept.

A critical element of this article's argument is the notion that the definition of command of the sea can be extended to peacetime. Those who feel that the concept applies only to wartime tend to base their view on Sir Julian Corbett's assertion that most of the ocean is uncommanded most of the time:

> The object of naval warfare must always be directly or indirectly either to secure command of the sea or to prevent the enemy from securing it.
>
> The second part of the proposition should be noted with special care in order to exclude a habit of thought, which is one of the commonest sources of error in naval speculation. That error is the very general assumption that if one belligerent loses command of the sea that command passes at once to the other belligerent. The most cursory study of naval history is enough to reveal the falseness of such an assumption. It tells us that the most common situation in naval war is that neither side has command; that the normal position is not a commanded sea, but an uncommanded sea. The mere assertion, which no one denies, that the object of naval warfare is to get command of the sea actually connotes the proposition that the command is normally in dispute. It is this state of dispute with which naval strategy is most nearly concerned, for when the command is lost or won pure naval strategy comes to an end.[5]

In Corbett's framework, command is that condition imposed by one navy on another during wartime, and though the effects may extend globally, the arenas of the contending fleets are limited to regions.[6] Moreover, as revealed by the quotation above, Corbett's definition tends to weave between describing a condition of relative strength between two fleets and the status of an area of water. In this author's view, command strictly denotes the balance of power between or among navies. Water areas may be controlled or not. Conflation of relative strength with water space leads to the kind of error that Corbett himself decries, the kind of error that led to allied efforts early in both world wars to secure the sea-lanes. It turned out that all that could be done was to adopt the convoy system and hunt U-boats from the air. Even the concept of sea control, concerned as it is with military conditions in a specific time and space, is ultimately about ships and whether they can be effectively defended or attacked. Command of the sea, then, is a

statement about the relative power of navies and the perceptions that attend asymmetry in power. Such asymmetry exists in both peace and war.

In today's globalized world, one characterized by endemic struggle and conflict, nuclear weapons, the Internet, mass communications, and ubiquitous sensing, the dynamics of interstate, intergroup, and intercorporate relations have produced a world of continuous contention, the characteristics of which are significantly influenced by who can do what in the global commons. The geopolitical fact of American naval supremacy influenced the history of the Cold War, just as it influences the dynamics of today's world. Extending the definition of command of the sea temporally (into peacetime) and geographically (to global scope) appears to offer analytic utility in this environment, aiding in the assessment of appropriate risk for naval forces and in the development of effective maritime policies and strategies. In today's world, sea power, even for nations with small coastal navies, cannot be properly understood on any scale less than global. Command of the sea of the kind achieved by the United States and Britain in 1945 is directly associated with overall military and economic superiority, which in turn allows a nation to establish a world order on its terms.[7] Given that the United States and Great Britain were liberal maritime trading democracies, such command underpinned the achievement of the Bretton Woods accords of 1944 and the subsequent evolution of the global system of commerce and security. As Clark Reynolds puts it, "As in the past, however, international agreements depend on the willingness of the participants to live up to them and especially upon the acquiescence of the great powers which are capable of commanding the seas."[8]

The issue of potentiality is also central to the argument. Carl von Clausewitz asserts that possible engagements are to be regarded as real ones because of their consequences.[9] Whereas Corbett regarded command as an operative fact in war, this article seeks to establish command of the sea as a condition in which the various actors perceive the U.S. Navy as enjoying superiority and shape their actions accordingly. These actions may consist of decisions on whether to build a navy to challenge that superiority or decisions on whether and how to support, or at least go along with, American policies. Some of this could be wrapped up into "suasion," as described by Edward Luttwak: "Latent naval suasion continuously shapes the military dimension of the total environment which policy makers perceive and within which they operate."[10] However, for the purposes of assessing risk in the development of naval strategies and doctrine, it is useful to understand modern command of the sea as a condition of naval superiority that influences other nations' decisions in a way that is congenial to U.S. interests, especially as it relates to the maintenance of a global security system that supports the operation of a global economic system.

The onset of the Cold War generated a set of geopolitical parameters that provided context for the way American command of the sea made its presence felt. The development of huge arsenals of nuclear weapons created massive disincentives for the United States and Soviet Union to go to war directly with each other. The USSR, a continental power, attempted to create buffer states and to export its ideology via subversion and proxy wars. The United States was able to adopt a grand strategy of containment based on its command of the sea—which conferred, among other things, the ability to transport the U.S. Army to where it was needed. Moreover, this freedom of movement on the seas was a major factor in gluing together the cordon of alliances that hemmed in the USSR. The Soviets, for their part, built a large submarine fleet that was potentially capable of contesting U.S. command. However, the nuclear balance made the actual use of this capability problematic, and the established fact of U.S. command of the sea could not be reversed short of war.

Nuclear weapons governed another facet of command of the sea as well—concentration. The power of nuclear weapons meant that a whole fleet arrayed in a traditional formation could be wiped out at a single stroke. While methods of tactical dispersal were developed, the larger issue was strategic dispersal. To play its part in the implementation of a globe-girdling strategy of containment, the U.S. Navy had to disperse its forces into multiple regions in any case. Each carrier battle group was more powerful than any local force it could conceivably encounter. On only one occasion, the 1973 Yom Kippur War, were the Soviets able to assemble a locally superior force. Even then, the constraints of nuclear balance and emerging détente prevented the Soviets from leveraging their advantage. The command of the sea achieved by the United States at the end of World War II put it in a military, geographic, and economic position of leadership and advantage that could not be effectively undone by the Soviets in the nuclear age—short of risking nuclear war.

The fall of the Soviet Union created a unipolar situation in which U.S. command of the seas was, if anything, even more complete than at the end of World War II. The total absence of competition made the whole concept seem obsolete and thereby invisible—submerged, as it were, in a sea of peace. The U.S. Navy, though, maintained its global pace of operations, an indication that there was still some geopolitical function that needed to be performed. What was happening was that the process of globalization had kicked into high gear, partly as a result of the Soviet Union's collapse and in part as a result of new global communications technology, including the Internet. The nations of the world were becoming economically interdependent, and what the process needed was comprehensive global security.[11] The Gulf war of 1991 spotlighted the issue of regional instability, and naval forces seemed to be on call almost everywhere. American command of the sea, instantiated by a fleet sufficiently large to sustain capable presence

in multiple regions, continued to define the geopolitical environment of the post–Cold War era.

It should be noted that one of the earliest manifestations of command of the sea—preventing an enemy from moving his army by sea and driving his commerce from the sea—had by now lost its salience. Fleet dispersal was by now an inherent modus operandi for the U.S. Navy. With American global leadership now a virtually unassailable fact, all the factors associated with "command of the sea" disappeared below the waves, and with them use of the term.

Command of the Seas Resurfaces

We must ask why command of the sea could now be relevant again. The answer lies in the changed set of geopolitical circumstances. The issue is not simply that China is building a more capable navy. The point lies in the nature of the global system that has emerged and in the potential consequences for that system if the U.S. Navy suffers even a local defeat at the hands of China, Iran, or some other power.

The process of globalization has created a closely coupled global economic system in which the degree of economic interdependency among nations has made the smooth and uninterrupted flow of resources, goods, and information critical to the economic well-being of all nations. The system can be visualized as a set of nodes and connectors. The nodes are resource-extraction-and-production areas, manufacturing areas, and consumption areas. These nodes are in some cases geographically focused, but most often they are widely separated and geographically noncontiguous. Connectors consist of commercial maritime shipping, airlines and airfreight carriage, mass media, telephony, and the Internet. All this creates a complex economic topology that is tightly interdependent. Consumption places demand on manufacturing, which in turn places demand on resources. Within the manufacturing node, production has become highly parsed, with components for particular goods being made in multiple countries and being shipped, in an intricate global ballet of just-in-time delivery, ultimately to the country that assembles the final product.[12] The history of the last two decades is one of nations joining the system, not leaving it. It is likely that this system possesses a degree of adaptive self-healing capacity to contend with shocks like natural disasters. However, it is not clear what the consequences would be if one nation or bloc of nations withdrew from it or attempted to subvert it by imposing a different rule set.

China is a continental power that is pursuing a continental-style grand strategy. A Eurasian authoritarian regime, the Chinese Communist Party (CCP) must garrison its own territory to ensure national integrity. Security for such a regime radiates out from the capital to the national borders. Typically, continental powers from Rome onward

have been unable to arrest their security strategies at their frontiers; they have always felt compelled to establish buffers, in the form of neutralized states or occupied territories, which they eventually incorporate into an empire. This process also takes place at sea, which appears to be manifest in China's focus in its "near seas." China's ambitions in this process have brought it into conflict with neighboring states that claim the same islands and sea areas as Beijing does. Although China has benefited greatly from participation in the global system, for various reasons the CCP would like to change the rules of that system or even create an alternative one, with China as its leader.[13]

China's People's Liberation Army and its component navy (the PLAN) have, in pursuance of its buffering strategy, developed an array of missile, air, and naval forces designed to deny the U.S. Navy access to the ocean areas adjacent to the Chinese mainland, including the Yellow Sea, East China Sea, South China Sea, and even the western portions of the Philippine Sea. In the first instance, these forces are meant to prevent interference by the U.S. Navy if China feels it necessary to use force to prevent a declaration of independence by Taiwan. However, as its interests have broadened and its naval power has developed, China has expanded its military objectives to keeping the United States out of the near seas in order to solidify its greater territorial claims. While many in the U.S. naval establishment regard the evolving operational challenge in East Asia as a regional sea-control issue, there are larger implications with regard to the global system that cause the matter of command of the sea to resurface in a new form.

The current American maritime strategy, "A Cooperative Strategy for 21st Century Seapower," says that the U.S. sea services will be deployed to defend the global system on a day-to-day basis.[14] In doing so, they will attempt to limit regional conflict, defend the homeland, and prevent war among the major powers. The issue is systemic disruption. According to Stephen Carmel, senior vice president of Maersk Line, "As the last great age showed us, the forward march of globalization is not inevitable, but also not reversible. We cannot slide easily backwards into a better previous time when the pressure gets to be too much. When globalization breaks, it does so violently, permanently altering the trajectory of history."[15] In a potential naval fight between China and the United States, the stakes become the functioning of the global system, given the importance of East Asian manufacturing and container shipping hubs.

In light of the central role of the U.S. Navy in maintaining a stable security environment in which the system, specifically its flows, can function, we may define command of the seas as the condition in which the U.S. Navy, in conjunction with allies and partners, is able to maintain a global security environment that permits unrestricted global systemic flow. In a negative sense, it denotes the inability of any navy or force to impose a defeat on the U.S. Navy that would compromise the latter's ability to carry out this function. If we view a regional sea-control fight through the lens of China's objectives,

the U.S. Navy will have been prevented from interfering with whatever operation in the near seas that it undertakes. From an American global perspective, this might seem like a regional setback with respect to local sea control. However, the systemic implications turn it into a global matter.

If China is able to chase the U.S. Navy from its near seas, it will change the political calculus of the world and acquire several strategic options. First, it could dictate an alteration of the rules under which the current global system operates. One of these would be the status of the exclusive economic zone (EEZ), the two-hundred-nautical-mile band of sea abutting a nation's territorial waters in which certain rights to exploit the resources in and under the water are reserved to the coastal state. Currently, the EEZ is regarded as a high-seas regime, except for reserved economic rights. China wants to expand sovereign rights, to include the ability to exclude outside naval forces from the EEZ. If it can enforce this claim, it will—aside from making virtually the entire South China Sea its "internal waters"—have erased the ability of the U.S. Navy to operate globally to maintain the security environment required by the global system. While not enjoying the kind of comprehensive command of the seas that accrued to the United States in 1945, China would, to a significant degree, rob the United States of that command necessary to underpin the Bretton Woods regime. The consequences for global flow are hard to envision, but if Mr. Carmel is correct in his diagnosis, it would be anything but a graceful degradation. The second option that opens up to China would be the formation of a separate economic system. It could, for example, elevate the Shanghai Cooperative Organization to the status of a modern and more effective version of Napoleon's Continental System.[16] Such a system would not be purely continental, as it is unlikely that a continuing state of war would exist, such that the United States could interdict the organization's shipping. Such a project by China might or might not succeed, but the attempt would likely disrupt the current system catastrophically.

If we "drill down" to operational matters, we can speculate on what the nature of a U.S. Navy strategic defeat might look like. First, we must remind ourselves that China is a nuclear power that, in lieu of a proven comprehensive U.S. missile-defense system, can presumably inflict massive damage on the American homeland. All naval operations are delimited within this context. Second, U.S. naval conventional striking power is substantially invested in eleven large nuclear-powered aircraft carriers. The Chinese, for their part, have heavily invested in various systems to knock these carriers out of action.

With these considerations in mind, we can examine a plausible combat scenario. Postulate: a few years from now the true resource potential of the seabed in the South China Sea is revealed, and it is massive. China decides to assert, fully and finally, its territorial claims to the South China Sea and issues a démarche instructing all other navies to stay

outside the "nine-dash line" that essentially cordons off the whole of that sea as Chinese internal waters. Chinese antiaccess/area-denial forces deploy to the theater. The United States, along with a group of Southeast Asian nations, condemns the démarche, and two carrier battle groups, along with submarines and other naval forces, are dispatched to challenge it. To do so, these forces must sail into the disputed zone.

Let us now assume that the Chinese allow these forces into the zone and then spring a trap, shooting first with missiles and torpedoes, supported by mines. This "battle of the first salvo" succeeds in disabling the two carriers and several surface ships. The president of the United States now has a decision to make. Does the United States continue to "feed the fight" with more naval forces? Does the United States escalate with strikes against Chinese area-denial systems on the mainland? Or does the United States decline to challenge the military status quo and instead call for negotiations? The latter two choices would be politically and strategically unpalatable, at least as long as the United States sees an opportunity to stay in the fight via the first option.

But the question now arises of how much of its navy the United States is prepared to risk in the fight. The criterion on which this judgment is made should be based on an understanding of the role that command of the sea plays in the functioning of the modern global system and on a calculation of how much loss the U.S. Navy can absorb before the edifice crumbles.

Before proceeding farther, it should be noted that there are those who refuse to contemplate issues such as this, being convinced that the U.S. Navy would be able to prevail quickly and decisively, without significant loss, in any such contest. Whether such outlooks are based on computer simulations or fear of admitting potential weakness (whether to the Chinese or to other services, which might take advantage to seize more budget share), they constitute a roadblock to thinking and could leave the national command authority unprepared in case the unthinkable happens. In any case, the purpose of positing such a negative scenario is not to assert that U.S. aircraft carriers are vulnerable but to explore the dimensions of command of the sea. To do so, we have to get on the other side of the loss of several carriers to see how the options play out. Any attempt to discredit this argument on the basis of an assertion that "it would never happen" would therefore be specious.

The foregoing notwithstanding, however, we must first ask ourselves what might happen if the U.S. Navy were successful, if it forced the PLAN to retreat from the scene and was able to prevent land-based systems from achieving significant effects. Would China then withdraw from the system—that is, put an embargo on trade with the United States and its allies? Despite the emotional and cultural imperative of saving face, economic survival might dictate that China keep its ports open and even continue to trade with

the United States, if only indirectly. In any case, while a Chinese withdrawal from the system would be damaging, it is plausible to think that the system would adapt and remain functional. On the other hand, if the war escalated to the use of nuclear weapons or China won the engagement, the system would likely break.

If a win of sorts is possible for the U.S. Navy, what cost would be acceptable? Beyond a certain level of destruction, given the length of time needed to build, fit out, and work up a modern warship, the U.S. Navy would become less than a global navy. At that point it could no longer provide the security environment necessary for the global system to operate.[17] If the current U.S. Navy, at around 280 ships, is stretched thin and strains to meet demands from regional commanders, the amount and kind of losses it could absorb in a fight with the Chinese and still maintain command of the sea—in its modern instantiation—likely would be relatively low. This is especially the case for aircraft carriers, whose capacity to project power ashore has made them such useful geopolitical chess pieces that President Barack Obama dictated that the Navy retain eleven in commission, even in the face of huge defense-budget cuts. Almost paradoxically, the utility of carriers on a global scale in maintaining the system's security environment makes them too valuable to risk in a regional sea-control fight, even though, or perhaps precisely because, command of the sea is at stake. A posture that would align better with the strategic architecture would be to create a naval force consisting of submarines, smaller surface combatants, and unmanned systems that could impose losses on the PLAN but could also absorb losses without jeopardizing command of the sea.

This brief thought experiment reveals an interesting inversion of naval strategic imperatives that highlights how the nature of command of the sea has changed since Sir Walter Raleigh concocted his syllogism. As codified by both Mahan and Corbett, command of the sea was to be won by defeating or bottling up the enemy battle fleet. This was a matter for the navy's most powerful ships to settle. Once command of the sea was gained, the seas became safe for smaller units, like frigates, to spread out and exercise sea control in specific and local circumstances. In other words, one *fought for* command of the sea—via battle, if possible—and *exercised* sea control, via dispersed security operations. This general relationship held good at least through the end of World War II. Now, however, as we see in our thought experiment, our most capable ships, the carriers, are best used to *exercise* command of the sea—that is, maintain the security environment—while smaller, more numerous forces may have to *fight* a decisive battle for local or regional sea control, the outcome of which would likely have profound global strategic consequences. This inversion is new and runs counter to common wisdom. It must be understood if we are properly to assess risk and structure fleet architecture.

Assessing and Managing Risk

"Command of the sea" is a descriptive term. What it describes is a strategic condition. As the world geopolitical environment evolves, so does the nature of the condition that the term describes. Great and broad strategic conditions are not easily encapsulated by a four-word term, so it is both necessary and useful to inquire more deeply into its definition and thus into the parameters of the condition. Such inquiry as we have outlined reveals important relationships between strategic conditions and the nature and use of naval forces.

Naval forces have always been expensive and relatively scarce. Their employment, especially of the largest and scarcest of these, must therefore be attended by clearheaded calculations of acceptable risk.[18] Bottom-up examinations of potential tactical outcomes using computer simulations have their uses, but these must not constitute the sole basis for assessing risk. The enemy could always get lucky, and an understanding of risk from the top-down strategic perspective allows us to understand the consequences of loss in a way that provides better ability to better assess and manage risk.

The inquiry conducted in this article reveals that a new relationship has emerged between command of the sea and sea control, and the kinds of ships that are appropriate to each function. Whether an aircraft carrier is a capital ship in the sense a battleship was in 1922 is beside the point. Their unique characteristics, coupled with today's changed geopolitical circumstances, suggest that they should be used in a dispersed manner to exercise command of the sea on a day-to-day basis, much as British frigates in 1812 exercised sea control around the periphery of the British Empire. While carriers will never be numerous, the implication is that we should have enough of these ships to make them readily available in most regions. The U.S. Navy may never again have more than eleven of them, but assuming most nations have incentives to do their part to protect the global system, their carriers, even including those of China, could be enlisted in the common effort. More total carriers being operated by like-minded nations make the continuous and systemic exercise of command of the sea all the more effective, because they will be available in more places more often. Aircraft carrier building is more widespread today than it has been at any time since World War II. But given their vulnerability to missiles, torpedoes, and mines, why would nations devote their scarce resources to such ships? Beyond national prestige, which is no small thing, it appears that there is a tacit understanding that they contribute to the overall security environment—a corporate command of the sea by an informal condominium of nations all of which, despite particular differences in policy, share a common incentive to keep the global system operating.

The new logic of command of the sea also suggests a kind of strategic equivalence between aircraft carrier forces and amphibious forces. Modern amphibious groups,

especially when equipped with missiles, unmanned systems, and modern vertical/short-takeoff-and-landing jets, have a legitimate capability to conduct autonomous power-projection operations, thus increasing the capability of the U.S. Navy and others to exercise command in more places at more times, making that command more effective and secure. Moreover, the flexibility of some new designs, such as the *San Antonio* (LPD 17) class, offers the potential of significantly increasing the sea control, shore-bombardment capability, and cooperative international expeditionary operations capabilities of an amphibious group.

There may never be a fight for sea control between the United States and China. If there is, it will be in the American interest to fight it with forces made up of units that are relatively hard to find and hit and whose acceptable-risk profile is more compatible with the conditions that would obtain in the East Asian arena.[19] This would allow the president to feed the fight without placing himself on the horns of a difficult strategic dilemma. If the United States has the option of fighting—and winning—the war solely at sea (on, under, and above it, using joint forces), the strategic risks of nuclear escalation and rupture of the system are minimized. If such a posture is credibly attained through force-structure investments, concept and doctrine development, and strategic communication, deterrence will be enhanced. In the end, the issue may not be U.S. ability to seize sea control in the South China Sea but its ability to deny it to China—a less rigorous and presumably less costly requirement.

"Command of the sea" is not and maybe should not be a doctrinal term, but its utility as a tool for strategic analysis has reemerged. Some may be uncomfortable with its hegemonic overtones, but in a global system environment it is ever more suggestive of an informal partnership of nations, especially in view of the cooperative approach that the current American maritime strategy espouses. A current and sophisticated understanding of command of the sea contextualizes doctrinal concepts and terms such as "sea control," "sea denial," and others, which should improve programmatic analysis and tactical development. "Command of the sea" is an old term that, in a new form, can be usefully leveraged to enhance our understanding of the modern strategic maritime environment.

Notes

1. U.S. Navy Dept., *Naval Warfare,* Naval Doctrine Publication 1 (Washington, D.C.: March 2010), available at www.usnwc.edu/Academics/Maritime--Staff-Operators-Course/documents/NDP-1-Naval-Warfare-(Mar-2010)_Chapters2-3.aspx. This manual (known as NDP 1), the Navy's keystone doctrinal publication, does not mention the term. It does use "maritime superiority" and "supremacy," apparently as equivalents to "sea control."

2. Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660–1783* (Boston: Little, Brown, 1890), chap. 2, p. 138.
3. Alfred Thayer Mahan, *Naval Strategy* (Boston: Little, Brown, 1919), pp. 5–6, 18. The reader will have to connect the dots of Mahan's argument, but it is clear that he regards a concentrated fleet as the best deterrent against European aggression in the Americas.
4. Julian S. Corbett, *Some Principles of Maritime Strategy* (London: Longmans, Green, 1918), part 2, chap. 2, pp. 100–104. Corbett establishes the relationship between command of the sea and sea control through his discussion of the roles of "cruisers" (frigates, brigs, and sloops, in the days of sail). Frigates especially had a role with the battle fleet as scouts, but they also functioned independently as convoy escorts, privateer hunters, etc., to protect British sea communications and disrupt those of the enemy. The need to concentrate the fleet to secure command absorbed frigates that could otherwise be dispersed to control communications.
5. Ibid., p. 77.
6. Ibid., pp. 114–36. Corbett goes into a rather intricate explanation of concentration and dispersal in naval warfare as distinguished from land warfare. He sees concentration as an elastic concept in which a certain degree of dispersal is inherent. However, his whole concept of concentration revolves around the existence of a "strategical centre" (p. 117), which implies a regional delimitation—for example, Royal Navy dispositions in the eastern Atlantic during Britain's wars with France. Dispersal beyond that to such places as the Indian Ocean or even the eastern Mediterranean would break the concentration.
7. George Modelski and William Thompson, *Seapower in Global Politics 1494–1993* (Seattle: Univ. of Washington Press, 1988), pp. 16–17.
8. Clark G. Reynolds, *Command of the Sea: The History and Strategy of Maritime Empires,* vol. 2, *Since 1915* (Malabar, Fla.: Robert E. Krieger, 1983), p. 547.
9. Carl von Clausewitz, *On War,* trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton Univ. Press, 1976), book 3, chap. 1, p. 181.
10. Edward N. Luttwak, "The Political Uses of Sea Power: The Theory of Suasion," in *Strategy and History, Collected Essays* (New Brunswick, N.J.: Transaction Books, 1985), vol. 2, p. 84.
11. Sam J. Tangredi, ed., *Globalization and Maritime Power* (Honolulu: Univ. Press of the Pacific, 2004), chap. 1, pp. 1–21.
12. Stephen Carmel, "Globalization, Security, and Economic Well-Being" (address, Twentieth International Seapower Symposium, Naval War College, Newport, R.I., 19 October 2011), available at www.maersklinelimited.com/.
13. Gregory Chin and Ramesh Thakur, "Will China Change the Rules of Global Order?," *Washington Quarterly* (October 2010), pp. 119–38.
14. J. T. Conway, G. Roughead, and T. W. Allen, "A Cooperative Strategy for 21st Century Seapower," October 2007, available at www.navy.mil/; repr. *Naval War College Review* 61, no. 1 (Winter 2008), pp. 7–19.
15. Carmel, "Globalization, Security, and Economic Well-Being."
16. Ariel Pablo Sznajder, "China's Shanghai Cooperation Organization Strategy," *Journal of IPS* 5 (Spring 2006), pp. 93–102, available at irps.ucsd.edu/.
17. Roger Whiteneck et al., *The Navy at a Tipping Point: Maritime Dominance at Stake?,* CAB D0022262.A3/1REV (Alexandria, Va.: Center for Naval Analyses, March 2010), pp. 41–43, available at www.cna.org/.
18. See Robert C. Rubel, "The Future of Aircraft Carriers," *Naval War College Review* 64, no. 4 (Autumn 2011), pp. 13–27.
19. See Robert C. Rubel, "Talking about Sea Control," *Naval War College Review* 63, no. 4 (Autumn 2010), pp. 38–47.

CHAPTER FIVE

Navies and Economic Prosperity
The New Logic of Sea Power

Since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed.

PREAMBLE TO THE UNESCO CONSTITUTION

Because navies are expensive, they must, from time to time, make an argument for why their country should invest its public resources in maintaining one.[1] There are a number of different justifications that have been used over the course of history, including guarding the nation's coast from the depredations of raiders or invaders, moving its army to a foreign shore, and simply prestige—announcing to the world via the possession of a fleet that the nation is a significant power. It is also routinely argued that a navy is needed to secure the nation's economic interests by protecting its commercial shipping. This argument has been leveraged by the U.S. Navy in conjunction with the rollout of its current maritime strategy and is being employed by the navies of Canada and the United Kingdom as they struggle to secure sufficient public investment to keep themselves viable. Admiral Gary Roughead, the former U.S. Navy Chief of Naval Operations, said: "So much of what moves on the world today in trade and commerce and the resources that flow moves on the oceans. About 90 percent of everything that moves, moves on the oceans. So how we protect the sea lanes, how confident we are that goods can move from one point to the other and not be interfered with is extremely important."[2] The notion that navies exist to protect merchant shipping has been around a long time and has had, up to the end of the Cold War, a substantial element of truth to it. However times have changed and the world strategic environment has evolved to the point that the rug has been pulled out from under this argument. Yet navies persist in using it because they have not delved deeply enough into the new connection between sea power and economic activity to articulate a new argument. Thus, when admirals roll out the traditional utility argument civilians do not find it compelling, although they

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cannot say exactly why. This article is an attempt to articulate the relationship between navies and the economic prospects of their parent nations that actually exists in today's world. If this relationship is properly understood, perhaps more compelling utility arguments can be made by navies.

In the last decade of the nineteenth century, the American naval theorist Alfred Thayer Mahan broke new ground in military literature with his book *The Influence of Sea Power upon History 1660–1783*. His principal intellectual advance was to describe the connection between war, sea power and the economic prospects of a nation.[3] By doing so, Mahan added an outer layer of analysis to the Prussian military theorist Carl Von Clausewitz's epic exploration of war's essence, *On War*. It was not enough, Mahan argued, to understand war solely by examining the clash of armies. One had to also understand that armies are underwritten by the wealth of their parent country, and that wealth is in turn enhanced by trade, which by the time Napoleon ruled France, had an essential maritime commerce component. The flow or constriction of maritime commerce was, in turn, governed by the success or failure of navies.

Mahan went on to establish a sort of logical syllogism that described the relationship between a nation's economic prospects, its maritime trade and its navy. He described a virtuous cycle in which a nation's propensity for economic activity leads naturally to the carrying of goods on the sea, both coastwise and across the ocean. The need to protect this trade spawns a navy. The navy, by protecting trade, enhances it and thereby the wealth of the nation grows. Sir Julian Corbett, the distinguished British interpreter of sea power, based his theories on the same idea, if conversely applied:

> Finance is scarcely less important. When other things are equal, it is the longer purse that wins. It has even many times redressed an unfavourable balance of armed force and given victory to the physically weaker Power. Anything, therefore, which we are able to achieve towards crippling our enemy's finance is a direct step to his overthrow, and the most effective means we can employ to this end against a maritime State is to deny him the resources of seaborne trade.[4]

Theodore Roosevelt read Mahan's book, became a true believer in sea power and pushed for a strong American Navy. He dispatched the Great White Fleet on a world tour to announce America's arrival on the world stage. Mahan's book was also an international best seller and he wrote many articles for popular magazines explaining his theories. Thus was welded into the American psyche the idea that its navy sprung from and was formed to protect its seaborne commerce. The subsequent experience of two world wars, with their respective Battles of the Atlantic against commerce-raiding German U-boats, only reinforced this notion.

After World War II the American merchant marine dwindled, causing considerable angst among U.S. navalists, but the U.S. Navy, despite some ups and downs, remained by far the strongest navy in the world. American prosperity, coupled with a lack of

serious naval threat for over a half century, pushed Mahan's syllogism to the back of the national consciousness. However, from time to time, when naval affairs were discussed, the syllogism was rolled out as a kind of shibboleth—sacred and unchallenged—even though the reality on the seas had changed fundamentally. By the end of the Cold War, the United States was almost bereft of a merchant marine, was incredibly prosperous and possessed a navy whose size appeared to be all out of proportion to any conceivable threat to American commerce. There was, apparently, some problem with Mahan's syllogism. And yet, at the end of the first decade of the twenty-first century, naval officers and naval scholars seem to persist in embracing it in spite of clear evidence it does not hold.

To understand why the relationship between war, economic health, maritime commerce and navies has changed, we need to go back to the early years of the twentieth century, shortly after Mahan's book had become a world best seller. It was an era of unprecedented world trade and stability. The industrial revolution had transformed much of the world and the empires of the colonial powers were at their zeniths. World trade flowed virtually unmolested thanks to the Royal Navy's unchallenged command of the seas. Although the old Concert of Europe had broken down, peace still reigned among the principal nations on the Continent. The world was in the process of linking itself together as a unified global economic system based on free trade.[5] It was, though, a multi-polar world consisting of a number of great powers, each of whom had an ocean-going navy. Despite the peaceful concord of Europe, nations felt their merchant marines needed protection. Thus despite the lack of war, Mahan's syllogism held.

The First World War brought the whole edifice down. Navies contended for command of the seas; commerce raiding disrupted trade, and the world system crumbled into hostile blocs. The Second World War simply reinforced this condition, which wore on into the Cold War. However, after 1945, the United States put together a new system of alliances and economic structures to avoid another Great Depression and to inoculate as much of the world as possible against the inroads of communism. It was able to do this in part because of the complete command of the sea it had won by virtue of defeating the Axis navies, and the lack of a significant navy by the Soviet Union. Here we see a foundational notion of the new syllogism: command of the sea, as an indicator of overall national power, allows a nation to set the rules of the international order. In the case of the United States, it permitted the establishment of a liberal capitalist trading order.[6]

The new "Free World" started to put back together the global system of commerce and security, but it could not be complete in the face of the alternate economic system of the communist bloc. Moreover, in this era, the U.S. Navy found itself forced to adopt a new focus—nuclear warfare. In combination with requirements to support land wars in Korea and then Vietnam, the absence of a compelling Soviet threat to its sea commerce

and a withered merchant marine, the Mahanian syllogism invisibly fell apart. The U.S. Navy would stay large for reasons other than protection of American shipping, notwithstanding the requirement to protect military shipping to reinforce Germany in case of a Soviet invasion.

The fall of the Soviet Union precipitated the final phase of the reconstruction of the global trade and security system that the First World War destroyed. China, even though possessing a communist government in name, adopted capitalist economic policies and became the world's factory. The process of globalization reordered the economic geography of the world, increasing economic interdependency and producing areas of specialization. Today, East Asia, including China, Taiwan, South Korea and Japan, conducts a large part of the world's manufacturing[7] while the bulk of its oil reserves reside in the Persian Gulf. Many key strategic ores are found in only one or two places. Consumerism in North America and Europe generates consumption that creates the demand for Mideast oil and Asian manufactured goods. A globe-girdling system of financial institutions, laws and agreements as well as the emergence of the internet and global media has generated a highly integrated and intertwined economic system. Commercial shipping has similarly transformed, and today ships may be owned by multi-national companies, sail under a flag of convenience, be operated by a diverse international crew and carry a cargo that might change hands several times during its transit.

This economic geography both ashore and at sea has ripped apart Mahan's syllogism. Merchant shipping is not so closely aligned with a national flag any more, and because virtually every functioning nation state has a stake in the effective operation of the global economic system, commercial shipping moves unmolested and without threat from any navy. But navies still exist, and the leaders of these navies must justify the expense of building and operating them to their nations. Reflexively, they reach back for Mahan's syllogism to try and link their country's economic prospects to investment in its navy. It does not work because Mahan's syllogism no longer holds.

If Mahan's syllogism linking the existence of a nation's economic well-being to the possession of a capable navy is no longer valid, is there one to replace it? Fortunately for naval officers, the answer is yes, although the new logic is not as straightforward as its ancestor.

The first step in constructing the new syllogism is to understand and accept the world in system terms. The difficulty for many naval officers as well as for their civilian masters is that such acceptance implies a certain diminution of the state's sovereignty: a traditional bedrock of naval thinking. However, it is simply a brute fact that most developed nations are no longer economically, if not politically, self-sufficient. This is an uncomfortable notion, but one that is at the heart of the new logic. Acceptance of it

opens one's eyes to new patterns and possibilities for naval operations. It also opens the door for a new and effective argument for national investment in navies. In fact, the U.S. Navy's 2007 maritime strategy, *A Cooperative Strategy for 21st Century Seapower* (hereafter referred to as CS21), is explicitly based on it.

The approach to strategy embodied in CS21 reflects the new geopolitical realities that have been generated by the process of globalization. As Ellen Frost says, "Coming to grips with this force calls for substantially transforming the way that U.S. leaders think about the world and adjusting their policy instruments accordingly."[8] Traditional military strategies are contingent; that is, they are meant to be invoked when and if an adversary does something such as invade an ally. Day-to-day, they are on the shelf, although the forces that would execute them may conduct peacetime exercises for readiness or deterrent value. After the Cold War, the U.S. Navy adopted, in its white paper entitled . . . *From the Sea,* what might be termed a doctrinal strategy, not specifying who, where or why it would fight, only how. CS21, by contrast, is a systemic strategy, crafted to be executed continuously in time of peace in order to defend the global system.[9]

Understanding the modern linkage between navies and the effective functioning of the global economic system requires us to develop a truly global viewpoint. This is not particularly straightforward because geographically, it is all too easy to think of the world as a collection of different regions. However, to use a trite phrase, the world is more than the sum of its parts, at least for the purpose of understanding how all the parts relate to one another. What some key theorists have done is establish a functional schematic of the world. Halford Mackinder in his seminal work on geopolitics showed the world as a kind of Venn diagram in which the key geographic land masses were depicted as circles whose size corresponded to both area and population.[10] Underpinning this depiction was the notion that population and land area indicated industrial potential, which in turn portended the military and naval power the land mass could produce if it was brought under a single government. More recently, Thomas Barnett described the world in terms of a "functioning core" of nations that were tied together by economic relationships as well as the networks facilitated by the internet. "The Non-Integrating Gap" consists, in his view, of those countries that have not, for various reasons, become part of the functioning core, including most of Africa, the Middle East and parts of Latin America.[11] In each case, the writer looked for some basis upon which to describe the relationships that linked human civilizations on the various continents together so that a comprehensible whole could be discerned. However, description is not enough; the depiction must have utility in the formation of policy and strategy.

Systems thinking recognizes the interdependency of the various elements that contribute to a system. If we understand and accept that the world has knitted itself together into a global system of commerce (and the necessary forms of collective security that

accompany commerce), then we are prepared to recognize and acknowledge that a wide range of factors impinge upon and even govern the effectiveness and efficiency of each subsystem. Using this logic we can easily understand not only that resource extraction, manufacturing, consumption and transportation are inextricably integrated elements of the world economy, but also that the protection of one to the exclusion of the others is not rational. The system as a whole must be protected. While it is true that no single military service—or nation—has the capability to render holistic systemic protection it is also true that the effects of each one's operations ripple throughout the system as a whole, either enhancing or diminishing its overall security.

For navies, then, it is not sufficient to think of their purpose only in terms of protecting shipping. Certainly, shipping must be protected, but if there is nothing to put in those ships, their transits, safe or not, are meaningless. Therefore, it is as important that manufacturing nodes and resource nodes be similarly protected and that efforts be made to protect and enhance the nations and societies that constitute these nodes, not to mention the nations and societies that consume their output. Thus we have an end-to-end systemic-view of what we might call the "mission space" of navies. The better the system works—the more secure it is—the better the world's prospects for economic prosperity. It does not work for just one nation. For the purposes of this discussion, the important point is that the flow of finance, goods, information, etc. must be sustained across the system. The flow can be interrupted by disrupting shipping (and air travel and the internet), but commercial shipping, at least, is not significantly threatened in today's world. On the other hand, war among major powers, instability in resource areas and major terrorist attacks in consumption areas all could significantly disrupt the flow, with disastrous results for the world economy as well as international peace. Given the dependency of most pension plans on the growth in the value of securities, it is not inaccurate to say that the well-being of much of the world's greying population is dependent upon the effective functioning of navies.

Having established the systemic context for the new syllogism, we can engage in some reductionism to sort out some individual factors that can help us identify particular naval capabilities that are needed, their magnitude and even their mode of application (strategy). In doing so, we will focus, naturally, on threats to the system, proceeding from the most to the least dire.

As intimated previously, war among major powers is potentially the most disruptive threat to the global system. When one considers the almost eighty-year global system "dark age" between the outbreak of the First World War and the end of the Cold War, the impact of major power war becomes obvious. It would be arrogant and facile to suggest that navies themselves can prevent such wars, but it should be noted that a naval arms race between Great Britain and Germany played no small part in the chain of

events leading to 1914 and the perceived vulnerability of the U.S. fleet in Hawaii was a factor in the Japanese decision to attack in 1941. These two themes, naval arms races and perceived naval vulnerability, constitute factors that have continuing relevance in today's systemic world.

Let us start with naval arms races. We must admit that nations build navies for a range of reasons beyond protection of merchant shipping. These may include the desire to protect a vulnerable coast line, deter depredations by other powers and even generate prestige. There is, perhaps, one element of Mahan's syllogism that continues to be true: at a certain level of economic activity and wealth, nations start building navies. A capable, ocean-going navy is a sign that a nation has "arrived" as a major power. Whether such navy building is a herald of future war or is a politically neutral phenomenon is not clear, although the historical record is cause for concern. Today, China, Japan, India, Brazil and other nations are building navies. They each have their reasons, but the prospects that such building programmes will lead to suspicion, alarm, fear and ultimately war may depend very much on how the current leading navies and their parent nations proceed.

An important reason the world system has been able to stitch itself back together after the world wars is the military superiority of the United States. A liberal democratic trading nation, it has coupled this superiority with free trade policies to stimulate economic growth. Capital, goods and people can flow freely around the globe, generating systemic behaviour. A key element of American military superiority is command of the seas, a term denoting the inability of any other navy to impose a strategic defeat on the U.S. Navy on the high seas. It is this command, like that achieved by the Royal Navy in the nineteenth century, which helped create the necessary conditions for system formation. When it is lost, as it was in 1914 and 1941, the world fragments and falls into war.

The challenge becomes how to use command of the sea to manage or influence the emergence of other navies such that true naval arms races do not occur. The right way to do this is not completely clear but there appear to be several sure-fire losing strategies. The first is for the United States to start the arms race itself by reflexively viewing the emergence of the Chinese Navy or others as a threat. Policies and patterns of building and deployment based on alarm and fear will generate reciprocal responses in China and elsewhere. This is why CS21 does not mention China or any other nation by name, something often criticized by those with an alarmist bent. Among the ways the U.S. Navy can stimulate Chinese alarm is to openly consider interdiction of their seaborne commerce in exercises, war games or articles. Not only would this strengthen the hand of Chinese alarmists, but commerce interdiction would probably be infeasible on a number of counts anyway. Another good way to invoke this kind of reciprocal security dilemma is to link sea control and power projection. After the Cold War, the U.S. Navy

focused so narrowly on power projection that it and some of its allied navies forgot how to talk about sea control.[12] While progress has been made in this area, there is still a sense in the doctrine that U.S. forces will use land strikes to neutralize shore based anti-access systems with sea control being an exercise in access generation that is prerequisite to projecting power ashore.[13] One can imagine the effect such talk has on a nation like China that has suffered humiliation and exploitation from the sea at the hands of western nations. Already, the Chinese are reacting to the most recent U.S. concept of this ilk, Air-Sea Battle: "If the U.S. military develops Air-Sea Battle to deal with the [People's Liberation Army], the PLA will be forced to develop anti-Air-Sea Battle."[14]

A second way to increase the odds that navy building will lead to war is for the leading navies to allow vulnerabilities to emerge. The U.S. Navy did this in two ways during the 1930s and up to 1941. First, it was slow to recognize and accept that the bomb-carrying aircraft had replaced the major calibre gun as the dominant naval weapon. Although war games at the Naval War College and demonstrations by Billy Mitchell provided clear indicators, it took the December 1941 disasters of Pearl Harbor and the sinking of the *HMS Repulse* and *Prince of Wales* to force the new reality on the admirals. Today, the new reality is that the anti-ship missile is the arbiter of what floats and what does not. This is a condition that has existed since the early 1970s but has not been compellingly revealed due to the lack of an all-out naval battle, just as there was no all-out naval battle between 1922 and 1941 to reveal the bomb's superiority. Vulnerability can also be generated by concentration. In 1941 the bulk of the U.S. fleet was concentrated at Pearl Harbor, leading Admiral Yamamoto to think that a single knock-out blow was possible. Although today the U.S. Navy is strategically dispersed around the world, its principal combat power is concentrated into eleven aircraft carriers. Taking several of these out would seriously compromise the strategic capabilities of the U.S. Navy, not to mention the potential adverse effects of derailing U.S. policy as happened via the loss of eighteen Special Forces soldiers in Somalia, or conversely stimulating escalation, possibly to the nuclear level. Moreover, a hit on a nuclear carrier that killed hundreds, if not thousands, of U.S. sailors in a single blow might easily generate national outrage and serve to escalate the conflict far above initial intentions. In naval warfare, history has shown that the tactical offense has most often trumped the tactical defence, and thinking that aircraft carriers can be defended against the array of existing and potential anti-ship missiles is not much different than the outlook of battleship admirals in the fall of 1941.[15]

The combination of vulnerability issues suggests that the U.S. Navy and any allied or cooperating navies that seek to constitute a combat credible force in ocean zones threatened by anti-ship missiles will have to disaggregate their power into a dispersed grid of submarines, destroyers and unmanned vehicles, themselves armed with highly lethal

anti-ship missiles. Their purpose should be clearly articulated as defending the system by deterring aggression via the sea by means of defeating—at sea—any attempt to do so. Even the best anti-ship missile cannot hit what cannot be found. By disaggregating naval combat power and equipping it to exert sea control—at sea—we thereby eliminate both forms of naval vulnerability that contribute to naval arms races, and the deterioration of deterrence.

There is one other vulnerability issue that must be considered, and that is positioning. If caught out of position when a crisis erupts, the reactive movements of naval forces can catalyse rather than deter military action. In 1982, during the crisis leading up to the Falklands War, fears that the British were gathering up naval forces to send south helped put the Argentine Junta in a now-or-never state of mind, which precipitated their invasion and the war.[16] If catalysis is to be avoided, naval forces must maintain a persistent presence in such areas where deterrence is necessary. This is why CS21 prescribes concentrated, credible combat forces be stationed forward in East Asia and the Persian Gulf. The Navy's inventory of ships, aircraft and other systems must be sufficiently large such that this presence can be maintained indefinitely without "using up" ships and sailors at an unsustainable rate.

If command of the seas is achieved and maintained wisely by not provoking alarm and not allowing naval vulnerabilities to occur, the seas can constitute a massive geopolitical shock absorber, preventing conflicts in one area of the world from spilling over into others, mainly by keeping hostile armies from moving by sea, and allowing one's own to do so. Even though this condition holds today as a function of American command of the sea, there has emerged, since the attacks on the World Trade Center in New York, the prospect of terrorists and their weapons being smuggled by sea to the shores of America, Europe, China, Japan and other developed countries. Given the disruptive potential of terrorist attacks, it is reasonable to regard them as only a step down from major power war as a threat to the system. Although the attacks of 9/11 were perpetrated by the radical Islamic organization al Qaeda, in the future such strikes might be staged by any number of groups. Although neutralization of such organizations by intelligence or law enforcement agencies is the preferred method, the lack of success to date in doing so for narco-traffickers and other criminal enterprises leaves us to consider at-sea interdiction as a necessary measure.

The seas, of course, are huge, and at any moment they are dotted with tens of thousands of ships. There is not now nor has there ever been a navy of sufficient size to hermetically seal off the seas to smugglers. The only way to make the seas a barrier to terrorists is to have every costal nation effectively guard its own waters and establish good teamwork between its navy, intelligence service and law enforcement agencies. Some nations

do but many do not. Thus CS21 calls for building capacity in those developing nations whose navies or coast guards are embryonic.

The mission of capacity building requires a very different kind of naval force than the one needed to prevent major power war. The main "weapon system" of such a force is the sailors and other personnel that train, educate and influence those in developing countries that will become sailors. The sheer number of countries needing such assistance suggests these missions be conducted from relatively inexpensive ships that can be procured in some numbers. In addition to actual naval forces deployed for capacity building purposes, the navies of developed nations employ their shore training and education infrastructures. The importance of naval academies and war colleges in building not only capacity but relationships cannot be overstated.

Beyond capacity building, making the seas a barrier to terrorists requires information about who is at sea, what is in the containers and holds, and where they are. Not only are new forms of surveillance needed, but also intensive information sharing so that two and two can be put together to reveal suspicious activity. To manage this, the U.S. Navy is developing a global network of maritime operations centres that will develop regional pictures that will be shared globally. This, in turn requires an international effort to develop trust and confidence so that information flows freely.

If an adequate degree of maritime security can be achieved, the seas will constitute a geopolitical shock absorber in another way. In the wake of 9/11 the United States had no equivalent of the First Lord of the Admiralty, Admiral Lord St Vincent, who supposedly advised a jittery parliament in 1801, "I do not say my lords that the French will not come, I say only that they will not come by sea." Without the assurance of the seas as a barrier to further attack, it was as if New York City was connected to Kabul and Baghdad by a land bridge. The Bush Administration was spooked by the prospect of a WMD attack and rather stampeded itself into two simultaneous Eurasian land wars that got the United States mired down and over-extended. The comfort of insulating oceans can provide, among other things, a certain poise to the deliberations of the National Security Council and time for cooling off and reflection before committing the nation to war. Moreover, in the wake of the pull-out from Iraq and an increasingly rapid drawdown in Afghanistan, both the current and former U.S. Chiefs of Naval Operations have advanced the notion of an "offshore option" for anchoring forward U.S. military capabilities in the future.[17] This would increase the proportionate contribution of naval forces to the U.S. effort to maintain global stability.

The threat of terrorism emanates principally from an area of a world that has been variously referred to as the "arc of instability" and Barnett's Non-Integrating Gap. It encompasses much of Africa and the Middle East as well as parts of Southeast Asia. It

is where most failed states exist but also where much of the natural resources necessary for the world economy are found. Thus the nations that constitute the global economic system can ill afford a hands-off strategy of containment, hoping to seal off the area against the spread of terrorism until it heals itself. Therapeutic incisions have been and will continue to be necessary at various times and places.

Because of the undeveloped nature of this area of the world, along with the fact that most of its inhabitants live within several hundred miles of the coast, naval force projection capability from a sea base will be necessary. The early phases of the Afghanistan operations were of this nature and we can confidently expect that if and when the world's developed nations reach a consensus about going into Somalia to cure the piracy problem, it will be a sea-based expeditionary operation. Thus, protection of resource areas will require that some number of navies possess substantial sea-based expeditionary force capability, preferably of a kind that can integrate multi-national contributions easily. Rendering disaster relief, as was done in the tsunami relief effort in 2004, the Haiti earthquake and the Japan tsunami, is also an important form of sea-based force projection that mitigates economic damage to the system. It is likely that future sea-based expeditionary operations will be international, and so that capability must be conceptualized and practiced.

The mere presence of naval forces in areas of the world that are the source of resources, notably oil, seems to have a beneficial economic effect. Both routine presence of naval forces and their responses in crises were shown to have a substantial economic benefit in a 1997 study by the U.S. Naval Postgraduate School.[18] It found that the initial naval response to the Iraqi invasion of Kuwait is likely to have increased global GDP by over $86 billion.[19] Perhaps the least dire threat to the global system is piracy—albeit one that is currently seizing the headlines. Somali pirates, a manifestation of a failed state in the Non-Integrating Gap, hijack merchants and demand ransom for the crew and ship. The actual chance of a particular merchant being hijacked is less than one in nine hundred,[20] and shipping companies seem more inclined to pay the ransom than install armed guards aboard their ships. However, the publicity has galvanized nations and their navies to take action. A previous bout of piracy in the Straits of Malacca was cured by the joint action of local navies. The Somalia/Gulf of Aden situation is more problematic since there is no effective governmental authority ashore. However, the emerging world response to it reveals some important facets of an emerging global naval infrastructure that supports the global system of commerce and security.

In Mahan's day, the movement of major naval forces was noted by many countries, sometimes with alarm, as it might presage invasion, or at least a round of coercive diplomacy. In fact, when the PRC announced it was dispatching a small squadron to the Gulf

of Aden, there was alarm in some quarters in the United States and other countries that this was a sign of an expansionist China. The Chinese themselves announced that their ships would operate independently in the Gulf of Aden to protect their own merchants. However, after several weeks on station two things happened: the alarm about their movement died off and the Chinese commander suggested a cooperative zone defence in order to make most efficient use of the international naval forces on station. Moreover, not only the Chinese are there, but the Russians, NATO, EU (different task force), the Japanese, Koreans, Singaporeans and even the "rogue" nation of Iran. Everybody is cooperating—why, how and what does it mean?

To start with, we must acknowledge the uniqueness of the Gulf of Aden situation. Somalia is a failed state that possesses neither resources nor location that would incite major power rivalry over influence ashore there. There is a universal confluence of interests centred on the protection of shipping. The unusual absence of major power competition allows naval operations to follow their natural course and provide a unique opportunity for us to see the security side of the global system in action.

The Chinese, Russians, Iranians and other naval forces have become virtually invisible in the Gulf of Aden because they have fallen in on an existing framework and infrastructure of sea power that girdles the globe. This infrastructure (perhaps more accurately the maritime security subsystem of the global economic system) consists of both physical and intangible elements. On the physical side, there is the U.S. Navy's world-wide logistics system. It operates 24/7/365 and is composed of a web of bases, husbanding (victuals) contracts and replenishment ships, augmented by the supply ships of the Royal Navy, Japan and other allies. This system can support international naval operations anywhere in the world. In addition, there are GPS and communication satellites as well as the ubiquitous internet. Among the intangibles are the UN Law of the Sea that provides a clear framework for who can do what in whose waters, any number of other international agreements governing a range of maritime issues, and a world conditioned to see U.S. Navy and allied ships cruising the littorals of Eurasia. Perhaps another intangible element is CS21 itself, which casts the United States and its navy in a defensive posture (defence of the global system). This makes it easier politically for other nations to deploy their ships on a cooperative mission and make use of the U.S. Navy's logistics system. It also appears that the navies of the world are getting comfortable with looser coordination arrangements. Before the internet, strict communications, protocols, and structured command and control schemes were necessary. With the internet, everyone can talk more extensively and in new ways such that restrictive command arrangements are not so necessary. This in turn obviates the need for formal agreements prior to conducting cooperative operations. With the political

and technical barriers to entry low, nations become more willing to send their navies on cooperative ventures.

Previously we discussed the seas as geopolitical shock absorbers, both to limit other nations' options for aggression and to provide our own government time for reflection and preserving the option of doing nothing. In the cooperative naval operations off Somalia, we see another aspect of the phenomenon emerging in a very positive way. It turns out that ships from the Chinese, Japanese and South Korean navies have taken to operating together in the Gulf of Aden. Strange bedfellows indeed, but as both the Japanese navy's operations chief and a Chinese maritime scholar have said to the author on different occasions, cooperating on easier missions can build trust and confidence that will provide a basis for achieving resolution of more difficult maritime issues between the nations. This is indeed geopolitical shock absorbing of the most congenial kind.

We have now arrived at a point where we can put all of the elements of modern naval endeavour together in a new syllogism. Navies protect their nations' economic prospects by operating cooperatively to defend all elements of the global system of commerce and security. Their necessary functions range from averting naval arms races to rendering disaster relief to, yes, protecting shipping. But it is not an every navy for itself process; the more cooperation, the better. It may even turn out that sustained and habitual international naval cooperation will someday make the concept of command of the sea irrelevant. Until then, the U.S. Navy must exert careful stewardship over its command of the sea, keep its global logistics system robust and develop the capacity to catalyse a global maritime security partnership on a broad front by being in a lot of places at the same time. Other navies must also look at the world in systems terms if they are to most effectively develop utility arguments and determine how to most effectively target their limited resources.

If one accepts the arguments that underpin the new syllogism of how navies support economic prosperity, then reasons for optimism become clear. Naval building programmes in China, India and elsewhere do not have to lead to war as has happened in the past in Europe; there is a reasonable prospect that the seas can be denied to terrorists; the seas can be used to bring the Non-Integrating Gap into the system; and the emerging pattern of naval cooperating can not only secure the seas but reduce the likelihood of conflict and war.

None of this will happen if nations let their navies decay. The unique thing about navies is that their optimum utility is in time of peace. When sea power is hitting on all cylinders, it is invisible. An investment in sea power is most appropriate and effective at a point when threats are not apparent. In Mahan's day the syllogism of sea power focused on the sovereign interests of individual nations and its application led eventually to war.

Today we see the world as a system, with a sea power logic that is expressed in systems terms. Its application, that is, investment in navies structured along systemic lines, promises a massive return in the form of an extended and improving peace and—despite the current global economic woes—prosperity.

Notes

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2. ADM Gary Roughead, podcast 29 February 2009, www.navy.mil/.
3. Alfred Thayer Mahan, *The Influence of Sea Power upon History 1660–1783* (Boston: Little, Brown and Company, 1890). Chapter 1 sets forth Mahan's basic logic. However, it should be noted that he subsequently recognized that nations without large shipping interests may also build navies. See A. T. Mahan, *Naval Strategy* (Boston: Little, Brown and Company, 1918), pp. 445–447.
4. Sir Julian Corbett, *Some Principles of Maritime Strategy* (London: Longmans, Green and Co., 1911), p. 99.
5. Niall Ferguson, *The War of the World* (New York: The Penguin Press, 2006). Chapters 1 and 2 delineate the state of the pre-WWI world, including its increasing economic integration. Then check the first full paragraph on page 73 to see his analysis of the effect on globalization of war among major powers.
6. George Modelski and William Thompson, *Seapower in Global Politics 1494–1993* (Seattle, WA: University of Washington Press, 1988), pp. 16–17.
7. But manufacturing itself is extensively parsed on a global scale with components and subcomponents manufacturing distributed throughout the world in an intricate ballet of shipping and scheduling for final assembly. See Stephen Carmel, "Globalization, Security and Economic Well-Being" remarks delivered to the 20th International Seapower Symposium, 19 October 2011, Naval War College, Newport, RI, available at www.maersklinelimited.com/.
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12. Robert C. Rubel, "Talking about Sea Control," *Naval War College Review,* Autumn 2010, pp. 38–47, www.usnwc.edu/.
13. See, for example, Joint Publication 3-0, *Operations,* 17 September 2006 with Change 2 of 22 March 2010, p. V-9. www.dtic.mil/. See also General Norton A. Schwartz and Admiral Jonathan W. Greenert, "Air-Sea Battle," *The American Interest,* 20 February 2012. Note especially the "Attack in Depth" element of the concept. Available on line at www.the-american-interest.com/.
14. Col. Gaoyue Fan, PLA, quoted in "Real Tensions over a Theoretical War: U.S. Model for a Future 'Air-Sea Battle' Stirs Ire in China and inside Pentagon," by Greg Jaffe, *Washington Post,* 2 August 2012.
15. The November 1941 Army/Navy football game program pamphlet had a picture of USS *Arizona* plowing through the waves with the following caption: "A bow on view of the USS *Arizona* as she plows into a huge swell. It is significant that despite the claims of air enthusiasts no battleship has yet been sunk by bombs."
16. Lawrence Freedman and Virginia Gamba-Stonehouse, *Signals of War* (Princeton, NJ: Princeton Univ. Press, 1991), pp. 65–78.
17. Testimony of ADM Jonathan Greenert before the U.S. House of Representatives Armed Services Committee on the Future of the Military

Services and the Consequences of Sequestration. 2 November 2011, www.navy.mil/.

18. Robert E. Looney, "Market Effects of Naval Presence in a Globalized World: A Research Summary," in Sam J. Tangredi, ed., *Globalization and Maritime Power* (Washington, DC: National Defense University Press, 2002), pp. 103–131.

19. Ibid., p. 105.

20. From a brief presented at the NAVCENT/5th Fleet Maritime Infrastructure Protection Symposium February 2009 by CDR Thomas Rasmussen (Danish Navy) (claiming to be quoting IMO numbers): Risk of attack: 1:340; Risk of hijack (i.e. successful attack): 1:907.

CHAPTER SIX

Defense of the System
Changing the Geometry of Great Power Competition

The growth of the power of Athens, and the alarm which this inspired in Sparta, made war inevitable.

THUCYDIDES, *THE PELOPONNESIAN WAR*[1]

Introduction

The rise of nations has always occasioned alarm and tension, and frequently produced wars. Existing powers interpret a rising nation's accretion of economic and military power as a threat, and take measures to hedge against it. The rising nation sees such measures as an existential threat and makes greater efforts to overcome them. Thus ensues a continuous cycle of strategic challenge and response that may spiral out of control until a war breaks out. China and the United States potentially find themselves in such a situation. Although China has pursued what it terms a "peaceful rise" strategy and has adopted a number of policies aimed at reassuring its neighbors and indeed all nations of its benign intent, its maritime territorial claims that conflict with those of others, as well as the buildup of its navy, have spawned alarm and reaction. Many analysts in the United States are convinced that China's strategic aims are indeed limited and peaceful, and that the extensive economic links between China and the rest of the world make war highly unlikely. Others see the picture very differently. In their view, China will not be self-limiting. It will develop its military and economic power and seek territorial expansion until some nation or group of nations impose on it constraints from the outside. Given the complexities of national grand strategy, the vast and diverse nature of China's society, and the dynamic nature of even a highly structured and ostensibly stable governing bureaucracy like the Chinese Communist Party (CCP), it is likely that the thinking within Chinese policy elites is not entirely settled on the matter.

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The danger is that without intending to, the United States and China may stumble into a future war that neither wants, but which arrives via a pathway of strategic challenge and response cycles; individual actions and policies, each of which is intended to increase security. Thus, some intellectual methodology for escaping the so-called security dilemma of spawning alarm and distrust in others through efforts to make oneself more secure must be found. This chapter will propose a modest start down that road by proposing the adoption of a particular organizing principle for maritime strategy: defense of the global system of commerce and security. This principle has already been recognized and adopted by the United States Sea Services[2] and has also been proclaimed by the Chief of the Canadian Navy.[3] Although not a replacement for strategic hedging in war planning and force development, system defense as an organizing principle changes the context in which these functions take place, and may moderate the way each nation sees the other's efforts. This is not a complete solution to the problem of avoiding the security dilemma, but it is a small step that involves little in the way of strategic risk on the part of either nation, and could, if it proves useful in the maritime cooperation realm, mark the way for more ambitious measures of strategic reassurance.

The notion that some such measure is worthwhile was clearly indicated by Dr. Wang Jisi, dean of the School of International Relations at Peking University, at a conference on maritime strategy between Chinese scholars and a group from the U.S. Naval War College. He said that a good relationship in the maritime domain between China and the United States must be approached both from a bottom up perspective, by which he meant mechanisms such as an incidents at sea agreement, hot lines, etc., and from a top down perspective.[4] With respect to the top down perspective, he mentioned what he called "strategic reassurance." There are a number of ways to interpret such a term, or perhaps better put, a number of facets to it. As the conference proceeded, one Chinese scholar complained that a recent exercise between the navies of the United States, India and Japan indicated the United States was trying to "encircle" China. Clearly, some Chinese, at least, believe the United States has a particular strategic organizing principle or approach that it has used before in the defeat of the Axis powers as well as against the Soviet Union. Conversely, many in the United States see the Chinese as expansionistic, attempting to build continental style buffer zones, even at sea. If each nation persists in thinking the other is pursuing one of these traditional strategic approaches, strategic reassurance cannot be achieved. Just as clearly, each nation would like to have some assurance that the other is indeed not doing so.

Although the articulation of a strategic organizing principle is simple, its instantiation is another matter. While it is easy in retrospect to identify the strategic plan, approach or principle a nation used in a war, struggle or era, it is harder to ascribe a specific strategic approach based on any particular policy or action. Grand strategy emerges from a

pattern of decisions and actions over time and frequently across several administrations or regimes. Individual leaders may or may not act in specific cases on the basis of a formally articulated principle or strategy. Often, patterns of decision making over time exhibit coherency not from adherence to a plan but in the cumulative responses to a set of incentives, pressures, values and ideas that constitute the decision-making environment. Professor Walter A. McDougall said recently:

> In other words, was Auguste Comte correct when he insisted that demography is destiny, or Robert Strausz-Hupé, when he insisted that you cannot argue with geography? We quote such lines to good effect, but are they operationally true in the sense of being impersonal forces that move events? One need not be a rigid determinist to grant that, especially in retrospect, there is often a logic to strategic interactions that the players sensed, if at all, by sheer instinct.[5]

Among the elements of this logic is a certain geometry of conflict that arises as a function of geography. That geometry has traditionally involved internal and external positions on a global scale, with Eurasian continental powers in the center pushing out and insular sea powers on the periphery enveloping and pushing in. This pattern has been in place at least since the Napoleonic Era and constitutes a kind of default context within which the strategic decision making of great powers takes place. However, the globalization process that has gained steam since the end of the Cold War is changing the economic geography and consequently the geopolitical geometry of the world, opening up an opportunity for great powers to escape the traditional cycles of conflict. Geopolitical geometry is a convenient basis for crafting an easily grasped organizing principle that can underpin grand strategy. An example of such is George Kennan's notion of containment which he advanced in his famous "Mr. X" article.

This chapter will attempt to establish "defense of the global system of commerce and security" as a viable alternative to two traditional strategic organizing principles, or perhaps better stated, approaches to strategy that have been based on geopolitical geometry: continental and maritime. It will examine the prospects for defense of the system being adopted by the United States and China as a shared organizing principle for strategy and policy.

Strategic Reassurance

Since strategic reassurance is the goal of a new strategic organizing principle, some attention must be paid to the term and its constituent elements. The term is of relatively recent provenance, being first defined in March of 2001 by Banning Garrett in *Arms Control Today*. He established the term as follows:

> In order for two states wary of each other to solve policy problems, they may need to first struggle to demonstrate that, despite differences over specific issues, their long-term intentions toward each other are benign—in other words, they may need to engage in strategic reassurance.[6]

This is perhaps an overly ambitious definition, as two major powers whose spheres of interests may overlap may not be able to render definitive, long-term judgments to themselves, much less to each other, on how benign their intentions are. For the purpose of this chapter, it will be limited to the national security policy, planning and decision-making realm, which is still extensive. Within this realm, strategic reassurance will denote the condition in which each nation's security leadership has sufficient confidence that it understands at least the true short term strategic aims of the other such that it could correctly interpret the intent of actions by the other nation as well as feel able to refrain from actions that might otherwise invoke or exacerbate a security dilemma.

In his article, Garrett focuses principally on measures the United States might take to allay strategic mistrust surrounding its deployment of ballistic missile defense systems. Certainly, in the area of nuclear weaponry, strategic reassurance was a key issue in the days of "mutually assured destruction" where each side in the Cold War had reasonable confidence it could hold the other at risk. However, the potential deployment of highly accurate Trident D4 missiles and operational status of the Strategic Defense Initiative was viewed by the Soviets as evidence of hostile intent by the United States and therefore destabilizing. China has similar worries about U.S. ballistic missile defense and its naval intelligence activities in the South China Sea. If the United States was freed from worry about nuclear retaliation, Chinese leaders must fear it would be free to incite Taiwan independence or commit other strategic outrages, achieving perhaps a strategy of encirclement in which China is again at the mercy of a Western power. Thus, strategic reassurance in the realm of nuclear deterrence might take the form of a pact on limited deployment of missile defenses such that the United States could be assured of intercepting any missiles North Korea might launch at it while limiting it such that at least one Chinese warhead could get through.

Strategic reassurance is now a policy toward China adopted by the Obama Administration. Outlined by Deputy Secretary of State John B. Steinberg, it

> . . . rests on a core, if tacit, bargain. Just as we and our allies must make clear that we are prepared to welcome China's "arrival" . . . as a prosperous and successful power, China must reassure the rest of the world that its development and growing global role will not come at the expense of security and well-being of others.

Steinberg goes on to enumerate a number of areas in which the United States and China might adopt policies that would lead to strategic reassurance, including resource and monetary policy. Beyond the specifics of missile defense, a later part of Steinberg's speech addresses the broader issue of security planning:

> In the face of uncertainty, policymakers in any government tend to prepare for the worst to focus on the potential threat down the road, and of course, some of that is necessary. But we also have to make sure that by preparing for the worst, we don't foreclose positive outcomes; that we leave ourselves open to the positive, and avoid the trap of self-fulfilling fears.[7]

While the Administration's policy toward China may indeed be strategic reassurance, all policy-making and strategic-planning organizations within the government must adopt it, requiring acceptance of risk and a culture change in some cases. If such changes do not occur, United States actions will not match its words and the Chinese will quickly perceive the dichotomy. The United States would appear to the Chinese as a hegemon attempting to undercut Chinese development in order to retain its global primacy. The Chinese, in turn, would presumably adopt their own versions of worst-case planning scenarios, further propelling the cycle of mistrust.

Of course, the Chinese would have to keep their end of the tacit bargain. In theory, they have been doing so with their doctrine of "peaceful rise." Clearly, China has genuinely desired an era of peace and stability in order to allow her economic development to take place, so to that extent the doctrine seems genuine enough. However, as China has achieved economic success, it has found itself with the resources to modernize and expand its armed forces, including its navy. As it has attained a degree of security and self-confidence through naval strength, it has more aggressively asserted what it considers its traditional and rightful claims in the South China Sea and elsewhere along its bordering oceans. However, these claims cannot be considered in isolation from China's "resource strategy," which has increasingly taken the form of mercantilist policy aimed at monopolizing access to various resources and bypassing global commodity markets. Moreover, the presumption of vast energy resources under the Spratly Islands, for example, makes China's claims to them seem more expansionistic than historic. This generates strategic mistrust by virtually all other nations, spawning suspicions that the doctrine of peaceful rise is essentially a ruse to buy time until China has sufficient power to become hegemonic and potentially imperial.

Strategic reassurance requires not so much stated policy but a national security strategic planning culture that can abandon the worst-case scenarios that arise from the strategic orientation of the particular country. For a continental power, it means being able to set aside the invasion and encirclement scenarios and abandon the quest for geopolitical buffers and mercantilist economic "bastions." For maritime powers, the challenge is to accept the growing strength of a continental power without engaging in balancing or containment strategies. Both of these acts of strategic risk taking would face serious opposition by conservatives and hawks, just as Obama's policy of strategic reassurance has drawn criticism from right-leaning pundits.[8] The arguments of conservatives have a certain salience because the policy of strategic reassurance as currently defined and articulated requires of strategic planners an act omission based on faith that reciprocity will be forthcoming from the other side. This is difficult in lieu of any definite concept or organizing principle that would replace the continental and maritime models, and provide planners with some basis for managing risk in their processes.

Geopolitics and Security Planning

Once humans gained global mobility, the nature of national strategy changed for those nations rich enough to possess a powerful navy. The competition between two early global powers, Spain and Portugal, prompted Pope Alexander VI to establish a dividing line that later encircled the globe from north to south in hopes of peacefully allocating newly found lands. This artificial frontier was necessitated by the fact that the oceans are all connected and the ships of each power could move freely about them, virtually guaranteeing a clash. Since that time, the interaction between the continental and maritime strategic approaches has been about movement (encirclement) versus frontiers (exclusion). In today's world, the essentials of strategic maneuver that characterize the continental and maritime strategic approaches still retain their saliency, but technological developments have superimposed on them added dimensions. Nuclear weapons, space and the internet each introduce a new virtual geography that must be considered in conjunction with the physical geography of the globe. It is not enough for an authoritarian continental power, for example, to establish geographic buffers; it must also erect information buffers in the form of internet censorship. Maritime maneuver, similarly, cannot any longer rely on the anonymity of the high seas; space must be taken into account. These added dimensions complicate the process of strategic maneuver, but grand strategic approaches and principles that incorporate them have yet to be explicitly articulated, although the new approach identified in this chapter inherently integrates them. In the meantime, strategists work with the traditional approaches at their disposal.

Continental powers have never needed a geographical theorist to instruct them on the need for buffering and expansion, nor have maritime powers required tutelage on the dangers of a single continental power becoming too dominant. However, geopolitical theorists have articulated the two strategic approaches, allowing them to be analyzed and discussed. Most fundamentally, the relationship between geography and the dynamics of the ascent of nations to power as well as the perceptions of strategists generated by that relationship is at the heart of understanding how a new relationship might be articulated and a new set of perceptions created.

The Continental Approach

Continental powers arising on the Eurasian "World Island" have generally possessed authoritarian governments. Because of this, the continental strategic approach—the net vector of perceptions, principles, policies and actions—starts at the capital and radiates outward. Maintaining the regime in power is job one. Because a Eurasian power of any size is necessarily an empire of sorts—a collection of smaller cultural enclaves—the logic of internal security does not differ fundamentally from the logic of external security. Thus, the establishment of neutralized buffer states around the national periphery is

not that much different than keeping restive internal elements under control. While the threat of invasion by external powers has been very real and has contributed to the "psychosis of impending attack,"[9] the threat of internal dissolution is also a major factor in a continental-style strategy. The continental approach is thus oriented on the central position, essentially the capital, with its vectors of security interests radiating outward from there. The internal side of the continental security equation is based on garrisons within cultural enclaves—strong points—and control and even suppression of the movement of populace. This general logic tends to carry over into buffer zones outside the continental power's borders, including maritime buffers.

Besides being authoritarian, continental powers have also tended to have their own economic systems that have been either exclusionary, such as Napoleon's continental system and the Soviet command economy, or mercantilist, such as modern China. The approach to economics mirrors its approach to political security—exclusionary in one way or another. Mercantilism, the attempt to corner markets on resources or to exclude competitors from various arenas of economic activity, can be regarded as a form of strong point or bastion logic in that each exclusive deal with a resource supplier keeps other parties from having access to that particular mine, well or other resource source. It is a matter of keeping others from having access to something of value to one's self.

It has been mostly the case that continental powers are substantially land-locked, Germany and the Soviet Union being the primary examples. On the other hand, Napoleonic France had extensive coastlines and at times a very capable fleet, but still hewed to a continental approach to grand strategy. Perhaps the most striking case is Imperial Japan. Being an island nation akin to Great Britain, and possessing a highly capable fleet, she nonetheless adopted a continental-style strategy of expansion from a central point and tried to defend her maritime acquisitions to the south and east with a system of island strong points.

Just as the geopolitical theorist Halford Mackinder understood "the dominant value of sea power,"[10] continental powers have been concerned about gaining access to the seas. Because of the logic of buffering and garrisoning, however, even the existence of open access to the sea is problematic because it could constitute an avenue of invasion, and of course such has been the case. This results in a continental power trying to establish strong points of various kinds to maintain access to the open sea and prevent contending powers from entering. Moreover centralized or exclusionary regional economic systems like Imperial Japan's Greater East Asia Co-Prosperity Sphere or the Warsaw Pact constituted economic bastions that overlaid and supported the center-out security bastion logic that is the heart of the continental approach.

Modern-day China's policies indicate that her security strategy establishment is following the continental approach. She is an authoritarian power that has internal integration issues with Tibet and of course Taiwan, and shares a land border with significant geopolitical competitors, India and Russia. The discussion in her modern literature on maritime strategy focuses on the "first and second island chains" as geographic barriers keeping her from gaining free access to the world ocean or potentially barriers for keeping the U.S. Navy at bay.[11] Talking about geographic features in this manner is consistent with the continental approach.[12]

Although she has adopted a capitalist economic structure, she preserves a mercantilist approach to obtaining resources and has manipulated her currency to maintain a favorable trade balance—all exclusionary practices. Having suffered invasion from the sea on several occasions, she is attempting via extensive oceanic territorial claims and exclusionary interpretations of the UN Law of the Sea to establish oceanic buffer zones. These policies have brought her into dispute with regional nations and into maritime conflict with the United States, the world's principal maritime power.

The Maritime Approach

Since the time of the Napoleonic Wars, nations following the maritime approach have been capitalist democracies, notably Great Britain and the United States. Essentially free of internal integration problems, and possessing powerful navies that ensured their insularity, these nations have viewed their security in a manner geographically opposite of that of continental powers. Because they relied on international trade to build their economies, the basis of their security posture is the world ocean. Because the seas are all connected, and because the principal threats have emanated from continental powers, maritime powers have oriented on the external position. The external position, based on extensive global trade and a network of allies, is about movement rather than strong points. Maritime powers have always been able to find allies whose location presented continental powers with multi-front strategic problems, and have used the mobility of sea power to adopt advantageous strategic lines of approach as opportunities presented themselves. Being liberal market economies, maritime powers have found it easier than authoritarian continental powers to attract allies, regardless of the form of government those allies possessed. Command of the seas allowed them to maintain credible and effective contact with allies.

For the first century of its existence, the United States was a continental power as it completed the process of consolidating its hold on its North American territory. The Monroe Doctrine was a continentalist policy aimed at excluding European powers from the Western Hemisphere. The Spanish-American War represented a shift in orientation to a maritime approach, which was further impelled by World War I. Although its

citizenry possessed a strong isolationist outlook between the World Wars, the Japanese attack on Pearl Harbor decisively propelled the United States into the maritime approach. Its subsequent adoption of containment of the Soviet Union was perhaps the ultimate expression of that approach.

Globalization and the System

After the fall of the Soviet Union, the United States found itself in the position of a maritime hyperpower with no countervailing Eurasian continental power to contend with. As a liberal trading democracy oriented on the maritime strategic approach, it had no agenda to assert continental-style control over the world, although the combination of World War II, the Cold War and the 1991 Gulf War left it with military garrisons around the globe. The general thrust of its policies was to encourage industrialization and economic development of what had been termed "Third World" nations during the Cold War. The ensuing spread of economic development was termed "globalization." Perhaps the most significant geopolitical effect of globalization was the emergence of economic interdependency among nations. Although abetted by the complex of international economic accords such as Bretton Woods, aimed at preserving democracy in the face of the communist challenge after World War II, the current global system is best understood as a phenomenon rather than a construction. Jiang Zemin captured the essence of this when he said, "Economic globalization, being an objective tendency of the development of the world's economy, is independent of man's will and cannot be avoided by any country."[13] The proliferation of economic development and global economic growth in general has produced a new economic geography that calls for new strategic approaches.

Due in part to industrialization, the last decades of the nineteenth century and the first decade of the twentieth saw the emergence of an increasingly active global system of trade. However, it took place in an international context in which the sovereign state was almost the sole repository of political power. World War I brought that phase of globalization to a halt, followed by a 76-year "dark age" in which two contending economic systems led the world, and in which continental powers contended in traditional ways with maritime powers.[14] After 1990, in the "unipolar moment" enjoyed by the United States, not only did nations start down the road toward economic interdependency, the state itself started to lose its monopoly on political power. International organizations such as the European Union and the World Trade Organization, and trans-national organizations such as multi-national corporations and Al Qaeda have achieved a degree of power formerly held by states. The newly forming system is forcing states into closer coordination and cooperation on a range of issues related to security.

The effective functioning of the global system of commerce and security, as it exists today, is more important to the long-term prospects of most all states than was the global system of 1914. Although the system is complex, it can be simplistically and schematically characterized as consisting of flows of trade, finance and information among three types of nodes; resource extraction, manufacturing and consumption. These nodes are connected by merchant shipping, airlines, mass media, cell phones and the internet. Although in many cases, resource extraction, manufacturing and consumption geographically coexist, it tends to be the case that certain geographic areas emphasize one function over the others and so the flow among them must take place if the countries comprising the nodes are to prosper.

The U.S. maritime strategy says the system is vulnerable to a range of potential disruptions. The cascading effects emanating from the disruption of air travel in Europe due to the eruption of a volcano in Iceland is a case in point. It should also be noted that although it is natural to think that a maritime strategy like CS21 *(A Cooperative Strategy for 21st Century Seapower)* would focus on connectors, notably commercial shipping, in reality there exist few significant threats to its flow, with the principal exception being closure of the Straits of Hormuz. While piracy in the Gulf of Aden is distressing, it is far from a level that would cause actual disruption to the system. Rather, it is instability and conflict within and between the nodes that pose the greatest threat of systemic disruption. Principal among these is war among the major powers. Additionally, a 9/11-style attack on the United States or other major consumer countries might stifle demand, causing ripple effects in manufacturing, and major instability in the Middle East or Africa could disrupt access to resources the system needs. It is the recognition not only of the criticality of maintaining flows, but also that virtually all countries have a stake in proper functioning that prompted U.S. Navy strategists to adopt defense of the system as the strategic approach upon which to base its strategy.

As a broad geopolitical strategic approach, defense of the system shares one characteristic with its continental and maritime siblings; it is a continuous process that spans peace and war. Additionally, reflecting the fusion of economics, politics and geography as the other two do, defense of the system can transcend the policies of individual administrations or regimes and characterize the long-term strategic vector of a nation.

On the other hand, there are some fundamental differences that lead to its potential utility in making mutual strategic reassurance possible between the United States/China. The first difference is that whereas both the continental and maritime approaches are inherently exclusionary, defense of the system is inherently inclusive. As one example, maritime security is critical for defense of the system (far less critical to the other two), and this task is so large and so diffuse in its conduct that no navy, regardless of its power, can do it alone. Therefore, the broadest possible maritime cooperation is needed.

Moreover, maritime domain awareness, disaster relief and other systemic maritime missions are an inherent part of system defense and are not the sole provinces of big navies or structured alliances. Every navy, regardless of size or makeup, has an important part to play in systemic maritime security. Similarly, the process of cooperation has shifted from formal and hierarchal alliance structures that have high cost of entry to loose, collaborative networks that anyone can join for the cost of a laptop and cell phone.

The second key difference between system defense and the other two approaches is that it is not a zero-sum game. The continental and maritime approaches are ways of limiting and neutralizing competitive powers. Gains by one power almost always come at the perceived expense of the other. In the system defense approach, defending the flow is a collective good that benefits not only the major powers but all the nations that are functioning members of the system. While the adoption of the system defense approach does not eradicate competition it would at least reduce one endemic source of potential conflict—an inherently adversarial strategic planning structure.

Sharing an Approach—Is It Feasible?

At first glance, defense of the system may appear to be artificial and idealistic. Whereas it may have value in selling maritime security cooperation to smaller nations, as a basis for strategic planning for those nations that have the wherewithal to engage in power politics, it is easily seen as invoking too many risks. Its other liability is that it is new and it was first articulated by Americans. All of these factors can make the approach an object of suspicion to security planners who are inherently conservative and an object of skepticism and derision to pundits who are wedded to a more traditional view of the world. All of these and other factors would seem to make mutual adoption of the approach by the United States and China a pipe dream. However, closer examination of the changed geopolitical realities of the modern world reveals some fundamental problems with pursuing either continental or maritime approaches, problems that may make system defense a more practical and attractive alternative.

Any nation that adopts the continental approach faces the inherent problem of limits and when to stop. In ancient times, the quest for local security exploded into empire building. Success, as Brantly Womack states, is a poor teacher of limits.[15] If a continental power is successful in ringing itself with buffers, how does it then protect the buffers? In the case of ancient Rome, buffers were added to buffers until it ruled the known world. Neither Napoleon nor Hitler could abide the idea of a powerful Russia lurking to the East and were impelled to invade. History aside, even if a continental power elects to stop and adopt a status quo stance, it faces the problem of dynamism. The world outside is constantly changing, and new political and religious movements as well

as developing technology and shifting demographics all serve to erode and undercut geopolitical barriers.

The problem of barriers extends down to the means of erecting and maintaining them, particularly at sea. Throughout the history of naval warfare, the offense has trumped the defense,[16] and the advent of anti-ship missiles only continues this trend. Thus any power that sought to keep other navies out of a large area of bordering ocean would have a very difficult time of it. This is especially true in the undersea realm, as the oceans are anything but transparent even with today's technology. The advent of unmanned systems and nanotechnology will make the problem that much harder. In the realm of cyberspace, although China has attempted to erect electronic barriers to information flow that are analogues to physical barriers, it is not clear whether these will be viable over the long run. Just as historic barriers, whether castles, forts or the Maginot Line, all succumbed to the technology of offense and maneuver, modern barriers and strong points, geopolitical or otherwise, are likely to suffer the same fate. In a systemic world, systemic style defenses are needed.

A third difficulty that attends the continental approach is that it inevitably produces conflict between the major power and its neighbors. It was one thing for the United States, in its continental phase, to adopt a declaratory Monroe Doctrine that was essentially underpinned by the Royal Navy, and which was motivated more by the desire to protect fledgling democracies in Latin America than it was by United States' desire for hegemony. It was quite another thing for the Soviet Union to subvert the Eastern European democracies after World War II and turn them into communist buffer states. The recent Russian incursion into Georgia indicates the continental approach is anything but dead. China has a somewhat different set of problems and has tried to take a more sophisticated and peaceful approach to buffer building, but has nonetheless run into conflict with its neighbors and with the United States. China's territorial claims in the South China Sea and East China Sea have ignited disputes with Japan, the Philippines, Vietnam and others. Her policies with respect to her asserted rights in the Exclusive Economic Zone (EEZ) have generated naval incidents with United States forces. More broadly, China's sheer economic growth coupled with her need to improve regional economic infrastructure to support that growth has increased the sense of exposure and vulnerability among neighboring nations. The danger of this for China is that they could be driven into the arms of a United States that felt impelled to balance or encircle her using a maritime approach.

The laundry list of modern geopolitical difficulties facing a continental power notwithstanding, the maritime approach is similarly burdened. To begin with, just as continentalist barriers promised to be increasingly porous in various ways, so has the insularity upon which the maritime approach depends become a victim of modern conditions, as

the attacks of 9/11 so spectacularly demonstrated. The nightmare of terrorists sneaking weapons of mass destruction around by sea is all too conceivable. In the aftermath of 9/11, the Bush Administration was stampeded into a continental approach—looking to neutralize threats at their origin and establish buffers—by invading Afghanistan and Iraq. At the time there was no admiral who could assure them, as Lord St. Vincent assured a jumpy British Parliament in 1801, that although the enemy might come, they would not come by sea. Maritime security is rapidly improving today, but it will never produce the kind of secure insularity that was possible in the days of fleets and command of the sea.

Another bedrock of the maritime approach is allies. Historically, a common threat drove nations into alliances, even great powers that would otherwise be competitors. Smaller nations jumped on the bandwagon. The fact that the expansionist continental powers also had an alternate economic system helped draw clear lines between good and evil for most nations. Today, in a systemic world the lines are anything but clear. Most nations are part of the global economic system, and even nations that have authoritarian regimes such as China do not espouse militant and hostile ideologies as did the old Soviet Union. This makes it hard for a maritime approach to gain strategic purchase. In the case of China specifically, her contributions to the global system, and specifically the economic well-being of the United States, are enormous. There would be massive economic costs to any attempt at encirclement and isolation.

As with the continental approach, there are naval obstacles to adopting the maritime approach. An inherent part of encirclement is the interdiction of merchant shipping. Prior to the onset of globalization, seaborne commerce was generally carried in ships flying the flag of the country that owned the cargo, making interdiction and commerce raiding relatively straightforward. Today's situation is much different. Flags of convenience rule the waves, the nationality of crews and masters is likely to be different than that of the flag, and who actually owns the ship and cargo is murky at best. Moreover, the huge cargoes of crude carriers are often on the global oil spot market and could change hands several times en-route. Container shipping has gone to a hub and spoke system meaning that any particular ship's cargo is likely to be very multi-national. For these and various other naval warfare reasons, chasing enemy commerce from the seas *a la* Alfred Thayer Mahan's theory, if not totally infeasible, is at least a lot more complicated.

The multiplicity of modern difficulties that attend either of the traditional strategic approaches may make strategists at least listen to arguments for adopting defense of the system. It is not without its own set of risks and difficulties, but they are different than those previously mentioned and may be more tolerable.

Perhaps the key difficulty with defense of the system is that it is not a wholly sovereign approach. No single nation can pull it off alone, if for no other reason than being part of the global system means a nation must necessarily sacrifice some elements of sovereignty, especially in the economic sphere. In the maritime arena, maritime security requires a globally cooperative effort. The oceans are simply too large for one navy, no matter how powerful, to police them adequately. Other missions such as disaster relief and humanitarian assistance have also become collaborative international enterprises. The nature of many collaborative projects in defense of the system tends to equalize the participants. In the maritime security business, the United States is not the kind of overwhelmingly influential presence it was as the leader of a military alliance in the Cold War. It must get used to being a peer, not because its power has declined, but because the nature of the business has changed. Nations as diverse as Italy, Singapore and Brazil are new key players in the world of maritime security.

Defense of the system is also bedeviled by the absence of a clearly assignable enemy (although this is also one of its virtues). Certainly Al Qaeda and other such movements are a threat to the system, but they are covert and diffuse and hard to hem in with clean definitions and characterizations. War among major powers is a principal threat to the system, but war is a condition, and increasingly hard to nail down when it exists and when it doesn't. Are we in a war on terror? Are we already in a cyber-war? Climate change, resource scarcity, volcanoes, tsunamis, earthquakes, floods and pandemics are all threats to the system—but to what degree, and who can say where or how the next one will strike? Planning for defense of the system is not like planning for a war; it's harder. Besides the lack of a clearly definable villain, it requires a systemic strategy rather than a traditional contingent strategy. Wars are episodic whereas threats to the system are continuous. This takes strategic planners into some intellectual *terra incognita* that is likely to be very uncomfortable.

Finally, defense of the system puts powerful nations in a form of the prisoners' dilemma. The prisoners' dilemma is a game theory situation in which two prisoners are being interrogated separately. If both cooperate—that is, each refuses to rat out the other—the law has no case and they are released. If, however, one talks and the other doesn't, the talker gets lenient treatment and the ratted out person faces hard time. Obviously, if the prisoners could communicate during interrogation, they could assure the most favorable outcome because each could assure himself the other was not talking. On the other hand, if both talked, each would do some hard time but less than if he kept silent. If both China and the United States cooperate in adopting the defense of the system approach, then the geopolitical risks that accrue to each from the other are substantially mitigated. However, if one decides to abandon it and secretly pursue a continental or maritime approach, it might gain at least a temporary strategic advantage over the

other. The way out of the prisoners' dilemma is the free flow of information so that each knows what the other is planning to do. This is not easy to achieve in the world of strategic planning where levels of classification tend to be high. On the other hand, the first step has already been taken by the United States with the publication of CS21, in which it not only declares that defense of the system is an organizing principle, but also refrains from naming China as a specific threat. If China reciprocated with some kind of analogous unclassified strategic document, then at least both nations would have made public declarations of the new approach to which the world could hold them accountable. The most recent Chinese national defense white paper does not appear to make any progress in this direction.[17]

If we were to draw up a game theory matrix of the strategic options of both China and the United States, we would list the strategic options for both sides and bounce them together. Key to this analysis is the judgment that a true maritime approach to grand strategy is not feasible for China regardless of how big a navy she builds. The maritime approach requires allies, and as an authoritarian power, China is not likely to be able to attract them. Similarly, while the United States may persist in an offensive version of the continental approach (new versions of the wars in Iraq and Afghanistan), it is unlikely to revert to isolationism, the defensive form.

Thus China can either follow its current course of continentalism with an expanding maritime capacity, or adopt defense of the system. The United States can continue a *de facto* offensive continentalist approach, a maritime approach (sometimes described as offshore balancing) or defense of the system. If we mentally game out the interactions between each of the options for both sides (specific outcomes or payoffs left to the imagination of the reader), we would find some potential outcomes more favorable to the United States and some more favorable to China, with the box containing the outcome generated by both pursuing defense of the system as being most favorable to each (neither prisoner rats out the other). However, in looking at the matrix of presumed results as a whole, it appears that there would be a tendency for the United States to revert from defense of the system to a maritime approach as a kind of default response to persistent and aggressive continentalism by China and a tendency for China to revert from system defense to the continental approach in response to perceived United States encirclement. In other words, even if one or the other adopted defense of the system, it would not persist in this approach if it perceived the other was adopting some other approach—just like a prisoner would quickly start talking to interrogators if he perceived that the other one was starting to talk. The idea is to move from the most adverse outcome cell to the least worst, which is the one in which both prisoners squeal on the other. The outcome of this cell is conflict and war—expensive to both sides, with the ultimate winner likely being the United States, albeit a banged-up and poorer United States. China might or

might not implode, but its economic development would come to an end and internal instability would rack it for decades.

Clearly, great powers are going to engage in some form of strategic hedging—that is, preparing for the worst case. To invoke the prisoners' dilemma analogy once more, if strategic hedging is interpreted by the other as "talking to the interrogator," then the cycle of mistrust kicks in. The question becomes how prudent and appropriate strategic hedging could be kept from being interpreted as "talking." Clearly, strategic hedging for both the United States and China involves the building and maintenance of strong navies. This, in and of itself, should not be the cause for alarm. Rather it is how these navies are used that is the indicator of whether a nation is adopting one strategic approach or another. A continentalist navy will attempt to erect barriers to keep others as far away as possible. A maritime navy will attempt to hem in an opposing navy. The game theory outcome box governed by both powers pursuing defense of the system would feature each navy welcoming the other into its "turf." From a hedging point of view, the United States must accept China's right to have a strong navy that can prevent invasion of her territory and operate globally in support of legitimate sovereign interests as well as system defense requirements. China, reciprocally, must accept the presence of the U.S. Navy in East Asian waters in support of existing alliance arrangements and also system defense needs. U.S. intelligence gathering and aircraft carrier operations in close proximity to China will inevitably be interpreted as "hemming in" operations, while Chinese threats to use missiles against U.S. forces as well as collision incidents send the message that China is establishing keep out zones on the high seas. If defense of the system was indeed the strategic approach of both nations, neither of these kinds of operations would be needed and the naval tactical geometry of conflict would be avoided.

Declarative maritime policy is a start, but it will be the pattern of actions and policies over time that will either build or erode strategic reassurance. The basic difficulty with the defense of the system approach in this regard is that since it is necessarily cooperative, actions by the United States, say, to establish collaborative maritime security relationships with East Asian nations could be easily interpreted by China as encirclement.[18] Similarly, Chinese persistence in its current position on EEZ rights and exclusions would be interpreted by the United States as buffer building. Both countries would have to develop confidence-building measures that would indicate a true adherence to the approach. One such measure might be to agree that any joint naval exercise conducted between the United States and regional third parties would be at least observed, if not participated in, by China. China, for its part, would have to adjust its interpretation of the UN Law of the Sea provisions concerning the EEZ to match that of the United States and most other nations. Neither of these measures would have any significant effect on China's island claims or the status of Taiwan. So long as neither country is intent on

encirclement or exclusion, provisions such as these do no strategic harm. However, it is open to question whether they would be acceptable to each country's military leadership, and what the reactions to such measures by other nations in the region would be.

If the difficulties in adopting defense of the system are significant, so are the potential benefits. The main one has already been mentioned—it avoids the zero-sum game. The system is global, and while not all nations are functioning smoothly as members, and while globalization has not been a uniform blessing to all peoples, its benefits for the majority of nations and regions are very real and very great. Living standards around the world are higher and growing because of it. The costs to any nation that wishes to secede or to overturn it are much greater than before and may even be lethal. The great and emerging powers of the world need each other, and the defense of the system approach is a way of aligning strategic planning with existing economic realities.

There is another potential benefit for China in adopting the defense of the system approach. The historical record shows that other than Rome and the Persian Empire (and for them only partially and for relatively short periods) continental powers have not met with success in developing naval power. The problem has not been so much that such powers did not develop strong navies (which some did), but that they were not able to develop effective strategies for using them.[19] This is perhaps partially a function of the nations' accrued histories. Even where a successful transition from the continental to the maritime approach has occurred, the United States being the principal example, it is all too easy for leadership to lose its poise and revert.[20] Defense of the system may represent a strategic "halfway house" that provides context and coherency to a nation that either does not have the resources or the political will to adopt fully the maritime approach. Moreover, as a kind of "anti-Mahanian" concept, in that it requires neither a strong capital ship fleet nor strings of bases, it allows a kind of gradualist approach to execution. In terms of developing execution strategy, which has been a traditional weakness of continental powers trying to go to sea, defense of the system is far more tolerant of errors since it is a collective and collaborative enterprise and allows for some strategic flexibility. As mentioned at the outset of this paper, Canada, the second largest country in the world in terms of land area, and possessing a relatively small navy, is adopting defense of the system as its approach. It has neither the population nor economic power to build a big navy, and for most of the past century has been a participant in the maritime strategies of Great Britain and the United States. Adopting the defense of the system as its organizing principle allows Canada to justify the maintenance of a globally deployable fleet of modest size while not having to function as an accessory to anyone else's foreign policy. Defense of the system allows even tentative initial efforts such as the Chinese naval deployments for anti-piracy operations in the Persian Gulf to have strategic coherency and utility.

Conclusion: Prospects for Adoption

Despite the difficulties of pursuing the continental and maritime approaches in this day and age, and despite the practical benefits of adopting defense of the system as a strategic planning organizing principle, there will be considerable friction to overcome in doing so. Influential voices in the United States are already opposing the policy of strategic reassurance, and a pundit like Robert Kaplan has recently said,

> Each of these states [of East Asia] is seeking to adjust the balance of power in its favor. This is why United States Secretary of State Hillary Clinton's rejection of balance-of-power politics as a relic of the past is either disingenuous or misguided. There is an arms race going on in Asia, and the United States will have to face this reality when it substantially reduces its forces in Afghanistan and Iraq.[21]

Similar debates are no doubt occurring within the Chinese government. Most fundamentally, shifting to defense of the system requires a change in strategic planning culture, something that is likely to be difficult for both the United States and China. An additional challenge for the United States is the periodic turnover, not just of administrations but of political philosophy, yawing between liberal and conservative.

Despite cultural inertia and opposition of various kinds there are reasons to think the new approach has a fighting chance at adoption. First, it has been embraced by the U.S. Navy, Marine Corps and Coast Guard, the three largest and most powerful organizations of their kind in the world. Moreover, the U.S. maritime strategy, signed during the Bush Administration, survived the transition to the Obama Administration. The widespread international approbation the strategy has received will likely moderate any internal bureaucratic influences to make arbitrary changes in order to advance careers or make personal marks. Importantly, Canada's adoption of it could spark a chain reaction of adoption by other navies, creating a certain momentum the Chinese would notice. While China would certainly not want to be seen jumping on any United States inspired bandwagon, the opportunity for putting their own spin on it and its collaborative vice affiliated nature might tip their scale in its favor.

Of course, adoption of this approach by everyone would not eradicate conflict. China will still want to assert what she sees as her legitimate rights and claims and to achieve recognition and acceptance as a great power whose interests and opinions are respected. The United States will continue to promote democracy and human rights, thus worrying and irritating an authoritarian China. However, through its adoption, the geopolitical geometry of conflict would change, and avenues for dispute resolution, previously obviated by the interplay of the continental and maritime approaches to grand strategy, might become feasible.

Defense of the global system is simply the articulation of an idea—albeit one that reflects the emergent realities on the ground and at sea. Like its traditional counterparts,

the continental and maritime approaches, it is a way to rise above the trees and see the strategic forest. Being simply an idea is no small thing, though, for as the preamble to the UNESCO Charter states: "since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed."

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PART TWO

Naval Aviation

CHAPTER SEVEN

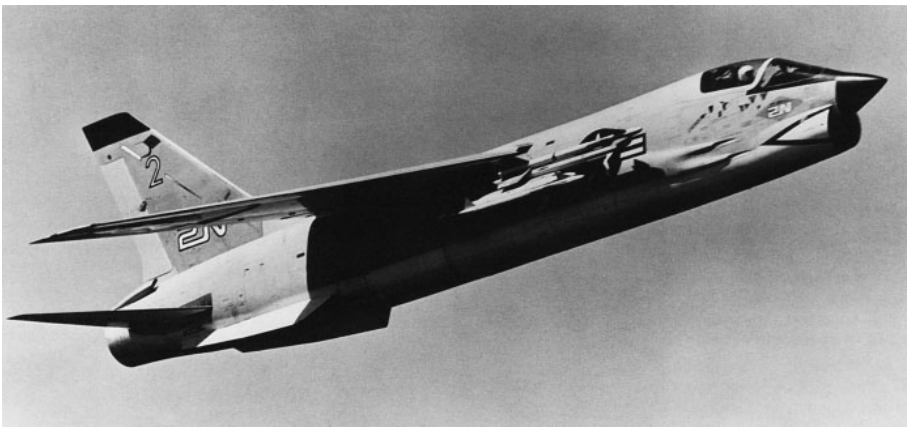
The U.S. Navy's Transition to Jets

Definition of an optimist: a naval aviator with a savings account.

QUIP POPULAR IN NAVAL AVIATION

As we approach 2011, the centennial year of aviation in the U.S. Navy, the jet engine and jet-powered aircraft have become ubiquitous. Today millions travel safely in jet airliners, and the military jet fighter is almost a cultural icon. However, in the late 1930s the prospect for powering aircraft with anything but piston engines seemed remote, except to a few visionary engineers in Great Britain and Germany. In the early 1940s their work resulted in the first flights of jet-powered aircraft, but due to the low thrust of their engines these aircraft were outclassed by existing piston-engine fighters. Additional advances in engine design in Germany resulted in the fielding of the Me-262 Swallow fighter, which, although not as maneuverable as the American P-51 Mustang or other Allied fighters, had a top speed 100 mph faster, due to its jet engines and swept wings, giving it significant operational advantages. After the war, aeronautical engineers from all the Allied nations studied German technical advances and worked to incorporate them into their new generations of fighters.

When the U.S. Navy introduced its first operational jet, the McDonnell F1H Phantom, in 1947, it began a transition phase that turned out to be extended and very costly in terms of aircrew lives and airplanes lost. The higher speeds and altitudes of jets presented a new set of problems to the aircraft designers and manufacturers, as well as to the Navy squadrons that operated them. In 1946, nobody knew that a high-performance jet fighter needed such appurtenances as a stabilator (instead of an elevator); irreversible, hydraulic flight controls with artificial feel; redundant hydraulic systems; pitch and yaw stability augmentation; ejection seats; air conditioning; and others.[1] Learning these lessons required a trial-and-error process that resulted in the fielding and rapid obsolescence of a series of different jets, each reflecting solutions to the defects discovered in earlier models.



F8U-2N Crusader.

U.S. Navy

It is central to the story presented in this article to consider how long this "transition" to jets lasted. Some histories of naval aviation regard the transition to jets to be substantially complete with the phasing out of the last propeller-driven fighter, the F4U Corsair, while others maintain that the transition lasted until the introduction of the F-8 Crusader and F-4 Phantom II—the first Navy carrier-based fighters that were the equals of their land-based counterparts. Another way of looking at it is through the lens of safety: one might declare the transition to have been complete when the Navy aviation accident rate became comparable to that of the U.S. Air Force. The logic behind this reasoning is that whereas a multitude of factors—technical, organizational, and cultural—constitute the capability to operate swept-wing jets, the mishap rate offers an overall indicator of how successful an organization is in adopting a new technology. Using this criterion, the Navy's transition process lasted until the late 1980s—which was, not coincidentally, the era in which the F/A-18 arrived in the fleet in numbers. This article argues that tactical jet aircraft design and technology presented Navy aircrews, maintenance personnel, and leaders with several major challenges that were in fact not substantially overcome until the introduction of the F/A-18 Hornet in 1983. These challenges included such technical problems as engine reliability and response times, swept-wing flight characteristics, and man/machine interface issues. The Air Force also encountered these challenges, but the Navy's operating environment and, indeed, its organizational culture kept it from achieving a fully successful transition until well after the Air Force did.

Between 1949, the year jets started showing up in the fleet in numbers, and 1988, the year their combined mishap rate finally got down to Air Force levels, the Navy and Marine Corps lost almost twelve thousand airplanes of all types (helicopters, trainers, and patrol planes, in addition to jets) and over 8,500 aircrew, in no small part as a result

F/A-18 Hornet.

U.S. Navy

of these issues. Perhaps the statistics for the F-8 Crusader, a supersonic fighter designed by Vought in the late 1950s, provide a good illustration of the problem. The F-8 was always known as a difficult airplane to master. In all, 1,261 Crusaders were built. By the time it was withdrawn from the fleet, 1,106 had been involved in mishaps. Only a handful of them were lost to enemy fire in Vietnam.[2] While the F-8 statistics might have been worse than those for most other models, they make the magnitude of the problem clear: whether from engine failure, pilot error, weather, or bad luck, the vast majority (88 percent!) of Crusaders ever built ended up as smoking holes in the ground, splashes in the water, or fireballs hurtling across a flight deck. This was naval aviation from 1947 through about 1988. Today, the accident rate is normally one or less per hundred thousand hours of flight time, making mishaps an unusual occurrence. This is in stark contrast to the landmark year of 1954, when naval aviation (that is, Navy and Marine combined) lost 776 aircraft and 535 crew, for an accident rate well above fifty per hundred thousand flight hours—and the rate for carrier-based tactical aviation was much higher than that.

During this extended transition period, naval aviation participated in three major wars and numerous crises, and, of course, many planes and crews were lost to enemy fire. However, the vast majority of aircraft losses over this period were due to mishaps, many of which were associated with the technical and organizational problems just mentioned. In other words, the airplanes that populated the flight decks of aircraft carriers

from the introduction of the F1H Phantom through the retirement of the F-14 Tomcat were, with few exceptions, hard to fly and maintain and would kill the unwary crew. Many men and a few women gave their lives trying to operate these machines in the challenging environment of the sea. This history is meant to recognize their sacrifice and honor their service.

The Operational Imperative

U.S. naval aviation ended World War II at the pinnacle of success; its propeller-driven aircraft were the best in the world, and the requirements of carrier suitability did not compromise their performance versus that of land-based fighters. By the early 1940s the Navy's Bureau of Aeronautics had received word of jet engine developments in Germany and Great Britain and had commissioned Westinghouse and Allis Chalmers to build American versions. However, the high fuel consumption, low power at takeoff, and poor reliability of early engines did not make them attractive for use in carrier-borne planes. Moreover, when details of German aerodynamic advances, specifically the swept wing, became known, Navy planners felt that high landing speeds and adverse handling characteristics would make aircraft equipped with them unsuitable for carrier use.

On the other hand, the Navy was faced with a new opponent, the Soviet Union, that had also capitalized on captured German knowledge. If the Soviets were to build a high-speed jet bomber, carriers might be defenseless if they could not launch high-speed interceptors from their decks. As the Cold War came into being, this knowledge pressurized the development of jet aircraft, adding to the rapidity with which it took place but also imposing brutal material and human costs.

An additional source of pressure was the new U.S. Air Force, whose leadership in the postwar environment believed that the combination of the atomic bomb and the ultra-long-range bomber rendered naval aviation irrelevant. The Navy had long regarded strikes against land targets to be a fundamental mission of its own air arm, and the prospect of being sidelined in the business of nuclear attack seemed to threaten the very existence of naval aviation. In April 1949 the secretary of defense, Louis Johnson, canceled the construction of USS *United States,* a very large aircraft carrier that had been designed to support a new generation of big Navy jet bombers capable of carrying the large and heavy nuclear weapons of the day. This cancellation, along with Air Force efforts to push the huge B-36 bomber program at the expense of the other services, produced in October 1949 an incident that has been termed the "Revolt of the Admirals." Admiral Arthur Radford and other aviation flag officers, as well as the Chief of Naval Operations (CNO), Admiral Louis Denfeld, testified before Congress arguing the need for an atomic delivery capability for naval aviation and alleging the deficiencies of the B-36—in direct contravention of the secretary of defense's wishes. Although

Admiral Denfeld was subsequently fired by the secretary, Congress was sufficiently convinced of the Navy's utility in strike warfare to authorize in 1951 the construction of USS *Forrestal,* the first of the "supercarriers" that could adequately handle the heavy, fast jets. However, the Navy still needed a jet to perform the mission of nuclear strike, and development pressures continued.

The early Cold War operational environment was challenging for naval aviation, to say the least. Knowing that the Soviet Union was working on jet fighters and jet bombers that could carry nuclear weapons and drop them on naval formations, the Navy needed to develop fighter/interceptor aircraft that could defend the carrier and its escorts from attack while sailing into position to launch its own strike, and also strike aircraft that had enough range to hit meaningful targets and enough speed to survive enemy defenses. These general requirements propelled naval aviation development efforts from the late 1940s through the 1970s. During this period, the actual employment of naval aviation in two wars—Korea and Vietnam, as well as later in DESERT STORM—demanded of Navy jets the flexibility to conduct conventional bomb delivery, close air support, and dogfighting. Thus carrier jets morphed over time to designs that were more general in purpose, resulting ultimately in the F/A-18 Hornet, an aircraft that is a true strike-fighter.

Thus there was no opportunity for naval aviation to rest on its laurels after World War II. In combination with a massive postwar demobilization, it had to forge ahead with a program to adopt the new engine and aerodynamic technology. It attempted to reduce strategic risk, by letting multiple contracts to different aircraft companies in hopes that at least one of the designs would be viable. On the other hand, it accepted a high degree of operational risk, by ordering series production of various models before flight-testing was complete. The net effect of this strategy was that between 1945 and 1959 twenty-two Navy fighters made their first flights, whereas over the following forty-six years only five did so.[3] Some of the designs spawned during the early period, such as the F2H Banshee, were useful machines and had lengthy service lives, while others, like the F7U Cutlass and F-11 Tiger, were disappointments and saw only brief service.

As mentioned previously, the first years of the jet era in the Navy were disastrous in terms of aircraft and crews lost, but the Navy had little choice but to continue sending jets to sea. The gas-guzzling nature of jets made getting them back aboard the carrier in a timely manner a matter of utmost urgency and increased the pressure on carrier captains, admirals, and their staffs to adapt to an operational tempo very different from what had been the norm. In 1950, a future vice admiral, Gerald Miller, was on a carrier group staff operating F9F-2 Panthers in Korea. On one occasion the group staff meant to swap sixty-four Panthers from an outgoing carrier to one just coming into the theater. The weather was bad at airfields ashore, and heavy seas were causing the flight decks

to pitch. The staff work and planning did not adequately take into account the limited endurance of the new jet-powered aircraft. Miller's description of what happened next illustrates the consequences of learning to operate jets in a wartime environment:

> We had a lot of these fighters in the air. Then we tried to bring them down and it was a tough job of getting them on board. They were running out of fuel and there was no base on the beach to send them to. We had to get them back on board those two carriers, and we broke up those planes in some numbers.
>
> It was awful. It was so bad, I can still remember the admiral walking over to the opposite side of the bridge, putting his head down on his hands and shaking. It was so bad he couldn't even get mad. It was a horrible mess. Well, that was all because of the size of the ship, the nature of the airplanes and straight deck operations. We started from debacles of that kind to get something better.
>
> Considering the upheaval in the navy caused by demobilization and the introduction of new technologies, it's amazing that we kept together as much as we did. . . . We worried, but we did proceed with the jet program.[4]

At the same time that naval aviators were attempting to master the new jet aircraft, they were also grappling with two new missions that increased the degree of difficulty even more: night or all-weather operations, and nuclear weapons delivery. In a sense, these two missions were connected, in that it was felt that when the call came, weather or darkness must not be allowed to stand in the way of getting the nuclear weapon to its target. These two missions exerted considerable pressure on aircraft design and on the risks naval aviation was willing to endure to put these capabilities to sea. Coupled with the hazards inherent in jet-powered aviation in those years, they significantly contributed to the loss of aircraft. Gerald O'Rourke, USN (Ret.), describes the environment in Composite Squadron Four (VC-4, based at Naval Air Station Atlantic City, New Jersey), the Navy's East Coast night/all-weather fighter squadron in the early 1950s:

F9F-2 Panther.

Courtesy National Naval Aviation Museum

> All naval aviators are routinely exposed to, or involved in, aircraft accidents. That's accepted as almost a hazard of the trade. In carrier work, where dangers abound, accidents tend to be more frequent. In the night carrier operations of those days, accidents were so frequent that they were considered commonplace and unexceptional. Whenever a det [detachment of four to six aircraft sent out on a carrier] departed, the aircraft they flew off were more or less written off. No one expected that all of them would ever come back to Atlantic City. . . . Unfortunately, the same negativism tended to extend to the pilots as well, whose safe return wasn't much better than the aircraft. Between pilots lost, the pilots maimed, and the pilots who decided to throw in their wings, precious few dets ever returned with the same resources they took with them.[5]

Naval Aviation Culture and the Transition to Jets

In order to understand the catastrophic price the Navy paid in its march to operate swept-wing jets from aircraft carriers, we must look at the organizational culture onto which this new technology was grafted. After all, the majority of the mishaps that occurred were due to aircrew errors of some sort, whether precipitated or exacerbated by design problems or the result of gross error, negligence, or irresponsibility not connected with design issues.

Naval aviators always viewed themselves as daredevils. The difficulties of taking off from and landing on ships were unequaled in the land aviation domain, and naval aviators therefore considered themselves exceptionally skilled—and expendable. The accident rate (if not the sheer number of mishaps) in naval aviation from its inception to World War II was hardly less than the awful rates experienced in the early jet era. Naval aviators always regarded themselves as a different breed from their surface-ship brethren, but for all that they shared, and still do, the Navy's culture of independence and self-reliance. The simplicity and relative inexpensiveness of early naval aircraft allowed this culture to thrive; flight instruction was personal, and aviators had few detailed procedures or rules to follow in mastering their aircraft. "Seat of the pants" flying and individuality in technique were the orders of the day. Since piston-engine aircraft all operated essentially in the same way and roughly at the same speeds, especially when landing, and since they rarely flew at night or in bad weather, pilots could transition between aircraft easily and informally. Mr. Richard "Chick" Eldridge, a member of the Naval Safety Center staff for several decades, remembers his Navy flight training in 1943: "To my recollection, there was little emphasis on aviation safety. What safety information was imparted to the fledgling aviator came from the primary instructors. Lessons learned usually came in the form of 'gems of instructor wisdom.' You were simply told to fly certain maneuvers in a specific way or wind up as a statistic."[6]

The first thing to change was the technology. Culture change lagged by more than a decade, and the result was a virtual bloodbath. In addition to the specific challenges of flying jets must be added greatly increased speeds. Things happen much faster in jets, and a different mind-set and discipline are called for to avoid disaster. Pilots who had

spent a good deal of time operating at propeller-aircraft speeds tended to have more difficulty adjusting to jet speeds than those who were introduced to jets early. The author observed this during the Navy's transition from the piston-engine S-2 Tracker carrier antisubmarine aircraft to the jet-powered S-3 Viking. The more senior pilots seemed to have the most difficulty, and indeed a number of them either quit, had accidents, or failed to pass flight checks. This was a serious issue as well for the fleet introduction of the A-3 Skywarrior. Initially, in addition to carrier pilots, the Navy brought into the A-3 program senior aviators from the land-based patrol community. A series of accidents and difficulties involving former patrol pilots prompted the commander of the Sixth Fleet to write a letter to the CNO recommending that only carrier-trained pilots be assigned to A-3 squadrons.[7]

A-3 Skywarrior.

Courtesy National Naval Aviation Museum

In the early years of the jet transition, naval aviation remained wedded to its individualistic culture. Structured programs of training, detailed reference manuals, and disciplined evaluations of pilot performance did not exist in any coherent way across naval aviation. But jets, with their higher speeds, challenging handling characteristics, and ever more complex systems, required just that. The horrible accident rates eventually drove the Navy to do something. Meanwhile, the Air Force, which had been suffering an increase in mishaps also, formed a Flight Safety Directorate, with 525 personnel, and undertook to impose discipline on the aviation corps by punishing crews after mishaps when fault and culpability could be assigned. The Navy's first effort at a flight-safety agency was puny by comparison, with only twenty-five personnel. However, in 1953 a war hero, Captain James F. "Jimmy" Flatley, wrote a highly critical and influential

report on naval aviation safety that generated organizational and procedural changes that in turn went far to change the culture.[8] Along with them, a more structured program of flight training was introduced, eventually culminating in the establishment of replacement training squadrons that provided intensive and detailed instruction for newly "winged" aviators in the aircraft they would fly in the fleet. These squadrons would also become centers of flight and maintenance evaluation of fleet squadrons based with them. A variety of other measures also served to professionalize and discipline the naval aviation culture, including formal training for squadron safety officers, improved accident investigation techniques, specially trained medical personnel (called "flight surgeons"), the publication of a safety magazine to share stories of accidents and near misses, and top-down leadership that countered the laissez-faire cultural heritage.

However the "ready room" culture was resistant to change. Thus the authors of a 1961 *Naval Aviation News* article felt compelled to say, "Some people view the idea of everyone in Naval Aviation doing everything 'the one best way' with some misgivings. They fear that general use of standardized procedures, while it may reduce the accident rate, will result in a reduction of a pilot's ability to 'think on his feet' and deal flexibly with emergencies and combat situations. Experience in other fields has proved that fear unfounded."[9] A major element of the resistance to change was the fact that adaptation to the new technology had a value content—that is, it made irrelevant certain skill sets that had been associated with being a "good" aviator. The issue was not so much the difficulty of learning new skills as reluctance to abandon old ones that were associated with professional virtue. The naval aviation culture that had grown up from 1911 to 1947 was intense, parochial, and value-centric. Moreover, likely because of the acrimonious relationship that developed between the two services in the late 1940s, there was a reluctance to view anything the Air Force did as appropriate for naval aviation.

The Navy has always placed considerable responsibility and authority in the hands of the individual officer. An imperative of war at sea, this delegated style of command and control has both enhanced and afflicted U.S. naval aviation. Throughout its history, outstanding decision making by relatively junior officers has made the difference in battle, such as when, during the battle of Midway, Lieutenant Commander Wade McClusky decided, in the air, to take his strike group in the direction a Japanese destroyer was headed and thus found the enemy aircraft carriers. Faced in the 1940s and '50s with new technology that demanded new types of procedural discipline and centralized management, the culture was slow to adapt, and many naval aviators lost their lives as a result.

Finding the Right Combination of Ingredients

The development of aviation technology between the Wright brothers' first flight and 1947 was amazingly fast. In just forty-five years aviation progressed from machines

that were hardly more than powered kites to jets that pushed the speed of sound. This rapid development meant that individual models of combat aircraft became obsolete fairly quickly. This had been the case prior to and during World War II, and it was to be the case over the early years of jet transition in the Navy. The initial echelon of straight-wing jets had an operational life span in the fleet of only a few years, although some of them had longer, second lives in the reserves or specialized shore-based uses, such as in training commands. In the late 1940s and the early '50s, as whole squadrons transitioned from propeller airplanes to jets, pilots who had developed habits molded to straight-wing propeller planes that were slower, lighter, and simpler and burned fuel more slowly were put into fast, gas-guzzling jets. It was a lethal combination.

As the centennial of naval aviation approaches, it is interesting to observe that it has been jet powered for over half of its history. The transition was long and brutally expensive in terms of life and aircraft. However, it was, by any measure, a success. Throughout the Cold War and a series of hot wars—Korea, Vietnam, DESERT STORM, and others—naval aviation has been able to provide effective tactical airpower from the sea. Its ability to do this despite a long and difficult process of learning how to operate jet aircraft at sea is a tribute to the brilliance of various aircraft designers, the ingenuity of countless "airdales," the sailors who struggled to keep those complex and touchy machines flying, and the bravery (and perhaps foolhardiness) of the crews who would climb into jets that were hard to fly and lacked reliability and in those aircraft perform missions that took them to the edge of what man and machine could do.

Notes

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CHAPTER EIGHT

The Future of Aircraft Carriers

The aircraft carrier has been around in various forms since the First World War. Its emergence as the key denominator of naval power is legendary, and its continuing prestige in this role is even yet spawning building programs among established and growing navies. The aircraft carrier is the largest and most complex of all warships and in most cases the most expensive. In addition to the cost of the ship itself, that of the embarked air wing must be considered, not to mention the extensive logistics and training infrastructure needed to keep carriers operating and useful. A recent Naval Postgraduate School study has shown that approximately 46 percent of the Navy's personnel—officer, enlisted, and civilian—are assigned to positions either on or supporting its carriers.[1] For these and other reasons, there has been almost constant debate over the past ninety years within navies, between navies and air forces, and within governments over the advisability of investing in carriers. As the prospects for major cutbacks in defense spending loom, the debate will again heat up. Both proponents and opponents of carriers have refined their arguments over the past nine decades, but these are now starting to wear thin as the geopolitical environment and the technology of war have changed. Also, the arguments both for and against have tended toward the theological, with many tacit or unacknowledged assumptions underpinning the argumentative maneuvers. In an attempt to improve the quality of the coming debates, this article will examine the prospects for future utility of the ship type, including that of the embarked air wing, from a different angle. Instead of making a holistic judgment on the future utility of aircraft carriers, it will focus on the ways they have been, are, or could be used. Within the bounds of security classification, it will also attempt to sort out the risk factors that attend their use. Others may then proceed to decide whether a continued investment in them is justified.

In order even to begin to analyze the future of aircraft carriers, a definition of the type is warranted. It is easy to accept that the imposing, nuclear-powered *Nimitz*-class

carriers (CVNs) of the U.S. Navy are truly aircraft carriers, operating as they do robust mini–air forces of sixty to eighty tactical jets and support aircraft. Similarly, the French *Charles de Gaulle* and the Brazilian *São Paulo* are clearly aircraft carriers, if significantly smaller. The former Russian *Varyag,* now being refurbished by the Chinese, is also clearly an aircraft carrier, meant as it is to handle fixed-wing jets as well as helicopters. There are a number of similar ships around the world that are meant to support operations of short-takeoff/vertical-landing (STOVL) jets. However, the definition becomes less clear in the case of ships that are capable of supporting STOVL jets but whose stated purpose is either amphibious assault (the U.S. *Wasp* and *Tarawa* classes, for example) or antisubmarine warfare (the Japanese *Hyuga*-class "destroyers," which have ship-long flight decks).[2] Principally, though these latter ships are designed to operate helicopters, they could have—and they have in fact—operated STOVLs. However, despite their ability to operate STOVL jets, these ships cannot be considered true aircraft carriers, since, as will be seen, they cannot adequately perform the doctrinal roles that aircraft carriers have historically fulfilled.

A Short Doctrinal History of Aircraft Carriers

Most histories of aircraft carriers focus on the progressive development of their physical characteristics and their performance in battle. However, in order to understand the issues that will influence their future, it is necessary to understand how the doctrinal roles of aircraft carriers have evolved. Since navies in general and the U.S. Navy in particular do not publish doctrine along these lines, it is necessary to infer it from the way the carriers have been used.

The normal way to discuss doctrinal roles of aircraft carriers is in terms of "sea control" and "power projection"—this terminology being congruent with the way the U.S. Navy describes its strategic missions. However, these terms are too broad and indiscriminate to allow clear analysis of the strengths and weaknesses of aircraft carriers. Power projection could mean either one-time strikes or sustained, "level of effort" operations to prosecute air campaigns against enemy infrastructure or in support of ground forces with interdiction and close air support. However, it makes a critical difference whether operations against land require a carrier to constrain its movements or not. Thus terms like "power projection" and "strike," and even "sea control," are too broad to be useful in this discussion. For the purpose of this article, they are subsumed, as appropriate, within the roles described below.

The six doctrinal roles aircraft carriers have performed are presented below in roughly the order they were adopted.

Eyes of the Fleet. In their earliest instantiation in the U.S. Navy, aircraft carriers were conceived of as platforms whose aircraft would be used to locate the enemy fleet before it broke the horizon so that one's own battle line could maneuver to engage at best advantage. Once the battle lines were engaged within visual range, aircraft would spot the fall of shot, adjusting the fire of major-caliber guns more quickly and accurately and at longer ranges than could observers high in the battleships' masts. In this role, the carrier would operate with its own fleet's battle line interposed between it and the enemy; without substantial defense of its own, the carrier could not be subjected to risk. Its air wing would consist almost solely of scout planes, which was appropriate in view of the limited performance of the aircraft of the day. However, it did not take long to realize that the advantages of aircraft scouting and shot spotting were so great that an opposing fleet would obtain its own carriers and embark on them fighters to shoot down scouts. Thus carriers quickly became homes to fighter aircraft that could fight for and win air superiority over the enemy fleet so that the scouts could do their mission.

Cavalry. In some of the fleet battle experiments in the 1930s and throughout most of World War II, the carriers took on the mission of conducting hit-and-run raids, the most famous of which was the Doolittle raid on Tokyo in early 1942.[3] Operating in a manner not unlike the cavalry of Confederate general Nathan Bedford Forrest in the Civil War, the fast carriers depended on speed and stealth to sneak into waters in which the Japanese fleet held sway in order to attack bases and otherwise disrupt enemy logistical operations. In this role, the carriers could not risk getting into a decisive engagement, any more than a Civil War cavalry brigade could risk becoming snared in a dismounted fight with infantry.

Capital Ship. A "capital ship," rightly understood, is a ship type that can defeat any other ship type. In the days of sail and dreadnoughts, it was the type of ship having the most and biggest guns. It is the ship type around which fleet doctrine and fleet architecture are established. The question is what kind of killing weapon the capital ship supports. In the early 1920s, as naval aviation was gestating, it became clear from war games at the U.S. Naval War College that if aircraft performance kept increasing, a coordinated attack by carrier aircraft with armor-piercing bombs could sink a battleship before it ever got in range of one's own fleet. This notion was validated by the Japanese attack on Pearl Harbor and by the sinking of two British dreadnoughts by Japanese land-based aircraft. Subsequently, the great carrier battles of the Pacific determined the outcome of the war as much as great sailing-ship battles had those of earlier conflicts. Used as capital ships, the acceptable risk profile for aircraft carriers changes substantially—they become consumables, just like any other capital ship. However, in subjecting themselves to risk they must be able to inflict such harm on the

main enemy force that it is not capable of further contesting "command of the sea" at an acceptable level of risk to itself. Since the battle of Leyte Gulf, carriers have not been used in this role.

When nations commit their capital ships to a battle, it is generally for command of the sea, having achieved which, by virtue of defeating and seriously weakening the opponent's main fleet, a force may use the seas for its own strategic purposes. Fighting for sea control in specific instances may still be necessary. The carrier battles of World War II were generally aimed at securing command of the sea; however, the carriers still had to function as local sea-control platforms, a role in which they were very effective. However, it should be noted that as the American fleet approached the Japanese home islands, threats from land-based defenses required ever greater concentrations of carriers to secure sufficient control of the sea to allow amphibious operations to take place.

Nuclear-Strike Platform. The advent of nuclear weapons caused significant turmoil within the U.S. military establishment. The newly independent Air Force argued that its intercontinental nuclear bombers made aircraft carriers obsolete. The Navy, for its part, sought to defend the carrier force by making it a part of the nation's nuclear war plans and deterrent posture. As a nuclear delivery platform, the carrier would operate a bit as it did in the cavalry role, depending on speed and stealth to reach a point at which it could launch its nuclear bombers. After that launch, it would attempt to survive as best it could, either to get back to the United States or to be ready for additional tasking. The point is that in this role, just as in the cavalry and capital-ship roles, its mode of operation was to deliver a pulse of power and then scoot—standing and fighting was a recipe for destruction. Keeping risk acceptable was a function of the ability to stay unlocated and untargeted. The ballistic-missile nuclear submarine replaced the aircraft carrier in this role because the risk of it being found before it could fire its missiles was all but eliminated.

Airfield at Sea. Three traditional rules govern how a fleet should be employed:

1. Keep the fleet concentrated.
2. Do not tie a mobile fleet to a piece of ground.
3. Do not become decisively engaged with land forces unless decisively superior.

These rules can be violated, but the conditions have to be right—namely, there can be no significant opposition at sea. In order to support a ground fight ashore or conduct a continuous air campaign (power projection in the "level of effort" mode), aircraft carriers have to break at least rules 2 and 3, and in order to maintain a carrier on station for months or years, as was done in Vietnam, they must break rule 1. The requirement

to feed aircraft continuously into a land fight essentially robs the aircraft carrier of its maneuverability, due to the relatively short range of carrier-borne tactical jets. During the wars in Korea and Vietnam and all operations since the fall of the Soviet Union, in the almost complete absence of at-sea opposition, U.S. aircraft carriers have operated exclusively in this role. The one exception was the U.S.-Soviet face-down in the eastern Mediterranean in conjunction with the 1973 Yom Kippur War between Israel and an assortment of Arab powers. In that crisis, three American carrier groups were positioned to be ready to assist the Israelis with land strikes. Meanwhile, the numerically superior Soviet Fifth Eskadra positioned itself to sink or disable the carriers.[4] This represented a fundamental paradox in doctrinal roles for the carriers, and they faced tactical defeat had hostilities broken out, having insufficient sea room to maneuver so as to adopt a capital-ship posture. The key to using carriers in the "airfield at sea" role is to take explicit account of their inability to tolerate much risk at all.

Geopolitical Chess Piece. It has been the habit of American presidents and their advisers in the gamut of crises since World War II to move aircraft carriers around to demonstrate American concern, resolve, or outright anger. The particular benefits of using carriers in this way are that they operate on the high seas, where permission to move is not needed from other countries, and that because they carry their own fuel, weapons, and maintenance, they are ready on arrival at the scene of a crisis to deliver power. Moreover, since modern U.S. carriers are large and imposing, and have been unchallenged on the seas, they "show the flag" to great effect—they provide excellent "visuals." Here too, however, precisely because they need to be visible in this role, and because they normally must be ready to function also as an airfield at sea, carriers cannot tolerate any significant risk. This was the difficulty in the Yom Kippur War crisis mentioned previously. The Navy and the nation are so used to operating carriers with impunity as airfields at sea that as new sea-denial threats emerge (as did the Soviet navy) the potential for a role/risk disconnect is magnified.

Another definition of "capital ship," though not unrelated to its operational definition, is that of a ship type whose power, expense, and prestige are so great that it becomes the yardstick for measuring a nation's naval power. This definition is essentially a different slant on the "geopolitical chess piece" role. This view arose especially during the age of dreadnoughts, when the Washington Treaty attempted to rein in naval arms races by formally limiting the tonnage of battleships.[5] Aircraft carriers became the objects of this type of thinking, and this is one of the reasons that a number of emerging navies, as well as established navies under pressure from shrinking budgets, are electing to devote higher proportions of their resources to building them.

However, for the United States, this thinking could become a geopolitical trap. The *Nimitz*- and *Ford*-class carriers are built at only one yard, in Newport News, Virginia. Currently, they are being built at the rate of one every five years, in order to maintain the Navy's inventory of them at eleven. One of these carriers, including its air wing, costs about as much as ten nuclear submarines or almost twenty guided-missile destroyers. When debates arise about how many carriers this nation really needs, one of the arguments employed to oppose reductions is that if it does not keep building these ships, it will lose the workforce needed to construct hem. Not having the capability to construct a large nuclear-powered carrier would, some argue, put the nation at strategic risk. However, this line of reasoning seems to be based more on the general notion that carriers represent national strength than on any specific strategic or operational necessity. Even if it does not build another carrier after USS *Ford,* the United States will have nuclear carriers around for at least the next fifty years. It does not seem reasonable to presume that the strategic future of the United States hinges on a few thousand shipyard workers in Virginia.

Other Roles for Aviation Ships

In World War II, the majority of the aircraft carriers the United States built were termed "escort carriers." These small ships could carry only a few aircraft and were used mostly for antisubmarine (ASW) work or for air support of amphibious operations. Because of their limited capacity and slow speed, they could not be adequately used in any of the six doctrinal roles outlined above. In the 1950s, a number of World War II fast carriers of the *Essex* class were converted to antisubmarine carriers. These ships carried mostly sub-hunting aircraft, with a few jets for self-defense. Other *Essex*es were turned into helicopter carriers, for helo-borne assaults over the beach. Once these ships had passed their useful service lives, vessels designed from the keel up as helicopter carriers were put into service; progressively newer designs have entered the fleet ever since. Some new versions of the through-deck aviation ship now complicate the matter of designation. The recently commissioned Spanish "strategic projection ship" *Juan Carlos* would seem to blur doctrinal boundaries, because it features a "ski jump" for operating STOVL jets. Nevertheless, the ship's design focuses on amphibious operations more than any of the doctrinal roles mentioned above.

Aside from ship designs or conversions with specific mission focuses of ASW or amphibious assault, regular aircraft carriers, by virtue of their inherent flexibility, have been pressed into service in a number of collateral missions in recent years, most prominently disaster relief and humanitarian assistance. In this mode they mostly operate helicopters, although other aspects of their capability come into play, such as communications, freshwater distillation, and medical capacity. It is worthwhile noting

at this point that the impetus behind the forthcoming new Chinese aircraft carrier may have been more frustration at inability to participate in the 2004 tsunami relief effort in Indonesia (where the *Nimitz*-class carrier USS *Abraham Lincoln* played a key part) than a desire to face down American carriers.

In considering the future of aircraft carriers, we should understand that aviation-capable ships engaging in specialized or collateral missions will always be needed to some extent. Whether ships used for these purposes look like aircraft carriers or not, the calculus for the advisability of building them will be different from that which governs true aircraft carriers.

The Impact of Future Technology

Armed with an understanding of their doctrinal roles, we can proceed to assess how current and future weapons and systems technologies might affect the utility of aircraft carriers. It is a matter not simply of whether the carrier can be defended or not but of whether it can fulfill the doctrinal role the nation requires of it.

Antiship Ballistic Missiles. Professional journals have been full of articles analyzing the potential impact of the recently developed Chinese DF-21F intermediate-range ballistic missile, fitted with a maneuvering reentry head that has an antiship seeker built into it. The purpose of this missile is thought to be not so much to sink the carrier as to achieve a "mission kill," causing fires and damage to the air wing and topside structures. If the missile system is perceived to be effective at this, then its existence and the presence of its mobile transporter/erector/launchers would constitute a deterrent to U.S. interference in an invasion of Taiwan or in other Chinese initiatives within about a thousand miles of China's coast. Assuming that a terminal, hit-to-kill defense is not feasible against it, this missile would seem to threaten seriously the future utility of the aircraft carrier anywhere within its range. On the other hand, having a seeker, it could be vulnerable to decoying. If this is the case, the probabilities for missile success are reduced. This leads us to think in terms of what role the carrier might be playing as it sails into DF-21 threat range. If the carrier is functioning as cavalry, a capital ship, or a nuclear-strike platform—that is, delivering a pulse of power and then escaping—the risk tolerance inherent in those roles might be compatible with the reduced but still significant threat posed by the DF-21. If, however, the carrier is being used as either an airfield at sea or a geopolitical chess piece, its mobility sacrificed and the risk incurred likely would be incommensurate with the role.

Submarines, Antiship Cruise Missiles, and Other Access-Denial Systems. The effect of these systems is similar to that of the DF-21. Current and anticipated defensive systems for the carrier are likely to be able to handle small numbers of these weapons. However,

when larger numbers are employed against the carrier—and this will probably only happen in littoral waters—the likelihood of "leakers" increases. Once again, depending on the role the carrier is playing, the risk may be tolerable, especially if the carrier is free to maneuver. If a combination of geography and doctrinal role constrains its mobility and maneuverability, the risk climbs quickly.

Some have advocated, on these grounds, that smaller carriers ought to be built in larger numbers to achieve "tactical stability," the condition in which the defensive capabilities of the ship and its contributions to the overall offensive power of the force are in balance. Games at the Naval War College have cast some doubt on this logic, quite apart from considerations of the relative efficiency of large and small flight decks. It appears that doctrinal role is a governing factor. In general, it seems that if mobility is compromised by doctrinal role, the net risk to the force is the same, whether the force is composed of one or two large, or four to six small, carriers. Nothing changes, except in the inefficiencies and added cost of multiple small carriers.

Improved Air-Defense Systems. In one important sense, the viability of tactical airpower is the essence of the future utility of aircraft carriers. New types of surface-to-air missile systems have made operation of nonstealthy aircraft within their range excessively risky. Also, new generations of fighters, notably the Su-27, its derivatives, and even newer designs from Russia and China, have eroded the technical advantages traditionally enjoyed by American aircraft. New types of air-to-air missiles, fighter radars, and sophisticated crew/system interfaces have similarly lessened the advantage our superior training has conferred. All of this calls into question the utility of aircraft carriers as strike (cavalry) platforms or airfields at sea against a well armed opponent. The same trend holds in the arena of war at sea, at least with respect to surface-to-air missiles, and may compromise the viability of the aircraft carrier in the capital-ship role. To fight modern, high-tech air defenses, sea or land based, missiles may be the only viable answer, although very stealthy unmanned aircraft operating from aircraft carriers may also be viable, especially if equipped with short-range attack missiles.

Short-Takeoff/Vertical-Landing Jets. The advent of the F-35B STOVL Joint Strike Fighter (JSF) promises to enhance significantly the overall capabilities of a ski jump–equipped carrier. The question is whether this increase in capability would both allow such smaller aviation-capable ships to function as regular aircraft carriers and change the calculus of the various doctrinal roles. It appears that the F-35B will offer increases in range and load-carrying capability over the AV-8 Harrier, the British-developed "jump jet" that has served a number of navies and the U.S. Marines for decades. However, these increases do not come close to bringing the F-35B into the same class as conventional-takeoff-and-landing carrier aircraft, and the range and endurance

of even these are short enough to require the carrier to get in rather close to the fight. The principal advantages of the F-35B will be its increased connectivity, sensing, and stealth—all good things, but not sufficient to change the logic inherent in the doctrinal roles. Moreover, the small number of aircraft that can be carried on the ski-jump carriers limits their ability to perform some of the doctrinal roles. They will likely remain useful support ships for amphibious and antisubmarine operations, especially operating helicopters, and will constitute prestige platforms for small navies to show the flag.

Unmanned Aircraft (UAVs). What could potentially change the calculus of doctrinal roles is the unmanned aircraft. For a given "deck spot" (the square footage an aircraft takes up parked on a carrier's flight or hangar deck), unmanned aircraft offer double or triple the range and endurance of manned aircraft. Moreover, without the need to accommodate a human, their form can be considerably more stealthy, and their operations do not need to take into account crew-rest factors, at least to the extent that they do in manned aircraft. What this may offer in terms of doctrinal roles is a return of the carrier as the eyes of the fleet, operating a wing of long-range UAVs for reconnaissance and perhaps line-of-sight communications relay. A carrier could then remain outside most threat "envelopes," with much more scope for maneuvering to keep from being targeted. The longer range of UAVs (including unmanned combat aerial vehicles, or UCAVs) would also allow the carrier to function as an airfield at sea with less risk. In terms of command and control, however, UAVs that require a constant "man in the loop" would not offer as much flexibility to the carrier as those with higher degrees of autonomy.

Future Doctrinal Roles

The traditional rationale for aircraft carriers is that they provide tactical airpower independent of land bases and that—no small thing—they are ready to do so on arrival. While all of this is true and constitutes concrete benefits of having aircraft carriers, the real arguments for and against them reside in their doctrinal roles. Which of the traditional roles are obsolete? Do the remaining ones justify continuing investment in aircraft carriers? Are there emerging or potential roles for carriers that would justify building more?

As has been mentioned, the development of unmanned aircraft may revitalize the primordial role of aircraft carriers as eyes of the fleet. Operating a wing of various kinds of UAVs, the carriers could conduct what is known as C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) or establish a grid of airborne relay nodes that would support a fleet battle network if satellites were destroyed or intense jamming occurred. Because of the vulnerability of land bases to ballistic missiles, and at increasing distances from potential war zones, the arguments

that the Navy has used in the realm of tactical airpower to justify carriers also serve for carrier-based C4ISR. As with tactical airpower, regardless of how long aircraft range is and how much in-flight refueling is available, if land bases are distant from the area of operations, it takes far more aircraft to generate a continuous presence in the battle space and operations are far less responsive and flexible than they would be if based from a nearby carrier. A local source of UAVs, if land bases are far away, is invaluable operationally and strategically.

The cavalry role for carriers, practiced as late as the 1986 El Dorado Canyon strikes on Libya, has become a victim of the missile age. In the most recent round of strikes on Libya, Tomahawk cruise missiles were used. Now possessing guided-missile submarines that can carry over a hundred Tomahawks, the Navy does not have to accept risks of running a carrier surreptitiously into hostile waters to carry out a strike or subjecting manned tactical aircraft to robust air defenses. In a similar manner, the introduction of the ballistic-missile submarine made the carrier nuclear-strike role obsolete. Whatever the trade-offs between tactical aircraft, manned or unmanned, and missiles, the lethality of modern air defenses and the difficulty of moving naval forces undetected militate strongly against using carriers in this role. It does not appear that a carrier operating UCAVs would offer any significant advantage in the cavalry role over a submarine carrying cruise missiles.

As for the capital-ship role, in the missile age the whole concept may be obsolete. There has been a constant ebb and flow of technical and tactical superiority of the offense and defense at sea, but mostly the offense now dominates—modern antiship missiles are very fast and hard to shoot down. Certainly, they are dependent on the successful functioning of their seeker heads; these can be decoyed or blinded, and the prospect of close-in directed-energy defenses may tilt the balance in favor of the defense.[6] However, a successful defense of the carrier does no good if the carrier cannot in turn succeed in attacking enemy naval forces. Improvements in air-defense technology by Russia and China and the prospects for their proliferation will make the tactical offense progressively more difficult and risky. It should be recalled that in the great carrier battles of World War II, the aircraft losses were brutal, on the order of 70 percent for the Japanese and 28 percent for the Americans.[7] In the late 1970s, as naval aviation developed aircraft-centric antiship tactics in the aftermath of the wake-up call of the 1973 episode, it became clear that a single strike on a single formation of Soviet ships might cost a quarter of an air wing.[8] Whereas we were able to replace such losses in 1942–45, no such thing would be possible today, given the complexity and expense of modern jets.

The upshot is that the seas, at least certain areas of them, are becoming a no-man's-land for surface ships. Whether or not submarines ought to be considered capital ships is beside the point; the carrier will likely not be one. On the other hand, for scenarios short

of high-end missile combat, there is no ship more able to exercise general control of a large ocean area than an aircraft carrier, fanning out its air wing to scout and identify surface vessels. Carrier aircraft probably are the best counter, for example, to the small-boat swarms that some countries, like Iran, have adopted, assuming the carrier can operate out of range of the densest littoral defenses.

Currently, the "airfield at sea" is almost the exclusive role for the large aircraft carrier, essentially fused with that of the "geopolitical chess piece." This (combined) role will continue to be highly useful into the future, so long as the intensity of defenses stays below a certain threshold. If either high-tech air or naval defenses proliferate, the number of areas and scenarios in which carriers can function in this role will decline. If this happens, the value of the carrier as a geopolitical chess piece will erode proportionately. This is a key uncertainty about the future and a central difficulty in assessing the future value of aircraft carriers. If a ground fight occurs close to the coast and a carrier could move in with impunity to provide air support, perhaps through-deck amphibious ships flying STOVL aircraft would suffice. But their capacity to generate sorties and the number of targets they can strike are nowhere near what is possible for large carriers with catapults and arresting wires; moreover, if deep penetration is needed, as has been the case in Afghanistan, nothing less than a large carrier operating conventional aircraft will do. Because of miniaturization, advanced electronics, and advances in missile, mine, torpedo, and submarine design, it is becoming easier to hide naval defenses. A particular case in point is the Club-K cruise missile marketed by the Russian company Novator. Four missiles could be housed in an innocuous-looking shipping container, hidden in plain sight and ready to be fired from trucks, railroad cars, or commercial ships.[9] Similar advances in covertness can be expected in other weapons types. The implication is that it will be difficult or impossible to "sanitize" an area where a carrier can function as an airfield at sea.

What new doctrinal roles might emerge for the aircraft carrier? One that comes to mind is a variation on "eyes of the fleet." If the struggle for sea control migrates to below the surface, an aircraft carrier might be highly useful as a submarine-support vessel. The carrier would not only provide C4ISR services for submarines but disrupt air and surface ASW efforts by the enemy, perhaps even conduct ASW itself. Especially if operating long-range UAVs, the carrier might be able to maneuver more widely and thereby perform this role at an acceptable degree of risk—or better put, at a level of risk commensurate with the doctrinal role.

Another potential supporting role for the carrier is as a mother ship for the littoral combat ship (LCS). The LCS has limited sea-keeping capability and must have a source of logistical support relatively close by, especially if it is to operate at high speed and high combat tempo. If a squadron of LCSs must enter a high-threat area where there are

no bases and where regular logistical ships would be at excessive risk, a nuclear carrier might be the answer. Having considerable fuel and ammunition-storage capacity, high sustained speeds, and self-defense ability (with its escorts), a carrier could range around undetected or untargeted until a covert rendezvous with one or more LCSs could be arranged. While a logistical support system that employs submarines might be the ideal, this arrangement may be the most feasible in the short term. In conjunction with this role, the carrier, operating both manned and unmanned aircraft, could provide tactical scouting for littoral combat vessels as well as a secure and robust local battle network.

A New Calculus

This assessment of doctrinal roles is revealing. Certain roles for the carrier are already obsolete, and others are eroding. A few new roles are emerging, but these place the carrier in a new position in relation to the rest of the fleet. Whereas the carrier has been the central pivot of the fleet since World War II, the arbiter and yardstick of naval supremacy and the keystone of fleet architecture, it will gradually become a more narrowly useful role player. There will be, for the foreseeable future, situations that demand an aircraft carrier, so it can be said with confidence that the ship type will be needed. However, the constriction in its roles and in the locations and circumstances in which it could be appropriately used (i.e., where doctrinal role and risk intersect) indicates that a new calculus is needed to determine how many the U.S. Navy really needs.

This article has dealt only obliquely with the issue of small versus large carriers. The author has served on both types and is convinced that nonnuclear ships under about eighty thousand tons sacrifice too much total combat capability to be worthwhile investments as aircraft carriers. On the other hand, aviation ships that can support operationally significant numbers of helicopters and STOVL jets will be useful in amphibious and antisubmarine operations as well as a host of others, including disaster relief, noncombatant evacuation, and various types of humanitarian assistance.

An embedded implication in all this for amphibious operations should be noted. If things are too hot to allow a carrier to operate as an airfield at sea, they are too hot for an amphibious assault. If the number of times and places a carrier can operate as an airfield at sea decrease, they decrease as well for amphibious operations. Any assumptions about the ability to "roll back" enemy defenses must be severely tempered by the likelihood that new technologies will produce weapons that can be hidden from preemptive strikes—like the improvised explosive devices and car bombs that have been such intractable problems in Afghanistan and Iraq. There is no question that some capacity for amphibious operations from the sea will be needed in the future, but a rigorous and objective analysis of the number of times and places in which they would be possible is warranted, and as with carriers, a new calculus for sizing that capability is needed.

Another key consideration that would govern carrier force structure is deployment posture. Since World War II, the United States has maintained a forward-deployed posture for the Navy, at times severely stressing its capacity. The Navy has found that for each carrier it wants to keep forward, it needs two additional ones to account for crew deployment tempo, training, and maintenance requirements. In theory, then, any carrier force level ought to be divisible by three. However, an additional carrier is needed to compensate for the extended yard periods required for nuclear refueling. That adds up to ten CVNs, but Congress has legislated that the Navy maintain eleven, the "extra" carrier being available for surge operations. There is currently a carrier homeported forward in Japan, which provides additional scheduling flexibility. In practice, however, the demand for carriers by the combatant commanders, coupled with the Navy's Fleet Response Plan deployment scheme (which seeks to maximize the number of carriers available for surge operations), makes even eleven carriers seem insufficient. But the increasing expense of tactical jets and delays in their development, as exemplified by the JSF, means that there will not be enough aircraft to populate eleven flight decks adequately, let alone a higher number.

In the future, as the doctrinal roles of the aircraft carrier change and become more narrowly defined, the number of carriers needed forward at any time may decline. Using the reverse of the standard Navy calculus, for every carrier not needed to be stationed forward, the total inventory could, in theory, be reduced by three. The savings would be enormous, and, if this analysis of doctrinal roles is correct, there would be no reduction in the overall war-fighting effectiveness of the Navy, assuming the money saved could be reinvested, at least in part, in missiles, submarines, and surface ships. On one hand, a reduction of one carrier on station would take the Navy to a force of eight CVNs. On the other hand, if new doctrinal roles do materialize, a higher number of carriers may be warranted. USS *Enterprise,* the first nuclear carrier, commissioned fifty years ago, is on a forward deployment as this article is written. There is no reason to think that the *Nimitz*-class carriers will have shorter service lives, and the newer ones may last even longer. There is at least reason to think that a number of these ships will outlive the utility of any given type of embarked aircraft. This makes it difficult to assess the return on investment of additional new construction beyond *Ford* or its follow-on ship. If the possible doctrinal roles for the aircraft carrier become too risky or are significantly constrained in terms of where and when they might be feasible, the value of so expensive a platform will be called into question.

The purpose of this article has been to explore the future of the aircraft carrier using the framework of doctrinal roles. It appears that despite changing technology there will be a continuing need for the ship type, although the obsolescence of some doctrinal roles

and the anticipated constriction of its use as an airfield at sea may limit the numbers that are justified. New doctrinal roles may emerge, depending on the flexibility of mind shown by the naval aviation community. However, even if these new roles do pan out, they may not justify significantly greater numbers of ships. Moreover, the carrier's day as the supreme arbiter of naval power and the determinant of fleet architecture may be coming to a close. Its continuing utility will increasingly be in support roles. Once this shift occurs, it may actually be easier to arrive at an objective determination of numbers required, as much of the emotional and political baggage surrounding them will have been shed.

If we mark the emergence of the aircraft carrier as sovereign of the seas at the British carrier strike on the Italian fleet at Taranto in 1940, we see that the carrier has enjoyed a period of dominance of over seventy years, substantially longer than that of the dreadnought. To paraphrase Yogi Berra, the future of the aircraft carrier isn't what it used to be, but it is fairly clear the type will be around more than long enough to celebrate a century and a half of service.

Notes

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1. Juan Carrasco [Lt., USN], "A Manpower Comparison of Three U.S. Navies: The Current Fleet, a Projected 313 Ship Fleet, and a More Distributed Bimodal Alternative" (master's thesis, U.S. Naval Postgraduate School, Monterey, Calif., 2009), p. xvii, available at edocs.nps.edu/.
2. See Vice Adm. Yoji Koda, "A New Carrier Race? Strategy, Force Planning, and JS *Hyuga,*" *Naval War College Review* 64, no. 3 (Summer 2011), pp. 31–60.
3. For the interwar exercises see Albert A. Nofi, *To Train the Fleet for War: The U.S. Navy Fleet Problems, 1923–1940* (Newport, R.I.: Naval War College Press, 2010).
4. See Lyle Goldstein and Yuri Zhukov, "A Tale of Two Fleets: A Russian Perspective on the 1973 Naval Standoff in the Mediterranean," *Naval War College Review* 57, no. 2 (Spring 2004), pp. 27–63.
5. Aircraft carrier tonnage too was limited by the treaty, indicating that the carrier had already become identified as a type of capital ship.
6. Obscurants might do so as well, as argued by Thomas J. Culora, "The Strategic Implications of Obscurants: History and the Future," *Naval War College Review* 63, no. 3 (Summer 2010), pp. 73–84.
7. Wayne Hughes, *Fleet Tactics and Coastal Combat* (Annapolis, Md.: Naval Institute Press, 2000), pp. 102–106.
8. The author was a weapons and tactics officer in the A-7 community at that time; this assertion is based on personal experience in both planning and conducting exercise strikes.
9. It should be noted that Russian officials have denied that these missiles could be launched from a shipping container. See "Club-K Container Missile System," *Kontsern Morinformsistema-AGAT,* www.concern-agat.ru/, for the company's position. It is interesting, however, that the company has used in its advertisements web videos of the missile being fired from shipping containers.

CHAPTER NINE

Pigeonholes and Paradigm Shifts
Getting the Most Out of Unmanned Aircraft

The assimilation of a new technology by an organization is a complex undertaking. Besides the opposition of people who view it as a threat, a subtle phenomenon that sometimes occurs is a failure of the organization to fully leverage the technology because of a failure of imagination. The new technology is at least initially forced into existing roles and functions—slotted, that is, into established intellectual pigeonholes. In this way, the organization, while adopting a new technology, will fail to take full advantage of it. This article will explore potential uses of unmanned aerial vehicles (UAVs)[1] that go beyond seeing them as merely unmanned versions of existing manned aircraft in order to help the Navy take full advantage of this new technology.

Pigeonhole 1: Pilots

In the original Star Wars movie Luke Skywalker piloted an X-wing fighter with his trusty droid R2-D2 in the back. Single-seat aviators of the era (like the author) noted with some glee the allegorical automation of the naval flight officer. It appeared that the function of piloting was inherently human, system management being something a robot could handle. However, even at their current stage of development, the flight of unmanned aircraft is considerably more automated than, say, radio-controlled model airplanes, which indeed must be flown. UAVs such as Global Hawk are capable of autonomous takeoff, navigation, and landing. It is the pilot function that has been automated; it is the naval flight officer function that still requires human decision making. This is the leading edge of a paradigm shift: pilotless aircraft operated by pilotless squadrons or perhaps not by squadrons at all. The shift may go further, possibly obviating the need for any kind of "winged" specialist. The Navy has been operating, after all, a large fleet of highly lethal unmanned aircraft since the 1950s that has been controlled almost exclusively by surface warfare officers. These aircraft are called missiles. As UAVs attain

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more and more autonomy, the nature of human oversight will change, being involved less with the physics of their functioning and more with the broader decisions of when to launch, how many, where to place them, and targeting. It is not clear that, at this level of decision making, an aviation specialist is either necessary or desirable. This notion would appear to bust some naval aviation rice bowls and would very likely find ready opposition in some circles. However, it is not difficult to imagine a future Navy in which the UAV "squadrons" are manned solely by maintenance personnel and the craft are controlled by naval "general staff" officers who inhabit a maritime operations center (MOC). This kind of arrangement could up the odds that UAVs would be used efficiently and perhaps more creatively.

A serious question that will attend the use of armed UAVs that have increasing degrees of autonomy is where in the "kill chain" moral agency should exist in the form of human decision making. Failures in the form of blue on blue or the inadvertent targeting of non-combatants have occurred with both manned and unmanned aircraft. It is not evident at this point how and where moral agency ought to be exerted with autonomous or semi-autonomous armed aircraft, but what does seem clear is that this question ought not to be hostage to traditional notions of who should control what. Existing naval cultural norms concerning centralization and delegation should be subordinated to the central issue of assuring effective moral agency in the kill chain, and our organizational paradigms will influence how effectively this question is answered.

Pigeonhole 2: Aircraft Carrier Doctrinal Roles

The Navy's allergy to written doctrine, or at least to adhering to it, is well known. However, that does not mean that the Navy does not have doctrine. A tacit form of doctrine that has been around for most of its history involves the roles assigned to different types of ships. Aircraft carriers, while an extremely versatile ship type, have historically been used in a limited set of doctrinal roles. When USS *Langley* was commissioned, she was assigned to the doctrinal role of "eyes of the fleet." In this role her aircraft would scout for the enemy and spot the shot of the battleships. Subsequently, as naval aircraft gained capability, the aircraft carrier assumed other roles: capital ship,[2] nuclear strike platform, geopolitical chess piece, and airfield at sea, to mention the most prominent ones.[3] Other ships have their own sets of roles. In the post–Cold War era, because of the lack of any significant naval opposition, the aircraft carrier has been almost exclusively used as an airfield at sea. The Northrop Grumman X-47B is a prototype UAV that is meant to operate from an aircraft carrier. In a sense, this craft is an unmanned version of an F/A-18 Hornet or F-35C Joint Strike Fighter.[4] One would expect, therefore, that while the

fleet introduction of the X-47B would enhance the functioning of the carrier air wing, it would not change the doctrinal role of the carrier.

But what if we imagined a different doctrinal role for the aircraft carrier? What might UAVs, with their doubling or tripling of range and endurance over manned aircraft, allow us to do with the CVN that cannot be done now? One possibility that comes to mind is a return to a version of the carrier's original role, eyes of the fleet. Due to technological advances such as the Chinese ballistic anti-ship missile that presents an increasing threat to the carrier in China's near seas, the U.S. Navy might elect to conduct a sea fight with its own new set of anti-ship missiles. These missiles, launched from submarines, aircraft or surface ships, will need C4ISR[5] support. If the Chinese succeed in shooting down our satellites and are thus able to disrupt our networks, we will have to reconstitute them locally. If we had a wing of long-range and endurance UAVs on a carrier, it could populate the battle space with both ISR and line-of-sight communications relays for the battle-force network. While some of these services could be provided from land-based UAVs such as the Navy's version of Global Hawk (Broad Area Maritime Surveillance, or BAMS), the same logic that favors local carrier-based aircraft over long-range land-based bombers also favors carrier-based C4ISR UAVs.[6]

Resurrecting Old Pigeonholes

What other uses might the Navy find for UAVs? It has been said that if you want a new idea, read an old book. In this case the old book is a set of former naval concepts that never quite worked out because the technology of the day was insufficient to make them viable. The application of UAVs, however, might give them new life.

Son of Akron *and* Macon

Akron and *Macon* were two giant dirigibles the Navy operated in the 1930s. Their distinguishing feature was the capability to launch and recover biplane fighters via a "sky hook." These fighters would be used to extend the scouting horizon of the dirigible and for self-defense. Tragically, both dirigibles were lost in storms, and the notion of an "aerial aircraft carrier" died with them. UAVs may allow us to resurrect this concept, not with modern lighter-than-air mother ships but with C-130s and C-17s. These transports have rear ramps that can be lowered in flight. UAVs could be launched and recovered while in flight. The operation of UAVs via these aircraft opens up many opportunities for leveraging their capabilities. We could, for instance, deliver hordes of mini-UAVs that could not otherwise get to a desired area of operations. Large transport aircraft could recover larger UAVs that were launched from subs or other ships that could not recover them. The possibilities abound.

Son of Arapaho

Arapaho was originally an Army concept for embarking an aviation detachment on a container ship. The Navy subsequently took the idea into consideration as a way of creating a convoy self-escort capability (in the Cold War days).[7] All the aviation support capability would be in containers and a helo/Harrier flight platform would be mounted on top. An Arapaho unit would presumably be able to provide some degree of protection against air raids and submarines. In the 1980s this idea did not gain traction in part due to the limitations of technology.

Today, UAVs might make the concept viable. While we are unlikely to need convoy self-escort, we might consider a small anti-mine, anti-pirate, or anti–small boat swarm UAV detachment. The very small on-scene personnel requirements would comport well with the limited berthing capabilities of merchants. If we containerized anti-ship missiles such as suggested by a Russian company[8] we would need the kind of on-board over-the-horizon targeting (OTH-T) capability that Son of Arapaho could provide. The combination of containerized missiles and on-board OTH-T could turn any ship into a potential surface combatant and greatly complicate an enemy's sea denial and control problem. They could do it, and maybe we should too. There are probably dozens of other possibilities; Son of Arapaho is simply a pump-priming idea.

Son of I-400

In World War II the Japanese devised a way of putting a single float plane on a submarine. They constructed a tubular hangar on the sub's deck and stuffed three float planes with their wings removed inside it. The idea was that the sub could approach the West Coast undetected, surface, quickly assemble the airplane, and send it to bomb targets in the United States. The major limitation was that the sub could only carry three aircraft, so its potential operational and strategic effect was likely to be nil. The U.S. Navy, for its part, adopted a similar concept in the 1950s for carrying and launching the early nuclear-armed cruise missiles like Regulus. Once Polaris SSBNs hit the fleet this idea was abandoned.

The converted *Ohio*-class SSGNs of today are a modern version of the concept. Capable of carrying over a hundred Tomahawk cruise missiles, they are a potent source of striking power. Coupling UAVs with new kinds of missiles in the SSGN gives the concept a new twist. UAVs with a submerged launch capability could provide a number of C4ISR, deception, and defensive services for the sub. The UAVs might be expendable or could, as mentioned earlier, be recovered in the air by a C-17. If the sub itself could recover them, the SSGN starts looking at least a little bit like a submersible CVN. One of the doctrinal roles of the CV in World War II was "cavalry," doing hit and run raids on

Japanese-held islands and even the home islands. In this their actions were very analogous to the way Confederate general Nathan Bedford Forrest used his horsemen. Today, a CVN is likely to be too visible to re-adopt that doctrinal role, but the SSGN could do it.

Son of Jeep Carrier

In World War II the U.S. Navy operated a large number of aircraft carriers, the majority of which were small light carriers or escort carriers. These ships provided sea-based air power for functions such as amphibious landing support and anti-submarine protection that the large carriers were too scarce and valuable to support. After the war their numbers quickly dwindled in favor of very large aircraft carriers. Starting in the 1970s, the notion of a smaller carrier again resurfaced in the guise of a "sea control ship." That concept never got off the drawing board due to resource constraints and opposition within naval aviation ranks. Later, Admiral Art Cebrowski, the oracle of network-centric warfare, again proposed a small carrier that could be built in numbers and operate in threatened littoral waters.[9] This concept again foundered in the face of opposition. Could UAVs breathe new life into the idea of a small carrier?

The Navy currently operates a fleet of ten large-deck amphibious ships (LHA or LHD), from whose decks the Marines have been operating helos and Harrier jump jets for decades. The F-35B STOVL[10] jet will significantly improve the capabilities of the Marine air wing, but it will not turn the LHA into a kind of aircraft carrier, due mostly to limitations in range and payload, not to mention doctrinal constraints imposed by the Marines. Short takeoff technology, even abetted by a ski jump, will always limit range, endurance, and load-carrying capability barring unforeseen technical advancements. This is why U.S. carriers have catapults and arresting gear and why the Royal Navy has recently and wisely switched its proposed *Queen Elizabeth*–class aircraft carriers to a catapult and arresting gear configuration. However, mounting catapults and arresting gear for manned aircraft on LHAs is not likely to be either feasible or cost-effective.

UAVs could change this picture. There exist small-scale catapults on trailers for UAVs. It is not hard to envision a scaled-up version of these being craned aboard an LHA to operate a wing of UAVs that might be half the size and weight of a Predator or X-47B. These would likely have at least the range and endurance of an F-18. Recovery would have to be worked out, but regular arresting gear would not be needed. If such a wing was embarked, the LHA starts looking at least a little bit like a jeep carrier. The sky is the limit, so to speak, on the doctrinal roles that might be adopted by a UAV-operating LHA. It would appear that UAVs also change the nature of the debate over large versus small carriers.

Son of Bismarck

Most everyone knows the story of the German battleship *Bismarck*. She was essentially the last of the surface raiders, having been done in by British aircraft carrier and surface fleet power. Her predecessors *Graf Spee* and *Emden* met similar fates, and the submarine inherited the mission of commerce raiding. Besides being on the surface and easier to find than submarines, the problem was numbers; there were never more than one or two of them operating at any particular time. Moreover, although *Bismarck* carried four Arado float planes, these were not effectively utilized, and none of the raiders received effective air support from land bases, so they operated effectively in the blind.

Perhaps the best surface combatant in the world today is the U.S. Navy's *Arleigh Burke*–class destroyer. Its combination of Aegis weapon system, SPY-1 radar, and an array of 96 missile tubes makes it highly flexible and lethal. The late block hulls support embarked helicopter detachments and all of them can operate a small UAV called the Scan Eagle. The *Burke*s have been slotted into two doctrinal roles: high value unit escort and ballistic missile defense ship. However, if they embarked more capable UAVs that could provide greater C4ISR reach, and they were equipped with long-range anti-ship missiles, they could become a modern version of a surface raider. *Bismarck* had to get within the visual horizon to attack her targets and knew not what was lurking just beyond, stalking her. A *Burke* surface raider would suffer no such limitation. It could reach out hundreds of miles. Such reach would allow it to maneuver in any number of ways to prevent the enemy from identifying and targeting her. The U.S. Navy has 61 of these ships and is building more, so it could literally flood a sea fight problem with them. Their targets would most likely be enemy combatants vice merchants. Operating singly or perhaps in pairs, and in cooperation with submarines and other units, they would add enormous complexity to an enemy's sea denial or sea control problem.

Conclusion

New kinds of missiles, satellites, cyberspace, and robotic technologies, as well as emerging navies, are going to change the nature of naval warfare whether we like it or not. The Navy's imperative is to imagine new ways to leverage these technologies that will give us major operational advantages over an enemy. We must realize that other countries, some potentially hostile, are developing or buying UAVs. All the ideas presented in this article could be turned around and used against us, so we had better think through the counters to them even as we develop them for our own use.

UAVs are going to change things, and they will provide us with opportunities to use our ships in new ways. We must proceed by examination through war gaming and by

subsequent fleet experimentation. In order for this to be most effective we must attempt to remove our blinders and envision new uses and new relationships.

Notes

1. There are a number of acronyms associated with unmanned aircraft, including UCAS (unmanned combat air system), UCAV (unmanned combat air vehicle), and UAS (unmanned air system). For the purposes of this article, all such designations will be subsumed under the acronym UAV.
2. *Capital ship* is defined for the purposes of this article as the ship type most capable of contending for command of the sea in general and for seizing and maintaining local sea control.
3. Robert C. Rubel, "The Future of Aircraft Carriers," *Naval War College Review* (Autumn 2011), pp. 13–27, www.usnwc.edu/.
4. Norman Friedman, *Unmanned Combat Air Systems* (Annapolis, MD: Naval Institute Press, 2010). Friedman makes the case that the X-47B is a significantly new technology because of the potential for swarming operations.
5. Command, control, communications, computers, intelligence, surveillance, and reconnaissance. A *T* is sometimes appended to indicate targeting.
6. Aircraft carrier proponents have long pointed out that if local land bases for tactical aircraft are not available, long-range operations from more distant bases are not as effective as those from a nearby carrier. The advantages of local tactical air from a carrier include greater flexibility in changing missions and the ability to surge quickly in response to emergent conditions.
7. Jim Bencivinga, "Rigging US Container Ships to Defend Themselves in Time of War," *Christian Science Monitor,* January 6, 1981, www.csmonitor.com/.
8. This concept emerged on line with a computer graphics–based video on YouTube, www.youtube.com/watch?v=N6dKCkv1fzs, and reported by the UK *Telegraph,* at www.telegraph.co.uk/.
9. "Cebrowski: Develop Small Aircraft Carriers from High-Speed Ships," *Inside the Navy,* August 9, 2004, p. 1.
10. Short takeoff, vertical landing.

CHAPTER TEN

Tales from the Platform

I am proud to say that I served for seven years as a U.S. Navy landing signal officer. I often said that I would have been happy to retire as a thirty-year lieutenant if they would just let me wave aircraft the whole time. That gives you some insight into the depth of my career planning. In any case, after serving as the Carrier Air Wing (CAG) landing signal officer (LSO) in Air Wing Seven, I had to move on. I retired after thirty years of service and would do it all over again if I had the chance. But regardless of the subsequent achievements and satisfactions that a Navy career brought me, my heart was always on the platform. I proudly devoted a whole section of my retirement shadow box to my years as paddles: a pickle switch and the "rectum non bustus" patch. However, it wasn't all fair winds and following seas out there, especially in the years I waved (1973–1980). In the interest of preserving for future generations some idea of the mayhem we experienced, I offer the following absolutely truthful account of some notable episodes. There are no morals to these stories; they just happened.

Night Phantoms, or How I Learned to Love My Net

Like a lot of carrier aviators, I quickly came to idolize my training command and Replacement Air Group (RAG) LSOs. They were the ones that inducted us into the tribe of tailhookers, keeping us alive during the process. Naturally, I wanted to be like them. Upon completing the A-7 RAG (VA-174 at NAS Cecil Field) in late September 1973, I was "must-pumped" to VA-66 (Waldos) aboard USS *Independence,* then sailing in the Eastern Mediterranean. I promptly informed the skipper that I wanted to be an LSO. The squadron LSO immediately sent me out to the platform to observe a night recovery.

At this point, I need to say a little about the characteristics of the F-4 Phantom. A great jet, it was pointed out to me that it was proof that if you put enough power on it, you could make anything fly. From an LSO's perspective, that meant power was everything, kind of like the Hornet is now. After a lot of nights waving Phantoms, I concluded that

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there was something about how the pilot sat in the airplane that made F-4 drivers feel high and fast at night when they were in fact on glideslope and on speed. It was a beautiful airplane to have in the pattern in the daytime, but at night it seemed to always be a struggle for survival. Of course, I knew none of this as I climbed onto the platform for the first time.

Per normal, the fighters were first in line to recover. The first couple of passes were uneventful and I was caught up in the excitement of the whole thing. Then Diamondback 104 shows up on the ball. He was a bit high and fast, exacerbating the normal F-4 illusion, and the pilot made an MFC (do they use this term in the coed Navy?—it means a sharp correction that succeeds but probably shouldn't have been tried). It was like the pilot decided his best move was to shut 'em down at the start and go for a relight in the middle. Remember, power is everything on a Phantom. The jet immediately went from flying to falling and the controlling LSO, a fighter guy named Dan Gabriel, yelled for power once and then hit the wave-off lights. Diamondback 104 responded by dipping his left wing and came straight at us. Charlie Cook (the CAG LSO and the best paddles I ever saw) convulsively mashed the transmit button on his handset and yelled at the six of us others on the platform, "Hit the net!!" Now, I don't know if the radar intercept officer (RIO) was taking a nap or what, but if I had been in that back seat, I would have yanked on the command eject handle a nanosecond later. He didn't, which is why I am still alive to write about the incident.

Hit the net we did, except for Charlie and Dan, who both crouched down on the platform yelling, "Burner!! Burner!!" Of course, it was pitch black, and with six of us hitting the net at the same time, it wasn't going to be pretty. I landed in the net with nobody on top of me so I was instantly up and running full speed inboard. I don't know where I thought I was going (there was only a small, circular "escape" scuttle that was closed anyway), but I was going there at warp one. The night being pitch black, I did not see the stanchion that held up the LSO platform, and hit it with the right side of my face. I bounced back into the net and was instantly up and running full speed inboard again. Being a slow learner, I again slammed into the stanchion, again with the right side of my face.

While my own little battle with structural steel was taking place, Diamondback 104 did jam the throttles into burner and, God bless the J-79, got the Phantom into a climb, just enough to miss the round down by two feet and the LSO platform by the same amount. Good thing there was no port angle aircraft park on the *Forrestal* class. We climbed back up on the platform, just a bit shaken, but Charlie and Dan just stood up and went on to the next approach like nothing had happened. Diamondback 104 eventually came back around and trapped with a fair 2 wire.

In the aftermath, the right half of my face turned dark purple, making me look like a harlequin clown for the next week or so. Charlie and Dan were singed by the F-4's afterburners and looked like they had been out in the sun too long. The next day I asked Charlie what the pilot had to say in the debrief and he said, "Nothing I wanted to hear." I became an LSO anyway.

FCLP Date Night

After three cruises in 2½ years in VA-66, I got orders to VA-174, where I figured I would be an LSO. My commanding officer (CO) in the Waldos advised me to abandon waving because the word was that the executive officer (XO) of 174, then Cdr. John McCain (now senator), didn't like LSOs, since one had disqualified him, keeping him from a command at sea. Thus I spent my first year in 174 as a weapons training officer, figuring my waving days were over. But then all the LSOs got out because the airlines were hiring and I got pressed back into service at the paddles. Well, because there were so few of us left on active duty, I started to do back-to-back boat detachments (usually to Lady *Lex* [the training carrier USS *Lexington*], a ship I liked a lot), necessitating lots of time on the edge of the runway. Much of the time having no second LSO around to write book, and spending almost no time with my wife on this "shore duty," I asked her one night if she would come out to the field with me. I had her write book, which she picked up rapidly. This became too convenient, so we had these "date nights" sitting in the LSO truck at the end of the runway. She developed an eye, so I let her start waving. In those days, a woman's voice saying, "Roger Ball!" was unheard of, and you could see some wing waggles as guys reacted with surprise. Bless her heart, she got me through the lean times in 174. She is an honorary paddles in my book.

Vasectomies and Waving Do Not Mix

I am guessing the title of this section is already making the male LSOs reading this wince. In late 1978 I reported as CVW-7 LSO aboard the recently-commissioned USS *Eisenhower,* and by the following spring we were on cruise in the Mediterranean. By this time, I was thirty years old, with two sons, and my wife and I decided that two were enough—especially since it appeared that it was her lot in life to be a functional single parent. Vasectomies were the new, trendy thing then, so we decided I would have one on cruise. Apparently a lot of my shipmates had the same idea, because sickbay turned into a vasectomy assembly line. I got mine without incident and after twelve hours in a sickbay cot, was told to go to my stateroom (02 level forward under cat 1) and stay in bed another couple of days. The next day I heard the faint echo of the Air Boss yelling emergency pull forward on the 5MC [intercom speaker]. I knew the other CAG LSO was flying, and I was feeling fine, so I jumped out of the rack, pulled on my wash khaki

trousers and white LSO jersey and proceeded to do the thousand-foot low hurdles through the knee knockers to the LSO platform. I got there just in time to wave a burning Tomcat aboard (they seemed to catch fire a lot). We took him in the barrier and the crash crew immediately had the fire out. Great, but when the book writer turned to look at me for the grade he turned white and said, "Barney! What is going on?" I looked down at my crotch where he was staring and it was like I had peed my pants with blood. I had ripped all the stitches out (did not feel a thing—good ole adrenalin). Well, they could not re-stitch me, so I hobbled around the next couple of weeks with big wads of gauze stuffed down my pants. Fortunately, I was full systems capable by the time I met my wife in Rome . . .

Mother Ship

Later that cruise, on a balmy night with scattered showers, *Ike* was steaming through the Straits of Sicily making her own wind to recover aircraft. I was backing up and greatly enjoying the fact that F-14 drivers did not seem to suffer the old F-4 illusion of being high and fast. The wind started to die off and the Air Boss came up on the 14MC telling us to be ready for a foul deck. All of a sudden the collision alarm sounded. I looked around the windshield just in time to see lights come on right in front of our bow. It turned out to be a mother ship for cigarette runners that had been running dark. Obviously there had been some back and forth between the bridge and Combat Information Center (CIC) about a non-correlated radar blip that took a finite amount of time. By the time someone decided that yes, the radar blip was more than a shower, we were bearing down on the mother ship.

I yelled at my team to grab onto something because I was sure we were going to hit. Now, for those of you who have been down in the machinery spaces of a *Nimitz* class, you know that the power output of the reactors and the engines is, for all intents and purposes, infinite. The bottleneck that keeps a CVN (Carrier Vessel Nuclear) from having the same thrust to weight ratio as a Hornet is the propeller shaft. Kind of like the dilithium crystals in the Starship *Enterprise.* I can hear in my mind the conversation between Capt. Jim Mauldin, then-CO of *Ike,* and the chief engineer:

> "All back emergency, Scottie!!!"
>
> "She will not take no more, Cap'n!!"
>
> "Dammit, Scottie, I said emergency power!!"

"Scottie" obviously obeyed the Captain and pulled out all the rods. The propeller shafts must have been starting to look like the rubber band on a model airplane, but the net effect for us on the platform was that *Ike* became a 90,000-ton bucking bronco. Forget the collision, we had to cling to whatever we could grab onto in order to keep from being

launched off into the water. Amazingly, we stopped short of hitting that mother ship, which by now had lights on and was stoking its boilers for all they were worth. In that moment I imagine there was a brotherhood of soiled britches on both bridges.

The MiG Moment

By early 1980 *Ike* was starting workups for another cruise. In those days we did our initial drills off "Gitmo" (Guantanamo Bay), Cuba, where there was a fleet training team. *Ike* had sailed from Norfolk with an empty deck. We were supposed to bring elements of the wing aboard once we neared the Gitmo OPAREA (operating area). So there we were, off the southeastern tip of Cuba, at flight quarters, waiting for the wing. My team and I were out on the platform, stripped to the waist, basking in the sun and watching the dolphins and flying fish play in our wake. I heard something behind me and turned to look forward. I saw a little bug-like thing go zorching down the starboard side of the ship, bow to stern, at around five–500 feet. I thought, gee, that looks like a MiG-21, but nah, it can't be. It zoomed up, did a wingover and came back down at us. Sure enough, it was a Cuban MiG-21. How could this be? Nobody had said anything. Thus the following conversation on the 14MC:

> "Air Ops, Paddles."
>
> "Go, Paddles."
>
> "Yeah, does anyone know anything about this Cuban MiG-21 that is buzzing the LSO platform?"
>
> "Say again?"
>
> "Yeah, we have got a MiG-21 buzzing the LSO platform and we wanted to know what the deal is."
>
> "Stand by . . . "

One can only imagine the ensuing conversation between CIC and the bridge. Good thing there was no flag aboard. That Cuban MiG driver had a career day. If he took pictures, he probably got a Hero of the Revolution medal and a promotion.

Why They Do Not Put MB5s on the Flight Deck Anymore

A month or two later we were up in the VACAPES (Virginia Capes Operating Area) doing refresher carrier qualifications (CQ) just before going on the interminable Indian Ocean (IO) cruise (Iranian hostage crisis). Plenty of natural wind with choppy water, overcast skies, and day Case III. An A-6 showed up calling "coupled ball." Unbeknownst to us, he was trying to fly it manual throttle. By the middle the indexer light was green, indicating something was wrong, so we called "uncouple" and "power." Should have waved him off at that point but we didn't. He added power and seemed to be OK over the ramp, but then did a big right wing dip. The Intruder immediately lost lift by virtue

of its spoilerons, sank down short of the 1 wire, picked up a right drift, and "kiddie-car'ed" over the wires.

Now, since everyone flies off *Nimitz* class nowadays (except for *Enterprise*), you are used to a 9.3 degree angle and a 765-foot landing area. In 1980 we had not quite wrapped our minds around that, being used to the more canted and shorter angled decks of the earlier-class carriers. So we on the platform were not, in that instant, overly concerned about the bolter, especially since there was nothing on deck—except the MB5, which for some reason was parked hard up against the crotch, just over the foul line. The MB5 was essentially the same kind of fire truck you see at shore bases. It turned out that its windshield was at the same height as an A-6 wing. Fortunately, the fire crew saw it coming and jumped out of the truck, but one sailor got a bad concussion.

We had always heard about the "Grumman Iron Works" and I actually had some time in the old F-9 Cougar. However, this A-6 added to the legend. The outer six feet of the Intruder's starboard wing hit the MB5 at windshield level and peeled the top of the truck back like a sardine can. It maybe cost the A-6 a knot of airspeed and scratched up the leading edge flap. It got airborne again and diverted to Oceana. I guess there really is a moral to this story: do not try to salvage passes and no pass is over for the LSO until the jet is stopped or safely airborne again.

Prowlers, Toilet Paper, and Miss America

The weeks and months were wearing away slowly in the spring and summer of 1980 as we rotted away on "Gonzo Station" in the Arabian Sea aboard USS *Eisenhower*. The Iranian hostage crisis wore on, and somebody in Washington figured that a visit from Miss America and her entourage, doing a song and dance USO show for us, was just the ticket. They were CODed (sent by a Carrier Onboard Delivery flight) aboard, and did their routine down in the hangar bay. They couldn't leave until the next day, so were bunked in some staterooms on the 03 level, under heavy Marine guard. Meanwhile, flight ops proceeded uninterrupted.

Unbeknownst to me, somebody in the black ops wing of my LSO corps either bribed or garroted the Marine guards, because in the middle of a night recovery, up pops Miss America and her court onto the LSO platform. No time to sort it out because the deck was moving and there was no divert, and I did not feel like creating a public relations faux pas by kicking them off the platform. So, we just kept landing aircraft.

Now, any paddles can tell you that the EA-6B Prowler has a weak hook snubber. The snubber is a little hydraulic cylinder that presses the hook down when you lower it so that it does not bounce when the aircraft hits the deck, causing it to miss the arresting

wires. Prowlers were notorious for having "kiddie car bolters" in which the airplane lands nicely in the wires, but just keeps going due to hook bounce. Well, on this recovery, sure enough, we had a Prowler that just would not snag a wire. We simply could not just keep refueling him and keep trying. One fix would be simply to barricade him—catching the whole plane in a big nylon net stretched across the deck. However, this virtually ensures serious damage to the aircraft. We had a second fix, not covered at the time in the technical bulletins: stack rolls of toilet paper under the arresting wires to raise them up more to up the odds the hook will catch one. Toilet paper is used because it won't harm the jet engines if it gets sucked into the intake. For this reason, we had an emergency stash of TP located in a locker under the LSO platform.

I called the play to the Air Boss, who issued a delta and turned on the floodlights. We grabbed the cases of TP and ran out onto the deck, madly stuffing rolls under the wires. Sure enough, the Prowler snags a wire on the next pass. Of course the arrestment sends cascades of TP flowing down the deck and also over the LSO platform. I can just imagine the tales Miss America and her court told their friends back in the States.

Story not complete. The same LSO black ops covert organization that snuck the girls out onto the platform also rigged up a disco in the aviator's wardroom. It was after midnight when we finally completed the recovery, so there were a) midrats available and b) no senior officer presence (unless you considered me, the CAG LSO, a senior officer). So, the junior officers were dancing and carrying on until, as luck would have it, a sleepless executive officer of the ship wanders in. We went from disco to tap dancing in nothing flat.

Moon over the IO

So we find ourselves rotting away in the IO from April to December 1980, with one four-day port call in Singapore. The first three months were solid Case III due to the monsoon, with the deck moving a lot. We got real comfortable with MOVLAS (mobile visual landing aid), and had several of those legendary passes where the pilot did not see the deck until touchdown. Finally the monsoon blew itself out and the IO turned into the glassy lake we had heard about. One of the duties of the O-4s aboard *Ike* was leading the daily FOD (foreign object damage) walkdowns, and the CAG LSOs were not exempt, so one fine morning I am out in front of several hundred shipmates moving down the deck in precise military formation (or so I recall). The Air Boss was always up for dumping on the LSOs, so he kept up a steady stream of cracks and insults on the 5MC as we made our way aft. When we got to the fantail I decided to fight back. I had everyone line up facing aft and issued the order "Drop trou!" Everyone obeyed with military precision and bent over, providing the Boss with a full IO moon. You probably cannot get away with that today, can you?

Epilogue

God, I loved waving. The fantail is where the sea and sky meet as the planes come down the chute to land. It is where the ship and the airplane become one again, and it is the LSO that makes it happen. In the monsoon, the CO of *Ike* would have me go out on the platform at dawn to advise him on whether it was safe (relatively speaking) to fly that day. He never overrode me. I would stand out there, feeling the ship move, seeing how she was getting along with the wind and the waves. She was like a living thing, almost. There I was with her, in a conversation about how she felt about tossing her chicks into the air. Times like that are rare and precious, and come only to a precious few—the paddles. I remember appreciating it, even as I stood there—and then all the chaff cuttings that had been dropping through a deck drain in the chaff cutting room, located just above the air intake vent for the main reactor electrical control panel, shorted out the main bus and the reactors scrammed, leaving USS *Eisenhower* adrift in the IO . . .

Happy waving, folks—enjoy it while you can!

PART THREE

Joint Operations

CHAPTER ELEVEN

Gettysburg and Midway
Historical Parallels in Operational Command

The purpose of this study is to show the profound effect a commander in chief's approach to operational command can have on the course of events in war. It does so by analyzing the performance of two operational-level commanders in chief, General Robert E. Lee, commander of the Army of Northern Virginia, and Admiral Isoroku Yamamoto, commander of the Imperial Japanese Navy Combined Fleet, during the defining campaign of their respective careers. These specific battles are selected to demonstrate that the requirements of operational-level command transcend time, technology, and environment. Additionally, it is in the study of the losing commanders that the most compelling lessons can be drawn. The picture that emerges is an endorsement of Carl von Clausewitz's notion that there are no hard and fast rules that govern the conduct of war; it is the presence of the commander that decisively influences the course of events—for better or worse.[1]

This focus on the commander in chief recognizes that the process of command at the operational level of war is a distinct discipline. An operational commander in chief must orchestrate the actions of a large and complex organization under the most difficult of circumstances and must creatively out-think his counterpart on the other side. His span of control is so great that there is no possibility of directly responding to everything that happens. He therefore must impose his will on people with whom he has little or no direct contact, and he must get them to act as he would wish even though he cannot know all the situations they will face or even be entirely familiar with their characters.

The term "operational art" denotes the collection of requirements and skills necessary for effective command at the operational level. The word "art" is used advisedly; it indicates that operational-level command is a process sensitive to the abilities of the

practitioner. If it were a science, it would depend on knowledge of certain absolute truths and their application to situations that arise. A considerable amount of the current literature in the field of military theory concerns itself with principles and concepts, technology and doctrine—leading one perhaps to suppose that these things exclusively govern the conduct of war. As usual, von Clausewitz has the best commentary on the matter: "It is only analytically that these attempts at theory can be called advances in the realm of truth; synthetically, in the rules and regulations they offer, they are absolutely useless."[2] In other words, one can study war by using theory, principles, and doctrine to disassemble it into understandable chunks, but when the responsibility of command descends and one has to put it all together, there is nothing but judgment and personal approach to help one practice the art. How Lee and Yamamoto practiced the art exerted decisive influence on the campaigns we shall examine.

Historical Parallels and the Study of War

In the world of wargaming, there are two terms commonly used to characterize the computer models that calculate outcomes. "Deterministic" models are like machinery; they crank out identical products every time, given identical inputs. "Stochastic" models, on the other hand, use probabilistic calculations and thus may not yield identical results even if the inputs are the same. War, to invoke von Clausewitz once again, is the playground of chance, and it requires the practitioner to calculate probabilities.[3] Real war is therefore stochastic. This characteristic has bedeviled theorists who have sought to identify principles and laws of strategy. Blind application of a particular principle or doctrine cannot be relied upon in any particular instance to produce victory; the real world of human interactions is too complex and messy to be encompassed by a few simple rules.

The complex nature of war should not, however, deter us from trying to understand its elements and to learn from the failures and successes of those who have conducted it in the past. In studying the chronicle of warfare, its stochastic nature becomes evident; concentrating force, for instance, does not always lead to victory any more than dividing one's force in the face of a superior enemy invariably invites disaster. Therefore, when one does find parallel events in the historical record, they should be scrutinized for evidence that, in certain circumstances, certain approaches to the problem of combat command are likely to bring about similar results at least more than once. Put another way, if actual war is likened to a stochastic computer model, whenever similar results are observed, it is worthwhile to go back and check the inputs.

The battles of Gettysburg and Midway are such parallels, and it turns out that for all their separation in time and setting, among their similarities are some that seem to be the product of more than pure chance. This is all the more striking because one is

an American Civil War land battle, fought with some of the same kinds of equipment and tactics Napoleon used, and the other a sea battle between aircraft carrier forces; moreover, the cultural differences between the losing commanders, Robert E. Lee and Isoroku Yamamoto, appear to be vast. While these are not battles that leap to mind as subjects for comparison, the "computer" of war does seem to have calculated some surprising parallels between them, due to some interestingly similar inputs.

The Parallels

The battles of Gettysburg and Midway marked turning points in their respective wars. In both cases the United States secured a tactical victory that gave it the strategic breathing space needed to build, with its massive economic power, an armed force that would eventually overwhelm its adversary. In both cases, U.S. forces defeated an enemy that had a reputation for tactical invincibility, thereby greatly promoting the morale of the American people as well as that of their military commanders and fighting forces. Before these battles, the enemy had enjoyed the initiative and a string of tactical victories that had kept the U.S. off balance and the issue of the war in doubt. After the battles, neither the Confederates nor the Japanese were ever again in such a favorable position to win the war through battlefield victory.

In both battles, the U.S. forces fought on the operational defensive. In neither case did the battle fit into any overall American strategy except as something required to meet a threat to a base of operations. However, Major General George Meade's Army of the Potomac fought on the tactical defensive, whereas Admiral Chester Nimitz's Pacific Fleet forces (under the command of Rear Admirals Frank Jack Fletcher and Raymond Spruance) took the tactical offensive. These differences reflect the basic requirements of each kind of warfare (sea and land) and the nature of the weapons the respective forces used. However, in both campaigns, owing to the enemy's failure to provide for adequate scouting, the U.S. was able to pick the time and place of the battle to its advantage and thus secure the inherent strengths of defensive warfare.

Both of the battles were lost in part due to the lack of timely and aggressive decision making by a key subordinate to the commander in chief. In the case of Gettysburg, Lieutenant General Richard Ewell, commanding the Confederate II Corps, failed to occupy Culp's Hill when it was his for the taking; at Midway, Vice Admiral Chuichi Nagumo, commanding the Japanese First Carrier Striking Force, failed to make a timely decision to attack the American task force when he became aware of its presence. On both occasions inaction permitted the United States forces to achieve a position of tactical superiority that neither Lee nor Yamamoto could subsequently recoup. In contrast, outstanding decisions by U.S. subordinates seized the advantage at critical moments. The decision by Brigadier General John Buford to risk a defense with dismounted

cavalry against an infantry force of unknown size can be compared to the decision by Spruance to order an attack on the Japanese carriers even though his aerial strike group was not completely launched or organized. This position of tactical advantage stole the initiative from the attacker, who as a result suffered heavy losses to his outstanding first-line forces. Neither the Confederates nor the Japanese were able to recover fully from these losses.

The Inputs

The two battles, then, bear a distinct resemblance. Even the circumstances under which the battles were joined and the performance of subordinate officers were impressively alike. Accepting that chance can always produce like results from unlike causes, it still seems worthwhile to search among the threads of similarity in these battles' "inputs" in search of useful generalizations about the art of war.

Similar Strategic Dilemmas

Although both the South and the Japanese had, through the use of brilliant tactics against an ill prepared opponent, seized the operational and even the strategic initiative, their long-term prospects appeared questionable. For the industry-poor South, gasping under the squeeze of the North's economic blockade, a protracted war of attrition was not feasible. Japan likewise did not possess an industrial base sufficient to engage in such a war with the United States. Both Lee and Yamamoto saw time running against their countries. Neither opponent's initial gambits had brought the United States to the bargaining table, and for each the question of what to do next was the subject of debate at the highest levels.

In both cases, the dilemma presented to the national authorities was how to use their best maneuver forces to secure permanent strategic advantage. The South in early 1863 had to contemplate the threat to its communication with Texas and to the access, through Mexico, to the resources of the outside world that such communication represented. New Orleans had been lost the previous spring, and contact with the trans-Mississippi theater hinged on maintaining Vicksburg. However, by June Brigadier General Ulysses S. Grant's troops were threatening Vicksburg, and Union forces in Tennessee menaced Atlanta and such industrial and resource heartland as the Confederacy possessed. Its best maneuver force was the Army of Northern Virginia, under Lee. Should this force, or parts of it, be sent west to secure the Southern position there? Or should it be concentrated in the East to seek decisive battle against the battered but intact Army of the Potomac, a battle that might lead directly to peace negotiations?[4]

The situation facing Japanese leadership was similar. To the south lay the resource-rich East Indies, which represented staying power for the Empire; however, the buildup of Allied forces in Australia posed a serious threat to Japan's access there. To the east lay the undefeated U.S. Pacific Fleet. Should the victorious Combined Fleet be used to secure Japan's position in the south, or to defeat the Pacific Fleet in a decisive battle that could lead to a negotiated settlement with the United States?[5]

Strategy has been defined as both an art and a science, but when the bullets fly, strategy boils down to what people think about war and the influence they each exert in the decisions made about where, when, why, and how to fight. In the case of the Confederacy and Japan, the resolution of their respective strategic dilemmas was influenced decisively by what Lee and Yamamoto thought about fighting.[6]

The Insistence of an Operational Commander

Both Robert E. Lee and Isoroku Yamamoto were enterprising commanders who believed in the utility of activity. Both men, as junior officers, had served with distinction in earlier wars. They each had inherited a defensive strategic doctrine as they assumed their respective commands but soon discarded it as unsuitable to the situations that they faced.[7] Lee realized that digging in and conducting a positional defense of Richmond would invite eventual pulverization of his army by superior Union forces. He felt he had to wrest the initiative from Major General Joseph Hooker, then commanding the Army of the Potomac.[8] Yamamoto likewise rejected the defensive doctrine of the Imperial Japanese Navy, which contemplated ambushing the U.S. fleet as it sailed into the Western Pacific to take back the Philippines. Given the need for naval support for operations in the south to secure resources, he felt he could not sit and wait for the U.S. Pacific Fleet to arrive at its own convenience; he had to deal with it on his terms.[9]

Both commanders were consummate operational planners and decision makers, adept at outfoxing and outmaneuvering their enemies. They consequently developed a serene confidence in the fighting prowess of their forces and in their own command abilities that made them risk-oriented rather than risk-averse. Two months before Gettysburg, Lee had divided his smaller force in front of a numerically superior enemy at Chancellorsville in order to maintain the tactical initiative. Yamamoto, in dispatching his fleet to surprise the Pacific Fleet at Pearl Harbor, had hazarded his aircraft carriers in an attack unsupported by land-based air in the face of significant American land defenses. Both gambits met with great success and reinforced the commanders' belief in the utility of operational risk-taking.[10]

As a result of their early successes, both Lee and Yamamoto had achieved considerable prestige and influence in the highest circles of government, not to mention among

the general public. Each man brought this prestige and influence as a winner on the battlefield decisively to bear in getting his views accepted by national authorities.[11] Thus in each case, matters of national strategic policy were in effect decided by an operational-level commander whose outlook was formed by a faith in decisive battle and a conviction of the necessity to accept risk to precipitate such a battle.

Lack of Strategic Priority

Interestingly enough, the strategic outlooks of both Lee and Yamamoto were heavily influenced by concern for the security of their countries' capitals. Lee saw his invasion of Pennsylvania as a means of drawing the Army of the Potomac away from northern Virginia and reducing the threat to Richmond without resorting to a static defense of the city.[12] Yamamoto's fixation on Midway was cemented by the April 1942 Doolittle raid on Tokyo and his desire to prevent a recurrence by eradicating the Pacific Fleet.[13]

While concern for the security of their capitals gave useful leverage in gaining acceptance for their projects, both Lee and Yamamoto clearly thought that the best hope for a successful end to the war lay in annihilating the enemy in the campaigns upon which they were about to embark. A sufficiently complete destruction of remaining U.S. forces would lay open the American homeland to operations that would demoralize the populace and, from the perspective of Lee and Yamamoto, strengthen the hand of those in the United States who might counsel peace.[14]

There were also other reasons for undertaking the Gettysburg and Midway campaigns. Lee was short of forage for his horses and mules as well as of many other items of supply that might be gained from the rich countryside of Pennsylvania and points north. He made enough of this aspect of the proposed operation to convince some that it was the primary reason for embarking on the campaign.[15] Yamamoto too had other uses for a successful campaign. He felt that Japanese operations in the south against Australia and New Guinea would otherwise constantly be threatened by the American fleet on his eastern flank.[16] In a real sense, the Midway campaign constituted a monumental flank-securing operation.

Whatever their reasons for insisting on those particular campaigns, at the most fundamental level neither Lee nor Yamamoto could abide inaction, and both required a suitable outlet for their martial spirits. The majestic scope of each campaign, the lure of glory, and the promise of strategic decision pulled them inexorably toward the showdown. But the very multiplicity of prior justifications for the campaigns proved disastrous in the end, because in each case the lack of clear relative priority among the goals and objectives of the campaign, especially that of waging decisive battle, led to failure to concentrate forces at the critical place and fatal indecision at the critical moment.

Failures in Scouting

Much has been made of the ignorance of both Lee and Yamamoto as to the whereabouts of the U.S. force that opposed them. In Lee's case, Major General J. E. B. Stuart and his cavalry failed to maintain contact with either the main Union forces or his own, causing Lee to march blindly into a collision with the Army of the Potomac on ground unfavorable to the Confederates.[17] Likewise, the Japanese Combined Fleet sailed unawares into an American naval ambush, finding out too late that three Pacific Fleet carriers awaited them at Midway.[18]

The reasons behind each commander's failure to ensure adequate scouting are open to speculation. Certainly both Lee and Yamamoto were sufficiently skilled field commanders to understand the necessity for scouting, and both had made provisions for it. In both cases, however, negligence on the part of a principal subordinate led to a breakdown. General Stuart failed to keep Lee informed on Federal movements, and Admiral Nagumo sealed his own fate by failing to mount a sufficiently aggressive tactical reconnaissance.[19]

In both battles, however easy it may be to pin the blame on subordinate commanders, the commander in chief retains some responsibility for these failures. In the first place, neither Lee nor Yamamoto seemed to appreciate fully the importance of detailed knowledge of enemy movements in a campaign designed to precipitate a battle that they hoped would decide the war. They both assumed the U.S. force would react predictably to their own movements, and the lack of information seemed only to confirm their own expectations.[20] Moreover, lack of intelligence did not deter them from pressing on with their respective plans, even though the level of risk in an already chancy operation had become thereby even higher.

The reason for this lapse in judgment may be found in the soaring confidence each commander had in his force. Both the Army of Northern Virginia and the Japanese Combined Fleet could, with justification, claim to be the finest fighting force of its kind in the world at the time. Lee and Yamamoto both felt that their commands would inevitably prevail in any situation in which the enemy could be brought to battle.[21] In this frame of mind, complacency about scouting could easily develop. Both men expected their movements to stimulate an enemy countermove that would bring about the expected engagement. The enemy was going to come to them, they would defeat the enemy when he arrived, and that was that.

The Decisive Place and Time

If there is a principle that is universally accepted by military theorists and writers, it is that a commander should attempt to concentrate his own forces when and where it

matters most. Concentration may be absolute (that is, having all one's force available) or relative (being superior to the enemy at the point of contact), but either way, successful results in a battle cannot be expected, especially on the tactical offensive, if superior combat power cannot be brought to bear. At Gettysburg and Midway, neither Lee nor Yamamoto, two acknowledged masters of the operational art, adhered to this principle. Both of their forces had sufficient combat power in the aggregate to achieve a battlefield victory if favorable conditions for engagement could be obtained. Lee's army, while numerically inferior to the Army of the Potomac, was a combat-proven force whose effective power had consistently been out of proportion to its numbers. Yamamoto, on the other hand, had a fleet that was superior to the American task forces both in numbers and in certain aspects of fighting capability, such as aircraft range, torpedo tactics, and night gunnery.

Lee's inability to concentrate was partially a function of his order of march. He sent his army across the Potomac piecemeal, partly in order to maintain a credible rear guard in case Hooker decided at that moment to advance on Richmond.[22] Lack of parallel avenues of advance further exacerbated Lee's maneuver problems, and by the eve of the battle the Army of Northern Virginia found itself spread out over many miles along the narrow defiles of the Cumberland Valley. The final division of Lieutenant General James Longstreet's corps was to be unable to reach the scene of the battle until the evening of the second day of the battle, too late to have a decisive effect. Yamamoto likewise strung out his forces. The most egregious dispersal was of his aircraft carriers; he assigned two of his eight carriers to a deception operation in the Aleutians, kept one more with his so-called "Main Body," and placed another with his invasion force. Almost half of his total carrier strength was thereby prevented from participating in the main engagement.

Each commander failed, in designing his operational campaign, to achieve consistency between the principal goal of the operation and the force dispositions employed. In light of the strategic situation in which each commander found himself—a high-stakes gamble to stave off ultimate strategic defeat—taking unnecessary operational risks by failing to provide for rapid concentration should the desired major battle present itself seems almost incomprehensible, especially considering the demonstrated talent of the two commanders. The answer again seems to revolve around complacency borne of successive victories. Both men had achieved success by breaking, rather than adhering to, conventional military wisdom, and each seems to have lost some respect for both his enemy and the dangers of war in general.[23]

Indecision by Key Subordinates

General Ewell's failure to occupy Culp's Hill on the first day of the battle of Gettysburg is commonly cited as one of the major contributing factors in the Confederates' defeat.

Worried about a possible Union flanking attack and the fatigue of his men, he chose to take up temporary defensive positions around Gettysburg rather than press the attack on into the evening. Had he acted aggressively to take the high ground while it was still weakly held, the ill fated attacks on the following days might have been avoided.[24]

Likewise, Admiral Nagumo's failure to launch promptly a strike against the U.S. forces he had just found doomed his four carriers to a bombing attack with their decks crowded with fully fueled and armed aircraft.[25] He opted to recover his fighters and prepare an escorted attack on Spruance's force because he had just witnessed the carnage that had befallen the initial unescorted American raids on his force. The fatal dive-bombing attack occurred just as he was completing these preparations. Had the American attack been any less successful than it was, Nagumo might indeed have annihilated the U.S. force.

The intriguing question is why these officers failed to demonstrate initiative when the need arose. The issue is all the more puzzling given the aggressive nature of their respective commanders in chief. For Ewell, part of the problem was that he was new to command. Assuming command of Stonewall Jackson's corps after that brilliant tactician's death on the eve of the Gettysburg campaign, Ewell was presented challenges with which few officers might have been capable of coping. He had little opportunity to develop confidence in either his own judgment or the capabilities of his lieutenants. These leadership challenges were exacerbated by Lee's own style of command. Ewell had functioned well as a division commander under Jackson; Jackson's directives had been very detailed, left little room for interpretation, and had given Ewell small opportunity to develop the analytical thinking that underpins initiative. Lee's discretionary orders proved debilitating for a commander like Ewell, because Lee had not impressed on him a clear vision of the campaign's objective or accompanied his orders with a clear statement of intent.[26]

Nagumo, on the other hand, was an experienced carrier task force commander who had commanded the Pearl Harbor attack and several operations in the South Pacific and the Indian Ocean. However, he was also a methodical and cautious flag officer, a battleship specialist who now found himself in command of an aircraft carrier–centered fleet. He had been criticized for failing to follow up on the initial success at Pearl Harbor; in fact, Yamamoto had been pressed to relieve him but had refused to do so for fear he would commit suicide.[27]

Each of these officers has had his supporters and detractors among historians and analysts. Detractors accuse them of indecision, and supporters claim they were exercising justified caution. However that may be, their failure to risk aggressive tactical action allowed in each case the U.S. force to gain a measure of initiative that ultimately decided

the battle. In part, responsibility for this failure to exercise initiative must rest with the commander in chief. Failure to impart a clear vision of the campaign's purpose and the place of decisive battle within it made it possible for each of these officers to opt legitimately and rationally for a too-cautious tactical course of action at the critical moment.

Old and New Forms of Warfare

Despite prior battlefield successes that had taken advantage of improved weapons at their disposal, in the battles of Gettysburg and Midway both commanders reverted to tactics appropriate to weapons of the previous generation. Lee had enjoyed great success employing a tactical defensive that was enhanced by the new rifled muskets. Effective at over twice the range of smooth-bores, these new weapons made traditional infantry charges excessively costly. Assuming the tactical defense at Fredericksburg, Confederate forces had mowed down attacking Federals. While Lee's understanding of the newfound strength of the defense may not have been complete, the lesson was abundantly clear to officers such as General Longstreet, who sought to engage the Army of the Potomac using the strengths of the tactical defensive.[28] Lee must have had some appreciation of this when he decided to divide his forces at Chancellorsville in the face of a superior enemy. For his part, Yamamoto was considered the oracle of carrier warfare in the Imperial Japanese Navy. His design for the Pearl Harbor attack had reflected his understanding of the potential of this new form of naval warfare. The results of Pearl Harbor had provided ample reinforcement of the doctrine.

Yet embarking on the most portentous operations of their careers, both commanders reverted to forms of warfare made obsolete by their new weapons and tactics, and which they themselves had seen fail when used by the enemy. At Gettysburg, Lee ordered Pickett's charge across open ground against prepared Federal positions when he must have understood its hazards. Yamamoto made his battleships the centerpiece of his tactical plan even though it was by then evident that the aircraft carrier was the ship that counted.[29] It is difficult to account for these lapses, and available evidence for their rationale is scanty. It is possible that when the strategic stakes became sufficiently high, the commanders' confidence in the new forms of fighting was insufficient to bolster their nerve, causing them to adopt the methods they had seen succeed in their formative years. As a captain during the war with Mexico, Lee had participated in the storming of Chapultepec. There, even though he learned about the value of strong fortifications, he saw the tactical offensive carry the day.[30] Yamamoto had served with Admiral Heihachiro Togo at the battle of Tsushima and had seen the big guns of the Japanese battleships annihilate the Russian squadron.[31]

In any event, in their greatest trials both commanders changed their modes of operation and found themselves applying inappropriate tactics. One of the responsibilities of an

operational commander is to understand the nature of battle and to adapt to new forms that technology demands. In this fundamental aspect of the operational art, both men failed.

Command at a Distance

Finally, these two commanders failed one of the most crucial tests of operational command: the ability to influence the course of events that are outside the immediate span of personal control. A tactical commander's job is to extract maximum fighting performance from his engaged forces. In this role he is in explicit control of the situation and can react to sudden developments with immediate and specific orders. The operational commander, by contrast, is removed by one order of cause and effect from direct control of events. He must achieve orchestration of the varied elements of his command through influence. Not being privy to every local tactical detail, he must rely on the judgment of his subordinate commanders to accept or avoid risk in consonance with his overall intent for the operation.

Both Lee and Yamamoto had a fatally flawed command and control arrangement. For a variety of reasons, neither enjoyed a productive relationship with key subordinates. They failed to exercise effective influence over the situation because they did not firmly establish in their subordinates' minds the importance of a major engagement in the overall scheme of campaign.[32] Additionally, neither commander promptly provided information, guidance, or even moral support once it became evident that the sought-for major battle with U.S. forces was imminent.[33] In striking contrast is Admiral Chester Nimitz's council of war with his tactical commanders, Spruance and Fletcher, and his message concerning calculated risk.[34] Nimitz's influence allowed Spruance, a normally circumspect and cautious commander, to go against type and to get in the first blow by ordering his incompletely launched and half-organized strike forces to attack Nagumo.

Lessons

It is clear that similarities in the observed results of the two battles are attended by some striking similarities in the decisions and command styles of Lee and Yamamoto. Differences in environment and weapons—one battle being a twentieth-century naval engagement involving aircraft and submarines almost exclusively, the other a Napoleonic land battle of foot soldiers and smooth-bore artillery—seem less relevant than the parallels in the personalities and approaches of the commanders, at least the losing ones. It is in the personal approaches to operational command on the part of Lee and Yamamoto that the most enduring lessons can be found, for in the planning and decision making of these two commanders some of the similarities in the results of the two great battles can be understood.

The first lesson is that strategy should be left to strategists, which validates Clemenceau's dictum that war is too important to be left to generals. Lee and Yamamoto ventured into the realm of strategic decision making with a rather narrow perspective that was based on their faith in the strategic utility of battlefield victory. To the misfortune of the Confederacy and Japan, they served no wartime strategists like Lincoln or Roosevelt, who possessed the perspective and authority to prevent the displacement of coherent grand strategy by operational-level opportunism.

The second lesson is that the operational commander in chief must build internal consistency into his plans. Each of the campaigns studied here was a risky strategic venture, normally the recourse of the desperate. Given the high stakes, each commander should have attempted to minimize the operational risks. Lee would have been well advised to provide for quicker concentration, or at least to form a contingency plan for managing an unexpected meeting engagement. Yamamoto should have kept his force concentrated so that he could have steamrolled the Americans whether they struck by surprise or not. However, reducing operational-level risks sometimes means accepting greater tactical ones. Both Ewell and Nagumo could have risked an aggressive attack and thereby saved the day. They did not because their orders did not impart to them the vision that would have allowed them responsibly to accept greater risk.

Consistency not only means complementary risk management, it also means knowing what one wants. An organization cannot have more than one top priority, or its members will find themselves working at cross purposes. At Gettysburg and Midway the fundamental implied objective in the plans of both commanders was to generate a decisive battle that would destroy the enemy's remaining main maneuver forces in the theater. That was the object of the strategic risk, and it should have ordered all efforts; but neither commander established that priority, either in the disposition of his forces or in his guidance to his subordinates. Nor is it even clear that either man had expressly prioritized the objectives in his own mind. Beforehand, in marshalling their arguments to gain approval for their respective projects, both Lee and Yamamoto had articulated a variety of objectives and benefits, and both may have ended up confusing themselves as to what exactly they were about.

Thirdly, the operational commander must have faith in his methods. Mastery of the art of war involves understanding the characteristics of the weapons at hand and their influence on both tactical and operational-level plans. Technology is always creating new and improved weapons, tactics undergo change, and senior commanders are often faced with having to apply appreciably different methods than those they learned as junior officers. Lee and Yamamoto appeared to lose their poise as the burden of national salvation descended on their shoulders, and they abandoned their newly acquired warfare expertise in favor of methods they had seen work years before.

The fourth lesson is that the operational art is a delicate balance of delegation and influence. The commander simply cannot control everything that is going on in a battle or campaign; he must allow subordinates room to exercise initiative. However, he retains absolute responsibility for everything that happens and must take steps to ensure that all parts of the force work with unity of purpose. He achieves this by establishing a close and forthright relationship with his key subordinates and imbedding his vision in their minds before action occurs. Once the operation is underway, he must follow up his training of subordinates by providing them information, guidance, and moral support to help ensure they react to the changing fortunes of battle in consonance with his intent.

Finally, the biggest lesson that can be drawn may be that though forms of war change, people do not. Theorists search in vain for the perfect strategy or for immutable principles of war. Clausewitz admonishes us that the human genius for war will always operate outside the rules. Conversely, as these cases show, even geniuses fall prey to such human frailties as pride, complacency, and irresolution. While these faults may be understandable reactions to the pressure cooker of war, when they reside in the operational commander in chief even the finest weapons and the bravest soldiers, sailors, and airmen cannot save the cause.

Notes

1. This article assumes a general familiarity with the battles and personalities that are its subjects. The author recommends the following books for the best overall descriptions: Gettysburg: *The Gettysburg Campaign: A Study in Command,* by Edwin B. Coddington (New York: Macmillan, 1968). For Midway: *The Barrier and the Javelin,* by H. P. Willmott (Annapolis, Md.: Naval Institute Press, 1983).
2. Carl von Clausewitz, *On War,* Michael Howard and Peter Paret, trans. and eds. (New Jersey: Princeton Univ. Press, 1976), p. 136.
3. *Ibid.,* pp. 101–2.
4. Coddington, pp. 4–5, 9; Douglas Southall Freeman, *R. E. Lee: A Biography* (New York: Scribner, 1937), v. III, pp. 18–9; and Archer Jones, *Confederate Strategy from Shiloh to Vicksburg* (Baton Rouge: Louisiana State Univ. Press, 1991), chap. XI.
5. Mitsuo Fuchida and Masatake Okumiya, *Midway, the Battle That Doomed Japan: The Japanese Navy's Story* (Annapolis, Md.: Naval Institute Press, 1955), pp. 34–5; and John Deane Potter, *Yamamoto: The Man Who Menaced America* (New York: Viking Press, 1965), pp. 140–54.
6. Coddington, pp. 5–7; and Fuchida, p. 49.
7. Fuchida, p. 12; Clifford Dowdey and Louis H. Manarin, eds., *The Wartime Papers of Robert E. Lee* (New York: Bramhall House, 1961), letter 463, p. 504.
8. Coddington, pp. 5, 7–8; J. J. Bowen, *The Strategy of Robert E. Lee* (New York: Neale, 1914), p. 140; and Dowdey and Manarin, letter 497, pp. 532–3.
9. Potter, p. 36; and Fuchida, p. 50. For a further analysis of the Japanese prewar defensive doctrine and Yamamoto's role in changing it, see "A Commander's Dilemma: Admiral Yamamoto and the 'Gradual Attrition' Strategy," *Naval War College Review,* Autumn 1993, by Captain Yoji Koda of the Japanese Maritime Self-Defense Force. The reader will observe in this article both an excellent description of the defensive doctrine Yamamoto discarded and evidence of the high esteem this

leader still elicits from the Japanese, much as General Lee continues to be revered by many Americans. Captain Koda attempts to exculpate Yamamoto by saying that revising fleet doctrine was too big a job for one admiral. This author feels that the Pearl Harbor operation and subsequent ones leading to Midway demonstrated that the Imperial Japanese Navy was indeed capable of adapting to the new form of sea warfare.

10. Coddington, p. 8; Freeman, pp. 23–4; Bowen, p. 136; and Potter, p. 139.
11. Peter J. Parrish, *The American Civil War* (New York: Holms and Meier, 1975), p. 280; and Potter, p. 139.
12. Dowdey, p. 504.
13. Fuchida, pp. 64–5.
14. Potter, pp. 43–4, 179, 185; and Fuchida, pp. 59, 76.
15. Freeman, p. 19.
16. Fuchida, pp. 35–7.
17. Dowdey, p. 580. Lee admits earlier in this letter (p. 576) that he had not expected to encounter Union forces at this location or time.
18. Willmott, pp. 367–9.
19. Freeman, p. 147. Other writers, including Coddington, have deflected the blame onto others, including Robertson, one of Stuart's brigade commanders; see Coddington, pp. 182–5. Defects in scouting plagued the Japanese campaign plan at several levels, but Nagumo's scouting plan was the proximate cause for his misfortunes. See Fuchida, pp. 145–50.
20. Freeman, p. 147; and Willmott, pp. 350–1.
21. Coddington, p. 25; and Potter, pp. 139, 179.
22. Coddington, pp. 68–9.
23. The fighting spirit and mettle of the Army of Northern Virginia on the eve of the invasion of Pennsylvania was the subject of comment by several observers. Lee, as much in the emotional grip of his soldiers as they were in his, seems to have been caught up in the atmosphere of confidence. His letter of 21 May 1863 to General John B. Hood expresses this confidence despite his concerns over finding replacements for the deceased Stonewall Jackson and other leaders. See Dowdey and Manarin, letter 447, p. 490. The "victory disease" of the Japanese is well documented. More specifically, Yamamoto, for all of his respect for the overall power of the United States, also seems to have developed a kind of disdain for the fighting ability of the U.S. Navy. At the very least, he appeared to make no effort to discourage overconfidence on the part of his staff and subordinates. Fuchida repeatedly brings out this aspect of the Imperial Japanese Navy's organizational climate; see pp. 134, 170, 207, 246.
24. Some evidence for this analysis is provided by General Meade's 3:00 P.M. letter of 2 July to General Henry Halleck, general in chief of the Army, in which he states an intent to fall back to Westminster if he sees the Confederates trying to get to his rear. If Ewell had taken Culp's Hill, the Confederates would have been in a position to get to the rear of Federal positions on Cemetery Ridge and Meade might very well have elected to withdraw. Meade ends his letter by assuring Halleck that he would act with caution, which, among Union generals, generally meant withdrawing to avoid encirclement. His letter of 8:00 P.M. of the same day also betrays a degree of skittishness. U.S. War Department, *War of the Rebellion: A Compilation of the Official Records* (Washington: U.S. Govt. Print. Off., 1889), v. 27, part I, p. 72.
25. Fuchida, pp. 169–73.
26. General Ewell's performance on the first day of the battle is the subject of controversy. His detractors, including Generals Trimble and Gordon, accused him of culpable indecision. Even his supporters admit that had he been a leader of Jackson's caliber, he might have been able to organize an attack on Culp's Hill. See Coddington, pp. 318–9. Freeman's account of the events of that evening focuses on Ewell's inability to rise to the demands of the situation; see Freeman, pp. 76–8.
27. Potter, p. 123.
28. Coddington, pp. 360–1.
29. Yamamoto sent Nagumo, with his four carriers, out ahead of the "Main Body," which included seven battleships. Nagumo's carriers were being used to attack Midway and create the conditions under which the Main Body could decisively engage the remnants of the U.S. Pacific Fleet. In this stage of the battle, the carriers were being used as skirmishers or cavalry, a role subordinate to the battleship and reflecting obsolete prewar doctrine.
30. Freeman, v. 1, pp. 295–6.
31. Potter, p. 12.

32. Lee anticipated a battle with Union forces, but it did not seem to be the centerpiece of his strategy. Thus his subordinates demonstrated insufficient sense of urgency at critical times to do those things that would ensure engagement under the best possible circumstances. Lee's concept for the Gettysburg campaign had a definite opportunistic flavor that made it difficult for subordinates to grasp the significance of emerging situations. See Coddington, pp. 8–9. Yamamoto was clear about his desire to destroy the American fleet, but he and his staff were so sure that the Americans would act predictably that he placed Nagumo in a position in which that subordinate would have to make a split-second decision as to priority and risk that rightly belonged to the commander in chief himself. See Fuchida, pp. 126–7.
33. Lee's style of discretionary or conditional order writing is well documented; see Coddington, p. 192. Lee's instruction to Ewell to take Cemetery Hill "if practicable" was just another instance, and one that Ewell, already frustrated by such orders, apparently felt free to interpret as a suggestion, especially since it appeared to involve considerable risk. Additionally, Lee kept his grand designs for the campaign to himself, because he had seen his privately expressed views find their way into the newspapers. See Gen. James Longstreet, *From Manassas to Appomattox* (New York: Mallard Press, 1991), pp. 336–7. Yamamoto insisted on exercising command from the battleship *Yamato,* where, far to the rear of Nagumo's carrier forces, he steadfastly refused to break radio silence. See Fuchida, pp. 123–4; and Willmott, pp. 362, 368–9.
34. E. B. Potter, *Nimitz* (Annapolis, Md.: Naval Institute Press, 1976), p. 87.

CHAPTER TWELVE

Principles of Jointness

For all the attention that has been given to jointness among the U.S. armed forces since World War II, nobody yet has developed a comprehensive theory that underpins statute, policy, or doctrine. This is curious, since the literature on operational-art theory, a subject that most senior military officers contend is inherently joint, is quite extensive. Operational art is a clearly identified military discipline and enjoys a general agreement as to its basics. However, despite claims that modern operational art is joint in nature, nobody links it to a theory of jointness. Joint Publication 1, *Joint Warfare of the U.S. Armed Forces,* provides a list of joint principles, but these are mostly exhortatory and fall short of constituting a theory of jointness.

The reasons for this state of affairs are not hard to fathom. Roger Beaumont, in the preface to his book *Joint Military Operations: A Short History,* puts his finger on it:

> In the course of research and analysis, I also gained a sense of why jointness has rarely been treated clinically. In peacetime, the bewildering maze of operational detail, legislation, doctrine, technology, personalities, factions and formal organizations has made jointness many things to many people. Since as a subset of war, jointness in combat lies in the realm of chaos, it is no more tractable to numerical reductionism, logical formats or formulae than the arts, sculpture, or the weather. Like schools of thought in art, the intensity of partisanship on issues of jointness has sometimes approached the level of emotion held toward foes in war, for it touches closely on the critical bonding and cohesion that lie at the heart of military institutions, and their predisposition to see the world in "them-us" terms.[1]

In such a highly charged environment, it is difficult to attain the degree of objectivity necessary for the development of theory. This does not mean, however, that there is no literature on the subject. It does mean that even if some brave soul articulates valid principles, the proposals are bound to threaten somebody, and the likelihood of universal acceptance is virtually nil. Notwithstanding this state of affairs, this article will attempt a little clinical analysis and set forth some principles of jointness that could underpin the development of theory on the subject.

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A review of the literature reveals a rather fragmented approach to joint theory. Writers tend to concentrate on either the theater war-fighting aspect of jointness, or on the Washington, D.C., headquarters scene. This is not surprising, because the environments are so very different. Moreover, writers usually deal with joint principles in order to support some other issue that is the real subject of their writing. However, where the literature does attempt to address underlying factors, two basic principles seem to emerge repeatedly, either explicitly or implicitly:

- *The Complementarity Principle.* By combining the various military services into single organizations (joint force commands) we can compensate for one arm's weakness through another arm's strength. In such a manner, each arm complements the others. For example, the Air Force can provide the Army more air defense than the Army can provide itself.
- *The Dilemma Principle.* In order for an enemy to defend successfully against one arm, he must become vulnerable to another. If, for example, an enemy wanted to throw his mobile operational reserve against a U.S. Army thrust at a particular objective, he would have to move that reserve. This would make it vulnerable to attack by the Air Force. The enemy is therefore faced with an unpalatable dilemma.[2]

Together, these two principles define what synergy means in military terms. In other words, by combining the forces of two or more services, you get more effect than if you just added up their respective numbers. Joint doctrine appears to be built upon these principles, as Joint Publications 1 and 3 *(Joint Operations)* frequently prescribe achieving synergy and presenting the enemy with difficult dilemmas.

That is not the whole story, however. The preceding principles represent the desired benefits of joint operations; they do not address how jointness is to be achieved or how much is enough. A number of writers advance, in various ways, what we will call the *Hierarchy Principle,* which says that the degree of jointness (which we will loosely define here as effective cooperation between the various military services) is inversely proportional to the number of command echelons.[3] The clear implication is that flatter organizations are more apt to exhibit effective internal cooperation. This principle is firmly embedded in joint doctrine, in the form of the joint task force. JTFs have become the principal method of U.S. operational command and control in-theater—despite the risks and costs of their *ad hoc* nature—precisely because they make the operational organization flatter.

Another, somewhat related principle that arises in the literature can be termed the *Necessity Principle.* It states that greater jointness tends to be exhibited in the face of the enemy at the lower echelons of command. One writer states that "the supreme lesson of the Pacific War . . . [is] that true unity of command can be achieved only on the field

of battle."[4] The least jointness is exhibited in peacetime at the higher echelons. There is nothing particularly surprising about this principle, but it does raise an interesting point that seems to penetrate to the heart of the matter. While creative improvisation and willingness to put mission interests ahead of service political interests when engaged in battle is laudable, it should not constitute de facto military policy. In other words, instead of waiting until we are locked in combat, we would prefer to have "proactive jointness," the ability to achieve effective cooperation prior to entering a fight. However, proactive jointness is an inherently top-down policy matter in peacetime, and it is therefore inhibited by the Hierarchy Principle, since all echelons from the Joint Staff down get involved.

The literature also deals with the question of how much jointness is enough and how much is too much. There seem to be at least two principles at work here. The first is the *Cohesion Principle.* Writers almost universally state that joint arrangements that disrupt unit cohesion would negate any potential benefits of jointness by reducing morale and basic military efficiency. The command level at which jointness would disrupt cohesion is generally thought to be the upper tactical level (division, battle group, wing, Marine expeditionary force).[5] However, the historical record with regard to the Necessity Principle would seem to indicate that lower levels have successfully integrated. The "Cactus Air Force" in the World War II Solomons campaign successfully integrated squadrons from different services into a cohesive fighting group.[6]

At this point it is probably worthwhile to distinguish between synchronization and integration. There appears to be great advantage in having tactical units self-synchronize with elements from other services. However, integration, the assignment of elements of one service's forces to those of another (attachment, in joint parlance), is fraught with hazards. First, logistics can become so cumbersome that formation efficiency is reduced, despite the additive effects of the attached element. Second, depending on when the unit is attached, training (or the lack thereof) will be similarly inhibiting. Therefore, we must conclude that the applicability of the Cohesion Principle is situation dependent.

A second limiting factor on jointness is the idea of diversity. Some writers decry the potential for strategic "monism" if the services were truly unified.[7] So, the *Diversity Principle* states that competition of ideas leads to a more robust and stable strategy-development process.[8] This idea seems to have merit on several counts. First, the historical record is full of episodes in which one person or organization dominated national or theater strategy to the detriment of the parent nation's interests. The United States is a pluralistic democracy, and its strategies should be discourse based and represent the aggregate interests of the relevant stakeholders. This was illustrated when President Harry Truman relieved General Douglas MacArthur during the Korean War. Second, if jointness were incarnated by a general staff, it might acquire a strategic "tilt" that could

lead to programming decisions that would eventually paint the military into a strategic corner. Moreover, the unhappy history of the Canadian Armed Forces with true unification is universally cited as an example of too much jointness.

This is not to say that constant internecine service squabbling is to be tolerated. Congress, in passing the 1986 Goldwater-Nichols Act, clearly based its actions on the idea that competition could be accommodated only within the context of available national resources and only down to certain levels of command. In the era 1947 to 1986 the Diversity and Hierarchy Principles combined, without the moderating influence of necessity, to override decisively the Complementarity Principle. Congress finally supplied the necessity. If we have correctly discerned the existence of the Diversity and Hierarchy Principles, then logic would tell us that those are wrong who say that the military has so changed since 1986 that continuing legislative forcing functions is unnecessary.

The Cohesion Principle seems to lose relevance as we go up the chain of command, whereas the Diversity Principle loses relevance as we descend the hierarchy. In the middle, where the curves cross, exist the joint commanders in chief (CINCs) and the JTFs. At these levels a joint-force commander can choose two styles of command with regard to these two principles. He can elect to be a "coordinator," who rationalizes the possibly competing plans of his service component commanders, or an "orchestrator," who uses his staff to develop an operational plan and then issues unambiguous orders to his components. General Norman Schwarzkopf appears to have been a coordinator, letting his service components develop their plans (within the context of a general strategy) and then taking whatever minimum steps he deemed necessary to deconflict them. In contrast, General MacArthur was an orchestrator. The Inchon operation was an example of a detailed operational strategy imposed on unwilling subordinate commands.[9] A coordinator will maximize diversity and therefore unit cohesion, while an orchestrator will minimize diversity and might very well take some risks with tactical formation cohesion in the interests of tight orchestration. Both of these joint command styles have their place, and neither can be said to be inherently superior to the other. The trick is to recognize when one is more appropriate.

This leads us to the conclusion that the degree of desired jointness is situation dependent and not an absolute standard. While the principles so far discussed give us some general parameters concerning jointness, they do not offer any clear guidance on what kinds of circumstances demand various degrees of jointness. At this point we leave the realm of available literature and head into intellectual *terra incognita.* The principles I will articulate are at best speculative, but they are based as much as possible on observed facts and trends.

The Preparation Principle. A corollary to the Necessity Principle, it states that the greater the expected necessity for speed of command in an operation, the greater the required degree of proactive jointness. One of the fundamental tenets of "Joint Vision 2020" is that the future operational environment will demand increasing speed of command. This implies that much self-synchronization of lower command echelons will be required and that therefore the services should invest heavily in C4ISR interoperability down to the unit level.[10]

Networking of combat units will have a profound effect on how the Preparation, Cohesion, and Diversity Principles apply to military operations. Networked units will permit a swarming style of warfare, in which individual unit commanders will have considerable decision-making discretion within the context of a constantly updated joint commander's intent. Good joint doctrine will be critical to the success of such operations, so that aspect of preparation will be central. However, networking will allow both creativity and changes of plans on the fly, so highly structured joint training will be of less use. Since networked units will be less dependent on fixed formations for mutual support and more dependent on information sharing, the Cohesion Principle will change dramatically. There may be little need for formal attachments, and units will naturally collaborate and cooperate on the basis of the emerging common operational picture. Finally, network-enabled swarming will demand knowledge of and adherence to a basic rule set (doctrine) but will permit (and even require) considerable latitude in decision making for local commanders, so the Diversity Principle will change.

The Orchestration Principle. Joint strategies and concepts of operation that require tight orchestration should be subject to centralized joint planning and control. There may be a time and place for diverse inputs on strategy, but once decided, diversity is an evil. DESERT STORM seemed to illustrate this principle. The Marine Corps was supposed to conduct a fixing attack in the center while the Army VII Corps conducted a flanking attack that would surround and annihilate the Iraqi Republican Guards. However, General Schwarzkopf did not closely control the Marines' rate of advance, and their rapid attack forced the Iraqis into headlong retreat before the VII Corps could close the trap.[11]

The Triphibious Principle. (This principle is named in honor of Winston Churchill, who coined the term to articulate the need for officers who understood the combined action of land, sea, and air forces.) The converse of the Dilemma Principle, it holds that a joint-force commander should avoid getting into situations in which he has to risk a disaster in one warfare environment in order to avoid one in another. There are various permutations of this principle, such as "Don't get yourself into a situation in which you have to risk a disaster at sea in order to avert one on land, or vice versa." Land, sea,

air, space, and special operations, as well as information, are all warfare environments that are connected by this principle. A prime historical example is Guadalcanal, where Admiral Ernest J. King sent the Marines ashore before an adequate degree of sea and air control was attained. The result was that Admiral Frank Jack Fletcher was put in an untenable dilemma and General Alexander Vandegrift and his Marines were put at extreme risk.

The Parallel Strategies Principle. Military risk is reduced by executing multiple, simultaneous strategies (for instance, an air strategy combined with a ground or maritime strategy), to the extent that their effects are additive and do not significantly attenuate the effects or execution of each other. This is a combination of the Complementarity and Dilemma Principles writ large. Joint doctrine does not take this issue head on but leaves the door open for it, and it is the source of serious doctrinal friction between the Air Force and the other services. The Marines, for example, because they are so dependent on their aviation arm for tactical fires, are loath to chop their air assets to the Joint Force Air Component Commander (JFACC), because losses in a precursor air campaign may hamstring subsequent amphibious or ground maneuver operations. Joint-force commanders must have the authority, objectivity, and guts to decide on a principal operational strategy, but also the vision (based on education in strategy and operations) to see the benefits and hazards of a multipronged strategy.

There are two issues that have not been addressed by any of the principles articulated so far. The first is micromanagement. There are those who contend that increasing connectivity and flatter organizations will lead to centralized control. There does not appear to be any principle governing this matter that can be deduced from either the literature or the historical record. Abraham Lincoln tried to micromanage his armies at various points with a telegraph and pony express, whereas President George Bush left Schwarzkopf in a guidance vacuum during cease-fire talks in the desert, despite the availability of satellite phones, faxes, and numerous other means of instant communications. This seems to be a matter governed by personalities and not at all amenable to simple rules.

The second matter that has not been broached is who should hold joint command. This issue is currently governed by the quasi-principle that the commander of a joint force should be from the service that supplies the preponderance of forces.[12] There is some sense to this, but on the other hand, it does not necessarily guarantee the fittest person gains command. There is the concern that an officer from one service cannot be trusted to make strategic decisions concerning the core fighting capability of another service's main forces. The Navy, for example, refused to assign any fast carriers to General MacArthur in World War II, assuming that an Army officer would not be able to make

hard decisions competently about risking these scarce strategic assets. Most recently, the Army assigned a three-star general to the command of a relatively small helicopter detachment in Albania in order to ensure the Air Force JFACC would not "misuse" the helicopters.

The answer to these problems does not appear to lie in principles or rules of thumb. It does seem to lie, in this writer's opinion, in the existence of robust joint institutions. Joint Forces Command, as the joint-force trainer and integrator, and National Defense University, through its component schools and think tanks, should be centers of excellence that develop joint operational theory and doctrine. This system would refine officer joint education and training to the point that all officers eligible for joint command would be adequately prepared and the "preponderance of forces" policy would suffice. Conversely, if joint officer development reached a sufficiently sophisticated level, individual capabilities and personality, not the color of uniform, could be the deciding factor in picking a joint commander.[13] In such an environment, where higher echelons had great confidence in local commanders, counterproductive micromanagement would be less likely.

Having gone through the exercise of distilling prospective joint principles, can we see any utility in them? Would the existence of an accepted joint theory make a difference in how the armed forces operate? I think the answer is yes. For one thing, the articulation of theory provides us with a common set of terms through which we can communicate complex ideas. Who would argue the utility of Clausewitz's "center of gravity" or "culminating point"? No common set of terms settles all arguments, but at least we would move closer to knowing what we are really arguing about. Second, theory begets theory. If we can take the first step toward a clinical examination of jointness, it likely will stimulate further work. Progressive theoretical work might help prevent reinvention of the same wheels by successive generations of officers. The rather cyclic nature of attempts at jointness, reflected in part by the Necessity Principle, would be disrupted, and actual progress would be achieved.

Notes

1. Roger A. Beaumont, *Joint Military Operations: A Short History* (Westport, Conn.: Greenwood, 1993), p. xv.
2. Robert Leonhard, *The Art of Maneuver* (Novato, Calif.: Presidio, 1991), pp. 92–93.
3. C. P. Ankersen, "A Little Bit Joint: Component Commands: Seams, Not Synergy," *Joint Force Quarterly* (Spring 1998), p. 92.
4. Louis Morton, "Pacific Command: A Study in Interservice Relations," in *Harmon Memorial Lectures in Military History, 1957–1987* (Washington, D.C.: Office of Air Force History, 1988), p. 152.
5. See, for example, Thomas C. Linn, "The Cutting Edge of Unified Actions," *Joint Force Quarterly* (Winter 1993/94), p. 39.

6. James A. Winnefeld and Dana J. Johnson, *Joint Air Operations* (Annapolis, Md.: Naval Institute Press, 1993), pp. 23–38.
7. Mackubin T. Owens, "The Use and Abuse of Jointness," *Marine Corps Gazette* (November, 1997). Owens casts the argument in terms of integration versus unification and comes out, on the basis of historical analysis, on the side of integration.
8. An example of numerous student papers that discuss the subject of unification of the services and the effects and benefits of organizational competition is Lt. Col. Dennis W. Tighe, "Unification of Forces: The Road to Jointness" (School of Advanced Military Studies, Fort Leavenworth, Kans., 1991).
9. Maj. Jerry McElwee, USA, "Principles for Organization of Joint and Combined Staffs" (Fort Leavenworth, Kans., 1986). McElwee cites the following principles that MacArthur used to organize his commands and staffs: complete integration of ground, air, and naval forces; close personal relationships; close physical location; and frequent coordination between combined and component staffs.
10. C4ISR: Command, control, communications, computers, intelligence, surveillance, and reconnaissance.
11. Michael R. Gordon and Gen. Bernard E. Trainor, *The Generals' War* (Boston: Little, Brown, 1995), pp. 472–73.
12. Actually, joint doctrine addresses this principle explicitly with regard only to functional component commanders and multinational force commanders. See U.S. Defense Dept., *Unified Action Armed Forces,* Joint Publication 0-2 (Washington, D.C.: Joint Staff, 2001).
13. A variation on this theme is that the nature of the task should determine the service of a JTF commander. Linn, "Cutting Edge of Unified Actions," pp. 34–35.

CHAPTER THIRTEEN

Slicing the Onion Differently
Seapower and the Levels of War

Significantly, this strategy requires new ways of thinking—about both empowering individual commanders and understanding the net effects of dispersed operations.

A COOPERATIVE STRATEGY FOR 21ST-CENTURY SEAPOWER[1]

For most of history, generals and admirals have talked about the process of war in terms of strategy and tactics. However, in its 1982 Field Manual 100-5, *Operations,* the U.S. Army inserted an intermediate level between strategy and tactics that it called the "operational level." Subsequently, military officers and scholars have devoted considerable effort to defining and developing the different levels of war, especially the operational level. Although first institutionalized by the Army, the levels of war were eventually embedded in joint doctrine. However, the notion of an operational level of war and its attendant set of terms, principles, and concepts has not gained purchase within the U.S. Navy until recently, despite being taught and touted by its own war college. Even now, most naval officers, including many admirals, are either unfamiliar or uncomfortable with the idea, despite giving it considerable lip service. Although this could be dismissed as parochialism, there are deeper and more pragmatic reasons for the Navy's institutional discomfort with the operational level of war that will be addressed in this article. Understanding these reasons will lead to the articulation of a new way to look at the relationship between levels of war—a different way to slice the onion.

The Problem of Command

Napoleon, it is said, was unbeatable when he could see the whole battlefield and personally direct the action. However, he did not do so well when he had to rely on his subordinate generals to exercise independent command.[2] Either they were incompetent, or Napoleon lacked understanding of what we now call the operational art. The growth

in size of armies in the 19th century and the industrialization of warfare, including railroads, meant that no general could exercise personal command of a whole army. This was clearly illustrated in the U.S. Civil War when General Ulysses S. Grant coordinated the movements of several widely separated armies toward a common goal. By World War II, millions of men comprised the Red Army that drove back the vaunted German *Wehrmacht* in 1944 and 1945. The Soviets, in order to keep coherence across this massive force, developed the notion of operational art, which referred to the principles and concepts needed to link a set of tactical actions to a goal that was itself part of a larger scheme. Armed with this doctrine, subordinate commanders and their staffs could plan and execute even large and progressive operations in a way that was congruent with overall strategy. The commander in chief did not have to be there in person.

Until World War II, navies did not have the problem of trying to closely coordinate the actions of widely separated fleets. It was not that there were no scattered fleets; it was just that the nature of the problem at sea was different than on land. If one navy concentrated its power into a main fleet, the contending navy had to follow suit or risk defeat in detail. The mobility of ships made this a central issue. Therefore, large naval battles, when they occurred, were concentrated in space and time such that the admiral in charge was there in person. The key command problem was tactical: how to find the enemy and then how to coordinate the movements of individual ships or squadrons such that maximum firepower could be brought to bear. The big battles were over in a few hours, and they generally had significant strategic effects. Thus, naval officers thought in terms of strategy and tactics.

World War II forced a change in practice, if not in terminology. The adoption of a progressive island-hopping strategy through the Mandated Islands with concurrent support to General Douglas MacArthur's converging drive along the north coast of New Guinea meant that the actions of separate, powerful fleets had to be coordinated. Upon arrival in Pearl Harbor in December 1941, Admiral Chester Nimitz, Commander in Chief, Pacific Ocean Areas, elected to command from ashore in Hawaii, allowing subordinate admirals such as Raymond Spruance and William Halsey to plan and execute the individual operations that constituted the Central Pacific campaign, each of which might involve multiple tactical engagements or battles. Although not articulated as such, the Navy had to develop its own version of the Soviet operational art. However, after the war—and notwithstanding several dramatic operational-level actions in the Korean War such as the Inchon invasion and the rescue of Army and Marine forces in North Korea—with no enemy fleet in sight but pressured by the advent of nuclear weapons, the Navy promptly reverted to the traditional strategy and tactics framework. Individual battlegroups each centered on an aircraft carrier became the strategic chess pieces that the fleet commanders moved around.

The strategy/tactics framework sufficed for the Navy until the 1991 Gulf War. In that conflict, the Service discovered that the lack of any theory or doctrine connected with a progressive and sustained air campaign, a form of operational art, put it in a subordinate position to the Air Force, which did have such doctrine. After the war, the Navy embarked upon an effort to achieve its own operational-level command and control capability by trying to mirror the Air Force's Joint Force Air Component Commander (JFACC) command structure—at sea. This effort ultimately failed in part because the Navy attempted to shoehorn a highly complex operations center into a space-limited ship and superimpose it on existing tactical staffs. However, a key reason it did not work out was that the Navy did not have any existing operational-level theory or doctrine that would have established the need for such a command element.

The command problem for the Navy in the 1990s became one of protecting its warfighting equities in an increasingly developed joint command environment that was based substantially on Army structure, process, and doctrine. In the wake of the Soviet Union's demise, the Navy again found itself without a seagoing rival. In order to establish its continuing relevance in new terms, it issued a white paper entitled . . . *From the Sea* in which it acknowledged the absence of a threat to its command of the seas and committed itself to supporting joint warfighting in the littorals. Over the next few years, several successor documents were issued to refine the Navy's utility argument, but each retained the fundamental argument that its mission was power projection.[3] This argument ended up presenting the Navy with a new command problem in the first decade of the 21st century. Prior to . . . *From the Sea,* the world ocean was divided into two massive areas of responsibility (AORs), U.S. Pacific Command and U.S. Atlantic Command. The two "fleet commanders in chief" owned virtually all naval forces, which moved fluidly (as it were) around the world operating "in support" of the land-oriented joint commanders (although substantial forces were transferred on a rotating basis to the Mediterranean under U.S. European Command). After the Navy issued . . . *From the Sea,* each successive Unified Command Plan (UCP), the document that spells out the joint command structure, expanded the AOR boundaries of the land commanders into the oceans. Now, U.S. Southern Command, a traditionally Army-centric command, owns the Caribbean and large swaths of the Atlantic and Pacific. U.S. Central Command owns the Indian Ocean north and west of Diego Garcia, and U.S. Africa Command owns the seas around much of Africa.

In the new joint command arrangements, each unified commander has his own naval component, a numbered fleet that exercises command in the AOR in a way very similar to the ground and air components. In joint theory, these components represent the lower echelon of the operational level, with the joint task force commander being in

the heart of it and the unified combatant commander (COCOM) being at the "theater-strategic level"—the levels-of-war onion being sliced rather thin by now.

For the world of the 1990s, this set of command arrangements worked adequately despite being occasionally awkward for mobile naval forces and despite various spats between the Air Force and Navy over where the maritime commander's airspace ended and that of the JFACC began. Naval forces were essentially a "sea base" that contributed air sorties, gunfire, and other support to forces ashore. Moreover, even in the peacetime naval diplomacy role, the pattern of naval operations was a function of the COCOM's security cooperation plan. The world as seen from the perspective of the UCP is simply a collection of individual and autonomous AORs.

In the wake of the 9/11 attacks, the whole architecture of the UCP started to become obsolete, especially for the Navy. The possibility of terrorists smuggling nuclear weapons or other dangerous things into the homeland by sea posed a new kind of security threat, one that neither the Navy nor the Coast Guard was prepared to deal with. As the nature of the problem and its potential solution began to emerge, it started to dawn on admirals that a new approach to command and control was necessary. Maritime security and its component function, maritime domain awareness (MDA), require the utmost in fleet dispersal in order to catalyze a global maritime security partnership. MDA—the collaborative sharing of information about who is doing what on the seas and where—requires centralized fusion of information to see tips and patterns from terrorist organizations that are not constrained by American AOR boundaries. The need is for information to flow freely among naval forces and headquarters around the world, unfettered or distorted by the existing structure of joint command authorities and UCP dividing lines. The Navy's answer to this problem has been the establishment of a network of interconnected maritime operations centers (MOCs), one in each of the numbered fleet headquarters. While not exactly violating the existing provisions of U.S. statute or the UCP, the networking of the MOCs to rapidly share information is the leading edge of an emerging process of globalizing naval command and control that eventually will yield a structure that does not conform to the Army-defined levels of war.

The MOCs are one response to the global terrorist problem, but they are not the only one. As mentioned previously, achieving global maritime security requires the utmost in dispersion of naval forces. However, the Navy is not structured to do this effectively. Its fleet of around 280 ships consists primarily of high-end combat units centered on nuclear aircraft carriers and large amphibious ships. It currently has few ships that are suitable for constabulary work or supporting engagement with the many small navies of African, Caribbean, Middle Eastern, and Southeast Asian countries. With such limited assets, the Navy cannot afford to respond fully to the demands levied by each regional numbered fleet or the COCOMs. The Navy has decided it needs some way of figuring

out, from a global perspective, where to place its limited resources for the most effect. It therefore created the Global Engagement Strategy Division within the Navy Headquarters staff in the Pentagon. Having no direct command authority, it is charged nonetheless with advising the Chief of Naval Operations (CNO) on how to make the case for depriving some AORs of forces and attention while loading up others—in other words, devising a strategy for placing the Navy's limited chips where they count the most from a global perspective. Here again, there are no violations of existing law or joint regulations, but the CNO is now getting more involved in how Navy forces are distributed.

A third Navy command and control response to the changed strategic environment is the standup of U.S. Tenth Fleet, the Navy component of U.S. Cyber Command (which itself is a subunified command of U.S. Strategic Command). U.S. Strategic Command has global functional responsibilities, so Tenth Fleet is global within the context of the existing UCP. However, much remains to be worked out as to how Tenth Fleet relates to the rest of the numbered fleets and their MOCs. Tenth Fleet has recently assumed authority over the Navy Information Operations Command, allowing it to coordinate information operations that will be needed to cover the movement of forces during crisis or war. In an age of satellites, the Internet, cell phones, and significant ocean instrumentation, naval operational deception will no longer be a local tactical matter. It will require a globe-girdling effort of exquisite timing and comprehensiveness to allow ships and fleets to show up somewhere by surprise. This can only be achieved through a tightly coordinated effort among all the MOCs and the Navy Staff in the Pentagon. Tenth Fleet's MOC will be the logical coordination point.

Perspective

The Navy's responses to the command and control problems it faces point toward a different way of looking at the relationships among forces and commanders. In each case, the Navy is attempting to match planning and execution authority with the perspective needed to ensure those plans and orders are coherent at the proper level; and in each case, the Navy has found that the existing joint command structure is either inappropriate or incomplete. That command structure, and the attendant levels-of-war framework upon which it is based, is inherently regional and land-oriented. What is missing is an effective global and maritime perspective.

For the Navy, and perhaps also for the Air Force, a framework that makes more sense in terms of matching command arrangements with environment and mission can be described simply as global, regional, and local. Unlike the existing levels of war (tactical, operational, and strategic), in this framework the military skill sets of strategy and tactics—and, yes, the operational art—could inhabit each level of command, depending on the nature of the specific missions and functions that are needed. By divorcing the

separate intellectual skill sets of tactics, operational art, and strategy from command level, we would empower Sailors, to use a trite phrase, to think globally and act locally. Moreover, if the military skill sets were refined within this framework, there would be less likelihood of destructive micromanagement from above, of the operational tail wagging the strategic dog, and of "loose cannon" activities at the tactical level.

The proposed framework is anchored at the global level. The Navy has good reasons for needing a global perspective embedded in its planning and decision-making process, operational as well as administrative. The first and perhaps most fundamental reason is that seapower can be neither understood properly nor applied properly except from a global perspective. Most naval theorists have missed this point. A true maritime strategy is based on the ocean and is oriented on movement. Leveraging the geographic fact that the seas are all connected, it seeks to gain and maintain the global exterior position in order to provide sanctuary for the Nation's trading economy, maintain credible contact with allies and create strategic options, and hem in opponents. The pursuance of such a strategy might result in regional or local operations (such as invasions) but must be coordinated from a global perspective. One reason for having a maritime headquarters with a global perspective is that because the global system is so tightly coupled, perturbations propagate rapidly and globally and can emanate from disruptions that are of natural or human origin. Planning for and reacting to such disruptions must be based on a global perspective and can best be coordinated from Washington, where, not coincidentally, most of the personnel from other executive branch departments, headquarters of nongovernmental organizations, and embassies of other countries are located.

In 2003, the Navy and U.S. Joint Forces Command ran a war game entitled Unified Course 04 in which conflicts erupted in several different regions of the world nearly simultaneously. Each region's game cell was led by an admiral. By the end of the game, a strong consensus emerged that since events in widely separated theaters seemed to be coupled in various ways, some sort of "global operational art" was needed for a number of reasons, including making sure the logistics of one theater did not disrupt the logistics in another. Moreover, in the Internet age, ad hoc allies scattered around the globe can form up and coordinate their efforts if their common foe is the United States. Without commensurate operational coordination among theaters, the U.S. military risks being outmaneuvered. In lieu of the Joint Staff acting as a general staff, such a military skill is orphaned, with no staff having the perspective or incentive to develop it. In World War II, Admiral Ernest King and his staff, with King functioning as Commander in Chief, U.S. Fleet, as well as CNO, provided the Navy with the global operational perspective needed to rationalize Atlantic, Pacific, Mediterranean, and Indian Ocean projects. Currently, the UCP offers no such mechanism. The issue here is that the

global level is not necessarily strategic; an operational art perspective is needed at times, mostly for naval, air, cyber, and space operations.

There are clearly times and places where the local perspective is the key to effective military decision-making. The sea Services have a long tradition of decentralized command and control, and this corporate culture will continue to serve them well. However, naval weapons, both offensive and defensive, and sensors have attained such range and capability that in many cases, local perspective is no longer competent to control them. It has been a long time since a naval officer in tactical command has had targeting authority over his land attack missiles or aircraft, and as the Standard Missile achieves over-the-horizon aircraft intercept capability, it is likely that the JFACC will have the call on some defensive shots. Because our arsenal of missiles is limited, including those for ballistic missile defense, a headquarters with regional perspective will have to make decisions on the positioning of forces and establishing doctrine for making actual use of these weapons. The necessity for regional perspective is a way of establishing who should have what authorities over what weapons and sensors. Given the culture of delegation in the Navy, allowing the matter to be defined as centralization versus decentralization will unnecessarily abet conservatism and generate tensions. As the Navy establishes the MOC as its key regional command center, using the needed geographic perspective as the litmus test for whether it should have certain command authorities will help ensure its ultimate success.

New Principles

As with the introduction of the operational level of war in 1982, adoption of this framework will necessarily be attended by a gestation period in which the war and staff colleges and perhaps academia in general digest the concept, test it in games, and generate doctrine. However, it seems possible at this point to identify some principles a priori that fall out logically from the inherent nature of the new framework.

The first principle is the most basic: define the security problem from all perspectives. Defining the problem is a preliminary step in the military decision-making process that has found currency in the U.S. Army in the past few years.[4] Performed prior to the mission analysis step, it makes the whole process more intellectual and less mechanical. In terms of the new framework proposed here, defining a problem separately from the global, regional, and local perspectives helps to illuminate what measures of coordination will be necessary and where various command authorities ought to reside.

A second principle is that strategy is not a level of war or even a command echelon, but a thought process that links specific actions, military or otherwise, to political and economic goals. This makes strategy an intellectual skill set that, combined with defined

command authorities, might be applied at each of the levels of command. For years, the military literature has been full of assertions that the levels of war have been fusing into each other and of observations about "strategic corporals."[5] However, the traditional levels-of-war framework does not accommodate such an evolution comfortably. Establishing a framework based on command perspective, and regarding strategy, operations, and tactics as skill sets to be applied as needed at each level, would accommodate these phenomena quite naturally.

Regarding strategy as a skill set versus command echelon or level of war might also improve the oversight of military operations. Two Army authors argue that the elaboration of the original Soviet concept of operational art into a level of war and echelon of command has driven a wedge between civilian political authorities and commanders in the field. Politicians, they say, have become detached strategic sponsors rather than effective strategic overseers of operations.[6] If perspective rather than levels of war became our organizing principle, and there existed a military staff in Washington with operational authority, the coordination of politics and operations would be much more effective. Moreover, since strategy would be a skill set that inhabited each level, based on perspective, the appropriate influence of political and economic guidance from the capital would be clearer, with issues of micromanagement or neglect becoming moot.[7]

The issue of strategy as a skill set leads to a third principle. Command authority should not be a comprehensive or blanket tool; it is multifaceted and should be delegated in specific segments to the command with the appropriate perspective for exercising it. This kind of thing has already happened. Navy battlegroup commanders no longer have targeting authority over the land attack missiles their ships carry; that resides with higher authority—commanders with the requisite perspective on the effects those weapons are to produce or on the coordination of their employment with other means from other Services. Instead of echeloning command as is currently done, it would be distributed. Moreover, specific command authorities would not be static; they would migrate among the command levels as the situation unfolds. Whereas the local commander might initially have the authority to strike certain types of targets, emerging intelligence may indicate that such authority should be moved to either the regional or global level, at least for a time. Authorities could as easily migrate downward. For those used to the rigid command structure that has been in place since Napoleon's day, this may seem a recipe for chaos. However, what we have observed at the tactical level in wars from Vietnam through Afghanistan is that an echeloned command structure is not capable of rapidly integrating strategy and operations, thus allowing events to spin out of control. At the end of the "100-hour war" in 1991, the George H. W. Bush administration failed to exert sufficient oversight of General Norman Schwarzkopf (who, despite having four stars, was a local commander in that fight), and the Iraqis were

allowed to fly their helicopters, thus keeping Saddam Hussein in power. In 2003, Army ground commanders removed key command elements from Baghdad at precisely the moment their presence could have been most helpful in averting an insurgency. While echeloning of command is necessary for the effective functioning of ground forces at the corps level and below, the presence of a global/regional/local framework might have distributed command authorities in these cases such that the strategic errors could have been avoided.

A fourth principle prescribes that speed of coordination trumps speed of command. Since Air Force Colonel John Boyd articulated his theory of the "observe-orient-decide-act loop,"[8] military theorists have almost universally extolled the virtues of what some call "speed of command," that is, the ability of a commander and staff to make and implement decisions faster than the enemy. This is clearly a benefit when the issue is solely kinetic combat, but in an age in which fewer military actions are purely or even mostly kinetic and the need for interagency and international coordination is also universally cited, it is more likely that kinetic speed of command will produce harmful strategic side effects that outweigh the tactical or operational benefits. If coordination is indeed key, then the faster it can be done, the less it will adversely affect speed of command. A command framework that has at its core a global operations center that is collocated with the headquarters of the other government agencies as well as foreign embassies, and has as its intellectual fabric the integration of strategy, operations, and tactics at each command level, is far better positioned to achieve speed of coordination.

A final preliminary principle is that the U.S. Government should act in a unified manner. Given the size of the executive branch and its multiplicity of organizations that could have both a stake in and influence on any modern military operation, the government as a whole must be convinced to lend support and to coordinate with the military. This idea was manifested in a speech by Admiral Mike Mullen, then Chairman of the Joint Chiefs of Staff, when he said that no military operation ought to be undertaken unless and until the whole government is ready.[9] The framework advocated in this article would make it easier and faster for a proposed operation to be articulated in a way that would be more intelligible and persuasive to organizations not imbued with a military culture or educated in military matters. The need for military action must be sold, but under the current levels-of-war structure, the military is isolated and its imperatives and reasoning are opaque to other organizations. Defining problems from the different command perspectives and integrating strategy at each level could greatly enhance communication and thus aid the vetting process.

There are undoubtedly more principles that can be defined, but these five serve to provide a better view of what the proposed framework really is and how it would work.

However, these principles, if pragmatic, are still abstract. If the framework is to be adopted in practice, a specific new command structure would have to be created.

Fixing the Problem

There are several ways the problem might be solved or ameliorated. The most radical solution is to do away with the geographic combatant commanders (GCCs). Over the past few years, a number of people, including Admiral Mullen, have expressed concern that American diplomacy has become too militarized.[10] One way of counteracting this perception, if not fact, is to disestablish the GCC position. Much of the staff structure would remain in place, but instead of a four-star military officer, the person heading the staff would be a senior State Department officer. There would be a number of three-star officers on the staff who would maintain the necessary regional military infrastructure. The mission of this newly reorganized "regional engagement staff" would focus on diplomacy. There would not be AOR boundaries in the current sense, but rather perhaps delineations that correspond to current State Department assignments. There would also be a standing joint task force headquarters in each region to handle any contingencies that might arise. These joint task force headquarters, as well as the regional Service component headquarters, would report to a central military coordinating staff in Washington, thus establishing a joint staff with a global perspective and global authority, located in a place where close coordination with the National Security Council as well as a host of other agencies is most feasible. If current operational-level doctrine has produced a disconnect between strategy and operations, then such an arrangement would facilitate appropriate strategic oversight of military operations.

On the other hand, major surgery on the UCP may be politically infeasible. How could all of this be squared with the existing joint command and control system? One way would be to focus on the status of naval forces. Resurrecting the doctrine of operating "in support" and having the Pacific Fleet and Fleet Forces staffs function as the principal maritime operations centers for each hemisphere would be one way to reestablish fleet mobility in peacetime execution of the *Cooperative Strategy for 21st Century Seapower*. If a fight did break out in Korea or the Persian Gulf, a joint task force could be established and, per existing joint doctrine, the local numbered fleet would take over Joint Force Maritime Component Commander duties for the joint operations area.

Although the Navy, in its attempt to generate a global command perspective, is applying the various band-aid fixes that have been described in this article, a more comprehensive solution is needed in order to ensure a global command perspective is available when needed. Assuming that the reestablishment of Admiral Ernest King–like authorities for the CNO is no more politically feasible than eradicating current AOR boundaries, a new approach is called for. One possibility is to create a naval deputy to

the Secretary of Defense who has defined authorities to direct intertheater movements and certain operations of naval forces. The advantage of such an arrangement is that this officer would be located in Washington, close to the other cabinet departments and the Pentagon's communications capabilities. An alternate solution might be to invest such authorities in the existing Navy component to U.S. Strategic Command, although the range of responsibilities and authorities would not be exactly compatible with those of the unified commander. Moreover, it adds a layer of command between the global naval commander and the national command authorities. In any case, the emerging global strategic environment cries out for an updated U.S. military command structure that can provide a global perspective to local operations and can conceive of and execute strategic maritime maneuver.

For armies, the three levels of war are not abstract constructions, but a command echeloning framework that emerged quite naturally as a function of the scale of operations enabled by industrialized warfare. However, this framework does not apply equally naturally to naval operations. In an era when naval operations were almost entirely auxiliary to land operations, the inconveniences were tolerable. In an era of global transnational threats, the Internet, and an emerging global competitor, the inconveniences are turning into operational and strategic vulnerabilities. The world has entered an era in which the seas are more than just extended communications zones between a land operation in Eurasia and the continental United States; they have attained strategic significance in and of themselves. Among other things, they are now a vast strategic and operational maneuver space, not only for us, but also increasingly for nations and groups hostile to the United States and to the global system of commerce and security that perpetuates our economic well-being and political values. If we are to avoid being outmaneuvered, we must overcome the maritime seams our former strategic success has created. Slicing the onion differently in terms of maritime command arrangements will help.

Notes

1. U.S. Navy, *A Cooperative Strategy for 21st Century Seapower,* October 2007, available at www.navy.mil/.
2. John Prados, "Napoleon Bonaparte," in *The Reader's Companion to Military History,* ed. Robert Cowley and Geoffrey Parker (New York: Houghton Mifflin & Co., 1996), 322.
3. There are three principal documents that were progressively issued during the 1990s: . . . *From the Sea* (September 1992), available at www.globalsecurity.org/; *Forward . . . From the Sea* (1994), available at www.dtic.mil/; and *Forward . . . From the Sea, the Navy Operational Concept,* March 1997, available at www.navy.mil/.
4. U.S. Army, TRADOC Pamphlet 525-5-500, "Commander's Appreciation and Campaign Design," January 28, 2008, page 5, paragraph e, concisely states the logic of the issue. Section 1-3 goes into detail on defining problems.

5. See for example, Douglas Macgregor, "Future Battle: Merging the Levels of War," *Parameters* (Winter 1992/1993), 33–47; Elaine M. Grossman, "Developing Adaptive Army Leaders: 10 Questions for Don Vandergriff," *Inside the Pentagon,* March 15, 2007; Charles C. Krulak, "The Strategic Corporal: Leadership in the Three Block War," *Marines Magazine* (January 1999).
6. Justin Kelly and Mike Brennan, *Alien: How the Operational Art Devoured Strategy* (Carlisle, PA: Strategic Studies Institute, 2010), 93.
7. Carl von Clausewitz, *On War,* ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 177. Clausewitz has some pithy remarks concerning the coordination of strategy and operations that are apropos of the difficulties cited by Kelly and Brennan.
8. Boyd never wrote a book on his theories. For a detailed analysis of his ideas, see Frans Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (London: Routledge, Taylor and Francis Group, 2007).
9. "In fact, I would argue that in the future struggles of the asymmetric counterinsurgent variety, we ought to make it a precondition of committing our troops, that we will do so only if and when the other instruments of national power are ready to engage as well." Admiral Michael G. Mullen, speech at Kansas State University, March 3, 2011, available at www.cfr.org/.
10. Max Hastings, "Heroism Is No Substitute for an Afghan Strategy," *Financial Times,* December 20, 2010.

CHAPTER FOURTEEN

Getting a Grip on Tailored Deterrence
The World of Conflict Management

The end of the Cold War brought about a lengthy hiatus in the national and international dialogue on deterrence. A concept that once seemed pivotal to the very survival of the human race, deterrence appeared to rest upon the rather narrow foundation of nuclear weapons, a perception only reinforced by the rapid disappearance of deterrence from the national agenda after the fall of the Soviet Union. Recently, however, deterrence has resurfaced as a subject of discussion and concern in the wake of the 9/11 attacks, further nuclear proliferation and the increasing dependence of the world on computer systems linked by the Internet.

The 2006 Quadrennial Defense Review (QDR) introduced a broadened notion of the concept it labeled *tailored deterrence:* "The future force will provide a fully balanced, tailored capability to deter both state and non-state threats—including WMD employment, terrorist attacks in the physical and information domains, and opportunistic aggression—while assuring allies and dissuading potential competitors."[1] The very broadness of this approach to deterrence has spurred a new round of discussion in policy and academic circles on the modern nature and limits of deterrence.

Extending the notion of deterrence beyond its more traditional arena of nuclear weapons quickly invokes difficult—if not intractable—issues surrounding who and what might be the method's new targets. The 2010 QDR continues its 2006 counterpart's discussion of tailored deterrence in this vein: "Credibly underwriting U.S. defense commitments will demand tailored approaches to deterrence. Such tailoring requires an in-depth understanding of the capabilities, values, intent, and decision making of potential adversaries, whether they are individuals, networks, or states."[2] The 2006 Deterrence Operations Joint Operating Concept (DO JOC) adopts the same approach in its central idea for mechanizing deterrence: Deterrence operations are dependent on the ability

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of the joint force to manage perceptions and act directly and discriminately through multiple domains on the decision-making calculus of adversaries.[3]

An interesting recent example of an attempt at very tailored deterrence, albeit directed at the United States, is China's development of the DF-21D intermediate range ballistic missile with an anti-ship homing device installed. China's specific goal is to dissuade U.S. intervention in a crisis involving Taiwan.[4] The humiliation China felt after the 1996 Taiwan Straits crisis, when the United States dispatched two carrier battle groups to the area, spawned a general naval buildup. However, realizing that it would be decades, if ever, before the Chinese People's Liberation Army Navy (PLAN) could expect to face down the U.S. Navy, they sought an asymmetric and focused deterrent option. The DF-21D seems to fit the bill—the presumed effect being to alter the U.S. risk/benefit analysis to deter intervention entirely, or at least to keep U.S. aircraft carriers far enough away from a putative Taiwan invasion effort that their tactical aircraft would not be able to make a difference. While broadly worded, the following quotation from the most recent Chinese defense white paper clearly conveys their intent: "Following the principle of building a lean and effective force, the PLA Second Artillery Force (PLASAF) strives to push forward its modernization and improve its capabilities in rapid reaction, penetration, precision strike, damage infliction, protection, and survivability, while steadily enhancing its capabilities in strategic deterrence and defensive operations."[5] Not surprisingly, the U.S. Navy is hard at work finding ways to neutralize or work around this threat, which ought to provide insight on the effect of our own attempted efforts to focus, or tailor, deterrence.

Approaches to Deterrence

There are two potential intellectual approaches to understanding deterrence. The first, as exemplified by the QDRs and DO JOC, is to focus on the opponent and ask what levers might exist to influence their actions. This would be especially important for the examination of tailored deterrence, since it deals with preventing an opponent from taking fairly specific actions.[6] At the heart of this approach is manipulation, and while history records some successful episodes (an example is the infamous "Mr. X" episode prior to D Day in World War II, in which a dead body carrying false plans for the invasion washed ashore in Spain and caused Hitler to delay the movement of his reaction forces toward Normandy until it was too late), it is problematic on several counts. First, there is the issue of complexity at the strategic level. Understanding the dynamics of decision making within the inner councils of a government requires "exquisite" intelligence of a form that is rarely available and, in any case, there is still the problem of unpredictability in governments that are less than stolidly doctrinal in their functioning.

The second difficulty with the focus on opponents is the epistemic one of proving and predicting a negative. The matter of retrospective proof is important because the absence of any conclusive evidence from historical cases makes the future-oriented process of deterrence planning a faith-based proposition. On the other hand, common sense might convince us that it is easier to keep someone from doing something than it is getting them to act. However, this is at least partly illusory. While it is likely true that overall strength and credible intent will serve to raise the risks and deter someone whose motivation is not especially strong, trying to get specific with deterrence could easily result in miscalculation. The more specific the intended deterrence, the more it starts to look like an attempt to catalyze second or third order events; always a risky undertaking.

There is a second intellectual approach to understanding deterrence, one that, while neither a panacea nor a key to unlocking the puzzle, at least avoids some of the difficulties associated with the first approach. This second approach focuses on the context of deterrence, examining the logic of situations and the incentives and opportunities for action and inaction. Here, the prospects for deterrence depend less on an exquisite understanding of the other side's intent (although this is always good to know if one can obtain such intelligence), than on an understanding of one's own situation and the inherent logic of conflict. This article will explore the second approach to understanding deterrence, defining it as a subset of conflict management strategy.

As normally used in the existing international relations literature, "conflict management" denotes a form of bargaining or mediation among nations or other parties to a dispute, analogous to the use of the term in labor relations and organizational dynamics. In contrast, the term is used in this article to denote the intent of a state or group and the methods it uses to limit, channel or otherwise control the intensity and nature of violence associated with a conflict when the prospects for dispute resolution on favorable terms have disappeared. A conflict management strategy in this context is a defensive holding action. It will be established that such a strategic defensive holding action may occur either right after a war, in times of tension or crisis, or even in times of what might be termed "violent peace" such as exist today.

Defining deterrence as a component of conflict management strategy first requires an examination of the broader context of conflict, because conflict management strategies are themselves components of an overall approach to dealing with conflict. For the purpose of this article, conflict means the range of measures a state, alliance, armed group, etc., takes to resolve a dispute in its favor. Viewed through this lens, conflict encompasses everything from antagonistic negotiations to nuclear war. At first glance, this definition may seem to be so broad as to be useless for analytic purposes, but it is its very holistic nature that produces the necessary insights. Looked at in this way, conflict

is a single continuum; terrorism is essentially the same thing as nuclear war. Such an approach is necessary to establish whether a concept like tailored deterrence is viable and advisable.

If one accepts this "unified field theory" of conflict, then it follows that notions such as "fourth generation war," conventional war, insurgency and "hybrid war" deal solely with means and have no useful meaning with respect to the intent and dynamics of conflict, the elements relevant to the study of deterrence. These appellations of different modes of warfare constitute thick intellectual underbrush that must be cleared away in order to observe the trees of strategy, much less the forest. Moreover, in the literature concerning all these concepts there is frequently embedded the notion that there is a particular "recipe" for conducting war or conflict in a particular mode. This is an effect of dealing with means rather than motivation and intent. While the matter of means will enter into this discussion, it will always be subordinate to the factors of human intent and motivation.

Disputes

Disputes are the engine of conflict, and before conflict as well as strategies for pursuing it can be adequately characterized, there must be a framework for understanding disputes. To build such a framework it is first necessary to delineate what kinds of disputes are relevant to this discussion of deterrence. Simply stated, they are those that affect the policies and actions of national governments and groups such as al Qaeda, and more specifically, those policies and actions taken in the national security arena, broadly defined. These include everything from trade disputes to collisions between the most fundamental aspirations or identities of peoples. Today's world is a stewpot of disputes, large and small, some of which simmer quietly and some of which boil over into violence of varying types and intensities. While any pragmatic discussion of tailored deterrence would have to pick apart specific disputes, some antecedent considerations can produce useful insights.

First, because the world is a closed system, disputes will impinge on each other and amplify, attenuate or alter each other in complex ways. Thus, any discussion of deterrence with respect to a particular dispute or disputant risks the danger of ignoring some relevant external factor. If this is acknowledged up front, the discussion is at least more sophisticated. Other useful observations devolve from the first. Disputes tend not to be static; not only are they affected by the conflict generated by other disputes, they may change in intensity and nature in response to the dynamics of conflict associated with the dispute itself. What started out as a simple spat over who may fish where might escalate into a full-blown duel of national pride if one nation takes actions that the other sees as excessive. Moreover, there is a natural tendency for disputes and conflicts to escalate

as an inherent function of competitive interaction, a dynamic pointed out by the famous Prussian philosopher of war Carl von Clausewitz.[7]

A third useful observation is that disputes, especially those that are connected to the fundamental identity of the disputants, tend to be persistent, if not intractable. Even the massive application of military force may not settle them, which led Clausewitz to assert that in war the result is never final. This notion leads, in turn, to a fourth one, based on this article's definition of conflict, which is that the span of conflict covers the time duration from the onset of a dispute to the point at which it is settled. Settlement may involve a deal (not some sort of armistice or imposed peace) or it may require the extermination of one of the disputants, or at least its government and controlling ideology. It is critical, though, to distinguish between a cessation of violent conflict associated with the settlement of a dispute and one that is simply an armistice. The difference between the two is not always clear. The peace settlement at Versailles in 1919 did not prevent World War II; the peace accord in Paris in 1973 proved to be a prelude to the North Vietnamese invasion of the South.

In some cases, wars do produce a definitive settlement of a conflict, such as the Pacific War of 1941–1945, but in other cases they do not. If they do not, the winning disputant has a choice to make: do nothing and hope the dispute just goes away or simmers harmlessly, take yet more draconian measures to force a definitive settlement, or adopt some form of conflict management strategy to limit the nature and amount of future violence associated with the dispute in hopes that conditions will mature such that a deal will be possible or that new avenues of forceful dispute resolution will open up.

Disputes are numerous and persistent; they affect each other, and they can evolve in intensity and nature. They are the source of conflict and conflict does not disappear until disputes are settled. Each of these characteristics has an impact on the logic of deterrence.

Conflict

This article has offered a very broad definition of conflict that encompasses, at a minimum, all forms of violence. There are a few more things that need to be said about it in order to finalize a basis for addressing deterrence. The first is obvious, but needs to be formally stated: conflict comes in numerous forms, ranging from political maneuvers to cyber attacks to nuclear war. The key insight emerging from this point is that disputants have a lot of different tools at their disposal. If one option is removed, they may select another. If a dispute is not settled by means of war, the losing disputant may resort to an alternate means of carrying on the struggle. This is today's asymmetric war. For example, a militarily-defeated Taliban shifted to an insurgency directed from a sanctuary

within Pakistan. Depending on the disputant, there may be legal, moral, financial or political strictures that make certain avenues or modes of conflict off limits; however, as the dispute morphs or is impacted by others, these strictures may disappear.

What does all of this mean for strategy and deterrence? First, strategies may be sorted into two types: those designed to resolve the dispute on favorable terms and those whose purpose is to manage the nature of conflict attendant to the dispute. Much of the literature on conflict and war deals solely with the first kind of strategy and indeed makes the tacit assumption that this is the only kind. The traditional view, focused on means, is that peace and war are two different phenomena. Clearly, the definition of conflict that has been established recognizes only the existence or absence of disputes. Thus, it becomes entirely reasonable to think about strategies that are aimed not at settling a dispute but rather at managing the conflict related to the dispute until conditions favor another attempt at settlement. The whole concept of containment pursued during the Cold War, of which nuclear and conventional deterrence were components, was a massive and extended strategy of conflict management. The current U.S. maritime strategy, *A Cooperative Strategy for 21st Century Seapower* (CS21), is a pure form of conflict management strategy.[8]

The literature of conflict management has tended to divide conflict not only into war and peace, but in a more sophisticated way, into rivalries, disputes and wars.[9] A unified approach to conflict as a manifestation of disputes produces a different analytic lens through which to examine conflict management strategy. If all conflict is understood to emanate from disputes, then the objective of the disputants is to settle the dispute on terms favorable to themselves. This produces the first family of strategies: those intended to achieve favorable dispute settlement. If this becomes infeasible, then one or more of the disputants is likely to adopt a conflict management strategy—which may be defined as the attempt to control the nature and intensity of conflict until such time as conditions favor another try at dispute settlement. Starting with this perspective, conflict management strategy can be dissected in order to help contextualize the role of deterrence.

Conflict Management Strategy

To begin with, the objectives of a conflict management strategy must be understood. On the whole, the intent of conflict management is defensive—to keep the military, political and economic conditions of a dispute from deteriorating until such time as new opportunities for dispute resolution emerge. It should be noted at this point that Clausewitz regarded defense as the stronger form of warfare, principally because it is the resort of the weaker side. However, as will be discussed presently, it is often the stronger or even dominant side that adopts a conflict management strategy. This apparent contradiction

can be resolved if the widest view of conflict is adopted and it is observed that there are frequently external factors that impinge on a conflict that block, at least temporarily, the acceptable avenues of dispute resolution open to the stronger power. A combination of moral and political inhibitions, for example, not to mention fear of bringing in the Chinese or Russians, prevented the United States from bombing the Red River dikes in North Vietnam, which would have been a devastating blow to Hanoi that might have won the war. Instead, the United States adopted a less harsh but also less effective conflict management strategy that featured, among other things, local pacification and supply line interdiction.

The second objective of conflict management strategy is to buy time. The inherent assumption is that by creating some kind of pause in the intensity of the conflict, the march of political and economic events will eventually produce conditions more favorable to dispute resolution. Returning to the Vietnam example, the U.S. strategy after 1968 was meant to buy time for the South Vietnamese government and military to develop such that it could defend itself. This in itself was not a war-winning strategy, but a holding action that would eventually allow the United States to extract itself from the fight—which it did. To follow Clausewitz's logic of polarity,[10] if a moderation of conflict is in one's own interest, it must not be in the enemy's interest. Thus, the enemy can be expected to act in some way to break the strictures of the conflict management strategy. Of course, any number of real world factors may impinge to moderate the enemy's desire to do so, including his own internal political dynamics. This is what makes it hard to assert that particular actions or policies actually had a deterrent effect; the enemy may have found his own reasons for not acting. However, at the heart of the matter, this logic governs: if it is in one's interest to manage conflict, it is in the interest of the enemy not to allow such conflict management to occur.

The particular combination of factors—a stronger power wanting to moderate conflict and an opposing weaker power (or group) that does not—leads naturally to what are termed asymmetric operations. The term denotes the use of means other than conventional military forces, but may also be used to indicate novel employment of conventional forces, such as the aforementioned Chinese DF-21 anti-ship ballistic missile. Fired from mobile ground launchers, it would be targeted against U.S. aircraft carriers, thus relieving the Chinese navy of having to face the U.S. Navy in a direct sea battle.

Regardless of the arena of conflict or particular means, the principle is the same: the weaker power, seeing certain avenues or axes of conflict barred to it by the stronger power's conflict management (including deterrent) measures, will look for and pursue other avenues for gaining advantage in the dispute. A bit like water taking the path of least resistance, this phenomenon of switching conflict mode or arena due to perceived obstacles down one avenue or axis of conflict modality is sometimes referred to as "axis

jumping." Perhaps this is the most fundamental of asymmetries—one side pursuing conflict management and the other side pursuing dispute resolution. This is typically the case in insurgencies, in which the nation conducting counterinsurgency is likely pursuing conflict management and the insurgents are pursuing dispute resolution. Note also that differing motivations are structural and not directly dependent on other factors such as political will or the value of the object.

The Chinese DF-21 example also illustrates one of Clausewitz's basic elements of strategic wisdom: one is faced not with an inert target but with an enemy that reacts. The 1996 dispatch of two aircraft carrier battle groups to the waters off Taiwan precipitated the asymmetric buildup of Chinese access denial forces. What to the United States was an almost routine exercise in "gunboat diplomacy"[11] (probably termed a "flexible deterrent option" within U.S. decision making circles) was to the Chinese a national humiliation that unleashed considerable national energy and catalyzed the current naval buildup. Measures intended as a deterrent may turn out to be catalytic for several reasons. First is simple miscalculation. One may simply be wrong about the deterrent effect of a measure. Second, while the specific instance of deterrence may have been successful, it produced a reaction, such as in the China case, that serves to erode deterrence in the long run. Finally, and again due to an ostensibly successful instance of specific and discrete deterrence, the opponent may elect to pursue alternate avenues of conflict. Thus, one cannot usefully speak of tailored deterrence or flexible deterrent options without taking these phenomena into account.

Deterrence is a major component of conflict management strategy, but there are others also. Among the other potential tools are conflict channeling, accommodation and appeasement, dissuasion and preventive war. Deterrence cannot be properly understood unless its relationship to these other tools is taken into account. While there is not room here to examine all the relationships among these tools, the main point to be made is that for deterrence planning to make sense, it must be preceded by the recognition and admission that a conflict management strategy is being pursued (often a difficult admission) and this being the case, there are, inevitably, more components to it.

Making Strategy

At this point it is useful to pause and reflect on strategy making and execution, as this plays a key role in how the logic of deterrence plays out. Although the word "strategy" is general and scalable—it can mean anything from a chess player's scheme to the Schlieffen Plan—for the purposes of this discussion it will denote the pattern of policies and decisions taken over time by a national government or defined group (such as the Taliban) in conjunction with a dispute or series of concurrent disputes. As such, it normally does not take the form of a well-defined and formally articulated plan to which

national leadership refers when decisions are called for. Sometimes a nation's strategy is only discernable in retrospect, even to its own leadership; muddling through has been something any number of governments have done. Internal bureaucratic dynamics and the coming and going of politicians, among many other things, serve to make the process less coherent and straightforward. However, underneath, the DNA of the dispute remains and works to shape the strategy. This alone ensures that deterrence is not some formula—not some tool in a mythical strategic toolbox. It is a temporary condition that someone is trying to create in the context of considerable uncertainty.

However, strategy must be discussed and analyzed if the human mind is to bring coherence to the realm of conflict. A useful way to proceed is to categorize strategy on the basis of intent—dispute resolution or conflict management—for these categorizations can lead to certain insights about deterrence. To begin with, the word "deterrence," like the word "strategy," is general and can be used to denote the condition of someone refraining from doing something under threat from another in circumstances ranging from personal disputes to those among nations. While the focus here is on the national level, it is necessary to point out that it can be applied at each level of war, tactical, operational and strategic. In fact in *On War,* Clausewitz has a nice discussion of what today would be termed the operational or campaign level.[12] In his view, a general would calculate the potential outcome of an envisioned engagement and if it was likely to be adverse, he would decline the engagement. Thus deterrence naturally inhabits conflict and war at the operational and tactical levels, regardless of the intent of a strategy. However, armed with this insight it is possible to say that deterrence is at most a subordinate and auxiliary part of a dispute resolution strategy, whereas it occupies a more prominent place in conflict management strategies.

Conflict management strategies are frequently not the desired approach to disputes, since solution on favorable terms is the preferred solution. Conflict management strategies are often strategies of necessity. The conditions under which they are adopted will be addressed presently, but since they are usually not preferred strategies, their adoption is likely to be shrouded in cant and propaganda. Governments will cling to the rhetoric of victory even as they recognize that dispute resolution on favorable terms has slipped from their grasp. This makes the rare moment of lucidity such as George Kennan's Long Telegram during the Cold War all the more valuable and revealing.[13] This is not to say that conflict management strategies always denote some type of antecedent failure—simply that they imply limits to power and motivation. It is in that context, however, that deterrence must be examined.

Armed with an understanding of conflict as a broad, inclusive phenomenon that can change in nature and intensity over the course of a dispute, it is possible to identify situations in which conflict management strategies might be adopted. A simple, schematic

representation of conflict over time could be drawn. The vertical axis would include all means from hostile political maneuvering to nuclear war. The graph depicts the notional life of a dispute in which conflict begins at a low level, perhaps propaganda, but escalates into economic sanctions. The first spike is a medium intensity war in which one side "wins" but fails to achieve dispute settlement. As time passes, another, more violent war breaks out that finally settles the dispute by, perhaps, removing the opposing government.

The first situation that stands out is the area where the curve bottoms out at the end of a war that fails to settle the underlying dispute. The capture of Baghdad and the disintegration of the Iraqi army is a case in point. At this juncture, unless the winning power has some plausible avenue for pursuing dispute resolution, it has no choice but to adopt a conflict management strategy or simply retreat and relinquish the political gains that victory in war conferred. Clausewitz explicitly recognized this situation with his concept of the culminating point of victory.

Every offense, he said, regardless of how successful it has been, must culminate in a defense. Knowing this, an attacker must first of all ensure he has enough military power to mount a successful defense at the point of victory. Clausewitz's example was Napoleon's invasion of Russia. Although he captured Moscow, Bonaparte no longer had sufficient force to impose a peace on Czar Alexander. Assuming that a) having reached his goal, the attacker no longer wishes to keep on fighting and b) the defender is significantly beaten down but neither fully defeated nor willing to cede his side of the dispute, then the victor must establish a strong enough defense to deter further military action on the part of the defender. In other words, to again leverage Clausewitz's thought, the defender calculates the likely outcome of another counterattack, sees that it would be defeated, and so refrains from doing so—is deterred—at least for some period of time.

If the defender's army is defeated but the government is still viable, perhaps in hiding if the capital was overrun, it may carry on the struggle via insurgency. This is especially feasible if some type of sanctuary exists. Two obvious examples are the Free French government in World War II and the Taliban of today. The nation attempting to counter the insurgency or resistance must, almost by definition, pursue a conflict management strategy, the goal being to suppress the degree of violence as much as possible in order to "pacify" the occupied territories.

Dispute resolution may consist of trying to win the hearts and minds of the populace, but history has demonstrated that if the resistance can just keep the pot boiling, the nation attempting to defend its conventional victory will sooner or later resort to a conflict management strategy as a prelude to leaving. In this context—when there is a political sanctuary—deterrence of any sort from the perspective of the occupier is not likely to

be successful, simply due to the circumstances under which the conflict management strategy was adopted. Moreover, the original military victory is not likely to have deterrent value after the occupier leaves. The North Vietnamese invasion of the South in 1975 is an example of this, because it was U.S. exhaustion that led to its adoption of a conflict management strategy and subsequent withdrawal—it wasn't going to come back. No amount of rhetoric can change the inherent dynamics of the situation.

The other location on our graph of conflict where conflict management strategies may occur is after the onset of a dispute but prior to the escalation of violence into a war. A key example is the Cold War. It is thought by many that the existence of large arsenals of nuclear weapons on both sides, as well as the presence of hundreds of thousands of troops stationed on both sides of the inter-German border, served to prevent a war between NATO and the Warsaw Pact. Of course, limited wars such as Korea and Vietnam broke out, but despite tense crises such as the Cuban Missile Crisis and the naval standoff in the Eastern Mediterranean in 1973, the U.S. conflict management strategy of containment held until internal decay brought down the USSR.

The prospects for success of a conflict management strategy in the pre-war phase of a dispute are dependent on a wide variety of factors, many of which have received competent coverage in the existing literature on deterrence. On the other hand, the perspective that seems to be missing is the essential fact that a conflict management strategy is being pursued. One is being pursued because a dispute resolution strategy is unavailable due to the strength of the opponent, one's own weakness, potential intervention of third parties or other constraints. They all add up to an uncomfortable situation in which powerlessness must be at least tacitly acknowledged. This is the psychological and political milieu of those attempting to deter. The attempt to deter others also implies self-deterrence on one's own part. If this were not the case, preventive wars would be the norm. This is obviously an ultra-realist view, and more altruistic motives on the part of states must be acknowledged, but even here the strictures of law or morality represent a form of self-deterrence.

Deterrence Challenges

It is the context of being forced to defer dispute resolution and adopt an expedient conflict management strategy that reveals the difficulties and dangers involved in attempting to deter, especially if the deterrence aimed for is specific and discrete. The epistemic difficulties that attend deterrence in general have already been mentioned. These difficulties are intimidating by themselves, but there are other difficulties that the epistemic ones exacerbate: those of wishful thinking that lead to miscalculation. The military concept of the strategic barrier can be used to illustrate the point. Commonly, strategic barriers consisted of mountain ranges, deserts and seas. These were geographic

barriers thought to be impassible. If one was available, that line of potential enemy approach would not have to be defended strongly, freeing up forces for other missions.

Of course, history is full of examples where an enterprising commander was able to surprise and defeat the army relying on the strategic barrier by going over or through it, against all common sense or expectation—not being deterred by the putative physical difficulties. From Hannibal's push through the Alps with his elephants to the wide left hook of the U.S. XVIII Airborne Corps through the Iraqi desert in the 1991 Gulf War, the deterrent effect of strategic barriers has been repeatedly belied. If the strategic barrier is regarded as a specific and discrete, i.e., tailored, deterrence measure, then the dynamic of concern can be seen.

The army that relied on the barrier estimated that it would be impassible, i.e., that the enemy would be deterred from attempting to cross it. Sometimes this worked, but in some cases the enemy was not deterred and crossed the barrier, surprising and defeating the army that was relying on it. The problem is that adverse necessity—having too few forces to defend everywhere, or, relevant to this discussion, having the need to pursue a conflict management strategy—can lead to overestimating the deterrent value of a strategic barrier or some "tailored deterrence" measure. The first step in developing a rational approach to strategic barriers or tailored deterrent efforts is to first recognize the nature of the context that drives the need. Only in this way can one guard oneself against overestimating the efficacy of the measure.

It is one thing to establish macro efforts to establish strategic deterrence, such as the nuclear triad. The destructiveness of these weapons essentially overwhelms the dispute, even such a fundamental dispute as the future of communist ideology. However, when more discrete and bounded deterrent measures are contemplated, the context of conflict management now dominates and the dangers of miscalculation multiply. Thus certain new concepts such as "tailored deterrence" seem fragile at best and delusional at worst. Equally dangerous is the concept of "flexible deterrent options" (FDOs) that has been incorporated into some U.S. military planning.[14] Beyond the difficulties already mentioned, FDOs are essentially last-ditch efforts to stave off a war. They are pre-scripted maneuvers that are conducted in times of high tension where the incentives for wishful thinking are strongest. Being pre-scripted (a necessity so they can be executed reliably by deployed forces) they exacerbate the epistemic difficulties too. This is not to say that deterrent measures are not necessary or desirable, but to have any reliability, they must dominate the conflict management context, not be subordinate to it. This has certain implications for escalation theory. Following this logic, a nation desiring to prevent escalation has to threaten much greater escalation early in the interaction.

There is another class of conflict management strategies, or rather, another strategic context in which they are employed. When a state has achieved a dominant status, either globally or regionally, it generally desires that there is as little violence as possible associated with any of the numerous disputes that affect the relations of other states in its sphere of influence. It wants, in other words, stability. This is a situation in which conflict management strategies writ large are adopted. Once again the situation is one in which the limits of power to resolve disputes must be faced, but here it is the multiplicity of disputes, not only between the dominant state and others, but also between or among the other parties, that brings a state up against the limits of its power and influence.

The approach to conflict management must be broad and may involve the actual use of force as a preventive measure. In this context, deterrence rests principally on overall strength, but it also depends on how it is attempted in particular situations. Specific measures may enhance or degrade the overall condition. This is because a broadly-based conflict management strategy must be founded on much more than just deterrence; it must contain a substantial amount of positive incentives in order to prevent the formation of countervailing coalitions or the release of hostile nationalism within a potential competitor. One may argue that this is precisely what happened when the United States dispatched two aircraft carrier battle groups to the waters off Taiwan in 1996. While this move could be chalked up to U.S. hubris or short-sighted decision making, it is more revealing and useful to understand the decision as an honest effort at deterrence taken in the absence of any theory of the relationship of discrete deterrent actions to a strategy of conflict management.

Deterrence is normally conceived of as a form of coercion, and indeed, the notion of tailored deterrence, first mentioned in the 2006 QDR, denoting specific actions to deter specific acts, has an overtone of coercion to it. However, in the context of a conflict management strategy, a wider conception may be called for. Providing governments with reasons not to act, especially in the context of a broad conflict management strategy aimed at general stability, may involve positive inducements. These, of course, would not consist of anything resembling appeasement, but might, for example, include establishing a policy, backed by appropriate naval force, of freedom of the seas. This, presumably, would deter predation of various kinds on the seas and, thus, obviate the need on the part of many nations to build a big navy.

Another aspect of deterrence as an element of a conflict management strategy results from the inherent nature of strategy itself. Strategy is normally manifested as a series of moves, i.e., a campaign. In a campaign, events are related to each other in one of three ways. First, they could have a sequential relationship wherein event A is prerequisite to event B, B is prerequisite to C and so on. In cumulative campaigns, events A, B, C and others are related only insofar as each produces some incremental effect, such as

damage to the enemy that adds up over time. The third relationship may be termed decisive. Gambit A is designed to precipitate a decisive event, such as a battle. If the battle does occur and is indeed decisive, the campaign is over. If, however, gambit A does not produce the battle or it is not decisive, then gambit B is tried, and so forth again.

Conflict management strategies generally take the form of cumulative campaigns. Their object being inherently negative, they most often focus on the avoidance of their own casualties or damage while either ignoring enemy damage or conversely focusing very much on some aspect of damage to the enemy as a surrogate for a measure of progress toward dispute resolution, e.g., enemy body counts in Vietnam and to a lesser extent in Iraq and Afghanistan. In terms of deterrence, the cumulative logic can be applied to generate some insights. A British naval officer once said that the Royal Navy's (RN) most precious strategic asset was its reputation for reckless persistence. The implication is that other countries would be deterred from taking on the RN because it was crazy and would not admit defeat, thus extracting costs from the enemy out of proportion to the value of the object in question. Presumably, if the RN did not, on a specific occasion, demonstrate such recklessness, its reputation would be diminished and deterrent value lost. So in this branch of deterrence logic there can be a campaign of deterrence and its nature is cumulative.

Scaling up the RN example to the strategic level, one may deduce that if the dominant power engages in some kind of limited war that turns out to be unsuccessful in one way or another, its overall deterrent posture is diminished. This may or may not be the case, but the essential issue is that deterrence is always part of a conflict management strategy that is dynamic—always in motion. Thus deterrence, even the macro kind, is a changeable condition that must be continually tended. Discrete instances of tailored deterrence actions, if indeed such things are possible, cannot be properly understood or undertaken without reference to the context of an unfolding and dynamic conflict management strategy.

Conclusion

This article has attempted to make the case that deterrence is a desired condition—intended to be produced by certain force postures, policies and, in current U.S. doctrine, by specific actions—which cannot be properly understood nor reliably achieved without referencing it to an overall strategy of conflict management. In simple words, it is not a specific and independent thing; it is a component of something larger. However, that larger thing, conflict management strategy, has not been subject to sufficient examination, at least in the sense it has been presented in this article. Thus deterrence, and especially the new notion of tailored deterrence, has been subject to an intellectual

approach that at a minimum requires exquisite understanding of the other side's decision process—the possibility of which is debatable.

Deterrence, inherently, is about stability—keeping things from happening. Therefore, its intellectual framework should not be based on the unstable foundation of exquisite intelligence and razor-edge predictions of specific decisions. Rather, it should rest on the more stable intellectual foundation of context, situational logic and an understanding of one's own motives and incentives. It is hoped that this article will serve to open new avenues of inquiry concerning deterrence so that novel concepts such as tailored deterrence, coined in important national statements of policy, do not obfuscate defense and security thinking to the detriment of national interests.

Notes

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4. See, for example, "China Targeting U.S. Deterrence," Jan. 5, 2011, *The Japan Times Online,* search.japantimes.co.jp/.
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6. See M. Elaine Bunn, "Can Deterrence Be Tailored?," National Defense University Strategic Forum No. 225, Jan. 2007. permanent.access.gpo.gov/.
7. Carl von Clausewitz, *On War,* translated by Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), Book I, Chapter 1, p. 77.
8. U.S. Navy, U.S. Marine Corps, U.S. Coast Guard, *A Cooperative Strategy for 21st Century Seapower,* www.navy.mil/.
9. Paul F. Diehl and Gary Goertz, *War and Peace in International Rivalry* (Ann Arbor, MI: University of Michigan, 2000), Chapter 4, pp. 67–85.
10. Clausewitz, Book I, Chapter 1, op. cit., p. 83.
11. I use this term in precisely the way James Cable defines it in his landmark book *Gunboat Diplomacy* (London: Macmillan, 1981).
12. Clausewitz, Book III, Chapter 1, op. cit., p. 181.
13. George Kennan, "The Sources of Soviet Conduct," *Foreign Affairs* (New York: The Council on Foreign Relations, July 1947).
14. Joint Publication 1-02, *DOD Dictionary of Military and Associated Terms,* as amended through April 2010. "A planning construct intended to facilitate early decision making by developing a wide range of interrelated responses that begin with deterrent-oriented actions carefully tailored to produce a desired effect. The flexible deterrent option is the means by which the various diplomatic, information, military, and economic deterrent measures available to the President are included in the joint operation planning process. Also called FDO. See also deterrent options."

PART FOUR

War Gaming

CHAPTER FIFTEEN

The Forms of Warfare
Integrating Ethos and Warfighting

Wars must vary with the nature of their motives and of the situations which give rise to them. The first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish by that test the kind of war on which they are embarking; neither mistaking it for, nor trying to turn it into, something that is alien to its nature.

CARL VON CLAUSEWITZ, *ON WAR*

Water shapes its course according to the ground over which it flows; the soldier works out his victory in relation to the foe whom he is fighting.

SUN TZU, *THE ART OF WAR*

Our direct experience of life is limited to the here and now, and to the immediate and specific issues that we encounter on a daily basis. However, we understand that there are larger patterns that arise out of our daily activities. These patterns are produced by the influence of frequently unseen or unacknowledged forces. Perhaps the first and most well-known description of such influences was produced by the British economist Adam Smith. His "invisible hand" of self-interest underlies the effectiveness of the market in distributing goods and services.[1] Other writers, such as Marshall MacLuhan[2] and Jared Diamond,[3] have revealed the hitherto unperceived influences of media and geography on the patterns of human activity. It is in this same vein that this paper will attempt to reveal a larger pattern of warfare, the understanding of which could help governments and militaries improve the judgment that Clausewitz calls upon them to make.

We frequently talk about not being able to "see the forest for the trees." What this means is that we are distracted or blinded by a focus on the specifics or details of an issue such that we cannot discern the larger patterns—"the forest"—that would reveal the

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operation of otherwise invisible hands. Thus blinded, we are presumably at the mercy of these influences and our decision making is thereby defective. This is as true in the realm of warfare as it is in any other arena of life. In particular, it seems that strategy, normally considered to be the upper and broadest conceptual level of warfare, is in reality just another copse of trees. The forest, the larger pattern, is the form of warfare a nation or group conducts. Strategy occurs within the confines of that forest. If we can identify and categorize these larger patterns, military services will be able to better understand themselves and the enemy, and thereby, as Sun Tzu says, we will need not fear the results of a hundred battles.

Forms of Warfare

One of the defining moments of the American Civil War occurred when General Robert E. Lee ordered Pickett's charge at Gettysburg. Although ill-fated from the outset, it was perhaps the apotheosis of what we will call the "heroic" form of warfare. Lee was the epitome of the "great captain"—the general of genius who, at the head of an army comprised of highly skilled and motivated troops, used deft maneuver to defeat a more numerous enemy in battle. The Confederate States of America did not pursue the heroic form of warfare as an explicit choice; the invisible hand at work was a combination of history and necessity. All military officers of the day were well steeped in the legend of Napoleon Bonaparte, the archangel of war whose genius for maneuver had made him master of Europe. Napoleon applied the heroic form of warfare with considerable success until his wave broke upon the rocks of the Russian winter. Lee and his counterparts had imbibed the lessons and ethos of Napoleonic warfare since they were cadets, so adopting any other form would have seemed almost sacrilegious. However strong the influence of history, necessity intervened to reinforce Lee's attachment to the heroic form. The Confederacy was poor in the kinds of resources that constitute the sinews of war. Lacking in industry and with its finances being constricted by the Union blockade, the South had to rely on those threads of advantage it seemed to have: excellent generals, especially Lee, and troops that could outfight their Union counterparts. The South, as had so many other nations who were weaker than their opponents, embraced the heroic form of warfare.

Lee had flummoxed a series of Union generals over the preceding two years, but his victorious battles had not produced a strategic decision. Now, in Pennsylvania, he had the Army of the Potomac in his grasp. A victory at Gettysburg, especially if it allowed him to threaten Washington, might be the final leverage the Confederacy needed to force the Lincoln administration to cut a deal. Although the dawning of the third day of the battle found his army in a tactically disadvantageous position, he was convinced that the fighting skill and spirit of his troops would carry the day in a battle that would determine the outcome of the war. This is the essence of the heroic ethos: the faith that

military genius and virtue will produce decisive results. In the case of Lee at Gettysburg, we can see the influence that warfare form has on institutional ethos and the consequent effect that ethos has on an individual's decision making.

By contrast, when Lieutenant General Ulysses S. Grant assumed command of all Union armies, he was in a position to adopt a different form of warfare, which we will call "systematic." Grant understood two things that few others did. First, Lee and his army were the keys to annihilating the rebellion, and second, his army could only be defeated through attrition and the destruction of its support infrastructure. Grant had the tools at his disposal to act on these insights: a virtually inexhaustible supply of men and resources and a government and populace that supported the war effort. Grant thus embarked on a campaign in Virginia in which he sought to keep constant pressure on Lee such that the South suffered continual combat losses that it could not make good. Concurrently, Grant ordered Major General W. T. Sherman and his army to capture Atlanta and then march through the lower South, destroying the resource base for Lee's army. The kind of warfare Grant conducted did not rely on decisive battles or any tactical genius on his part. Rather, relentlessness, well-planned logistics and competent management carried the day. A certain degree of ruthlessness also helped. The deliberate, almost mechanistic, approach that the systematic form of warfare employs reflects a significantly different ethos than the heroic form of fighting.

Perhaps the most indicative articulation of the systematic form of warfare comes from Rear Admiral Henry E. Eccles, who wrote several landmark books on logistics in the wake of World War II: "From the strategic-tactical point of view, exploitation of momentum is similar to the 'killer instinct' in the boxing ring. It means that once a decisive opening is obtained, every resource is concentrated to obtain overwhelming victory by the most rapid succession of powerful blows. It aims at the complete destruction of enemy fighting power in the area concerned. The enemy is permitted no respite to regroup his forces and to recover his strength."[4]

In the spring of 1865, as Lee's position became increasingly untenable, Grant's and Lincoln's thoughts turned to the end game. In particular, they were worried about the armies of the Confederacy dissolving into partisan bands and carrying on the struggle using a different form of warfare. To describe this, commonly termed insurgency or irregular warfare, we will use a broader term: "disruptive" warfare. This form of warfare is conducted by a party that is much weaker than its opponent. Termed disruptive because the stronger opponent's capabilities to conduct heroic or systematic warfare are regarded as a system, disruptive warfare seeks to disrupt that system over time until the opponent is discredited, exhausted and dismayed such that he either withdraws from the fight or makes terms. The means of disruptive warfare can include terrorism,

ambushes and other means that allow a much weaker force to impose costs on the stronger opponent and still survive to fight another day.

To illustrate the broader application of the term "disruptive," we can look at the naval strategy employed by U.S. Secretary of the Navy William Jones in the War of 1812. The American navy, with its handful of frigates and sloops, was no match for the dominant British Royal Navy. What Jones hoped to do was sneak his ships out singly to conduct commerce raiding against the British. The intent was not to disrupt British commerce; rather its goal was to force the Royal Navy to spend so much effort trying to chase down American raiders that Britain would decide the war with the United States was not worth the effort in the context of the larger struggle against Napoleon.[5] One can also make the case that the German U-boat campaigns in the Atlantic in both world wars were applications of the disruptive form.

The disruptive form of warfare is the recourse of the much weaker party. Of necessity, it is drawn-out warfare that is conducted on a shoestring, relatively speaking. The ethos of disruptive warfare is therefore quite different than those of the other two forms. At heart, it demands some form of doctrinal or political orthodoxy, because to carry it out requires small cells or units operating independently. In order to achieve unity of effort, the leaders of cells must be true believers in the religion, political doctrine, cause or strategy. Disruptive warfare is inherently cumulative; each raid or ambush incrementally contributes to the overall effect. In order to persist over time, tactical risk must be minimized. The required mind-set is fundamentally different from that which is willing to roll the dice on a decisive battle in the heroic form or that which is willing to incur losses in order to impose unremitting pressure in the systematic form. Moreover, whereas the heroic form aims for a quick victory and the systematic form demands steady progress toward victory, in the disruptive form, the path to victory is not predictable in either duration or character.

In looking at these three forms of warfare we see that the essential elements of each are contained in a "trinity" that is a bit analogous to the one established by Clausewitz.[6] The form of war is composed of an expected victory dynamic, an institutional ethos and a set of methods. These three elements are interdependent and when aligned, provide the power the form has to offer. When they are not aligned, the form is dysfunctional. Most commonly this occurs when the prospects for victory using a particular form fade, but the form is retained.

Interaction among the Forms

Lincoln and Grant had good reason to worry about the Confederates resorting to the disruptive form of warfare. They instinctively understood that trying to apply the

systematic form of warfare against the disruptive form would be like trying to punch at smoke. It is precisely the potential effectiveness of the disruptive form versus the other two forms that brought it into being in the first place. There is perhaps no better example of the interaction between the systematic and disruptive forms than the Vietnam War. The Viet Cong and North Vietnamese waged disruptive war against the U.S. and South Vietnamese forces using a combination of terror tactics against villages and ambushes against opposing forces. The United States, for its part, entered the war trying to apply its existing systematic form. While there were tactical successes and failures on both sides, the net result was frustration and exhaustion for the United States, which ultimately pulled out of the fight: precisely the result North Vietnam had sought.

In the years between the entry by the United States into and its pullout from Vietnam, the unsuccessful attempt to apply the systematic form of warfare warped and weakened the ethos of each of the U.S. armed services. The services had gone into the war with an adherence to analysis-based management, an approach imposed by Secretary of Defense Robert McNamara that was entirely compatible with the ethos of systematic warfare. In the context of a limited war and against an enemy pursuing the disruptive form of warfare, frustration led to the adoption of measures of effectiveness that were not useful indicators of progress, and thus over time produced cynicism within the ranks which eroded the Army's ethos and its embedded ethics.[7]

After Vietnam, the U.S. Army and its sister services embarked on a program of rehabilitation. As chronicled in the book *Prodigal Soldiers,* by James Kitfield, senior officers such as Shy Meyer of the Army and Bill Creech of the Air Force wrought major changes in their respective services that reset their ethos and ultimately produced the high-tech, highly professional force that outmaneuvered and dismembered the Iraqi army and air force in DESERT STORM. At the heart of the transformation lay a shift in the form of warfare the services pursued, from systematic to heroic. After Vietnam, the Army's focus shifted to the NATO Central Front. There, facing the massive Red Army and in the context of massive nuclear stockpiles, the U.S. Army saw itself as the weaker party, thus making the use of the systematic form infeasible. Although it did not work for the Confederacy, or for that matter for Germany or Japan in World War II, the heroic form, in the guise of AirLand Battle, was seen as the antidote against the Soviets. The Soviets, for their part, had to also consider the use of the heroic form. This was due to the ever-looming shadow of nuclear weapons. With nukes almost anyone could adopt the systematic form, but their sheer destructiveness would make any victory Pyrrhic at best. So if the Soviets were forced into a heroic-style war of maneuver in Europe to achieve their objectives in a hurry before the nukes flew, they would be themselves, by definition, vulnerable to being outmaneuvered.

Adoption of the heroic form of warfare allowed the Army to shift ethos, not try and repair one that had been ruptured and discredited in Vietnam. The ethos of heroic warfare, with its emphasis on warfare virtuosity, was a healing balm for the Army. Moreover, emerging technology promised to supercharge the ethos. Technology such as Abrams tanks, F-16 fighters and precision guided munitions required technical virtuosity on the part of soldiers but it also made them more powerful warriors, both individually and as units. Thus the American military that was unleashed in the Iraqi desert in 1991 was heroic in all its dimensions. The systematic army of 1965 most likely could have defeated Saddam Hussein in 1991 and again in 2003, especially since Iraq had adopted the heroic form itself as a matter of both Arab tradition and of logistic necessity. Moreover, logically, if one has the capacity to conduct systematic warfare against an opponent that conducts heroic warfare, one should; otherwise unnecessary risk is incurred. In 1991, however, the American military was wedded to the heroic form but its sheer quality overwhelmed an Iraqi military that was a generation behind.

After the 9/11 attacks the American military carried with it into Afghanistan and Iraq its heroic warfare form and its accompanying ethos. In the early going of both wars the techno-heroic form made quick work of the organized opposition. In the aftermath of their initial defeats, both the Taliban and Iraqis reverted to a version of the disruptive form of warfare—insurgency. However, the interaction between the heroic form and disruptive form turned out to be a bit different than the interaction between the systematic form and disruptive form in Vietnam. It was true that in confronting the disruptive form, the heroic form still found itself punching at smoke, but the ethos of the heroic form turned out to be more resilient under conditions of frustration than did that of the systematic form. For one thing, the heroic form appears to more easily accommodate tactical adaptation. Army officers such as David Petraeus were able to shift their approach from killing insurgents to courting key tribes, which, in conjunction with political errors by Al Qaeda, eventually produced a form of success in Iraq.

In Afghanistan, similar shifts were made, but because the Taliban continued to enjoy sanctuary in Pakistan, and for other ethnic and tribal reasons within Afghanistan, the war continues without resolution. There is some evidence that mild forms of the cynicism that infected the armed forces in Vietnam have crept into the American forces deployed in Afghanistan, the misuse of measures of effectiveness and statistics being one.[8] However, the legacy of the DESERT STORM victory in legitimizing and reinforcing the heroic ethos has made the Army relatively resilient in the face of frustration. Moreover, that legacy and that ethos have created, along with the galvanizing effects of the 9/11 attacks, a very strong bond between the U.S. armed forces and the American public.

Notwithstanding the resilience of the heroic ethos, the heroic form of warfare is not working in Afghanistan. The heroic form, which is predicated on maneuver and rapid

victory, is confronting the disruptive form, which seeks to avoid pitched battles and whose fundamental dynamic involves prolonging war. In his landmark work *On War,* the Prussian theorist Carl von Clausewitz says that defense must be the stronger form of war because it is the weaker party that adopts it. The same logic seems to apply to the disruptive form of warfare. In Clausewitz's formulation the defense can be overcome if the attacker enjoys a sufficient margin of superiority. However, it is not at all clear that any margin of superiority would allow either the heroic or systematic forms of warfare to prevail over the disruptive form, due to the profound asymmetry that exists. This asymmetry is not necessarily one of means; it is one of form. Being an asymmetry of warfare form, it is also one of ethos.

The forms of warfare are inherent in the logic of human conflict and have been around since the Egyptians defeated the Hittites in 1286 BC. A nation or group adopts a form of warfare for a number of reasons, not the least of which is because it can. There seems to be a hierarchy among the forms. The systematic form is inherently the weakest form, because only the very strong, relative to the opponent, can adopt it. However, when it is adopted, its results are most sure—at least against the heroic form. The heroic form is a stronger form, and promises quick victory to those who possess the great generals and excellent technology—assuming that the surrounding set of political conditions permit a military and political checkmate to occur. The disruptive form is the strongest, which is why it is the resort of the very weak, relative to the military power of the enemy or in relation to the political circumstances surrounding the dispute. It should be noted that in the course of a conflict a nation or group may shift forms in midstream, as circumstances dictate.

Technology and the Forms of Warfare

The literature of war in the last two decades has been full of assertions that the nature of war is being changed by new technology. While it is clear that new technology has indeed transformed the methods of war over the course of human history, if we accept the "trinity" of elements that characterize the warfare forms that we have established, we are led to conclude that technology has done little or nothing to change the inherent nature of war. Technology has meaning only within the context of one of the forms of war, regardless of how seemingly decisive it might be. The only exception is nuclear weapons. Nuclear warfare has not been conducted; one reason may be that it does not fit into the trinity because there is no available victory dynamic and no available rational ethos for it. All other technologies are given meaning within the context of a form of warfare.

In the waning days of World War II in Europe, Hitler and the Wehrmacht increasingly relied on a set of "wonder weapons" including the V-2 ballistic missile and the ME-262 jet fighter to turn the tide of the war. These weapons were supposed to shock

and dismay the Allies, thereby abetting the efforts of German generals to achieve some kind of checkmate that would provide Germany with a bit of strategic breathing room, if not a negotiated settlement. In a sense, these weapons were the technological avatars of Teutonic knights of an earlier age. Since the Wars of German Unification, Teutonic armies had been imbued with the ethos of heroic warfare. The goal was always to win a decisive battle that would produce a checkmate in which the enemy would call for terms, even though he might still have means for resistance. In the early going of World War II the Germans used the heroic form with great effect in subduing Poland and then France. However, there are limits to which the heroic form of warfare can be effective. If the enemy refuses to concede defeat and adopts one of the other two forms of warfare, the heroic form could fail—as a form—regardless of the quality of the fighting forces involved.[9]

The problem for Hitler in 1944 and 1945 was that the Allies had been able to stay in the game long enough to adopt the systematic form of warfare. War production in the United States and Soviet Union reached levels that allowed them to flood the battlefields with a constant stream of new forces. The systematic form relies on constant pressure and overwhelming firepower to pulverize enemy forces and force the surrender of the enemy. This form also relies on competence and determination if not ruthlessness in its generals and in its soldiers; genius may be an added benefit, but it may also get in the way. Kitfield reports on how in Vietnam, General DePuy rejected and suppressed innovative tactics by junior officers because they did not conform to the overall doctrine. Technology flows along the same lines: the American Sherman tank, like its Soviet cousins, was in many ways inferior to the best German tanks, but the United States could make lots of Shermans and they were logistically supportable and easy to use. The Germans had a number of superior tank types, but their industrial strategy of designing and fielding limited numbers of ever better tanks confounded their logistic system, vitiating whatever benefits the newer tank conferred.

Here one can see the differing roles of technology in the heroic and systematic forms of warfare. The German Tiger tank was supposed to overcome the Soviet horde with its pure excellence. However, there were never enough of them to make a difference. Better, as the Soviets said, is the enemy of good enough. The Soviet T-34s and American Shermans were good enough because they could be built in numbers and be supported with parts. That is the heart of systematic warfare.

When the Americans rolled into Vietnam they brought with them the systematic form of warfare they had adopted in World War II and Korea. However, the North Vietnamese and their Viet Cong colleagues adopted the third form of warfare—disruptive. In adopting this form, the Vietnamese used such low technology as booby traps, punji stick–filled pits and a variety of man-toted weapons such as mortars. The use of

improvised explosive devices (IEDs) in Iraq was a way for insurgents to avoid losses while imposing them on coalition forces. Technology in disruptive warfare must be focused on empowering persistence while disrupting the enemy. However, disruptive warfare can also benefit from some of the most advanced forms of technology, including cell phones, computers and robotics.

Disruptive Warfare

Since the 9/11 attacks the United States has been engaged in two extended wars against insurgencies—Iraq and Afghanistan. Both wars have sparked a voluminous literature on counterinsurgency. Within this literature, disagreements have emerged over the relative efficacy of killing insurgents, denying sanctuary, winning hearts and minds, and nation building. While the United States succeeded in extracting itself from Iraq with at least some basis for thinking it had achieved a degree of success, the insurgency in Afghanistan drags on with conflicting assessments over progress there and at best an uncertain prognosis after American withdrawal occurs. A former Secretary of Defense opined that wars of this type will characterize the future environment, while scholars and veteran fighters attempt to concoct a formula for successfully fighting them.

Using the forms of warfare framework will not produce such a formula, but it can illuminate the elements of the conflict and indicate where one might look for solutions, always keeping in mind Carl von Clausewitz's caveat that however good theory might be, it can never serve as a formula for a specific situation.[10] In order to find avenues of possible strategic advantage, the disruptive form of warfare must be dissected into its component elements. However, even before that is done, the context for disruptive warfare must be understood, and that context, in a like manner, can be dissected so that seemingly profound aphorisms like Clausewitz's dictum that war is the continuation of politics by other means do not constitute the entire description of context.

Context I: Disputes

Politics is about who has the power to do what. In the course of politics, disputes arise among constituencies, be they political parties, ethnic groups, nations, religious sects or other groupings. Disputes may be settled peaceably via formal, structured political processes, or they may be characterized by hostile, violent competition. War occurs in the context of disputes, but there are other self-help methods used to achieve dispute resolution besides violence: diplomatic maneuvering, dirty tricks, demonstrations, etc. All of these methods, including violence up to and including nuclear war, may be seen as a continuum of actions, with no clear boundary necessarily existing between methods that involve violence and those that do not. This is lesson one about war; its mother is not politics, it is the dispute. The nature of the dispute, the nature of the parties to that

dispute and the circumstances attending the dispute will influence the methods used to resolve it. Some writers have made the clever comment that politics is the continuation of war by other means, and they are correct. But that only illuminates the point that there is a continuum of conflict that is spawned by a dispute.

The nature of a dispute has a profound influence on the methods people will use to resolve it in their favor. Sometimes disputes arise over specific issues like fishing rights or even ownership of a particular piece of territory. Depending on the relative motivations of the disputants, solutions can be achieved either through diplomatic maneuvering or even limited military action. Identity disputes are much harder to resolve and may result in the highest levels of violence. The place of Germany in Europe, for example, involved multiple wars of the most extreme kind. Another kind of dispute that falls somewhere between issue and identity disputes is what might be termed security disputes. The tug of war between the United States, NATO and Russia over countries in Eastern Europe is an example. While this tug of war is mostly characterized by diplomatic maneuvering and interference in internal politics, the Russian invasion of Georgia represented a spike in violence in the conflict over what constitutes satisfactory security buffers for Russia.

Disputes are not static or simple phenomena. What starts as an issue dispute might easily metastasize into an identity dispute if the actions by one disputant are seen as either disproportional or existentially threatening by the other. Clausewitz indirectly addresses this with his concept of culminating point of victory. Any victory, he says, no matter how complete, must be defended in some way.[11] If, therefore, one disputant does something that so enrages the other that the nature of the dispute changes, then all previous calculations of strategy are negated, and the conflict becomes something much more intense. The Japanese attack on Pearl Harbor was intended to take the U.S. Pacific Fleet off the table and thereby convince the United States that interference in the establishment of the Greater East Asia Co-Prosperity Sphere was not feasible. Given the isolationist sentiment in the United States and the sheer distance to East Asia from North America, such a plan had some logic in the minds of Japanese strategists. However, the way the attack was conducted—without warning—so violated the American sense of honor and fairness that it galvanized America and sparked a crusade against fascism that resulted in the destruction of Imperial Japan as well as Nazi Germany. Morphing of disputes is scalable; it can happen locally as easily as globally, and this has implications for the way disruptive warfare is conducted and the way it is countered.

Context II: Conflict

"Conflict" is the term we will use to indicate the hostile intent and methods used by disputants to achieve resolution on their terms. As mentioned previously, it can encompass the whole range of noncooperative methods from deceptive diplomacy to

nuclear war. Despite large differences in the methods arrayed along the spectrum of conflict, it is useful to think of them as variations of the same thing. Viewed in this way, we can establish a mental picture of conflict that is almost a graph. If the vertical axis is defined to be the spectrum of conflict methods according to the degree of violence, with higher on the axis representing more violence, and the horizontal axis represents time, then we can draw a curve that depicts the dynamics of a dispute. The curve would start at the intersection of the two axes, representing the onset of the dispute. This is a simplification, of course, because many disputes emerge gradually, but such simplification does no harm to our theory. The curve may remain close to the horizontal axis for a while, indicating latency of the dispute or perhaps the employment of nonviolent means. An upward surge to the curve indicates the introduction of violent means, and a near-vertical spike represents the outbreak of war. If one party wins the war but the dispute remains unsettled, the curve will drop down near the horizontal axis, indicating the quiescence of the defeated party, or it may level off at some point higher, indicating an insurgency. The curve may spike back up, indicating a subsequent war, or it may undulate at a lower but persistent level of violence indicating an extended insurgency. If it descends to intersect the horizontal axis, it means the dispute is settled.

With this graph of conflict in our minds we can make some observations about the context in which the disruptive form of warfare occurs. First, it can be said that any disputant has available one of two possible overall strategies: a strategy designed to obtain favorable dispute resolution, or one that is meant to manage the kind and degree of violence employed in the conflict. The first kind of strategy is adopted when at least one of the disputants feels it has sufficient resources, be they material, moral or political, to overcome the opposition of the other and achieve resolution. The second kind is adopted when the disputant does not feel it has such resources, but does not want to abandon the dispute. Thus it attempts measures to keep the violence within acceptable parameters until such time as circumstances may favor a turn to a strategy of the first kind. Pushing this abstract reasoning a bit further, we might observe that the relative strength of the disputants is measured with respect to the nature and parameters of the dispute, not any absolute rating of combat capability, economic strength or political will. It is this principle that allows militarily and economically weaker parties to sometimes prevail over stronger ones, especially in the context of the adoption of the disruptive form of warfare.

Depicting conflict via a graph over time leads us also to think about how the events of a conflict relate to the overall picture. If we accept the idea that even massive wars do not necessarily settle the underlying dispute that spawned them, we can proceed to establish a hierarchy of events based roughly on their size and duration. To engage in the use of descriptive physics metaphors as did Clausewitz, we might define the engagement as

the basic subatomic particle of a war. Of course, there are even smaller particles that involve such things as deception and counterdeception, but we can content ourselves at this point with the engagement as the basic constituent particle. The battle, then, is the atom, and the campaign the molecule that gives the war its character. But as the graph indicates, the war may be itself only a part of a larger substance that we might term a struggle. One might thus define the struggle of Germany to define its place in Europe as composed of everything from the Wars of German Unification to the Maastricht Treaty. On an even grander scale, perhaps the grandest, we have regional or global order. At this level there are nations and groups that adhere to and support the order, and those that oppose and seek to undermine it. At this level, the graph is essentially open-ended, and conflict is seen to be endemic, with disputes of this kind essentially irresolvable.

This "Standard Theory" of conflict now allows us to see the elements of context within which the disruptive form of war is conducted. Generally, if history is an indicator, parties engaging in the disruptive form of war have an identity dispute with the stronger party. If the particularity of the weaker, let us say insurgent, party is such that the dispute is confined to the level of struggle, then there are prospects for eventual resolution of that dispute, even if far off and brutal. The unification of an independent Vietnam under the communists comes to mind. On the other hand, remembering the tendency of disputes to morph, it is not that hard to envision the struggles of Al Qaeda, the Taliban or Arab Spring insurgents growing into an open-ended dispute about the global order. The implication is that what Western powers do in the individual engagements or campaigns might change the natures of local disputes. This must be kept in mind as we proceed to dissect the disruptive form of warfare in order to provide insights into how strategies for engagements and campaigns might be crafted.

The Elements of Disruptive Warfare

To extend the physics analogy, the Navy teaches the "fire triangle"; in order for a fire to burn, three things are needed: fuel, oxygen and heat to ignite it. Similarly, disruptive warfare requires three things for it to be viable. The first is some form of sanctuary. This may range from the ability of insurgents to hide among the populace to political restrictions in the form of inviolable territory across a border to the opacity of the seas. Being very weak in relation to the opponent, disruptive forces must be able to avoid contact except under the right conditions. The second requirement is that there must be some feasible coercive or catalytic defeat mechanism available. In other words, the cumulative effect of disruptive operations must produce a sufficient level of dismay in the enemy to precipitate a withdrawal or a willingness to negotiate under adverse conditions. Thirdly, there must be a tactical mechanism that imposes cost on the enemy while limiting the

cost to oneself such that the war is sustainable over the long haul. If any of these requirements are lacking or are removed by the other side, the disruptive form will fail.

There appear to be two basic ways to counter the disruptive form of warfare. The first is to adopt a form of conflict management strategy and the second is to fight fire with fire by adopting the disruptive form oneself. In reality, current counterinsurgency doctrine is a blend of each, with the disruptive form predominating.[12] However, the proper mixture of force and persuasion cannot be understood or calculated unless the structure of the warfare form is known—in the context of the particulars of the current conflict. Then and only then can one decide whether to pursue dispute resolution (to "win" the struggle) or adopt a conflict management strategy. Once that decision is made, then one can proceed to examine opportunities for removing one or more of the elements of the insurgency "fire triangle." Success in this endeavor might "win the war" but as with a fire, if the elements remain in place, the fire will reignite. Thus a follow-on strategy is needed for keeping the elements of insurgency from coming together again (win the peace), or, if no feasible course of action along that line is available, one must consider reverting to a conflict management strategy. At every step of the way, the strategist must consider whether the actions being taken, regardless of their immediate success, will cause the dispute to morph, either with regard to its nature in the context of the parties involved, or by having it "jump the fire breaks" and become something larger and endemic that involves regional or world order.

Conflict Management

If we understand war to be one manifestation of the spectrum of conflict that is generated by a dispute among two or more parties, we are in a better position to see the meaning of a conflict management strategy. Disputes among nations or groups spawn conflict, which may range from political maneuvering to all-out war. Wars may or may not settle the dispute, a fact acknowledged by Clausewitz when he said that in war the results are never final. Depending on the nature of the dispute and the conditions attending it, each disputant will have differing levels of motivation both going into it and at various points along the timeline of the dispute. The forms of warfare are applied within this context. As previously mentioned, disputants may adopt either of two kinds of strategy—one aimed at resolution of the dispute or one whose purpose is to manage the degree and kind of violence associated with the dispute. Conflict management strategies are adopted when political or military conditions close out the possibility of a successful dispute resolution strategy. The objective is to remain viable in the dispute until some future point at which conditions again favor the adoption of a dispute resolution strategy. Examples of conflict management strategies range from deterrence and

containment to some forms of counterinsurgency to peacekeeping to just hiding out and biding one's time.

If the heroic or systematic form of warfare is frustrated by its encounter with disruptive warfare, adoption of a conflict management strategy is a common and sometimes viable response. Adoption of a conflict management strategy is a tacit acknowledgment that the heroic/systematic form must be at least temporarily abandoned, along with its inherent component of a quick or at least predictable victory schedule. The conflict must be drawn out for some indefinite period of time. Nations and armies do not willingly admit this to the public or even to themselves. This disconnect between doctrine, ethos, and reality produces the cynicism, both individual and corporate, that leads to the breakdown in discipline, institutional coherence and public support. In theory it would be better for a service and government to acknowledge the true state of affairs and set about adjusting expectations and even corporate ethos to gain the institutional resiliency needed for the long haul. When victory becomes a fiction, the results are corrosive.

Conflict management can take the form of security assistance, "Vietnamization" being one instantiation. In other words, the host country's armed forces are trained and equipped so that they can carry on the fight. The supporting country does this because it does not see a strategy that would allow it to defeat the insurgents, so it attempts to extract itself by creating a viable indigenous army. What that army would be able to do in the future is unclear, but if it is viable, at least the supporting country has not "lost." Other strictures on the use of force might be imposed, such as putting the North Vietnamese dams off limits to bombing. The whole idea is that there is no apparent path to "victory" but acknowledging defeat is unacceptable. Thus the disputant attempts to create stable conditions that prevent defeat until some future opportunity might arise. However, conflict management does not mean a lack of violence; it simply means that one acts to constrain the vector and nature of events so as to avert defeat until opportunities for winning arise. Counterinsurgency can easily take this form. What is important is for the nation or force pursuing this kind of strategy to admit to itself that conflict management is what it is up to and not confuse itself into thinking it is on the road to dispute resolution.

Fighting Fire with Fire

The other method for dealing with disruptive warfare is to adopt some form of it oneself. There are indications that the United States is doing so in Afghanistan. In this case it is manifested in the form of drone strikes on Taliban leadership across the border in Pakistan. The United States enjoys sanctuary in that it has drones operate from secure airfields and their operators are in Nevada, it has a plausible defeat mechanism in the

form of decapitation, and it has a sustainable tactical mechanism in that the drones are relatively cheap and hard to hit.

However, adoption of the disruptive form demands a shift in ethos. Abandonment of a quick or predictable win is just the start. Drone strikes are anything but heroic, either with regard to the technology or its operators. This may allow a form of cynicism to seep in as the "warriors" are not subject to personal risk and go home for dinner after their shift. Perhaps more importantly, adopting the disruptive form requires pushing the boundaries of international law. Al Qaeda and the Taliban clearly violate international norms in a number of ways, including using Pakistan as refuge. The United States, for its part, walks a fine line with its drone strikes. Advances in precision targeting may reduce harm to innocents, but denying sanctuary to disruptive operatives will continue to challenge traditional views of norms.[13]

The battles of the Atlantic in both world wars offer additional perspective on fighting the disruptive form with the disruptive form. As previously mentioned, disruptive warfare requires a combination of sanctuary, a strategic defeat mechanism and a sustainable engagement tactic. For the German navy these consisted of, respectively, secure ports (submarine pens under thick concrete roofs), the "tonnage theory," which specified that a sufficient rate of sinkings in excess of allied ship replacement capacity would "bring England to her knees," and the stealth of a U-boat torpedo attack. Initial allied "heroic" efforts to sweep the sea-lanes and bomb submarine pens proved fruitless and the rate of sinkings in the initial going of World War II approached the catastrophic. In the end, a form of counterdisruptive warfare—the convoy—was adopted. The convoy disrupted the third requirement for disruptive warfare, a sustainable tactic. Escorted convoys both vitiated the damage done by U-boats and also increased the risk and loss to the U-boat force to the point that the disruptive form was unsustainable at an effective level for the Germans.

In terms of the broadest field of regard in our model of conflict, the dispute, adoption of the disruptive form against an opponent doing the same produces some difficult questions. Especially with respect to its application on land, how does one know one is winning, or for that matter has won? The inherent opacity of the disruptive form makes progress assessments problematic. Body counts have proved to be worse than worthless, and even more focused measures such as the tally of captured and killed leaders may be deceiving. The number of terrorist attacks or ambushes may be an indicator, but these could also be deceiving if the enemy is simply regrouping or biding his time. This state of affairs leads us to an element of disruptive ethos that is almost a fourth strategic requirement: faith in the defeat mechanism, along with massive patience and persistence. It is certainly possible that for extended periods of time no progress is discernible and then, abruptly, the opponent collapses. While not a matter of disruptive warfare *per se,*

the collapse of the Soviet Union occurred in the context of a disruptive struggle with the West. This is all to say that the conduct of disruptive warfare is oftentimes a faith-based exercise, something that would appear to be unprofessional and negligent to one who is steeped in the ethos of systematic or heroic warfare.

Precipitous collapse of the enemy or not, how does one conclude a disruptive fight? Clausewitz again offers us some insight with his concept of culminating point of victory. He says that any offensive, regardless of how successful, must culminate in some form of defense.[14] In the heroic and systematic forms this usually means setting up physical defenses, establishing a military government of occupation and/or nation building. In fact, when this process has been flubbed, a disruptive insurgency has arisen, Iraq being the most notorious recent example. But what happens at the end game of a disruptive war? Precipitous collapse of the enemy likely results in the same measures that attend the end of a disruptive or heroic fight. However, if the enemy's demise is less clear cut, the putative victor may be forced to adopt some type of conflict management strategy. This could take the form of long-term occupation if the idea or doctrine that spawned the insurgency has not been discredited or eradicated. Open-ended occupations have always eroded the ethos of the occupying force, just as being a jailer proves hazardous to the moral fiber of guards. Nations should take this into account when they decide to adopt disruptive warfare to counter a disruptive foe.

Another moral hazard associated with disruptive warfare is the involvement of innocent parties. It is certainly true that civilians have been killed in heroic and systematic wars. In some cases, such as the German pogroms against the Jews and Poles, such killing is an evil accessory to these forms. Most often, civilian death, injury or displacement is an inadvertent side effect of heroic warfare. Systematic warfare frequently involves attacks on civilian infrastructure, but not normally with the express intent of killing civilians, although civilian casualties associated with World War II strategic bombing were horrific. In disruptive warfare, innocents or at least third parties are frequently inherent elements. Terror against civilians is an integral element of insurgencies. Innocent third parties are pawns, as are, to some extent, one's own forces. One has only to observe the role of suicide bombers in Middle Eastern insurgencies to understand that the life of a disruptive operative has a very different value than a heroic or systematic warrior. Disruptive warfare is fundamentally cumulative and attrition based. A disruptive strategist certainly wants to minimize risk to his forces, but this is for an objective reason. Minimizing tactical risk is an imperative of a cumulative campaign; it has nothing to do with the worth of the individual warrior. This is in stark contrast to the heroic form, in which the individual is valued because he or she is critical to victory. This devaluing of individuals is an inherent part of the logic of disruptive warfare that can corrode the

ethos of any organization conducting it. An indicator of this imperative associated with the disruptive form may be found in the attempt by the Obama administration, ostensibly a liberal values–minded organization, to justify the targeted killing of American citizens that are members of Al Qaeda.[15]

Conclusions

Being able to see a larger forest, the forms of warfare, provides us not only with new and useful insights on the dynamics of warfare, but also illuminates the intimate connection between strategy and ethos. In a very real sense, every strategic plan and decision is a moral statement. Our strategy cannot be contemplated in isolation from the moral agent—the military—that executes it. If this happens, the moral fabric of the military may deteriorate and with it, its fighting value. To the extent that this happens invisibly, the greater the overall risk.

In addition to this general conclusion, several others suggest themselves, each flowing from the concept of warfare form. To begin with, nuclear weapons may have made the systematic form obsolete. A nation possessing nukes will not likely allow itself to be overrun or otherwise reduced to impotence without letting them fly. Assuming that no nation is willing to suffer nuclear attack, the only choice is some kind of checkmate achieved through heroic warfare or a disruptive campaign to undermine the enemy's will. The idea of a heroic checkmate seemed to be at the heart of the 1980s AirLand Battle doctrine.

The heroic form of warfare has shown it can produce a robust ethos that can withstand the corrosive effects of a shift to conflict management. However, if the nation elects to pursue its own form of disruptive warfare, an extension, say, of drone-empowered decapitation (assassination?) of Taliban and other troublesome nonstate actor leadership, a change of ethos would be required if this mission fell to the military (instead of the Central Intelligence Agency) and constituted the main thrust of a future extension of the war on terror. It might be possible that such an effort could be roped off to a particular section of the Air Force or Army, thus limiting the effects of ethos shift, but with the current joint command and control arrangements established by Goldwater-Nichols, there is little chance disruptive operations can be carried out without the broad involvement of all the services. The challenge therefore for strategists and military leadership is to somehow maintain the heroic ethos intact while it adopts a different form of warfare. This cannot be done if we do not acknowledge the existence of these warfare forms as the overarching patterns of conflict and their profound influence on the ethos of the military services.

Notes

1. Adam Smith, *The Wealth of Nations* (University Park: Pennsylvania State Univ., Electronic Classics Series Publication), p. 364, www2.hn.psu.edu/.
2. Marshall MacLuhan, *Understanding Media: The Extensions of Man* (Corte Madera, Calif.: Gingko, 1994).
3. Jared Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (New York: W. W. Norton, 1999).
4. Henry E. Eccles, *Logistics in the National Defense* (Harrisburg, Pa.: Stackpole, 1959), p. 124.
5. Kevin McCranie, *Utmost Gallantry* (Annapolis, Md.: Naval Institute Press, 2011), pp. 116, 158, 218, 248. McCranie's discussion of Jones' oceanic strategy is distributed in bits and pieces throughout the book, but in the aggregate it lays out very well the elements of a disruptive strategy. Of note is the tension between Secretary of the Navy Jones and some of his ship captains. Jones, in consonance with the demands of a disruptive strategy, wanted to limit risk to his ships and ordered captains to avoid decisive engagements with the Royal Navy. The captains, imbued with the heroic ethos, hungered for battle and glory.
6. Carl von Clausewitz, *On War,* trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton Univ. Press, 1984), p. 89. Clausewitz's trinity consists of primordial violence, hatred and enmity, which are associated with the people; the play of chance and probability, which is associated with the armed forces; and war's subordination to policy, which is associated with the government.
7. James Kitfield, *Prodigal Soldiers* (New York: Simon and Schuster, 1995), pp. 73, 121–22.
8. Stephen Downes-Martin, "Operations Assessment in Afghanistan Is Broken," *Naval War College Review* 64, no. 4 (Autumn 2011), pp. 103–25.
9. Clausewitz, *On War,* p. 161. Clausewitz's discussion of the difference in nature between the early victories of Napoleon in Italy and Western Europe and his later failures in Russia and elsewhere illustrates the limitations on the heroic form of warfare. Clausewitz's entire book is essentially based on the heroic ethos.
10. Ibid., p. 139.
11. Ibid., p. 570.
12. U.S. Army, U.S. Marine Corps, *Counterinsurgency,* FM 3-24/MCWP 3-33.5 (Washington, D.C.: December 2006), chap. 4; U.S. Defense Dept., *Counterinsurgency Operations,* JP 3-24 (Washington, D.C.: 5 October 2009), chap. 9, www.dtic.mil/. The joint publication goes much more deeply into the disruptive aspects of counterinsurgency.
13. For an exposition defending the U.S. position on drone strikes, see Michael N. Schmitt, "Drone Attacks under the *Jus ad Bellum* and *Jus in Bello:* Clearing the 'Fog of Law,'" *Yearbook of International Humanitarian Law* 13 (2011), pp. 311–26. For an argument against the legality of drone strikes see Morris Davis, *Combatant Immunity and the Death of Anwar al-Awlaqi, Jurist Forum,* 17 October 2011, jurist.org/.
14. Clausewitz, *On War,* p. 566. If we extend Clausewitz's logic, we can see that we must not do something during a war that makes a defense of victory impossible. Thus the Japanese attack on Pearl Harbor so riled the American public that any chance for some kind of heroic checkmate by Japan had evaporated. Moreover, it had empowered the Roosevelt administration to adopt the systematic form of warfare, since it generated huge public support such that the logistics were fulsome.
15. U.S. Justice Dept., "Lawfulness of a Lethal Operation Directed against a U.S. Citizen Who Is a Senior Leader of al Qa'ida or an Associated Force," white paper, reported by NBC News, 5 February 2013, available at msnbcmedia.msn.com/.

CHAPTER SIXTEEN

War-Gaming Network-centric Warfare

The familiar techniques of war gaming will be insufficient for scenarios involving network-centric warfare. NCW, as it is known—with its focus on speed, downstream effects, and information flow—will require of gamers more than simply additional computational power or communications bandwidth, although these will certainly be needed. Gamers will need a new framework in which to apply these tools.

In 1886, Lieutenant William McCarty Little introduced war gaming to the Naval War College. The concept found immediate acceptance; faculty and students recognized that the war game was well suited to analyzing the characteristics of naval warfare of the time. Gaming has since been applied to all manner of warfare, in a variety of ways. As warfare has become more sophisticated, multidimensional, and joint, the challenges of gaming it have increased. Even the application of computer technology has not been effective for all purposes, especially in games that involve large forces. We are now facing, in network-centric warfare, a new form of conflict that will challenge gamers even more severely. In this article we will attempt to develop a framework to help us identify techniques necessary for gaming network-centric warfare.

A characteristic of warfare that has made it amenable in the past to simulation through gaming is its inherently structured nature. Troops operate in formations; so do ships and aircraft. Groupings of units or formations generally operate according to doctrine, in some specified relationship to one another. As a result, war-game designers have been able to govern and model the movements of forces and to project the results of combat with the enemy by relatively simple rules. A scenario that confines itself solely to surface ships, ground forces, or aircraft generates possible interactions and outcomes that are few enough in number for a "playable" game—one with rules sufficiently simple to allow it to be played in a reasonable period of time and at acceptable effort and expense. However, as the numbers and types of playing "pieces" grow and the flexibility of their employment doctrine increases, the difficulties of gaming by sets of rules swell almost

exponentially. Today, despite the impressive increases in computing power, operational-level games involving the full range of forces (which includes space assets), even in traditional hierarchical command arrangements, must generally be controlled and adjudicated not by rules or algorithms but by the professional judgment of human umpires.[2]

The current state of affairs in war gaming, then, is not totally satisfactory. Still, it is possible to design and execute games that have a reasonable degree of validity. By *validity* we mean a correspondence with reality sufficient to allow useful insights to be drawn from the game's results. Validity is achieved through careful design of the scenario and control techniques, and recruitment of players and umpires with appropriate credentials. Of course, computer models are critical, but they are usually employed "off-line"—that is, specialized models are used to support the judgment of the human umpires who ultimately decide the aggregated outcomes of complex and extensive engagements.

A Basic Gaming Framework

War gaming can be classified in many different ways. One common distinction is between *educational* (or training) games and *research* games. In educational games, the objective is to acquaint players with warfare situations and exercise their decision-making skills. Designers of educational games may stretch the bounds of probability somewhat in scenarios, as may control cells in move-outcome assessments, in order to ensure that players are confronted with the decision-making situations desired by the game's sponsor—the command or entity (not necessarily the war-gaming center where it is conducted) that created the game requirement and set its objectives. Research games, in contrast, are designed to generate insights into military problems; designers and controllers attempt to inject as much realism as possible, given the inherent limitations of the medium.

Network-centric warfare would be gamed primarily for research purposes; however, of course, research games frequently have instructional value, and the proposals advanced here would apply to educational and training games as well.

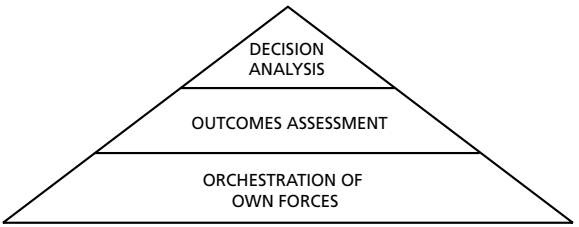
War games are also classified by the way they deal with time. Some proceed in stages, known as "moves." In each of these steps, players (or groups of players) privately assess a situation as they perceive it—on the basis of "intelligence" provided by the control cell, and within the scenario framework—and then report to the controllers their intentions (force movements, dispositions, and fighting orders) for the next specified period of time. The control cell's umpires, receiving inputs from all player cells, analyze their interactions to identify likely combat engagements and assess their outcomes. Generally, moves cover short periods of time for tactical-level games and much longer increments for operational and strategic-level ones. In contrast to such stepwise exercises are *operational* games, which involve "moving game clocks" and present players with

continuously changing situations to which they must respond. The "clocks" in such games, which are almost always computer based, typically run at four or six times normal speed. Operational games tend to be limited to the tactical level, due to the necessarily limited spans of time they can accommodate.

Network-centric games virtually demand moving game clocks because of the criticality of time dynamics. In other words, one of the primary benefits of NCW is that the side employing it can generate rates of change that are unmanageable for the other side's command and control system. Because of this, a timestep-move convention would be unsuitable. A moving game clock would be sufficient for tactical-level play. However, analysts believe that NCW will produce an intermixing, or compression, of the levels of war.[3] If so, it will be necessary to accommodate both short and long-term phenomena in NCW-based war games. One possibility would be composite operational and move-step games, in which "time" advances at different speeds in various portions of the game. To meet tactical-level objectives, designers would set aside periods in which players would operate against a moving game clock, alternating with move-step phases embracing much longer increments of game time. At the start of each successive operational-play session, umpires would assess the war's progress to that point and produce a new situation for players to confront. There are probably other ways of dealing with the problem of time in network-centric games, but it is clear that traditional methods will not suffice.

In order to explore fully the needs of network-centric war gaming, however, we must go beyond traditional classification methods. The underlying structure of war games suggests a set of categories that illuminate the way in which NCW relates to traditional gaming. All war games, whether they involve fighting sail or network-centric fleets, soldiers, and satellites, share a certain hierarchical organization. We will refer to the levels of this structure as "dimensions" (figure 1), in order to avoid confusion with the "levels of war"—tactical, operational, and strategic—which themselves form a different gaming framework.

FIGURE 1
"Dimensions" of Gaming



At the bottom of the pyramid is the most fundamental dimension of gaming. If blocks representing ships are laid out, perhaps on a chart table or a grid floor, players can move them around and see directly their relationships to one another at various points. Similarly, the U.S. Army routinely conducts "rock drills," in which markers (as simple as bits of stone) representing platoons or tanks are used to orchestrate maneuvers. Even complex operations, including their logistical flows, can be simulated in essentially this way, using either physical markers or computer symbols. Many games need to go no farther. This first dimension is an extremely important aspect even of more ambitious games; the analytical or instructional usefulness of outcomes at higher dimensions of a game depends on how realistically forces are played. If tactics are used that would be impossible to execute in the real world, assessments of interactions with the enemy will be invalid.

The next dimension is assessment of outcomes, the determination of what would have happened in a confrontation of forces. Whether based upon a roll of the dice, the "crunching" of complex algorithms by a computer, or the judgment of human umpires, the outcomes form the basis for judgments of how effectively players orchestrated their forces, and for the input to be provided them for subsequent decisions. Many games stop at this dimension; such exercises are generally analytical and are meant to draw insights into the suitability of certain tactics or the efficacy of new equipment. Here again, fidelity to real-world phenomena is necessary in order to prevent distortions at the dimension of player decisions. Skewed assessments can lead to faulty analysis and to decisions that yield no useful insights.

The topmost dimension is the analysis of player decisions. Frequently the focus of educational gaming, the purpose of such analysis is to help players perceive objectively their own reactions to warfare situations. It must be emphasized, however, that many analyses focus on aspects other than player decisions. For instance, a game intended to explore the logistics of amphibious operations might require players to develop possible courses of action; the factors affecting these courses of action might well be of more concern in terms of game objectives than specific plans produced. In order to simulate the "fog of war," players in educational games are typically provided not the actual, precise, and complete outcome assessments—the "ground truth," about which more below—but only those elements (or indications of them) that might realistically be observable. Research games do not often deal with this dimension, because of its indeterminate and unpredictable nature; a notable exception is the Navy's Global War Game series.

Network-centric Warfare

Having established a baseline understanding of war gaming, we must do the same for network-centric warfare. Stripped of the jargon and mysticism that has grown up

around it, NCW can be simply described as the style of warfare that is possible when individual combat units are robustly connected by information. When this is achieved, many familiar constraints disappear, and units become able to interact in many more productive ways than are possible under traditional systems of command and control. In fact, the potential flexibility is so great that centralized orchestration or management, however lightly exercised, becomes a limitation. When units know what is going on and are confident that others do as well—that is, when they have *shared awareness*—they can themselves avoid wasting efforts on enemy units that other friendly forces are engaging, or even shooting at each other. They can also render mutual support without higher-echelon coordination, fixed physical relationships to each other, or restrictive doctrine. The net effect of this new flexibility is a "swarming" warfare style that demands a fundamentally different approach to command and control than has been practiced up until now.[4]

Current U.S. practice employs layers of staffs to coordinate the efforts of command echelons below them. Plans and orders originating from a senior commander produce a series of staffing cycles in which successively junior echelons distill the orders of the next higher echelons into more focused orders for their own subordinate commanders. This cascade of planning and order writing can produce delay and confusion. In a network-centric environment, fighting organizations will be much "flatter," because the need for intermediary coordinating layers will be obviated. However, the exact nature of future command and control requirements, should new and radical policies and techniques be adopted, cannot be determined without resorting to some form of gaming and simulation.

The principal requirements for achieving network-centric warfare are a network and shared awareness. By a *network* we mean linkage of all units and echelons of a force with all others. But merely wiring together a collection of units does not guarantee that NCW or its benefits will result; network-centric warfare is a behavioral, tactical, bottom-up phenomenon. The network cannot be achieved either merely by tuning everyone's radios to the same frequency, because voice channels alone cannot deliver the required diversity and volume of information. Nor is e-mail sufficient. We are talking about significant bandwidth, enough for simultaneous transmission of voice, video, data, and any other necessary medium of communication. All this is necessary because shared awareness is a robust phenomenon—comprehensive, responsive, adaptable, and survivable—or it does not exist at all.[5]

Shared awareness entails more than the possession of large amounts of information; in fact, flooding the network with information will guarantee that shared awareness does not occur. Some undertakings require complex graphics and a sophisticated stream of diverse media; in others, only a few words are necessary. In any case, the delivery of

information is not enough; it must be absorbed and interpreted by the people within the units. Shared awareness, it can be seen, is a concept still in need of refinement by the naval warfare community. For our purposes, it is a condition in which every element of a force has sufficient grasp of its own situation and that of other friendly forces to synchronize its actions with them without detailed orders from next-higher echelons, which themselves would limit their exercise of command and control to the promulgation of broad "commander's intent."

So understood, shared awareness via networks powers network-centric warfare. In turn, the "swarming" style of warfare thus enabled will generate higher operational tempos than ever before. Because of the psychological effects of shock and paralysis that such speed promises to inflict, it may become possible to produce higher-order, even strategic, effects very quickly. It is for this reason that many writers have envisioned the weakening of the boundaries between the tactical, operational, and strategic levels of war.[6] This compression would be furthered by information operations, which would themselves be enhanced by networking. All of this has important implications for gaming.

Putting It All Together

Traditional war gaming employs markers, maps, and rules as substitutes for real warfare. What should gamers use to represent the network-centric environment? It seems clear that the only way to game network-centric warfare, as is the case for actually waging network-centric warfare, is to create a network of players with shared awareness. But what kind of network is needed? One of the principal values of gaming is that it allows its practitioners to simulate warfare "on the cheap"; field exercises using real troops and ships are prohibitively expensive, especially for educational and research purposes. How are gamers to replicate a network without generating a real one? The interrelated issues of shared awareness and robust networking confound our current attempts to game network-centric warfare. Overlaying specially designed local-area networks onto traditional command structures does not constitute a satisfactory simulation of the NCW environment. Until a tactical network of units, each of them exercising a great degree of autonomy, can be simulated, it will be impossible to game network-centric warfare adequately.

One promising line of development is *agent-based models*. These programs, fairly simple in concept but demanding considerable computer power, consist of a number of individual "agents," virtual entities whose actions are governed by rule sets.[7] However, merely dictating rule sets is insufficient for exploring network-centric warfare. Units in the net must be able to generate information for headquarters, and anomalous behavior on the part of a few units will be necessary in order to create realism for the players in the command center.

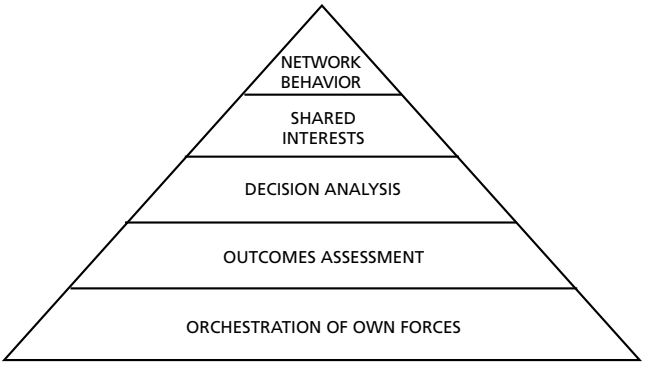
Absent a suitable model to simulate a network, an actual one will be required. To achieve that, distributed gaming will be necessary. The technology that distributes the gaming might be one that units would use in actual operations. If so, the control cell would need to generate "synthetic" forces, both "Blue" and "Red" (friendly and opposition), that would create a realistic combat environment in units' display systems. All of this implies a much closer relationship between war-gaming centers and operational units than currently exists.

Still, a network is of no use unless players can effectively use the information it is capable of moving around. It is simply not sufficient to dump information into player cells; commanders and staffs would be quickly overwhelmed. Therefore, a prerequisite to the achievement of network-centric gaming is the development of techniques for creating shared awareness among the players. This may seem a chicken-or-egg dilemma: which should come first? However, it appears from the Navy's experience in the latest games of its Global series that shared-awareness technology can be employed and techniques "incubated" in the context of traditional command and control structures; thereafter, they can be applied to the new network paradigm. Then, and only then, can we embark on the process of effectively gaming network-centric warfare.

A Modified Gaming Framework

With the principles of NCW gaming in mind, we can alter (figure 2) the gaming structure by adding two new dimensions, producing a framework in which the higher and more challenging dimensions rely as before upon the execution of the more basic levels. This reliance has important implications as we proceed with the development of network-centric warfare gaming.

FIGURE 2
Higher-Level Dimensions



First, as we have seen, gamers cannot ignore familiar skills and functions as they strive for more exotic applications. Errors or omissions in lower dimensions would call into question any insights derived or phenomena observed in the higher ones. That is not to say that absolute fidelity is required in all aspects; the attempt would probably result in a game that was unplayable or too expensive. However, it does mean that designers must pay attention to the lower dimensions and find ways to simulate properly, or fix, the variables that reside there.

The alert reader may object that the two new dimensions do not belong on top of the pyramid—that they should be considered rather as parts of the lowest dimension. This objection has considerable validity, on several counts. First, it is clear that the process of getting shared awareness and networking right is akin to orchestrating the tactical doctrine of forces. Second, one might well argue that it is the analysis of human decisions that is the most difficult and complex problem in gaming. Notwithstanding, the new dimensions are here placed atop the pyramid to highlight the extensions of gaming logic that are needed to game network-centric warfare effectively.

The dimension of player decisions becomes very interesting in network-centric gaming. Since shared awareness is probably sensitive to competence of command, sponsors will have to be especially careful about whom they invite as players in NCW games. A reflexive application by a senior player of a traditional, centralized command style would probably end any hope of generating true shared-awareness behavior in a game. Moreover, players "taken off the street," with no training in or understanding of shared-awareness theory, techniques, and requirements will likely distort findings from games that seek to explore the various phenomena encountered.

If all this is true, several implications emerge. First, it may be necessary to change command and control doctrine before NCW can be gamed, in order to train the officers who will be the players. In other words, game designers must work closely with command and control experts to synchronize player capabilities with game demands. Second, if NCW gaming achieves any degree of validity—that is, correspondence to a future warfare environment—the education and training needed by commanders for network-centric warfare are likely to be somewhat different than is necessary today.

Third, development of NCW gaming must proceed step by step up the framework. In other words, gamers should not begin the process by lashing together a network; they need first to game shared awareness alone, in the context of current scenarios and equipment. After collecting insights and perfecting their techniques, they can move with confidence to true network gaming.

Fourth, the development of network-centric warfare war games will bring a fundamental change to the gaming environment. Traditional games, whether played on map

boards or computers, are conducted by moving playing pieces around in geographical arenas; the pieces' movements and interactions are governed by rules, perhaps quite complex. In network-centric gaming, while traditional geographic displays will be used, the most important "map board" will be the human mental picture. This is not to say that a commander's situational awareness has not always been critical—it has. But it will now be especially difficult for players to keep track of what is happening in the game, because events will orient themselves around the flows of information between networked players. While game pieces (force symbols) will continue to be necessary, the arena that counts in the network-centric game will be virtual, and there are as yet no adequate rules for the movement of information in that topography. At a minimum, gamers must recognize the fundamental shift of venue and consider how it affects design, play, and analysis. For instance, whereas previously gamers would use tactical experts as umpires and analysts, in NCW gaming they may want to involve psychologists or other social scientists, as well as perhaps physiologists and physicians.

Gaming Effects

Closely paralleling the development of network-centric warfare is a movement tending to shift thinking about military operations away from input-based measures (such as sorties flown, ground gained, or targets destroyed) and toward an output-oriented focus on the ultimate effects of military actions—that which, from the commander's perspective, has been caused to happen, or prevented. A classic, if limited, World War II example of this distinction arises from the cruiser-destroyer engagement near Guadalcanal on 8–9 August 1942: in "input-measure" terms, the result was the disaster (for the U.S.-Australian force) known as the battle of Savo Island. But because the Japanese commander, Admiral Gunichi Mikawa, focused only on the "input" measure of allied warships sunk, the tactically victorious Japanese cruisers and destroyers departed without having attacked the vulnerable U.S. invasion shipping, which had been their ultimate objective.

The desired development of effects-based measures of effectiveness will bring with it a further fusion of the three traditional levels of war. This is characteristic of the emerging nature of warfare in the information age and has been predicted by many writers. It is a difficult idea to get hold of, and almost impossible if one remains tied to conventional intellectual frameworks. Once again, in terms of war gaming, simply superimposing effects-based planning onto the traditional gaming approach will not be sufficient; the whole approach to planning and assessment has to change.

Presently, the same rule sets that govern the movement and engagements of "pieces" determine the consequent attrition. The strategic effects of this attrition are then extrapolated—that is, if a certain percentage of an enemy force is destroyed or a particular

category of targets is hit, certain repercussions upon enemy decision makers are assumed to follow. Detailed exploration of the linkages between battlefield events and political decisions has not been a regular feature of operational-level games. Combat—the use of force itself—has been the centerpiece, and its political and moral effects usually presumed. All traditional gaming models and methods are designed according to this approach.

Some work, however, has been done on effects. The Joint Warfare Analysis Center conducts detailed and sophisticated analyses of how various types of effects can be generated through bombing and other military action. To date, most of its work has focused on what may be termed "definitive effects," those whose mechanisms are physical—such as neutralizing an electrical generation grid or disrupting a rail transportation system. Such an effect can presumably be more easily predicted than can those that lie in the realm of belief and reason. The latter, whether catalytic or coercive, involve inducing enemy commanders or political leaders to make decisions one wants them to make. The complexities and difficulties of precipitating congenial decisions by hostile parties are self-evident. However, well-designed games might at least be able to generate useful insights into the problem.

To that end, a fundamental reorientation of the gaming process is required. Gamers must center their analyses, rules, and gaming contexts on the minds of the decision makers whom military actions are designed to influence. Models and methods must be capable of rationally depicting, assessing, and synthesizing the effects of a wide variety of events on these decision makers. In this context, the use of force is only one of an array of factors that must be considered if war games are to reflect in a valid way the influence of combat outcomes on an enemy's strategic decisions.

One way to shift gaming to an effects-centered approach is to focus on specific desired enemy decisions, to have players begin by analyzing the full range of factors, including (but not only) military ones, that might induce them. Such an approach would tend to keep players from ascribing *a priori* utility to various kinds of military actions. A sensitivity analysis might be able to identify certain types of military outcomes that would be most influential. The game proper would explore the prospects for generating those outcomes.[8]

Gaming Red

In addition to the taxonomy we have already laid out, war games can be classified as *one-sided* or *two-sided*. In one-sided games, the players are all "Blue," or friendly; game controllers play "Red" (the enemy). One-sided games are frequently used when the sole concern is the orchestration dimension. In higher dimensions, one-sided games are

most often associated with educational games; Red's actions are chosen to produce the desired decision-making situations for the players. In two-sided games, by contrast, there are both Red and Blue players, and the opposition is free to act as it wishes; the control cell limits itself to assessing outcomes and briefing "intelligence" on them to both sides.

It might seem that if a network-centric game focused upon effects is preceded, as described above, by an analysis of factors bearing upon enemy decisions, the game itself could be one-sided, in effect a high-tech orchestration exercise. This is not the case. Network-centric warfare theory envisions that rapid operations (rapid, that is, in comparison with the enemy's ability to react) will preclude ("lock out") certain Red military options and cause the kind of decision-making paralysis that French commanders displayed in 1940 in the face of the German blitzkrieg. One-sided gaming could not determine if Blue network-centric operations induced such effects. Therefore, much network-centric gaming will have to be two-sided.

In present two-sided games, Red cells typically "play" orders of battle that reflect fairly accurately those of actual states being simulated. Organizations specializing in acting as the opposition in war games (like the Office of Naval Intelligence Detachment at the Naval War College) even employ enemy doctrine, insofar as it is understood. In network-centric gaming, however, the real key will be the accurate simulation of the enemy's command and control. Whether one-sided or two-sided, war games in which Red either is given artificially good situational awareness or is allowed face-to-face communication between all its command echelons will generate distorted outcomes. NCW game designers must ascribe networked capabilities only to player cells that would actually possess them; the Red side must be designed with realistic command and control mechanisms. Only then will players and sponsor be able to perceive the effects of rapid, network-centric operations on enemy decision making.

Ground Truth

Virtually all war games require some mechanism for keeping track of what forces actually exist (friendly, enemy, allied, and neutral), what their condition and capabilities are, where they are, what they are doing, and what they intend to do. Ground truth is, in effect, the sum of the scenario and the moves as privately submitted to controllers and mediated by umpires. Players usually are not allowed perfect knowledge and must rely on their own interpretations of the "observables" supplied to them; controllers or umpires, however, need ground truth so that they can accurately adjudicate combat results. In war games that deal solely with forces and physical geography, maintaining ground truth is a relatively simple matter; the control cells know both sides' strategies

and orders, decide themselves the outcomes of engagements, and maintain a master map and status board with the true positions, movements, etc., of all forces.

In network-centric gaming, however, the focus shifts from geographic to mental terrain, and from ground, sea, and air maneuver to communications and psychology. In such a realm the very concept of ground truth, let alone plotting it, becomes problematic. It might be possible to play an NCW operational game (against a running clock) without keeping ground truth, but it would be almost impossible to analyze the play after the fact. At the very least it will be necessary, therefore, to find ways to capture each side's relative awareness and knowledge at key points. Observers might take notes in command centers, or software solutions may be found. In any case, the whole concept of ground truth will have to be reevaluated.

It is not going to be possible to game network-centric warfare by simply superimposing information technology onto traditional gaming techniques. Network-centric warfare represents in war gaming, as it does in warfare itself, a new frontier, one that will require new theory, new techniques, and new technology. It will also require new kinds of training for players, controllers, and designers.

This is not to say that traditional gaming techniques are made obsolete by the new warfare paradigm. The basic principles of game design remain largely intact. Games will still consist of players, pieces, and rules, and they must, as before, be playable at acceptable outlays of effort, time, and money. Nonetheless, game designers will not be successful in gaming network-centric warfare without adopting new approaches. It is of critical importance that they do succeed, because gaming will be vital to the adoption of this new warfare style among commanders. It will be in war games that they best learn to wage network-centric warfare and to abandon certain ingrained elements of operational and tactical art, such as fixed formations and cascading staff cycles. War gaming will be fundamental in so developing future commanders' confidence that they do not retain old methods past their usefulness, simply out of lack of trust in the new.

Notes

1. For background on war gaming, see Peter Perla's excellent *The Art of Wargaming* (Annapolis, Md.: Naval Institute Press, 1990). For the purposes of this article, we can define a war game as a simulation of real warfare events based on: a scenario, or story, that provides the context for game moves; a playing board (either physical or electronic) that provides an environment in which the pieces can move; playing pieces (again, either physical or electronic) that represent forces; a set of rules that govern how the pieces move and interact with each other; a procedure for determining the outcome of battles; and finally (and most importantly), players.

2. The operational level is one of three levels of war commonly acknowledged by military officers. The lowest level, involving individual units up to divisions and battle groups, is *tactical;* tactics are mostly concerned with the actions of forces in contact with the enemy. The highest level is *strategy,* where the plan of war is linked to national political objectives. The *operational* level exists between the two. There, theater and joint task force commanders devise campaign and operations plans that maneuver forces so as to engage under the most advantageous circumstances, and to link the effects of their tactical actions to the attainment of strategic objectives.

3. David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority* (Washington, D.C.: C4ISR Cooperative Research Program, Department of Defense, 1999), p. 69; see the program site on the World Wide Web: www.dodccrp.org.

4. For more depth on the "swarming" style of warfare, see John Arquilla and David Ronfeldt, *Swarming and the Future of Conflict* (Santa Monica, Calif.: RAND, 2000). This publication is available on the World Wide Web: www.rand.org/publications/DB/DB311.

5. "Shared battlespace awareness emerges when all relevant elements of the warfighting ecosystem are provided with access to the COP [common operational picture]." Alberts, Garstka, and Stein, *Network Centric Warfare.* This is the seminal book on the subject.

6. The phenomenon of compression of the levels of war has been widely discussed in the literature. For one of the first examinations of it, see Douglas A. MacGregor, "Future Battle: The Merging Levels of War," *Parameters,* Winter 1992–93, pp. 33–47.

7. An example of an agent-based model is SWARM, developed by researchers at the Santa Fe Institute. Agent-based models have been found useful in researching complex phenomena. See the Santa Fe Institute Website, www.santafe.edu, and the SWARM Website, www.swarm.org.

8. One computer-based tool that shows promise in facilitating this type of analysis is the "Influence Net." It is based on Bayesian inference, a mathematical technique that calculates the relative influence of one set of factors upon another. The model is applied to particular decisions to be gamed (for instance, an Iraqi decision on whether or not to use chemical weapons). Game designers would, with the help of a virtual web of outside experts, populate the model with the encyclopedic data necessary for its proper functioning. During the game, certain cells would play combat events in a traditional manner; the outcomes would be supplied to a wider net of players who are each responding to the others' inputs. The output of the model would indicate the proclivities of the targeted decision maker at the end of the move. For a basic description of influence nets see www.inet.saic.com/inet-public/.

CHAPTER SEVENTEEN

The Epistemology of War Gaming

Anyone who has conducted or has studied actual warfare knows well its massive complexities.[1]

These complexities do not relieve humans from the responsibility for making decisions—difficult decisions—aimed at navigating their organizations successfully through campaigns, be they in a theater of war or in the halls of the Pentagon. Minds must be prepared beforehand, both in their general, educated functioning and in the specific, sophisticated understanding of conflict and the competitive environments they face. This preparation must be predicated on the internalization of "valid" knowledge about the conflict environment. There are many ways of gaining such knowledge: the study of history and theory, practical experience, and exposure to the results of various kinds of research and analysis. Each of these methods of developing knowledge has its own particular epistemology—formally, a "theory of the nature and grounds of knowledge, especially with reference to its limits and validity," or more practically, rules by which error is distinguished from truth. War gaming is a distinct and historically significant tool that warriors have used over the centuries to help them understand war in general and the nature of specific upcoming operations. The importance of war gaming demands serious examination of the nature of the knowledge it produces.

Before going farther, it is worthwhile to define exactly what we mean by "war game." Peter Perla provides as good a definition as any: a war game is "a warfare model or simulation whose operation does not involve the activities of actual military forces, and whose sequence of events affects and is, in turn, affected by the decisions made by players representing the opposing sides."[2] War gaming, rightly considered, is inherently a method of research, regardless of how people apply it. The essence of war gaming is the examination of conflict in an artificial environment. Through such examination, gamers gain new knowledge about the phenomena the game represents. The purpose of a game is immaterial to this central epistemological element. Moreover, the gaining of

knowledge is inherent and unavoidable, whatever a game's object. The real question is whether such knowledge is valid and useful. This question is all the more important because of the growing reliance on gaming techniques in an increasingly complex world.

This article will attempt to initiate a professional dialogue on the underlying logic structure of gaming by examining the epistemological foundations of gaming in general and ways in which the knowledge gained from specific games can be judged sound.

Perhaps the most compelling reason to conduct such an inquiry is the possibility of insidious error creeping into war games. War gaming, even after centuries of practice, is still more a craft than a discipline, and it is quite possible for rank amateurs, dilettantes, and con artists to produce large, expensive, and apparently successful but worthless or misleading games for unsuspecting sponsors. There is little incentive to apply incisive criticism to games in which heavy investments have been made, and persons or organizations inclined to do so are hampered by lack of an established set of epistemological theory and principle. This does not mean that the majority of games are fatally flawed; it does mean that there is no accepted set of criteria to determine whether they are or not. Judgment as to the success and quality of a war game, especially one of high profile and consequence, is too often the result of organizational politics.

Epistemology

Some elaboration of the meaning of this somewhat esoteric term is essential. To avoid getting sidetracked by philosophical complexities, we can adopt a convention based on current thinking. One widely accepted branch of modern epistemological theory holds that knowledge results from the building of simplified mental models of reality in order to solve problems. The "validity" of a model (or knowledge) emanates from its utility in problem solving.[3] This approach seems sufficient for our purposes. Knowledge is a practical human response to the challenges of our environment. Valid knowledge is that which has sufficient practical correspondence to our environment to be useful for problem solving.

Readers with knowledge of modeling and simulation will immediately find resonances in this definition with widely used definitions of computer simulation validity—for example, "substantiation that a computerized model within its domain of applicability possesses a satisfactory range of accuracy consistent with the intended application of the model."[4] Thus we are not so much concerned with the validity of knowledge in an absolute sense as with the practical utility of knowledge emanating from a game relative to the projected warfare environment in which it will be applied. Most war games are oriented in some way to the future, either explicitly or inherently; accordingly, the predictive value of knowledge emanating from a game is critical. At this point many

veteran gamers will cry foul, as it is widely accepted that war games are not predictive (although there are some who will disagree). To untangle this knot, let us go back to our baseline definition of valid knowledge—that which is useful for problem solving. This presupposes that the environment can to some degree be shaped by decisions. If it were not, war gaming—in fact, any decision-support tool—would be irrelevant. If the environment is malleable, however, there are "right" and "wrong" decisions available to the decision maker.[5] Ignorant decision makers would be at the mercy of chance; their decisions would be shots in the dark, or worse. An informed decision maker—one who possesses valid knowledge about the environment and the potential consequences of alternate choices—could do better than that in a future situation. Valid knowledge is predictive to that extent. However, since life in general and war in particular are influenced by thousands of little happenstances that are beyond the control of any single decision maker (a true definition of Clausewitz's "friction"), "right" decisions do not guarantee success. If they did, war would be formulaic and gaming unnecessary. For that reason, although valid knowledge of the environment is inherently predictive—in that it indicates potentially valid cause-and-effect relationships through which decision makers can bring about their intent—a war game can never be truly predictive.

Setting aside, for now, arguments about certain war games in history that have seemed in some way predictive, we are left with the uncomfortable question of what games are good for if they cannot truly predict. Indeed, why do we game at all?

Why Game?

If we accept the notion that war gaming is inherently a research tool (a definition that includes the produced effects of education, training, experimentation, and analysis) and one that generates potentially valid knowledge, we must ask under what conditions, or for what problems, it can have validity. Can it be used validly in lieu of other tools, or does it occupy a unique relationship to a class of problems for which it is the only valid tool?

Perhaps the deepest treatment of this question is that of John Hanley, who relates the inherent nature and structure of war gaming to the amount and kind of "fuzziness" (indeterminacy) attending a problem. Indeterminacy comprises those things we do not know about either the initial conditions of relevant elements of the problem or about the effects of our potential attempts to solve it. Hanley posits a spectrum of indeterminacy, as follows:

- *No indeterminacy.* The elements of the problem are known and amenable to engineering solutions.

- *Statistical indeterminacy.* The initial set of conditions is a random variable whose statistics we know, and the effects of our actions upon it can be determined. For instance, the chances of a submarine being in a particular area of ocean could be calculated from intelligence, and our search efforts would be shaped thereby.
- *Stochastic indeterminacy.* The initial set of conditions may be known, but the process by which new states of affairs (for instance, battle outcomes) are produced by our actions is subject to statistical variation—the "roll of the dice."
- *Strategic indeterminacy.* The initial set of conditions is known, but there are two or more competing "players" whose independent choices govern the end state.
- *Structural indeterminacy.* Significant elements of the problem are so little known or understood that we cannot define the problem in terms of the other forms of indeterminacy. Such elements might be "indeterminacy in current conditions, the kinematics of the process, acts of nature, the available response time, and the perceptions, beliefs and values of the decision makers."[6]

Hanley describes war gaming as a weakly structured tool appropriate to weakly structured problems.[7] Such problems are those so complex or poorly defined as to require a tool that can accommodate their considerable imprecision. Warfare in general and many of the problems subsumed within it are certainly weakly structured—that is, marked by structural indeterminacy. This adds up to the first part of the answer to our question: We war-game because we must. There are certain warfare problems that only gaming will illuminate.

This imprecision, or lack of solid structure, characterizes both the problem and the tool, and therefore governs the nature of the knowledge produced by a war game. That knowledge is not in the form of a solution to an engineering problem. It is commonly said that war games produce insights, not proofs. This conventional wisdom is correct insofar as it goes, but it is not sufficiently developed to stand as an epistemological principle. Following Hanley's line of thought, we can say that the knowledge emanating from a game is also weakly structured, meaning that such knowledge is conditional and subject to judgment in application. Our confidence in the structural calculations for a bridge can be very high if we combine accepted engineering formulae, accurate measurements, and building materials of the predicted quality. In contrast, however, our confidence in answers produced by population sampling cannot be 100 percent; further, any answers produced by game theory for a particular conflict situation must be understood to be conditional on the scope for free choice enjoyed by the opponent. Answers produced by war games are yet more conditional, due to the wide scope of significant variables attendant to warfare, whether or not incorporated into the game. Perhaps the best way to characterize this conditionality is to say that knowledge produced by war

games is *indicative*—that is, at its best it can indicate the possibilities of a projected warfare situation and certain potential cause-and-effect linkages.

Indicativeness is no mean thing when dealing with a very complex or weakly structured problem. The primary mechanism through which war games produce such knowledge is visualization. Games allow players and observers to see relationships—geographic, temporal, functional, political, and other—that would otherwise not be possible to discern. Seeing and understanding these relationships prepare the mind for decisions in a complex environment. This holds true whether the purpose of the game is education or research.

While weak problem structure is a compelling reason to war-game, there are other equally compelling reasons, each of which has epistemological implications. A common reason for mounting a war game is socialization, either of concepts or people. Many organizations within the U.S. government sponsor games in order to get a wide and diverse set of stakeholders to "buy into" a set of concepts or doctrine. Military "Title X" games (that is, Title Ten, referring to the federal statute that directs the armed services to raise, maintain, and train forces) frequently have this as at least a tacit purpose. Knowledge emerging from such games is less conditional than in other settings, at least with respect to the consensus they are meant to generate. A recent joint war game revealed that none of the military services had invested sufficiently in the suppression of enemy air defenses to support an aggressive airborne assault early in a particular scenario. That revelation was more than just indicative—it was usable intelligence. Such knowledge could be used to alter budgets or even service roles and missions.

Some games are used to acquaint organizations with each other. This has been an important aspect of homeland security gaming in the wake of 9/11. For instance, in a recent homeland security game, a state emergency management agency learned that it had formally to request federal assistance in a disaster, not just expect it to show up. That knowledge was not in the least conditional; the game provided to key officers of a state agency concrete knowledge of federal requirements.

Simulation

War games are inherently simulations of reality. By this we mean that they are simplified representations of a potential future (or perhaps past) warfare situation. Simulation has epistemological implications all its own. Most fundamentally, simulation is a calculation technique, and as such it is coupled to the phenomena it seeks to represent along Hanley's spectrum of indeterminacy. For instance, physicists use simulation techniques to explore subatomic interactions. They can do this with high confidence because the problem set they are dealing with contains no more than statistical indeterminacy.

Naturally, then, simulation of war is less closely coupled to its parent phenomenon because of the high degree of structural indeterminacy involved. In other words, it is far less likely that any warfare simulation would be "valid" due to all the imponderables that are necessarily distilled out.

A war game is an artificial representation—that is, simulation—of war that is used to learn more about a particular situation. A common misconception is that computer simulations are war games. Computer programs are not in themselves war games, although they are frequently referred to as such; war games require human players, who may employ computer programs to assist them. In a broad sense, simulation is the attempt to represent reality to the degree necessary to explore the warfare phenomena in which we are interested. Thus when we talk of simulation in this article, it is in the general sense of war-game design and not the narrower sense of computer software.

Following Hanley, we can attack the issue of warfare simulation by establishing a vertical spectrum of sorts, based on the degree of fidelity a simulation possesses. At the bottom of the spectrum exist such games as Go and chess. These games are abstractions; all that is retained of reality is the essence of conflict. That does not mean that valid knowledge cannot be gained from these games; many wise generals have extolled their virtues in preparing the mind for actual battle. At the top of the spectrum are detailed simulations, attempts to capture as much reality as possible. In between exist what we will call "distillations"—games in which significant simplifications of reality are made for specific purposes. In a sense, all simulations are distillations, because a perfect representation of reality would *be* reality. To put it more practically, exact simulation of real warfare is not possible. Admiral Arleigh Burke illustrated the matter well when he said, "Nobody can actually duplicate the strain that a commander is under in making a decision during combat."

This distilling process has epistemological implications for simulation. Pursuing farther the logic we have been following, we could easily conclude that the knowledge produced by highly distilled games is more conditional and less predictive than that from simulations having greater fidelity. Such reasoning would force us to conduct nothing but elaborate and expensive games. Fortunately, such an epistemological blind alley can be avoided by linking purpose to predictiveness. All war games have explicit purposes, and rarely are these purposes so holistic as to demand unsparing investment in fidelity. Bringing the purpose of a game into focus leads quite naturally to distillation; many games are able to set aside significant aspects of reality. To the extent that distillation promotes clarity, highlighting relationships in the aspect of warfare we are studying, the epistemological damage of failure to include all possible factors is counterbalanced. Since knowledge gained from a war game is in the eye of the beholder (player or

analyst), obfuscation caused by excessive comprehensiveness is at least as damaging as the omission of some significant element.

Epistemologically speaking, we conclude that a war game should be designed with as much fidelity as possible without including factors that, because they are not clearly related to its purpose, risk diluting or masking valid knowledge that might legitimately be gained.

There is another implication of simulation that must be addressed: the common wisdom holding that war games are not experiments, as they cannot prove anything. This is clearly true, in terms of John Hanley's logic, since knowledge emerging from games is conditional. The proposition is confirmed also by the nature of warfare simulation; the lack of close coupling with its parent phenomenon due to structural indeterminacy makes it always incomplete and defective in some, possibly unknown, way.

Nevertheless, there is an aspect of war gaming that can accommodate experimentation. Some war games focus on command and control. In them, players are organized into cells, each of which represents a command or perhaps an element of a staff organization. These cells are provided with communications devices (most recently networked computers) and command and control (C2) doctrine. The war game provides a venue in which command and control processes can take place. The point here is that within the context of the game, actual—not simulated—command and control occurs. Thus, knowledge gained from this activity can be treated like experimental data, subject to all the epistemological principles and injunctions of the scientific method. One caveat is that war games are most commonly one-time affairs, so the data cannot be treated with the same confidence as that gained from experiments run a number of times. On the other hand, simple and appropriately distilled games have been used as substrates within multiple-run C2 experiments, the output of which constitutes valid statistical data.[8] However, in games featuring a significant command and control focus, information gained from the underlying simulation must be treated differently than that derived from the command and control "layer."

Game Artifacts

Games can easily produce information that is invalid. Commonly, such information is produced by what are termed "game artifacts," defects of simulation that corrupt a game's cause-and-effect relationships. If, for instance, a Control umpire somehow used the wrong weapons-effects table to look up the outcome of a tactical engagement, subsequent player decisions based on that assessment would be tainted. Similarly, defects in display may cause players to be artificially misled as to where units are. Simply ascribing

such defects to the "fog of war" and allowing them to be folded into the game's flow is as much an epistemological mistake as assigning too much significance to game outcomes.

It is entirely reasonable to build the fog of war into a game, which can be done in various ways. These devices, such as revealing to players only that information which their reconnaissance assets could "see," normally place bounds on the nature of misinformation that may crop up. Players may, for instance, make unwarranted assumptions about the location of enemy forces due to a lack of information; they might equally do so in the real world, and such imperfection of information does no violence to the intellectual validity of cause and effect or critical analysis. However, if a computer-generated operational picture through some system defect placed a "Red" unit far out of position and thereby affected "Blue's" decision making, we cannot explain it away as the result of a Red computer attack or some sophisticated deception. Nor can it be chalked up to equipment failure that might happen in real life; unless it is known that the game's designers provided for this real-world factor, it cannot be assumed to be a part of the simulation.

A game artifact that is perhaps easier to understand but more difficult to detect or avert is invalid decision making by players. It is a fundamental, if tacit, assumption of war gaming that players will make the best decisions they can. They need not be the right decisions—after all, somebody has to lose—but they must not be capricious or negligent. Players are expected to try to win, or at least to carry out doctrine in a faithful way. When they do not, as a result of alienation, inattention, or malice, the game's results are contaminated. This can happen all too easily. In some games, Red is constrained by Control, in order to shape the game in some needed way, from certain otherwise reasonable actions it wants to take; if Red players react with disillusionment or cynicism, they may "mentally disengage" from the game and make very different decisions than if they were properly immersed and motivated. Another source of defective decision making is ignorance or improper training among players. If the goal of the game is to examine the efficacy of a particular concept or doctrine but the key players do not know or understand the material, the game results cannot be accepted.

Another player artifact, one that is harder to account for, crops up in games as well: players tend to be more aggressive than they would be in the real world with real lives at stake. There are several inherent reasons for this. First, it is just a game, and therefore real lives are *not* at stake. Second, depending on the extent of the simulation, there are no tactical commanders screaming bloody murder if the operational-level player puts them in an unnecessarily dangerous situation. One of the most common misfortunes to attend Blue players in Cold War games was the loss of amphibious groups because the Blue players had let them sit in exposed positions. Third, since every game has a defined end point or specific set of victory conditions, there is no "tomorrow" to be provided for

by players after the last move. Game designers must therefore understand these tendencies and attempt to structure their games to minimize the likelihood and intensity of this player artifact.

The War Game as Military History

We have seen that knowledge gained from war games is conditional—that its validity is ultimately dependent on its effects on decisions made in real-world operations. But analysts examine games after the fact, and all participants have the opportunity to learn from their findings. How should this information be handled, sorted, and considered? How can it be converted into valid knowledge? Because it is not scientific data, it cannot be statistically reduced or otherwise treated in ways appropriate for "hard" data. Perhaps information produced by war games is best considered artificial military history. Game data can then be approached with the full array of methods available to the historian. Moreover, the trap of treating mere discussions as games can be avoided. Insiders have a term for nongames masquerading as games: BOGSAT ("Bunch of Guys Sitting around a Table"). If the data derived from an event consists solely of what participants said, it was not truly a war game, and its results should not be accorded the stature that knowledge gained from a real game should have.

Perhaps the best commentary on converting military history into useful knowledge is to be found in the writings of Carl von Clausewitz. Clausewitz regarded history as a real-life laboratory of war, one that can be mined for information useful for preparing the minds of future commanders. His approach was what he called *Kritik,* or critical analysis: researching the facts, tracing effects back to their causes, and evaluating the means employed.[9] This process (which emerges from a close reading of Book Two, chapter 5, of his classic treatise *On War*) is as valid today as it was in Clausewitz's time. These three steps constitute more than a method; they establish a criterion for the extraction of valid knowledge from a war game. It is not enough simply to list the facts of what happened in the game; these are meaningless in themselves, because the game was a simulation. We must examine why these events occurred—the combinations of player decisions and umpire determinations that produced them.

Clausewitz himself, however, acknowledges the limits of the method: at some point, results must be allowed to speak for themselves. The critic, "having analyzed everything within the range of human calculation and belief, will let the outcome speak for that part whose deep, mysterious operation is never visible."[10] In other words, war cannot be completely understood in its full complexity; ultimately criticism must recognize that there are factors at work whose functioning can be revealed only by the actual victories or defeats of a commander being studied. This is perfectly reasonable with respect to real warfare. It might also be true for war games, but its usefulness is limited by the fact

that they are simulations. For example, a common method of introducing uncertainty into battle-outcome calculations is rolling dice to represent the probabilistic nature of certain phenomena, like sonar or radar detection. Beyond this narrow use of stochastic indeterminacy, game designers frequently aggregate complex interactions of large combat forces with a combination of dice rolls and structured combat-results tables. Here the die simulates the effects of a wide range of variables that are not explicitly modeled.

It would be easy enough, lacking any other good explanation of the cause-and-effect relationships between player decisions and outcomes, to sense here the presence of invisible factors. But if such "deep, mysterious" elements exist in war games, they are not those of which Clausewitz speaks. A roll of the dice is simply that. To say it simulates unmodeled portions of reality is going too far. The most one can say is that there are physical forces at play on the die itself that players cannot calculate and therefore cannot predict. This is different from admitting one does not understand all the complexities of a real battlefield. Thus, we cannot approach the results of a war game as a military critic would the outcome of a real battle or campaign. Results of a war game cannot be used to fill in analytical blanks in the way Clausewitz describes, nor can theory or judgment be derived from them in the way historians do from real events.

Nevertheless, we can ascribe a certain significance to war-game outcomes. If the game is run according to a specific set of rules and those rules constitute a valid distilled simulation of reality, outcomes of individual "moves" or entire games can yield useful knowledge. To understand when this can be the case, we need to understand the difference between *rigidly assessed* and *freely assessed* war games. We describe as "rigidly assessed" those games that proceed strictly according to rules governing movement, detection, and combat. Such games produce situations governed by player decisions, the rules, and combat-results tables (manual or computerized). Assuming the absence of artifacts and within the limitations of dice rolls, we can in such a case ascribe significance to game, or even move, outcomes. The game goes where the rules take it; if the rules and the combat-resolution tables are good representations of reality, the outcome constitutes artificial military history, and one can usefully work backward from outcomes and look for reasons. This would be so whether the game is played by hand around a board or at computer workstations. Inputs are generated, and these, by means of a known system, produce results that cannot be predicted or influenced. The game goes where it goes.

Freely assessed games are somewhat different epistemological animals. In these, the flow of the game is governed by umpires and game directors. Instead of following game rules, players make plans and decisions as they would in real life, more or less, and umpires, collecting the interacting moves of all the players, translate them into force movements, detections, and combat results. The umpires may be aided by computers. The key difference is that the game's progress, including move results, are governed by

the objectives of the game's sponsors, the time available, and sometimes the conflicting interests of stakeholders. Control may determine that a certain set of conditions must occur at a specific point if the game's objectives are to be met. This is most commonly the case in educational games, but it can also occur in research games. In such a case, Control defines in operational game terms the needed conditions, looks at the situation at the end of the previous move, and then figures out what—within the bounds of plausibility, given the players' new moves—*must have happened* in order to get from that situation to the desired condition.

That is, the umpires deduce tactical outcomes, the necessary inputs, by working backward from a set of desired results. This fact does not negate the validity or value of the game, but it does mean that its *outcome* does not have the same analytical weight as that of a rigidly assessed game. Freely assessed games can be valuable for discovery purposes—perceiving relationships or finding defects in plans—but they cannot be used to see "who would win." Similarly, they cannot be regarded as artificial military history to the same extent as rigidly assessed games.

Monte Carlo versus Deterministic Combat Results

A Naval War College elective course on war-gaming theory and practice recently designed and played an instructional board game. In the course of it, a Blue player exclaimed in frustration, "This is a dice game, not a capabilities game!" His observation was trenchant as well as accurate. In the game—which combined various types of dice and combat-results tables—a small Red force had just hammered a larger Blue fleet after four or five very lucky die rolls. The rules had attempted to reflect lower Red strength by awarding hits only on rolls of one or two on a ten-sided die, but five consecutive rolls of one or two now produced a David-slaying-Goliath result. How does one deal with such an outcome?

As we have seen, there are several reasons to roll dice—that is, to use Monte Carlo methods to produce uncertainty in outcomes. Perhaps the best reason is to simulate real-world phenomena that are in fact probabilistic. Some good examples are certain types of radar detections and the reliability of weapons systems. Epistemologically, there are few reasons to object to such an application of probabilistic simulation.

Another reason to roll the dice is to represent the aggregate performance of complicated systems that are at least partially dependent on human performance. If, for instance, we assign an 80 percent probability of a hit by an antiship missile and its purely mechanical reliability is on the order of 99 percent, the other 19 percent of uncertainty would consist of such things as operator error and, perhaps, brilliant maneuvering by the target ship. Here, epistemologically speaking, we start to get a bit uneasy, because the moment

probability enters into the picture, we introduce the possibility of very-low-probability occurrences, such as the string of lucky rolls by Red just mentioned. Could such a thing happen? Of course it could—anything is possible—but we must ask ourselves if such an ascription of exceptional human incompetence or brilliance has any place in the intellectual architecture of game objectives. On some level, we may accept the validity of the knowledge produced by such simulation methodology, but the student's complaint haunts us: Is it a dice game or a capabilities game? To put it differently, does the introduction of Monte Carlo methodology distort the intellectual structure of the game?

We have previously asserted that it is not valid to substitute dice rolls for unmodeled aspects of reality. Here we see one reason why—that luck in dice rolling is a special phenomenon in itself. The actual likelihood of unmodeled factors all lining up in a way that would be represented by rolling five ones or twos in a row is likely to be far smaller than the roughly three-in-ten-thousand odds of such a string of rolls. It would be different if we contemplated a hundred or even a thousand iterations of the game; by looking at the most frequent outcomes, we might then place the "outliers" in their proper perspective. This is done in campaign analyses via computer simulations; scenarios are iterated very many times at high speed to produce a population of results that are subject to statistical reduction. However, most war games are conducted once, and thus the impact of outlying results arising from the peculiarity of Monte Carlo methods must be considered. What validity should we ascribe to a web of human decisions impacted by quirky dice rolls? From this point of view, it appears that invalid Monte Carlo methods can produce game artifacts.

The obvious alternative to Monte Carlo simulation is deterministic calculation, using algorithms. Playing pieces are assigned numbers to represent their capabilities on offense, defense, and perhaps other aspects of combat power. Combat-result tables based on some predetermined formula are consulted to determine outcomes. One simply compares offensive points to defensive points to find a ratio and enters the table with that ratio to look up the result. Every time that ratio arises, the same result ensues. For this methodology, game validity is a function of the accuracy with which the embedded algorithms describe real combat interactions. In a deterministic game, neither human idiocy nor brilliance exists, below the level of the game player; the impact of player decisions is sharply highlighted. This leads us back to the axiom that games should model reality with as much fidelity as possible without masking the phenomena we are trying to elucidate.

Strategy and Effects

Clausewitz extended his *Kritik* from the tactical and operational levels into the realm of strategy through the device of concentric analytic rings. He undertook to analyze

and critique the decision of Napoleon Bonaparte (then a general in the field, under the French Directory) to make the peace of Campo Formio by examining the wider strategic context in stages, working from narrower to wider views. In other words, he examined the context for Napoleon's northern Italy campaign to ascertain whether the latter's decision to make peace with the Austrians when and where he did was justified.[11] Such analysis might be possible in war games, but the analyst must decide whether the strategic context of the game was established with sufficient detail and realism to stand as a criterion for judgment. Operational-level war games are frequently accompanied by unrealistic or truncated strategic contexts, in order to allow the fighting called for by game objectives to take place. Assessments of operational decision quality or utility based on such strategic criteria are likely to be invalid.

As an example, the Naval War College's Global War Game series (played annually from 1979 until 2001) focused on rapid, operational-level decision making, supported in later years by an advanced, networked collaboration environment and computer-analysis tools.[12] In 2000 the scenario featured a brink-of-war situation in which Blue players had to generate high "speed of command" in the conflict's first exchanges in order to avoid catastrophic casualties. The national-level command apparatus was played by Control, which assigned the role to a small cell of subject-matter experts. Pressure from the game's directorship resulted in quick, streamlined, and aggressive decision making by this cell (also recall the player aggressiveness artifact mentioned previously), allowing operational-level players to preempt and gain a smashing victory. The postgame judgment was that network-enabled speed of command was a very good thing.[13] However, in fact, the strategic-level command apparatus context had been so unrealistic as to invalidate any such assessment. In any case, games that incorporate detailed play at both the strategic and operational levels are uncommon, for a number of reasons, including the practical matter that free play at the strategic level tends to constrain or disrupt operational-level processes.

Strategic games have a long history, and they can produce knowledge as valid as that from games at the operational and tactical levels. It is possible to explore the strategic conflict environment in order to discern relationships between factors, including the structure of incentives that influence players. Sometimes these games are used as background for subsequent operational-level games. If so, consistency must be achieved between the scenarios, orders of battle, and player assumptions of the various games, or it will not be possible to relate their outcomes to each other—they will be "apples and oranges." Moreover, analysts must rigorously identify artifacts in the first game in order to prevent them from affecting player decisions or analysis in following games.

There is yet another issue related to strategic context and critical analysis that must be considered—"effects-based operations," or EBO. This concept, which is permeating the

U.S. military lexicon today, has been an aspect of war gaming for the last few years. EBO focuses on the second- and higher-order effects of military actions, with an eye toward making these actions more effective and avoiding adverse side effects, in terms of broader purposes. At the tactical and operational levels, the prediction of battle effects is reasonably straightforward, at least in the physical realm. Consequently, assessing wargame move outcomes when players are using EBO planning methods is fairly straightforward. Even "moral" effects at these levels are possible to assess; for instance, units that are outflanked tend to lose cohesion, and generals faced with the cutting of main supply routes can be expected to withdraw their forces to avoid encirclement.[14] However, at the strategic level, the degrees of freedom proliferate, and assessment of possible effects on populations and on national leaders is highly problematic.[15] If it is difficult in real war, as has been proven time and again, it is doubly hard in war games, which look to an uncertain future.

There is an epistemological solution. It lies in understanding that while war games are not crystal balls, they can highlight the relationships between factors. We could, for example, decide to explore the political terrain of war termination under given mind-sets or policies of the enemy leadership. Game designers would "script" a set of presumed conditions faced by enemy leadership—personal proclivities, influence distribution among top leadership, and the like—establishing a "moral context" for strategic decision making. Players would role-play and umpires assess strategic effects strictly within this context. Such a game would have a chance at generating indicative information concerning, say, the relationship between the course of one's own offensive operations and the willingness of an enemy leadership to negotiate. Iterative gaming involving different internal enemy conditions would at the very least prove educational.

Comparing War Games

A large military organization with a mission of experimentation and concept development once developed a system for synthesizing the data gained from multiple war games so that it could capitalize upon the considerable investment in gaming by the services. The key to the system was correlation; the more frequently a particular result emerged, the more weight was ascribed to it. Epistemologically, there is potential validity to this approach, but it was implemented in a way that had serious defects. First, the system essentially captured and digested the comments of senior and experienced subject-matter experts who participated in the games and interpreted their results. However, that in effect reduced games to BOGSATs; the system processed people's opinions, not game results (i.e., plans, decisions, and move assessments). Second, since the same senior folks tend to be invited to games, one after another, an expert with a particular outlook or agenda is likely to make very similar comments at each game, thus lending these

"findings" artificial weight. It is easy enough to pick apart such a correlation system, but less easy to establish a sound way of comparing results of different war games.

Experienced gamers, for instance, quite naturally on the basis of running many games, derive rules of thumb and gaming techniques; also, a number of phenomena tend to occur in similar and consistent ways even in games of very different kinds. One example is the tendency of players to "fight the scenario"—that is, to object to certain aspects of the game's story line, structure, or orders of battle and use these objections to hedge against the possibility of "losing." Such underlying commonalities with respect to game process can lead gamers to assume that equivalent commonalities exist in terms of game substance. They believe that they can derive on that basis, in an essentially correlative way, synthesized lessons from the substantive outputs of multiple games. But such an attempt is intellectually unsupportable, on several grounds.

First, unless games are specifically designed to be analyzed in conjunction with other games, there are almost certain to be differences in objectives and design so fundamental as to prevent it. For instance, imagine two games producing results that, taken together, point to an apparent vulnerability of the littoral combat ship (LCS)—in both games several of that ship type are sunk. Closer scrutiny reveals, however, that whereas in one game the objective was indeed to examine the utility of the LCS in littoral warfare, with consequent close attention in move assessment to ship defenses, the other was meant to explore maritime command and control processes, with assessments focusing on the handling of various kinds of reports and orders by the C2 system. In the latter game, umpires in fact imposed ship losses specifically in order to generate reports and command responses. To attach significance to the fact that several LCSs were lost in both games distorts conclusions, since in the second game at least some of the losses were "artificial." This example is a bit contrived, in order to define the issue clearly; in reality, many games appear to offer numerous opportunities for comparison, because their methods and outputs appear comparable. Even then, however, there can exist subtle, disabling differences.

A second reason why correlation of seemingly similar events in different games fails at the substantive level (even inside the scenario) arises from the very nature of gaming. Games are not reality, and players are likely to do things they simply would not do in reality. A common manifestation, as previously discussed, is inadvertently leaving important forces unprotected, to be knocked off by the enemy. Controllers and umpires, however, rarely identify such instances, making it almost impossible to go back after the game and determine when this tendency was in play.

What then can be gleaned from comparing multiple games? First, we must remember what games can reliably produce: knowledge about the nature of a warfare problem,

such as potential flaws in a plan, the potential importance of geographic features, gaps in command and control, logistical needs, etc. The familiar metaphor of blind men feeling around an elephant tells us that multiple games, almost regardless of their individual methodologies, can contribute incrementally to the understanding of a particular warfare problem. That problem may be a specific scenario, such as a war on the Korean Peninsula, or it may be a function, like close air support. If we avoid attaching significance to the number of times something happens, we can derive epistemologically sound knowledge. We can collect anecdotes of various game happenings, lessons learned, and analyses, to be pieced together into a more complete, qualitative understanding of the issue in which we are interested. In one game we may learn that command and control arrangements for close air support are flawed, in another that certain types of preferred weapons are in short supply. These specific outcomes can be combined to form a picture of the "elephant."

Listening to Whispers

Our general thrust to this point has been to identify limitations on what can be said to have been learned from a war game. Still, there is an epistemological reason to wrest from a game all the valid knowledge it has to offer. If it is easy to overstate what was learned from a game, it is also easy to ignore what it did produce—all *too* easy, if that information or knowledge is either subtle or somehow threatening. Such information, being tempting to dismiss, might be called "whispers."

We have seen that the results of a war game are in the eyes of the beholder (player or analyst), because of conditionality. That is, game-generated knowledge, being merely indicative in itself, must be combined with judgment in order to have useful predictive value. But such application of judgment is rarely easy or straightforward. For example, in war games at the Naval War College in the 1920s and '30s, despite the repeated indications of the importance of the Mariana, Caroline, and Marshall island groups—then known as the Mandated Islands—as intermediate logistics bases in any campaign to relieve the Philippines and defeat Japan, it took many years for the U.S. Navy to abandon fully the idea of mounting a direct thrust on the Philippines from Pearl Harbor.[16] The games, apparently, were telling officers things many did not want to hear. Conditional knowledge can be a slippery thing. Games are complex affairs that almost always produce more information than their designers intended to generate. Moreover, game results are often equivocal, open to interpretation.

The subjective nature of game-produced knowledge is nowhere clearer than in games that generate information that is bureaucratically or politically threatening to players or sponsors. It is all too easy either to ignore or put a favorable spin on game events or results that do not fit comfortably into existing doctrines or accepted theories. A notable

historical example of this phenomenon was a war game conducted by the Japanese Combined Fleet staff prior to the Midway operation. Historians have made much of the fact that the umpires resurrected a Japanese carrier that had been sunk by American aircraft operating out of Midway, citing it as evidence of "victory disease." In fact, however, the Japanese umpires were perfectly justified—a dice roll had given a highly improbable hit to level-flying bombers (that is, as opposed to dive-bombers), which had proven generally ineffective in attacking ships. They were properly attempting to prevent a capabilities game from becoming a dice game. However, at another point during the game it was asked what would happen if an American carrier task force ambushed Vice Admiral Chuichi Nagumo's carrier force while it was raiding Midway, and that uncomfortable question seems to have been ignored. The existing plan was based on deception and surprise, tenets and war-fighting values dear to the Imperial Japanese Navy. To acknowledge the existence of an American task force northeast of Midway in a position to ambush Nagumo's carriers would have been to discount the possibility of surprise. The Japanese planners simply did not want to admit that—it would have negated their plans, and there was no time to start again from scratch. At the very least the game should have suggested more extensive searches in that sector, but the plan was not modified even to that extent. It was easier to ignore this particular game outcome.[17]

The "whispers" phenomenon has important implications for war-gaming policy. As the Japanese example shows, players and sponsors are almost never objective about their games. Games are played in a setting of institutional imperatives, such as budget justification, or the need to affirm a service's foundational theory and doctrine ("airpower is decisive," "the infantryman is the ultimate strategic weapon," and so on). Moreover, as in the Japanese case, games may be linked in some way to imminent deadlines. All of these factors tend to deaden ears to the whispers. But these whispers are frequently the most important outcomes of war gaming. How can an organization increase its ability to hear them?

The key is objective, disinterested sponsorship, or at least analysis. A sponsoring organization (the agency that "gives," or initiates, the game, as distinct from the facility that stages it) cannot realistically be relied upon, especially if constrained by time, political imperatives, or the dictates of theory and doctrine, to hear whispers from its own games. A frequent alternative is the use of civilian contractors; the difficulty is that contractors, paid for their services and generally hoping for follow-on contracts, have a built-in incentive, regardless of the talent or intellectual integrity of the individuals and companies involved, to tell sponsors what they want to hear, or at least not press them to hear whispers. Another option is academia. The service colleges frequently perform this role, and each has a war-gaming center. These facilities, however, must have a sufficient degree of autonomy—specifically, protection from firing of personnel or other sanctions

for games that produce uncomfortable results. The gaming departments themselves must incorporate a culture of rigorous intellectual objectivity and commitment to the discipline of war gaming.

Finally, the results of war games must receive proper handling. Perhaps most importantly, the heads of sponsoring organizations must commit themselves to receiving game results directly and personally from gaming organizations, and not after filtering and sanitizing by their own staffs.

A Guild of War Gamers

In professional war gaming the stakes are high. Not only do games cost money and time, but their results can influence important operational and programmatic decisions. This holds true for the business as well as military worlds. Many organizations conduct war games, and even more consume their results, but few if any individuals involved have rigorous understanding of whether the games produce valid knowledge. As we have seen, it is entirely possible for games to produce valid-looking garbage. It is not easy to distinguish error from insight; it can be accomplished only if game design, execution, and analysis are conducted with discipline and rigor, and according to principles like those outlined here. Even then, however, wheat cannot be sifted from chaff with consistency and confidence unless another step is taken.

War gaming is currently a craft. There are a few highly experienced and skilled game designers and directors "out there," and these individuals each operate by rules of thumb they have learned over the years. Approaches vary. A large war game might be proclaimed a success by sponsors but at the same time be criticized severely—in private—by players, observers, and analysts. Who is right? What is missing is a universal set of standards, an accepted body of knowledge, such as established academic disciplines possess. In the "hard" sciences, even the social sciences, there is less room for charlatanism and sloppiness. Practitioners there have frameworks for understanding their disciplines and becoming credentialed in them. War gaming needs the same if it is to warrant the resources invested in holding games and the confidence routinely vested in their results. Such a step is all the more important today in light of the changing nature of warfare and the concomitantly receding utility of traditional force-on-force gaming techniques. "Fourth-generation warfare" blends politics, mass media, global information flows, culture, and religion with combat in a highly complex way; games attempting to simulate it can lead to catastrophic intellectual error if not conducted under the aegis of a sound, overarching framework.

The substrate for founding a gaming discipline exists. The nation's war and staff colleges all have war-gaming departments whose directors have professional contact with

each other and with key figures in the wider war-gaming world. Certain academic institutions, notably the Naval Postgraduate School, teach courses in war gaming. These organizations could come together in a "guild" of sorts to establish standards and promote the formalization and professionalization of a war-gaming discipline. This professional society, in effect, could draw members from outside the military, such as business and academia, whose contributions would universalize standards and add vitality. The society might publish a professional journal, with refereed articles. All this is necessary if war-game output is to merit a level of epistemological confidence commensurate with the uses made of it.

Valid knowledge can emerge from war games, but only if due diligence is applied. That diligence is considerably hampered today because war gaming is a craft or an art, not a true profession, a discipline. Much more work must be done. Those who believe in the value of games must now link up and work toward the goal of truly professional war gaming.

Notes

1. For background on the theory and practice of war gaming, see Robert C. Rubel, "War-Gaming Network-centric Warfare," *Naval War College Review* 54, no. 2 (Spring 2001), pp. 61–74.
2. Peter P. Perla, *The Art of Wargaming: A Guide for Professionals and Hobbyists* (Annapolis, Md.: Naval Institute Press, 1990), p. 164.
3. F. Heylighen, C. Joslyn, and V. Turchin, eds., *Principia Cybernetica Web* (Brussels: Principia Cybernetica, 1995), available at pespmc1.vub.ac.be/EPISTEMI.html.
4. S[tewart] Schlesinger et al., "Terminology for Model Credibility," *Simulation* 32, no. 3 (1979), pp. 103–104.
5. *Right* and *wrong* are not absolute terms. For the purpose of this discussion, "right" means a decision the likely outcome of which has envisioned benefits for the decision maker. Clearly, even "right" decisions could result in failure due to bad luck (statistically speaking) or the intervention of imponderable factors.
6. John T. Hanley, *On Wargaming* (dissertation, University of Michigan, Ann Arbor, Mich.; University Microfilms International, 1991), p. 13.
7. Ibid., pp. 19–25.
8. Peter Perla, Michael Markowitz, and Christopher Weuve, *Game-Based Experimentation for Research in Command and Control and Shared Situational Awareness,* CRM D0006277.A1/Final (Alexandria, Va.: Center for Naval Analyses, 2002). This document reports on the Naval War College's Scud Hunt experiment and offers some excellent prescriptions for achieving additional progress in game-based C2 experimentation.
9. Carl von Clausewitz, *On War,* ed. and trans. Peter Paret and Michael Howard (Princeton, N.J.: Princeton Univ. Press, 1976), p. 156.
10. Ibid., p. 167.
11. Ibid., pp. 159–61. The Treaty of Campo Formio of 17 October 1797 between France and Austria produced, aside from various territorial annexations and guarantees of support, the latter's retirement from the War of the First Coalition (1793–97, originally pitting Austria, Prussia, Great Britain, Spain, Sardinia, and the Netherlands against France).
12. For the Global games see Rubel, "War-Gaming Network-centric Warfare"; Kenneth Watman, "Global 2000," *Naval War College Review* 54, no. 2 (Spring 2001), pp. 75–88; Bud Hay and Bob Gile, *Global War Game: The First Five Years,* Newport Paper 4 (Newport, R.I.: Naval

War College Press, 1993); and Robert H. Gile, *Global War Game: Second Series, 1984–1988,* Newport Paper 20 (Newport, R.I.: Naval War College Press, 2004).

13. *Global 2000 Network-centric Warfare: Gaming the Navy Capstone Concept for Operations in the Information Age* (Newport, R.I.: Naval War College, December 2000). The report offers glowing endorsements of networked speed of command. The assessment of the national command authority play is that of the author, who was an observer during the game. See also Watman, "Global 2000."

14. Clausewitz, *On War,* p. 137. Clausewitz talks extensively and explicitly in *On War* about effects, except with much greater lucidity than is commonly found in the current literature, which is riddled with unsupported assertions and esoteric jargon.

15. Ibid., p. 178. A brief passage is referred to, but Clausewitz devotes considerable space to the difficulties of strategy, extolling its successful practitioners precisely because of the many imponderables at the strategic level.

16. Edwin Miller, *War Plan Orange: The U.S. Strategy to Defeat Japan 1897–1945* (Annapolis, Md.: Naval Institute Press, 1991), p. 168. Miller describes in this passage some of the Newport war games that indicated the folly of attempting to sail the U.S. fleet directly from Hawaii to the Philippines. However, despite these results, the "thrusters," who advocated such a strategy, held sway until the mid-1930s.

17. Mitsuo Fuchida, *Midway: The Battle That Doomed Japan* (Annapolis, Md.: Naval Institute Press, 1955), pp. 96–97.

About the Author

Professor Rubel, a retired Navy captain, is currently dean of the Center for Naval Warfare Studies. Prior to assuming this position he was chairman of the War Gaming Department of the Naval War College. In 2006–2007 he directed the Naval War College's research and gaming project that led to the current national maritime strategy "A Cooperative Strategy for 21stCentury Seapower," for which he received the Superior Civilian Service Award.

A thirty-year Navy veteran, he received his commission through the Naval Reserve Officer Training Corps at the University of Illinois. He subsequently became a light attack naval aviator, flying the A-7 Corsair II and later the F/A-18 Hornet. He commanded Strike Fighter Squadron 131 and also served as the inspector general at U.S. Southern Command.

Professor Rubel's shore assignments were principally involved with professional military education. He is a graduate of the Spanish Naval War College, in Madrid, and the U.S. Naval War College. He completed three separate faculty tours at the College as a joint military operations instructor and ultimately as the deputy dean of the Center for Naval Warfare Studies. During these tours he served as the William F. Halsey Chair of Air Strike Warfare and later as the Colin Powell Chair of Joint Warfare. He gained extensive experience with service and joint education policy through his participation as an accreditation team member on the Chairman of the Joint Chiefs of Staff Process for the Accreditation of Joint Education (PAJE) Team. He also served as the special assistant for joint education to the dean of academics. After retiring from the Navy, he became director of the Research and Analysis Division within the Naval War College's War Gaming Department, in 2004 becoming chairman of the department. In addition, he has been a visiting lecturer at a number of international professional military education institutions, including the German Armed Forces Staff College, the Mexican Naval War College, the British Joint Services Staff College, and the Colombian Senior War College.

Professor Rubel has earned master's degrees from Salve Regina University and the Naval War College. He has published a number of articles on a variety of subjects including security engagement strategy, joint operational art, advanced war gaming, and air warfare.

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