

Carriers and Amphibs Shibboleths of Sea Power

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Abstract: This article argues that American naval force packages built around aircraft carriers and amphibious assault ships no longer serve maritime security interests as effectively as in the past. It further claims that the current commitment in the published maritime strategy of the United States to the twin shibboleths of “carriers and amphibs” comes from a variety of attitudes held by senior decision makers and military leaders. This commitment betrays both cultural misunderstanding or even ignorance of seapower—“sea blindness”—as well as less than rational attachments to two operational capabilities that served the United States well in the past, but in doing so engendered emotional commitments that are little grounded in the facts.

Keywords: aircraft carrier, amphibious readiness group, U.S. Navy, U.S. Marine Corps, sea blindness, maritime security

*Shibboleth—A catchword, slogan*¹

When typing “U.S. Navy status” into a search engine these days, one quickly learns that only two specific ship types are tracked on this site and characterized as underway—“carriers” and “amphibs.” There are no submarines listed in this overview, no destroyers, no littoral com-

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bat ships, nothing but aircraft carriers and amphibious ships (hereafter amphibis) that normally embark U.S. Marines. This site previously listed which amphibis, but it is understood the ships discussed are those built around a large assault vessel with air capability such as the landing helicopter dock (LHD) or landing helicopter assault (LHA) ship classes.² If one searches about the website, two acronyms are presented that give more specificity about carriers and amphibis. According to the website, a CSG is an aircraft “carrier strike group” and ARG stands for an “amphibious readiness group.”³ When one reads Department of Defense news releases under Navy and Marine Corps subheadings, one finds these forces scattered about the globe.⁴

The move toward more operational security (OPSEC) on the U.S. Navy public website is laudable, but it is not applied uniformly. Does the United States really want its adversaries to know how many nuclear-powered ballistic missile submarines (SSBNs) it has deployed?⁵ Of course not, but why does that logic not apply to carriers and amphibis? It does not pertain because the strategic leadership of the Navy, perhaps of the nation, wants it known that these standard coins of naval power are out there protecting U.S. interests. Carriers and amphibis send a message of power and presence, in addition to providing support to allies and partners. They also inform deterrence. One cannot deter or send strategic signals using naval force packages unless one is transparent, to some degree, about what these naval force packages are doing.

CSGs and ARGs provide decision makers forward presence by naval forces in the global oceanic commons. The maritime strategy, *A Cooperative Strategy for 21st Century Sea Power* (hereafter CS-21R) states in the foreword:

Forward naval presence is essential to strengthening alliances and partnerships, providing the secure environment necessary for an open economic system based on the free flow of goods, protecting U.S. natural resources, promoting stability, deterring conflict, and responding to aggression.⁶

Undergirding this “forward naval presence” are carriers and amphibis; they are the accepted basis as the pillars of American seapower.

The problem is that this force structure and its attendant deployment model are now perhaps 30 years out of date. Yet, they linger on, defining for most American strategists (and probably plenty of non-American strategists) what seapower in today’s world means, just as seen in films, television, and on social media in trailers for films like the *Midway* and *Top Gun* remakes or the recent *The Pacific* series on HBO that dramatized Marine amphibious operations in World War II.⁷ This article argues that aircraft carriers and ARGs with an embarked Marine Expeditionary Unit (MEU) are shibboleths of seapower. They

represent catchphrases that belie or conflate a deeper understanding of where today's U.S. fleet is at and where it needs to go in order to face the challenges of the twenty-first century.⁸

What *Is* Seapower?

Recently a retired U.S. Navy captain, Sam J. Tangredi, wrote about the persistent misunderstanding of seapower inside the U.S. Department of Defense (DOD). He made the argument that “the current [Office of the Secretary of Defense] OSD leadership is Army-centric (which it is), but that it appears not to understand that armies and navies are vastly . . . different tools with much different long-term roles in U.S. territorial and economic security.”⁹ This has a lot to do with the fact that the United States has not been challenged by a peer competitor at sea since the mid- to late-Cold War period. One must go even further back to find the United States Navy actually fighting another fleet of warships for command of the sea at Leyte Gulf in 1944 and against an asymmetric, antiaccess threat by kamikaze aircraft at Okinawa in 1945.¹⁰

As mentioned, part of the staying power of the carrier-amphib seapower paradigm has to do with Tangredi's complaint about a poor understanding of it inside the DOD, especially at the senior levels. Carriers and amphibians are a default setting for decision makers who are not well-schooled in seapower. Additionally, these same leaders can find all the support they want for their confirmation bias for the duo by cherry-picking articles by reputed subject matter experts in seapower from any number of sources, principally from the premier journal for contemporary maritime issues, the U.S. Naval Institute *Proceedings*. In May 2020, a relatively junior officer, Lieutenant Commander Jeff Vandenberg won the prestigious Naval Institute General Essay Prize for modestly arguing that aircraft carrier construction has caused budget dysfunction for the Navy. He was roundly taken to task by a retired Navy captain (the equivalent of a colonel in the Marines or Army) for daring to criticize the aircraft carrier as one of the centerpieces of naval operations and strategy. This same captain is not some irate naval aviator worried about parochial interests of their community, but rather a former submariner. Those with a poor understanding of seapower who rely on those who presumably have it can find any number of arguments to retain the carrier-amphib paradigm of seapower.¹¹

Another area of concern in understanding seapower is the importance of the maritime domain to the security and economic well-being of the United States. Widespread misunderstanding of this issue is another facet of sea blindness.¹² A. T. Mahan's *The Influence of Sea Power Upon History* provides a useful place to start for a description of this aspect of seapower. Mahan described seapower as a form of national power that leverages the maritime domain for its application. He outlined six “principal conditions affecting the sea power of

nations.”¹³ Mahan introduced the six principal conditions with the following narrative:

In these three things—protection, with the necessity of exchanging products, shipping, whereby the exchange is carried on, and colonies, which facilitate and enlarge the operations of shipping and tend to protect it by multiplying points of safety—is to be found the key to much of the history, as well as of the policy, of nations bordering upon the sea. The policy has varied both with the spirit of the age and with the character and clear-sightedness of the rulers; but the history of the seaboard nations has been less determined by the shrewdness and foresight of governments than by conditions of position, extent, configuration, number and character of their people—by what are called, in a word, natural conditions.¹⁴

Three geographic and three social elements comprise these six conditions—making Mahan an advocate of both geographical and socioeconomic determinism when it came to the tendencies of nations to develop and employ seapower, especially as relates to what he called “trade.” The geographic elements encompass where, what, and how much? The social elements have to do with the society, both maritime and economic, and, thirdly, the form of government.¹⁵ In other words, seapower is not just about fleets of armed warships; it encompasses the range of factors involved with how the maritime environment interacts with the political economy of a nation.

Seapower Today

In today’s world, where globalism and information technology have both shrunk the maritime environment as well as paradoxically expanded its importance, Mahan’s approach retains value as a starting point. When examining the *National Security Strategy* (NSS) and subordinate strategies of the United States, one finds that the maritime domain is of great importance—at least on paper. Thus, the application of seapower in all its forms—economic, informational, military, and diplomatic, to say nothing of cultural or social—have clear relevance and even criticality to national security.¹⁶ The military component of the American NSS is often termed the “2 + 3” strategy, which stands for Russia and China and the lesser threats of North Korea, Iran, and extremist terrorist threats.¹⁷ Most of these threats have coastlines or maritime components, so they lend themselves well to military applications of seapower. However, for many of them, if not all, the problem of antiaccess measures such as mines and shore-based antiship missiles, to say nothing of actual navies, present real challenges to the United States’ traditional approach to power

projection via the sea to influence their behavior and adherence to the international rules-based system.¹⁸

Simply put, carrier and amphib power projection operations no longer operate in a benign or low-threat environment of assured access. But major components of the U.S. fleet structure revolve around these two approaches to applying naval power. Assumed, but often unexamined seriously until recently, is that “command of the commons” was assured.¹⁹ This is no longer the case. The Navy’s maritime strategy—*A Cooperative Strategy for 21st Century Seapower*—recognizes that command of the commons—maritime, air, cyber, and space—is no longer a given, especially in close proximity to the littorals of four of the five threats in the current strategy.²⁰ To combat this problem, the Navy has made something called “all domain access” a priority in CS-21R as discussed here:

All domain access is the ability to project military force in contested areas with sufficient freedom of action to operate effectively. In today’s security environment, *that access is increasingly contested by state and non-state actors* that can hold even our most advanced forces and weapon systems at risk with their own sophisticated anti-access/area denial strategies.²¹

It is against this backdrop of challenges to all-domain access that the twin shibboleths—carriers and amphib—must be examined.

Aircraft Carriers—Once a Battlecruiser, Again a Battlecruiser

The first substantial aircraft carriers the United States acquired came as a result of the Washington Naval Conference (or Five-Power Naval Limitation Treaty) of 1922. The Washington Conference allowed the United States to convert two unfinished battlecruisers—the USS *Lexington* (CV 2) and *Saratoga* (CV 3)—into aircraft carriers.²² Battlecruisers have often been criticized because their original purpose has been misunderstood by scholars and sailors alike. Admiral John A. Fisher created them to protect British imperial sea lines of communication (SLOC) against commerce raiders, principally those of Germany in the early twentieth century.²³ They did that job well in World War I—two British battlecruisers destroyed the commerce raiding squadron of Admiral Graf von Spee off the Falkland Islands in 1914, just as advertised.²⁴

Once *Lexington* and *Saratoga* joined the U.S. Navy in 1928, they became a part of the scouting fleet, that portion of the U.S. Fleet dedicated to battlecruiser-type missions, securing and scouting the sea lanes. But their purpose was less an anticommerce raiding countermeasure (*guerre de course*) and focused mainly on finding the main enemy fleet. Their primary role once a fleet action was

initiated was to provide air protection for the battle fleet (i.e., the battleships of the battle line) against enemy land or carrier based aircraft. During the fleet wargames, both at sea and in gaming at the Naval War College, in the period between the world wars, the value of carriers and their increasingly capable embarked aircraft became apparent and their employment to strike the enemy fleet or even attack its logistics bases emerged. However, it was only during World War II that the aircraft carrier emerged as a capital ship in its own right, which was able to not only scout and provide air defense but to defeat an enemy fleet in a main battle.²⁵

The aircraft carrier's capability to defeat fleets without attendant submarines, battleships, and cruisers (but not destroyers) in World War II and after has perhaps been overrated throughout the years.²⁶ However, there is no question that it became the premier naval platform around which to build force packages to project naval power. This was principally via projection of airpower over the shore, as seen in operations from late in World War II to those recently over Libya, Iraq, Syria, and landlocked Afghanistan. This was because there was little blue water challenge to the United States' *de facto* command of the sea commons until the Soviet Union built a blue water fleet to challenge U.S. maritime supremacy after the 1962 Cuban missile crisis. But no fleet engagement ever took place and U.S. maritime dominance was absolute after the Soviet Union collapsed in the early 1990s.²⁷ The U.S. Navy has not had to fight another major fleet action since the Battle of Leyte Gulf more than 75 years ago. This means the aircraft carrier as a fleet-defeating centerpiece has not been actively tested in more than 75 years. Conversely, its ability to project power was challenged, rather bloodily, by antiaccess countermeasures—the infamous kamikaze attacks of the Ketsu-Go campaign—off of Okinawa in 1945. The U.S. Navy and the Joint force it supported prevailed, but at a horrific cost. Okinawa was the bloodiest naval campaign of World War II, with the Guadalcanal campaign a close second. In both campaigns, carriers suffered horribly in the littoral environment against a peer competitor. And in both, carriers proved highly vulnerable, so much so that at Guadalcanal the final desperate sea battles involved no carriers at all because they had all been sunk or damaged between August and early November 1942.²⁸

This brings us to the current operating environment for seapower. Where do aircraft carriers fit in if power projection operations where carriers normally operate become contested environments as seen in the Baltic Sea, Persian Gulf, South China Sea, and East China Sea, to say nothing of the slightly less contested environments in the Sea of Japan and Eastern Mediterranean?²⁹ Can the United States sustain the loss of even one of these behemoths fighting a war to enforce the “international maritime rules-based order” as opposed to defending sea lines farther afield or the American homeland?³⁰ Or will such

a loss drag the United States into a major war of attrition with a continental power like China, an away game that will contribute to the unraveling of the post–Cold War order?³¹ Carriers have essentially become battlecruisers again in the early phases of a conflict with maritime dimensions. They are instruments for defending the sea lanes and policing the world’s oceans in a lower threat environment.

This very question was addressed recently in 2016–17 by Chief of Naval Operations (CNO) Admiral John M. Richardson. Richardson reached out to the former dean of the Naval Warfare Department at the Naval War College, retired naval aviator Captain Robert C. Rubel. Rubel gathered a team of six additional subject matter experts in naval history, wargaming, economics, and naval warfare tactics and operations.³² The team looked at three congressionally mandated studies conducted by the MITRE Corporation, the Center for Strategic and Budgetary Assessments, and an in-house assessment of fleet architecture by the CNOs’ staff (OpNav). The overall findings addressed the entire fleet, but the points made about aircraft carriers bear highlighting. In his report, Rubel wrote:

In the past, the pivot point for naval power has been the *capital ship*; that ship type that could deliver a greater weight of fire at a greater distance than any other type. While our aircraft carriers possess great capability in this respect, the limited range of tactical aircraft in comparison to missiles such as Tomahawk and *the increasing lethality of modern air defenses as well as missile and other threats to the carrier itself, call into question whether it should continue to be regarded as the capital ship for fleet design purposes.*³³

Recall that Rubel is a naval aviator from the strike community who flew the LTV A-7 Corsair II and McDonnell Douglas F/A-18 Hornet aircraft during his career. Another of the Fleet Design Advisory Panel members wrote:

Advances in nuclear propulsion and ballistic missile technology in the second half of the 20th century led to a new way to offer more secure nuclear deterrence from the sea depths. Parallel examples can be made for missile carrying aircraft and the guided torpedo. Future fleet architectures *that responsibly emphasize more, less expensive platforms that deliver kinetic and non-kinetic combat power* recognize the change in maritime warfare.³⁴

“Less expensive” cannot be extrapolated to refer to the \$13 billion and counting price tag of a nuclear-powered aircraft carrier today.³⁵ The evidence presented

suggests that this icon of naval power is costing more but delivering less in terms of capability.

Amphibs

Many of the same arguments about carriers above also apply to amphibs. In review, an ARG is composed normally of three amphibious assault ships, the largest of which looks like an aircraft carrier. They are designated as amphibious assault ships or amphibious assault docks (LHA/LHD). They normally embark a Marine Expeditionary Unit, which is built around a Marine infantry battalion with aviation and logistics support.³⁶ The ARG/MEU has tended to be most useful in the lower spectrum of conflict, particularly as a premier force package in low-threat environments to perform operations like noncombatant evacuations (NEOs), which they are quite accomplished at executing.³⁷ They have also performed well, again in benign maritime environments, in the opening phases of Operation Enduring Freedom (Afghanistan) as well as humanitarian assistance operations in the Indian Ocean and for Hurricane Katrina in 2005 off New Orleans.

Interestingly, the ARG has been reconceptualized through various organizational reevaluations as a beefed-up expeditionary strike group (ESG), an ARG-plus if you will. In that version of seapower, the ARG included its own surface ships, usually destroyers or cruisers, to perform and support this form of naval-power projection. But the current low numbers of U.S. Navy surface warships, and the high costs of replacements, has seemed to have removed the use of ESG on the Navy website. Therefore, those very platforms that might have made the ARG more survivable in high-threat, antiaccess environments are no longer routinely deployed with them. Instead, ESG is now the name for what was formerly known as an Amphibious Group, not a collection of amphib ships but a staff. Additionally, some of the newer Navy ships, such as the littoral combat ship (LCS), did not fit well into the ESG concept—but they were not designed for that role.³⁸

The last large-scale amphibious landings against defended beaches occurred in the Korean War (1950–53). The Inchon landing was justly famous, but after action analysis indicated that the risks associated with it would never be accepted today. Inchon was also part of Operation Chromite, which included a second landing at Wonsan on Korea's east coast. That landing was not conducted due to the presence of mines and an opposed landing delayed by weeks.³⁹ There was the threat to conduct an amphibious assault in Operation Desert Storm (First Gulf War), but that was a deception operation. Even so, mine damage to two major warships of that force, one of them a big deck amphib, only reinforces the threat of today's antiaccess environment to the ARG.⁴⁰ The viability of an opposed landing in an antiaccess environment has never been tested since Korea.

Returning to the *Fleet Design Advisory Panel Report*, one finds the discussion of amphibious shipping almost exclusively in areas not considered part of its primary mission. For example,

Each of the reports recommends the development of a light conventionally-powered aircraft carrier (CVL) evolved from an amphibious assault ship design. This is an innovative approach to providing additional tactical aviation into a sea control or power projection operation. *The [OpNav] report, however, essentially recommends the reduction of amphibious/expeditionary warship capabilities in order to fund other combatants (as well as the CVL).* In further briefings, the Navy report writers have suggested that well decks be removed from “large-deck amphibs” and LPDs/LSDs be utilized almost exclusively for the deployment of unmanned surface, air, and undersea vehicles. Obviously this is an approach that entails cultural/political/joint risk, particularly as the Navy report postulates an increase in the overall fleet, but an effective decrease in the amphibious force. . . . The MITRE report does not examine the amphibious force in detail (although it recommends ending the current LPD program and examining cheaper platforms for disaggregated operations).⁴¹

Inside the Navy, the owner of the ARG shipping it seems is trying to repurpose amphibs in its quest to find efficiencies to address the antiaccess/area-denial (A2/AD) threat. This is why the recent fire aboard the USS *Bonhomme Richard* (LHD 6) is so significant. That ship and its ARG were due to cover a “gapped” carrier presence in the Indo-Pacific region using the new Lockheed Martin F-35B Lightning II.⁴² The *Bonhomme Richard* tragedy also highlights how closely related amphibs and carriers have become over the years in force posture work arounds.

Shibboleths?

Obviously, no one is going to be laying up these two symbols of seapower just yet. The United States is stuck with them for decades. After all, the battleships that were reputedly obsolete in 1945 were around for one final war in 1991. However, the sooner the leadership of the Navy and the Department of Defense get serious about coming up with new, realistic solutions, the better. The congressionally mandated studies and the Fleet Design Advisory Panel were an attempt to do that, but the institutional inertia conferred by these icons, as Lieutenant Commander Vandenberg argued, seems almost insurmountable. Another issue is that there is always the problem of making what might be

called the *Billy Mitchell error*, replacing a proven something, with an unproven something. After bombing and sinking an already sinking, damaged, German battleship anchored and unmanned on a clear day in Hampton Roads, Virginia, Mitchell proceeded to proclaim that battleships, and navies “were almost obsolete.”⁴³ But Americans seem to favor these sorts of all-or-none solutions. After all, carriers and amphibs were nearly red-lined in 1949 by none other than the Secretary of Defense Louis Johnson:

Admiral, the Navy is on its way out. Now, take amphibious operations. There’s no reason for having a Navy and a Marine Corps. General [Omar N.] Bradley . . . tells me that amphibious operations are a thing of the past. We’ll never have any more amphibious operations. That does away with the Marine Corps. And the Air Force can do anything the Navy can do nowadays, so that does away with the Navy.⁴⁴

Johnson wanted to replace the shibboleths of the aircraft carrier and amphibious operations with the shibboleth of the atomic bomber.

So, what does that leave us with for today as alternative forms of seapower? Submarines will play a major role in any major maritime conflict. The “silent service” is a deadly and capable tool of seapower. The same might be said of the current crop of multimission Aegis-equipped ships, immensely capable, but very expensive—a \$1 billion platform for 96 missile tubes. Cheaper alternatives are available. It is time for the U.S. defense leadership to apply the tools of seapower more broadly and quit putting all of its resources into one or two options—carriers and amphibs in particular. Unmanned aerial systems (UAS) offer solutions, especially longer-range ones that authors like Rubel have written about, and not just the air systems, but submarine and surface ones as well.⁴⁵ One might see flotillas of unmanned and manned surface groups. Similarly, smaller, cheaper ships can be used as bases for these unmanned flotillas or even swarms of unmanned systems. Finally, a capability that often gets little mention in larger arenas of public debate, especially those outside the Navy, is that of the complicated space and terrestrial network that will support all these advanced tools of seapower. Rubel has proposed that perhaps the next capital ship is in fact the network that will tie all the tools of modern sea power together in the antiaccess as well as blue water environments.⁴⁶

In summary, carriers and amphibs are shibboleths in that they encourage a slogan approach to naval strategy built around two concepts that deliver much less capability than that perceived by U.S. decision makers for power projection in antiaccess environments overseas. Carriers are useful for patrolling the sea lanes or even power projection in the absence of antiaccess measures. They also still have value if a major blue water war occurs—that is a war at sea that is not

close to the littorals, oftentimes this means beyond the 100 fathom curve on maritime charts.⁴⁷ ARGs remain useful for low-intensity conflict and operations like NEOs. But for a real challenge in the Persian Gulf, Baltic, Taiwan Strait, and other antiaccess environments, both are not only of little value, but they also risk lives and national prestige when used carelessly. Tactical mistakes with these platforms mean thousands of lives lost in minutes, as at Pearl Harbor in 1941, but without the resilience the United States had back then to repair and replace its losses.

The uniformed and civilian leaders of the Department of Defense and in the Navy must be careful not to discard completely one capability—such as that conferred by aircraft carriers—for platforms and capabilities that serve a different function and in different scenarios, such as maritime conflict in a littoral environment. Recall that battleships lasted a very long time, until 1991, when they were finally deemed obsolete. But they were no longer the centerpiece of the fleet. However, these same leaders and their successors must be realistic about what aircraft carriers and ARGs bring to the fight—and also clearheaded about what they *do not* bring. Seapower for the twenty-first century must be built on more than these two aging coins of naval power.

To that end, the maritime security of the United States, when it comes to warship design, would do well to heed the old, but wise, words of Alfred Thayer Mahan: “In every class of naval vessel there should first of all, and first and last, throughout her design, be the recognition of her purpose in war.”⁴⁸

Endnotes

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3. See, for example, “Dwight D. Eisenhower Carrier Strike Group Returns from Deployment,” Navy.mil, 9 August 2020; and “First Ship from Bataan Amphibious Readiness Group Returns from Deployment,” Navy.mil, 18 July 2020. One must type *carrier strike group* and *amphibious readiness group* in the search box to find these terms and stories about them. The way the Navy now tells the public about these force packages has changed in the last year. Previously, the Navy would display specific CSGs and ARGs, for example, the USS *Theodore Roosevelt* (CVN 71) CSG would be in 5th Fleet area of operations and the USS *America* (LHD 6) ARG might be in the 6th Fleet area of operations (AOR). This is no longer the case and public awareness of Navy operations is more opaque now than it was just 12 months ago.
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32. Adm John M. Richardson, USN, *Chief of Naval Operations Fleet Design Advisory Panel Charter* (Washington, DC: Department of the Navy, 2016).
33. Robert C. Rubel, *Report of the Fleet Design Advisory Panel* (Washington, DC: Department of the Navy, 2017), 3. Emphasis added.
34. Jeffrey Kline, *Report of the Fleet Design Advisory Panel*, 3. Emphasis added.
35. *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress* (Washington, DC: Congressional Research Service, 2020).
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38. For a critical discussion of LCS, see Jared Keller, "The US Navy Basically Admitted that the Littoral Combat Ship Looks Like a Massive Failure," *Task & Purpose*, 14 April 2018.
39. See RAdm Arleigh Burke, USN, "Burke Speaks Out on Korea," *U.S. Naval Institute Proceedings* 125, no. 5 (May 2000) (reprint from a 1950 report): 68–72. For Inchon as a risky operation, see Cdr Malcolm W. Cagle, USN, "Inchon—The Analysis of a Gamble," *U.S. Naval Institute Proceedings* 80, no. 1 (January 1954): 47–51.
40. Kuehn, "'Sitting Ducks'."
41. Tangredi, *Fleet Design Advisory Panel Report*, 3–4.
42. Jerry Hendrix, "Burning USS *Bonhomme Richard* Signals More Trouble for Navy," *National Review*, 15 July 2020.
43. John T. Kuehn, "The *Ostfriesland*, the Washington Naval Treaty, and the General Board of the Navy: A Relook at a Historic Sinking," in *New Interpretations in Naval History: Selected Papers from the Sixteenth Naval History Symposium Held at the United States Naval Academy, 10–11 September 2009*, ed. Craig C. Felker and Marcus O. Jones (Newport, RI: Naval War College Press, 2012), 73–86.
44. Cited in George W. Baer, *One Hundred Years of Sea Power: The U.S. Navy, 1890–1990* (Stanford, CA: Stanford University Press 1994), 270–75.
45. Rubel, "The Future of Aircraft Carriers."
46. Rubel, *Report of the Fleet Design Advisory Panel*. *Blue water* is a subjective term, but it tends to mean fairly far out to sea in waters of around 100 fathoms or more in depth. This definition means the bulk of the South China Sea constitutes a non blue-water environment.
47. A fathom equals 6 feet on maritime charts; the water beyond 100 fathoms is normally the deepest blue color on the chart.
48. Capt A. T. Mahan, USN, "Reflections, Historic and Other, Suggested by the Battle of the Sea of Japan," *U.S. Naval Institute Proceedings* 32, no. 2 (June 1906): 471.