MARITIME TRADE WARFARE

A Strategy for the Twenty-First Century?

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> *The only thing that ever really frightened me during the war was the U-Boat peril.*
>
> WINSTON CHURCHILL

Maritime trade warfare, also called commerce warfare, is a naval/military strategy that has been followed since ancient times.[1] The idea of maritime trade warfare is to attack or neutralize the commercial shipping of one's enemy in an effort to disrupt the enemy's economy, make it more difficult for the enemy to continue waging war by disrupting the enemy's military supply chain that uses the sea, or both.

Maritime trade warfare can take different forms. Until the twentieth century, close blockades of an enemy's ports were most common, conducted to prevent the movement of an enemy's commercial shipping. In the twentieth century, with the introduction of new technologies such as the torpedo, submarine, and airplane, distant blockades (farther from the enemy coast) became standard practice. Mining of ports also was practiced.[2] In addition, maritime exclusion zones (MEZs) sometimes were established to prevent shipping from entering a designated area. Maritime trade warfare also has included attacking or seizing enemy shipping in general, or outright destroying an enemy's commercial shipping in particular. In the twentieth century, destruction of an enemy's port infrastructure to prevent the loading or off-loading of commercial vessels also became a type of maritime trade warfare.[3]

The use of maritime trade warfare in World War II and, to some extent, World War I is commonly understood. In the latter part of World War I, for example, the Germans' indiscriminate sinking of neutral vessels incensed the United States, eventually driving the country into the war on the side of the Allies.[4] German employment of submarines (U-boats), particularly in World War II, played a large role in disrupting the flow of supplies from North America and the British

Empire that was supporting the Allied war effort.[5] Similarly, the United States waged a very successful campaign of maritime trade warfare against the Empire of Japan in World War II.[6]

The present question is: Is maritime trade warfare still a viable strategy and tactic to be employed by warring powers today, or is it an anachronistic practice that has no place in twenty-first-century maritime conflicts? There seem to be two very different views on this question. On the one hand, there are military scholars and experts who not only promote the use of maritime trade warfare but also emphasize that modern navies should plan and exercise for it, from both offensive and defensive perspectives. On the other hand, there are military scholars and experts who argue that commerce warfare is a tactic of the past that is no longer viable, with no valid bearing on today's world. Reasons for the latter viewpoint, among others that will be discussed below, include the interconnectedness of the global economy and the nature of modern commercial shipping.

The purpose of this article is to consider both viewpoints and analyze their theories and supporting arguments. In the final analysis, the answer to the question whether maritime trade warfare belongs in the twenty-first century is complex. There are many obstacles to employing maritime trade warfare in a manner that would strangle an enemy's economy effectively or prevent the movement of military supplies. However, history shows that, given just the right circumstances and time, maritime trade warfare can work. In any case, it is in the interest of military strategists and planners to plan for and exercise offensive and defensive maritime trade warfare in many potential conflict scenarios.

HISTORY OF MARITIME TRADE WARFARE

Maritime trade warfare is certainly not a new military strategy. It has been employed for thousands of years in various forms.

Early to Modern History

Maritime trade warfare was employed commonly throughout ancient Greek history. In his writings on the Greek Peloponnesian War, the ancient historian Thucydides (ca. 460 BCE–400 BCE) described nearly thirty years of war between Athens and Sparta. In these writings he referred to what was essentially maritime trade warfare.[7]

For much of history, commerce warfare largely was performed by privateers, who received letters of marque from their governments. This instrument provided state authorization for their actions in seizing enemy shipping. In truth, however, there was often a fine line between privateers and pirates, since they operated in very similar manners. In theory, a privateer acted at least partly in the interest of his nation, whereas a pirate acted solely in his own interest.[8]

Essentially, privateers operating under letters of marque were nonmilitary persons given permission by their sovereigns or other governments to raid enemy shipping. This activity often was referred to as *guerre de course*. The intention was to enable a weaker naval power to attack a stronger power—and to seize booty in the process.[9] Acting as privateers with a letter of marque, a captain and crew were protected from being brought up on charges of piracy if captured. When successful in capturing an enemy merchant vessel, privateers turned over the vessel and cargo to the privateers' government in exchange for prize money. Rewards for privateers often were substantial.[10]

From a government's perspective, the major potential advantages of using privateers were the revenue generated and the damage inflicted on an enemy's economy. And the efforts of privateers could be had with little or no cost to a belligerent's treasury, because privateers often were completely self-funded. They might receive a small stipend from their host governments; Queen Elizabeth I of England, for example, partly funded the privateering efforts of Sir John Hawkins and Sir Francis Drake—Drake being, perhaps, the most successful privateer in history.[11] Probably because of their low cost to governments combined with their successes, privateers continued to be used to wage warfare on enemy commerce until the dawn of the twentieth century.[12]

Through the seventeenth and eighteenth centuries, maritime trade warfare in Europe played a role in the almost continuous conflicts among the British, French, Spanish, Dutch, and others. In the second half of the seventeenth century, Louis XIV of France, "the Sun King" (1638–1715), engaged his country in three major wars: the Franco-Dutch War, the War of the League of Augsburg, and the War of the Spanish Succession. In all three wars, maritime trade warfare played an important role in damaging enemy economies and preventing the movement of military supplies.[13] Because France was primarily a continental power, it needed to fund and support large land forces. This left it with only a limited ability to build or sustain a substantial navy with which to attack enemy shipping or fleets directly (i.e., *guerre d'escadre,* or war of fleets). As an alternative, in the last decade of the seventeenth century the French began to practice guerre de course to contest their enemies' complete command and control of the sea.[14]

The French enjoyed such great success with maritime trade warfare during this period that the noted late nineteenth-century naval theorist Rear Admiral Alfred Thayer Mahan, USN, suggested that "at no time has war against commerce been conducted on a larger scale and with greater results than during this period, . . . [which was] a large factor in bringing the sea nations to wish for peace."[15]

Guerre de course or maritime trade warfare has been called a tactic of the weak because it often has been practiced by nations with weaker navies.[16] The

American colonies employed commerce warfare from the late 1600s onward. For example, during times of conflict in the period 1739 to 1748, American colonial privateers sailed on some 466 privateering voyages and captured at least 829 foreign vessels.[17] During the War of 1812, American privateers profited handsomely from attacks on British shipping.[18]

In the Mediterranean, commerce warfare—perhaps legitimately called piracy by some—occurred from Roman times into the nineteenth century. The Knights of Malta preyed on Ottoman shipping sailing between North African and Spanish ports. During the Crusades, Ottoman pirates profited frequently from attacks on European shipping. So too the famed "Barbary pirates" attacked ships from countries unwilling to pay a tribute to the local beys (rulers). This included attacks in the late eighteenth century on merchant ships flagged by the new American republic, which prompted the U.S. Congress and president to establish a navy.[19]

Following the Crimean War in the mid-nineteenth century, the great powers of Europe negotiated the Declaration of Paris in 1856. Signing nations agreed to end guerre de course. The declaration pledged as follows: "Neutral goods, with the exception of contraband of war, are not liable to capture under the enemy's flag."[20] Not surprisingly, other countries did not sign the declaration. One such was the United States; because its Navy was small, guerre de course offered one of the few options by which it could attack a more-powerful naval power.[21] Indeed, during the American Civil War, the Confederates employed guerre de course against Union merchant ships, albeit with only a modest degree of success.[22]

The twentieth century brought an entirely new approach to maritime trade warfare with the introduction of several new maritime and naval technologies. At first, in the very early part of the twentieth century, it appeared to some that maritime trade warfare actually might cease to be a tactic because of these technological advances and treaties such as the Declaration of Paris.

In fact, in 1911 the noted British naval theorist Sir Julian Corbett declared, "Modern developments and changes in shipping and naval material have indeed so profoundly modified the whole conditions of commerce protection, that there is no part of the strategy where historical deduction is more difficult or more liable to error."[23] Corbett believed it would be difficult to provide sufficient coaling stations for modern steam-powered warships to cruise extensively to attack enemy shipping. He also believed (as though it were a requirement) that it would be difficult, if not impossible, to embark a prize crew on a captured vessel. As to merely sinking enemy vessels, Corbett famously stated, "No Power will incur the odium of sinking a prize with all hands, and their removal to the captor's ship takes time."[24] He also theorized that since commercial steam vessels had great maneuverability, they could avoid potentially dangerous routes on which enemy warships might be lying in wait.[25]

Needless to say, World Wars I and II clearly demonstrated the potential and effects of maritime trade warfare. At the beginning of World War I, German reliance on maritime trade for both imports and exports was substantial, and the British navy believed it had the potential to destroy the German economy through blockade.[26] Ultimately, with the largest and most powerful navy in the world, Great Britain successfully blockaded Germany and prevented merchant vessels, German or otherwise, from trading at German ports.

Whether today's Navy leadership believes that protecting shipping in a maritime trade warfare situation is a Navy mission is a moot point. . . . [T]he U.S. Navy has no doctrine and no current practices regarding protecting maritime commerce from attack, and precious few resources with which to do so in any case.

According to Naval War College professor and naval theorist Dr. Milan Vego, "a blockaded country often resorts to commercial counterblockade."[27] As an imperial power with the most far-flung empire in history, Britain was dependent on the sea for trade with its colonies and with nations providing matériel for the war effort. Not surprisingly, as the war progressed Germany increasingly countered the British blockade with commerce warfare, using the submarine.[28]

By the end of World War I, the Germans had managed to sink 11,153,000 tons of Allied merchant shipping, comprising 2,990 commercial ships and 578 fishing vessels. To accomplish this, the Germans used some 390 submarines, of which Allied forces sank 178.[29]

Although Germany was not as dependent on seaborne commerce at the beginning of World War II as it had been in 1914, its maritime trade was still important. As in World War I, the British early in World War II established a blockade of German ports. The Germans responded with commerce warfare in the form of air and submarine attacks on British, and later Allied, maritime trade and on British port infrastructure. In total, during this war the Germans sank 5,150 Allied merchant ships displacing 21.57 million tons.[30] The German attacks on maritime trade not only destroyed ships; they greatly disrupted the entire military supply chain by requiring the use of large, slow convoys and by causing substantial rerouting of ships, which increased voyage times. They also caused negative second-order effects by slowing the production of military equipment and supplies.[31]

The cost to the Germans of their submarine warfare campaign was the loss of 785 submarines and their crews.[32] However, looking at the big picture, the Allied cost in dollars and additional resources for protecting vessels with convoys and other measures and for merchant vessels lost nonetheless was substantially higher than the cost to the Germans of building and operating their submarine fleet.[33] In

other words, although the Germans were not ultimately successful in curtailing Allied maritime trade, they might have been if circumstances had been somewhat different. In any case, the U-boats greatly disrupted the entire Allied war effort and caused the Allies to expend substantial resources to protect their sea-lanes.[34] German maritime trade warfare was at least partly successful.

In World War II, the United States prosecuted a very successful maritime trade warfare campaign against Japan, destroying 8.1 million tons of merchant shipping. The United States employed 288 submarines in the Pacific, which were responsible for sinking about 4.9 million tons of that total; aircraft, surface ships, and mines accomplished the remainder. This crippled the Japanese merchant marine, which prevented the importation of critical supplies, starving the Japanese military, economy, and people.[35] The Japanese did not employ any significant maritime trade warfare against the United States during World War II, because it simply was not a part of Japanese naval doctrine, nor did it seem to conform to the Japanese Bushido (warrior) code. Further, the Japanese offered no effective defenses against the U.S. maritime trade warfare campaign.[36]

Maritime Trade Warfare in the Latter Half of the Twentieth Century

As noted earlier, the 1856 Declaration of Paris banned attacks on commercial shipping by privateers—at least, those of the European nations that signed the treaty. This was followed by significant maritime technological advances in the construction of naval vessels, including submarines, and the torpedo, which caused at least some naval theorists—such as the respected Sir Julian Corbett quoted earlier—to believe that commerce warfare in the modern age was far-fetched and very unlikely. Obviously, the events of World Wars I and II proved otherwise.[37]

In the dozens of conflicts that have broken out around the globe since World War II, maritime trade warfare has been relatively rare. During the U.S. interventions in Korea, Vietnam, Iraq, and Afghanistan, it was and has been limited or nonexistent. As a result of the lack of maritime trade warfare in recent times, and in a manner similar to the propositions of naval theorists a century ago, there are those who believe that commerce warfare has been relegated to the history books. As Professor Douglas Peifer of the University of North Carolina notes in an article, "'Maritime commerce warfare' has a distinctly dated whiff."[38] Still, as in the days of Corbett, this contention can be called into question.

Indeed, maritime trade warfare did occur in the second half of the twentieth century, albeit infrequently. During the period of the Yom Kippur or Ramadan War of 1973, for example, the Egyptians attempted to blockade commercial shipping traffic to prevent oil tankers from reaching Israel from Iran. To accomplish this, the Egyptians mined Israeli ports and declared a naval blockade in the Red

Sea. Had the war lasted longer, the Egyptians' maritime trade warfare might have been successful, because Israel had no other method of obtaining the necessary oil supplies.[39]

The Iran-Iraq War (1980–88) provides another very clear example of maritime trade warfare in relatively recent times. The so-called tanker war began in early 1981, when the Iraqis announced that all shipping headed to and from Iran was subject to attack. In 1982, Iraq attacked the Iranian oil terminal and commercial shipping at Khārk (Kharg) Island.[40] In every respect, this was maritime trade warfare.

Initially, Iran had little ability to attack commercial shipping bound for Iraq, but this eventually changed; by 1987, Iran was targeting tankers bound for Iraq effectively. In 1986, to protect its shipping interests, Kuwait requested assistance from the international community, including the United States. In 1987, several Kuwaiti tankers were reflagged to the United States, in theory protecting them from Iraqi or Iranian attack, since the United States was a neutral nation.[41] In any case, it was conjectured that the U.S. Navy would protect these ships through a convoy system, which is what eventually occurred.

In total, the marine insurance company Lloyd's of London reported that 546 commercial ships were damaged during the Iran-Iraq War, killing 430 merchant mariners.[42] Of the ships attacked, very few actually were sunk. Sixty-one percent of the vessels attacked (239 ships) were tankers. Fifty-five of these tankers were declared "constructive total losses." Thirty-nine percent of the bulk carriers attacked and 32 percent of the freighters attacked also were declared constructive total losses.[43]

The Use of Mines in Maritime Trade Warfare

Although the American David Bushnell is credited with developing the first naval mine in 1776 and mines were used to a limited extent in nineteenth-century wars, it was during World War I that the mine became a major weapon against navies and merchant ships.[44] Mines historically have been used to restrict access to a sea area and to blockade commercial vessels from port areas—a form of maritime trade warfare. Certainly World Wars I and II offer many examples of this type of warfare. In World War II alone some seven hundred thousand mines were sown. These accounted for the loss of 650 Allied ships and 1,100 Axis ships, with another eight hundred damaged between them. In fact, mines damaged or sank more vessels than any other weapon.[45] Perhaps the best example of the use of mines in maritime trade warfare was Operation STARVATION in the summer of 1945, for which the U.S. Navy and Army Air Corps sowed eleven thousand mines off the coasts and ports of Japan, sinking 605 Japanese merchant ships and sixty-five warships.[46]

From May 1972 through January 1973, the United States mined Haiphong Harbor in North Vietnam and two other, smaller North Vietnamese ports. This effectively closed these ports to commercial shipping, forcing North Vietnam to use inland roads and railroads from Chinese ports for imports and exports.[47]

During the Iran-Iraq War of the 1980s, Iran made extensive use of mines in an effort to blockade Kuwaiti ports. The mines damaged numerous merchant ships from many countries, although these efforts did not curtail merchant shipping in the Persian Gulf.[48]

ARGUMENTS FOR THE USE OF MARITIME TRADE WARFARE IN THE FUTURE

Some theorists believe that maritime trade warfare will continue to be used in any lengthy war conducted at least partly at sea.[49] Supporters of maritime trade warfare acknowledge that, for it to be an effective instrument for crippling an enemy's economy in general and preventing military supplies in particular from getting through, the time factor is essential. In other words, it takes time for maritime trade warfare to have the desired economic and military effects.

Geography also plays an important role in maritime trade warfare. An island nation, a coastal nation isolated by geographical features that are a barrier to land trade, or a nation with hostile neighbors is more vulnerable to maritime trade warfare.[50] Regarding the notion that because of the integration of the global economy commerce warfare is unlikely in future conflicts, proponents note that before 1914 many Europeans believed that a large-scale European war never would happen because it would lead to a European economic collapse that would harm all participating nations. Proponents argue that in many ways the global economy was intertwined prior to World War I in ways similar to today, yet both sides used maritime trade warfare as a tactic during the war.[51]

Prospects for Blockading

Given the past successes of maritime trade warfare, some experts contend that commerce warfare not only is likely to be practiced but should be incorporated into many conflict scenarios as an essential component of military strategy and tactics. In a *Yale Law Journal* article written in the 1990s, author Michael Fraunces notes:

> In the future, blockade may become even more important as the need of a blockading state to stop every merchant ship grows vital. The recent willingness of ostensibly neutral states to supply not simply technical know-how and materials for weapons of mass destruction, but also ready-for-use missiles and other decisive weapons, to the highest bidder portends such a future. As the negative consequences of allowing even one ship to pass uninspected grow more severe, blockading states will become more

willing to use the new blockade forms (long-range blockade and blockade zones) at the expense of neutral interests.[52]

To be sure, discussion in military circles today regarding maritime trade warfare is very limited, if it occurs at all. There currently is no U.S. military doctrine that even raises the issues of offensive or defensive maritime trade warfare. This situation is reminiscent of the interwar years: despite the extensive use of maritime trade warfare during World War I, requiring the United States to protect its convoys, during the 1920s and '30s the Navy essentially forgot the lessons it had learned. When the United States entered World War II, German submarines had a field day sinking American shipping, often in plain sight of the American mainland, because merchant shipping was given no protection at all.[53] The then Commander in Chief, United States Fleet, Admiral Ernest J. King, believed the Navy had no obligation to protect commercial shipping, in light of the many other demands the service faced at the time.[54] Whether today's Navy leadership believes that protecting shipping in a maritime trade warfare situation is a Navy mission is a moot point. Aside from fighting piracy in East Africa, which could be regarded as protecting shipping, the U.S. Navy has no doctrine and no current practices regarding protecting maritime commerce from attack, and precious few resources with which to do so in any case.

[O]pponents of modern commerce warfare contend that it simply is not possible to isolate a powerful nation through maritime trade warfare without devastating the entire global economy.

Some military experts contend that maritime trade warfare not only is likely in future conflicts, but that it can and should be a strategy the United States directs its military to employ. The services therefore should plan for and practice this employment, in the form of military exercises conducted from both offensive and defensive perspectives. Given the growing power, including naval power, of several nations around the world, some military experts have weighed the potential for maritime trade warfare being employed in a conflict and believe it is a worthy strategy.

The possibility of conducting maritime trade warfare against China is one example. In a paper entitled "Offshore Control: A Proposed Strategy for an Unlikely Conflict," retired U.S. Marine Corps colonel T. X. Hammes contends that in a protracted conflict with China the United States could employ a strategy of "offshore control" to interdict China's energy, raw material, and industrial imports and exports to strangle the country's economy. According to Hammes, this could be achieved through the use of Navy ships, Army and Navy boarding teams, and contracted shipping and helicopters.[55]

Essentially, Colonel Hammes believes that blockading shipments to China through the Straits of Malacca, Lombok, and Sunda and controlling the north–south routes to and from Australia could block 80 percent of China's oil imports. Further, blockading exports from China would rob China of its source of economic power. This would force the Chinese to the bargaining table, which very likely would end the conflict.[56]

Colonel Hammes states:

> Clearly the U.S. Navy has insufficient ships to control the almost 1,500 very large commercial ships projected to be in use by 2015. However, these numbers can be controlled by U.S. amphibious shipping projecting Army and Marine boarding parties that will travel with the ships to ensure they do not enter the maritime exclusion zone. Commercial shipping and helicopters could be contracted to support the distant efforts, thus reducing the stress on the amphibious fleet.[57]

In their article "No Oil for the Lamps of China," authors Gabriel Collins and William Murray further explain how the U.S. Navy could block the key straits on Chinese trade routes effectively:

> It appears then that at least ten surface warships and two replenishment vessels would be required to establish an effective and protected distant blockade at the Straits of Malacca. This number would increase proportionally if the Lombok Strait, Sunda Strait, and the route around Australia also had to be patrolled. The authors estimate that three surface warships and accompanying replenishment vessels per additional strait would be necessary to provide reasonable assurance that all passing tankers could be boarded, inspected, and if necessary escorted to a quarantine anchorage. This gives a minimum total of sixteen surface warships and four replenishment vessels.[58]

In a well-researched article in the *Journal of Strategic Studies,* author Sean Mirski argues as follows: "A blockade strategy [against China] is viable, but it would be limited to a narrow context: the United States would have to be engaged in a protracted conflict over vital interests, and it would need the support of key regional powers. The United States would also need to implement a mix between a close and distant blockade in order to avoid imperiling the conflict's strategic context. If enacted, a blockade could exact a ruinous cost on the Chinese economy and state."[59] Mirski comments that the existing literature on commerce warfare is "remarkably sparse, circumscribed, and inconclusive," in large part because commercial links between China and the United States are so intertwined that maritime trade warfare is considered unlikely because it would be too mutually destructive.[60]

Yet Naval War College professor Dr. Milan Vego believes that maritime trade warfare remains a possibility in the future. He notes that another large-scale

global war may never occur; however, history suggests that the improbable often becomes reality. He uses World War I as an example; as noted earlier, theorists in the early twentieth century did not believe a large European war would occur—yet it did. Similarly, some naval theorists in the early part of the twentieth century suggested that the days of commerce warfare were over—yet in both world wars, maritime trade warfare was definitely a reality.[61] Accordingly, Vego believes that in a large, long-term conflict, maritime trade warfare is probable. He also believes that attacks on maritime trade might take the form of attacks on infrastructure and ports and, perhaps, some forms of cyber warfare, but that "attacks on ships at sea and in port would also be essential."[62]

Prospects for Use of Mines

Historically, mines have been used effectively to blockade merchant shipping from entering a belligerent's ports. In numerous conflicts, mines have proved themselves to be quite deadly. It is noteworthy that since World War II, fourteen USN ships have been sunk or damaged by mines, compared with only two that have been damaged by missile or air attack.[63] Mines are relatively inexpensive, and nations throughout the world keep tens of thousands in their inventories.[64]

Available current literature on the use of mines to blockade as a form of commerce warfare is quite sparse. However, given the low cost and deadly effectiveness of mines in past conflicts, it seems reasonable to some experts that mines could play an important role in modern maritime trade warfare by effectively blockading the ports and harbors of an enemy.

ARGUMENTS AGAINST THE LIKELIHOOD OF MARITIME TRADE WARFARE IN THE FUTURE

While acknowledging the historical successes of maritime trade warfare, there are those who contend that this type of warfare is essentially a strategy and tactic of the past. Numerous factors support this position.

The Nature of the Global Economy

In a manner similar to the arguments offered prior to World War I, the integrated nature of the global economy today and the difficulty of interdicting maritime commerce often are cited as reasons there will be no maritime trade warfare in the future. In 1897, Germany's Grand Admiral Alfred von Tirpitz—given the situation at the time—projected as follows: "Commerce raiding and transatlantic war against England is so hopeless, because of the shortage of bases on our side and the superfluity on England's side, that we must ignore this type of war against England in our plans for the constitution of our fleet."[65] Obviously, Admiral Tirpitz's prediction of how developments would unfold was significantly off the mark.

Regarding the integrated global economy of today, opponents of modern commerce warfare contend that it simply is not possible to isolate a powerful nation through maritime trade warfare without devastating the entire global economy. Yes, the global economy was integrated to some extent prior to World War I, but not to the degree and scope that it is today. The technological developments in communications and transportation and more-positive international government policy environments established around the world in the last half-century have expanded trade greatly in both size and scope.[66] At the beginning of the nineteenth century, global trade was estimated to be U.S.$1.5 billion; by 1850 this had risen to $4 billion; and by 1900 to $24 billion.[67] In 2014, global trade was reported to be $18.5 *trillion*.[68] Worldwide, in manufacturing exports alone there was a 3,500 percent increase just from 1950 to 1998.[69]

World Wars I and II devastated the global economy. The reasoning follows that, with the economic destruction they inflicted so obvious, and with the global economy even more integrated today than it was prior to those wars, another conflict involving maritime trade warfare is as unthinkable as it is unlikely.

The Nature of Global Merchant Shipping

The complexity of the global commercial maritime business also is put forward as a reason maritime trade warfare is unlikely in the future. Until the late 1940s, commercial ships typically were financed, owned, built, and crewed in the flag state of their registry. This changed dramatically in the decades after World War II, with the proliferation of "flag-of-convenience registries."[70] Today, more than half the world's merchant ships are registered in flag-of-convenience countries.[71] In many cases, the actual ownership of a vessel is difficult to ascertain.

Complicating this is the very nature of modern commercial shipping. Ownership of bulk cargoes such as oil, grain, and iron ore, as well as the destinations of those cargoes, can change, sometimes repeatedly, as cargoes are sold and resold throughout the course of a voyage. With general cargo and container vessels, ownership and cargo destinations also can be complex. A single ship can contain multiple cargoes—sometimes thousands—destined for dozens of countries, often located far beyond the port of discharge.[72] The basic problem is that boarding, search, and seizure of vessels and cargoes on the high seas is complicated because it can be difficult to identify the ownership of a ship and cargo and because a vessel's cargoes often are destined for many countries. When a nation seizes or sinks a vessel apparently bound for a belligerent nation, its cargo, or at least a portion thereof, may be the property of a neutral nation, or even an ally.

Another factor of the modern global merchant marine is simply its size. In 1939, prior to World War II, the combined size of the entire global merchant marine was about fifty-seven million deadweight tons.[73] This included

approximately twelve thousand vessels in deep-sea trade. Today, the size of the global merchant marine is about 1.75 billion deadweight tons, with about ninety thousand commercial vessels.[74] In other words, there are tens of thousands more vessels in the world today than in the decades prior to World War II, and they are larger as well. At the same time, the number of naval vessels available in the larger navies of the world today—those warships capable of conducting maritime trade warfare or interdiction in any form—is very small.

These factors clearly indicate that conducting maritime trade warfare effectively would be exceedingly difficult in most scenarios today. Identifying vessels and cargoes belonging to a belligerent is much more complex today than it was in those historical situations in which maritime trade warfare proved a productive strategy and tactic. In any case, the number of naval vessels or auxiliaries needed to implement successfully an effective maritime trade warfare campaign would be very substantial—far more, in most scenarios, than the number of vessels needed during World War II. Compounding this is the fact that even the large navies of the world today are much smaller than in the era of the world wars.

Use of Alternative Intermodal Transportation

There are other reasons to argue that maritime trade warfare in the twenty-first century would require massive resources yet would be ineffective. As maritime transportation technologies have made great strides with the development of containerization and container shipping, so too have land port infrastructure and intermodal transportation. The majority of the world is linked as never before, not just by ports but by highly efficient ports, ports that are linked to vast networks of roads, railroads, and airports. This means that, in many cases, trade by sea can be bypassed by using other modes of transportation. Doing so might raise transportation costs significantly, but it nonetheless could render maritime trade warfare ineffective.

It must be noted, for example, that even during World War II German maritime trade warfare in the Atlantic was not effective in blocking the majority of economic and military supplies from reaching the Soviet Union from North America. In fact, of the supplies sent that reached the Soviet Union, 23 percent did so through Iran and another 46 percent reached Pacific coast ports of the Soviet Union—passing near Japan, which had a nonaggression pact with the Soviet Union until 1945. Today, in an era of much more sophisticated railroad, pipeline, and aviation intermodal links, maritime trade warfare alone, in many cases, would not isolate a country—particularly one with friendly or neutral countries on its borders. In a conflict with China, for example, it would be highly unlikely that land intermodal shipments of oil and other cargoes to and from one or more of China's many neighbors could be blocked.[75]

In November 2014, for example, China initiated a new train service from China west to Spain, a route covering a distance of some 6,200 miles and requiring approximately twenty-one days' travel.[76] In January 2017, the first freight train from China arrived in London after a 7,500-mile journey, having reached its destination in eighteen days—half the time required for a sea voyage.[77] In addition, China has the ability to link to Russia's Trans-Siberian Railway and other rail lines across Asia. Further, according to Global Risk Insights, during the past few years Russia and China have forged new energy deals that will open energy pipeline links from Russia to China.[78] The Chinese also are funding both rail and pipeline links from China to Myanmar ports so as to bypass the Straits of Malacca, Lombok, and Sunda.[79]

In other words, although the Chinese do rely on ocean transportation for the majority of their energy, raw materials, and exports, they have several neighbors and connections to numerous intermodal links to the Middle East and Europe that could ease their dependence on marine transportation during a military conflict. Most coastal nations, especially large nations, have the same ability.

Use of Reserves and Rationing

For any military conflict or other national emergency in which vital imports such as energy supplies are required, many nations around the world have plans and infrastructure in place to conduct rationing. In addition, many countries, including the United States, have established substantial petroleum reserves, which would provide energy supplies for an extended period during a national emergency.[80]

If targeted states brought in resources via intermodal links other than the sea, then rationed them carefully, the results desired from maritime trade warfare might be minimal.

The Naval Resources Question

The question of the naval resources needed to conduct maritime trade warfare in the form of imposing an effective blockade is a very significant one. With regard to a country such as China—or any other country in East Asia, for that matter—the supporters of maritime trade warfare cited in this article focus on blockades of the Straits of Malacca, Lombok, and Sunda as the method for restricting energy supply lines or otherwise curtailing economic activity, particularly exports. These studies indicate that a relatively small number of naval ships could blockade the Straits of Malacca, Lombok, and Sunda successfully, effectively isolating the energy and economic supply lines to and from China.[81]

However, the imposition of a blockade in these straits would be illegal under international law, as represented by the United Nations Convention on the Law of the Sea. *The Commander's Handbook on the Law of Naval Operations* notes:

> Belligerent forces transiting through international straits overlapped by neutral waters must proceed without delay, must refrain from the threat or use of force against the neutral nation, and must otherwise refrain from acts of hostility and other activities not incident to their transit. . . . Belligerent forces may not use neutral straits as a place of sanctuary or as a base of operations and belligerent warships may not exercise the belligerent right of visit and search in those waters.[82]

It could, perhaps, be argued that blockading naval vessels could operate in waters sufficiently far away from international straits to remain compliant with international law. However, this would increase significantly the number of naval resources required to implement an effective blockade. In any case, 2014 data indicate that in that year alone there were some 79,000 transits through the Strait of Malacca. These involved 25,071 containerships and 4,993 very large crude oil carriers (VLCCs), in addition to tens of thousands of smaller cargo vessels and tankers. This translates to about 217 ships a day passing through the Strait of Malacca.[83] Adding the vessels transiting the Sunda and Lombok Straits would increase significantly the daily and annual ship-transit totals. Simply put, the naval resources needed to effect a legal blockade in areas near these straits—to board, search, and inspect vessels and to provide escorts to quarantine anchorages for suspect vessels—would be far more significant than is accounted for in any of the sources cited in this article.

It further complicates this problem that there is a huge swath of the Pacific Ocean that could be used for alternative routes to China and the rest of East Asia—numerous Pacific Ocean trade routes to Asia are available that do not use any strait. True, this would add to shipping and other transportation costs, owing to the longer distances covered (west from the Panama Canal and northwest from Cape Horn), but nevertheless these routes could be used.

For a VLCC traveling from Saudi Arabian oil terminals to Shanghai, China, today, for example, the transportation cost of crude oil is thirteen to eighteen cents per gallon for a transit of about eighteen days.[84] Crude oil transportation to China from Venezuela instead, via the Panama Canal in a tanker somewhat smaller than a VLCC, would require twenty-six days. VLCC oil transportation from Angola to China via Cape Horn would entail a voyage of about forty days.[85]

Clearly, the added distance in longer voyages would add to transportation costs—possibly doubling them, or more—but this hardly would impose an insurmountable expense if the Straits of Malacca, Lombok, and Sunda were being blockaded. The Suez Canal has been closed five times since its opening in 1869, including for the eight years between 1967 and 1975.[86] Oil tankers and cargo vessels transiting from the Middle East to Europe and the Americas were required to transit much longer distances around the Cape of Good Hope, and at greater expense to shippers, but this did not impose an overbearing economic hardship

on the countries of Europe or the Americas. Similarly, if the Straits of Malacca, Lombok, and Sunda were blockaded, using Pacific Ocean shipping routes to East Asia would create a hardship, but one that could be endured.

Any attempt to conduct maritime trade warfare (or interdiction) against all the Pacific Ocean route approaches to Asia and the approaches to the Straits of Malacca, Lombok, and Sunda would require a huge number of naval vessels, with all the complicated logistics and resupply associated therewith. Further, for every naval and resupply vessel used for maritime trade warfare and blockade, one fewer vessel would be available for other naval missions—missions that probably would be critically important in a time of military conflict.

The Targeting Problem

As noted earlier, there are some ninety thousand deep-sea commercial vessels in the world. This does not include hundreds of thousands of fishing vessels, coastwise vessels, and other special-purpose vessels. The waters in and around East Asia teem with traffic—thousands of vessels within a relatively small area. Identifying which vessels to board, search, and seize would be a daunting task that would get harder the closer one approached the Asian mainland or a choke point such as a strait.

It is true that commercial vessels now broadcast on an Automatic Identification System (AIS) frequency, by which they identify themselves, but AIS can be switched off. During the recent piracy crisis off the coast of Somalia, for example, many vessels simply turned off their AIS to avoid identification. In a maritime trade warfare situation, many vessels, including neutral vessels, likely would not broadcast their AIS signals, further complicating identification efforts.[87]

The Complexity Involved in Sinking Vessels

Some supporters of maritime trade warfare suggest the establishment of a maritime exclusion zone, with any commercial vessel entering the MEZ subject to attack and sinking. The theory is that this would prevent merchant ships from entering the zone.

However, the collateral consequences of sinking a modern commercial vessel would be huge. Sinking a vessel likely would result in the deaths of innocent merchant mariners, probably from a large number of nations, including friendly or neutral ones. Some might view this as a war crime.

In addition, the environmental impact of sinking a large ship, especially a petroleum tanker, would be immense. Sinking a VLCC, which can carry more than 165 million gallons of crude oil, would create an environmental disaster of epic proportions. The destruction of fishing grounds and the pollution of thousands of square miles of coastlines would be enormous.

While the German and American navies had great success in sinking merchant vessels during World War II, the problem today is much more complex. Simply put, merchant ships now are huge—much larger than those that sailed the seas during the twentieth-century world wars. It likely would take a significant amount of ordnance to sink a ship, or even to damage and disable it. Recall that very few of the 546 ships attacked during the Iran-Iraq War in the 1980s were declared constructive total losses, and almost none actually were sunk. No recent studies are available that analyze the methods and weapon capabilities needed to sink modern commercial vessels; the problem is likely much more complex than many realize.

Adding to this problem is the scarce inventory of available weapons and ordnance. Just as the number of naval vessels available for maritime trade warfare is extremely small, so too is the availability of ordnance needed to accomplish the task. While production of naval ships, weapons, and ordnance in theory could be ramped up, this would take a substantial amount of time. In fact, it would take much more time than was needed after America entered World War II in December of 1941. At that time shipbuilding and weapons-manufacturing companies already had increased their production substantially over a span of years, yet it took years more for the United States to produce enough ships, weapons, and ordnance to protect against German maritime trade warfare effectively and to establish an offensive maritime trade warfare campaign against Japan.

Maritime Trade Warfare Does Not Curtail Shipping

Some believe that even the threat of maritime trade warfare would cause shipowners from nonbelligerent countries to keep their vessels out of hostile waters. In individual instances this might be true, but history shows that generally it is not so. During the age of sail, shipowners were quite willing to sail into harm's way because profit motives outweighed concern for the safety of their vessels.

The world wars of the twentieth century also offer no exception. During the relatively recent tanker wars during the Iran-Iraq War, there was an initial 25 percent decrease in shipping traffic, but this soon changed as profits for shipowners soared. More ships became available to carry crude oil, despite the dangers involved. To cover the cost of higher marine insurance premiums, Iran reduced the price of its oil exports.[88]

The Question of Mines

Historically, mines have been used effectively in commerce warfare as a form of blockade to close the ports and harbors of a belligerent. Given the massive number of mines in the current inventories of some nations, it seems reasonable that mines might be used with great effectiveness, and in some cases this is

probably true. For a relatively small island nation with a limited number of ports, an enemy with substantial mining capabilities probably could blockade its ports very effectively.

However, the scenarios under which this might occur are quite limited. With regard to large countries having multiple ports and effective militaries, the challenges to effective mining are many. In a country such as the United States or China, for example, it would be exceedingly difficult for an enemy's submarines, other vessels, or aircraft to sow mines in ports, harbors, or approach channels. During the India-Pakistan War of 1971, for example, Pakistan attempted to sow mines in Indian waters with a submarine, but was unsuccessful owing to Indian navy intervention.[89]

[I]f plans are not put in place and exercised to protect strategic sealift vessels, . . . protection of warships is really a moot point. Without a reliable and capable supply chain of commercial and military logistics ships, warships cannot operate and fight far from American shores for any significant span of time.

A large country such as the United States, India, or China or an economic zone such as the European Union has dozens of ports. The resources needed to blockade all these ports effectively using mines would be quite substantial, and such efforts similarly would be vulnerable to intervention by local navies. Further, merchant ships blockaded from one port could shift to ports in neighboring countries and load and discharge their cargoes at intermodal facilities there, thereby limiting the mine blockade's effectiveness. As noted previously, the United States did manage to close North Vietnamese ports with mines during the latter half of the Vietnam War; however, North Vietnam at the time had only one large port and two smaller ones, and no navy to challenge the U.S. Navy. Despite the resultant reduction in transportation capabilities, North Vietnam was able to divert shipping to Chinese ports and use road and rail into North Vietnam, although this was less efficient.

Finally, the mine ordnance necessary to effect a commercial blockade is significant and grows substantially as the number of ports, harbors, channels, and coastal areas that require mining increases. And the United States, for example, has only a very small inventory of mines.

A review of the sources cited in this article reveals general agreement that determining the likelihood of maritime trade warfare being practiced in the future is a complex question. The proponents and opponents of maritime trade warfare agree that, to be effective, maritime trade warfare generally needs to be executed over a significant span of time. The American and German campaigns of World

War II eventually had great effect, but required several years to reach that point. The Egyptian campaign against Israel in 1967 was not effective because of its short duration.

Proponents and opponents of maritime trade warfare also agree that any use of this strategy and tactic would have devastating impacts on today's global economy. An unanswered question is whether maritime trade warfare really would bring a belligerent nation to the bargaining table, or simply escalate the conflict, which might spiral out of control. The answer seems to be that it would depend entirely on the situation; either result might occur. This certainly makes reliance on maritime trade warfare a dangerous business.

Another concern is that in regional or limited wars with powerful nations involved, commerce warfare is likely to create second-order effects that might draw other nations into the conflict. In the colonial-era Seven Years' War, for example, British commerce raiding expanded beyond attacks on French vessels to include attacks on neutral Dutch vessels, which strained relations with a friendly country.[90] In the 1904–1905 Russo-Japanese War, Russia, fearing consequences after numerous protests from the British and American governments, restricted its maritime trade warfare.[91] In the early part of World War II, Hitler specifically forbade German submarines from attacking American vessels lest such attacks bring the United States into the war on Britain's side.[92] Would similar problems arise with modern use of maritime trade warfare? Would allied nations support maritime trade warfare, or would they attempt to circumvent blockades? Again, either outcome might occur.

Maritime trade warfare, however likely or unlikely it is to occur, could have vast global, regional, and national consequences. Therefore policy makers and military planners should consider the topic thoroughly from an offensive and—equally important—a defensive standpoint. When the United States entered World War II, the Navy was ill prepared for German maritime trade warfare and largely remained so until 1943. The resulting commercial and military sealift shipping losses were enormous, and thousands of merchant mariners lost their lives.[93] The United States today is equally unprepared to defend itself against maritime trade warfare or to protect American commerce and strategic sealift on the high seas.

To support its allies and national interests, the United States has taken on worldwide missions, and therefore has the most expeditionary military in the world. With the requirement to operate, in many cases, far forward from the continental United States, the armed forces rely heavily on ocean transportation for the majority of their lift capacity, in terms of tonnage. To support its worldwide ocean-transportation needs, the U.S. military depends on internal sealift

capabilities through the Navy's Military Sealift Command; for rapid deployment, on the Maritime Administration's Ready Reserve Fleet of government-owned vessels; and for sustainment, on the U.S. Merchant Marine (commercial vessels). This triad of fleets offers substantial sealift capacity.

However, the potential for losses in this maritime capability through the offensive actions of enemy maritime trade warfare against the United States simply is not factored adequately into the nation's policies or plans. During a July 2014 congressional hearing on sealift force requirements, the deputy commander of U.S. Transportation Command was asked about the potential for attacks on strategic sealift vessels. In his response he admitted, "So in terms of protecting ships as they go across [the ocean], we . . . don't have a lot of attrition built into our modeling. . . . [T]hat is not something that we really build in there."[94] In other words, although the United States currently has a substantial military sealift capability, the losses resulting from even moderately successful attacks on U.S.-flag shipping could have far-reaching consequences.

Further, the number of U.S.-flag merchant vessels engaged in international trade and available for strategic sealift is very small—seventy-eight—compared with the tens of thousands of merchant ships under other flags.[95] Should losses occur in the U.S. Merchant Marine as a result of an enemy maritime warfare campaign, it is certainly questionable whether America could rely on foreign-flag commercial vessels for economic or military sealift.[96] Yet this topic receives little attention.

Perhaps logically, USN planning efforts center on the protection of surface combatants, particularly aircraft carriers. However, if plans are not put in place and exercised to protect strategic sealift vessels, to include both government-owned vessels and those of the U.S. Merchant Marine, protection of warships is really a moot point. Without a reliable and capable supply chain of commercial and military logistics ships, warships cannot operate and fight far from American shores for any significant span of time.

The conduct of maritime trade warfare in the twenty-first century represents a complex problem that in many conflict scenarios would not yield positive results. However, history is full of examples of maritime trade warfare proving an effective strategy against enemies—which sometimes was the United States. Likewise, history is full of examples of "experts" and political leaders insisting that maritime trade warfare would not work—only to be proved very wrong as new conflicts and scenarios presented themselves.

Accordingly, it seems quite appropriate in the twenty-first century that historical lessons learned from maritime trade warfare campaigns of the past be studied carefully, and that political leaders and military planners consider, plan, and exercise scenarios involving maritime trade warfare from both offensive and

defensive perspectives. Doing anything less risks repeating some of the greatest mistakes of maritime history.

NOTES

1. The terms *maritime trade warfare* and *commerce warfare* will be used interchangeably in this article.
2. Roger W. Barnett, "Technology and Naval Blockade: Past Impact and Future Prospects," *Naval War College Review* 58, no. 3 (Summer 2005), pp. 87–88.
3. Douglas C. Peifer, "Maritime Commerce Warfare: The Coercive Response of the Weak?," *Naval War College Review* 66, no. 2 (Spring 2013), pp. 84–85.
4. Nicholas A. Lambert, *Planning Armageddon: British Economic Warfare and the First World War* (Cambridge, MA: Harvard Univ. Press, 2012), pp. 422, 424.
5. Michel T. Poirier, *Results of the German and American Submarine Campaigns of World War II* (Washington, DC: Office of the Chief of Naval Operations, 1999), p. 3.
6. Ibid., p. 7.
7. Sara E. Phang et al., eds., *Conflict in Ancient Greece and Rome: The Definitive Political, Social, and Military Encyclopedia* (Santa Barbara, CA: Greenwood, 2016), p. 450.
8. Peifer, "Maritime Commerce Warfare," p. 85.
9. Bruce A. Elleman and S. C. M. Paine, eds., *Commerce Raiding: Historical Case Studies, 1755–2009,* Newport Paper 40 (Newport, RI: Naval War College Press, 2013), pp. 1–2.
10. Peifer, "Maritime Commerce Warfare," pp. 85–86.
11. Ibid., p. 87.
12. As will be discussed later, the Declaration of Paris in 1856 banned privateering, but the practice still was employed by some nations, including the Union and the Confederacy during the American Civil War.
13. Peifer, "Maritime Commerce Warfare," p. 87.
14. Ibid.
15. Ibid.
16. Milan Vego, "Maritime Trade Warfare," NWC 1035 (unpublished course reading, Joint Military Operations Dept., Naval War College, Newport, RI, 2005), p. 1.
17. Alex Roland, W. Jeffrey Bolster, and Alexander Keyssar, *The Way of the Ship: America's Maritime History Reenvisioned, 1600–2000* (Hoboken, NJ: Wiley, 2007), p. 63.
18. Ibid., p. 158.
19. Ibid., p. 124.
20. Peifer, "Maritime Commerce Warfare," p. 95.
21. Ibid., p. 97.
22. Ibid.
23. Sir Julian S. Corbett, *Some Principles of Maritime Strategy* (Eastbourne, U.K.: Anthony Rowe, 1918; repr. Uckfield, U.K.: Naval and Military Press, 2009), p. 266.
24. Ibid., p. 269.
25. Ibid., pp. 270–71.
26. Lambert, *Planning Armageddon,* p. 81.
27. Vego, "Maritime Trade Warfare," p. 25.
28. Ibid., p. 26.
29. R. H. Gibson and Maurice Prendergast, *The German Submarine War 1914–1918* (Edinburgh, U.K.: Constable, 1931; repr. Annapolis, MD: Naval Institute Press, 2003), p. 333, quoted in Vego, "Maritime Trade Warfare," p. 26.
30. Poirier, *Results of the German and American Submarine Campaigns of World War II,* p. 3.
31. Ibid.
32. Ibid.
33. Ibid., app. 2. The Germans invested $2.7 billion on their submarine campaign, while the Allies invested $26.4 billion on shipping and the protection thereof.
34. Ibid., pp. 3–4.
35. Ibid., p. 7.

36. This was particularly ironic given Japan's alliance with Germany and considering Germany's major maritime trade warfare effort.
37. Corbett fully appreciated the major role submarines would play against capital ships but did not grasp the extent to which submarines would become the "cruisers" of the future. Indeed, in World War I and World War II submarines became one of the most serious threats to commerce, along with mines and aircraft.
38. Peifer, "Maritime Commerce Warfare," p. 83.
39. Vego, "Maritime Trade Warfare," p. 23.
40. Robert S. Strauss Center for International Security and Law, "Tanker War," *Strait of Hormuz,* February 1, 2009, p. 2, archive.li/.
41. Ibid.
42. Jeff Reed, "Troubled Waters: Recalling the Iran-Iraq Tanker War," *OilPro* (blog), n.d., oilpro.com/.
43. Ibid.
44. Samuel L. Morison, *Guide to Naval Mine Warfare* (Arlington, VA: Pasha, 1995), pp. 1, 4.
45. Ibid., p. 5.
46. Ibid., p. 6.
47. U.S. Navy Mine Warfare Office, *History of the Mining of North Vietnam 8 May 1972–14 January 1973,* OP-325 (Washington, DC: Chief of Naval Operations, 1975).
48. Martin S. Navias and E. R. Hooton, *Tanker Wars: The Assault on Merchant Shipping during the Iran-Iraq Crisis, 1980–1988* (London: I. B. Tauris, 1996), pp. 142–47.
49. Vego, "Maritime Trade Warfare," p. 16.
50. Ibid.
51. Margaret MacMillan, *The War That Ended Peace: The Road to 1914* (New York: Random House, 2014), p. 288, quoted in Vego, "Maritime Trade Warfare," pp. 49–50.
52. Michael G. Fraunces, "The International Law of Blockade: New Guiding Principles in Contemporary State Practice," *Yale Law Journal* 101, no. 4 (January 1991), p. 902, quoted in Barnett, "Technology and Naval Blockade," p. 88.
53. Werner Rahn, *The Battle of the Atlantic 1939–1945: The 50th Anniversary International Naval Conference,* ed. Stephen Howarth and Derek Law (Annapolis, MD: Naval Institute Press, 1994), p. 545.
54. Walter R. Borneman, *The Admirals: Nimitz, Halsey, Leahy, and King—the Five-Star Admirals Who Won the War at Sea* (New York: Little, Brown, 2012), pp. 276–77.
55. T. X. Hammes, "Offshore Control: A Proposed Strategy for an Unlikely Conflict," *Strategic Forum,* no. 278 (June 2012), pp. 4–6, available at www.dtic.mil/.
56. Ibid., p. 5.
57. Ibid., p. 11.
58. Gabriel B. Collins and William S. Murray, "No Oil for the Lamps of China?," *Naval War College Review* 61, no. 2 (Spring 2008), p. 87.
59. Sean Mirski, "Stranglehold: The Content, Conduct and Consequences of an American Naval Blockade of China," *Journal of Strategic Studies* 36, no. 3 (2013), p. 385, available at www.tandfonline.com/.
60. Ibid., p. 387.
61. Vego, "Maritime Trade Warfare," p. 49.
62. Ibid.
63. Committee for Mine Warfare Assessment, Naval Studies Board, National Research Council, *Naval Mine Warfare: Operational and Technical Challenges for Naval Forces* (Washington, DC: National Academy Press, 2001), p. 19.
64. "THE THREAT IS REAL. A mine is a terrible thing that waits. More than a quarter-million sea mines of more than 300 types are in the inventories of more than 50 navies world wide, not counting U.S. weapons. More than 30 countries produce and more than 20 countries export mines. Even highly sophisticated weapons are available in the international arms trade. Worse, these figures are for sea mines, proper; they do not include underwater improvised explosive devices, which can be fashioned from fuel bladders, 50-gallon drums, and even discarded refrigerators." U.S. Navy, *21st Century U.S. Navy Mine Warfare: Ensuring Global Access and Commerce* (Washington, DC: Program Executive Office, Littoral and Mine Warfare Expeditionary Warfare Directorate, 2009), available at www.gryphonlc.com/.

65. Peifer, "Maritime Commerce Warfare," p. 104.
66. Martin Wolf, *Is Today's Globalisation Different from What Has Gone Before?* (London: Manchester Statistical Society, 2001), p. 1.
67. Mark Albertson, *They'll Have to Follow You! The Triumph of the Great White Fleet* (Mustang, OK: Tate, 2007), p. 15.
68. "International Trade Statistics 2015," *World Trade Organization,* www.wto.org/.
69. Wolf, *Is Today's Globalisation Different from What Has Gone Before?,* p. 2.
70. A flag-of-convenience (FOC) country offers incentives to shipowners to register (flag) their vessels in that nation. Incentives include substantial tax reductions—even no taxes—on profits. In return, the country typically receives a fee for the registry. Among the dozens of FOC countries, the most prominent include Panama, Liberia, and the Marshall Islands.
71. Institute of Shipping Economics and Logistics, "World Cellular Container Fleet," *ISL Shipping Statistics and Market Review* 56, nos. 5/6 (2012), p. 7.
72. *Intermodal transportation* has become a key concept in ocean shipping. It is defined as transportation that uses two or more modes of transportation, such as ships, trains, and railroads. Today, particularly with containerization of cargo, shipping usually is arranged from point of origin to the final destination, generally using several modes of transportation.
73. John S. Maclay, "The General Shipping Situation," *International Affairs* (Royal Institute of International Affairs) 22, no. 4 (October 1946), p. 488. "Deadweight tonnage" includes the weight-carrying capacity of a ship plus fuel, stores, passengers, and crew; it does not include the weight of the vessel itself.
74. UN Conference on Trade and Development, "Structure, Ownership and Registration of the World Fleet," chap. 2 in *Review of Maritime Transport 2015* (New York: United Nations, 2015), p. 30.
75. Collins and Murray, "No Oil for the Lamps of China?," p. 92.
76. "World's Longest Train Journey Opens, Spanning China to Europe," *China like Never Before,* n.d., www.cnto.org/.
77. Ritvik Carvalho, "First Freight Train from China to London," *Reuters,* January 18, 2017, www.reuters.com/.
78. Ante Batovic, "Russia and China Continue to Forge Energy Ties," *Global Risk Insights,* March 14, 2016, globalriskinsights.com/.
79. Eric Meyer, "With Oil and Gas Pipelines, China Takes a Shortcut through Myanmar," *Forbes,* February 9, 2015, www.forbes.com/.
80. "The International Energy Agency works to ensure reliable, affordable, and clean energy for its 29 member countries and beyond. Our mission is guided by four main areas of focus: energy security, economic development, environmental awareness, and engagement worldwide." (Security includes strategic reserves.) "Statistics," *International Energy Agency,* www.iea.org/.
81. See Hammes, "Offshore Control"; Mirski, "Stranglehold"; and Collins and Murray, "No Oil for the Lamps of China?"
82. U.S. Navy / Marine Corps / Coast Guard, *The Commander's Handbook on the Law of Naval Operations* (2007), sec. 7-3-6.
83. Marcus Hand, "Malacca Strait Traffic Hits an All-Time High in 2014, VLCCs and Dry Bulk Lead Growth," *Seatrade Maritime News,* February 27, 2015, www.seatrade-maritime.com/.
84. BIMCO, "Tanker Shipping: Still a Strong Market as Demand Stays High," *Hellenic Shipping News Worldwide,* January 26, 2016, www.hellenicshippingnews.com/.
85. Distances were determined using the calculator function available at www.sea-distances.org.
86. Suez Canal Authority, "Canal History," *Suez Canal,* www.suezcanal.gov.eg/.
87. "There have been reports of vessels in the Gulf of Aden sailing at high speed at night, not showing any lights, and with their AIS turned off, no doubt in the belief that this makes them less vulnerable to a hijacking attempt. That may be correct, but such action is foolhardy as it enormously increases the risk of collision in those congested waters, and puts innocent vessels in danger." John Knott, "UK: The Paradox of Modern-Day Piracy off Somalia; The Dangers, and How to Reduce Them," *MONDAQ,* December 9, 2009, www.mondaq.com/.

88. Reed, "Troubled Waters."

89. Michael Peck, "The War That Made India a Great Power," *The Buzz* (blog), *National Interest,* December 2016, nationalinterest.org/.

90. Elleman and Paine, *Commerce Raiding,* p. 3.

91. Ibid., p. 133.

92. "Battle of the Atlantic: America Joins the War," *German U-boat,* www.uboataces.com/.

93. In terms of percentage of service members killed in action, U.S. merchant mariners suffered a greater loss of life during World War II than any other branch of the U.S. armed forces.

94. *Logistics and Sealift Force Requirements and Force Structure Assessment: Hearing on Logistics and Force Requirements Before the Committee on Armed Services, Subcommittee on Seapower and Projection Forces,* 113th Cong., p. 20 (July 30, 2014) (statement of William A. Brown [Vice Adm., USN], Deputy Commander, U.S. Transportation Command).

95. "Maritime Data and Statistics," *MARAD: Maritime Administration,* www.marad.dot.gov/.

96. Christopher J. McMahon, "The U.S. Merchant Marine: Back to the Future?," *Naval War College Review* 69, no. 1 (Winter 2016), pp. 100–101, 103.

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