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Lyle Goldstein

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The hard school of amphibious warfare: examining the lessons of the 20th century's major amphibious campaigns for contemporary Chinese strategy

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ABSTRACT

Increasing tensions across the Taiwan Strait have prompted many strategists to debate the nature of China's amphibious warfare capabilities. While it is often noted that Beijing's armed forces lack major, recent experience in that domain, this research reveals that Chinese strategists have undertaken intensive and systematic investigation of foreign experiences, including with respect to the most classic cases, such as the Normandy invasion. This study represents a first attempt to survey such Chinese strategic writings, in an effort to better understand the lessons that Chinese strategists take from these foreign campaigns. Themes that emerge from this Chinese literature include an emphasis on undersea warfare capabilities as a critical enabler for amphibious invasion, but an even greater prominence for air supremacy. The most persistent theme in this Chinese literature surrounds intelligence preparation, deception and, above all, surprise. Such findings have important policy implications for Asian security.

In May 2021, the *Economist* magazine used its cover story to call Taiwan "the most dangerous place in the world," since the related military scenario could see the world's two most powerful countries, the U.S. and China, coming to direct blows.[1] Even after the brutal and volatile Russia-Ukraine War that began in Feb 2022, their conclusion regarding Taiwan likely still holds true. Leaders in both Beijing and Washington continue to regularly warn one another not to miscalculate over Taiwan, but neither one seems inclined to blink.

A Chinese campaign to seize Taiwan by force would face some daunting obstacles: a dug-in and well-armed Taiwan military that would be defending their homes, as well as the massive complexity that is inherent to a joint landing campaign. Most likely, the bloody conflict in Ukraine has imbued China's leaders with greater caution and it has also inspired Taiwan to take its defense more seriously, so it seems.[2] Yet, it is also worth noting that Taiwan is almost 15 times smaller in area than Ukraine and could be quite rapidly isolated, while China's military has a much larger budget than the Russian military. Enhanced firepower concentrated against a much smaller target could imply success for China in a Taiwan scenario.[3] However, the most obvious difference between the war in Ukraine and a hypothetical Taiwan scenario, of course, is that a Taiwan scenario would likely involve a Chinese amphibious landing campaign.[4]

Amphibious operations "involve the projection of a military force from the sea onto a hostile, or a potentially hostile shore."[5] According to official U.S. military doctrine, there are five types of amphibious operations: raiding, demonstrations, assault, withdrawal, and crisis support.[6] While all of these could be highly relevant to the development of Chinese amphibious warfare in future decades, the major focus in this paper is on amphibious assault. That is the most demanding type of amphibious operation and it is differentiated from the other types of amphibious warfare by the "rapid buildup of

CONTACT Lyle Goldstein lyle_goldstein@brown.edu Brown University Watson Institute for International Studies, China Initiative, 111 Thayer Street, Rhode Island, RI 02912-1970

combat power ashore, from an initial zero capability to full coordinated striking power" in order to achieve the final military objective.[7] Given Taiwan's particular salience among global hot spots, and within the fraught U.S.-China relationship, this focus seems justified. Amphibious operations could be evaluated along a variety of other metrics besides their intended purpose, including their scale, the distance from home bases to the target, as well as the primary means for delivering combat power. From a theoretical perspective, one might also consider whether a given amphibious assault constitutes the opening phase of a war or rather is undertaken during the middle or concluding phase of a conflict.

Heated debates have raged over the last century, concerning the feasibility of amphibious warfare given the increased range, lethality and precision of modern warfare. Indeed, one naval officer observed in 1926 in America's leading maritime strategy forum that new technologies "made invasion by sea almost an impossibility."[8] The debate will continue and remains highly relevant to the strategic conundrum presented by the Taiwan issue.[9] All the cases discussed below for the relevance to Chinese amphibious warfare development represent large-scale amphibious assaults. Even if the scale of these assaults, along with the other parameters outlined above, varies to a considerable degree, all appear to have significant relevance to China's consideration of an amphibious attack against Taiwan.

Western strategists have long viewed China's amphibious capabilities and its naval ambitions more broadly with skepticism.[10] To be sure, China either sat out or was a bit player in the three epochal military struggles of the last century: the two world wars, followed by the intensive, prolonged military rivalry of the Cold War. China did have distinct roles in the latter two giant struggles, of course, and these roles should not be minimized.[11] Nevertheless, these roles hardly encompassed naval warfare, with only minor footnotes regarding amphibious operations.[12] It was the major Western powers, first among them the U.S., that perfected amphibious warfare during the Second World War, and succeeded in employing these capabilities with devastating strategic effect, including against China's flank at Inchon in Sept 1950.

Could China learn the intricacies of naval combat, in particular when applied to amphibious warfare? The 2020 edition of *The Science of Strategy* [战略学], a comprehensive doctrinal document published by the Chinese military, states that amphibious warfare is one of the most complex types of military campaigns.[13] The PLA did actually accumulate some intensive experience with amphibious warfare during the period from 1949–1955 at both the Jinmen and Yijiangshan battles. The former turned out to be a disastrous bloodbath for the PLA, but the later amphibious landing proved remarkably successful, featuring massive firepower, excellent mutual support among the air, land, and sea elements, timely coordination, and even meteorological innovation.[14] Despite that impressive demonstration of PLA learning, the question still arises regarding deductive learning of historical lessons from the most important amphibious campaigns of the 20th century. The PLA Navy, in particular, has demonstrated it is an organization that excels at learning from foreign experience, for example in developing its aircraft carrier program. Another example concerns PLA learning from the Falklands War, in which a systematic effort led the PLA Navy to focus on anti-ship cruise missiles, naval helicopters, and also nuclear submarines.[15] This study will review Chinese lessons from the Falklands War concerning amphibious warfare, but will move chronologically beginning with WW1. However, the bulk of the analysis concerns PLA lessons from the classic amphibious campaigns of WW2, including first and foremost the Normandy campaign.

Chinese military development continues to lack transparency in many respects, but one significant window into how the PLA is evolving is through a close reading of military and quasi-military Chinese writings, which are reasonably available and quite voluminous. Most of the Chinese authors cited below have active and direct ties to the PLA, particularly through the Chinese PLA Academy of Military Science [中国人民解放军军事科学研究院], which is tasked with the study of military history and developing military doctrine. Yet, some of these articles do not have direct connections. Still, they should be taken seriously. China, like many countries including the U.S., has a very dynamic, non-official defense press that often yields insights that go beyond what is flowing through official channels.

A truly comprehensive treatment of this issue would encompass an evaluation of how these lessons are integrated into current PLA doctrine and its evolving force structure. It would be of further interest to compare Chinese lessons from these engagements with other countries' lessons. However, this initial research effort is relatively limited to making a pilot probe of the major lessons that Chinese strategists have taken from the most significant amphibious engagements of the 20th century. This preliminary survey yields the significant conclusion that Beijing's military strategists have done very considerable intellectual spadework in order to accelerate PLA preparations for a possible amphibious invasion of Taiwan.

WW1: The Gallipoli Campaign

This very first modern amphibious campaign from 1915–16 is not very well known these days among strategists, because it is overshadowed by the masterful achievements of the Second World War, but it also amounts to a rather sad tale of woe. As an immense strategic and operational blunder, this campaign stands as the very antithesis of a competently planned amphibious battle. The campaign's proponents, not least Winston Churchill, hoped a nimble takeover of the Bosporus and Dardanelles would both knock Turkey out of the war, and simultaneously strengthen faltering Russia by ensuring a direct route for Allied war material to the Czar's armies. A 2016 analysis by a PLA researcher concludes crisply that the Allies "paid a huge price . . . and did not achieve their objectives."[16] Indeed, nearly 50,000 Allied soldiers were killed, while another 250,000 were wounded or evacuated due to illness when the Allies' forces were finally evacuated from the peninsula in early 1916.

As a first fundamental problem, the PLA researcher underlines a failure of "determination." Allied military leaders were neither resolute, nor decisive, it is explained. According to this rendering, they could not make up their mind regarding whether to employ ground forces together with naval forces. Even when the British finally made up their minds to make an actual amphibious landing, similar indecisiveness is said to have impacted determinations on strength, flow of forces, and points of attack. These mistakes "all had a negative impact on the attack" [都对进攻效果产生了负面影响]. A second major lesson of the Allied failure at Gallipoli for Chinese military readers is that "combat preparation must be serious and meticulous." Indeed, this account relates how British forces relied on tourist maps and brochures purchased in a hasty rush into a local book store before setting off on the expedition. Australian units are described to have been poorly equipped and not having received any amphibious warfare training whatsoever. Even if British units had some amphibious warfare training, the Chinese account notes that this training was not very specific, especially given Gallipoli's unique topography.[17]

The Allied campaign additionally suffered from major command deficiencies, according to this Chinese assessment. With each of several changes of command, the Allies reportedly gave the Turks a chance to "breathe and enhance their preparations." Moreover, the Allied "high command interfered excessively in the work of the battlefield commanders [高层对战场指挥官的干涉过多]." The PLA researcher explains that the Allied command was inhibited by a lack of experience in large-scale amphibious warfare, as well as relatively backward communications technology. Finally, this Chinese analysis notes that the support for combat forces ashore proved lacking across the board. Troops disembarking found that they were not provided with "entrenching tools," [堑壕工具] for example. Allied forces at Gallipoli were ravaged by disease, since medical preparations were inadequate. The PLA analysis states that due to lack of proper clothing, some troops even died from hypothermia. Intelligence failure was also of major significance, according to the Chinese analysis.

Overall, the main implications of the failed Allied amphibious campaign against Turkey at Gallipoli concerns mainly hubris. While the PLA analysis does not explicitly draw lessons for contemporary Chinese amphibious warfare, it is possible to infer these important lessons. The main point of this Chinese analysis seems to be to underline the inherent difficulties of amphibious operations, as well as to point out the salient roles for intelligence, scrupulously detailed planning, and an efficient, resolute command structure.

WW2: The Normandy Invasion

As by far the most famous amphibious assault in modern history, the D-day invasion has been studied carefully by nearly all branches of the Chinese military for decades. The Chinese Navy, for example, has marveled over the famous Mulberry harbors, caissons, and sunken ships that comprised the "artificial port" [人工港] at Normandy. This PLAN analysis notes, for example, that the Mulberry harbor was designed to reduce the time of unloading a tank-carrying ship from 10–12 hours to just over one hour. A map accompanying the article specifies the layout of the different attributes of the whole Allied artificial harbor at Normandy.[18] The campaign has likely influenced the development of whole sub-specialties within the PLAN, including mine-hunting divers [猎雷潜水员].[19] Other PLAN discussions of the Normandy invasion concern the vital role of weather forecasting, as well as the broader issue of amphibious fleet design.[20] In another example of the vital role of the Normandy invasion in PLA learning, a paper published by a research team from the Chinese Marine Academy in Guangzhou, while alluding to so-called "three-dimensional" [立体] amphibious operations (see extensive discussion in Part C below), builds a quantitative model that predicts ideal beach landing areas, employing the Normandy case as a validation of the model.[21]

Illustrating the sophistication of Chinese military readers, a recent Chinese analysis appeared that focuses on the vital and ultimately disastrous precursor experiment that was launched almost two years prior to Operation *Overlord*.[22] For readers unfamiliar with the Dieppe battle, this short, bloody engagement featured an amphibious "probe" by British and Canadian forces of German defenses along the French coast of the English Channel during mid-August 1942. This Chinese analysis rightly characterizes the raid as a "complete defeat," but extracts numerous lessons. First, it is assessed that "the forces were inadequate to risk such a decision" [实力不足冒险决策]. The Allies in this engagement suffered from a paucity of warships, transports, tanks, artillery, and even infantry numbers were less than their German adversaries. Trying to fight their way ashore straight into the teeth of Germany's "massive air force shield" was bound to be disastrous for Allied troops, according to this Chinese analysis, as Dieppe proved to be both "the wrong time and the wrong place" for an attack. A second lesson articulated in the Chinese article is, indeed, that "intelligence was poor causing operational blindness" [情报不力盲目行动]. The account reports the Allied forces were surprised by unexpected defenses, such as a two meter sea wall, minefields, and also German forces that were not anticipated to be in the area. Even the weather forecasts are reported in this Chinese rendering to have been inadequately detailed.[23]

Lacking both air and sea control in these circumstances, the Allies making the raid on Dieppe were relying heavily on the element of surprise. Apparently, there was neither an extensive pounding by bombers from the air, nor even any kind of preparatory barrage from warships offshore. This Chinese account relates how "the element of surprise was lost immediately … [and] the Allied amphibious forces came under the full firepower of the German military." Thus, a third lesson the Chinese take from Dieppe is that "inadequate fire preparation will entail major personnel casualties [火力不备人员伤亡]." Finally, the Chinese analysis examines the command arrangements for the Dieppe battle and finds them wanting. It is reported that there was no overall commander and each of the services went in their own direction. An airborne parachute drop was scrubbed due to weather at the last minute and the participating ships were very poorly coordinated, such that the amphibious forces were, more or less, left to simply try to save themselves with the resultant terrible losses. Thus, the fourth lesson for Chinese strategists from Dieppe was "the need to harmonize so that each service is not fighting on its own [协同不周各自为战]." Fortunately, as related in this Chinese analysis, the Allies got some substantial additional practice before Normandy. In the invasion of Sicily, for example, it is related that the Americans and British corrected almost all the mistakes from Dieppe. British intelligence, according to this rendering, succeeded in making fake plans and spreading rumors that the Allies intended to attack Greece instead of Sicily. Mobility was used to achieve surprise, air and naval superiority proved decisive, and due diligence on logistics also paid dividends for the Allies.[24]

Turning from its precursors to the actual Normandy invasion, a quite comprehensive analysis was published by former Military Academy researcher Peng Xunhou in 2008.[25] At the outset, the author recognizes that Normandy provides "useful experience to organize and execute large-scale amphibious warfare."[26] This analysis emphasizes the decisive role of naval and air superiority, along with "ingenious" [巧妙] intelligence preparation. There is no assumption in this assessment that the outcome of D-day was preordained or inevitable. Rather, it is recognized that the successful invasion benefited in no small part from Germany's already unfavorable position in the larger war. Germany had its hands full fighting the Allies in Italy – to say nothing of the Eastern Front.[27] Thus, Germany had just six divisions guarding Normandy in mid-1944, according to this rendering. Peng notes that Germany had not yet completed its so-called Atlantic Wall [大西洋壁垒] fortifications along the coast, and suffered from doctrinal and command shortcomings, including inter-service rivalry.[28] Still, this Chinese military account gives very ample credit to the Allies' diligent preparations.

In particular, this account highlights the key role of intelligence, which is described as both "comprehensive and thorough."[29] The code-breaking activities of Bletchley Park are mentioned. The Chinese account also underlines the importance of aerial reconnaissance, noting that more than 4,500 intelligence-related sorties were made in the two months before the attack to enable "a large amount of valuable tactical and operational intelligence."[30] The analysis also emphasizesthe importance of naval intelligence: "In addition, the Allied forces also sent small submarines to the French coast for reconnaissance. [They] retrieved sediment samples on the landing beach, so that the beach geology could be analyzed. This is very important for the landing of heavy tanks and armored vehicles and also impossible for aerial reconnaissance."[31] The assessment covers issues of weather, moon, and tides, noting that different services wanted different conditions. For example, the ground forces apparently favored high tide, while the naval services preferred low tide. The Chinese analysis notes that dawn was selected as the ideal time for the amphibious attack.[32] However, the greatest single intelligence factor emphasized in the Chinese analysis concerns the extraordinary ruse concocted to convince the German High Command to "defend strongly at Calais, while only lightly at Normandy" [重加来, 轻诺曼底]. The details of this crucial deception are covered at length in Peng's assessment, including the setting up of a "fake command [假司令部]," with fake forces, fake piers, and a fake fleet too.[33] To reinforce the ruse, as related in Peng's explanation, Allied bombers purposefully oriented a much stronger effort against Calais than Normandy. These intelligence successes paved the way for Allied success on D-Day, as they made it "easy to achieve strategic surprise. The Allies could choose a weak point in the adversary's defense, avoiding strength and striking into the gaps" [很容易达成战略突然性 . . . 盟军 . . . 任何时候它都可选择对方防守的薄弱之处, 避实而击虚].

Aside from intelligence, the PLA analysis puts a strong emphasis on the Allies efforts before and during D-Day to secure control of the sea, and then to exploit it to maximum advantage. It is noted that the Allied fleet assembled for D-Day included 5,000 ships, of which only 1,000 constituted warships with the large remainder used mainly to transport troops, vehicles and supplies. The assessment does not minimize the difficult task of organizing these ships into effective combat, escort, bombardment, landing, intelligence groups, etc. But it is also underlined that the main naval threat was seen as hundreds of German small fast attack boats, as well as the U-boat menace, of course. The former had demonstrated their prowess against slow landing ships during a devastating German attack against Allied forces training for Normandy along the English coast in late April 1944. Regarding the submarine threat, the Chinese analysis recognizes that the Battle of the Atlantic played the vital role of slowly wearing down the German submarine force. Allied air power, of course, repeatedly struck at German submarine production and bases. In addition to bombing, the Allies used sea mines, deploying 6,850 mines, over the course of *Overlord*. According to the PLA assessment, the Allied employment of offensive mine warfare "dramatically reduced the freedom of action for Germany's warships" [大大降低了德军舰艇兵力的行动自由].[34] It is explained, moreover, that the problem of effectively blockading the English Channel from enemy naval forces was of critical importance. Mines were deployed to block the eastern entrance to the English Channel [在英吉利海峡东口], while on the western side of the strait, it is said that anti-submarine planes patrolled at 30 second intervals.[35]

Additionally, 20 separate task groups of lighter warships, including small aircraft carriers, were also tasked with protecting various sea sectors to guard the invasion fleet. Regarding mine warfare, the Chinese analysis also emphasizes the role of mine countermeasures (MCM) ships. It is noted that a flotilla of 255 MCM ships and buoy tenders were assigned the task of clearing ten channels into the beaches, then charged to turn those ten channels into one "highway," and finally were also to be employed in the key task of towing the "Mulberry" artificial harbors into position. The account explains that the MCM task force began its work on 5 June, employing darkness and weather as well as lighted and acoustic navigation buoys, to accomplish its mission "relatively smoothly."[36] Of course, the issue of shore bombardment is also addressed and it is observed that the Allied air campaign had somewhat disappointing results in this regard. Still, the analysis explains that five different shore bombardment task groups, comprising destroyers, cruisers and also battleships, made a crucial firepower contribution to the assault.

While Peng's assessment focuses more on sea power, he does not neglect the importance of airpower, noting the Allies pulled together a force of roughly 15,000 aircraft for the campaign. Indeed, this PLA analyst makes the case that the airpower differentials were both stark and decisive. Thus, the Allies wielded 5,112 bombers at Normandy, while the Germans could muster only about 205. With respect to fighters, the Allies are said to have brought 5,405 into battle at Normandy, even as the Germans fielded a pitiful 135 on 6 June that only increased to 300 interceptors on 7 June, according to the Chinese analysis.[37] Peng underlines this "extreme disparity" [十分悬殊] and summarizes three major contributions of Allied aerial superiority.[38] Above, the role of airpower in the Calais ruse was explained, but this Chinese author raises the issue multiple times. As a second major contribution, U.S. and British airpower cut German supply lines with systematic attacks against rails, roads, and key bases, not to mention industrial facilities. A third role described by Peng is the role of "shielding the coastal attack, while supporting the ground campaign." Indeed, carpet bombing became a major feature of the Allied breakout from Normandy. Overall, Allied air superiority conferred very considerable "operational freedom" to Allied commanders. That started with blinding the Germans by destroying their radar stations, but lasted through the end of the Normandy campaign and well beyond.

Needless to say, there are abundant Chinese analyses of the Normandy invasion and it is not possible to survey them all here. However, one particular aspect deserves a brief focus: the role played by airborne (parachute) forces. A rather comprehensive analysis of this aspect of the Normandy campaign was published in China in 2001 as a collaboration among PLA researchers from the Academy of Military Sciences (军事科学院) and also the Air Force Engineering Academy (空军工程大学).[39] The article explains that the airborne aspect of *Overlord* proved to be critically important. It notes that 35,000 airborne troops deployed by air into Normandy with 17,000 of those descending by parachute and the other major segment by glider.[40] According to this Chinese military rendering, Eisenhower faced serious doubts on his staff regarding the operation, which some assessed would result in 50% casualties. Eisenhower is quoted to have said "I agree this is risky, but we must take risks" [我同意这是在冒险, 但是应当去冒险]. The Allied commander further concluded, according to this PLA analysis,[41] that it would be "more dangerous" not to undertake the large-scale airborne assault on Normandy to support the beach landings. Notably, the Chinese analysis emphasizes that the bombing campaign prior to the assault proved extremely crucial to the success of the airborne landings, since practically all German radar stations along the French coast had been destroyed. Thus, no warning could be relayed and the airborne troops were assured a high degree of surprise. Nevertheless, it is also noted in the PLA assessment that the airborne forces still confronted major casualties due to "fierce" German ground fire, suggesting that the firepower preparation for the airborne assault was insufficient. The most important precursor for a successful large-scale airborne assault, the analysis concludes, is the condition of a "total and reliable advantage in the air [全面, 可靠的空中优势]."[42] This PLA article takes the next step of using the Normandy lessons to call explicitly for an urgent buildup of China's capacity for a large-scale airborne assault. In particular, it states that the PLA requires both quantitative and qualitative improvements to its air transport fleets.[43] Whether this has been achieved

in the 20 years since this article was published is beyond the scope of this paper, but there are plentiful hints that these early calls for a buildup in airborne capacities have actually been heeded.[44]

Given that large-scale amphibious warfare has not been witnessed since WW2, it would be too hasty to move on from that massive conflict without some brief attention to campaigns from that war aside from the classic paradigm of Normandy.

WW2: Other Relevant Campaigns

The previous section examined Chinese analyses of key aspects of the Normandy invasion, including certain vital antecedent experiments, such as the Dieppe assault, along with critical, enabling operations, including especially the airborne component of D-day. Three additional operations are briefly discussed below: Germany's invasion of Norway in April 1940, its invasion of Crete about a year later, and finally regarding the U.S. battle for Guadalcanal in the Solomon Islands during 1942–43 and certain others in "island hoppping" campaign of the Pacific War.

The Norway Campaign is especially interesting, because it contrasts quite sharply with the Normandy campaign with respect to the balance of forces engaged. Notably, Chinese military sources do not appear to have studied the case intensively – as with the Normandy case. Yet, a recent, detailed Chinese analysis does imply that this example too is being mined for lessons.[45] Most notably, the Chinese assessment recognizes that the German attack on Norway in April 1940 marked a turning point in the history of amphibious warfare in which airpower and seapower were accorded equivalent status for the first time. Thus, amphibious warfare transformed into a "three-dimensional concept" [立体的概念] according to the Chinese discussion. Indeed, this noteworthy fact forms the title of the Chinese analysis. The research highlights that Germany was at a tremendous disadvantage in terms of naval power compared to Britain and France, which are reported to have had nine times the strength of Germany at sea in this campaign. Therefore, Berlin had to put a premium on surprise, employing not only "covert deployment" [隐蔽展开兵力], but also the dissemination of "false intelligence" [假情报].[46] Notably, the article also calls the existence of a "fifth column" or collaborationist elements within Norway as a critical enabler for the operation.[47]

Pertaining to the so-called "third dimension" or aerial innovation, the Chinese analysis explains that Germany wielded an aerial armada of 800 aircraft in the Norwegian campaign, including 250 transports for ferrying the airborne (parachute) soldiers. This assessment asserts that the German example in the Norway campaign could substantially impact military theory because Berlin succeeded in proving the potential supremacy of airpower, with what is described as "using the air to control the sea" [以空制海] but also a parallel concept of "using the air to control the land [以空制陆]."[48] In the former case, the *Luftwaffe* succeeded in remedying the gaping asymmetry separating the Germany Navy and the naval forces of the allies. In the latter case, German ground troops were able to defeat larger Allied formations, because of "massive fire support."[49] This analysis further highlights "multi-method deception … harmonizing inter-service cooperation and the detailed study of exercises," as additional keys to German success in this operation.[50] These Chinese strategists are not oblivious to quite extensive German losses, especially to the German Navy, but ultimately the Nazis "successfully got their landing forces ashore" [成功将登陆兵送上岸] and then "very rapidly consolidated the defense" of their newly captured territory. Strongly hinting that China should not be intimidated by foreign naval might, the analysis concludes that during the Norwegian campaign, the Allies possessed a total of 800 naval vessels in the region, but these forces hardly made a move to counter Germany's bold blitz.

It is conceivable that the Norway Campaign could serve as a paradigm for a Chinese amphibious campaign against Taiwan, because China's situation could be quite analogous to that of Germany. For Berlin, the Norway campaign could be summarized as "high risk, high reward" – and a similar approach could be taken by Beijing. In the same way that China could face challenges in redressing the naval balance against the U.S. and Japan in a Taiwan scenario, it might well find it easier to

compensate for its lack of sea control by wielding extensive air and missile power against the island, along with elite commandos and paratroopers.

If Chinese analysts are intrigued by the three-dimensional blitz of the Norway Campaign, it is quite interesting that they have also made surveys of a somewhat similar attack against the Mediterranean island of Crete that occurred just over a year later in the spring of 1941.[51] In some respects, the two operations are indeed similar. Due to British naval might, Berlin again adopted to employ airborne forces as a key to the operation. Likewise, the invaders focused on ports and airfields to enable follow-on forces to ingress. The Chinese analysis observes that German amphibious landings largely failed, because of determined British naval defense. However, it is also noted that German airborne landings suffered major casualties: "Even though British defenses were mainly focused against the sea landings, the British successfully killed and wounded many [airborne] German soldiers. [Many] German air transports were shot down and many German paratroopers were dead before they even reached the ground."[52] Indeed, the Chinese description notes that the Germans lost 220 aircraft in the engagement, of which more than half were air transports. The report concludes that Berlin did "fundamentally achieve the campaign's objective" [基本上达到了战役的目的].[53] The German losses were so great however, that Hitler apparently declared that the era of large, airborne assaults as over. Nevertheless, this Chinese account also states that the Allies learned many valuable lessons from Crete for staging the successful Normandy operation.

Undoubtedly, the Crete operations serves as a caution on Chinese enthusiasm for airborne assault – that is perhaps reinforced by Russia's experience in the 2022 war in Ukraine. However, there is ample evidence that the PLA's strong focus on airborne operations continues, apace.[54] Moreover, it is worth underlining that the PLA seems to believe that helicopters, which were not yet invented in WW2, could revolutionize the aerial dimension of amphibious operations.[55]

A more comprehensive study of this Chinese literature would examine all relevant Chinese writings related to both American and also Japanese landings during the Pacific War, 1941–45. PLA Navy strategists have recently emphasized the need to closely study the development experience of the U.S. Marine Corps.[56] However, this paper, a preliminary survey of a vast literature, does not scrutinize all Chinese writings about the myriad amphibious campaigns of WW2 in the Pacific theater. Nevertheless, some preliminary findings are related below.

Chinese defense analysts have taken an interest in Japanese amphibious operations that took place in the immediate aftermath of Pearl Harbor. They note that in the first three months of the Pacific War that the Japanese executed 30 different amphibious landing operations, of which 29 are reported to have been successful.[57] Japanese success in these operations is attributed to "complete preparation and thorough planning" [准备充分, 计划周密]. Interestingly, it is noted that Japan's innovative and highly aggressive approach to amphibious warfare went against prevailing notions of the time that believed amphibious operations to be "relatively difficult."[58] This analysis highlights Japan's extensive experience in amphibious operations from earlier wars, specific training programs tailored to each unique operation, as well as very close Japanese attention to air cover and securing aerial supremacy over the relevant landing areas. On the latter point, for example, it is explained that Japan's successful conquest of the Philippines depended to a large degree on destroying the "quite massive" quantity of U.S. airpower based on the archipelago, which was accomplished to a large extent on 8 Dec 1941. Departing with conventional wisdom on amphibious warfare doctrine, this analysis points out that Japanese amphibious forces would quite often "forgo any fire preparation" in order that they could "undertake a surprise landing with lightning speed," [迅雷不及掩耳之势奇袭登陆] to secure the amphibious victory.[59]

Turning to an examination of U.S. amphibious campaigns in the Pacific War, PLA analysts do seem extremely interested in the Battle of Guadalcanal that took place between Aug 1942 and Feb 1943. A relatively detailed Chinese analysis of the battle appeared recently in the official PLA Navy magazine, *Navy Today*.[60] The analysis asserts that much of the Japanese military was not even informed of the truly devastating results (for Japan) of Midway and that Tokyo's decision-making was plagued by an incessant and pervasive cult of the offensive. It is noted that the South Pacific could have been

invaluable to Japan's effort to sever U.S. supply lines, but that a critical shortage of airborne intelligence inhibited effective decision-making. The great importance of the U.S. capture of Henderson Field early in the Guadalcanal campaign is noted, and this Chinese analysis concludes that the Japanese pilots flying from distant Rabaul could not offer effective support to Japanese ground troops on the contested island, while Japanese carriers "would not dare to overreach by approaching Guadalcanal" [未敢过分接近瓜岛]. Japanese strategic decisions are assessed to have been plagued by poor coordination between ground and naval forces in the completely "unclear situation" [情况不明].

This analysis also points out a number of Japanese operational practices that contributed to Japan's defeat on Guadalcanal. First, it is noted that Japanese soldiers had previously taken pride in their prowess in night fighting and also close combat. Both elements were said to be hallmarks of Japan's "bushido spirit" [武士道精神] or warrior ethos. Yet fighting of this type (in and around islands) implied relying on small caliber fires (e.g. mortars) rather than naval gunnery or air support for ground assaults. This "limited fire preparation" [有限火力准备] proved ineffective. The Chinese analysis notes, moreover, that Japanese assaults on Guadalcanal achieved neither stealth nor surprise. Then, there was the failure to concentrate adequate forces. Initial Japanese attacks were too small and, by the time major Japanese forces arrived, American defenses had been strengthened. Another fundamental Japanese error, according to this analysis, concerned logistics. Japanese forces were not only inadequately supplied, but also critically failed to target American rear supply depots [未攻击美方后勤补给物资]. With respect to weapons (and sensors), the Chinese analysis also notes that the Americans skillfully employed a small number of tanks during the campaign, while the Japanese were completely unable to support their ground troops with armor. The tanks, according to this rendering, not only boosted the confidence of the American troops, but also played an important role in beating off Japanese attacks. A final point in the analysis is that the Japanese strategic culture of "the attack is first" resulted in naval ship designs that had "weak air defense and anti-submarine capabilities" [舰艇防空反潜能力弱]. The Japanese Navy's ineffective sonars, for example, formed a huge limitation on its naval operations, according to this Chinese Navy rendering.[61] Other analyses also note Japan's inadequate attention to the importance of civilian shipping, and the necessity of convoys to ensure effective logistics support for insular and amphibious warfare in the Pacific.[62]

Another campaign that appears to have received the attention of Chinese defense analysts concerns the U.S. campaigns in the Gilbert Islands that began in late 1943. In particular, they focus on the difficulties that the Americans had in making the assault on Tarawa. They point out that the U.S. side was initially too optimistic, seemed to underestimate the enemy, and suffered from "seriously inadequate preparation" [严重缺乏准备].[63] They discuss how the inadequacy of intelligence as well as the failure of naval gunfire to reduce the island's defenses. In the Chinese analysis, it is explained that the Americans had previously made many amphibious landings over the course of the Solomons Campaign, but had not assaulted well-defended beaches. It is further related that poor communications between the beaches and the supporting navy ships meant challenges in adjusting to the difficult circumstances of this attack.[64] The analysis discusses, in particular, the problem that the Americans did not have a good grasp of the undersea obstacles presented by offshore reefs, causing the attacking infantry to have to disembark 200 m from the actual beach. Indeed, the amphibious assault vehicles employed by the Americans were apparently too few and performed poorly, as related by the Chinese analysis.[65] Another detailed Chinese rendering of this campaign discusses the improved coordination of infantry with armored vehicles that occurred on the nearby island of Makin.[66] Chinese strategists have also studied the U.S. invasion of Okinawa in early 1945, but additional research is required to uncover the Chinese lessons from that massive amphibious invasion. Still, it can be posited here that the PLA is aware of the major losses sustained by the U.S. in that particular campaign, including losing 30 ships and having 360 more damaged.[67]

Chinese strategists have examined the bloody amphibious campaigns of the Pacific War, but not with the same focus that they have applied to other campaigns, including especially the Normandy assault. There has been some limited exploration of Japan's early amphibious successes in the Pacific War and those successes are explained by diligent Japanese preparation, speed and surprise. The

Chinese analyses of America's "island hopping" [跳岛] campaign might be somewhat less relevant to a Chinese amphibious campaign against Taiwan, but still could have important implications for these operations if they take on a more expeditionary character. Notably, there has been substantial concern recently about Chinese military bases in both the South Pacific and also Southeast Asia that could imply expeditionary Chinese amphibious operations are no longer so far-fetched.[68]

Korea: The Inchon Campaign

Unlike WW2 amphibious campaigns that did not involve China in any way, study of Gen. Douglas MacArthur's masterstroke amphibious assault at Inchon in Sept 1950 is a much more sensitive issue for Chinese strategists. While Chinese forces were not combatants in the war at that particular stage, it was the bold strike into the rear of Kim Il-Sung's North Korean armies that changed the war fundamentally – thus prompting Chinese intervention. The discussion below does not focus, however, on Pyongyang's error in leaving its flanks poorly protected. As illustrated in the analysis that follows, Beijing military strategists have proven quite capable of putting ideological "baggage" aside and objectively extracting insights from the American exploits at Inchon.

This PLA analysis explains up front that Inchon was viewed as geographically unsuitable for amphibious landings. "First of all, the Inchon port is regarded as having one of the largest tidal differentials in the world" [首先, 仁川港是世界上潮汐落差最大的港口之一].[69] The average tide is reported in this discussion to be 21 feet, but as much as 32 feet and the analysis notes that this meant the attackers would only have a few hours in the morning and the early evening for debarkation at the two daily high tides during that time of year. This Chinese analysis points out many other inhibiting factors as well, including a sea wall, and the narrow confines of "Flying Fish Passage" that would have to be navigated by the landing ships.[70] There was additionally the close proximity of the urbanized port that might create the possibility for "each building to be reinforced for defense," slowing the attackers ability to consolidate the amphibious lodgment.

The PLA analysis cites numerous reasons for American success at Inchon. Surprise is discussed as the first factor. Indeed, this article notes the paradox in that "all of the reasons why the area was not conducive to amphibious attack, actually proved the most effective in securing the amphibious operation's surprise" [所有不利于登陆作战的因素, 恰好也为这次登陆作战的突然性提供了最有力的保证].[71] The shocking nature of the operation allowed U.S. forces to "achieve the greatest success at the smallest cost," causing the North Korean Army to "fall into chaos."[72] Thus, the analysis concludes that surprise "forms the most critical variable for the success of amphibious operations" [是登陆作战最关键的制胜要素].[73]

A variety of other factors are also emphasized in the PLA analysis of the Inchon invasion. The Chinese author gives credit to the U.S. for diligent and thorough preparations for the attack. For example, the issue of sea mines and their removal is addressed in some detail. As it turns out, the mines in the channel were revealed at low tide and destroyed by U.S. naval gunnery. The PLA author writes that this could be interpreted as "accidental" [偶然], but that would be a mistake, since these American mine counter-measures reflected careful intelligence observation and planning.[74] Similarly, the landing forces were equipped with special ladders and grappling hooks to get over the sea wall. Close coordination among the different service specialties is also heralded as an important enabler of the U.S. victory at Inchon. Landing ships and supply vessels moved in an orderly way, it is noted. Air power and naval guns, moreover, provided devastating and effective firepower, so that the North Korean coastal defense forces in the landing zone "were completely destroyed" [全部摧毁].[75] Finally, U.S. air power proved critical to the initial landing by assaulting all roads going out of Inchon, ensuring that the North Koreans could not bring in reinforcements to contest the new American lodgment in their rear. Thus, air supremacy is underlined as another key to victory in this case.[76]

No doubt, the Inchon campaign has been carefully studied by the PLA. The two main implications of this operation for PLA amphibious warfare development include overcoming natural and operational challenges. Thus, Chinese planners may well look for such challenges and then seek to overturn

assumptions and thus achieve devastating shock through innovative technologies or doctrines. Also, there is little doubt that Beijing will try to capitalize on its airpower advantage in a Taiwan scenario, especially if that advantage is compounded by missile strikes that could put adversary airfields out of action.[77]

The Falklands War

Amphibious operations have been extremely rare in the decades since the Inchon invasion. No less than the Commandant of the U.S. Marine Corps in mid-2020 come close to stating that such operations are utterly obsolete.[78] That could be true from an American strategic perspective, but the articles cited above do suggest that Chinese strategists retain a robust interest in this unique type of military operation. The most recent, relatively large-scale amphibious landing operations took place during the Falklands War in 1982. Although the casualties proved to comparatively light on both sides, the short war did feature a task force of 127 British ships carrying nearly 30,000 soldiers and sailors. Of considerable interest to military strategists, the war featured intensive air and naval combat of all types, including numerous amphibious landings.

This author conducted an academic survey of Chinese writings regarding the Falklands War that was published in 2008.[79] That study revealed that Chinese strategists admired London's objective use of intelligence and its "flexible, joint, and efficient command arrangements."[80] The airpower discussion notes that the Argentines lacked effective anti-ship doctrine and the related weaponry, explaining that some Argentine gravity bombs passed right through Royal Navy ships without exploding.[81] Chinese strategists fully appreciate that the war's outcome could have been quite different if the Argentines possessed more than a handful of *Exocet* anti-ship cruise missiles. One Chinese assessment of the Falklands War concluded that the sinking of the *Belgrano* cruiser by a Royal Navy nuclear submarine proved to be "the most decisive military operation of the Falklands War."[82]

Turning to amphibious operations more narrowly, the 2008 *Survival* study does capture the thinking of PLA Navy Deputy Commander, VADM Ding Yiping, who notably published a lengthy survey of the history of naval warfare in 2000. Ding devotes considerable attention in his book about naval warfare to the success of British amphibious operations at San Carlos Bay. He underlines the importance of British deception techniques for the success of the amphibious operations, observing that "in order to deceive the Argentine forces and shield the main force landing at San Carlos Bay, UK forces executed feints along multiple vectors."[83] His most detailed analysis, however, concerns the British choice for the precise location of the landings. First, he notes that outwardly the area did not seem to be particularly well suited for amphibious operations, so it was not well defended by the Argentines. He cites the relative tranquility and deep draft of the enclosed waters as advantages. According to Ding, the location was also good because it was relatively insulated from potential Argentine submarine operations against the landing force. San Carlos Bay was also connected by a logical route to Port Stanley, and could effectively serve the overall campaign objective of forcing total Argentine capitulation in the islands. Finally, Ding emphasizes the local geography that favored protection of the initial lodgment: "the small hills could become vital support for amphibious troops trying to consolidate a beach head position."[84]

Subsequently, Chinese strategists have written extensively about the lessons of the Falklands War for amphibious operations, in particular concerning mobilization, logistics, and troop morale. One recent assessment, written by two professors at China's National Defense University, marvels at the "large quantity of mobility assets" [运输力量多] organized by the UK high command so quickly, beginning just two days after the war began. Rapid upgrades of these merchant ships included adding helicopter landing pads, equipment for at-sea resupply, as well as modernized communications and rescue equipment. Average time for these upgrades is reported by these Chinese analysts to have been just seventy-two hours and involved three hundred different private enterprises. That study recommends for the PLA: "greater specificity and increased quantification-type requirements [细化量化类要求]" based on computer modeling. The piece advocates for Chinese commanders to employ new

information tools, including the internet and "We Chat" as platforms to permit the "the fastest transmission of national orders." They also recommend that Beijing step up Chinese exercises of reserve forces in respect to "missions . . . time . . . content . . . [and] quality." The authors urge logistics forces to "lash up" [捆绑] with active forces in a way that resembles the British model from the Falklands.[85]

Finally, a series of articles in the Chinese journal *Shipborne Weapons* [舰载武器] addressed lessons from the Falklands War for Chinese strategists in exceptional detail. The present study cannot hope to provide a comprehensive summary of that trove of insights, but some of the articles do, indeed, reinforce themes articulated above. For instance, one of those studies observes that the unsuccessful Chinese amphibious operation against Jinmen Island in 1949 [金门登陆战] failed miserably due to "lack of adequate preparation for the transportation forces," and consequently "a paucity of both food supplies and ammunition" [无粮无弹].[86] Noting that quality food supplies are the most basic demand of fighting troops, it is observed that Argentine soldiers in the Falklands were often left to improvise and many went hungry – with predictable consequences for morale. Reaching back to the Pacific War, it is similarly recalled that Japanese soldiers defending Pacific islands were starving in many cases and unable to fight effectively.[87] By contrast, this article explains that the British proved extremely meticulous in ensuring that its soldiers in the Falklands were well fed, including three meals per day with dozens of choices.[88] Moreover, meal packets reflected the harsh climate of the Falklands, and helicopters were widely employed to ensure that units were continuously supplied in the difficult terrain. Another insight from this Chinese analysis of logistics is the focus on surging airpower to forward bases. Here, it is explained that the Argentines did not have the logistical sophistication to rapidly upgrade airbases on the Falklands to service jets. Therefore, they were limited to flying propeller aircraft, which proved ineffective and Argentine jets had to fly from distant mainland bases. Speaking of forward air bases in amphibious operations, this article also underlines the role of British "special forces in making surprise attacks against air bases" [使用特种部队突击机场].[89] Another more general analysis in the same series of Chinese articles on the Falklands War claims that the most basic attribute of success in amphibious operations comes down to the "firepower advantage" [火力优势].[90] That analysis states that Britain's firepower was not "enormous," due to the logistical constraints. Nevertheless, it details that Royal Navy ships fired 8,000 rounds in fire support of the landing forces, while the few large artillery pieces that went ashore also fired thousands of rounds, as well. Notably, these fire effects silenced the Argentine artillery, thanks in part to the advantage of counter-battery radar.[91] Still, the Chinese author concludes by putting a premium on the fighting spirit of the soldiers, noting that Argentine defenders of the Falklands outnumbered the British forces in most engagements. Thus, this analysis underlines the importance of soldier motivation and training. In the Falklands, there was a wide gap with respect to morale, and Argentina "lacked forces willing to fight to the death" [没有死战意志的部队]. Thus, this Chinese assessment concludes that only a long period with the strictest possible training regimen can prepare forces for the hard school of amphibious warfare.

Conclusion

The above case studies may imply that amphibious warfare is a Western innovation. However, it is worth reminding readers that very large-scale amphibious operations were undertaken in East Asian waters as early as the 13th century.[92] Still, in the last century, most instances of amphibious operations have been executed by the leading Western powers. Eager to learn from this experience, Chinese strategists have taken the care to scrape through these cases, mining for insights. They have examined the extravagant disaster of Gallipoli to see that even a first rate naval power like Britain has been capable of turning amphibious warfare into an enormous and costly fiasco. WW2, and Normandy in particular, provide Chinese strategists with ample inspiration, ranging from the Mulberries to airborne operations. Yet, the fact that Chinese military researchers have gone well beyond Normandy to explore the contours of Dieppe, the Norway campaign, Crete, as well as Guadalcanal and Tarawa, illustrates

the comprehensive scope of the Chinese endeavor to learn from foreign military experience. The impressively objective account of the Inchon landing demonstrates that Chinese strategists are quite able to put ideology aside in the interest of grasping the fundamentals of well executed amphibious warfare. Finally, the high level of Chinese interest in the Falklands campaign certainly suggests that there are lessons to be learned for PLA development, including with respect to complex landing operations.

The themes that appear in these Chinese-language analyses could inform the on-going and future development of PLA amphibious warfare. The sea power discussions evince a keen sensitivity to undersea warfare and how adversary submarines could interdict major amphibious operations. They examine various countermeasures, including sea mines. Indeed, mines form an important theme in this literature, along with the essential importance of effective naval gunnery support. Air power is put on a still higher pedestal, with one Chinese author even suggesting that dominance in the air might well entail breakthroughs on both land and at sea. The PLA's enormous efforts at air defense, missile forces, drones, aerial ASW and maritime strike, as well as heliborne and parachute insertion attest to lessons taken to heart. A final theme running through these analyses concerns intelligence and deception. They contain the full realization that surprise and misleading the adversary are vital to success in amphibious warfare. These findings are wholly consistent with the recent discussion of amphibious warfare in the 2020 edition of *The Science of Strategy*, published by China's National Defense University.[93]

There are many possible implications of this work for American strategists. For those contemplating a Taiwan scenario, one must consider, for example, that China may well succeed in gaining air supremacy over Taiwan and surrounding areas for some length of time. The Mainland might strike Taiwan under such circumstances even if they lack complete naval supremacy. Second, the premium on surprise and deception might suggest that any Chinese lunge across the Strait could be a "bolt from the blue." American strategists have been skeptical of such an outcome, maintaining that Taiwan has "the best early warning systems in the world."[94] Yet, such assessments may underestimate the PLA's organizational abilities or its opportunities to employ masking techniques, such as emphasizing mobile air assets and civilian shipping, relying on underground, pre-positioned facilities, as well as undertaking a "rolling start."[95] Moreover, such a surprise attack against Taiwan comports well with Chinese strategic culture, including its uses of force since 1949.[96] U.S. strategists may also expect the possibility of a diversionary maneuver that actually pulls attention away from the Taiwan Strait. It has been suggested that dramatic events in Europe could form such a distraction, but Beijing may also find a convenient disturbance in either the Persian Gulf or on the Korean Peninsula as well, of course.

Most importantly, this study reveals with significant fidelity that Chinese strategists have done their homework with respect to large amphibious operations. The timing of almost all the Chinese articles cited above is, perhaps not coincidentally, in the decade after the 1995–96 Taiwan Crisis. That crisis most likely inspired this Chinese research program in the period 2000–2010 and the conclusions from these analyses are now coming to full fruition, for example in the realization of a genuine airborne assault capability. An interesting question for future research, along with filling out the cases discussed above, could be to examine China's understanding of "dogs that did not bark," – or cases in which states opted *not* to undertake an amphibious assault, because it was judged to costly, as with Hitler's "Operation Sea Lion" – the planned invasion of England that was never executed.

Unquestionably, a Chinese amphibious invasion of Taiwan would face very substantial challenges. Beyond the difficult tasks of mobilizing, deploying, and supplying forces across the Taiwan Strait on a massive scale, the PLA would also need to be ready to confront countries coming to Taiwan's aid, including the U.S. and perhaps its allies too. Additionally, the Russian invasion of Ukraine has demonstrated that complex military operations often go awry and that highly motivated soldiers, especially when given access to advanced weapons, can make a determined, asymmetric defense.

It is quite true, moreover, that China has not conducted a major amphibious operation in the last half century. The U.S. literally wrote the book on amphibious warfare, so China's capabilities in this regard cannot amount to much – this is how the conventional wisdom goes. However, lest it be

forgotten, it was the British who first pioneered tank warfare and Germany had never before fought a major armored battle prior to May 1940.

Notes

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3 On comparisons between the Russian invasion of Ukraine and a possible Chinese invasion of Taiwan, see for example: Bonnie Lin and John Culver, "China's Taiwan Invasion Plans May Get Faster and Deadlier Russian Mistakes Offer Some Warnings for Beijing's Ambitions," *Foreign Policy*, https://foreignpolicy.com/2022/04/19/china-invasion-ukraine-taiwan/?tpcc=Editors+Picks+OC (April 19, 2022).; Thomas Corbett, Ma Xiu, and Peter Singer, "What is China Learning from the Ukraine War," *Defense One*, https://www.defenseone.com/ideas/2022/04/what-lessons-china-taking-ukraine-war/363915/ (accessed April 3, 2022).; and Gerrit van der Wees, "Ukraine War No Model for Taiwan," *Taipei Times*, https://www.taipeitimes.com/News/editorials/archives/2022/04/08/2003776205 (accessed April 8, 2022). Notably, the Russia-Ukraine War of 2022 could also have insights about defense against amphibious attack. See, for example, David Axe, "A Russian Attack On Odessa Could Be Naval Suicide," *Forbes*, https://www.forbes.com/sites/davidaxe/2022/04/04/a-russian-attack-on-odessa-could-be-naval-suicide/?sh=154270be3e7e.
4 It is also quite conceivable that a Chinese military campaign against Taiwan could exclude amphibious warfare. Alternative scenarios, for example, might rely instead on coercion through aerial and missile bombardment or a naval blockade of the island. These alternative scenarios are not the focus of the study.
5 Ian Speller and Christopher Tuck, *Amphibious Warfare: Strategy and Tactics from Gallipoli to Iraq* (London: Amber Books, 2014), 7.
6 See Chapter 2 in Amphibious Operations, Joint Publication 3–02 (Washington DC: Joint Chiefs of Staff, Department of Defense, January 4, 2019), https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_02.pdf
7 *Ibid*, II-9.
8 W.S. Pye (CAPT, USN), quoted in James Bird (LCDR, USN), "Amphibious Assaults: Obligatory or Obsolete," *Global Security.org*, 1990, https://www.globalsecurity.org/military/library/report/1990/BJJ.htm#:~:text=Improvements%20in%20weapon%20systems%20and,have%20made%20amphibious%20operations%20obsolete
9 For a skeptical view on the future of large-scale amphibious assault, see Michael O'Hanlon, "The Questionable Future of Amphibious Assault," *Order from Chaos*, (Washington DC: Brookings, 23 June 2020), https://www.brookings.edu/blog/order-from-chaos/2020/06/23/the-questionable-future-of-amphibious-assault/
10 See, for example, Michael O'Hanlon, "Why China Cannot Conquer Taiwan," *International Security* 25, no. 2 (2000): 51–86.; or more recently Elliot Waldman, "Fears of an Imminent Chinese Invasion of Taiwan Are Overblown" *World Politics Review*, https://www.worldpoliticsreview.com/trend-lines/29538/fears-of-an-imminent-china-taiwan-war-are-overblown (accessed April 1, 2021).; A less skeptical viewpoint is offered in Grant Newsham, "Is China Willing and Able to Invade Taiwan?" *Asia Times*, https://asiatimes.com/2021/04/is-china-willing-and-able-to-invade-taiwan/ (accessed April 3, 2021).; On Chinese amphibious warfare capabilities, see also U.S. Department of Defense, *Military and Security Developments Related to the People's Republic of China 2020* (Washington, DC: September, 2020), https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF 47–48, 79–80, 96, 113–120.
11 On China's role in the Second World War, see for example Rana Mitter, *Forgotten Ally: China's WWII* (UK: Houghton Mifflin Harcourt, 2013), 1937–45.
12 Concerning, for example, the March 1950 amphibious invasion of Hainan Island as part of the Chinese Civil War, see Chen Qiaogui (陈乔桂) "The Bloody Battle at Baishanmen," (血战白沙门) *China National Defense News* (中国国防报), http://www.81.cn/gfbmap/content/2021-01/28/content_281620.htm (accessed January 21, 2021). 4.
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14 Xiaobing Li, "PLA Attacks and Amphibious Operations during the Taiwan Strait Crises of 1954–55 and 1958," in *Chinese Warfighting: The PLA Experience Since 1949*, ed. Mark A. Ryan, David M. Finkelstein, and Michael A. McDevitt, (Armonk, NY: M.E. Sharpe, 2003): 154–55.
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53 *Ibid*, 46.
54 The 2021 DoD Report on Chinese Military Power assesses that the PLAAF Airborne Corps is comprised of 10 brigades. *Military and Security Developments Involving the People's Republic of China 2021* (Washington DC:

Department of Defense), 58.; However, that figure likely significantly understates the PLA's overall number of parachute-trained soldiers. In fact, three out of four armed services regularly practice parachute assault. On Chinese Navy parachute exercise see Lu Hongbo, Zhang Zhi and Jin Tian [卢红波, 张智, 金天] "Parachutes Bloom between the Sea and Sky" [伞花绽放海天间] *PLA Daily* [解放军报], p. 9, http://81.cn/jfjbmap/content/2021-11/16/content_303226.htm (accessed December 13, 2021).; Chinese ground forces parachute exercises are a regular feature in the Chinese military press. See, for example, 78th Army Group exercise described in *Military Report* [军事报道], https://tv.cctv.com/live/cctv7/ (accessed June 23, 2022).

55 Chinese military news shows both PLA 71st Army Group transport and attack helicopters operating from a merchant vessel. CCTV7 *Military Report* [军事报道], 14 May 2022. Additional recent evidence of Chinese ground forces helicopters training for a cross-Strait attack are in the same source: 73rd Army Group on 14 Apr 2022, 72nd Army Group on 28 Apr 2022, and 74th Army Group on 17 May 2022.

56 Liu Kui (刘奎) "Deep Enlightenment Brought about by 'Deep Transformation'" ('深度变革'带来的深度启示) *People's Navy* (人民海军), April 28, 2020, 4.

57 Lu Xianchen [吕贤臣] "Maritime Strategy of the Pacific War (first segment)," [太平洋战场的海上战略 (上)] *Modern Ships* [现代舰船], no. 21/22 (2020): 153.; As reported in this article, the exception was at Wake Island.

58 *Ibid*, 152.

59 *Ibid*, 153.

60 Lyle J. Goldstein, "Why is China's Navy Studying the Battle of Guadalcanal?" *National Interest*, https://nationalinterest.org/blog/buzz/why-chinas-navy-studying-battle-guadalcanal-50107 (accessed April 21, 2019).; On the Chinese study of the Guadalcanal, see also Guo Yuanfei, Bai Wenjie, and Chi Luoming [郭渊斐,白文杰,赤骆铭] "Looking Back on the Guadalcanal Island Campaign: The Decisive US-Japan Contest to Safeguard Logistics," [回顾瓜岛战役: 决定胜负的美日后勤保障较量] *Navy Today* [当代海军] (August 2020): 72–74; and Lu Xianchen [吕贤臣] "Maritime Strategy of the Pacific War (middle segment)," [太平洋战场的海上战略 (中)] *Modern Ships* [现代舰船], no. 23/24 (2020): 161–64.

61 *Ibid*.

62 Sun Xiaoxiang [孙晓翔] "Reflections on Japan's Pacific War Strategy," [日本太平洋战争战略之反思] Modern Ships [现代舰船] no. 3B (2015): 84–85.

63 Sun Xiaoxiang [孙晓翔] "Pacific Tide: The Route of the Counteroffensive of the U.S. Navy in 1943–45," [太平洋浪潮美国海军的反攻之路 1943–45] *Shipborne Weapons* [舰载武器] (July 2020), 89.

64 *Ibid*, 89.

65 *Ibid*, 89.

66 "Coordinating Infantry and Armor to Seize the Island: Recalling the US Army's 193rd Tank Battalion in the Battle for Makin Island during WW2," [步坦协同抢滩夺岛: 二战美国陆军第 193 坦克营马金战记] *Weapon* [兵器] no. 263 (April, 2021): 28–35.

67 Lu Xianchen [吕贤臣] "Maritime Strategy of the Pacific War (third segment)," [太平洋战场的海上战略 (下)] *Modern Ships* [现代舰船], no. 1 (2021): 148.

68 See, for example, Kirsty Needham, "Solomon Islands Won't Allow Chinese Base, Says PM's Office," *Reuters*, https://www.reuters.com/world/asia-pacific/solomon-islands-says-wont-allow-chinese-military-base-knows-ramification-2022-04-01/ (accessed April 1, 2022).; or Ellen Nakashima and Cate Cadell, "China Secretly Building Naval Facility in Cambodia, Western Officials Say," *Washington Post*, https://www.washingtonpost.com/national-security/2022/06/06/cambodia-china-navy-base-ream/ (accessed June 6, 2022).

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70 *Ibid*, 14.

71 *Ibid*, 16.

72 *Ibid*, 16. Somewhat predictably, the PLA analysis does suggest that China had tried to warn the North Koreans.

73 *Ibid*, 16. Surprise attack receives substantial emphasis in current Chinese doctrinal writings. See Xiao Tianliang (肖天亮), ed. *The Science of Strategy*, 2020. ed. (战略学), 224–26.

74 Ibid, 16.

75 *Ibid*, 15.

76 *Ibid*, 16.

77 See, for example, Eric Heginbotham et al, "Chinese Attacks on U.S. Airbases in Asia," (Washington DC: RAND, 2015), https://www.rand.org/pubs/research_briefs/RB9858z2.html

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80 *Ibid*, 68.

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82 *Ibid*, 72. This conclusion is reaffirmed in Lu Rude (陆儒德) "The Malvinas Naval War: A Modern War Connecting the Past and Present," (承前启后的现代战争: 马岛海战) *People's Navy* (人民海军) May 8, 2012, 4.; and Xiao Tianliang (肖天亮), ed. *The Science of Strategy*, 2020. ed. (战略学), 156.

83 Ding Yiping, PLA Navy VADM (丁一平) *World Naval History* (世界海军史) (Beijing: Haichao Press, 2000), 774.
84 *Ibid*, 774.
85 This paragraph is derived from Han Dong and Kai Xiankui (韩冻, 开先奎) "The Characteristics and Enlightenment of British Logistics Mobilization in the Falklands War," (马岛战争英国后勤动员特点及其启示) *Military Economic Research* (军事经济研究), no. 4 (2017): 12–16.; See also Xiong Huaming (熊华明) "The Origin of Strength, the Origin of Victory," (力量之本胜利之原) *People's Navy* (人民海军) July 15, 2010, 3.; and Zhang Qingbao (张庆宝) "The Most Successful Example of Maritime Strategic Projection," (最成功的海上战略投送) *People's Navy* (人民海军) August 8, 2016, 4.
86 "Enlightenment from the Falklands War 4: Logistics Support for Amphibious Operations," (马岛战争启示录4: 两栖作战的后勤保障) *Shipborne Weapons* (舰载武器), no. 7 (2009): 66.
87 *Ibid*, 64.
88 *Ibid*, 63.
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90 "Enlightenment from the Falklands War 3: Amphibious Landing Operations," [马岛战争启示录3: 两栖部队的登陆作战] *Shipborne Weapons* (舰载武器), no. 6 (2009): 59.
91 *Ibid*, 60.
92 See, for example, James P. Delgado, *Khubilai Khan's Lost Fleet* (Los Angeles: University of California Press, 2010).
93 Xiao Tianliang (肖天亮), ed. *The Science of Strategy*, 2020. ed. (战略学), 364.
94 Michael Beckley, "The Emerging Military Balance in East Asia" *International Security* 42, no.2, (Fall 2017): 85.
95 A "rolling start" would imply that major and more visible parts of the mobilization for amphibious invasion might only begin after the start of the initial "fire campaign" and insertion of smaller units comprising special forces or airborne units. As to predicting major Chinese military operations, the recent record does not seem to warrant any special confidence. Notably, Western strategists appear to have been surprised by the rapidity and scale of China's building of reef bases in the South China Sea during 2014–15. That effort entailed significant logistics processes and technical breakthroughs, which do not appear to have been previously realized in the West.
96 See, for example, Brahma Chellaney, "How China Fights: Lessons from the 1962 Sino-Indian War," *Newsweek*, https://www.newsweek.com/how-china-fights-lessons-1962-sino-indian-war-65429 (accessed October 29, 2012).

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Notes on contributor

Lyle Goldstein is Visiting Professor at the Watson Institute for International and Public Affairs at Brown University. At Brown, he is investigating the costs of great power competition with both China and Russia in association with the Costs of War Project at Watson. He is also assisting in the further development of Watson's China Initiative.

Goldstein serves concurrently as Director of Asia Engagement at the Washington think-tank *Defense Priorities*, which advocates for realism and restraint in U.S. defense policy. In this role, he is overseeing a range of studies that evaluate U.S. foreign policy and defense strategy in the Asia-Pacific region, including with respect to such key flashpoints as the Korean Peninsula, the South China Sea, the Sino-Indian border, and also the status of Taiwan. He maintains expertise in both Chinese and Russian military strategic development, and also has expertise on particular issues in the China-Russia relationship, including especially the Arctic and also Central Asia.

In Oct 2021, Goldstein retired after 20 years of service on the faculty at the U.S. Naval War College (NWC) after being promoted by his peers to the rank of Full Professor. During his career at NWC, he founded the China Maritime Studies Institute (CMSI) and has been awarded the Superior Civilian Service Medal for this achievement. He has written or edited seven books on Chinese strategy and continues to work on a book length project that examines the nature of China-Russia relations in the 21st century.

Goldstein has his PhD from Princeton, an MA from Johns Hopkins SAIS, and his BA from Harvard. He is fluent in both Chinese and Russian languages, and is now studying Korean. He tweets regularly on both Chinese and Russian strategic matters at @lylegoldstein.

ORCID

Lyle Goldstein http://orcid.org/0000-0001-7009-3175