NAVAL GUNFIRE SUPPORT OF AMPHIBIOUS OPERATIONS: PAST, PRESENT, AND FUTURE

by

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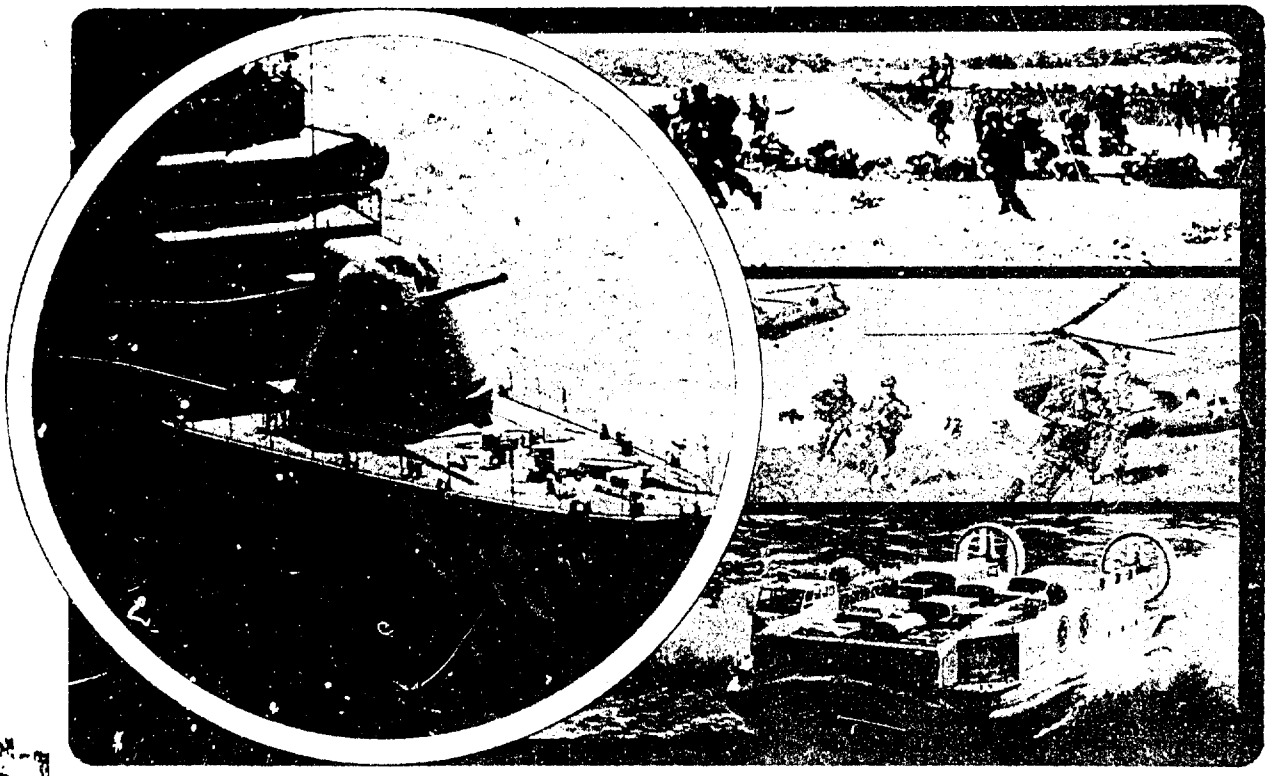

prepared for

Naval Sea Systems Command
Headquarters, U.S. Marine Corps

NAVAL SURFACE WEAPONS CENTER
Dahlgren, Virginia 22448

THE IDEAS, OPINIONS, AND CONCLUSIONS EXPRESSED HEREIN ARE NOT NECESSARILY THOSE OF THE DEPARTMENT OF THE NAVY.

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FOREWORD

A continuing issue since World War II has been the future role of naval gunnery. In fact, many senior leaders in the Navy and Marine Corps have concluded in recent years that we have lost our corporate memory on the use and effectiveness of naval gunnery. Nearly every reason postulated for this conclusion will meet as many in agreement as disagreement.

This paper is the first in a series to provide accurate, historical information on the use of naval guns. Specifically, this paper addresses the role of naval guns in World War II, Korea, and Vietnam in amphibious assault and in support of ground troops in littoral regions. The case studies presented are designed to help planners and decision makers bridge the gap between operational experience and the hypothesis of future needs.

Major General Donald M. Weller, USMC (Ret), the author, has been a student of maritime strategy throughout his professional career and in retirement. He is considered the father of modern naval gunfire support, having devised the basic doctrine and tactics in the thirties. His experience and proven foresight qualify him to evaluate naval gun performance and potential. General Weller's biography follows the bibliography at the end of this paper.

Future treatises of this type will address the total history of naval gunnery in strike warfare, gunfire support, surface-to-air and antisubmarine roles. It is hoped that the primary source material being developed will be of value to our schools, as professional reading, and in assisting decision makers in the weapon system acquisition process.

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INTRODUCTION

PURPOSE

One of the major problems facing naval planners involved in designing weapons for future support of amphibious operations is the lack of operational data on which to base such projections. The collective memory of the officer corps in the field of amphibious operations in general, particularly naval gunfire support, has been eroded seriously by time. After all, the last amphibious assault operation at Inchon, Korea, was executed in 1951, and few active officers remain who had the benefit of this experience. Unfortunately, there is no comprehensive analysis of naval gunfire support experience to bridge the memory gap.

An additional constraint facing naval planners is the debate within naval circles regarding the necessity of the major-caliber lightweight gun (MCLWG) system, the current candidate for strike warfare and support of amphibious operations. Opponents of the 8-inch 55-caliber (8"/55) MCLWG system maintain that the current naval gun system built around the 5-inch 54-caliber (5"/54) gun can satisfy requirements for support of amphibious operations in terms of range, accuracy, and lethality.

The purpose of this paper, then, is to assist naval planners by documenting performance of naval guns in past combat environments, by projecting gun system requirements for support of future amphibious operations, and by assessing the relative capabilities of the 5"/54 and 8"/55 MCLWG systems to satisfy such operational requirements. Specifically, this report:

(1) Examines World War II, Korea, and Vietnam experiences in projecting sea power ashore, assessing the contribution of naval guns;

(2) Identifies naval gunfire system range, lethality, and accuracy required in past sea-power projection operations and assesses the capabilities of the 5"/54 and 8"/55 systems to meet those needs;

(3) Estimates gun system qualitative requirements for support of future amphibious assault operations in terms of range, lethality, and accuracy; and

4. Assesses the qualitative capabilities of the 5"/54 and 8"/55 MCLWG systems to meet future gun system requirements.

METHODOLOGY AND SCOPE

This report is divided into three parts: the executive summary, support for summary and conclusions, and case studies. Part I consists of a concise

summary and conclusions responding to the purposes outlined above. Part II contains:

1. A detailed summary of World War II, Korea, and Vietnam gunfire support operations in terms of gun range, accuracy, and lethality requirements.

2. An analysis of current capabilities and future requirements for naval gun systems.

Part III contains selected case studies to support the summary and conclusions.

RATIONALE IN CASE-STUDY SELECTION

The contribution of naval guns in selected World War II amphibious operations with differing strategic environments is discussed to broaden the operational data base. Generally speaking, a study of naval gunfire support in the Mediterranean, Central Pacific, and Europe satisfies this objective. The South and Southwest Pacific theaters do not require detailed analysis, since the limited contribution of naval guns in these areas was duplicated elsewhere.

Two operations in the Mediterranean are described; i.e., the landings on Sicily and at Salerno in Italy, since these operations demonstrate most clearly the decisive role of naval guns in blunting major infantry and armored counterattacks against landing forces. In the Central Pacific, the classic amphibious assault on Iwo Jima is analyzed in detail because the operation highlights the destructive capability of the intermediate- and major-caliber weapons against hard point targets, as opposed to the relatively soft area targets represented by infantry and even armored counterattacking forces. In the European theater, a study of the Normandy invasion highlights features from both the Central Pacific and the Mediterranean, since hard targets in the form of protected coastal defense batteries and beach emplacements and the relatively soft conformation of counterattacking forces were encountered, a combat environment which has implications for the future.

For Korea, the wide scope and variety of naval gunfire support missions require extensive coverage in order to focus on the overall contribution of naval guns. Gunfire support discussed includes such diverse operations as support of the amphibious landing at Inchon; amphibious withdrawals of Korean forces at Pohang and U.S. and Korean forces at Hungnam; support of troop units on the coastal flanks, including the 1st Marine Division; counterbattery against the numerous communist coastal defense guns emplaced on the east coast to inhibit interdiction of the road and rail net by surface combatants; and finally the 30-month interdiction campaign designed to deprive communist troops of essential supplies.

On the other hand, the scope and variety of naval gunfire support missions in Vietnam were circumscribed by political constraints on the employment of the amphibious weapons system and by the unconventional nature of the war. Since the gun armament of the surface combatants employed was almost identical to that in World War II and Korea (with the sole exception of the 5"/54 caliber gun system), and since both hard point targets and soft area targets were encountered with characteristics similar to those encountered in World War II and Korea, the Vietnam gunfire support experience with regard to gun range, system accuracy, and projectile lethality adds little to that acquired in World War II and Korea. Finally, the operational data on the employment of naval guns in Vietnam would have required classification of the study--an undesirable feature.

SUMMARY AND CONCLUSIONS

REQUIREMENTS AND PERFORMANCE OF NAVAL GUN SYSTEMS IN WORLD WAR II, KOREA, AND VIETNAM

Gunfire support data generated in amphibious operations during World War II, Korea, and Vietnam demonstrate requirements in terms of gun range, projectile lethality, and system accuracy in a variety of combat environments. These data are used to assess the relative capabilities of current 5"/54 and 8"/55 MCLWG systems to satisfy fire-support requirements generated in past operations.

Range*

During World War II, the principal requirement for long-range gunnery stemmed from engagement of counterattacking German armor, although naval guns were used to support Allied troops out to the limit of operational range in all amphibious assault operations on large land masses; i.e., on Sicily and at Salerno, Anzio, and Normandy. At Normandy, ranges exceeding 30,000 yards were of particular importance in the British bridgehead where 10 German armored divisions counterattacked in the first 30 days of operations. British battleships with 15-inch guns could engage German armor at over 30,000 yards with devastating effect.

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* See Table 2, page 48, for armament characteristics of surface combatants.

On Sicily and at Salerno, the limiting range of 24,000 yards for the 6-inch guns on light cruisers, the heaviest U.S. naval guns available for these operations, handicapped the delivery of fire on German armor. At Salerno, the four counterattacking German armored divisions could have been engaged to advantage while canalized on mountain roads before they reached the Salerno plain and deployed into attack formations on a broad front which reduced their vulnerability to firepower. Similar conclusions can be drawn from operations on Sicily. Conversely, the relatively small size of the island amphibious objectives in the Central Pacific did not generate range requirements exceeding 30,000 yards, and naval gun range capabilities were adequate.

Korea, however, was a different story. The size of the land mass and the nature of operations continuously produced range requirements over 30,000 yards. Data on range requirements in Korea are derived from:

1. A data sample of 24,000 fire-support missions in which 414,000 rounds were expended from May 1951 through March 1952. The data show that:

a. Twenty percent of 16-inch-gun missions were fired at ranges exceeding 30,000 yards.

b. Ten percent of 8-inch-gun missions were fired at ranges exceeding 30,000 yards.

2. Four hundred twenty-three missions were fired in support of the 1st Marine Division from December 1950 to March 1951:

a. Ninety-eight 16-inch-gun missions were fired at hard targets (blockhouses, covered artillery emplacements, and personnel shelters) at an average range of 32,500 yards.

b. Three hundred twenty-three 8-inch-gun missions were fired against hard targets at an average range of 20,000 yards.

3. One hundred twenty-three interdiction missions (bridges and tunnels) were fired at an average range of 15,400 yards (7500 minimum and 38,000 maximum) from February 1951 to May 1953. It should be noted that heavy ships operated mostly outside the 100-fathom curve to avoid potential mine damage, which explains the long ranges against coastal interdiction targets.

Vietnam experience confirms range requirements over 30,000 yards generated in World War II and Korea. Most 16-inch-gun missions were fired at ranges beyond the 8-inch-gun capabilities (32,000 yards), while about 25 percent of the 8-inch-gun missions were fired at ranges beyond 5"/54 capabilities (26,000 yards).

Lethality

In World War II and Korea, a large proportion of the targets engaged by naval guns were hard point targets. Specifically:

1. In the Central Pacific, Japanese coastal defense guns, beach and inland defenses (including blockhouses and pillboxes), covered artillery emplacements, and mortar positions were of reinforced concrete or earth-log-rock construction.

2. In Normandy, German coastal defense guns and beach defenses were mostly reinforced concrete. The Germans also took advantage of the natural protection afforded by the French stone hamlets and villages as defensive positions.

3. In Korea, a significant proportion of targets were of hard construction. All bridge targets engaged in the 30 months of the interdiction campaign were reinforced concrete, steel girder or earth abutment construction, while tunnels were constructed in natural rock. The numerous coastal defense batteries constructed by the communists to inhibit the interdiction campaign of the surface combatants were in caves or hollowed-out hills. Once armistice negotiations were commenced, the communists literally went underground. Their field positions were dug in and heavily protected by concrete, rock, earth, or log construction.

4. In Vietnam, the communists constructed heavily protected bunkers and personnel shelters, which constituted the principal targets for the NEW JERSEY's 16-inch guns and the 8-inch guns of the heavy cruisers.

When the 5"/38 guns aboard destroyers were used against hard targets, they were ineffective. Their penetrative power was limited to 2 feet of reinforced concrete at short ranges, and the density and weight of fragments were only effective against soft area targets. While it is true that on occasions, particularly in the Sicily and Salerno campaigns, 5-inch projectiles were effective against tanks, this was because fire stripped tanks of accompanying infantry and engineers or neutralized artillery supporting tank assaults, not because of the projectile lethality against tanks themselves.

In Korea, where destroyers were forced to engage coastal batteries for their own protection during blockade operations and interdiction of rail lines, the 5-inch projectiles lacked lethality. Commander TF 95, responsible for blockade and interdiction efforts of the surface combatants, reported in 1953 that:

> Five inch had little or no effect against coastal defense battery positions unless a direct hit was scored on the aperture thus destroying the gun or sealing off the opening. Short of complete destruction,

> the Communist shore batteries thus protected returned to action very quickly and in some cases continued firing while under attack. On the other hand, gunfire of heavier caliber from battleships and cruisers had a much greater effect. On occasion batteries were permanently silenced by inflicting such heavy damage that the communists abandoned them. In other cases, they were placed out of action for long periods.[1]*

The 5"/38 was also ineffective against communist bunkers and underground personnel shelters, as well as bridges and tunnels. On the other hand, major-caliber projectiles could destroy these targets.

Vietnam reconfirmed World War II and Korean experiences regarding projectile lethality; i.e., the 5"/54 projectile lacked the essential punch to defeat typical hard targets. Therefore, most 5"/54 missions were against soft area targets for harassment and interdiction. Experience demonstrated that the 5"/38 and the 5"/54 gun systems were effective against soft area targets because of projectile fragmentation patterns and high rates of fire. Typical soft targets, such as counterattacking infantry, field and antiaircraft artillery in open emplacements, and infantry and engineer personnel accompanying armored counterattacks were successfully engaged by the 5"/38 in all theaters in World War II and in Korea. Finally, the 5"/38 furnished a major portion of beach neutralization fires in support of amphibious landings.

Accuracy

All gun systems employed in World War II, Korea, and Vietnam were constrained by the inherent limitations of ballistic weaponry. However, high velocity, a characteristic of all naval gun systems, produces flat trajectories at short range with relatively small vertical dispersion. This characteristic, coupled with the penetrative capability of heavy naval projectiles and the employment of pointer fire to maximize gun laying accuracy, was exploited in the Central Pacific campaign of World War II where the strategic environment permitted operations before D day for deliberate destruction of coastal defense guns and beach defenses. For example, a typical blockhouse for a medium-caliber coastal defense gun encountered on Iwo Jima, with a vertical surface 30 feet wide and 12 feet high, could be attacked with a hit probability of about 12 percent (one hit in nine rounds). At 10,000 yards, ammunition requirements for one hit escalated to 64 rounds, demonstrating dispersion sensitivity to increased ranges.**

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* See notes at the end of the report.

** See Table 4, page 50.

Conclusions

Analysis of combat experience in World War II, Korea, and Vietnam demonstrates a requirement for:

1. Range capabilities exceeding 30,000 yards. The 5"/54 gun system could not have met this requirement, even with the development of an improved projectile with a maximum potential range of 30,000 yards. On the other hand, the 8"/55 MCLWG and an improved projectile with a range of over 40,000 yards could have satisfied this requirement.*

2. Destruction of hard point targets. The 5"/54 projectile lacks penetrative power and essential lethality to destroy hard targets characteristic of past combat environments, including coastal defense guns, blockhouses, pillboxes, covered artillery emplacements, and individual tanks, as opposed to a tank weapon system consisting of armor with supporting infantry, engineers, artillery, and logistics personnel.

3. Improved accuracy. Gun systems in past combat environments were constrained by inherent ballistic dispersion, a characteristic of all gun systems, both ship- and land-based. Dispersion was compensated, at least in part, by employing very short range fire against targets with a significant vertical dimension or by the delivery of a very heavy volume of fire to ensure a probability of some hits. The latter technique was possible only because of the large gun inventory and almost unlimited ammunition. The potential for guidance in both the 5"/54 and the 8"/55 MCLWG systems through employment of laser target illumination (either ship-, land-, or air-based) combined with laser or IR seekers, can reduce or eliminate this limitation.

4. Neutralization (suppression) of soft area targets. The 5"/38 and 5"/54 projectiles, because of favorable fragmentation patterns and high rates of fire, were effective against typical soft area targets such as infantry in the open, field artillery, antiaircraft artillery, man-portable antiaircraft missiles, and mortars without overhead cover, as well as infantry, engineering personnel, and artillery supporting armored counterattacks. Smoke, dust, and blast also inhibited the operations of counterattacking tanks. The 8"/55 MCLWG, firing an improved conventional munition (ICM) projectile, would be much more effective than the 5"/54 conventional projectile because of a wide dispersion of bomblets and their demonstrated lethality against personnel and light armor. Because of projectile cavity limitations, it is not practical to fabricate a 5"/54 projectile with improved conventional munitions loading.

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* See page 41 for capability of 5"/54 and 8"/55 MCLWG.

ACCURACY OF CURRENT 5"/54 IN DISCHARGING GUNFIRE SUPPORT MISSIONS OF PAST OPERATIONS

As a consequence of range and lethality limitations outlined above, the current naval gun system, the 5"/54, could not have met past combat requirements. Specifically, the Central Pacific campaign in World War II; with the requirement for destruction of hard targets, blockhouses, and pillboxes, both on the beach and inland, as well as coastal defense guns; could not have been executed with the 5"/54 gun system. Contemporary World War II aircraft could not have filled the destruction gap, due to inherent limitations in lethality and accuracy of bombs and rockets. In short, the Central Pacific campaign, the key to the defeat of the Japanese, would have been impossible without major-caliber naval guns.

In Normandy, the 5"/54 would not have been capable of neutralizing, much less destroying, the 23 coastal defense batteries commanding the seaward approaches to the landing beaches because of range and lethality limitations. Similarly, the 5"/54 could not have contributed significantly to the defeat of the German armored counterattacks because of range limitations. While the naval gun was not as decisive in the Normandy invasion as it was in the Central Pacific campaign, nevertheless the Germans themselves repeatedly attributed the failure of their counterattacks to the major-caliber naval guns and to the air arm.

In Korea, range limitations of the 5"/54 would have eliminated about 20 percent of the support missions, including a significant number of missions fired in support of the 1st Marine Division. Lethality limitations would have prevented participation by naval guns in the interdiction campaign to destroy bridges and tunnels and in the attack of blockhouses and bunkers in support of the 1st Marine Division. Also, the 5"/54 would not have been able to significantly reduce the level of coastal battery fire against surface combatants.

In Vietnam, range and lethality limitations of the 5"/38 and 5"/54 caliber guns would have reduced the contribution of naval guns to primarily harassment and interdiction with occasional troop support missions. The successful engagement of hard targets, particularly those north of the DMZ, would have been impossible.

In contrast, if the 8"/55 MCLWG had been in the naval gun inventory on DD-class ships, it would have been capable of satisfying the requirements for range and lethality generated in all past combat environments. In addition, assuming that state-of-the-art guided projectiles were in the inventory, ammunition expenditures would have been reduced and, more importantly, ensured destruction of a higher percentage of hard targets through significantly increased accuracy.

GUN SYSTEM REQUIREMENTS IN FUTURE COMBAT ENVIRONMENTS

Range

Future combat settings will demand increased gun ranges, compared with past combat environments. Most hostile targets (including beach defenses, local reserves, field artillery, and mortars) will normally be positioned within 25,000 yards of the landing beaches. However, general reserves of infantry, armor, and mechanized forces, together with surface-to-surface missile batteries (ranges 39,000 to 98,000 yards) and potential helicopter landing zones, could be located up to 50 miles inland.

In any case, it is obvious that the range capability of the 5"/54 gun system, even with the development of an improved conventional projectile with a 30,000-yard capability, cannot satisfy requirements for the engagement of most target arrays. Even the increased range potential of the 8"/55 MCLWG (over 40,000 yards) cannot satisfy all range requirements. This limitation may dictate the exploitation of sabot-type projectiles similar to Gunfighter, which has demonstrated range capabilities on the order of 65,000 yards.

Lethality--Hard Point Targets

As in past combat environments, hard targets in the form of blockhouses, pillboxes, and covered artillery emplacements, as well as individual tanks, will be encountered in future amphibious assault operations. Combat experience has demonstrated the inadequacy of the 5-inch projectile to penetrate and defeat such targets. Conversely, the 8-inch projectile, either conventionally loaded or in an improved conventional munition configuration, can satisfy future lethality requirements. The conventional 8-inch projectile can penetrate 2 inches of armor, which is adequate to defeat horizontal armor located over a tank engine or the side and horizontal armor of a modern armored personnel carrier. Lethality of the 8-inch projectile could be exponentially enhanced by fuel air explosive (FAE) loading.

Lethality--Soft Area Targets

Both the 5"/54 and 8"/55 MCLWG projectiles have effective fragmentation patterns which are capable of neutralizing soft area targets such as infantry in the open and weapons emplacements lacking overhead cover. The 8-inch projectile, with improved conventional munition loading (approximately 109-yard bursting radius) would be significantly superior to the 5-inch projectile with conventional loading.

Accuracy

The requirement for tactical support in future amphibious assault operations against a first-class power defending a large land mass with multiple landing areas will rule out preliminary operations analagous to those conducted in the Central Pacific during World War II. This will limit the time for destruction of targets to that available on D day prior to H hour. As a further complication, the small number of available gun barrels for support of the amphibious assault will put a premium on accuracy. However, potential laser and IR guidance for the 8-inch projectile should contribute significantly to gun accuracy, with consequent reduction in both time and ammunition expenditure required for target destruction.

INTRODUCTION

The role of naval guns in World War II amphibious operations stemmed from the defensive strategy of Italian, German, and Japanese opponents. Their strategy, in turn, was dictated by the geographical characteristics of amphibious objectives and their inventory of military forces. In the Mediterranean theater, large land masses and numerous potential landing beaches at Sicily and Italy limited the organization of beach defenses and coastal artillery positions and forced the Axis to depend on prompt counterattack with infantry and armored reserves against Allied landings. Consequently, the major contribution of naval guns was to assist in the disruption of these counterattacks, although guns were directed against the limited beach defenses and coastal artillery whenever the situation so required.

Japanese defensive strategy in the Central Pacific contrasted sharply. Amphibious objectives were far smaller, ranging in size from the tiny atolls in the Gilberts and Marshalls to the relatively large island of Okinawa, all characterized by relatively few potential landing sites. In all cases, Japanese military resources were sufficient for the organization of powerful beach defenses and coastal artillery positions. In this theater, the most important mission of the naval guns was the destruction of beach defenses and coastal artillery so that a foothold could be established without crippling casualties. However, field artillery, mortars, and rocket launchers were also taken under fire.

The German strategy for defense of Western Europe combined elements encountered in both the Central Pacific and the Mediterranean theaters. As in the Pacific, a system of beach obstacles, strongpoints, and coastal artillery was encountered, designed to defeat the assault forces before they could establish a foothold. However, if the assault troops should penetrate the coastal crust, then infantry and armored reserves were to counterattack in order to drive the invasion force into the sea--a strategy similar to that employed in the Mediterranean.

THE COASTAL DEFENSE GUN BATTERY

One of the major challenges to naval guns during World War II and Korea was the elimination of hostile coastal defense guns. These weapons played key roles in the defensive strategy of the Germans and the Japanese. In the Korean War, the North Koreans attempted to restrict the Navy's east-coast interdiction campaign by placing numerous coastal guns to command the sea approaches. In Vietnam, the communists positioned coastal defense batteries north of the DMZ to inhibit the effectiveness of surface combatants engaged in interdiction.

The Japanese protected the seaward approaches of their island holdings in the Central Pacific with heavy-caliber guns up to 8 inches installed in caves or massive reinforced-concrete emplacements resembling gun casemates. At Normandy, the German Navy, responsible for coastal defense of the Atlantic wall, had erected an impressive system of coastal defense batteries with guns up to 210 mm (8.3 inches). By June 1944, the landing beaches for the Normandy invasion were covered by 23 coastal defense batteries, over half of which were emplaced in massive concrete casemates.

At the beginning of World War II, naval planners were convinced that the coastal defense gun would be a major hazard to surface combatants; so much so that pre-war doctrine specified that ships would deliver counterbattery and fire support from long ranges while maneuvering at high speed to avoid damage. Yet the coastal defense gun turned out to be a "paper tiger," in spite of the enormous resources that the Germans and Japanese devoted to that system. Coastal defense guns never succeeded in interfering significantly with transport unloadings or with landing craft and control vessels engaged in the ship-to-shore movement. Occasionally, a transport had to shift its unloading position or a "small boy" engaged in close-in minesweeping was hit, but very few surface combatants or amphibious ships were even damaged; none were sunk. How can this failure be explained?

The differing strategic environments in the Central Pacific and Normandy dictated differing techniques. U.S. control of the sea and air in the Pacific and the limited size of the island objectives eliminated the requirement for surprise. Consequently, all Central Pacific operations after Tarawa were characterized by 2 or more days of preliminary operations devoted to destruction of Japanese island defenses, including coastal defense guns. The heavy guns of battleships and cruisers firing at point-blank ranges (2000 to 5000 yards) pulverized and eliminated these weapons.

In the Normandy invasion, the essential requirement for surprise ruled out pre-D-day firing, although some air attacks were directed against coastal weapons prior to D day without significant reduction in their capabilities. On D day, each of the 23 coastal defense batteries covering the seaward approaches to the invasion beaches was assigned to a heavy-gun ship, either cruiser or battleship. These ships, firing from positions 10,500 to 30,000 yards offshore, were able to suppress the coastal batteries, thereby preventing any significant interference with the landing operation, although, unlike the Japanese batteries, few were actually destroyed. Admiral Moon, the Amphibious Attack Force Commander for Utah Beach (one of the two on which U.S. forces landed), explained the success of the naval guns as follows:

> It was significant that at least through the first week of the operation, no battery could be considered destroyed unless captured. There were several instances of positions which were believed, on the basis of air and sea observation, to have been destroyed yet guns in these positions subsequently opened fire. In some of these cases, there

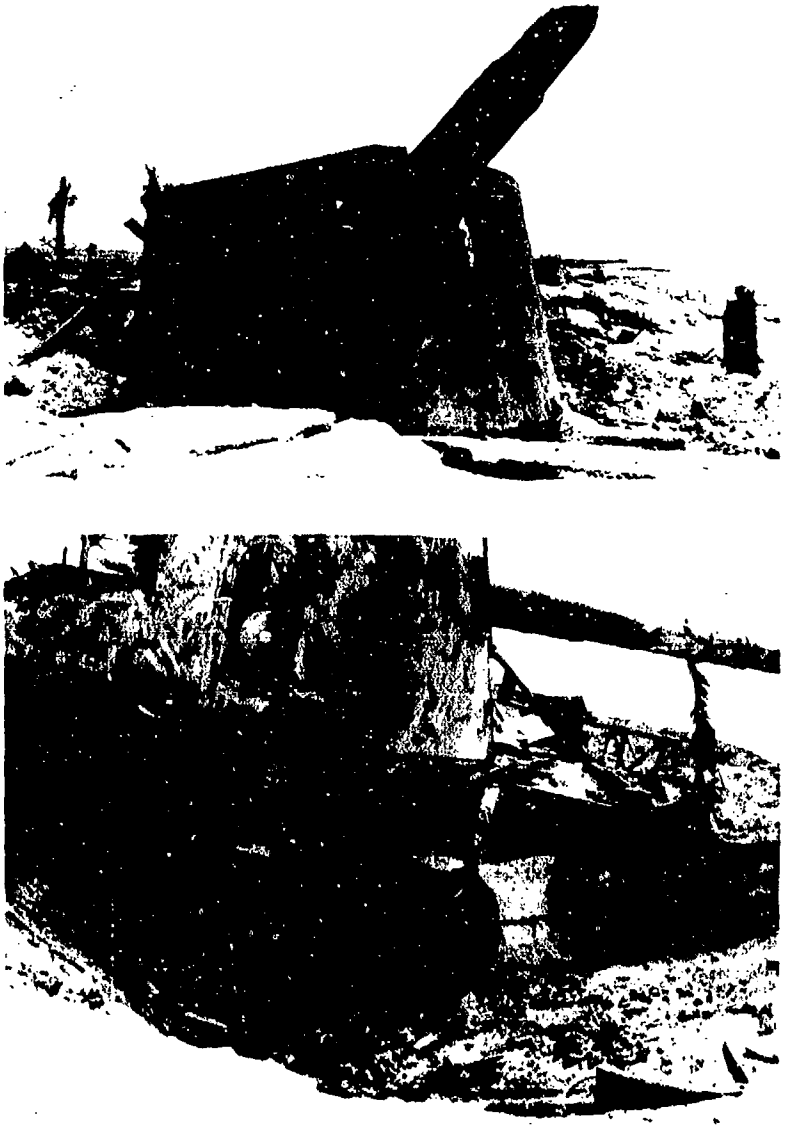


Photo 1. Eight-inch Japanese coastal defense guns destroyed by major-caliber naval guns of MARYLAND and COLORADO.

(Official USMC Photo)

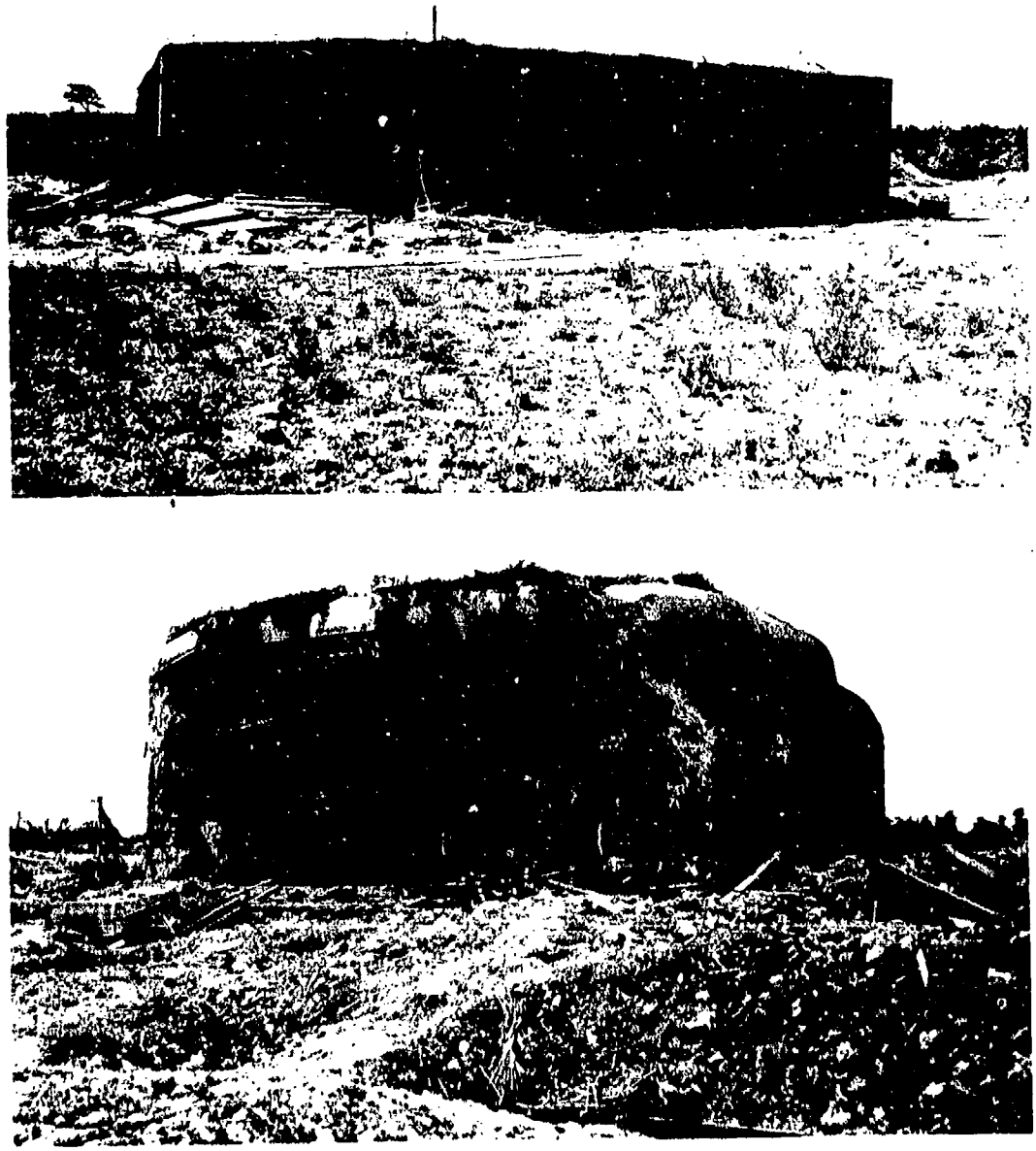
Photo 2. Japanese coastal defense guns on Iwo Jima destroyed by main battery fire from IDAHO and TENNESSEE.

is evidence that casements protected the guns against lethal damage although they were rendered inoperative during the bombardment and for many hours thereafter. The latter was probably the case at Crisbecq, which battery was one of the most important on the east coast of the Cherbourg Penisula. The position contained two 210mm guns in casements, one 210mm in an open emplacement, and six 88mm dual purpose in open revetted emplacements. The casements had roofs of reinforced concrete 12 1/2 feet thick and walls ranging from 10 to 16 feet. This position had been subjected, both before and after D-day, to especially heavy air and naval bombardment. The guns in casemates were undamaged except for minor fragmentation scars, the casemates themselves were also entirely unscratched even by close misses. On the other hand, all communication leading to them from the observation post and rangefinders were disrupted which probably rendered accurate fire extremely difficult. All the other guns in the battery which were not enclosed were destroyed or nearly so.[2]

Thus the success of the heavy naval guns is explained by the characteristics of the coastal defense weapons system. While very few coastal guns were literally destroyed, some component of the system, be it the range finders, fire-control stations, communications, or operating personnel, was degraded by the destructive and psychological power of the heavy-caliber naval projectiles. It was, of course, necessary to repeat suppressive fires when the damaged components of the system had been repaired. The fact remains that the coastal defense weapons system, which the Germans believed would disrupt the Allied landings, was never a factor.

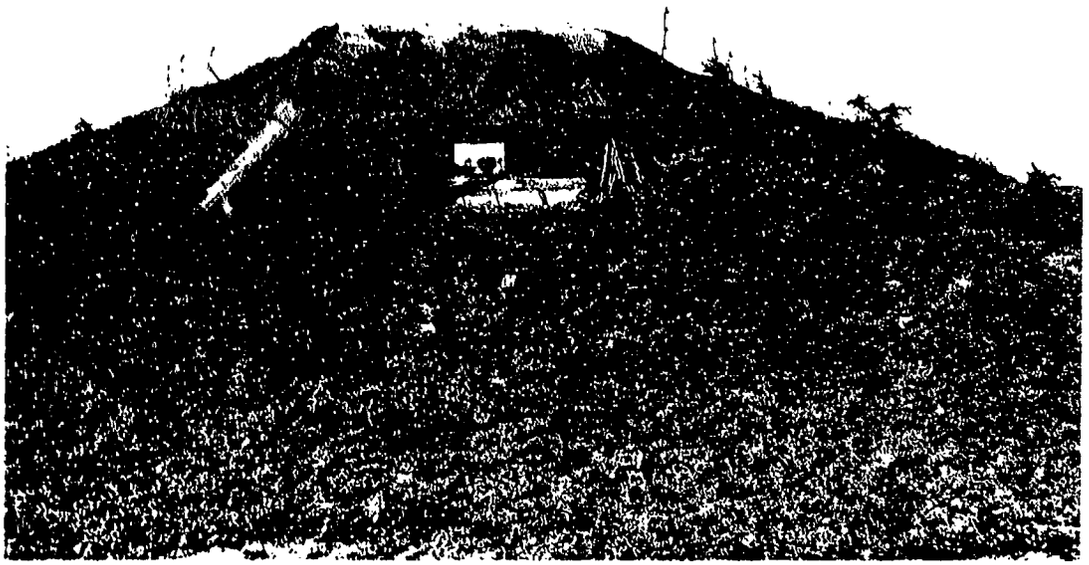
In Korea, the communists payed grudging tribute to the effectiveness of the naval guns in the interdiction campaign against the east-coast rail net by a massive buildup of coastal defense guns. By July 1952, nearly 1500 guns and mortars had been reported. These weapons were mostly field artillery types of 76 and 105 mm, but, as the interdiction campaign continued, heavier calibers controlled by radar with ranges out to 16,000 yards were introduced. Individual guns were emplaced in caves and dugouts located in hilly terrain that would provide maximum cover and concealment, with fields of fire sacrificed for protection by the use of small firing apertures.

During the 30 months of the interdiction campaign and the siege of Wonsan Harbor, communist shore batteries were engaged by all types of ships, primarily destroyers of the blockade force. Because destroyers were the main instruments in maintaining daily surveillance of the Korean coast, coupled with their responsibility for inhibiting repairs of rail and bridge cuts, and because they provided the artillery for the siege of Wonsan, they were exposed to communist shore battery fire almost continuously. In all, 110 ships, most of which were destroyers, were damaged by coastal batteries; however, destruction was relatively minor.



(U.S. Army Photos SC275908 and 275907)

Photo 3. Two 210-mm concrete gun emplacements of the Crisbecq battery.



(U.S. Army Photo SC275903)

Photo 4. An observation post for the Crisbecq battery.

Heavy coastal battery fire forced destroyers to take passive measures to reduce vulnerability, particularly in the Wonsan area where the concentration of coastal batteries in 1953 amounted to about 1000 guns. In essence, destroyers reverted to the pre-World-War-II doctrine of conducting counterbattery while maneuvering at high speed, and on many occasions they were forced to open the range to escape damage.

In 1953, Commander, East Coast Blockade Force, analyzed counterbattery effectiveness as follows:

> During the course of the conflict and particularly during the latter stages, the Communists became highly skilled at building practically invulnerable emplacements, underground shelters and the like. In addition to the extremely rugged construction, the Communists were most adept in camouflage. In many cases, new gun positions were not detected until gun flashes were seen when fire was opened. In fact, in many instances ships were unable to detect the fact that they were under fire until the splashes were observed. Five inch gunfire had little or no effect against these emplacements and shelters unless a direct hit were scored destroying the gun or sealing off an opening. Short of complete destruction, the Communist shore batteries thus protected returned to action very shortly and in some cases continued firing while under attack.[3]*

There is no doubt that 5-inch guns inflicted some damage to guns and crews and certainly caused the enemy to cease fire on many occasions, but, due to the type of emplacement, destruction was virtually impossible. The blockade commander continued:

> Gunfire of heavier caliber, from battleships and heavy cruisers, had a much greater effect. On occasion, batteries were permanently silenced by inflicting such heavy damage that the Communists abandoned them. In other cases they were placed out out of action for long periods.[4]*

LANDING BEACH DEFENSES

One of the principal ingredients of Japanese defensive strategy in the Central Pacific and of the Germans in defense of Fortress Europe was the defeat of the invasion force at the water's edge. To implement this strategy,

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* Underlining supplied.

potential landing beaches were defended by a belt of blockhouses and pillboxes armed with a variety of automatic weapons and medium-caliber guns. The rapid penetration of these beach defenses by the assault forces without crippling casualties was essential to success.

In the Central Pacific, naval guns, with limited assistance from carrier- and land-based aircraft, were assigned the task of destroying these defenses during operations preceding D day. At Normandy, these defenses were to be neutralized during the landing of the assault troops. The effectiveness of naval guns is illustrated by the Iwo Jima operation in the Central Pacific and by the Normandy invasion.

IWO JIMA

The beach defenses of Iwo Jima were the most heavily concentrated defenses encountered in any amphibious operation in history. The 3500-yard beach, over which the marines would land in February 1945, was defended by 20 blockhouses, 99 pillboxes, and 32 covered artillery emplacements. All featured the lavish use of heavily reinforced concrete, which characterized Japanese defenses. Blockhouses and covered artillery emplacements had reinforced walls and overheads 3 to 5 feet thick, were compartmentalized to localize damage, and were situated below ground level for additional protection. Pillboxes also featured the use of concrete, but of less massive proportions.

The firing ports of blockhouses and pillboxes in the beach area were located for the delivery of flanking fire along the beaches so that the ports were invisible from seaward. Blockhouses contained 37- and 75-mm antitank guns and 25-mm machine guns; pillboxes were limited to machine guns. A four-gun battery of naval guns was situated in massive emplacements at the base of Mount Suribachi so that it commanded the transport area and boat lanes. Similarly, on a bluff overlooking the northern flank of the landing beach, coastal batteries were positioned in concrete casemates. Camouflage was extensively and cunningly employed, with natural materials of grass, brush, and sand. Thus, the difficulty in detecting these weapons from seaward severely complicated the task of destruction. Considerable firing would be necessary simply to strip away the camouflage before the defenses could be detected and subjected to attack by naval guns or aircraft.

Battleships TENNESSEE, NEVADA, and IDAHO were assigned to deliver short-range destructive fire against the beach defenses during 3 days of bombardment before D day. However, a number of unforeseen developments limited destructive fires to only 2 hours on D minus 3 and D minus 2 days, with negligible results. Accordingly, on D minus 1 an additional battleship, NEW YORK, and the heavy cruiser CHESTER were shifted to augment beach destructive fires.

At first light on D minus 1, the five heavy ships engaged the blockhouses, pillboxes, and coastal defense batteries. In order to take advantage of the limited vertical dispersion of the high-velocity projectiles, fire was delivered from short ranges of 2000 to 4000 yards, using single gun pointer fire for maximum accuracy. One or two rounds of high-capacity projectiles usually sufficed to strip camouflage and sand, fully revealing the vertical walls of the blockhouses and pillboxes for further attack.

One or two hits were sufficient to destroy the targets. NEVADA, the most experienced of the heavy ships, averaged less than ten rounds of 14-inch high-capacity projectiles for each destructive mission. By 1830 hours, when darkness forced retirement, the defenses had been subjected to 10 hours of heavy destructive fire.

The results were most heartening. From seaward, observers could plainly see the four casemated guns commanding the beaches pounded into a rubble. Similarly, the battery at the base of Suribachi had been reduced to a mass of broken concrete; blockhouses had been blasted by the main batteries of NEW YORK and NEVADA. Of the 150 targets in the beach area, intelligence operators on ESTES estimated, from a combination of photo interpretation and visual observation, that 115 had been destroyed or damaged. Specifically, all of the coastal defense guns, 22 of 33 antiaircraft positions, 16 out of 20 blockhouses, and 48 out of 99 pillboxes were declared destroyed or critically damaged.

In order to cover the landing of the assault marines, the D-day plan for neutralization of remaining defenses called for seven battleships, eight cruisers, and nine destroyers, assisted by 40 assorted gunboats and rocket craft, firing 3000 rounds of major-caliber ammunition, over 10,000 rounds of 5- and 6-inch projectiles, and over 20,000 mortar and rocket rounds. After H hour, prearranged fire in the form of a rolling barrage fired by eight destroyers was to be delivered over the heads of the marines, continuing until H plus 1. Aircraft observers were to call for repetition of fires in the event the assault should lag behind the fires. After prearranged fires had ceased, targets of opportunity were to be engaged through shore fire-control parties or air observers. This heaviest coverage of a landing in history enabled the marines to penetrate the beach defenses without crippling casualties or serious delays.

The penetration of the beach defenses was the key to success. Without such a breakthrough, a far more concentrated personnel target would have been presented to Japanese artillery, mortars, and rockets. Casualties would have been multiplied, robbing the assault of its momentum. Nor is it likely that the landing of reserves would have restored momentum; they would have simply added to the concentration of personnel and induced further casualties. Without the destruction of Japanese beach defenses accomplished by naval guns during preliminary operations, it is probable that the Japanese would have defeated the assault on the beaches. The most unbiased testimony regarding

(Official USMC Photo)

Photo 5. Blockhouses on the Iwo Jima landing beaches destroyed by main battery fire of NEW YORK and NEVADA.

the guns' destructive capability came from the Japanese Commander on Iwo Jima, General Kuribayashi, who reported to Tokyo that:

> However firm and stout pillboxes you may build at the beach, they will be destroyed by bombardment of main armament of the battleships. Power of the American warships and aircraft makes every landing operation possible to whatever beachhead they like.[5]

While the assault on Iwo Jima was reaching its height, Japanese forces on Okinawa were bracing themselves for attack. But the lessons of previous unsuccessful Central Pacific defenses were taken into account. Here the defense plan was deliberately designed to reduce the effect of the American firepower, particularly the naval guns and aircraft.

The philosophy of defense was set forth by the Commanding General of the Okinawa defenses in Battle Instruction Number 8 dated 8 March 1945:

> The time of opening fire will naturally vary somewhat according to the type of weapons, strength of positions, duties, etc. However, generally speaking we must make it our basic principle to allow the enemy to land in full. Until he penetrates our positions and loses his freedom of movement inside our most effective system of firepower, and until he can be lured into a position where he cannot receive cover and support from naval gunfire and aerial bombardment, we must patiently and prudently hold our fire. Then, leaping into action, we shall destroy the enemy.[6]

This dramatic reversal of tactics was verified in the assault on Okinawa. When the Army personnel and marines of the 10th Corps went over the Okinawa beaches on the first of April, they were unopposed. It was not until the troops turned south that the Japanese exposed their weapons and defenses anchored on the ancient Shuri castle. This new tactic ultimately failed, but the defense was effective enough to prolong the campaign, and the full fury of the kamikaze attack was brought to bear on the fleet, while ashore the defenders extracted a bloody price. Our own troops crowded the enemy defenses so closely that the naval guns and aircraft could not be used in systematic destruction for fear of causing casualties among our own people.

NORMANDY

The 7000-yard expanse of Omaha Beach, over which the 1st and 29th U.S. Infantry Divisions would land on 6 June 1944, was defended by 12 strongpoints. Each strongpoint was a complex system of elements, including pillboxes, gun casemates, open positions for light guns, and firing trenches, surrounded by minefields and wire. The elements were connected with each other and with underground quarters and magazines by deep trenches or tunnels.

While machine guns were the basic weapons in all emplacements, there were over 60 light artillery pieces of various calibers. Eight concrete casemates and four open-field positions were designed for guns ranging from 75 to 88 mm. Thirty-five pillboxes were occupied by lighter guns, and there were about 18 antitank guns (37 to 75 mm). The heavier guns were situated to give lateral fire along the beach, with traverse limited by thick concrete wing walls that concealed the flashes of these guns and made them hard to spot from the sea.

The neutralization of the 12 strongpoints on Omaha Beach featured the use of aircraft and fire-support ships. The 8th Air Force was to send 480 B-24s, armed with a total of 1300 tons of 100-pound bombs, against these defenses during the period H minus 30 to H minus 5 minutes. The five heavy ships off Omaha were to deliver approximately 750 rounds of 6-inch, 200 rounds of 8-inch, and 385 rounds of 12-inch projectiles at the beach defenses, while five of 11 destroyers firing from swept lanes about 1800 yards offshore were to fire a total of 1800 rounds of 4- and 5-inch projectiles from H minus 40 to H minus 5 minutes. The remainder of the destroyers were to engage targets on the flank or to stand by, awaiting call from the shore fire-control parties. It should be noted that, in spite of an expressed concern for the shortage of gunfire support, 11 destroyers fired only the equivalent of one full destroyer load prior to H hour.

On D day, gunfire support from destroyers and heavier ships commenced on schedule at H minus 40 minutes, increasingly hampered by heavy smoke and dust that obscured targets. Firing continued until H minus 5, when the B-24s, with 1300 tons of bombs, were supposed to take up the attack on the beach defenses. However, on the night before D day, the 8th Air Force had decided to shift bombing targets inland to communication and reserve areas because of a lack of confidence in the ability of the bombers to hit beach targets without endangering the assault infantry. This momentous decision was not communicated to the Naval Attack Force Commanders or to the Landing Force Army Commanders.

The assault infantry had other problems as well. Due to an adverse current, the assault troops were landed well east of their assigned areas, and to further compound the situation many small units were dispersed and disrupted. Less than half of the 96 tanks scheduled to land were in operation. The demolition teams assigned to remove beach obstacles suffered 40-percent casualities, and only a few gaps were blown in the beach obstacles--those were not marked.

But the main problem was caused by automatic weapon, cannon, and artillery fire coming from the beach defenses. Landing craft came under fire about a quarter of a mile from the beach, then grounded on sandbars 100 yards from the low water mark, and the assault forces suffered their heaviest casualties just after debarkation. By 0730, elements of the assault

force were immobilized in hopeless confusion. At 0800, German observers in the strongpoints reported that the invasion had been stopped at the water line.

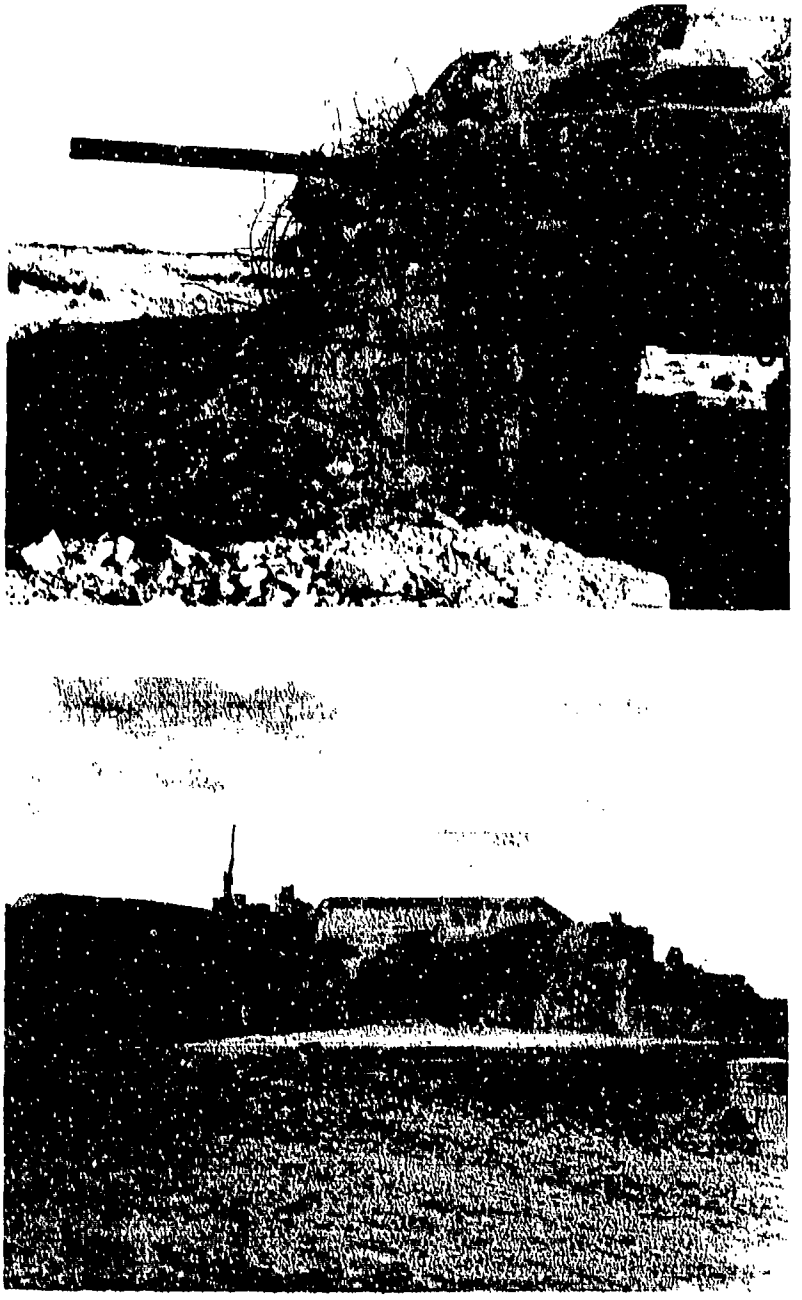
Shore fire-control parties with the assault infantry were unable to bring fires on beach defenses because of communication failures, separation from troop commanders, or fear of firing on own troops. Without effective contact with shore fire-control parties and under strict orders not to fire without clearance from these parties, ships could do nothing but stand by, helpless to intercede. A commander of a fire-support division of destroyers off Omaha Beach said:

> ...It was most galling and depressing to lie idly a few hundred yards off the beaches and watch our troops, tanks, landing boats, and motor vehicles being heavily shelled and not be able to fire a shot to help them just because we had no information as to what to shoot at and were unable to detect the source of the enemy's fire.[7]

But a break in the stalemate was to come from an unexpected source:

> LCT-30 drove at full speed through the obstacles in front of the Exit E-3 with all weapons firing on the emplacements to the front. The craft beached and continued to fight it out, silencing the enemy guns. At the same time, LCI(L) 544 also rammed its way through the obstacles, firing on machine guns in the house at the exit. It landed its men and, at the same time, kept up the bombardment knocking out the nests. The action of these craft had two results--they facilitated further advances up the the E-3 draw and established the fact that the beach defenses could be breached by ramming. Other craft followed their example; at approximately the same time a destroyer neared shore, swung broadside, and began firing at German positions, first concentrating on emplacements and houses at Les Moulins at D-3 draw, then continuing to the east. This fire was highly effective and played an important part in neutralizing the enemy defenses.[8]

The action of this destroyer, probably CARMICK, was the result of an order directing all ships to close the beach and render all assistance possible. Within 30 minutes, nine destroyers were in position from 800 to 1000 yards from the beach. CARMICK, watching the fire of some friendly tanks, used the point of impact of the tank projectiles as an aiming point. Other destroyers fired on beach targets; for example, on the right flank, a battalion found a pillbox still in action. Fire from a tank supported the infantry in the first attempt, but the attack was stalled. A shore fire-control party in contact with a destroyer about 1000 yards offshore coordinated its action with the infantry. The destroyer's guns fired only a few yards over the crowded beach and got a hit about the fourth round, forcing the pillbox personnel to surrender. Twenty Germans were taken prisoner. Thus, at about 1130, the last German



(U.S. Army Photos SC275767 and 275322)

Photo 6. Examples of Omaha Beach defenses.

defenses in front of E-1 draw were reduced, and E-1 became the main funnel for movement of troops off the beach.[9]

A V-Corps observer, laying off the beach in a landing craft, stated in a message at 1140: "Troops advancing up west slope Exit E-1, thanks due to destroyer."

Another message sent just before noon answered: "Troops moving up slope of Fox Green and Red. Join you in thanking God for our Navy."[10]

Beginning then with opportune action of a few landing craft, followed by the ordering into action of all destroyers with a blanket order to do all in their power to assist the troops, the situation improved rapidly.

By 1500, further improvement in the situation was apparent. Artillery fire still covered all exits, and small arms fire continued, but troops on the eastern half of the beach were less harassed. Movement off the beach continued. By evening of D day, although troops were far short of the assigned objective, a precarious foothold had been established, thanks to the decisive assistance of the naval guns.

POST-LANDING SUPPORT—INFANTRY AND TANK COUNTERATTACKS

Naval guns also played an important and continuing role once the assault forces had penetrated the beach defenses in all amphibious operations. On Sicily and at Salerno and Normandy, German strategy featured prompt armored counterattack, with the objective of defeating the assault before a significant buildup ashore could be effected. German armor, in contrast to coastal defense guns and beach defense systems, nearly tipped the balance on Sicily and at Salerno and was also a major factor in containing the Allied bridgehead in Normandy until D plus 41. Had Hitler released the reserves which were being held out of the Normandy battle in anticipation of another Allied invasion in the Pas de Calais area, the Normandy invasion might have failed.

SICILY

The most dramatic illustration of the effectiveness of naval guns against armored formations occurred during D day and D plus 1 in support of the 1st U.S. Infantry Division in one of three landings on the beaches of Sicily. The division was a target of armored counterattacks by an Italian tank group of 60 light tanks and the German Goering Panzer Division equipped with 100 Mark III and IV tanks with 76-mm guns, reinforced with 17 Tiger tanks with 88-mm guns. Both divisions had supporting infantry and artillery, and their combined attacks against the 1st Division were the most powerful launched against any single U.S. division in any theater, including Normandy. Furthermore,

during the attack on D day, the 1st Division was particularly vulnerable because there were no antitank weapons, tanks, or artillery ashore when the attacks began. The division did have the support of cruisers BOISE and SAVANNAH, armed with 6-inch guns, and several destroyers with 5-inch guns. These ships made the difference, even though the 126-knot float planes of the cruisers could only function intermittently in the face of the German air domination over the beachhead. In addition, unlike subsequent operations where a variety of firepower could be brought to bear against armor, which made it difficult to determine the precise role of naval guns, here on Sicily it was simple; there was no other firepower.

On the afternoon of D day, three separate tank attacks were launched, two by the Italians and one by the Mark IIIs and IVs of the Goering Divison. The first Italian attack was stopped with the expenditure of 100 rounds from the destroyer JEFFERS, which left several tanks burning and the remainder running the gauntlet of fire. However, the fire stripped the tanks of their supporting infantry and neutralized their artillery. When the remaining tanks came under fire from an infantry unit, the attack stalled. As the U.S. Army History says:

> Without infantry support, its artillery under heavy counter-battery from American warships, the Italian tankers broke off the fight and retired.[11]

The second prong of the Italian counterattack fared no better. As the force approached the infantry near the beach, a shore fire-control party called for support from destroyer SHUBRICK, which delivered 125 rounds on the formations, hitting several tanks and immobilizing the accompanying infantry. While 10 tanks actually penetrated the infantry defense and moved into Gela, they were dispersed by infantry firing bazookas and grenades from the protection of stone buildings. For all purposes, the Italian armored unit had been destroyed; they mounted no more attacks against the 1st Division.

The second armored attack, conducted by the Goering Division with about 90 Mark III and IV tanks, accompanied by infantry elements, was taken under fire by a light cruiser and destroyer in response to requests by a shore fire-control party with the supported infantry. Again, in the words of the Army History:

> The tanks slowed, sputtered and eventually stopped. The tankers could not go because they had nothing to cope with the five and six inch naval shells that whistled in from the sea....[12]

(U.S. Army Photo SC775981)

Photo 7. BOISE, one of the four light cruisers supporting U.S. forces at Sicily and Salerno, firing in support of 1st Army Division at Gela, Sicily.

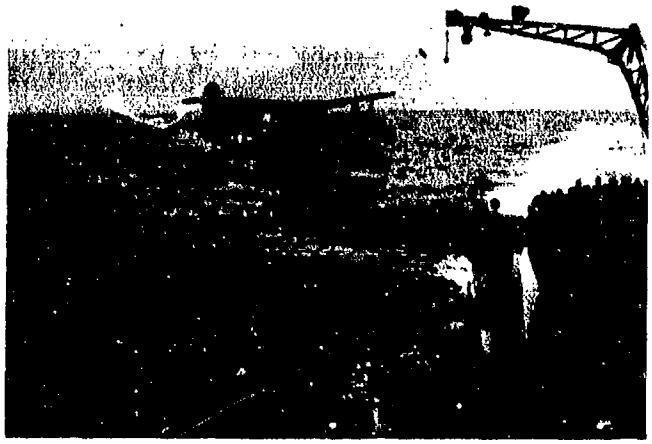
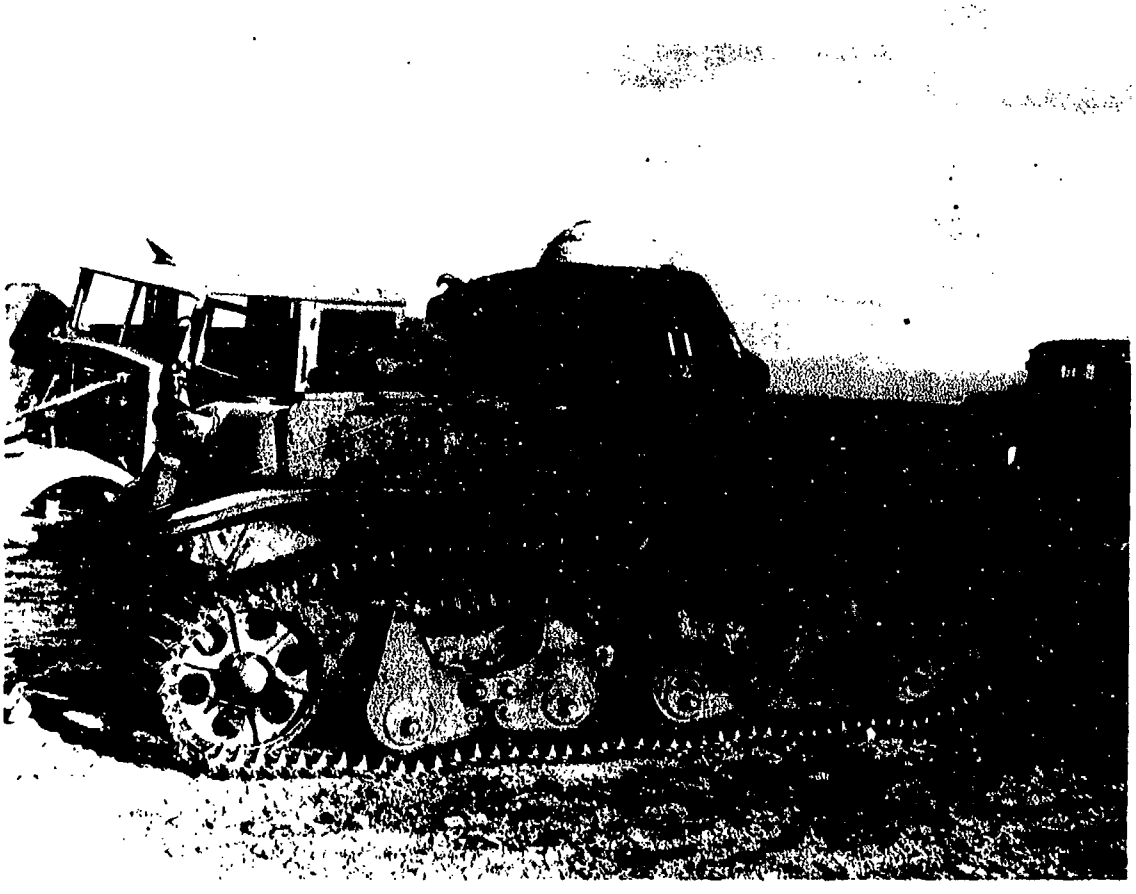


Photo 8. SOC aircraft being launched from light cruiser PHILADELPHIA during operations at Sicily.

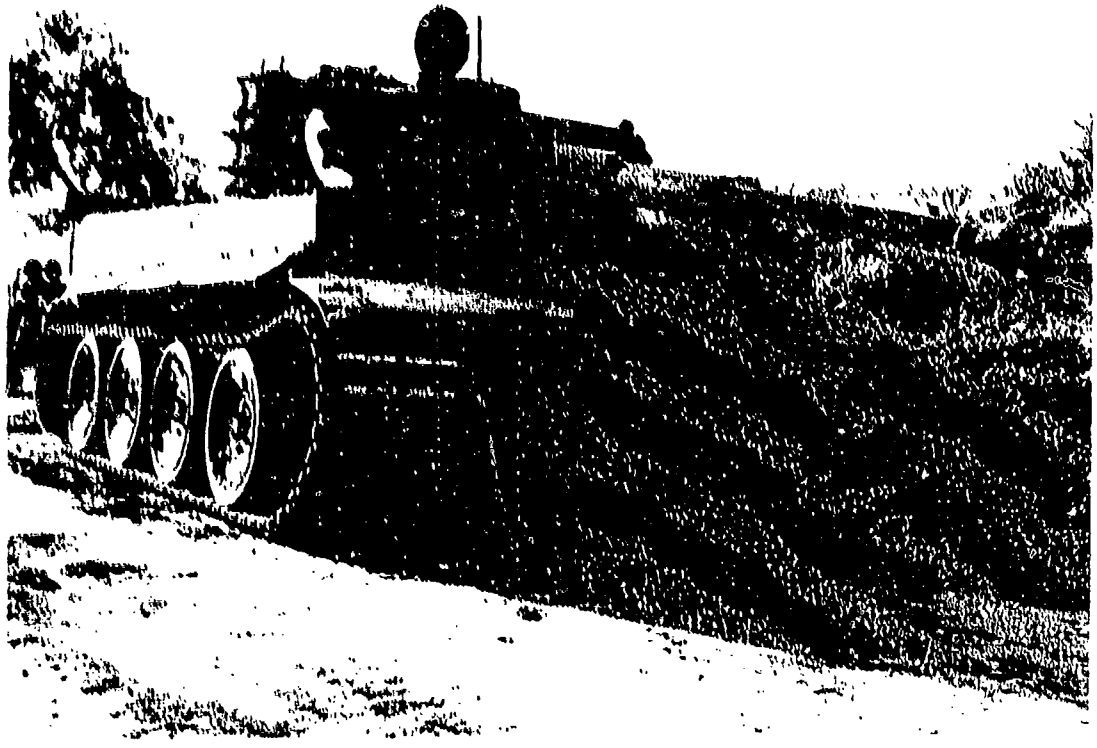


(U.S. Army Photo SC182060)

Photo 9. Damaged Italian light tank, one of 60 which counterattacked the 1st Infantry Division at Gela, Sicily. Five-inch gunfire from U.S. destroyers SHUBRICK and JEFFERS damaged several tanks and stripped them of essential supporting infantry, engineers, and artillery.

(U.S. Army Photo SC181089)

Photo 10. Destroyed German Mark IV, one of 90 tanks composing the Hermann Goering Panzer Grenadier Division which counterattacked the 1st Army Division at Gela, Sicily.



(U.S. Army Photo SC175669)

Photo 11. Damaged German Tiger Tank, one of 17 attached to the Hermann Goering Division.

SALERNO

The landing at Salerno on 9 September 1943, following closely on the heels of the capture of Sicily, demonstrates the contribution of naval guns against infantry and armored counterattacks on a grander scale. Armored reserves amounting to four Panzer divisions, with 600 tanks and armored vehicles, together with supporting infantry and artillery, were thrown into the fight to drive the Allied invasion into the sea. In addition, a Panzer Grenadier Division had occupied defensive positions in the landing area 48 hours before the Allied assault. Consequently, the assault forces were to encounter stubborn resistance at the beaches, as well as heavy counterattacks after the landing.

The Allied plan of attack called for simultaneous landing of two U.S. and two British divisions of General Clark's 5th Army under cover of darkness in order to achieve surprise. Gunfire support was to come from the veterans PHILADELPHIA, SAVANNAH, and BROOKLYN that had distinquished themselves at Sicily. Support for the British landing was more powerful; a heavy cruiser division with 8-inch guns was assigned, together with a HUNT-class destroyer employing 4.7-inch guns.

By the night of D plus 1, a precarious foothold had been carved out, but important inland objectives for securing the beach had not been seized, and a dangerous 7-mile gap between U.S. and British forces lay open for exploitation by the Germans. However, the effectiveness of the naval guns led the German Commander, General Vietinghoff, to request that Luft Flotte attacks be concentrated on the naval fire-support ships. Their elimination was considered the prime prerequisite for repelling the Allied invasion.

During the morning of 13 September, General Vietinghoff discovered the massive gap between the British and American forces, which he interpreted as an intention of the assault forces to withdraw from the beachhead. Other evidence reinforced this conviction. Sensing victory, his objective changed from simply driving the invaders off the beach to one of total annihilation. By this time, the depleted 29th Panzer Division, which had borne the brunt of the Allied assault, was being reinforced by elements of four additional Panzer divisions that had been ordered up to contain the beachhead. These forces were brigaded in two Panzer corps. In essence, the German command had achieved parity, if not superiority, over the four Allied divisions.

On 14 September, German armored infantry counterattacks were launched with elements of five Panzer divisions, although they were somewhat depleted by casualties. However, these attacks were successively beaten off by a combination of firepower, including effective assistance by the naval guns of cruisers and destroyers.

The fog of war prevents a precise assessment of the role of the naval guns in beating off the armored counterattacks. The varied assortment of firepower simultaneously brought to bear on the counterattacking forces makes

it impossible to sort out the individual effects. Here again, we fall back on the testimony of the Germans themselves who clarified the record. Of the 14 September assault, General Vietinghoff wrote:

> The attack this morning pushed on into stiffened resistance but above all the advancing troops had to endure the most severe heavy fire that had hitherto been experienced; the naval gunfire from at least 16 to 18 battleships, cruisers and large destroyers lying in the roadstead. With astonishing precision and freedom of maneuver, these ships shot at every recognized target with very overwhelming effect.[13]

Early on the morning of 15 September, Field Marshall Kesslering, in overall command, remarked to Vietinghoff during a conference that the counter-attacking Panzers seemed to be reverting to positional warfare. He warned:

> This must not happen. If attacks on the level ground of the Salerno plain were impractical because of Allied air and naval bombardment perhaps the Panzers could attack further south....[14]

General Herr, Commander of the LXXVI Panzer Corps, thought not as he stated that Allied naval fire made it doubtful that he could ever reach the coast.

That same night Vietinghoff recommended to Kesslering that the German forces be withdrawn to the north. In his recommendation he stated:

> The fact that the attacks which have been prepared fully and carried out with spirit, especially by the XIV Panzer corps, were unable to reach their objective owing to the fire from naval guns and low flying aircraft makes withdrawal imperative.[15]

NORMANDY

As we have seen, German strategy for the defense of Fortress Europe was based on pinning the Allied invasion to the beaches with obstacles and strongpoints until infantry and armored reserves could counterattack and drive the Allies into the sea. However, General von Rundstedt was aware that German armored counterattacks on Sicily and at Salerno had been blunted by naval guns. He had pointed out to the Supreme Headquarters that armor would not be able to carry out its counterattack mission unless the heavy ships were neutralized by German coastal artillery, aircraft, and submarines. As stated previously, these countermeasures failed to materialize. Fire-support ships were able to carry out their missions without interference.

Nevertheless, the effectiveness of the naval guns against infantry and armored counterattacks, which involved up to 10 Panzer divisions by D plus 30 days, came as a distinct shock to the German High Command. ARKANSAS, TEXAS,

and NEVADA, together with several heavy cruisers took tanks and infantry counterattacks under fire on numerous occasions. This support continued until D plus 9 days when U.S. forces advanced beyond the range of the heavy naval guns. In the British zone of action, where the bulk of German armor was concentrated, guns of British battleships and cruisers took tanks under fire until D plus 41 days.

The variety of firepower directed against German armor makes a precise assessment of the contribution of naval guns difficult. Here again, we must fall back on the evidence of the Germans themselves. As early as D plus 4 days, both Generals Rommel and von Rundstedt agreed that the success of any counterattack was jeopardized by Allied air and naval guns. They reported to Supreme Headquarters that:

> The guns of most enemy warships have so powerful an effect on areas within their range that any advance into this zone dominated by fire from the sea is impossible.[16]

In a subsequent meeting with Hitler in France on 17 June, Rommel and von Rundstedt met to discuss the deteriorating military position and measures to be taken. Hitler himself was so impressed with the impact of the Allied heavy guns that he caused a message to be sent to Admiral Doenitz, the German Naval Commander in Chief that stated:

> The Fuehrer considers the only possible way to ease the situation on land was to eliminate or neutralize the enemies naval forces, particularly his battleships.

On 29 June, General Hauser, Commander of the I and II Panzer Corps, reported that a Panzer counterattack:

> ...was scheduled to begin at seven o'clock in the morning but hardly had the tanks assembled when they were attacked by fighter-bombers. This disrupted the troops so much that the attack did not start again until two-thirty in the afternoon. But even then it could not get going. The murderous fire from naval guns in the Channel and the terrible British artillery destroyed the bulk of our attacking force in its assembly area. The few tanks that did manage to go forward were easily stopped by British anti-tank guns.[17]

On the following day, Army commanders under Rommel and von Rundstedt demanded an immediate evacuation of the "killing ground" of Caen, where most of the Panzers were concentrated, and a retirement to a new line beyond the range of naval guns that were causing appalling casualties and disruption in the assembly areas. Rommel passed this appreciation to von Rundstedt, and it was later forwarded to Hitler with von Rundstedt's endorsement. Hitler's reply was brief and to the point:

> The present positions are to be held; further breakthrough by the enemy will be prevented by tenacious defense or by local counter-attacks; assembly of armor will continue.[18]

But this was to no avail, as the heavy naval guns continued to support the British until D plus 41 days when the forces advanced beyond the range of the bombarding ships.

If the number of burning and gutted tanks were the sole criterion for measuring success of the naval guns against armor, the criterion adopted today in analytical circles, then it is unlikely that the realistic Germans would have credited naval guns with much effectiveness. Why, then, did the German commanders single out the naval guns as a major factor in the defeat of their armored counterattacks? The answer is simple enough. While the guns did destroy some individual tanks, the major effect was against the components of the armored weapons system; i.e., the accompanying infantry, artillery, and engineers. Attacking tanks were often stripped of vital support of these components; communications were sometimes disrupted; indirect effects of smoke and dust, as in the Salerno plain, blinded tanks so that cohesion was lost and momentum was slowed. Tanks in assembly areas, in the process of being rearmed and refueled, were particularly vulnerable. In short, weapons systems vulnerability accounts for the major success of the naval guns against armor.

In addition to contributing to the defeat of German armor, the naval guns added weight and lethality to the field artillery support of U.S. attacks to expand the beachheads in Normandy. The heavy guns played an important role in the support of U.S. attacks against German defensive positions in the stone hamlets and villages which characterized the Normandy countryside.

CENTRAL PACIFIC

In the Central Pacific, Japanese armor was never a significant factor because the Japanese had a limited inventory of tanks that were deficient in armor and armament. Japanese defensive strategy was based on infantry counterattack, the so-called banzai charge, at least through the Marianas campaign on Saipan, Guam, and Tinian in June and July 1944. These infantry counterattacks were broken up by a combination of firepower, including naval guns. Since these attacks were launched mostly during darkness, illumination fire by destroyers was of particular importance.

After the Marianas, the Japanese abandoned a counterattack strategy for one of simple attrition of U.S. forces through construction of a series of hard defensive positions that were to be defended to the death. Counterattacks larger than a squad were strictly proscribed. The hard nature of the pillboxes and covered emplacements that characterized Japanese inland defenses at Iwo Jima and Okinawa made them impervious to light artillery and 5-inch

guns. The 8-inch artillery and 8- and 16-inch naval guns of the heavy cruisers and battleships were essential for destruction. However, the naval guns were seldom able to engage these defenses at short range employing pointer fire, a requisite for accuracy, because of inland target location, lack of visibility due to smoke and dust raised by friendly firepower, and because friendly forces were engaging the defenses at ranges so close that they would be endangered by this type of fire from heavy naval guns. Occasionally, defenses near the coast could be engaged at short range by heavy guns, but for the most part the task of eliminating these defenses depended on the infantrymen, using grenades, portable flamethrowers, demolitions, and bayonets, with occasional support from tank guns and tank flamethrowers. The Japanese attrition strategy was indeed costly, if not successful. For example, in the 26-day campaign on Iwo Jima, 5000 marines were killed and about 17,000 wounded--one casuality for every Japanese defender.

KOREA

In Korea, naval guns were vital elements in power projection. Over a million rounds were fired at a variety of targets ranging from coastal defense batteries to ox carts, bunkers to locomotive and rail cars, and artillery positions to sampans. The 5-inch guns of a few destroyers destroyed vital enemy defenses at Inchon, enabling the marines to land with minimum casualties. The heavy guns of cruisers supported the capture of Seoul. Cruiser and destroyer fire extricated the 3d Republic of Korea (ROK) Division from certain destruction by two North Korean divisions at Pohang on the east coast in the early days of the battle for the Pusan perimeter. At Hungnam, MISSOURI, heavy cruisers ROCHESTER, LOS ANGELES, and SAINT PAUL, and destroyers covered the evacuation of the 10th Corps under pressure from Chinese communist forces. Naval guns lent credibility to amphibious demonstrations and supported a myriad of commando raids on North Korean island and coastal positions, serving to tie down significant communist ground force reserves to counter potential landings. Destroyer guns provided the artillery for the 30-month seige of Wonsan on the east coast.

Support of ground forces on the coastal flanks was continuous and important. The I ROK Corps, which held the seaward flank on the Pusan perimeter, was deficient in artillery, and major-caliber guns of the heavy cruisers (and occasionally the battleships) compensated for this deficiency and played a decisive role in the defeat of communist counterattacks.

Further inland, the 1st Marine Division received vital major-caliber support that engaged bunkers, artillery positions, and command posts on reverse slopes, which were either inaccessible to or beyond the destructive capabilities of field artillery. On the west coast, where hydrographic conditions were less favorable for coastal support, British destroyers and frigates, occasionally

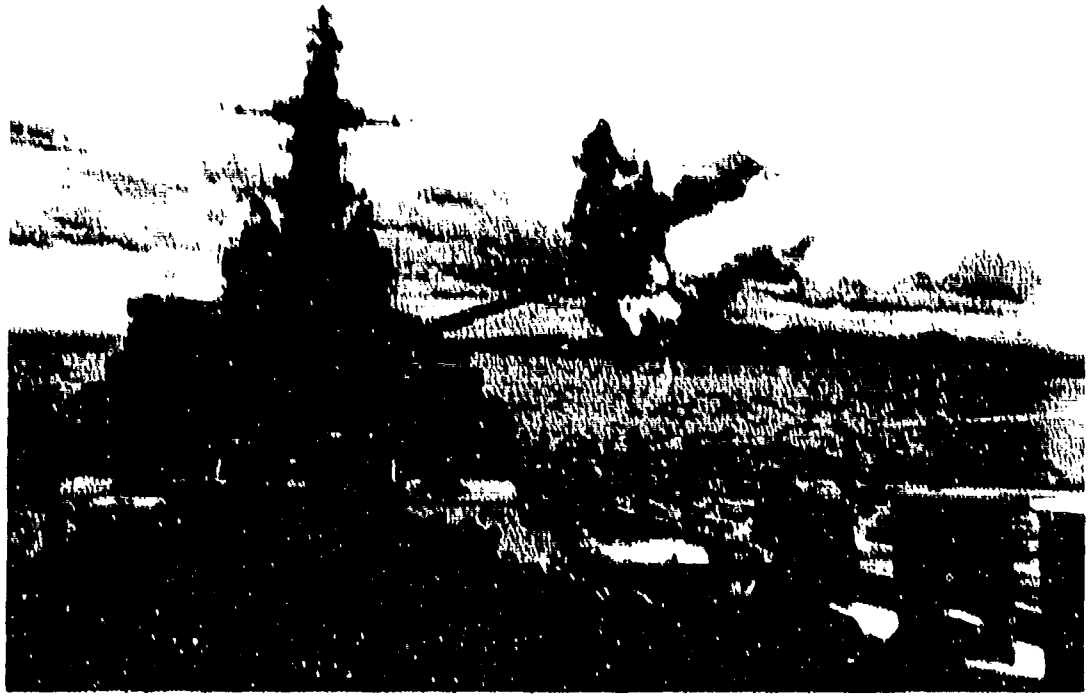


Photo 12. MISSOURI, one of four fast battleships deployed in support of Korean operations, engaged in interdiction against east-coast railroad bridges. Battleships also supported Korean operations by attacking coastal defense batteries, communist bunkers, emplacements, and troop formations.

supplemented by the heavy guns of a battleship, thwarted communist attempts to gain positions adjacent to Seoul during truce negotiations.

Finally, the heavy naval guns, in concert with air support, reduced the logistics capabilities of the east-coast rail net from 3000 tons per day to about 500 tons, and on occasion to zero. While the overall interdiction campaign failed to deprive the communist ground forces of essential resources necessary to sustain combat, nevertheless they were forced to shift dependence to truck transport. The success of the naval guns against the east-coast rail net forced the communists to attempt to counter the interdiction effort by emplacement of an unprecedented level of coastal defense batteries and mortars reaching the impressive total of 1500 by mid 1952.

VIETNAM

As in World War II and Korea, absolute control of the sea and air environment in Vietnam created ideal conditions for a maritime strategy and the projection of sea power ashore. However, unlike World War II and the first year of the war in Korea, domestic political constraints on full employment of a maritime strategy against the North Vietnam sanctuary limited the potential of sea-power projections, although carrier air support played a major role in the interdiction campaign against North Vietnam. Amphibious landings north of the DMZ, on the model of Inchon, were proscribed; even the limited exercise of the amphibious capabilities in the form of raids and sorties against communist targets in the North were excluded. While beyond the charter of this discussion, it is interesting to speculate the impact of a vigorous offensive use of the amphibious weapons system against North Vietnam. Certainly it would have forced the communists to meet such a threat by extensive deployment of North Vietnamese regular forces for protection of their resources and for isolation of their population from the fact of their military weaknesses to counter such a threat. Neutralization of North Vietnamese regular forces in static defense of their long coastline could have meant a far smaller deployment of these forces south of the DMZ, with significant impact on the war.

The decision to avoid the imposition of a blockade on North Vietnam's coastline and port complexes on the Korean model, until too late, was also politically motivated and a further factor in limiting the advantages of sea control inherent in the environment.

The unconventional nature of the Vietnam War was dictated by the political and military strategies of the North Vietnamese. The political objective was to prolong the conflict with the conviction that U.S. domestic opinion would force military withdrawal. The military objective in support of the political aim was to avoid confrontation with the militarily superior U.S. ground forces and their South Vietnamese allies. Instead, the communists sought weaknesses in the political and military environment. Military targets were the South

Vietnamese village defenders, the Regional, Popular, and Peoples Self-Defense Forces; small troop and supply movements. Only during the TET offensive and in limited operations south of the DMZ did major North Vietnamese regular forces challenge U.S. and South Vietnamese forces in conventional combat. The attempt to duplicate their political and military victory against the French at Dien Bien Phu was repeated with the siege of Khesan, which was broken by the application of massive air and artillery firepower. Only after their political objective of forcing a U.S. withdrawal had been achieved did they mount significant attacks with their regular formations, with tragic results for South Vietnam.

Political limitations on sea-power projection and the characteristics of the guerilla war circumscribed the contribution of naval guns in Vietnam. The few amphibious landings that took place south of the DMZ were limited to battalion size, conducted by seaborne Special Landing Force, part of the Amphibious Forces, 7th Fleet, in conjunction with ground operations of forces of the Marine Amphibious Force in I Corps. Since these landings were not made against hostile beach opposition, and since surprise was a fundamental requirement for success, beach neutralization fires were not essential. Support was limited to fires on targets of opportunity, after the landing had been made, in response to requests from the shore fire-control parties of the supported infantry battalion.

Unlike World War II and Korea, where opposing forces were in almost continuous contact across a broad front, battlefield contact in Vietnam was intermittent and limited to small forces for short periods of time. Consequently, the employment of naval guns was limited in duration and scope; few opportunities arose for the delivery of fires in support of an attack, or conversely, support against massed infantry in a counterattacking role. This is not to degrade the utility of support delivered on occasion when infantry elements were effectively supported by fires on targets of opportunity. One of the few exceptions to this general rule was the 8-inch-gun support of operations to drive the communists from Hue after the TET offensive had overrun that city.

On the other hand, the fleeting nature and small size of communist targets, coupled with the difficulties of target acquisition, placed a heavy premium on harassing and interdiction fires; i.e., fires directed at areas in which communist activity was suspected or those in which U.S. forces desired to inhibit communist activity. Records indicate that about 40 percent of the fires from the 5"/54 and about 35 percent of 5"/38 and 8"/55 were of this type.

North of the DMZ, surface combatant operations were but a pale imitation of those off the east coast of Korea, being limited to a few destroyers and normally one heavy ship, either SAINT PAUL or NEWPORT NEWS. After NEW JERSEY's deployment, most of her targets lay north of the DMZ. As in Korea, effective performance was dependent on air surveillance. Targets were generally similar to those encountered in Korea, since the North Vietnamese resembled their Chinese comrades in their proclivity for mole-like activities.

Covered personnel shelters (the so called "bunkers"), some coastal artillery, and an occasional bridge and waterborne logistic craft were hard point targets, while targets consisting of logistic storage sites, truck parks, and an occasional troop movement comprised the soft area targets. It bears repeating that at no time did the interdiction effort of the heavy ships remotely resemble that conducted against the east-coast rail net in Korea.

Limitations on the employment of naval guns, the unchanged nature of gun armament of surface combatants, and the similarity of targets with those encountered in World War II and Korea limit the utility of the Vietnam experience from the standpoint of naval gunfire support. Only the 5"/54 represented change and progress in gun armament, and this only from the standpoint of increased range, since accuracy and lethality were similar to that of the 5"/38. The deployment of the NEW JERSEY shed no new light on the range, accuracy, lethality, and effectiveness of the major-caliber naval guns that had not already been garnered from the deployment of the four fast battleships of the World War II era in the Korean "Police Action."

Vietnam reinforces conclusions drawn from Korea, with respect to target types, range, lethality, and accuracy requirements for the heavy naval guns. Specifically, data derived from firings of the 16"/50 guns of NEW JERSEY, 8"/55 guns of heavy cruisers, and 5"/54s of destroyers indicated that:

1. Most of 16- and 8-inch gunfire was directed at hard point targets for purposes of destruction.

2. Most of the 16-inch-gun missions were fired at ranges beyond 8-inch-gun capabilities; i.e., beyond 32,000 yards.

3. About one quarter of 8-inch-gun missions were fired at ranges beyond 5"/54 capabilities; i.e., beyond 26,000 yards.

4. The 5"/54 projectiles lacked the essential lethality to defeat typical hard point targets.

5. Ammunition expenditure (for destruction) by 8- and 16-inch guns was comparable to that expended against similar targets in Korea.

6. Most 5"/54 missions were against soft area targets. Most of these missions were dedicated to harassment and interdiction.*

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* Precise data are omitted in order to avoid classification of this paper. The general conclusions outlined above can be verified from precise data in such references as CINCPACFLT Staff Study 3-69, entitled "Main battery missions of NEW JERSEY, two 8-inch cruisers, and one 5-54 destroyer."

CURRENT NAVAL GUNFIRE SUPPORT CAPABILITIES

The current active naval gunfire capability of the U.S. Navy is confined to one modern gun system, the 5"/54. The 5"/38 gun system is in the process of being phased out of the active Fleet inventory. The 5"/54 system, either the MK 42 MOD 10 or the MK 45 MOD 0, is installed in most active ships, including missile cruisers (CGNs), destroyers (DDGs and DDs), most frigates (PFs), as well as carriers (CVAs and CVNs) and helicopter landing ships (LHAs). Most of the 5"/38 gun systems are mounted in GEARING-class destroyers and some frigates. Veterans of World War II, Korea, and Vietnam, the powerful fast battleships IOWA, MISSOURI, NEW JERSEY, and WISCONSIN, together with five 8-inch heavy cruisers, remain in the Atlantic and Pacific reserve fleets. Table 1 shows characteristics of the 5"/54 gun system.

Table 1. Characteristics of 5"/54 gun system *

Projectile	Range (yd)	Muzzle Velocity (ft/sec)	HE Content (lb)	Fuzes	Dispersion, CEP (yd/yd)	Penetration (Concrete)	Rate of Fire (rd/min)	Magazine Capability
MK 25	26,000	2650	7-3/4	PD	120/ 12,700	2 ft	20-MK 45 Mod 0	20 Ready Service Rd
				VTF	180/ 24,000		35-MK 42 Mod 10	
				MTF				599 Rd/ Mount
Rocket Asst. Projectile	34,000	2650	3-1/2					
New Conventional	30,000	2650	6					

* MK 42 MOD 10 interfaces with MK 68 MOD 11 FCS;
MK 45 MOD 0 interfaces with MK 86 FCS (LHA and DD 963).

The 8"/55 MCLWG system is a candidate for entry into the naval gun inventory. Since the capabilities of this weapons system are classified, they are discussed only in general terms. General characteristics of the 8"/55 MCLWG are as follows:

1. Range. About one and one-half times the effective range of the 5"/54 gun system with the current projectile. With improved ammunition, both ballistic and guided, about twice the range of the 5"/54.

2. Lethality. Greater high-explosive content produces about four times the penetration and about six times the fragmentation and blast of the 5"/54

projectile. Greater projectile volume also provides for more growth and diversification of deliverable ordnance and allows incorporation of new technology, such as subcaliber munitions.

3. Accuracy. Through the use of both infrared and semiactive laser systems, targets can be illuminated by ship, aircraft, or shore-based laser illuminators, thereby eliminating inaccuracies inherent in ballistic projectiles.

FUTURE NAVAL GUN REQUIREMENTS

If one possessed the gift of prophecy, an estimate of future firepower requirements for the naval inventory would be simple enough. Unfortunately, experience indicates that the record for prediction has been less than brilliant. The scenario, as a device for predicting future combat environments, has been virtually useless. No one in the political or military hierachy had foresight enough to put together scenarios which predicted wars in Korea and Vietnam. However, this lack of insight has not inhibited many political and military leaders from confidently affirming that there is no future requirement for projection of sea power ashore; no requirement for amphibious assault operations against a first-class military power.

Numerous factors contribute to this shortsighted attitude. The abortive Vietnam experience, which rejected an offensive maritime strategy against the seat of communist military power in the north (except for employment of carrier air), has soured a substantial portion of political, domestic, and even military elites on the utility of military power as an instrument of national policy. The nuclear stalemate reinforces this attitude, convincing many that limited war with limited objectives is not a viable strategy, because of the possibility of escalating conventional combat to a nuclear exchange; that the primary military role is deterrence, not fighting.

Fortunately, the naval mission of controlling the seas is still viewed as essential to the security of the United States. In this context, the requirement for increased gun power can be justified. One need not be an expert in naval warfare to recognize the dangerous gap in the Fleet's offensive capability between TOMAHAWK, HARPOON, and the airplane on the one hand and the 5"/54 gun on the other. The range, lethality, and accuracy potential of the 8"/55 MCLWG would go a long way in filling this void. In short, the requirement for the 8"/55 can be justified solely on the merits of its contribution to control of the seas, the fundamental requirernent for effective naval power.

Returning to consideration of the mission of power projection, no one will be able to prove or disprove a future requirement for forcible entry on a hostile shore defended by a first-class military power. The question then is should the United States deliberately deny itself such a capability? Is it in our best interest to ensure this capability as part of the General Purpose

Forces? Apparently, the United States has decided to retain this capability, if one is to judge by the fact that amphibious assault troop sea lift is part of the General Purpose Force inventory. This being so, common sense dictates that the essential fire-support capabilities should be added to the inventory to round out the amphibious assault capability. This viewpoint is reinforced by the fact that the qualitative capabilities of firepower inherent in the 8"/55 MCLWG can be acquired at such a modest price. The costs of this 40-unit gun system are estimated at about $720 million.

Assuming that the U.S. political and military leadership discreetly chooses to maintain an amphibious assault capability for use against a first-class power, what can be said regarding the qualitative requirements for fire support?

Several caveats are apparent in such a discussion. First, it is obvious that the capabilities of the carrier-based (and in some environments land-based) aircraft weapons systems must be considered along with naval guns. Indeed it is probable, because of all too obvious quantitive limitations on surface combatants in general and the naval gun inventory in particular, that aircraft will have to shoulder a larger share of the fire-support burden than in World War II and Korea. For example, in World War II and to some extent in Korea, naval guns furnished flak suppression to assist aircraft in executing their attack missions. In the future, because of the thin-skinned nature of surface combatants and the threat of long-range hostile surface-to-surface missiles in a coastal defense role, aircraft may have to suppress missile batteries in order to permit surface combatants to close the range and carry out destruction and neutralization missions with naval guns. In any case, it is apparent that aircraft weapons systems suffer from inherent limitations, such as lack of an all-weather 24-hour support capability, a significant response time, and a lack of lethality essential for destruction of hard targets. In short, aircraft cannot shoulder the full burden of fire support; the unique qualifications of naval guns remain essential to amphibious assault operations.

The second caveat in the discussion of future requirements is that such analysis must be qualitative in nature. Because of time limitation, quantitative requirements are beyond the scope of this paper, and the development of numerical requirements must be left to a more in-depth analysis. Accordingly, this study is limited to qualitative requirements for support of amphibious assault operations and to the question of the adequacy of the current 5"/54 gun system and the projected 8"/55 MCLWG system to satisfy these qualitative requirements.

POSTULATED STRATEGIC ENVIRONMENT

Qualitative requirements for naval gun systems are based on a worst-case combat environment. Requirements in a less-rigorous combat situation can be subsumed therein. Specifically, the strategic environment postulated assumes that:

1. The objective area is defended by a first-class military power with modern weaponry.

2. The amphibious objective area is on a large land mass.

3. The hostile power strategy is based on a combination of beach defenses and obstacles designed to defeat or at least contain the amphibious assault forces until reserves can counterattack and defeat the assault forces; a strategy similar to that adopted by the Germans in defense of Fortress Europe in World War II.

4. The necessity for surprise will rule out pre-D-day operations by naval guns, again analagous to the Normandy invasion.

In this environment, the seaward approaches to the objective will be defended by a combination of surface-to-surface missiles and coastal defense guns and mines. The beach defenses will be organized around a system of obstacles, blockhouses, and pillboxes; supported by mortar, field, and coastal artillery and surface-to-surface missiles; backed by local and general reserves, consisting of infantry, armor, and mechanized infantry. Potential helicopter landing sites will be defended at least by artillery, missiles, and antiaircraft missiles and guns, again backed by local and general reserves. Finally, it can be expected that the characteristic affinity of the Japanese, Chinese, Koreans, and Vietnamese for camouflage and for organization and construction of hard defenses will be duplicated.

Range Requirements

Range requirements for future gun systems will be dictated by hydrography of the amphibious objective area, positioning of minefields, location of enemy coastal gun and missile systems covering seaward approaches, battery positions of hostile field artillery and missiles covering the landing beaches, assembly areas of hostile reserves (infantry, armored, and mechanized units), and location of helicopter landing zones.

Hydrography

Destroyer types used in the fire-support role will generally operate outside of the 6-fathom curve for navigational safety. The location of the 6-fathom curve, with respect to the shoreline, will vary, depending on the hydrographic characteristics. However, in a generalized strategic environment, a reasonable assumption would place the 6-fathom curve from 5000 to 10,000 yards offshore, thereby degrading useful gun range. The location of minefields may force fire-support ships further offshore, thereby further reducing gun range.

Location of Hostile Field Artillery and Missiles

The thin-skinned characteristic of surface combatants will make them vulnerable to damage from hostile coastal defense and missile batteries covering fire-support areas. This hazard will probably force fire-support ships to operate beyond or at maximum gun range, at least until this threat has been brought under control. In this connection, hostile coastal defense guns could have ranges up to 30,000 yards, while surface-to-surface missile batteries located inland to reduce their vulnerability might be expected to have ranges on the order of 39,000 to 98,000 yards. As previously mentioned, this may dictate their engagement by carrier aircraft, since even the 8"/55 MCLWG will not possess the required range capability to strike targets this deep. It is presumed that the limited number of HARPOON missiles will reduce their employment in counterbattery missions.

Current field artillery has a maximum range of about 33,000 yards. In the future, it is probable that ranges will be increased. Normally, such field guns would be positioned about two-thirds to three-quarters of their effective range from the landing beach areas (i.e., from 22,000 to 24,600 yards) to ensure maximum lateral beach coverage and continuity of operations. Unguided missiles now have range capabilities of 76,500 yards. As in the case of field guns, these rocket batteries can be expected to be positioned on the order of 54,700 yards from the potential landing areas.

Location of Local and General Reserve Assembly Areas

Local reserves will usually occupy assembly positions within 20,000 yards of the defended beach areas. However, general reserves, particularly armor and mechanized units, will be positioned in assembly areas adjacent to a communications network to facilitate rapid counterattack. Generally, such locations might be expected on the order of 10 to 50 miles inland, depending on the lateral coverage of potential landing sites required and the characteristics of the terrain and road net.

Location of Helicopter Landing Zones

Potential landing zones may be located up to 50 nautical miles from the beach line. Practically speaking, it is probable that such landing zones would have to be located within the envelope of the naval guns to ensure essential fire support.

CONCLUSIONS

Range

Potential future combat settings will demand increased gun ranges, compared with past combat environments. Most hostile targets, including beach defenses, local reserves, field artillery, and mortars, will normally be positioned within 25,000 yards of the landing beaches. General reserves of infantry, armor, and mechanized forces, together with surface-to-surface missile batteries with ranges on the order of 39,000 to 98,000 yards and potential helicopter landing zones, could be located up to 50 miles inland. As a result, it is obvious that the range capability of the 5"/54 gun system, even with the development of an improved conventional projectile with a 30,000-yard capability, cannot satisfy requirements for engaging most of the target array. Even the increased range potential of the 8"/55 MCLWG (over 40,000 yards) cannot satisfy all range requirements. This limitation may dictate the exploitation of sabot-type projectiles similar to Gunfighter, which has demonstrated range capabilities on the order of 65,000 yards.

Lethality for Hard Point Targets

As in past combat environments, hard targets in the form of blockhouses, pillboxes, covered artillery emplacements, and individual tanks will be encountered in future amphibious assault operations. Combat experience has demonstrated the inadequacy of 5-inch projectiles to penetrate and defeat such hard targets. Conversely, the 8-inch projectile, either conventionally loaded or in an improved conventional munition configuration, can satisfy future lethality requirements. The conventional projectile can penetrate 5 to 8 feet of reinforced concrete, while each of the some 150 or more bomblets in an improved conventional munition projectile can penetrate 2 inches of armor, which is adequate to defeat horizontal armor located over a tank engine or the side and horizontal armor of a modern armored personnel carrier. Lethality of the 8-inch projectile could be exponentially enhanced by FAE loading.

Accuracy

The requirement for tactical support in future amphibious assault operations against a first-class power defending a large land mass with multiple landing areas will rule out preliminary operations analagous to those conducted in the Central Pacific campaign during World War II. This will limit the time for destruction of targets to that available on D day prior to H hour. As a further complication, the small number of available gun barrels for support of the amphibious assault will be put a premium on accuracy. The guidance potential inherent in laser and IR development for the 8-inch projectile should contribute significantly to gun accuracy, with consequent reduction in both time and ammunition expenditure required for target destruction.

NAVAL DOCTRINE LEADING INTO WORLD WAR II

The Navy and the Marine Corps entered World War II with a doctrine for employing naval guns set forth in Fleet Training Publication 167 for amphibious war. It had been compiled in the mid-thirties by the staff of Marine Corps Schools with the assistance of the resident naval officer, and doctrine was based on three principles:

1. The Assumed Vulnerability of Combat Ships to Air and Submarine Attack. This hazard would limit the duration of exposure to the threat and would confine gunfire support to the minimum necessary to establish the landing force ashore.

2. The Possibility of Fleet Surface Action. This contingency would require that a high percentage of ammunition be retained for surface action and would limit expenditures in shore bombardment.

3. The Vulnerability of Ships to Coastal Defense Batteries. The notion that "A ship's a fool to fight a fort," advanced by Admiral Nelson, undersigned by experience at Gallipoli, was firmly held. This meant that a ship could not stand within range of shore batteries and effectively engage without encountering the risk of being sunk or seriously damaged. The maximum that could be achieved was short-term neutralization by ships firing at long range while maneuvering at high speeds.

CHARACTERISTICS OF GUN SYSTEMS ON WORLD WAR II SHIPS (Tables 2 and 3)*

NAVAL GUN INVENTORY

Strategic naval thinking between the two world wars was concentrated on the classic naval mission of control of the seas. The notion that the Navy might engage in operations for the projection of sea power ashore went unrecognized. The natural result of this pattern of strategic thinking was a complement of ships designed and armed for combat at sea. Fortunately, for strategic flexibility in World War II, the gun armament of U.S. battleships, cruisers, and destroyers was highly applicable to the role of gunfire support for amphibious operations.

After the Japanese attack on Pearl Harbor, the aircraft carrier became the backbone of the Fleet's offensive striking power. Battleships lost their pre-eminence, and, since the 21-knot battleship was incapable of steaming in

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* Table 4 gives the required rounds per hit for various ranges.

Table 2. Armament characteristics of World War II ships

Gun Armament	5"/38 FLETCHER-SUMNER GEARING	6"/47 BROOKLYN Class	8"/55 BALTIMORE Class	14"/50 TENNESSEE Class	16"/50 IOWA Class	5"/54 SPRUANCE Class
Range, maximum (yards)	18,200	26,100	32,000	42,500	42,345	26,000 (new conventional) 34,000 (RAP)
Velocity (feet per second)	2,600 (1,200 reduced)	3,000 (2,700 reduced)	2,700 (2,200 reduced)	2,900 (2,000 reduced)	2,500 (2,000 reduced)	2,650
Rate of Fire (RPGPM)	10	5	4	1	1	20--MK 45 MOD 0 (SPRUANCE Class) 35--MK 42 MOD 10 (other)
Circular Error Probable, CEP (yards) (4 probable errors)	90-120	120-190	185-600	225-600	235-600	120-180 (MK 25 projectiles)
Ammunition	AA common illuminating white phosphorus	High-capacity common illuminating white phosphorus	Armor-piercing high-capacity common	Armor-piercing high-capacity bombardment	Armor-piercing high-capacity	MK 25 Rocket-assisted submunition new conventional
Bursting Radius (yards)	40	HC--60	HC--90	180	200	MK 25--40 Submunition--100
Penetration, reinforced concrete (feet)	2	3-6	5-8	8-12	8-12	2
Magazine capacity	1400-1850-2100	3,750 3,800 (5"/38)	1,350-1,475 5,000 (5"/38)	1,335 10,000 (5"/38)	1,080 10,200 (5"/38)	20 ready service 599 rd/mount
Artillery, 105-mm projectile neutralization equivalent	1.3	2.0	3.3	6.2-11.5	7.6-14.9	

Table 3. Armament of surface combatants

Destroyers	
(BRISTOL, FLETCHER) (SUMNER, GEARING)	Four to six 5"/38
Light Cruisers	
(BROOKLYN)	Fifteen 6"/47 Eight 5"/38
Heavy Cruisers	
(BALTIMORE)	Nine 8"/55 Eight to twelve 5"/38
Battleships	
(NORTH DAKOTA) (TENNESSEE) (IOWA)	Eight or nine 16"/45 Twelve 14"/50 Nine 16"/50 Fifteen to twenty 5"/54
Destroyers	
(SPRUANCE)	Two 5"/54

company with the fast carriers, the heavy guns of the old battleships became available for the support of amphibious operations.

As the war progressed, an unprecedented level of new construction augmented the surface ship inventory. As a consequence, gunfire support was not limited by a shortage of surface combatant ships, except in the Mediterranean Theater. The adequacy of resources was highlighted in the Iwo Jima operation where the marines were supported by 10 battleships, 12 cruisers, and 55 destroyers.

In the later phases of the war, a few support ships, such as the Landing Ship Medium Rocket, equipped with automatic 5-inch spin-stabilized launchers, entered the inventory. Nevertheless, surface combatants continued as the backbone of fire support.

SYSTEM ACCURACY

Components influencing accuracy included:

1. Bombardment Chart. Combination of the terrain map and hydrographic chart.

2. Spotter. Accuracy in estimating bombardment-chart coordinates of selected target and correct target designation.

3. Navigation and Position Fixing. Dependent on accuracy of location of navigational points used to obtain ship position and on inherent limits of navigational techniques and equipment.

Table 4. Required rounds per hit for various ranges[19]

ROUNDS-PER-HIT TABLE
TO DETERMINE N, THE PROBABLE NUMBER OF
ROUNDS REQUIRED TO OBTAIN ONE HIT ON
TARGETS OF SPECIFIED SIZE, BASED ON
SINGLE-GUN ADJUSTMENT

Firing Range (yards)	Point Destructive Targets Presenting Primarily Vertical Area to the Estimated Line of Fire (Dimensions shown in yards, width × height)						Neutralization Targets Requiring Destructive Treatment, Presenting Primarily Horizontal Areas on Terrain Dimension in yards, width × depth. A height of 1 yard is assumed (this gives a greater effective depth).					
X X X X X X	3 × 3	6 × 3	3 × 6	6 × 4	10 × 4	15 × 5 × 30 deep	5 × 5	10 × 10	15 × 15	30 × 30	50 × 50	100 × 100
	List a	List b	List c	List d	List e	List f	List g	List h	List i	List j	List k	List l
3,000	14	7	9	6	4	2	20	9	6	4	2	2
4,000	25	12	14	9	6	3	31	13	8	5	2	2
5,000	34	17	19	14	9	4	44	17	10	7	3	2
6,000	48	25	25	19	12	5	58	22	12	8	3	2
7,000	68	37	36	29	17	6	85	30	16	10	3	2
8,000	100+	56	54	44	25	8	100+	42	22	14	4	2
9,000		92	83	67	45	10		64	33	21	5	2
10,000	↓	100+	100+	100	64	14	↓	94	48	29	6	2

List a

Small cave for light gun
Pillbox
AA radar installation
Searchlight
Searchlight control station
Rangefinder (AA)

List b

Cave for light defense gun
Tank in open
Half-track mounted gun
Truck
Light coast defense gun emplacement
Small blockhouse

List c

Search radar tower
AA fire control tower
Elevated fuel tanks
Observation tower
Searchlight tower

List d

Cave for medium defense gun
Medium blockhouse
Large permanent radar installation
Small fuel tank

List e

Medium coast defense gun emplacement
Large blockhouse

List f

Tandem C. D. gun emplacement
Missile launcher control station
Large artillery (200-mm)

List g

Light mortar posits
Machine gun posits

List h

Medium AA gun emplacement
Observation post

List i

Medium artillery gun emplacement
Heavy AA gun emplacement

List j

Light AA battery posit
Heavy artillery gun emplacement

List k

Medium AA battery
Ammunition dump area

List l

Medium artillery battery complete with radar & control stations

4. Net Weapons System. Net sum of ballistic dispersion, battery alignment, and elements of the fire-control system.

LETHALITY

Thin-walled projectiles (AA Common or HC) with large explosive content, combined with point-detonating or VT fuzing, were effective against typical soft targets such as infantry in the open or in trenches; crews of field, antiaircraft, and coastal defense artillery; fire-control installations; motor convoys; and logistic installations--in short, any target served by personnel who lacked overhead cover. Effective bursting radii ranged from 35 yards for 5-inch guns to about 200 yards for 16-inch guns.

VELOCITY AND RANGE

High muzzle velocities generated ranges considerably beyond that of comparable calibers of field artillery as shown below:

18,000 yards--5"/38 naval gun
26,000 yards--6"/47 naval gun
32,000 yards--8"/55 naval gun
12,000 yards--105-mm howitzer
17,000 yards--155-mm howitzer
25,000 yards--155-mm gun
18,500 yards--8-inch howitzer

RATES OF FIRES

A combination of characteristics of lethality, high rates of fire, and range maximized effectiveness against soft targets. The 5-inch armament of a destroyer could deliver the equivalent of one World War II 105-mm light artillery battalion (12 howitzers) in terms of volume and lethality. The fifteen 6-inch guns of a light cruiser could match two World War II battalions of 155-mm howitzers or guns, while the nine 8-inch guns of a heavy cruiser were the equal of 1.5 battalions of 8-inch howitzers. Field artillery had nothing in the inventory that could approach, let alone match, the 12-, 14-, and 16-inch guns on battleships. High muzzle velocities and resultant minimal vertical dispersion at ranges of 6000 yards and below, combined with the penetrating ability of 8-, 12-, 14-, and 16-inch guns against reinforced concrete, maximized destruction capabilities against point targets. These guns could penetrate from 8 to 30 feet of reinforced concrete at ranges of 6000 yards and were, therefore, capable of defeating any field fortification that might be or was encountered throughout the war.

TARGET SPECTRUM

Coastal defense, antiaircraft, and field artillery weapons systems, targets for the naval gun in all theaters, were characterized by common functions including:

1. Acquisition of targets--Coastal artillery used base-end stations and rangefinders; AA employed height finders, visual OP, radar; and field artillery relied on ground or aerial observers to perform the function.

2. Generation of firing data--Performed at fire-control stations.

3. Delivery of fire by gun batteries.

4. Adjustment of fire by ship-based, ground, or aerial observers--Ground and aerial observers performing these functions were linked to fire-control stations by wire or radio communications.

Varying levels of protection could be provided for these weapons systems. Coastal artillery guns and on-site ammunition storage, fire-control stations, and target-acquisition posts, being permanently fixed and with predetermined arcs of fire, could be heavily protected by elaborate concrete defense. On the other hand, field artillery, being mobile, was usually limited to hasty field fortifications, their extent being dependent on the time the position was occupied. However, the Japanese tended to sacrifice mobility for protection in the defense of small island positions. Single weapons were often protected by overhead cover with narrow openings which limited arcs of fire. Antiaircraft weapons, of course, could not be protected by overhead cover.

The effectiveness of these weapons systems could be degraded or nullified by damage or destruction of any element of the system--the target-acquisition station, fire-control center, magazines, the guns, the communications linking these components, and the personnel performing the various functions. In short, vulnerability was not restricted to the weapon alone. Disruption of any link in the chain could and did reduce or destroy effectiveness.

Tanks assigned to armored or mechanized divisional units share system characteristics with other weapons. They are incorporated in fighting units which contain engineer troops to remove road and terrain obstacles for the passage of vehicles, infantry to accompany the tanks to consolidate gains or to cooperate in attack of fixed positions, and artillery to furnish supporting fires against antitank weapons, tanks, and infantry. Logistic-support personnel are required to move fuel, ammunition, and other supplies.

In order to reach counterattacking positions against the amphibious attack, tanks advance in columns along roads, preferably on a broad front; engineer and infantry must accompany leading elements to reduce roadblocks, remove

mines, or eliminate defenses. Artillery may have to be pressed into service to break through stout defenses at bridges, defiles, and other terrain obstructions. Refueling and rearming operations are required in assembly areas before reaching final attacking positions; finally even when tanks deploy for attack, supporting infantry and artillery are normally required. It follows then that armored formations are weapons systems. Firepower can disrupt or halt attacks by depriving the tanks of engineer, infantry, artillery, and logistic support; consequently, firepower effectiveness does not depend on direct hits on individual tanks. Effectiveness can be reduced by successful engagement of any component of the armored division.

Infantry formations lacking armor protection are even more vulnerable to firepower. Components of an infantry division include engineer, artillery, logistic, and communication units which share the same vulnerability to firepower as their counterparts in armored formations.

Blockhouses, pillboxes, and covered artillery emplacements mounting machine guns, antitank, and antiboat weapons comprising the backbone of beach defenses are less susceptible to firepower because of their self-contained nature and decentralized mission. Consequently, their destruction requires direct hits, although their operations can be inhibited by smoke and dust.

The effectiveness of all weapons systems can be degraded by indirect effects of firepower; smoke and dust can blind operating personnel, while blast has physical effects. Tanks are particularily susceptible to smoke and dust when "buttoned up." Terrain hazards and targets can be obscured by smoke and dust to the point where tanks lose cohesion and direction.

The psychological impact of fire on operating personnel can levy heavy constraints on weapons system performance, the degree of which is dependent on the quality of the personnel and their morale and discipline.

WORLD WAR II

OPERATIONS IN THE MEDITERRANEAN THEATER—1943

Strategic Environment

The surrender of Axis forces in North Africa in May 1943 set the stage for the campaign in the Mediterranean. The impotence of the Italian Navy and the limited German naval resources posed a minimal threat to amphibious operations. The Italian Air Force was to be destroyed on the ground by Allied air attack, and the capitulation of Italy on the eve of the Salerno operation in September eliminated both air and naval forces from consideration. The German Air Force remained a significant threat in both the Sicily and Salerno

campaigns, particularly with the introduction of heavy guided bombs at Salerno that were used so effectively against fire-support ships and amphibious shipping. In neither campaign was Allied land-based air able to control the skies over the amphibious objective areas, even though British escort carriers were committed to assist in the Salerno operation. On Sicily, Italian ground forces were generally ineffective, with the exception of a few elite units.

Defensive strategy of Axis forces was dictated by the geography of the amphibious objectives and the inventory of military forces. The large land masses and numerous potential landing beaches, coupled with the small numbers in the military force inventory, limited the organization of beach defenses and coastal artillery positions and forced the Axis to depend on prompt counter-attack with infantry and armored reserves against Allied landings. Consequently, the major contribution of naval gunnery was to assist in the disruption of these counterattacks, although guns were directed against beach defenses and coastal artillery whenever the situation so required.

The strategic decision to commit the bulk of the U.S. Navy to the Pacific reduced the firepower resources for the support of amphibious operations in the Mediterranean. In the heavy-ship category, only one light cruiser division, made up of PHILADELPHIA, BOISE, SAVANNAH, and BROOKLYN, was assigned, together with up to eight BRISTOL-FLETCHER destroyers rotating out of the screen. However, these ships were to overcome their numerical limitations by their technical competence and professionalism, and, fortunately, their armament was well adapted to support landing forces.

The main limitation of the cruiser force was the obsolescence of spotting aircraft essential for maximum effectiveness. Their Scout Observation Curtis (SOC) float planes, with a top speed of 126 knots, were easy targets for German fighters, both at Sicily and Salerno, with the inevitable result that the light cruisers' potential suffered. It was only determination and sheer bravery on the part of the pilots that permitted these aircraft to function at all in their target-detection and spotting roles. This deficiency was finally overcome in the landing in Southern France, September 1944, with activation of a squadron of carrier-based aircraft (VOF), specifically trained in target detection ashore and in the adjustment of ships' fire.

British naval resources were more numerous and powerful. Eight-inch heavy cruisers, HUNT-class destroyers with 4.7-inch guns, and two monitors, each with two 15-inch guns, were employed to support British troops. During the crisis at Salerno, battleships were ordered forward but arrived too late to lend assistance.

The prewar doctrine for employment of naval guns against shore targets had already been modified by experience gained in the North African landings, November 1942, where success of the BROOKLYN against coastal batteries

had disproved "A ship's a fool to fight a fort."* The small number of Italian coastal batteries reinforced confidence in the ability of the naval guns. Instead of firing at long range while maneuvering at high speed, cruisers and destroyers were to close the beach, either lying to or steaming slowly, to maximize accuracy and lethality of their fire. The necessity to conserve ammunition for surface engagement was also eliminated since British covering forces could readily counter reaction from the weak Axis naval forces. Finally, instead of terminating naval gunfire support once field artillery had been landed, support was to continue as long as targets were within range.

Sicily Operation

Operation Husky, scheduled for 10 July 1943, was the second amphibious operation to be conducted in the European area following operation Torch in North Africa in late 1942. General George Patton's 7th Army, consisting of three divisions, was to land under cover of darkness on three beaches along a 40-mile coastal stretch of southern Sicily beaches (Figure 1).

H hour was scheduled during darkness in order to gain maximum surprise, as well as to limit the effectiveness of the coastal defenses. After all, the participating troops had no experience with naval gunfire support and lacked confidence in its ability to deal with beach defenses.** The 1st Infantry Division, landing in the center adjacent to the coastal town of Gela, was to absorb the mass of the Axis counterattacks, so discussion will be limited to the action of this unit. The beaches were defended by elements of an Italian coastal division, specially organized for beach defense and manning coastal defense artillery. These units were backed by armored and infantry reserves composed of three groups: an Italian group with light tanks, supporting infantry, and artillery; an Italian infantry division; and the powerful Hermann Goering Panzer Grenadier Division with over 100 tanks, supporting infantry, and artillery.

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* BROOKLYN made a direct hit on the fire-control range finder and one gun of a four-gun 138-mm battery. The French crews abandoned the remaining serviceable three guns.

** Lack of confidence in the capabilities of naval gunfire support on the part of the troop units with no previous experience was a characteristic constraint.

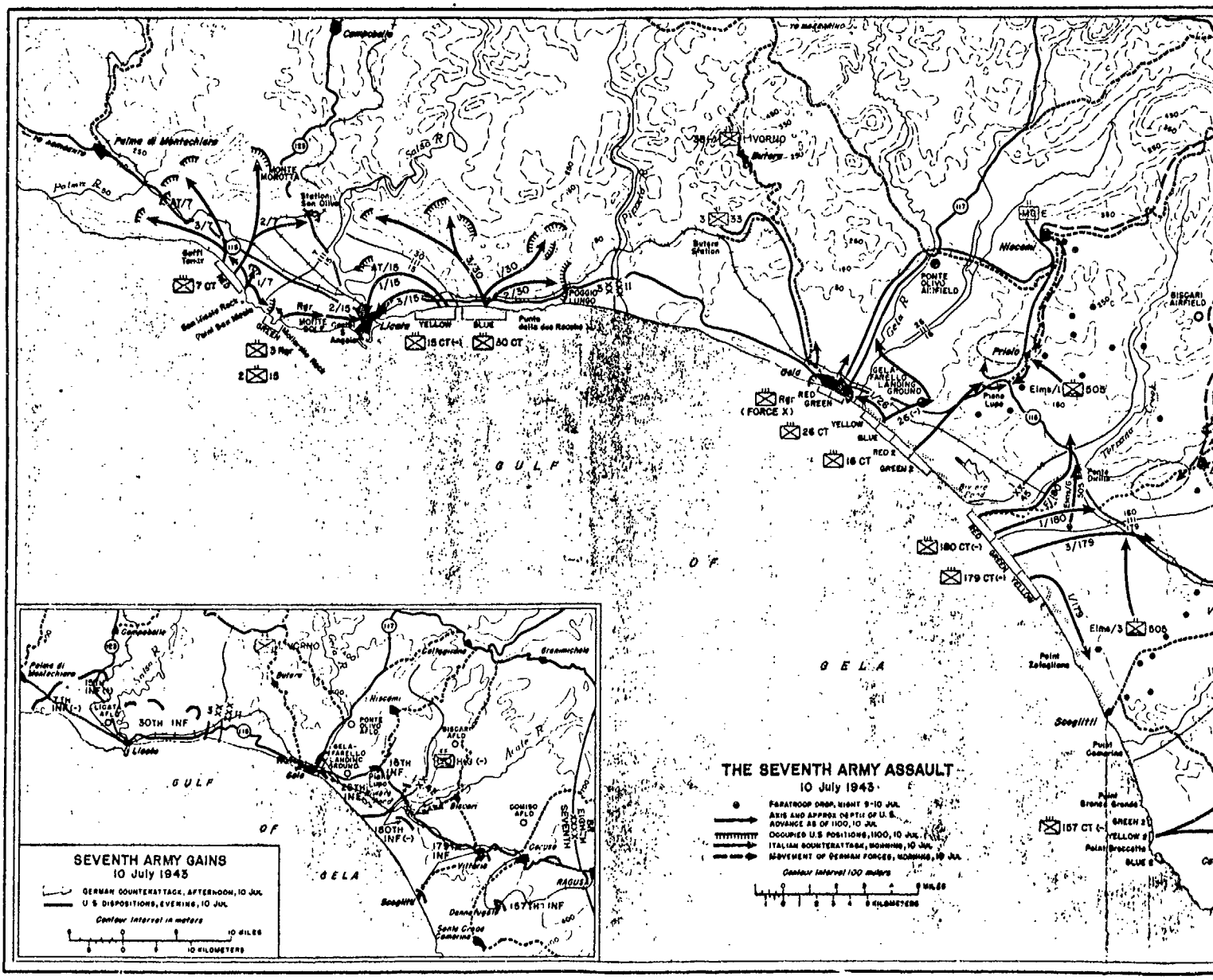

Figure 1. Seventh Army assaul

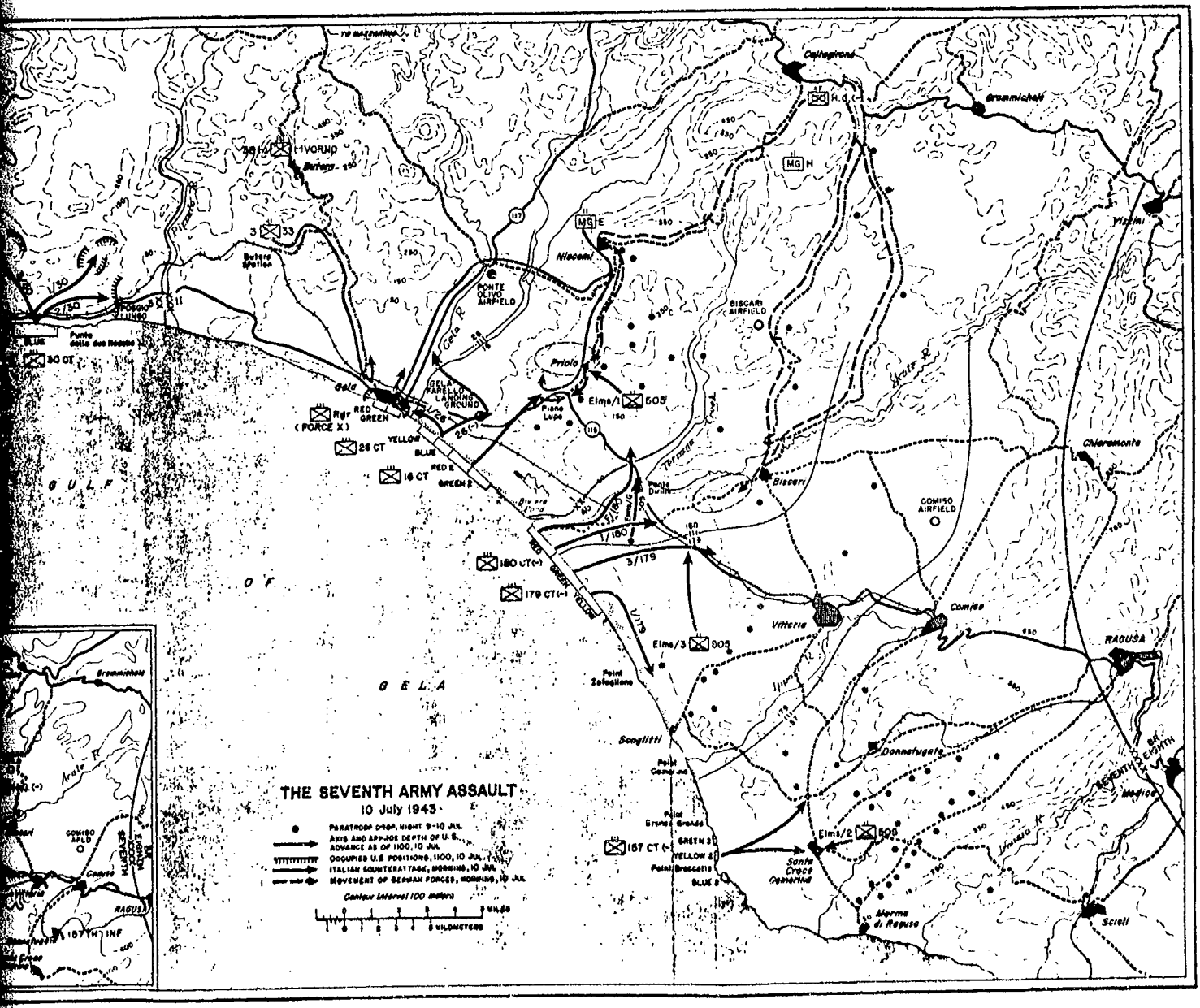

Figure 1. Seventh Army assault, 10 July 194320

The 1st Division, landing at 0335, was able to break through the crust of coastal defense positions with fewer casualities and less delay than had been anticipated, and by 0900 the infantry was on its way to their inland objective. In the meantime, the Italian and German counterattack forces had been set in motion; three separate tank-infantry forces* were converging on the 1st Division.

Tank Attacks--D Day, 10 July. The day had not begun auspiciously for the spotting aircraft of BOISE and SAVANNAH, the two heavy ships in support of the 1st Division. Two SOCs had been catapulted at first light from each of the two light cruisers, and SAVANNAH's aircraft were almost immediately shot down by roaming German Messerschmitts. Two more of SAVANNAH's aircraft were immediately catapulted--one was promptly shot down and the other driven off. BOISE's SOCs were a bit more fortunate. One spotted tanks comprising one of the prongs of the Italian infantry-tank attack and passed the coordinates to BOISE but was unable to adjust the fire because of pursuit by another German fighter. Nevertheless, BOISE fired 2 minutes of rapid fire with her main battery without spot. In the meantime, DD JEFFERS opened up on the same target in response to a request from the shore fire-control party with an infantry battalion in the path of the counterattack. About 100 five-inch rounds left several tanks burning, but the remainder ran the gauntlet. However, destroyer fire had stripped the tanks of their supporting infantry and neutralized their artillery. When the remaining tanks encountered fire from another U.S. infantry element, which destroyed several additional tanks, the Italian thrust came to a halt. In the words of an Army historian:

> Without infantry support, its artillery under heavy counterbattery fire from American warships, the Italian tankers broke off the fight and retired.[21]

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* a. Italian tank group--60 light tanks supporting infantry and artillery.
b. Italian infantry division (Livorno Division).
c. Hermann Goering Panzer Grenadier Division (reinforced) with 90 Mark III and IV tanks. The Mark III was a medium (25-1/2-ton) tank, carried a 5-man crew, and was armed with a long-barrel 50-mm or short-barrel 75-mm gun. It was 17-1/2 feet long, almost 10 feet wide, and could do 22 miles an hour on roads or about half that speed cross-country. The Mark IV medium (26-ton) tank also carried a 5-man crew but was armed with the long-barreled, high-velocity (3200-feet-per-second) 75-mm gun. It was 19 feet long, about 9-1/2 feet wide, and had roughly the same speed characteristics as the Mark III.
d. Seventeen Tiger heavy tanks were attached from 15th Panzer Division. The Tiger, a heavy battle tank (60 tons) with a 5-man crew, carried an 88-mm gun as main armament and had the thickest armor ever fitted up to this time on a German tank. The vehicle was 21 feet long, 12 feet wide, and could do 15 miles an hour on roads and 5 miles an hour cross-country.

The second prong of the Italian tank-infantry counterattack fared no better. As the force approached Gela, a shore fire-control party with the defenders in Gela called for support from DD SHUBRICK at about 0830. She responded with 125 five-inch rounds. SAVANNAH also delivered 25 rounds of 6-inch projectiles about the same time, but since she had no air-spot available, the source of the request or the spotting means is not clear. Several tanks were hit and the infantry was immobilized. About 10 of the 25 attacking tanks actually reached Gela, but deprived of their supporting infantry, they were ineffective against the infantry force with antitank weapons and grenades, which fought from the protection of the stone buildings. This hot reception forced the remnants to withdraw. For all intentions, the Italian tank-infantry force had been destroyed, for the survivors launched no further attacks on the 1st Division.

But more was soon to come. The tank-infantry counterattack of the Hermann Goering Division, coordinated with the Italian attack just described, had been slow in reaching its attack positions. The German attack was not launched until 1400. The right prong of the attack (90 medium 75-mm tanks plus artillery and infantry) followed the same route as that of one of the Italian thrusts that had been defeated in the morning. Leading elements collided with the U.S. infantry, which still lacked organic artillery, tank, and antitank support that had not yet been landed. Support would have to come from naval gunfire. Shore fire-control parties immediately brought cruiser and destroyer fire down on the tanks. In the words of the official history:

> Calls for naval gunfire soon had shells dropping on the Niscemi road, but the German tanks, accompanied by reconnaissance and engineer troops in an infantry mission, rolled slowly past Casa del Priolo. Not far from Casa del Priolo, the tanks slowed, sputtered, and eventually stopped. The tankers could not go on because they had nothing to cope with the five-inch and six-inch naval shells that came whistling in from the sea. Conrath (Division Commander) ordered the tank attack renewed at 1500. But even Conrath's inspiring and hard-driving presence was not enough to furnish impetus. The attack failed to get rolling. Still uncertain about the location and the fate of the infantry-heavy task force, Conrath called off his offensive action. "The tanks are trying to withdraw," the 16th Infantry reported around 1700. And at 1845, "Tanks are withdrawing, it seems we are too much for them."[22]

In spite of the fact that the German and Italian counterattacks had been checked, the night was uneasy. The beaches were so congested that landing of artillery, antitank guns, and tanks was proceeding with great difficulty. U.S. air cover was so minimal that the Germans had almost complete control of the air. The three remaining float planes of the cruisers could spot only intermittently, and there was danger that the Axis armor might well force the 1st Division off the beaches.

Tank-Infantry Attacks--D plus 1 (11 July). During the night, the Axis command ordered the Goering Division to renew the attack against the 1st Division from the northeast, while the Livorno Division was to drive toward Gela from the northwest. Both moved out in the early morning. A destroyer, responding to a shore fire-control party, took the German tanks under fire with 200 five-inch rounds; however, lack of air spotters for both BOISE and SAVANNAH severely hampered their response. BOISE was able to deliver only 40 rounds on the attack before it reached the wide plain east of Gela and closed with our front lines. Fortunately, elements of the division artillery, some antitank guns, and a few tanks which had landed that morning took the German armor under fire and saved the beachhead. However, intervention by SAVANNAH against the Livorno infantry, attacking Gela from the northwest, was decisive. Only two Ranger companies were available to stop the Italians. The Rangers were ordered "to fight with the troops and supporting weapons you have at this time; the units in the eastern sector are all engaged in stopping a tank attack." A shore fire-control party with the Rangers called for support from SAVANNAH with dramatic effect.

> Almost 500 devastating rounds struck the Italian columns. Through the smoke and dust, Italians could be seen staggering as if dazed. Casualties were heavy. The attack stalled. Moving out to finish the task, the Rangers captured almost 400 troops. There were human bodies hanging from the trees. A large proportion of the officers and more than 50% of the Italian soldiers were killed or wounded. The battering received during this attack finished the Livorno Division as an effective fighting unit.[23]

On the eastern flank, a second task force of the Goering Division, composed of 16 Tigers armed with 88-mm guns and a regiment of motorized infantry, directed their massive effort against 200 infantrymen. Destroyers played a significant role in the defeat of this counterattack, delivering about 2000 five-inch rounds from early morning until late at night, and enabled this tiny infantry element to frustrate a vastly superior force.

By mid-afternoon, the Goering Division faultered. Orders for a withdrawal were issued, which was sped by fires of the cruisers. The crack Panzer division had been badly mauled, losing about half of its organic tanks. The threat to the beachhead of the 1st Division had been beaten off.

The significant contribution of the naval guns was recognized by General Patton who wrote in his notes on the Sicilian campaign that:

> The naval gunfire support--that is, naval fire put on the beaches from vessels at sea--has been outstanding. We have even called for this support at night and got it on the target on the third salvo.[24]

A German colonel was even more specific:

> Naval gunfire forced us to withdraw, but if the Allies pursue too far inland they will be engaged by superior German forces and destroyed.[25]

Salerno--9 September 1943

The landing at Salerno (Figure 2), following closely on the heels of the capture of Sicily, was to demonstrate the contribution of naval guns against infantry and armored counterattacks on a grander scale. Armored reserves amounting to four Panzer divisions with 600 tanks and armored vehicles, together with supporting infantry and artillery, were thrown into the fight to drive the Allied invasion into the sea. In addition, a Panzer Grenadier Division had occupied defensive positions in the landing area 48 hours before the Allied assault. Consequently, the assault forces were to encounter stubborn resistance at the beaches, as well as heavy counterattacks after the landing.

The Allied plan of attack called for simultaneous landing of two U.S. and two British divisions of General Clark's 5th Army under cover of darkness in order to achieve surprise. Although gunfire support was offered by Admiral Hewitt's naval forces, it was rejected. On the other hand, on-call support was accepted by the British. The U.S. decision was unfortunate since, as we have seen, the Germans had anticipated the landing and reinforced the beaches.

Gunfire support was to come from the veterans PHILADELPHIA, SAVANNAH, and BROOKLYN, who had distinguished themselves at Sicily. The inability of the SOC aircraft to operate in the hostile air environment in Sicily led to the hasty training of an Air Force reconnaissance squadron (P-51s) in spotting for the cruisers. A complement of destroyers supplemented the light cruisers.

Support for the British landing was more powerful. A heavy cruiser division, mounting 8-inch guns, was assigned together with HUNT-class destroyers with 4.7-inch guns. Both U.S. and British forces were backed up by a British monitor mounting 15-inch guns. Unfortunately, the one assigned to the U.S. forces struck a mine early on D day. Later, when defeat loomed as an ominous possibility, Admiral Hewitt's request for heavy support was answered by the dispatch of two British battleships. Unfortunately, these ships arrived too late for practical help.

The Battle for the Beaches (9 and 10 July). As we have seen, H hour had been set at 0330 in order to achieve surprise, but General Kesslering had already reinforced the beach defenses with the 29th Panzer Division.* A fierce

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* Mark III and IV tanks, SP artillery, and motorized infantry.

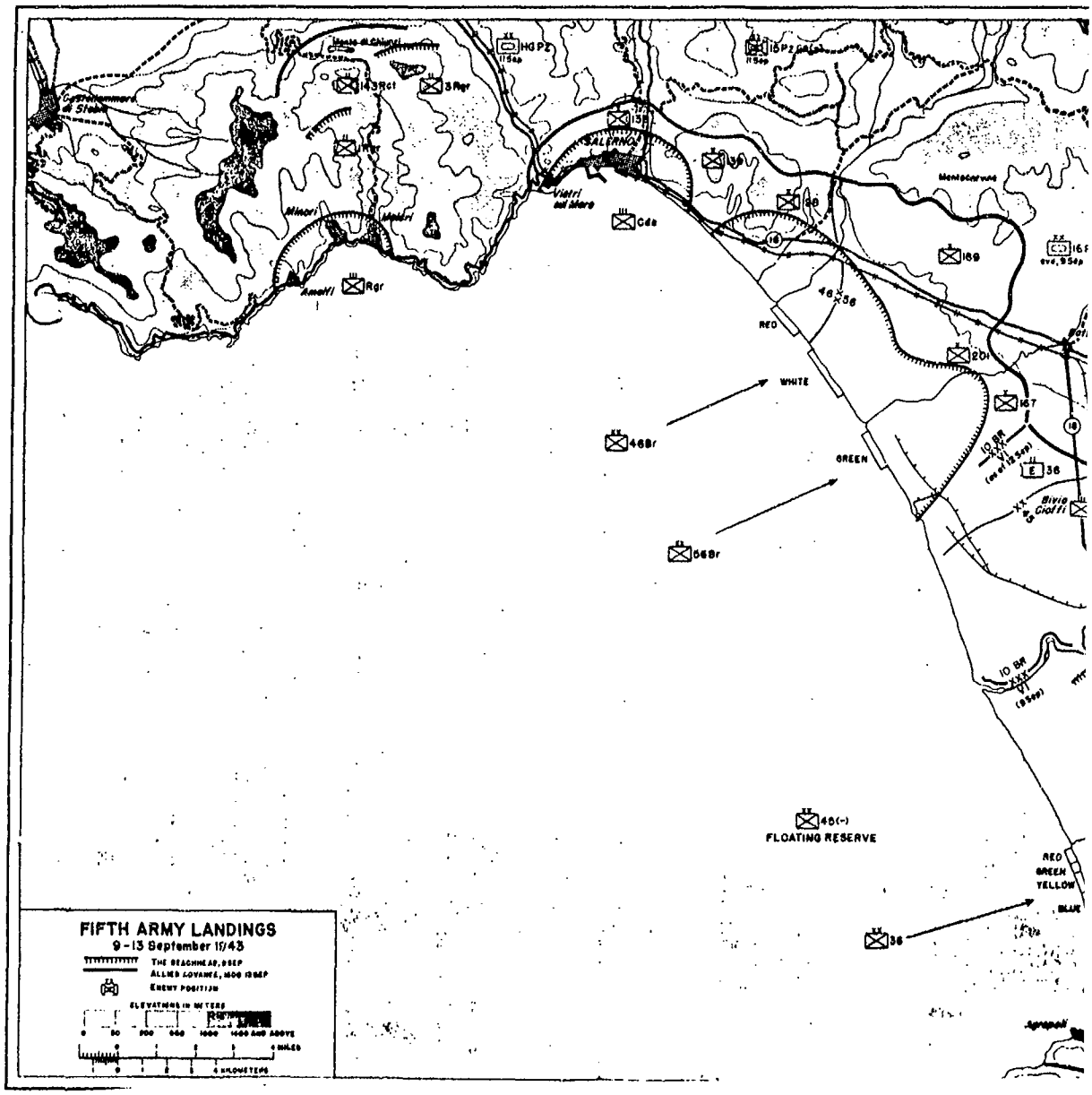

Figure 2. Fifth Army lanc

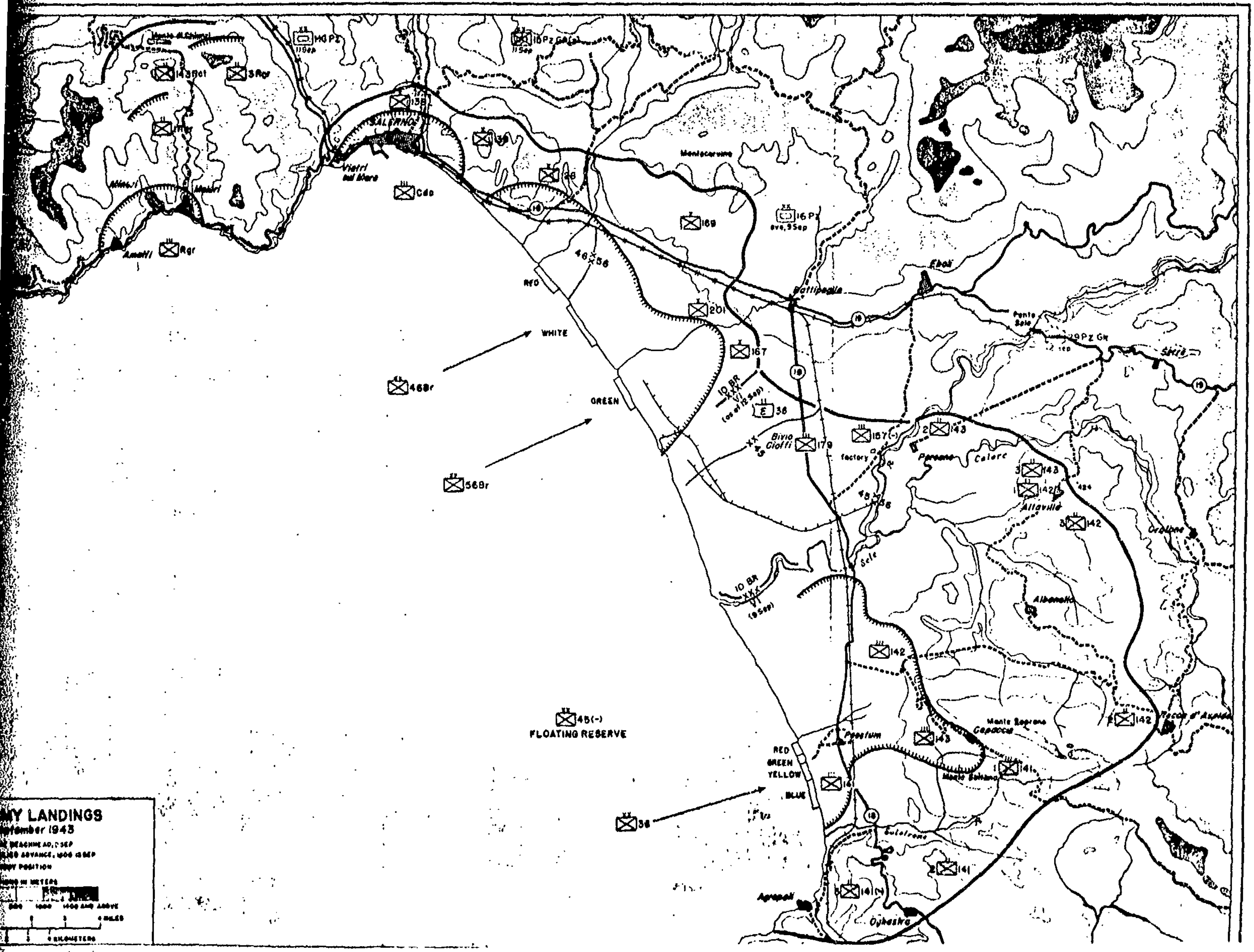

Figure 2. Fifth Army landings, 9-13 September 1943[26]

struggle was to be waged before friendly troops gained a foothold. The experience of one U.S. infantry regiment landing on two beaches is typical of that encountered by the entire assault force. The Germans had constructed a strongpoint covering these beaches, in which antitank and machine guns were emplaced. The strongpoint was backed by tank and infantry teams positioned under cover further inland. In addition, six coastal defense batteries could bring fire on the approaches to the beaches.

Landing craft transporting assault troops ran into heavy machine gun and antitank fire as they approached the beach. This fire was severe enough to pin one of the two assault battalions to the beach for 20 hours. However, the other battalion, after some delay, was able to infiltrate through the defenses, causing the defenders to eventually evacuate the strongpoint. LSTs carrying badly needed armor were thwarted by 88-mm gunfire until midday; then only 20 minutes of unloading time ensued before the beach was again closed by artillery fire, which continued until late afternoon. In the meantime, German tank and infantry teams launched a series of almost continuous counterattacks that were only prevented from overrunning the beaches by a combination of infantry, limited artillery, and naval gunfire support. Rear Admiral Sam Morison describes the support of SAVANNAH and PHILADELPHIA:

> At 0914, Savannah established communication with her shore fire-control party, which wanted a railway battery silenced. That was accomplished with an expenditure of 57 rounds. For more than an hour, beginning at 1132, Savannah fired on a concentration of tanks at the good range of 17,450 yards, yet (so it was reported from shore) forced them to retire. Other targets were German infantry, artillery batteries, observation posts, and the town of Capaccio. The cruiser answered eleven calls for fire support on D-day and expended 645 rounds of 6-inch ammunition.
>
> Flagship Philadelphia's work on D-day, the first of ten spent off the Salerno beaches, began at 0943 when, on call from shore fire-control party, she opened on an enemy battery. At 1033 she launched an SOC spotting plane, and two minutes later took a bridge under fire to hold up approaching panzer units. At 1057 she launched a second spotting plane and then following a minesweeper through a swept channel to close the beach. From 1220 to 1309, with destroyer Ludlow, she fired at a German battery which was shelling beached LSTs on Beach Blue, then recovered her planes. Shortly before 1400 she launched another plane which, simultaneously with one of Savannah's discovered a covey of German tanks concealed in a thicket adjacent to Beach Red. Philadelphia's 6-inch salvos flushed 38 of these birds and kept them under fire as they scurried to the rear; about seven were destroyed.

> Continuing almost to midnight, the cruiser expended 305 rounds of 6-inch shell on D-day.[27]

Destroyers boldly penetrating minefields to positions within 1500 yards of the beach fired on a full spectrum of targets, artillery, assault guns, and tanks, visible from seaward. They were particularly effective in neutralizing artillery firing on LSTs during the approach to the beach and during unloading operations. About 1500 rounds were expended.

The effectiveness of the cruisers and destroyers was praised by a U.S. division artillery commander in a message to Admiral Hewitt:

> Thank God for the fire of blue-belly Navy ships. Probably could not have stuck out Blue and Yellow beaches.[28]

Meanwhile, on the northern beaches, the British were encountering equally fierce opposition. Again, the intervention of heavy cruisers and destroyers was significant. The heavy cruiser NUBIAN broke up a particularly heavy tank and infantry counterattack, and destroyers closing the beaches took a variety of targets under fire.

By the night of D plus 1 day, a precarious foothold had been carved out, but important inland objectives securing the beach had not been seized, and a dangerous 7-mile gap between U.S. and British forces lay open for exploitation by the Germans. However, the effectiveness of the naval guns led the German Commander, General Vietinghoff, to request that Luft Flotte air attacks be concentrated on the naval gunfire support ships. Their elimination was considered the prime prerequisite for repelling the Allied invasion.

German Counterattacks--13 through 15 September. During the morning of 13 September, General Vietinghoff discovered the massive gap between the British and American forces, which he interpreted as an intention of the assault forces to withdraw from the beachhead. Other evidence reinforced this conviction. Sensing victory, his objective changed from simply driving the invaders off the beach to one of total annihilation. By this time, the depleted 29th Panzer Division, which had borne the brunt of the Allied assault, was being reinforced by elements of four additional Panzer divisions that had been ordered up to contain the beachhead. These forces were brigaded into Panzer corps. In essence, the German command had achieved parity, if not superiority over the four Allied divisions.

Beginning about midday of the 13th, the XXIV Panzer Corps, comprised of elements of two armored divisions, counterattacked the weakly held juncture between the British and Americans and overran the hasty infantry defenses. Fortunately, two 105-mm U.S. artillery battalions happened to be positioned squarely in the path of the armored attack, and their fires, reinforced by infantry with bazookas and a few tank destroyers, stopped the attack within 30 yards of General Clark's headquarters. Unfortunately, there were no shore

fire-control parties with these units, so naval gunfire could not be called in to assist. British forces also came under heavy armored attack by the Panzer divisions. All reserves were commited and the defensive line was barely held.

Fears of a successful renewal of the enemy thrust led General Clark to request Admiral Hewitt to prepare evacuation plans for the entire force, a proposal viewed with consternation by the naval command. And there were other concerns, for guided bombs had heavily damaged two cruisers, forcing their withdrawal. BOISE was brought forward to replace SAVANNAH, and a British cruiser replacement also came forward.

On 14 September, German armored and infantry counterattacks continued with elements of five Panzer divisions, although these divisions were somewhat depleted by casualties. However, these attacks were successively beaten off by a combination of firepower, including effective assistance by the naval guns of cruisers and destroyers. In the words of Rear Admiral Morison, who was there:

> Philadelphia, as usual, was to the fore. She continued to shoot at targets designated by her shore fire-control party throughout the night of 13-14 September, firing 921 rounds of 6-inch on tanks, batteries, road intersections and massed troops, and receiving such messages as: "Very good--we are under attack--stand by," and "Thank you--stand by." Between 0844 and 1345 September 14, Boise relieved her, firing almost continuously at tanks and troops--18 different targets--and expending nearly 600 rounds. Shore fire-control party reported "Very Well!" after a tank concentration had received 83 rounds. At 1503, Philadelphia returned for a two-hour session. There followed another lull in naval gunfire support; then at 2130 Boise was called on for rapid fire on troops. With shore fire-control party reporting "No Change" and "Straddle, straddle!" she unloaded 72 rounds in short order. An hour later, she was called on again, and after firing 121 rounds got the word, "Cease firing; thank you, stand by." At 2310 she delivered interdiction fire on German troops marching down from Eboli; "You are doing well," said the shore party. All night 14-15 September she continued firing on call. In the British sector the pattern of gunfire support was much the same. Four light cruisers and four destroyers got into the shooting, with good results.[29]

Conclusions

The fog of war prevents a precise assessment of the role of naval guns in beating off the counterattacks of 13 through 15 September. The varied assortment of firepower simultaneously brought to bear on the counterattacking

forces makes it impossible to sort out the individual effects. Here again, we fall back on the testimony of the Germans themselves:

> Of the 14th Vietinghoff wrote: "The attack this morning pushed on into stiffened resistance; but above all the advancing troops had to endure the most severe heavy fire that had hitherto been experienced; the naval gunfire from at least 16 to 18 battleships, cruisers and large destroyers lying in the roadstead. With astonishing precision and freedom of maneuver, these ships shot at every recognized target with very overwhelming effect.[30]

Early on the morning of 15 September, Kesslering remarked to Vietinghoff during a conference that the counterattacking Panzers seemed to be reverting to positional warfare. He warned, "This must not happen. If attacks on the level ground of the Salerno plain were impractical because of Allied air and naval bombardment, perhaps the Panzers could attack further south." General Herr thought not. "Allied naval fire made it doubtful that he could ever reach the coast."[31]

That same night, Vietinghoff recommended to Kesslering that the German forces be withdrawn to the north. In his recommendation, he stated, "The fact that the attacks which have been prepared fully and carried out with spirit, especially by the XIV Panzer Corps, were unable to reach their objective owing to the fire from naval guns and low flying aircraft makes withdrawal imperative.[32]

OPERATIONS IN THE CENTRAL PACIFIC—1943-45

Strategic Environment*

In late 1943, the naval balance of forces had swung sharply in favor of the U.S. Pacific Fleet. The erosion of Japanese naval forces first began at the Coral Sea battle, had continued through Midway, and culminated in the struggle for the Solomons. On the other hand, the Pacific Fleet had recouped its battle losses manyfold and was in a position to take the offensive. Pre-World-War-II battleships, with heavy guns but without sufficient speed to contribute to carrier operations, were available in quantity for support of amphibious operations.

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* Amphibious operations in the South and Southwest Pacific during 1942 and 1943 were characterized by limited enemy beach defensive positions, and coastal defense guns were never a significant factor. Gunfire support was confined to a short neutralization bombardment of beach defenses. Once the troops were ashore, limited support was available. So far, the prewar concept of neutralization of defenses remained valid.

Tarawa--The Doctrinal Watershed

The first objective for the Pacific Fleet was the capture of positions in the Gilbert Islands, with target dates in November 1943. Tarawa and Makin atolls were selected, with the objective of capturing advanced airfield sites in order to support subsequent operations in the Central Pacific.

Betio, an island in the Tarawa atoll, selected for seizure because of its existing airfield, presented a marked contrast with Mediterranean amphibious objectives which had been relatively large land masses with minimal beach defenses. Betio (Tarawa as it came to be known) was tiny, measuring only 3800 by 600 yards. It was crammed with the heaviest density and most sophisticated defenses so far encountered in any theater.

The core of the defense was two Japanese Special Naval Landing Forces, an elite corps, supplemented by two Seabee-type construction units with a combined strength of about 4500 personnel. These personnel manned an impressive defensive system, which featured Japanese defensive ingenuity, consisting of:

1. A barricade of coconut logs 3 to 5 feet in height behind the beaches.

2. A system of machine-gun positions behind the barricade covered with logs, sand, or occasional armor plate of concrete and connected by trenches with rifle ports.

3. Fourteen coastal defense guns, ranging from 5.5 to 8 inches with underground shelters for crews, fire control, and amunition.

4. Twenty-five field artillery pieces of 37 and 75 mm in covered emplacements.

5. Thirteen-millimeter and 5.1-inch antiaircraft guns.

6. Fourteen tanks with 37-mm guns.

7. A system of personnel shelters of coconut log or concrete construction.

The Japanese admiral in command, confident of the impregnability of his defenses, boasted: "The Americans could not take Betio with a million men in a million years."

The gunfire plan for support of the 2d Marine Division scheduled the heaviest bombardment so far delivered in World War II. Four old battleships, five cruisers, and eight destroyers were to participate in two phases. The first, consisting of the heavy ships firing from positions 15,000 yards off the beach and gradually closing to 5000 yards, was aimed at the coastal defense guns and organized beach positions to achieve maximum destruction. The

second phase called for 45 minutes of neutralization fire from all ships, directed at the machine guns and artillery positions along the beaches. This fire was to lift at H minus 5 to allow carrier air to deliver strafing runs. Shore fire-control parties with the infantry battalions were to call for fire after the landing.

Early on the morning of D day, before the heavy ships had commenced counterbattery fires against coastal defense guns, the Japanese commenced firing on the transports and fire-support ships, forcing the transports to shift position. COLORADO and MARYLAND retaliated with their 16-inch guns, with MARYLAND closing within 5000 yards to deal with a Japanese 8-inch battery. Japanese batteries were silenced temporarily, but it was not until D plus 1 that all enemy guns were finally put out of action. Nevertheless, these batteries had minimal effect. At H minus 45, all ships shifted their fires to the beach defenses.

In the meantime, a series of breakdowns in the plan were occurring which would have serious implications. The first of these was a delay in the ship-to-shore movement and consequent delay in H hour. However, gunfire support was lifted at the previously scheduled time because the Attack Force Commander feared that a continuation of the beach neutralization fires under the conditions of reduced visibility caused by smoke and dust would cause casualities among the assault troops. Accordingly, gunfire support lifted 23 minutes before the troops reached the beach.

The most costly failure was caused by a miscalculation of tidal conditions on the reef. Instead of an anticipated depth of 3 to 4 feet, the reef was nearly dry. This was no obstacle to the first assault waves, which were embarked on reef-crossing tractors, but it was fatal to many in subsequent assault waves, which were boated in landing craft. They were forced to climb out of the boats at the reef's edge and wade ashore up to 700 yards under intense artillery, machine gun, and rifle fire from undamaged beach defenses. One battalion, landing in reserve, lost 4 officers and 106 enlisted men killed and 9 officers and 225 enlisted wounded before reaching the beaches, over 30 percent before firing a shot. Three days of heavy fighting was to eliminate the defenses, but at a heavy price. Nine hundred eighty were killed and over 2000 wounded, or 18 percent of the entire force, in spite of the expenditure of 6000 tons of naval ammunition.

The tragedy at Tarawa led naval and marine planners to reexamine doctrine and techniques for amphibious warfare in their entirety. In the field of naval gunfire support, planners concluded that the effects of area neutralization fire on beach defenses had been grossly overestimated. Planners noted that while the defenses had been suppressed during the bombardment, the blockhouses, pillboxes, and artillery installations were, for the most part, undamaged. Enemy weapons were rapidly manned after the gunfire support lifted prematurely, and the troops were caught in a fusilade of fire.

It was now apparent that something more than neutralization of enemy defenses was required to effectively pave the way for a landing against serious opposition at the waterline. Actual destruction of individual defensive installations that could bear on the ship-to-shore movement and the landing of assault troops became, as the result of this bloody operation, a requirement in future bombardment. In effect, this amounted to an entirely new concept; i.e., one of destruction as opposed to neutralization. This destruction could only be realized by direct hits, which in turn required slow deliberate precision fire by medium and heavy calibers from short ranges. As a result of the Tarawa assault, all future operations in the Central Pacific were to be preceded by several days of pre-D-day bombardment designed to ensure destruction of beach defenses.

The change in doctrine was feasible because of the growing power of the U.S. Pacific Fleet, the attrition of the Japanese Fleet, which prevented serious interference with U.S. preliminary operations, and because the relatively small size of the objectives and the few potential landing sites eliminated a requirement for surprise.

The new doctrine of preliminary operations for destruction of defenses was to prove its worth in a series of amphibious operations in the Central Pacific, which projected American power within 600 miles of the Japanese homeland. The first of these came close on the heels of the Tarawa debacle with the seizure of islands in the Kwajalein atoll in February 1944. The defenses of these latest coral objectives were not as formidable as those on Tarawa, but they were substantial. Roi-Namur, objective of the 4th Marine Division, was defended by four coastal defense guns, 28 antiaircraft guns, four blockhouses, and 17 pillboxes mounting antiboat and machine guns. The plan called for 3 days of preliminary bombardment delivered by three battleships, five cruisers, and 11 destroyers, all under the direction of Admiral Connelly, a veteran of Mediterranean operations.

The heavy ships were to fire at the shortest possible range that safe navigation would permit, while lying to or steaming slowly, thereby maximizing the accuracy of deliberate fire by single guns, using pointer (i.e., observed direct) fire against the hard point targets. As in other operations, the assault landings were to be covered by fires to neutralize remaining intact defenses.

The 3 days of preliminary bombardment at Roi-Namui proved the worth of the destruction concept. Japanese defenses were almost completely obliterated, and casualties were a small fraction of those suffered at Tarawa. Similar success was achieved in support of the 7th U.S. Infantry Division landing on Kwajalien. Thereafter, precision destructive fires from heavy ships were features of the preliminary operations in successive amphibious operations in the Marianas in June 1944 and Iwo Jima and Okinawa in February and April of the following year.

Iwo Jima--16 February 1945*

The Iwo Jima operation is selected as one of the case studies because of the key role played by naval guns and because this role can be documented exactly. There is little doubt that the destructive capability of the intermediate- and heavy-caliber naval guns enabled the marines to gain a foothold on the most heavily defended objective in World War II. Without the naval guns, there is a high probability that the landing force would have been defeated on or short of the landing beaches.

Strategic Environment. Iwo Jima, the most southerly island of the Bonin Island group, is roughly 750 miles from both Japan and the Marianas. It lay athwart the route of Marianas-based B-29 bombers in their attacks on the Japanese homeland. Japanese fighter aircraft based on or staged through Iwo Jima could launch raids against B-29 fields in the Marianas and intercept General Curtis Le May's bombardment force. With Iwo Jima in American hands, these Japanese assets not only could be neutralized but turned against the Japanese.

The obvious advantages that would stem from the seizure of Iwo Jima, outlined in an urgent request from the Commanding General of the U.S. Army Air Force (CG USAAF), were recognized by the Joint Chiefs of Staff (JCS). Accordingly, a directive was issued to the Commander in Chief, Pacific (CINCPAC), to seize a position in the Bonins with a target date of January 1944. CINCPAC, in turn, assigned the responsibility to Admiral Spruance, Commander of Task Force (CTF) 58. In addition to the 16 fast carriers and supporting forces organic to TF 58, CINCPAC assigned Amphibious Force, Pacific, under Admiral Turner, with its associated transports, landing ships and craft, minesweepers, and underwater demolition teams, to CTF 58. Admiral Turner's forces were further augmented by two amphibious groups (under Admirals Blandy and Hill), a Support Carrier Group and a Gunfire Covering Group. V Amphibious Corps, Fleet Marine Force (FMF), Pacific, commanded by General Schmidt, consisting of the 3d, 4th, and 5th Marine Divisions and supporting troops, composed the landing force. Admiral Turner assigned the responsibility for the conduct of the preliminary operations to Admiral Blandy and the D-day assault to Admiral Hill.

Admiral Spruance planned to reduce the potential of Japanese air interference with the Iwo Jima assault by conducting fast-carrier strikes against Japanese airfields in the homeland during 16 through 18 February. He further directed that the preliminary operations for softening the Iwo Jima targets coincide

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* Data on the Japanese defense posture are derived mainly from the History of U.S. Marine Corps Operations in World War II (1966) by Shaw, Nalty, and Turnbladh. Data on gunfire support plan and execution are from the author's records.

with these carrier raids. Thus, the covering operations of the carriers dictated the duration of the effort to reduce the Iwo Jima defenses.

Tactical Environment. Following the seizure of the Marianas during the summer of 1944, the Japanese made every effort to turn the Bonins, and specifically Iwo Jima, into an impregnable bastion for defense of the Japanese homeland. To this end, the naval defenses, primarily coastal defense and antiaircraft guns, were reinforced by army troops under Lieutenant General Kuribayashi.

The defensive task was simplified by the characteristics of the island, which was 2-3/4 by 5 miles, about 8 square miles, in the shape of a rough triangle. The extinct volcanic cone of Mount Suribachi, some 550 feet high at the apex of the triangle, towered over the landing beaches (Figure 3).

Inland from the landing beaches, the terrain slopes up to a series of terraces to form a broad table on which the No. 1 airfield was located. The area is covered by a thick layer of volcanic ash, which became an unsuspected major obstacle to foot and vehicular movement.

North of Suribachi, extensive landing beaches, some 3500 yards long, occupied the eastern and western shorelines. There were no offshore hydrographic obstacles, and the water depths posed no impediment to naval gunfire-support ships, transports, and landing craft. An added advantage was the fact that the water was too deep for mining. However, the beaches were exposed to wind and surf.

To the north, the ground rises gradually to several low hills about 400 feet high overlooking the eastern and western landing beaches and formed the bases of the Japanese defensive systems. This ground was particularly suited for the purpose, since it is rough, rocky, and interspersed with deep caves and gorges. Mists of sulphur vapor accentuated the atmosphere.

Defenses. The task of turning Iwo Jima into a fortress was entrusted to the distinguished General Kuribayashi who received his directive from General Tojo, himself, in October 1944. If Kuribayashi had any illusions about the task ahead, they were shattered by events a few days after his arrival when a fast-carrier strike and naval gun bombardment destroyed his limited air resources and leveled every building above ground. It was obvious to Kuribayashi that defenses would have to go underground to survive.

The resources available for the defense were far from insignificant. By the end of 1944, in spite of heavy attrition levied by submarine sinkings of reinforcements, Kuribayashi's resources had reached the impressive total of:

33 naval guns, 88 mm or larger
130 artillery pieces, 75 mm or larger
17 320-mm mortars
65 medium and light mortars

70 antitank guns (37 and 47 mm)
94 antiaircraft guns (75 mm and larger)
200 20- and 25-mm antiaircraft guns
70 rocket projectors
22 light tanks
Numerous machine guns organic to the infantry components

These weapons were manned by 13,500 army personnel of the 109th Division, 2d Independent Brigade, the 145th Regiment, and the 26th Tank Regiment, along with 7400 naval personnel manning coastal defense guns and antiaircraft batteries, with the remainder brigaded in defensive unit positions.

In contrast with previous Japanese defensive strategy, Kuribayashi opted for the buildup of strong mutually supporting positions, which were to be defended to the death. Large-scale counterattacks, typical of previous banzai charges in the Marianas, were proscribed.

A main line of defense was established, consisting of two belts of mutually supporting positions located on the commanding ground overlooking the landing beaches and the waist of the peninsula. A final defensive line was located across the northern quarter of the island. The southern portion of Iwo, in the vicinity of Suribachi, was organized into an independent defense sector built around casemented coastal artillery, antitank weapons, and machine guns, supported by artillery, mortars, and rocket launchers positioned at the base of Suribachi and in the defiladed areas to the north.

The utility of the impressive inventory of weaponry was maximized by the skill of defenders in preparing defensive installations featuring the extensive use of concrete (for which the volcanic soil was ideally suited) and an unprecedented use of underground shelters for troops and their supplies, all interconnected by an extensive system of tunnels.

The eastern landing beaches (over which the marines would land) were defended by 20 blockhouses, over 90 pillboxes, and 32 covered artillery emplacements. All featured the lavish use of heavily reinforced concrete, which characterized all Japanese defenses. Blockhouses and covered artillery emplacements had reinforced walls and overheads, ranging from 3 to 5 feet in thickness, were compartmented to localize damage, and were sited below ground level for additional protection. Pillboxes also featured the use of concrete, but of less massive proportions. The firing ports of blockhouses and pillboxes in the beach area were located for the delivery of flanking fire along the beaches so that the ports were invisible from seaward. Blockhouses contained 37- and 75-mm antitank guns and 25-mm machine guns. Pillboxes were limited to machine guns. A four-gun battery of naval guns was situated in massive emplacements at the base of Suribachi, commanding the transport area and boat lanes. Similarly, on a bluff overlooking the northern flank of the landing beach, a battery of four 4.7-inch guns was positioned in concrete casemates. Camouflage was employed extensively and cunningly using natural materials

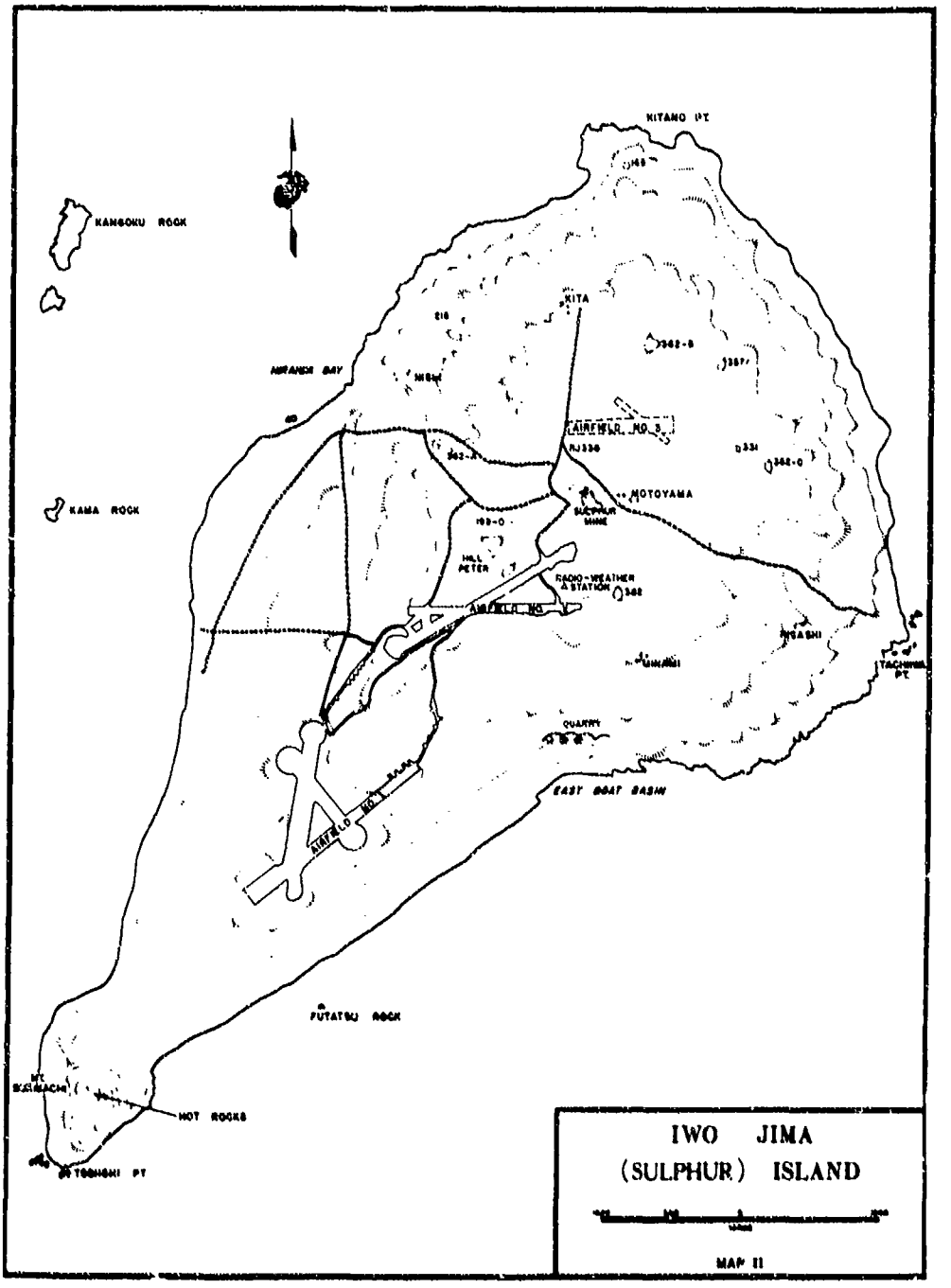


Figure 3. Iwo Jima (Sulphur) Island[33]

(Official USMC Photo)

Photo 13. Landing beaches of Iwo Jima looking southwest toward Mount Suribachi. A destroyer is firing on targets at the base of Suribachi.

(Official USMC Photo)

Photo 14. One of some 130 artillery bins located in a covered emplacement to reduce vulnerability to U.S. firepower.

of grass, brush, and sand. Thus, the problem of detecting these weapons from seaward severely complicated the task of destruction. Considerable firing would be necessary simply to strip away the camouflage before the defense could be detected and subjected to attack by naval guns or aircraft.

The immediate beach defenses were backed on the southern extremity by a defensive belt lying at the base of Suribachi. Here, in addition to a battery of coastal defense guns sited to cover seaward approaches, pillboxes housing machine guns and covered emplacements with mortars could bring their firepower to bear on troops debouching from the beaches. Similarly, the northern beaches were exposed to fire from machine guns and antitank weapons located in the main defensive belt overlooking the beaches. Finally, the extensive inventory of over 330 artillery pieces, mortars, and rocket launchers, positioned under concrete cover and in numerous gorges and caves, could deliver concentrated indirect fire on the beaches and the approaches inland. An extensive system of underground shelters and tunnels connecting defensive systems reduced the exposure of the Japanese defenders to firepower and multiplied the effect of the defense (Figure 4).

Because of the importance of the underground positions, 25 percent of the garrison was detailed to tunneling. Positions constructed underground ranged in size from small caves for a few men to several underground chambers capable of holding 300 to 400 men. In order to prevent personnel from becoming trapped in any one excavation, the subterranean installations were provided with multiple entrances and exits, as well as stairways and interconnecting passageways. Special attention had to be paid to providing adequate ventilation, since sulphur fumes were present in many of the underground installations. Fortunately for the Japanese, most of the volcanic stone on Iwo Jima was so soft that it could be cut with hand tools.

General Kuribayashi established his command post in the northern part of the island. This installation, 75 feet underground, consisted of caves of varying sizes, connected by 500 feet of tunnels. Here, the island commander had his own war room in one of three small concrete-enclosed chambers. Two similar rooms were used by the staff.

Further south on Hill 382, an enormous blockhouse was constructed which served as the headquarters of the artillery commander. Other hills in the northern portion of the island were tunneled out. All of these excavations featured multiple entrances and exits, which were invulnerable to damage from artillery or aerial bombardment. Typical of the thoroughness employed in the construction of subterranean defenses was the main communications center, which was so spacious that it contained a chamber 150 feet long and 70 feet wide. This structure was similar in construction and thickness of walls and ceilings to General Kuribayashi's command post. A 500-foot-long tunnel 75 feet below the ground led into this vast subterranean chamber.

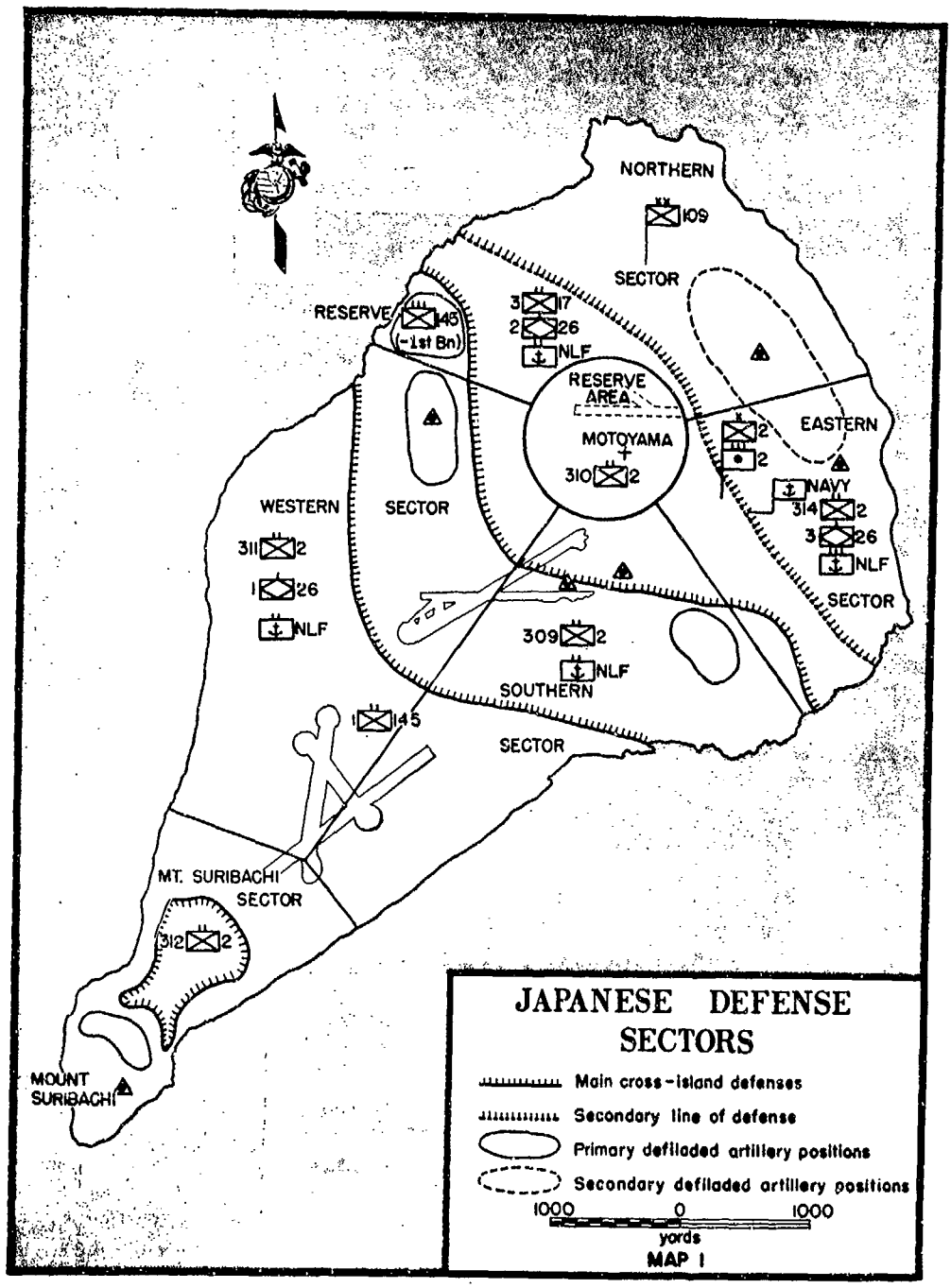


Figure 4. Japanese defense sectors[34]

The most ambitious construction project was the creation of an underground passageway designed to link all major defense installations on the island. As projected, this passageway was to have attained a total length of almost 17 miles, of which about 11 miles were actually completed by D day. The northern slope of Mount Suribachi alone harbored several thousand yards of tunnels and deep shelters.

In an operations order dated 11 December, General Kuribayashi directed that defensive preparations be completed by 11 February, a remarkably shrewd or alternatively lucky guess. The landing of the V Amphibious Corps was scheduled just 8 days later on 19 February.

Despite the almost continuous air raids that struck the island, with an occasional strike by surface ships, the Japanese garrison maintained a high degree of morale and dedication. Many copied their more celebrated colleagues, the kamikaze pilots, by wearing white headbands to show their dedication to die in the defense of the island. All subscribed to the Courageous Battle Vow, which ended:

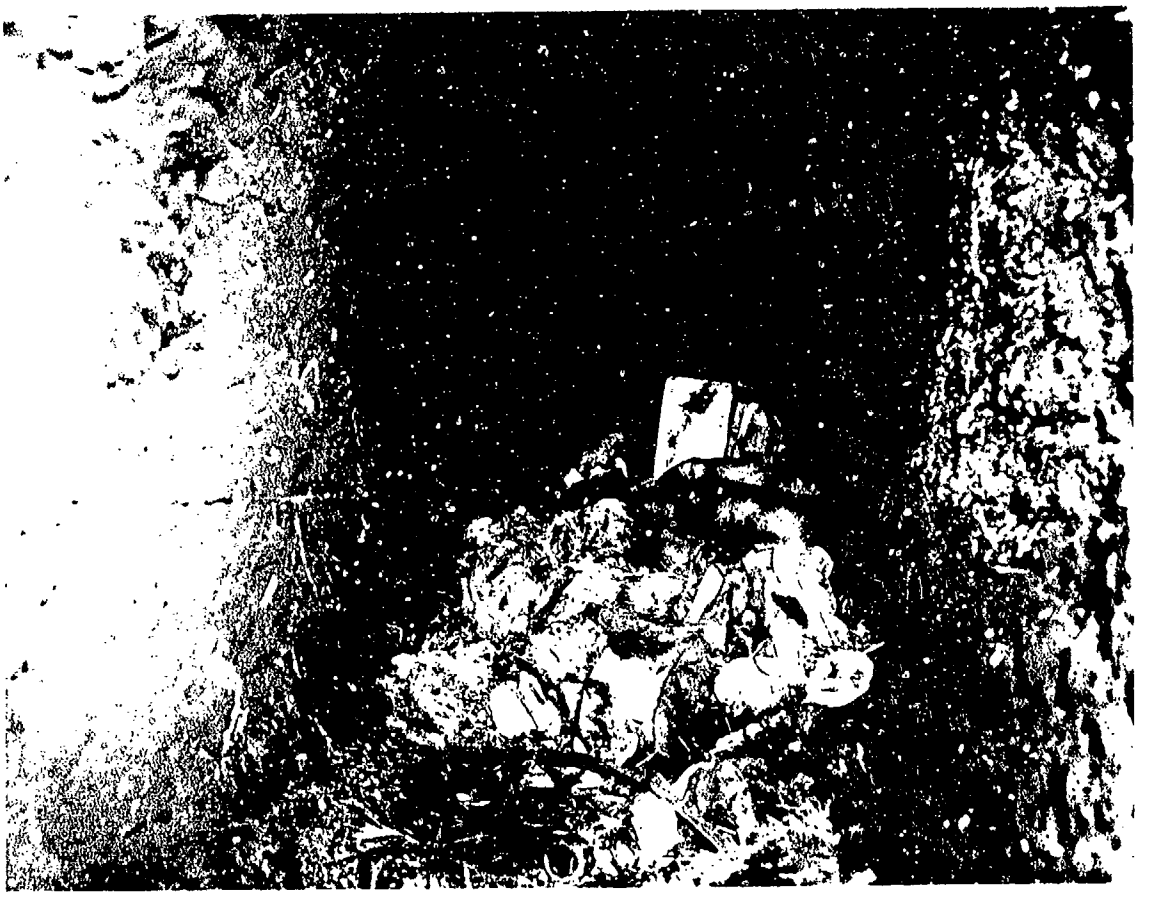
> Each man will make it his duty to kill ten of the enemy before dying. Until we are destroyed to the last man, we shall harass the enemy by guerrilla tactics.[35]

Warning of the impending invasion came when Japanese aircraft sighted the huge U.S. armada moving northwestward from Saipan. On Iwo Jima, the garrison was orderd to man its defensive positions and to brace itself for the coming ordeal.

While the intelligence gathered by the V Amphibious Corps from the joint intelligence effort of the Pacific forces was reasonably accurate, it erred in several major particulars. First of all, enemy strength was estimated between 13,000 and 14,000, as compared with the actual strength of about 22,000. Secondly, the estimate of the enemy strategy for defense was predicated on previous operations in which the Japanese had attempted to defeat the amphibious assault at the water line and, failing this, to launch an all-out counterattack in the typical banzai mode. This strategy had been rejected by Kuribayashi. Thirdly, while the estimate of the larger defensive installations and weapons were reasonably accurate, neither order of battle analyses nor photo intelligence revealed the huge numbers of field artillery pieces, mortars, and rocket launchers assigned to General Kuribayashi's forces. Nevertheless, intelligence had compiled a total of 724 A- and B-type targets. Type A comprised those targets that could threaten ship, aircraft, and underwater demolition team operations (coastal defense, antiaircraft, antitank, and artillery emplacements), while Type B were installations that could threaten the landing force in the ship-to-shore movement and the assault of the beaches. It should be noted that defensive installations that could oppose the troops after the seizure of an initial beachhead were not even listed. This category embraced those located in the extensive defense belts established across the island.

(Official USMC Photo)

Photo 15. Damaged 155mm mortar in emplacement--One of 65 medium mortars encountered on Iwo Jima.



(Official USMC Photo)

Photo 16. Typical tunnel on ridge north of Blue Beach 2, Iwo Jima.

(Official USMC Photo)

Photo 17. Tunnel leading to rocket-launcher emplacement on Iwo Jima.

The estimated number of naval coastal defense guns, heavy and light antiaircraft guns, as well as large covered emplacements, was relatively accurate. However, a coastal defense battery of 4.7-inch guns, commanding the sea approaches to the eastern beaches, was not carried in the intelligence estimate. As for the beach defenses themselves (i.e., blockhouses and pillboxes), the intelligence estimate proved to be reliable.

Preliminary Operations Planning. The major task of the preliminary operations was the destruction of a sufficient number of defenses so that air, naval, and marine operations could be executed. The V Amphibious Corps was convinced that the allocation of U.S. resources was insufficient to accomplish the level of destruction required to permit an easy landing in the face of the high level of expected Japanese counteraction. Their prolonged and repeated recommendation increased the duration of preliminary operations. However, the restrictions imposed by Admiral Spruance dictated that the duration of preliminaries be limited to and coincide with the 3-day period of the fast-carrier covering strikes. Nor is there any evidence that Admiral Turner was convinced by the V Corps' arguments for additional duration and scope of the preliminaries. This could be attributed, at least in part, to the fact that data on the destructive capabilities of the naval guns had not been collected and analyzed, in spite of the fact that such data existed from the preliminary bombardment of the Marshalls and from Saipan and Guam in the Marianas. Consequently, planners on the marine and naval staffs drew differing assumptions on the number of major-caliber rounds and the time necessary to destroy various defensive installations.*

The debate continued from late September to mid-January 1944 when Admiral Turner finally agreed to forward V Corps' request for an additional day of preliminary bombardment to Admiral Spruance (CTF 58). This last effort was refused on grounds that the air attacks by Army aircraft would be the equivalent of an additional day of preliminary naval bombardment. The final position of the V Corps was that two additional heavy-caliber gunships of the task force be rescheduled to reinforce those BBs assigned to bombard the landing beach areas. This recommendation was not acceptable to Admiral Turner, although Admiral Blandy, who was to command the preliminary operations, endorsed it strongly.

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* V Amphibious Corps planners estimated that two hard targets' would be destroyed per hour, while naval planners maintained that three targets could be destroyed. In addition, V Amphibious Corps planners held that short-range bombardment time would be significantly less than 18 hours programmed by naval planners.

The final preliminary bombardment plan allocated six old battleships (ARKANSAS, TEXAS, NEW YORK, NEVADA, IDAHO, and TENNESSEE), four heavy cruisers (TUSCALOOSA, SALT LAKE CITY, CHESTER, and PENSACOLA), and one light cruiser (VICKSBURG).

Each heavy ship was assigned to a specified area of responsibility (Figure 5). It should be noted that only TENNESSEE, NEVADA, and IDAHO, out of the six battleships available, were assigned to cover the 150 targets in the main landing beach area, consisting of 20 blockhouses, 99 pillboxes, and 32 covered artillery emplacements.

Each ship was expected to fire on its targets an average of about 6 hours a day during the 3 days allocated. This limitation stemmed from the necessity of conducting minesweeping and UDT operations off both the preferred (eastern) and alternative (western) beaches. On the assumption that TENNESSEE, NEVADA, and IDAHO had an equal proportion of the 150 beach targets (50 each) and accepting the Amphibious Force assumption that three targets an hour could be destroyed, then, in 18 hours, each of the three ships could have theoretically destroyed 54, provided that this bombardment was executed at short range where pointer fire could be used for maximum destructive effect. As we will see, short-range, main-battery pointer fire, a condition essential for certain destruction, established by prior operations in the Marshalls and the Marianas, could not be delivered at all on D minus 3 and for only approximately 2 hours on D minus 2.

Beginning on 8 December, preliminary air operations were to be conducted by Marianas-based B-24s of the 7th Air Force. After 31 January, 30 B-24s on daily sorties were to attack airfields, gun positions, and other defensive positions, the primary mission being to prevent the use of Iwo Jima as a base for air attack against Marianas-based B-29s.

D-Day Support Planning. While the employment of naval guns during preliminary operations was geared to deliberate time-consuming destruction of Japanese defenses, time constraints on D day dictated that the remaining defenses be suppressed (neutralized). Suppression required the delivery of a high volume of fire on areas containing Japanese defenses that could bring fire on the ship-to-shore movement, the landing, and the initial assaults. These fires had to be prearranged (scheduled) until such time as the shore fire-control parties with the assault battalions could be landed, establish communications, and direct fires on Japanese defenses impeding the assault. These scheduled fires had to be closely integrated with the assault plan (scheme of maneuver) of the V Amphibious Corps. Fires had to be placed as close as possible to the assault troops in order to ensure maximum suppression until the moment when fires had to be lifted to ensure troop safety. In short, the closest integration with the scheme of maneuver was essential.

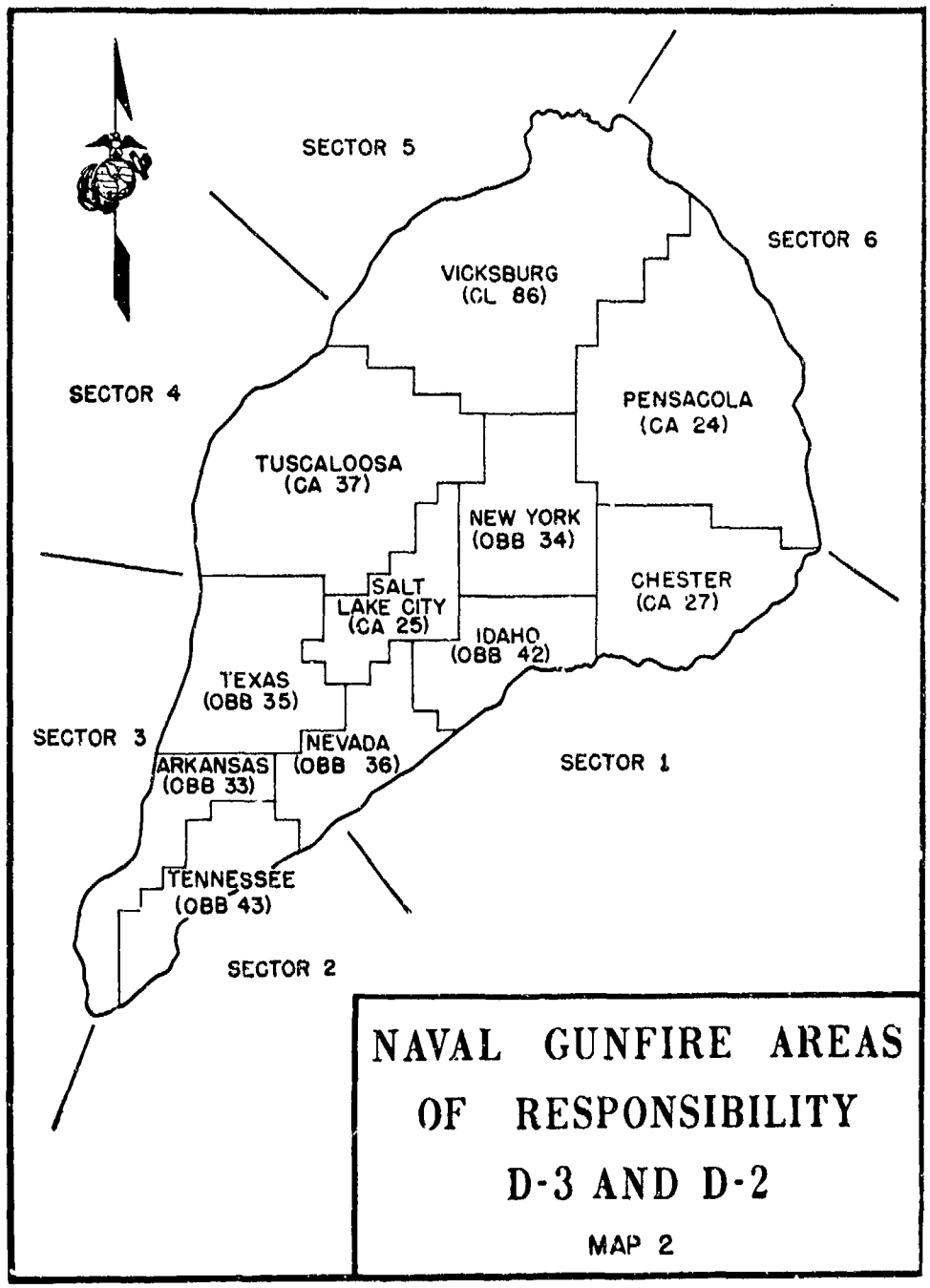

Figure 5. Naval gunfire areas of responsibility, D minus 3 and D minus 2

The scheme of maneuver of the V Amphibious Corps was designed to create the maximum shock effect. Accordingly, eight infantry battalions of the 4th and 5th Marine Divisions in four boat waves were to land simultaneously on 3500 yards of the eastern beaches (Figure 6). Additional infantry, tanks, artillery, and reserves were to follow as soon as sufficient beach area had been overrun.

The D-day plan for the neutralization of remaining defenses incorporated the lessons learned from previous amphibious operations in the Central Pacific. It called for employment of the greatest number of ships and the heaviest ammunition tonnage so far employed in amphibious assault operations. Seven battleships, eight cruisers, and nine destroyers,* assisted by over 40 assorted gunboats and rocket craft, were to deliver 3000 rounds of major-caliber ammunition, over 10,000 rounds of 5- and 6-inch projectiles, and over 20,000 rounds of 4.2-inch mortar and rocket rounds.

After H hour, a rolling barrage was to be delivered as close to our troops as possible and was to continue until H plus 60 minutes with a means for modifying the scheduled fires if our own troops were unable to keep up with the barrage. Tactical air observers of the two assault divisions were to report the positions of the landing boats during the ship-to-shore movement in order to assist in coordinating gunfire support. After the landing, these air observers were to view the movement of troops with respect to the rolling barrage and, when required, make recommendations to the V Corps and Attack Force Commander for repetition.

Firing with the main batteries of the heavy ships was planned for H minus 140, with 75 to 100 rounds allocated. This fire was to be directed at targets within assigned areas of responsibility. A strike by fast-carrier aircraft was scheduled from H minus 55 to H minus 35, during which time the ships were to take their final positions for delivery of the close supporting fire. At H minus 35, ships firing on the landing beaches were to deliver airbursts to inflict maximum casualities on any exposed personnel manning trenches and open emplacements. As the leading wave of landing craft passed through the line of fire (at about H minus 25), support ships were to shift to impact bursts, concentrating on enemy defenses located within their assigned area. At H minus 15, ships were to change to 1200-foot-per-second powder and fire 200 yards inland from the edge of the beach to give adequate trajectory clearance over the gunboats and other support craft in the line of fire, as well as to give maximum clearance over the troops. At H minus 7, gunfire support was suspended to allow aircraft from the escort carriers to strafe the beach. Thereafter, the barrage was to be resumed, lifting in 200-yard increments, based on the estimated movement of the marines.

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* NORTH CAROLINA, WASHINGTON, INDIANAPOLIS, SANTA FE, and BILOXI, all from Admiral Spruance's TF 58, augmented Admiral Turner's heavy ships.

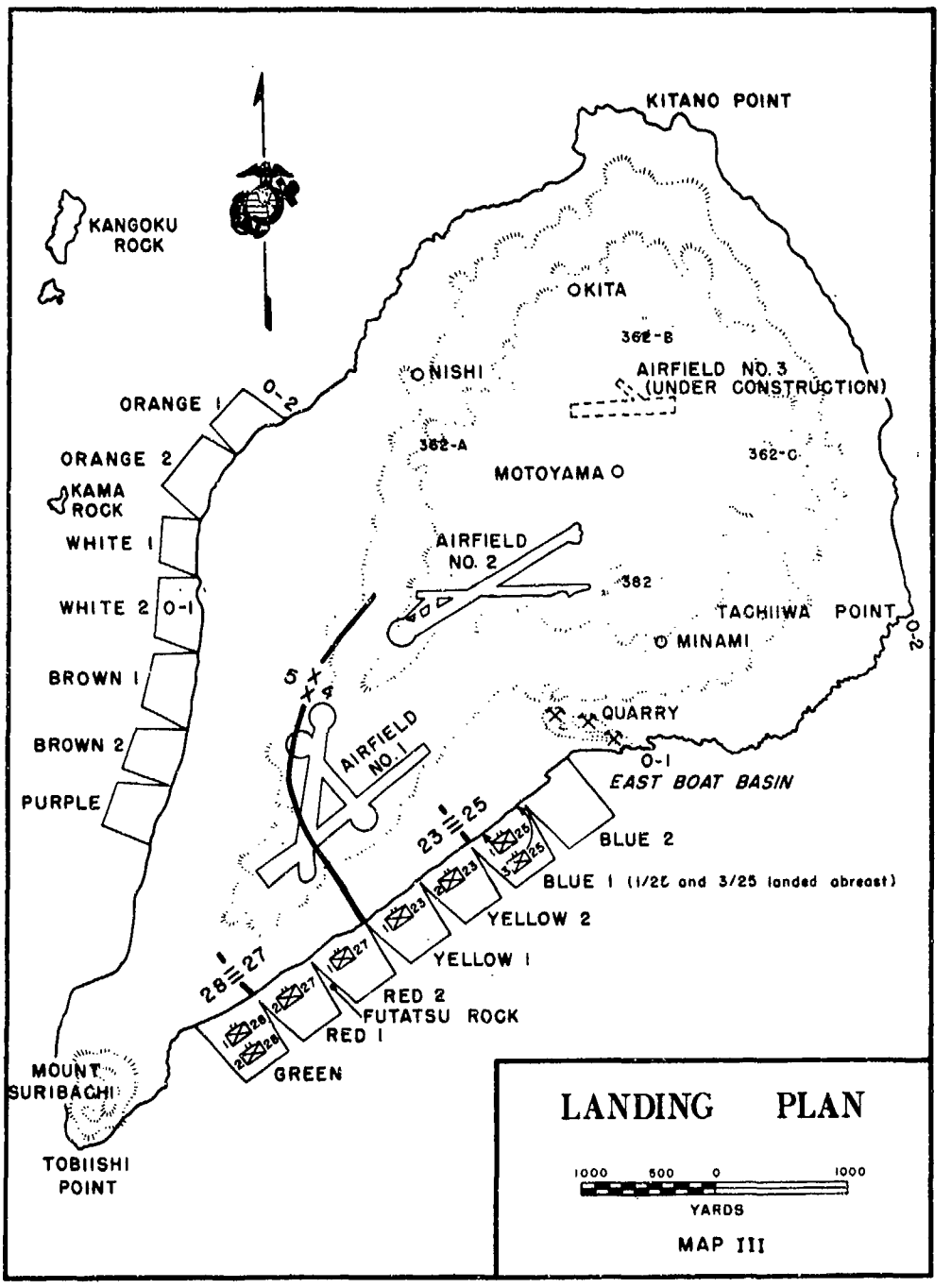


Figure 6. Landing plan[37]

Twelve rocket gunboats were to precede the leading wave firing 40-mm and rocket salvos. In addition, 18 mortar gunboats were to deliver their 4.2-inch mortar rounds on the base of Mount Suribachi and the north beach flank, while nine rocket gunboats were to fire their 5-inch rockets in the beach area.

Fires on the flanks were planned to move laterally away from the landing beaches in 200-yard increments. Considerable attention was devoted to determining when to lift fire from the various blocks on the north flank. Many estimates of troop advance were made before a final decision to lift fire from the first block on the right flank at H plus 12 was agreed upon. On the southern flank, a particularly difficult problem was posed by the conformation of Suribachi and by the troop scheme of maneuver in this zone. The 28th Regiment, landing on Green Beach One (the most southerly beach), planned to push a Battalion Land Team (BLT 1/28) directly across the island, while BLT 2/28 was to land at H plus 35, pivot, and attack Suribachi. It was, therefore, necessary to keep the slopes of Suribachi and its base under continual fire until such time as BLT 2/28 could commence its attack. The absolute necessity of keeping this vital area neutralized until it would be taken under fire by infantry weapons dictated that the fire be scheduled to lift on order. This involved the delivery of accurate fire within 200 yards of the left flank of our own troops for an indefinite period.

Previous experience had indicated the difficulty of establishing early shore fire-control party communications. In order to provide an alternate means of communication that would function early after H hour, it was decided to boat naval liaison officers of the shore fire-control parties in free landing craft equipped with a suitable radio, which was to be set up on the frequency of the shore fire-control party and firing ship. Communication between the spotter ashore and the liaison officer afloat was to be conducted by portable radios. It was felt that this would ensure communication with the firing ship as soon as possible and would provide the troops with an offshore spotting agency, if the shore fire-control party spotter could not set up his radio or could not observe due to terrain conditions. In addition, air spotters were provided in high-performance aircraft to operate in conjunction with shore fire-control parties and the firing ship. The air spotter, working with the shore fire-control party, was considered an elevated spotting station. His mission was to work in close liaison with the shore fire-control party and the assault battalion. Control of fires was given to the shore fire-control party for safety.

Preliminary Operations. Seventh Air Force operations against Iwo Jima targets had little destructive effect on hard targets, although it is probable that some antiaircraft guns were destroyed or damaged. This was expected, since the attacking B-24s employed 100-pound bombs and fragmentation munitions, which would not affect hard point targets. In any case, the 7th Air Force directed the weight of attack against antiaircraft and radio and radar installations, a fact probably unknown to Admiral Spruance, who had equated the effects

of the aerial bombardment to that of an additional day of preliminary bombardment by the surface ships. However, the destruction of aircraft on the ground and the neutralization of Iwo Jima airbases was accomplished, thus protecting Marianas-based B-29s.

Fortunately, neither Admiral Turner nor General H. M. Smith had expected significant results from these preliminary air attacks. All hands were aware that the destruction burden would fall on the naval guns, with assistance from aircraft of the fast and escort carriers. Thus, when Admiral Blandy arrived off Iwo Jima on the morning of 16 February, accompanied by his supporting forces of battleships, cruisers, minesweepers, and UDT units, he was under no illusion.

Execution of Preliminary Operations. The primary naval gunfire mission on D minus 3 was the destruction of coastal defense and antiaircraft guns. Firing was scheduled to commence at 0700 from ranges about 12,000 yards, closing to a 6000-yard minimum as minesweepers cleared the fire-support areas. Light mist and rain obscured visibility; very few ships were able to open fire until 0800, and firing was interrupted repeatedly when both ships' spotters and air observers were unable to observe. In addition, even when visibility permitted, the low-performance aircraft spotting for their parent vessels were unable to get below 3000 feet without receiving intense fire from light antiaircraft positions. Above 3000 feet, spotters had difficulty identifying targets and bringing accurate fire to bear. Consequently, scheduled firing was abandoned, and ships were directed to fire only when visibility permitted accurate fire. As might have been expected, the results of the day's firing were extremely disappointing. The photo intelligence group aboard Blandy's flagship estimated that very few targets near the beach were actually destroyed, although some damage to heavy antiaircraft guns had occurred.

D minus 2. NEVADA, IDAHO, and TENNESSEE were to close the range about 0800 and commence firing on their assigned targets in the eastern beach area. ARKANSAS, TEXAS, and TUSCALOOSA, with targets on and to the north of the western landing beaches, were to fire at medium ranges in order to remain out of the line of fire. The remaining heavy ships were to engage their targets with due regard for the position of the other ships and their trajectories.

Fortunately, visibility was excellent; both air and ship spotters were able to see their assigned targets clearly. NEVADA, IDAHO, and TENNESSEE were slow in closing the range, so slow that Admiral Blandy moved his command ship, ESTES, within 2000 yards of Mount Suribachi and commenced firing with the single 5-inch guns. This challenge accelerated the movement of NEVADA, IDAHO, and TENNESSEE, and by 0900 they had closed to within 3000 yards of eastern landing beaches, firing deliberately at their beach targets. However, they were forced to withdraw at 1025 in order to clear the area for UDT operations.

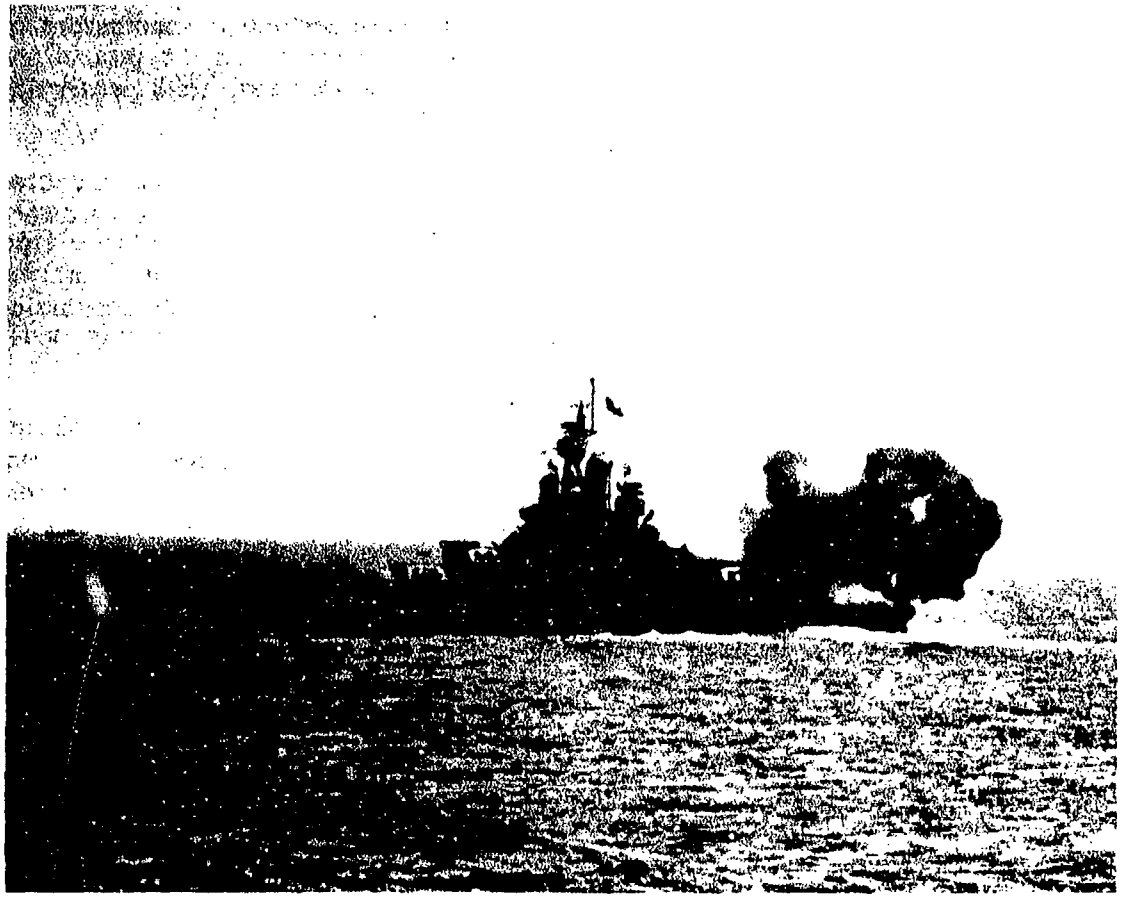
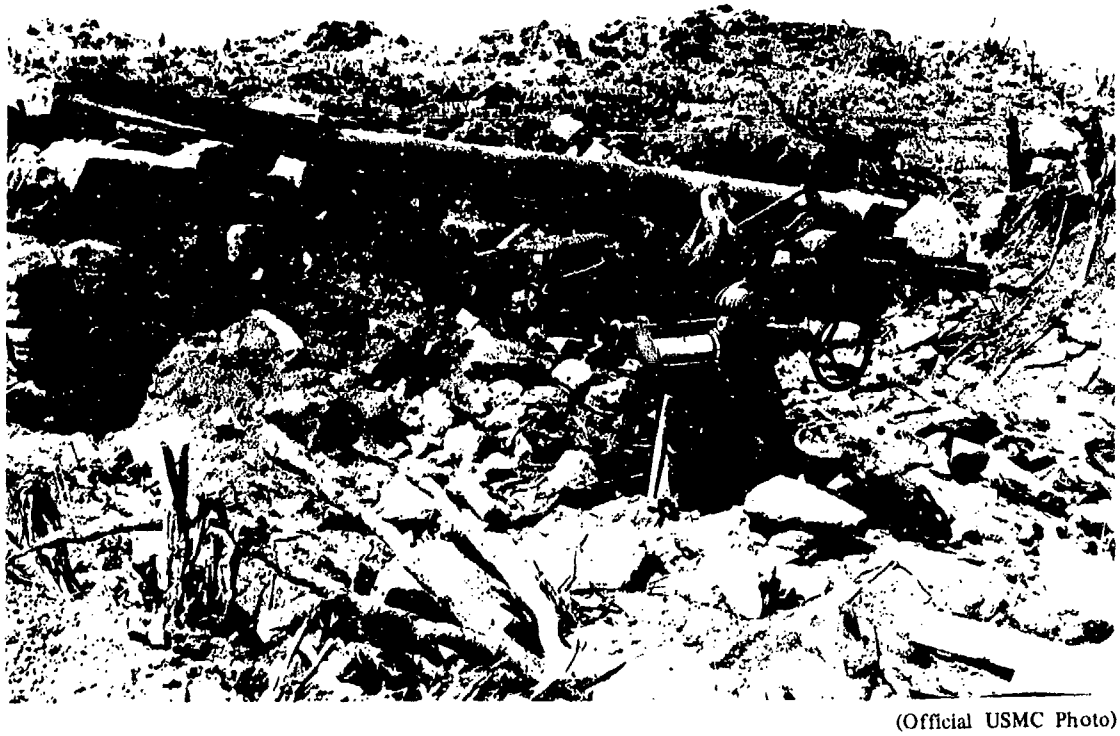


Photo 18. Battleship NEW YORK engaged in destruction of beach defenses on D-1 day at Iwo Jima.



(Official USMC Photo)

Photo 19. One of the 94 Japanese 75-mm antiaircraft guns after several direct hits on emplacement.

(Official USMC Photo)

Photo 20. A dual-purpose naval gun emplaced on Iwo Jima.

In meantime, PENSACOLA, firing from positions off the northeast coast of the island, was hit by six rounds from either 4.7- or 6-inch coastal defense guns, which penetrated the CIC, leaving 16 dead and 98 wounded, and forced her temporary withdrawal from firing position.

The most dramatic Japanese response was to come during the UDT reconnaissance of the eastern landing beaches. For this operation, four UDTs were embarked in four destroyer transports. Seven destroyers provided cover from positions about 3000 yards from the eastern beaches where the teams in landing craft were to be launched. In the words of Sam Morison:

> As the landing craft headed for the 500-yard line, where the swimmers would make the plunge, they were followed by seven LCI gunboats firing 20-mm and 40-mm guns at the beaches and preparing to launch 4.5-inch rockets. Soon after these gunboats passed the 1500-yard line, mortar shells began falling among them; and a little later, as they were beginning to launch rockets, they came under intense fire from the flanks of the beaches. A heavy battery casemated at the foot of Mount Suribachi joined in with mortars, automatic weapons and small arms, all aimed at the swimmers and LCI(G)s but the heaviest fire came from a hitherto unrevealed battery in the high ground just north of the beaches.*
>
> Around 1100 the seven LCI(G)s, advancing in line abreast, began to take hits, but pressed on to support the swimmers until forced out out by damage and casualties. Others dashed in to replace them, to be hit in turn, time after time.
>
> LCI(G)-471, -438,-441 and several others, although hit several times, gallantly returned to the fray after retiring just long enough to extinguish their fires and plug holes in the hull. LCI(G)-474, after closing destroyer Capps, had to be abandoned and went down. LCI(G)-409, after going in twice and sustaining 60 per cent casualties, closed Terror, removed wounded, and took on board officer and men to help damage control. In all, 12 LCI(G)s took part and all were hit, but they stuck to it until the swimmers were recovered and cleared.[38]

In the meantime, NEVADA, IDAHO, and TENNESSEE had opened up to cover the withdrawal; but heavy smoke, dust, and a white phosphorous smoke screen made it impossible to pick out individual targets. Nevertheless, the heavy volume of fire facilitated the withdrawal of the UDTs and their covering forces without further damage and casualties.

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* The intelligence estimate listed four possible antitank guns in this position.

Casualties to the gunboats forced Admiral Blandy to divert ARKANSAS, TEXAS, IDAHO, and TUSCALOOSA from their gunfire role to that of covering the UDT reconnaissance of the western beaches. Nor could additional close-range fire be carried out on the eastern beaches by NEVADA and TENNESSEE because of the possibility of "overs" from fire in support of the UDTs. So, by the end of D minus 2, eastern beach defenses had received only about 2 hours of fire.

While the effect of the Japanese fire produced momentary euphoria among the defenders, who reported to Tokyo that a landing had been repulsed, this premature disclosure was to cost the Japanese dearly. It had not only revealed the presence of a 4.7-inch naval gun battery on the bluff overlooking the eastern beach, sited to cover the seaward approaches and to enfilade the eastern beaches, but, of far more importance, it impressed Admiral Blandy and his subordinates with the strength of the landing beach defenses. If the landing were to be made good, far more destruction would have to be achieved.

That night, the atmosphere was grim as Admiral Blandy huddled with his staff and V Corps representative to decide on the essential measures necessary to cope with the forbidding defenses of the eastern beaches so dramatically revealed that morning. After consultation, the decision finally taken was one recommended by the V Corps in January; i.e., to augment the bombardment force of the three battleships assigned to the eastern landing beaches with an additional battleship, NEW YORK, and a heavy cruiser, CHESTER. TENNESSEE and IDAHO were to retain their previously assigned areas of responsibility on targets at the base of Suribachi, while the bluff containing the newly revealed casement naval guns continued as IDAHO's target area. NEW YORK took over half of the zone assigned NEVADA on the landing beaches (Figure 7).

Early morning of D minus 1 found IDAHO, TENNESSEE, NEW YORK, and NEVADA pounding away at their targets with their main batteries at ranges of 2000 to 3000 yards. Both NEW YORK and NEVADA attacked the mounds of sand that partially hid their blockhouse targets. After ranging rounds of high-capacity projectiles fired at the base of these mounds, the sand was blasted away, revealing the walls. One or two additional high-capacity hits on the walls disposed of the defense.

Visibility, unfortunately, was only fair. Occasional light rains reduced the vision of gun pointers and spotters, while cloud layers at 1500 feet hampered the work of air spotters. Air spotters were able to fly under the clouds, thanks to the reduced effectiveness of the Japanese antiaircraft guns. These guns, located in open emplacements, were more susceptible to damage from air and naval gun attacks.

The remaining heavy ships concentrated on targets in their areas of responsibility using air spotting. This pattern of firing continued without interruption until darkness forced curtailment about 1830, but the Japanese defenses

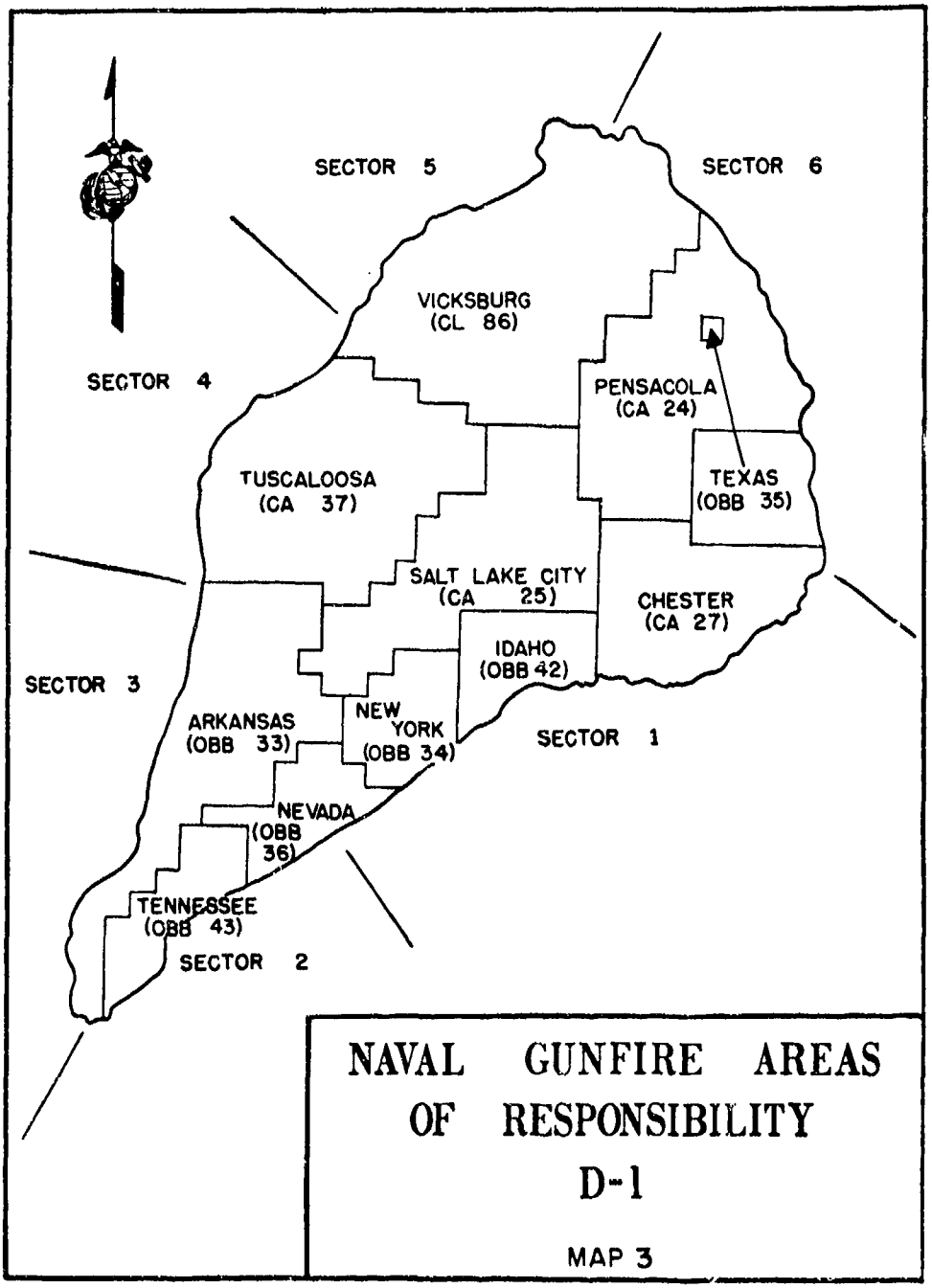

Figure 7. Naval gunfire areas of responsibility, D minus 1[39]

(Official USMC Photo)

Photo 21. Japanese coastal gun at the base of Mount Suribachi.

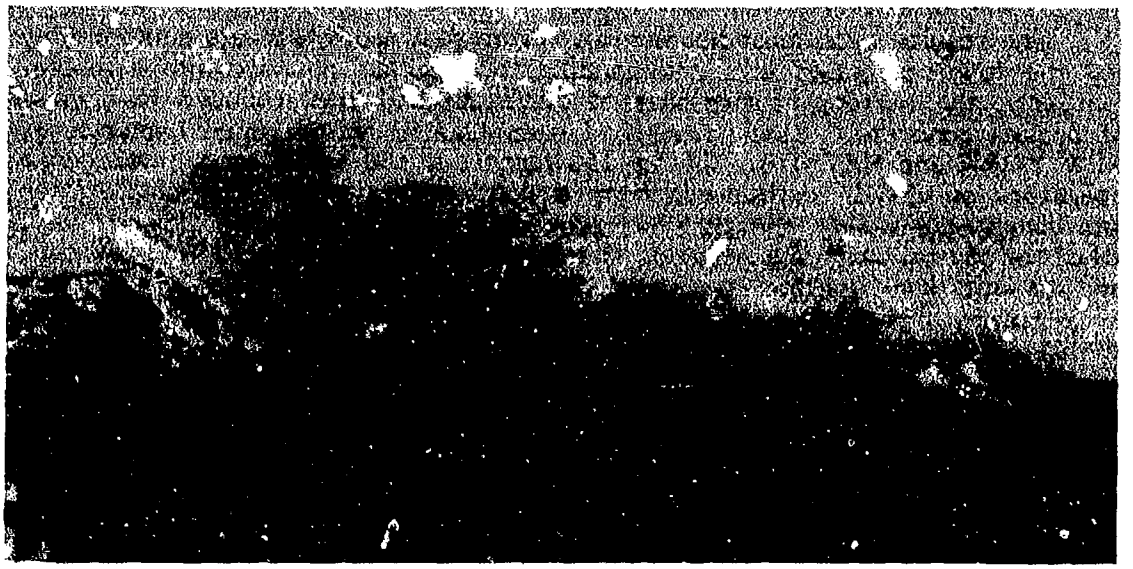

Photo 22. Rolling barrage fired over the heads of the troops by SUMNER-class destroyers during the D-day assault on Iwo Jima.

Photo 23. Assault waves approaching Iwo Jima beaches.

commanding the landing beaches had been subjected to nearly 10 hours of deliberate bombardment.

The results were most heartening. From seaward, observers could plainly see the four casemated 4.7s commanding the beaches pounded into a rubble. Similarly, the battery at the base of Suribachi had been reduced to a mass of broken concrete. Blockhouses had been blasted by the main batteries of NEW YORK and NEVADA. Of the 150 targets in the beach area, intelligence operators on ESTES estimated, from a combination of photo interpretation and visual observation, that 115 had been destroyed or damaged. Specifically, all of the coastal defense guns, 22 of 33 antiaircraft guns, 16 out of 20 blockhouses, and 48 out of 99 pillboxes were declared destroyed or critically damaged. In addition, heavy antiaircraft weapons in open emplacements throughout the island suffered.

However, the situation was less sanguine in the Japanese defense belt across the island and in the artillery, mortar, and rocket-launcher positions to the north thereof. Little damage could be verified there. Nevertheless, the consensus of Admiral Blandy and his staff, as well as the V Amphibious Corps representative, was that a successful landing could be made, but the going would be very tough once the marines turned north against the main Japanese defenses.

Admiral Blandy forwarded these views to Admiral Turner by dispatch stating that the landing could be accomplished but added that a large number of vital targets remained untouched. Similarly, the V Corps representative, in a personal message to General Smith, said virtually the same thing. A fact unknown to many, including the V Corps representative, was that Admiral Spruance had authorized Admiral Turner to take an additional day for preliminary bombardment, if he felt it essential.

In light of Admiral Blandy's report, neither Admiral Turner nor General Smith saw reason to delay. Now the efficiency of preliminary and D-day fire support would be subjected to the ultimate test. Would the troops gain a foothold? Could that foothold be expanded to permit the landing of reserves, artillery, tanks, and essential logistic support? The answer was soon to come.

Execution of the Assault. D day began auspiciously. The weather was sunny, and the light wind did not create unfavorable surf conditions on the exposed landing beaches, yet it was in the proper direction so as to blow the smoke and dust of the bombardment out of the line of visibility of the supporting ships.

Gunfire from the heavy ships commenced on schedule at H minus 140 and lifted at H minus 55 to permit fast-carrier aircraft to strafe the beach. In the meantime, destroyers and cruisers had taken their positions in and flanking the boat lanes about 2500 yards offshore and were pounding away at the beaches and flanks. These fires lifted at H minus 7, when landing craft were about

400 yards offshore, to permit escort-carrier aircraft to again strafe the beach. So far, the ship-to-shore movements resembled a rehearsal, a marked contrast with the reception given to the UDTs on D minus 2. No hostile fire fell among the gunboats and landing craft during the ship-to-shore movement. The first test had been passed; the marines in the assault had escaped significant casualties.

During the ship-to-shore movement, six of the eight shore fire-control parties with the eight assault battalions had established communication with their supporting ships. Neither of the flank battalion shore fire-control parties, working with VICKSBURG and SANTA FE, could contact their ships. This was an unfortunate beginning, in view of the opposition to be encountered and need for early fire support on targets of opportunity in the flanks. It would not be until H plus 270 that the assault battalion on the right flank, which encountered the most serious opposition, could call in supporting fires, although the air spotter was able to render some support. The fire-control party on the left flank did get into communication at about H plus 1 hour, a fortunate circumstance since many targets of opportunity were to develop around the base of Mount Suribachi.

Between 0859 and 0912, four waves of the assaulting marines had landed without opposition, and it was only then that scattered artillery and mortar rounds began to fall in the surf. As the assault moved inland, the Japanese shook off some of the effects of the heavy neutralization fires (about H plus 15). Marines of the 4th Division on northern beaches reported heavy mortar and artillery fire, and to the south the 5th Division marines were advancing inland with less opposition. However, by the time the advance was 300 yards inland, heavy mortar and artillery fire began. At the same time, men and supplies continued to pour ashore. By 1030, when scheduled fires were terminated (an hour and a half after H hour), all eight assault battalions, with about 8000 men, were ashore on the correct beaches with their organizations reasonably intact. Their task was to break through the crust of the beach defense in order to uncover sufficient ground for subsequent landings of reserves, artillery, tanks, and supplies.

The four assault battalions of the 5th Division found the going somewhat easier than those of the 4th Division on the right, due in part to the fact that NEVADA, the most experienced of the pre-D-day bombardment ships, had attacked the blockhouses and pillboxes in the 5th Division's action zone and because, unlike the 4th Division, they did not face the main Japanese line of defense. As a consequence, elements of the 5th Division were to reach their objective of completely crossing the island by 1100 (H plus 3 hours), while other elements had reached and crossed the southern end of the airfield.

The attack on Suribachi had not fared so well. Troops were held up by heavy machine gun and mortar fire. Nevertheless, the 5th Division, constituting half of the assault force, had broken through the beach defenses, thus ensuring that reserves, tanks, artillery, and supplies could be landed. By nightfall,

these forces were ashore, and the front lines had been tied in and were braced to meet the expected counterattack (Figure 8).

The 4th Division had tougher going. A larger number of pillboxes remained intact in their zone of action, and the main enemy defensive position was bringing small arms, machine guns, and antitank weapons to bear, in addition to the artillery and mortar fire which characterized the entire beach area. However, the 4th Division, like the 5th, had thrust through the beach defenses, gaining the edge of the airfield and a part of the commanding ground on the northern end of the beach, a gain of about 1000 yards. By nightfall, tanks, reserves, and half of the artillery had been landed.

Conclusions

The penetration of the beach defenses was the key to success. Without such a breakthrough, a far more concentrated personnel target would have been presented to Japanese artillery, mortars, and rockets. Casualties would have been multiplied, robbing the assault of its momentum. Nor is it likely that the landing of reserves would have restored momentum. They would have simply added to the concentration of personnel and induced further casualties. Without the destruction of Japanese beach defenses, accomplished by the naval guns during preliminary operations, it is probable that the Japanese would have defeated the assault on the beaches.

The most unbiased testimony regarding the destructive capability of the naval guns comes from General Kuribayashi, who reported to Tokyo that:

> However firm and stout pillboxes you may build at the beach, they will be destroyed by bombardment of main armament of the battleships. Power of the American warships and aircraft makes every landing operation possible to whatever beachhead they like.[40]

The destructive capability of the naval guns during preliminary operations forced the Japanese to abandon their strategy of defeating the amphibious assault at the beach. The new defensive strategy was to be set forth by the Commanding General of the Okinawa defenses in Battle Instruction Number 8, dated 8 March 1945:

> The time of opening fire will naturally vary somewhat according to the type of weapons, strength of positions, duties, etc. However, generally speaking we must make it our basic principle to allow the enemy to land in full. Until he penetrates our positions and loses his freedom of movement inside our most effective system of firepower, and until he can be lured into a position where he cannot receive cover and support from naval gunfire and aerial bombardment. We must patiently

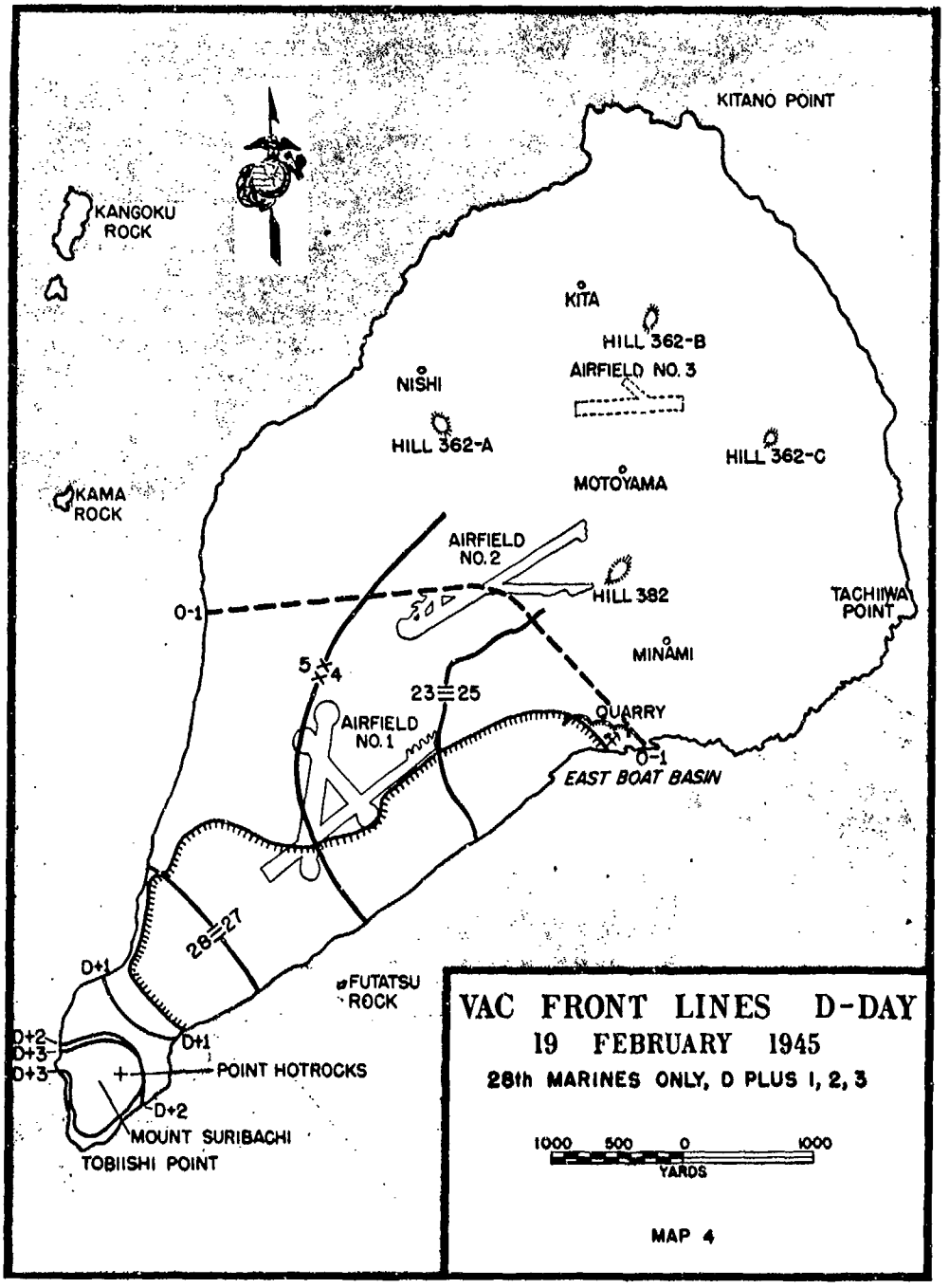

Figure 8. V Corps front lines, D day 19 February 1945[41]

and prudently hold our fire. Then, leaping into action, we shall destroy the enemy.[42]

This dramatic reversal of tactics was verified in the assault on Okinawa. When the Army and marines of the 10th Corps went over the Okinawa beaches on the first of April, they were unopposed. It was not until the troops turned south that the Japanese exposed their weapons and defenses anchored on the ancient Shuri castle. It is history that this new tactic ultimately failed, but the defense was effective enough to prolong the campaign. The full fury of the kamikaze attack was brought to bear on the Fleet in a sort of naval banzai, while ashore the defenders extracted a bloody price. Our own troops crowded the enemy defenses so closely that the naval guns and aircraft could not be employed for fear of causing casualties among our own people.

The effectiveness of the neutralization fires on D day at Iwo Jima is far more difficult to assess.* However, a number of conclusions seem supportable:

1. Naval gunfire and air cover prevented the Japanese from occupying positions that lacked overhead cover, such as light and heavy antiaircraft positions, as well as a few exposed mortar and rocket-launcher positions. But once scheduled fires had lifted, the defenders were free to emerge from cover and man their weapons.

2. Those defenses with overhead cover, such as pillboxes and most artillery, mortar, and rocket-launcher positions, were immune to direct effects. Because of the discipline of the Japanese and their steadiness under fire, their operational effectiveness also was not degraded significantly by indirect effects, such as blast.

3. Indirect effects of firepower, such as smoke and dust, did not degrade the effectiveness of artillery, mortars, and rockets, since all of these weapons had been assigned sections of the beach area on which they had previously registered their fires.

4. Communications for command and control were underground and not vulnerable to interruption by firepower.

5. The stockpiling of ammunition and other supplies at weapons sites reduced the vulnerability of logistics to firepower.

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* The handful of prisoners taken hampered an assessment of the effectiveness of the neutralization fires. However, one prisoner stated that 30 members of his platoon, assigned to trenches commanding the landing beaches, were killed by the rolling barrage.

The same conclusions apply to the naval gunfire support (as well as that rendered by artillery and air) in the remaining 26 days of the campaign. Assault battalions had the continuous benefit of a direct-support ship, usually a destroyer, controlled through a shore fire-control party. These ships participated in preparation fires prior to attack, fired on targets of opportunity, and furnished illumination with star shells during darkness. In all, 55 destroyers took part in the operation. Cruisers and battleships, in general support of the regiments, divisions, and the V Amphibious Corps, delivered preparation fires with main batteries often placing these fires within 400 yards of the front lines. On the western flank, where the terrain consisted of a number of ridge lines perpendicular to the sea, heavy ships worked on defenses using short-range destructive fire. Ten battleships and 12 heavy and light cruisers were employed throughout the campaign. The amount of support is indicated by the ammunition expended during the entire operation: 9500 rounds of 12-, 14-, and 16-inch ammunition from battleships; 20,000 rounds of 6-and 8-inch projectiles from cruisers; and 182,000 5-inch rounds from destroyers, of which almost 18,000 were illuminating shells.

The limited effectiveness of firepower left the difficult task of eliminating the defenses to the marine riflemen using grenades, portable flamethrowers, demolitions, and bayonets, with occasional support from tanks and antitank guns. By the end of the 26-day campaign, casualties amounted to about 22,000, of which over 5000 were killed--one casualty for every Japanese defender.

NORMANDY INVASION—6 JUNE 1944

Strategic Environment

By early spring of 1944, Allied air forces dominated the skies over France, while naval forces, with assistance from air elements, controlled the narrow waters of the English Channel. The German air strength in France numbered fewer than 200 aircraft, while their naval forces were limited to destroyers, torpedo boats, and submarines. On the other hand, German ground forces were still potent, in spite of heavy attrition inflicted by the Russians on the Eastern Front. Fifty infantry and 10 Panzer divisions were disposed in western France to oppose the expected Allied invasion.

The German strategy for defense combined elements encountered in both the Central Pacific and the Mediterranean Theaters. As in the Pacific, strategy featured a system of beach obstacles, strongpoints, and coastal artillery designed to defeat the assault forces before they could establish a foothold. However, if the invasion should penetrate the coastal crust, then infantry and armored reserves were to counterattack in order to drive the invaders into the sea--a strategy similar to that

employed in the Mediterranean and one likely to be used by Warsaw Pact Forces in the future.

The absolute essentiality of maintaining tactical surprise in the face of the strong German reserves ruled out methodical pre-D-day naval gunfire destruction of beach defenses and coastal artillery featured in Central Pacific operations. The destructive role was assigned to the Allied air forces, but air had to carry out this role in such a way that the landing area would not be pinpointed by the level of effort in any particular area.

On the morning of D day, the naval guns assumed the task of destroying or neutralizing beach strongpoints and coastal batteries in order to cover the landings. Isolation of the landing areas from infantry and armored counterattack was assigned to air, but naval guns were expected to contribute to this mission, within their capabilties. Finally, naval gunfire was to supplement field artillery by contributing support to Allied infantry and armored attack, as well as engaging German counterattacking forces.

Scheme of Landing

In February 1944, General Eisenhower received a directive from the Combined Chiefs of Staff which ordered him to enter the continent of Europe and undertake operations aimed at the heart of Germany and the destruction of her armed forces with a target date during the month of May 1944.

The plan for the invasion of Europe, adopted by Supreme Headquarters, called for landings extending from the base of the Cotentin peninsula to a point 50 miles east. The 21st Army Group (British) was to assault on three beaches (June, Gold, and Sword) with three seaborne assault divisions and seize Caen and Bayeau (Figure 9). One airborne division was to be dropped to seize Caen and Bayeau, and one was to be dropped to seize vital bridges. This force was to protect the left flank of the invasion against what was believed to be the main German thrust. The 1st U.S. Army was to land two seaborne divisions and two airborne divisions in assault, cut the Cotentin peninsula, and seize Cherbourg by D plus 8.

The V Corps, with the 1st Infantry Division in assault, was to land on Omaha Beach, followed by the 29th Infantry Division, while the VII Corps, with the 4th Infantry Division in assault, was to land on Utah Beach--both at 0630, sunrise being at 0558. Beginning at H minus 5 hours, the 82d and 101st Airborne Divisions were to be dropped inland from Utah Beach to assist the operations of the VII Corps, coming under the operational control of that corps after the drop. During the movement to the objective and until such time as the troops were firmly established ashore, the 1st Army was under the command of the Western Naval Task Force Commander, Admiral Kirk. His naval subordinates, Admiral Hall (Force

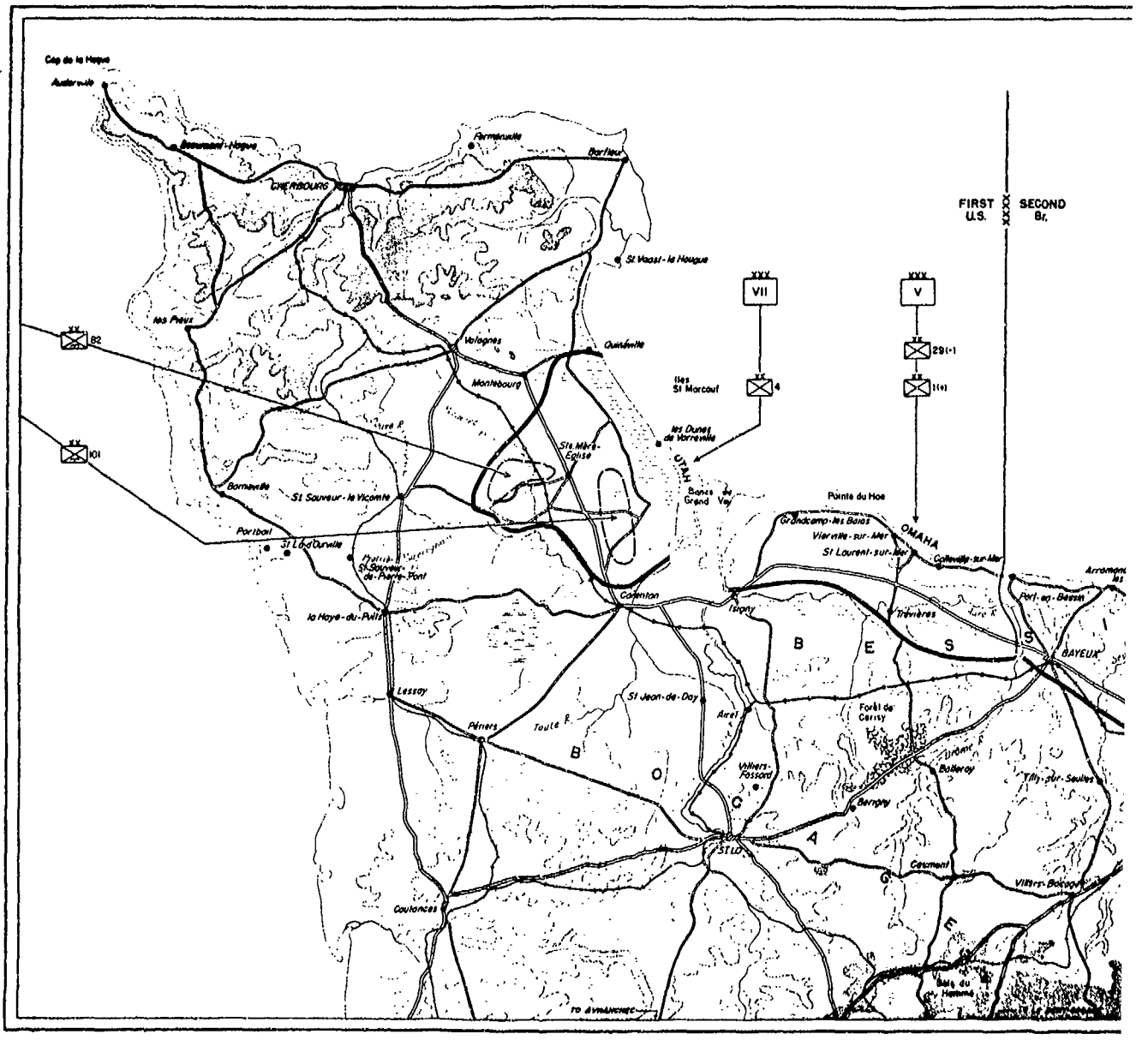


Figure 9. The final Overlord pl

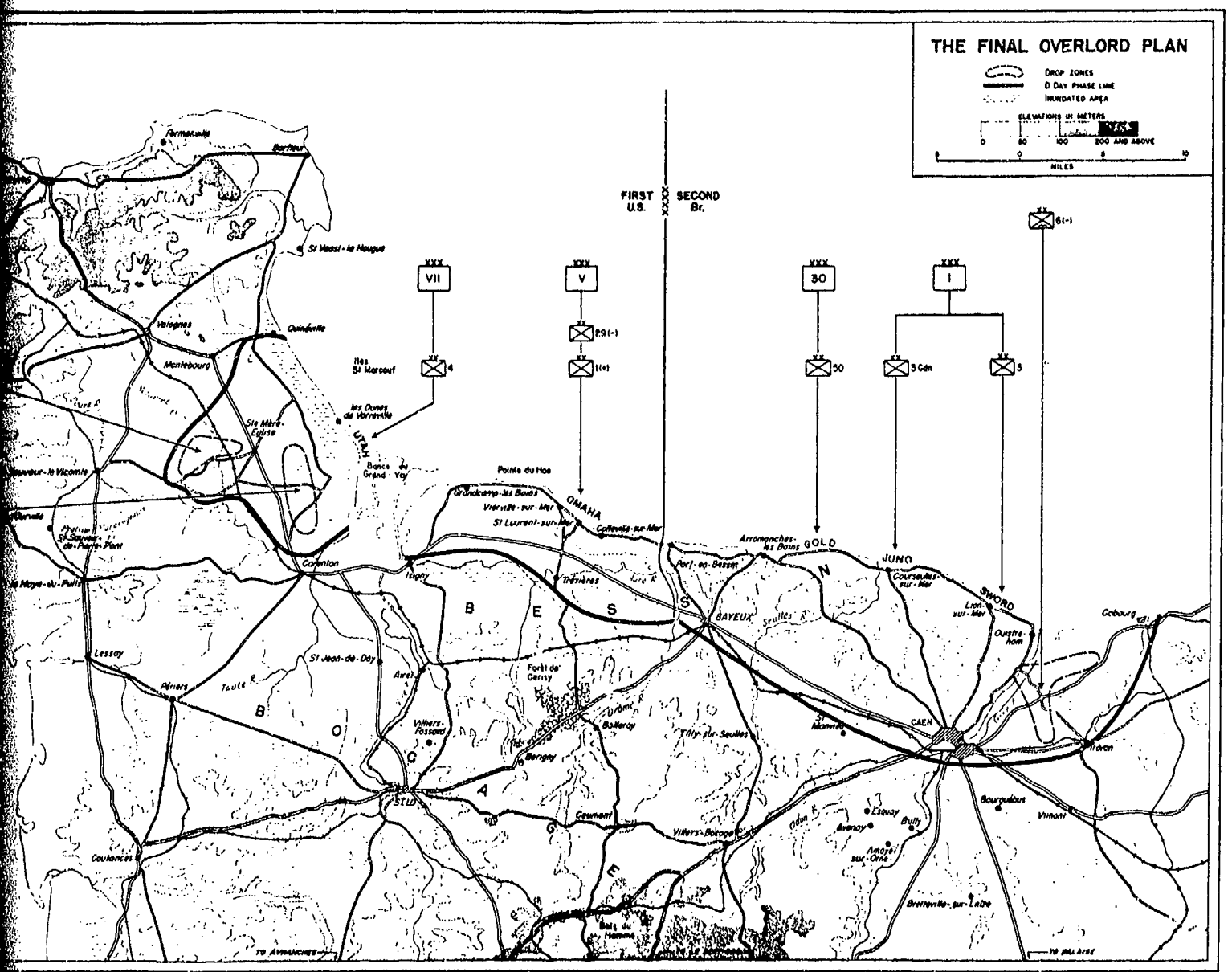


Figure 9. The final Overlord plan[43]

Omaha) and Admiral Moon (Force Utah), were to land the V and VII Corps on the assigned beaches, under the cover of supporting gunfire provided by the Western Task Force. Immediately following the 1st Infantry Division on Omaha was the 29th Infantry Division. Thereafter, the forces ashore were to build up to 13 infantry and two armored divisions by D plus 3 days. It was believed that the maximum enemy buildup to oppose our landings would amount to 18 to 20 divisions, including eight Panzer divisions.

The D-day objective of the V Corps involved a movement inland a little over 4 miles, while that of the VII Corps required joining up with the airborne divisions some 6 to 7 miles in rear of the beach. It was intended to land 176,500 troops with 20,100 vehicles on D day and D plus 1. The operation would involve some 4000 ships and over 5000 landing ships and craft.

Defenses

A rather complete intelligence picture of the enemy plans for the defense of Fortress Europe was available to General Eisenhower and his planners. In February, G-2 estimated that some 50 infantry and 10 Panzer divisions faced our troops. Of this total, seven infantry and two Panzer were in or near the area selected for the American assault. G-2 further estimated that maximum possible buildup by D plus 3 would be 18 to 29 divisions, including eight Panzer. This estimate of the enemy troops was almost entirely verified by operations soon to follow.

The dispositions of these forces, together with a considerable number of coastal defense and field artillery positions, were based on the assumption that the supply of an invasion force ashore would require the possession of one or more major ports. For this reason, the major defenses, both in troops and coastal defense artillery, were concentrated around the harbors. Coastal areas between these ports were protected by a thin crust of strongpoints, backed up by some fixed works and Panzer reserve divisions.

The differences in hydrographic conditions of the approaches to the landing beaches, as compared with those in the Pacific, are worth noting. First, there was a tremendous tidal range of 18 to 23 feet, with the slope of the beach averaging about 1/180, which would result in landing ships and craft grounding several hundred yards from the high-water mark. The tidal flat formed by the interval of high and low water was covered in part by a series of obstacles which the Germans had begun to erect in early April, under orders from General Rommel. The obstacles were emplaced in three rows, with varying gaps between rows. The seaward row consisted of steel gates, about 9 feet high, and the inner row consisted of stakes and ramps designed to rip the bottoms out of landing craft. The inshore row consisted of hedgehogs, made of angled steel girders or concrete. Most of these obstacles were mined

to prevent their ready removal. On Utah, the obstacles were neither as complete nor as numerous as these covering Omaha. The selection of H hour was strongly influenced by the necessity of removing these obstacles during favorable tidal conditions that would permit engineer teams to function.

Omaha Beach lay in the 53-mile sector defended by the 716th Infantry Division--a second-line unit of two infantry regiments and two to three artillery battalions, typical of the units assigned to the beach defenses. Fifty percent of the personnel in these divisions were mostly Russians and Poles. Morale was reportedly low.

G-2 estimated that the 12 Omaha strongpoints were manned by a reinforced battalion of 800 to 1000 men. Local reserves of the division were estimated as three battalions, of which only two were believed near enough to counterattack, with time of arrival at Omaha estimated to be H plus 2 or 3 hours. However, it was known that the major counterattacking force would come from the mobile reserves, the nearest being the 352d Infantry Division (a triangular field division with front-line experience) reported at St. Lo some 20 miles away. It was estimated that one regiment could reach Omaha by the afternoon of D day. Unfortunately, one battalion of this division had actually reinforced the beach strongpoints prior to D day, thereby doubling the troops assigned to the Omaha defenses and, of more importance, upgrading the quality of the defenders.

The terrain inland from the two assault beaches differed significantly. Utah was backed by a sea wall covering the whole beach. In the southern half, the terrain immediately inland from this sea wall gave way to low sand dunes, which at their highest never exceeded 30 feet. The northern half of the beach gave way to 200 to 500 yards of level grassy area. Behind the dune line and the grassy area, the terrain blended into a low meadow, which had been flooded to 2-1/2 to 4 feet simply by damming the drainage ditches that opened into the sea.

On the other hand, the terrain at Omaha offered better possibilities for the defense. Here the tidal flat gave way to a bank of coarse rock or shingle, sloping up steeply to a height of approximately 8 feet. On the eastern two-thirds of the beach, this shingle lay against a low sand embankment, while on the western third of the beach, the shingle piled into a sea wall, varying in height from 4 to 12 feet. Between the dune line or sea wall and the inland bluffs, there was a level beach area, reaching its widest point at the center of the 7000-yard beach area. Bluffs, ranging in height from 100 to 170 feet, rose sharply from the beach flat and dominated the whole beach area. The slopes of these bluffs were generally steep, but in varying degrees, being the steepest at the western end. Along most of the beach, the bluffs ended in a clear-cut crest line. At five points along this 7000-yard beach, wooded draws sloped inland forming beach exits.

Each of the 12 strongpoints at Omaha Beach was a complex system of elements including pillboxes, gun casemates, open positions for light guns, and firing trenches, surrounded by minefields and wire. The elements were connected with each other and with underground quarters and magazines by deep trenches or by tunnels. Most of the strongpoints were situated near the entrance to the draws, which were further protected by antitank ditches and roadblocks.

While machine guns were the basic weapons in all emplacements, there were over 60 light artillery pieces of various calibers. Eight concrete casemates and four open field positions were designed for 75- to 88-mm guns, 35 pillboxes were occupied by lighter guns, and there were about 18 antitank guns (37 to 75 mm). The heaviest guns were sited to give lateral fire along the beach, with traverse limited by thick concrete wing walls which concealed the flashes of these guns and made them difficult to spot from the sea. Mortar positions were sometimes included in the strongpoints but were more frequently placed behind the bluffs.

The considerable areas between the strongpoints were supposed to be protected by flanking fires, by minefields scattered on the beach flat and the slopes of the bluff, and by occasional trenches, rifle pits, and machine-gun emplacements along the crest. While the line of defense was not continuous, no areas of beach were left uncovered in the pattern of defensive fires. Nearly all weapons, machine guns as well as artillery pieces, were sited primarily to give lateral fires down the length of the beach, and the defense of a given sector usually depended as much on the flanking fire from neighboring positions as on the emplacements in the sector itself.

The defenses of Utah Beach were inferior to those of Omaha in terms of terrain, strongpoints, and manning. At Utah, the ground behind a low sea wall sloped upward very gradually, reaching a maximum elevation of 30 feet. There were seven strongpoints armed with machine guns and antitank weapons, supplemented by two 88-mm guns, a 4.7-inch gun, and a 75-mm gun. The defenders amounted to a battalion of about 800 men from a second-line defensive unit. They had not been stiffened by first-line combat troops, as had the defenders of Omaha Beach.

In the British assault area, the attacking divisions faced a similar maze of strongpoints, backed by local reserves, totaling some 13 battalions of infantry, about 260 guns of all calibers, and about 500 mortars and machine guns. Like the strongpoints at Omaha Beach, second-line defensive units had been bolstered by first-line troops in the landing area of one of the three British assault d sions.

Coastal defense batteries covered the seaward approaches to the landing beaches in both the British and American sectors. The larger-caliber weapons, including 210 mm, were located to protect Cherbourg and Le Havre. Not all of the batteries had been placed in concrete emplacements because of time constraints; nevertheless, the German High Command (particularly the

(U.S. Army Photo SC275816)

Photo 24. Landing beach from German 88-mm gun emplacement on Omaha Beach.

(U.S. Army Photo SC275817)

Photo 25. Omaha beach from a German 47-mm gun emplacement.

Navy, which was responsible for seaward defense) expected that these batteries would seriously interfere with the Allied amphibious assault.

The Allied Command estimated that there were 23 batteries that could bear on elements of the British and American Task Forces in their approach to the landing beaches. One heavy battery of 8-inch guns in concrete emplacements, 11 medium batteries, and nine light batteries could bring fire on the American Task Force ships and boats. About half of the guns were protected by concrete.

The threat posed by these guns led the American Task Force to place the transport areas 23,000 yards offshore, outside the range of coastal batteries. On the other hand, the British apparently had more confidence in the counterbattery capabilities of their heavy ships, since they positioned their transport areas 10,000 to 15,000 yards offshore, well within range of the German coastal batteries.

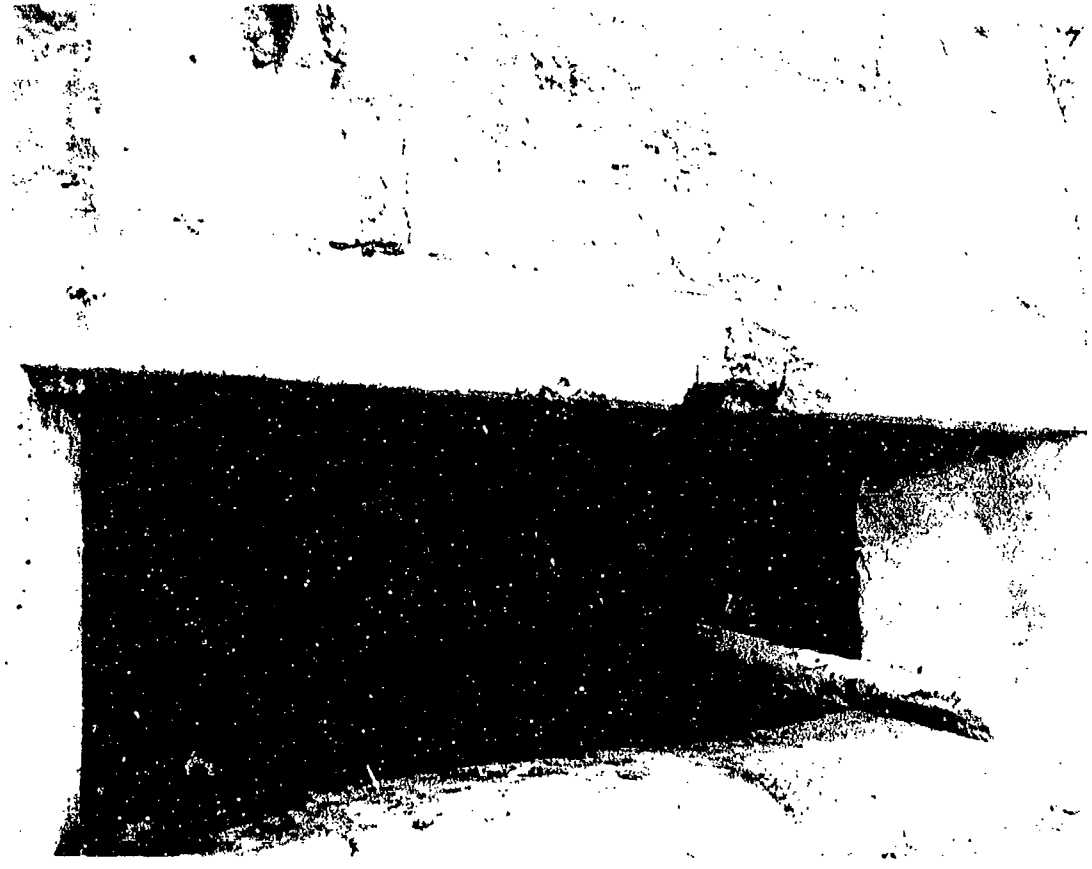
Fire-Support Planning

Fire-support planners were aware of the absolute necessity for suppressing the numerous coastal batteries that commanded the transport area, the boat lanes, and the landing beaches. The disastrous Dieppe raid had also brought home the requirement for a heavy volume of fire delivered on the beach defenses, so that assault troops could break through without crippling losses and costly delay. Unfortunately, at this stage of World War II, only one amphibious assault had been conducted against a heavily fortified beach (Tarawa in November 1943). In that situation, the naval guns had failed to neutralize the beach defenses, primarily due to defects in planning, and serious casualties resulted. Consequently, the planners were pessimistic regarding the effectiveness of naval guns. Some drew the conclusion that naval guns could not effectively neutralize the beach strongpoints or provide adequate close support for the assault infantry. Paradoxically, this concern had the beneficial result of increasing the allocation of naval gunfire support ships. Initially, all fire-support ships were to be provided by the British, but the requirement for additional support resulted in U.S. ships being brought into the theater and assigned to the U.S. assault forces. Even this increase was not considered sufficient, and experimental efforts to augment fire support were continued. Those giving the most promise were Landing Craft Tank modified so that M-4 tanks and self-propelled artillery could fire while enroute to the beach.

In all, when final allocations of ships and craft had been made to the Western (U.S.) Task Force, there were two very old battleships, ARKANSAS and TEXAS; one old battleship, NEVADA; the British monitor EREBUS, with two 15-inch guns; two heavy cruisers, QUINCY and TUSCALOOSA; the British HAWKINS; four light cruisers, British GLASGOW and ENTERPRISE and the French MONTCALM and GEORGES LEYGUES; one Dutch gunboat; and the equivalent of two squadrons of American 5"/38 destroyers, plus three British destroyers with 4.7-inch guns. In addition, the American heavy cruiser

(U.S. Army Photo SC'275766)

Photo 26. Pillbox in the chain of German fortifications along Utah Beach. The crater adjacent to this structure is 40 feet in width and 16 feet long.



(U.S. Army Photo SC275827)

Photo 27. German emplacement on Omaha Beach.

AUGUSTA, the British light cruiser BELLONA, and 17 destroyers constituted a reserve fire-support group. This force totaled some 11 heavy ships and about 30 destroyers. The British bombardment force was composed of 12 heavy ships and 38 destroyers.

Counterbattery Plan. The dominating requirement of tactical surprise dictated that preliminary operations against hostile batteries be limited to air attacks. Beginning with D minus 2, the 9th Tactical Air Force, composed of 2400 fighters and 700 medium bombers, was to bring coastal batteries under attack. However, these operations were severely limited by the necessity of concealing the selected assault areas from the Germans and by other priority commitments, including the attacks on the road and rail networks. Security considerations led to the policy of bombing two coastal batteries outside the assault area for each one in the area. Only about 10 percent of the air effort was directed against the coastal batteries, and only one-third of that effort was aimed at coastal batteries that could menace the invasion forces. In addition to this deception, other measures were taken to convince the Germans that the landing was intended in the Pas de Calais area of northern France where the major share of the German ground forces, 22 divisions, were concentrated. Deception was so successful that not a single reserve German division from this area appeared in front of the Allied lines until approximately D plus 37 days (July 13).

On D day, the responsibility for suppression of the coastal batteries was assigned to the heavy ships of the British and American Task Forces; in essence, one heavy ship for each of the 23 batteries indicated by intelligence. Figure 10 shows individual battery targets, as well as the ships' positions for delivery of this fire.

The vulnerability of float-type observation aircraft organic to the U.S. heavy ships dictated another adjustment. U.S. pilots flying British Spitfires and U.S. Mustangs were to furnish air spotting for the heavy ships in lieu of the organic low-performance aircraft of U.S. heavy ships. Operating from fields in England, these planes had about 45 minutes on station, during which it was hoped that two missions could be carried out. Unfortunately, these planes were not able to carry out training with the ships for which they were to spot on D day. Similar provisions for air spotting for heavy ships of the British task force were planned.

Plan for Beach Neutralization. The neutralization of 12 strongpoints on Omaha Beach featured the use of air forces and fire-support ships. The 8th Air Force was to send 480 B-24s armed with a total of 1300 tons of 100 pounders against these defenses during the period H minus 30 to H minus 5 minutes. The five heavy ships off Omaha were to deliver approximately 750 rounds of 6-inch, 200 rounds of 8-inch, and 385 rounds of 12-inch projectiles at the beach defenses, while five of 11 destroyers, firing from swept lanes about 1800 yards offshore, were to fire a total of 1800 rounds of 4- and 5-inch ammunition from H minus 40 to H minus 5. The remainder of the destroyers

(U.S. Army Photo SC275841)

Photo 28. Coastal defense gun defending approaches to Omaha and Utah beaches.

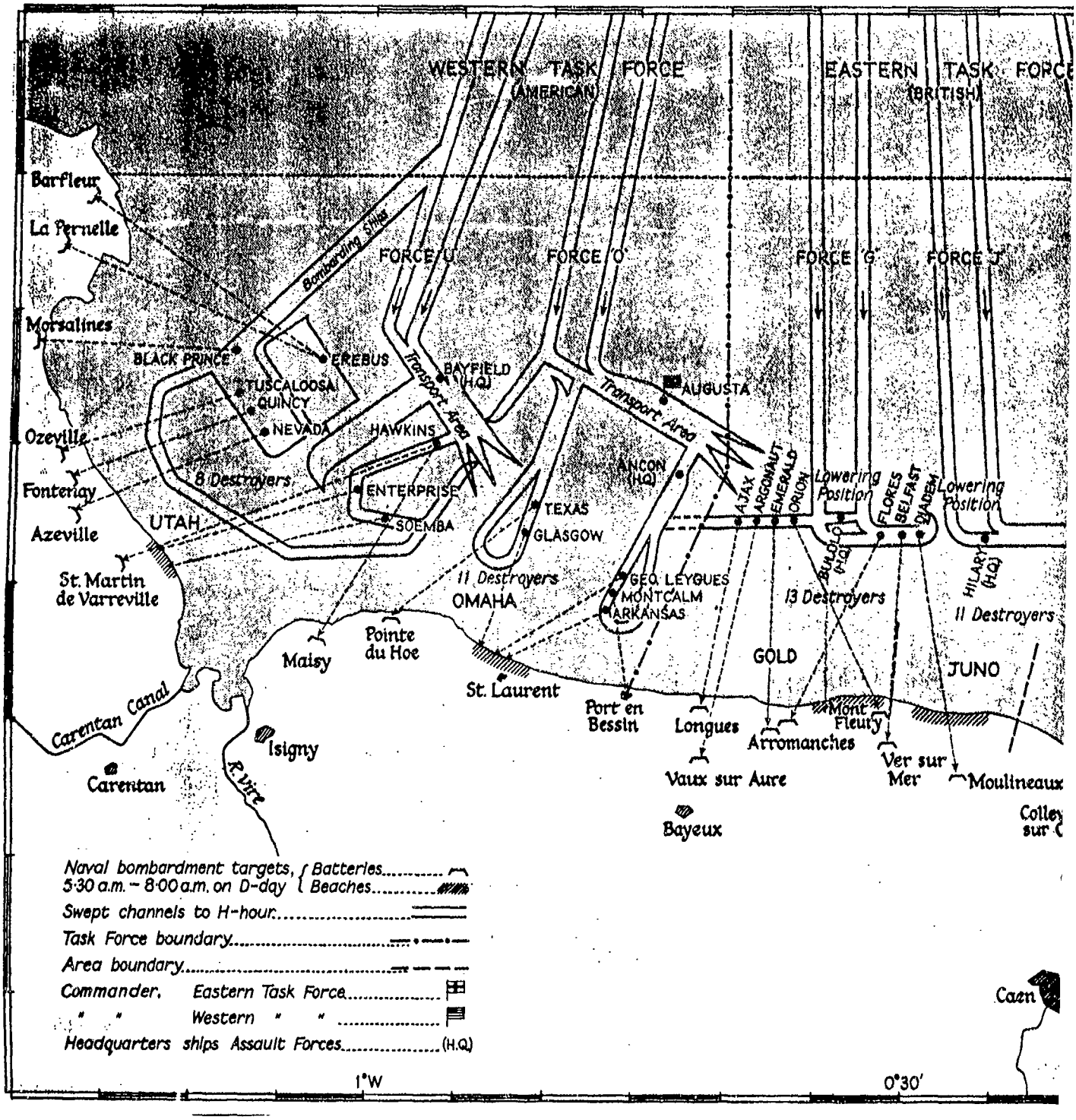


Figure 10. Operatio

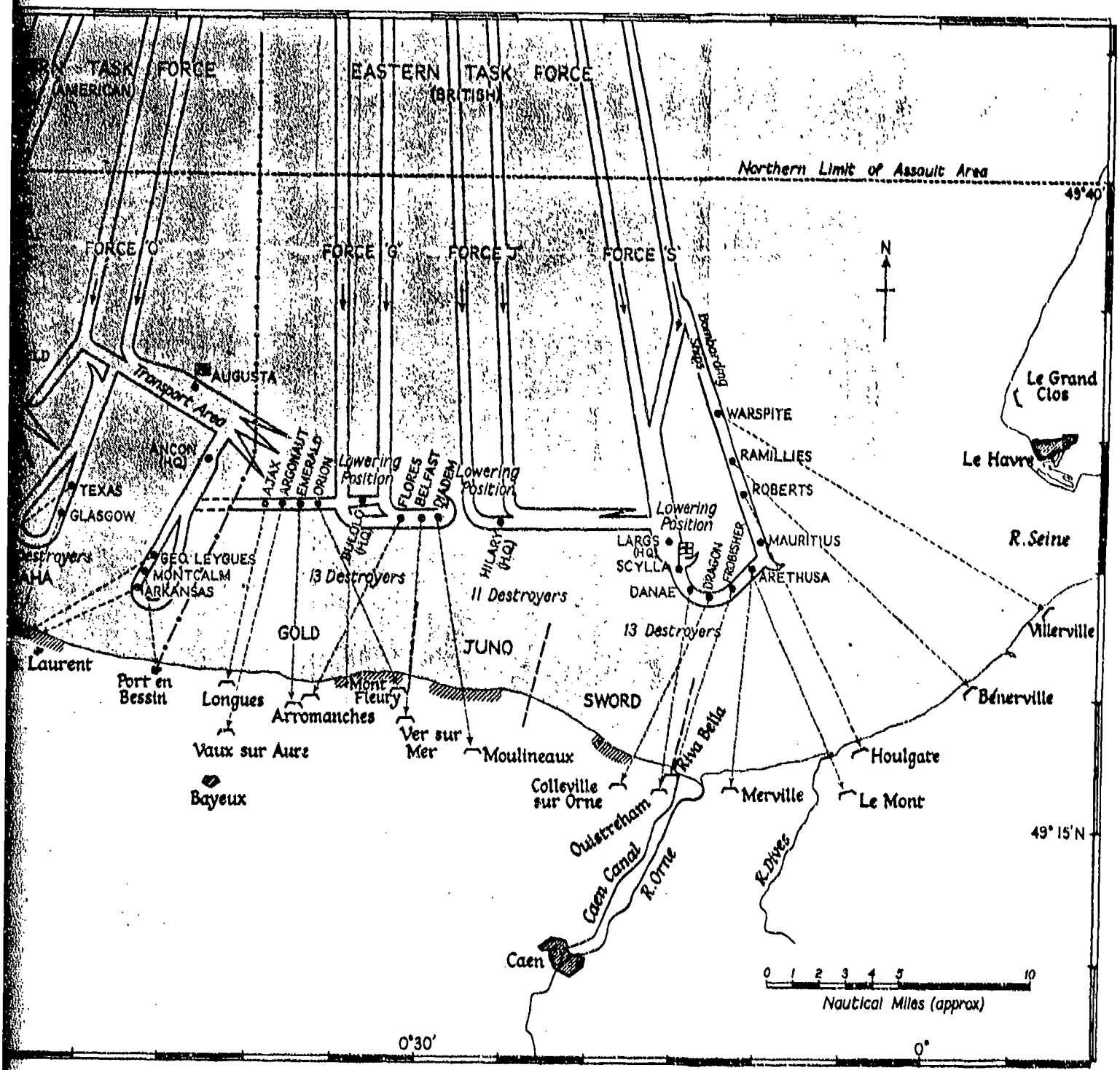


Figure 10. Operation Neptune--the naval bombardment[44]

were to engage targets on the flanks or to stand by awaiting call from their shore fire-control parties. It should be noted that, in spite of concern for the shortage of gunfire support, 11 destroyers fired only the equivalent of one full destroyer load prior to H hour.

The experimental Landing Craft Tank, mounting M-4 tanks and self-propelled artillery, were to add some 8000 rounds of 105 mm. Nine rocket craft were to deliver 1000 rockets each just prior to the landing of the leading waves, all of which were to be directed against the beach defenses.

Recapitulating, then, the strongpoints of Omaha were to receive about 1300 tons of bombs, 600 rounds of heavy-caliber naval ammunition, 8000 rounds of 105s, 9000 rockets, and about 1800 rounds of 4- and 5-inch destroyer ammunition. Thereafter, all fire was to be lifted off the beaches to other targets inland and to the flanks, awaiting calls from the shore fire-control parties with the assault battalions.

The "beach drenching," or neutralization, of the seven Utah strongpoints called for medium bombers of the 9th Tactical Air Force to attack from low level with some 650 tons of bombs during H minus 10 to H minus 2 minutes. Preceding this attack and beginning at H minus 40, NEVADA, QUINCY, and ENTERPRISE were to pound away with about 200 heavy-caliber rounds and 750 six-inch rounds, and four destroyers were to deliver about 4120 rounds of 5-inch ammunition. Fire was to be lifted on a black smoke signal when the leading wave of troops was 700 yards from the seawall. Fires would then be shifted to the flanks and inland. In addition, as at Omaha, five rocket ships were to launch 5000 rockets, while M-4 tanks and self-propelled artillery in Landing Craft Tank were to add about 8000 rounds of 105s. Support craft were to fire machine guns and rockets, lifting on a pyrotechnic signal from the troops. Roughly twice the amount of naval projectiles were to be directed toward the Utah defenses as compared with Omaha. Fourteen British heavy ships and 37 destroyers were to deliver neutralization fires on the strongpoints of Gold, Juno, and Sword landing beaches.

Post-Landing Naval Gunfire Support Planning. Heavy ships were to continue to neutralize coastal defense and field artillery, as well as to bring fire on targets of opportunity, employing air spotting from high-performance aircraft. In addition, shore fire-control parties with the assault infantry battalions were to bring fire to bear on targets of opportunity. The fact that British and French ships also supported U.S. assault units posed technical problems in the adjustment and control of fire from these ships to targets of opportunity. Ultimately, it was decided to use the American spotting procedures with U.S. shore fire-control parties, regardless of the nationality of the ship furnishing support. To ensure that this procedure was understood, U.S. naval liaison officers were assigned to each French and British ship.

At this point, it is necessary to digress from the fire-support plan in order to briefly cover the schemes of maneuver of the assault regiments,

since these were very carefully drawn to allow maximum fire support with tanks. That of the 116th Infantry, landing on the right half of Omaha, is sufficiently typical to use as a guide.

At H minus 5, two companies of amphibious tanks fitted with canvas "floats" were to land, followed by H hour by an additional tank company in Landing Craft Medium. These were to go into action immediately against the strongpoints capable of bringing flanking fire. At H plus 1, four covering companies were to land and assault the beach defenses. The fire from the tanks and the infantry assault were to cover the activities of the engineer demolition units, which were to land from H plus 3 to H plus 8. These units were to clear eight 50-yard gaps in the obstacles, employing demolitions and tank dozers. Thirty minutes was to be allowed for this work, after which the remainder of the two assault battalions were to land. It was expected that the assault regiments would have taken the beach defenses by H plus 2 hours. After reduction of the strongpoints, battalions were to move inland to assembly areas and operate toward their assigned objectives, some 6000 to 7000 yards inland.

The 4th Division's scheme of maneuver on Utah Beach was to land in a column of regiments with two battalions abreast leading. Each battalion was to land 16 tanks and two companies of infantry at H hour, followed by the remainder of the infantry and tank companies at H plus 15. Demolition units for obstacle removal, composed of engineer and naval personnel, were to follow.

Execution of the Fire-Support Plan

Counterbattery. D day was delayed for 24 hours because of unfavorable weather after the invasion force was, for the most part, loaded and at sea. However, the meteorologists believed that there would be a break in the general unfavorable weather pattern, which would permit the operation to go forward. Realizing that any further delay might mean a cancellation for as long as 30 days when conditions would again become favorable, with respect to tides and visibility, Eisenhower decided to take the risk and ordered the operation to go forward.

The decision was a fortunate one, for the German meteorologists had not discovered the break in the weather pattern. As a consequence, German air and naval reconnaissance operations were canceled, based on the belief that the invasion was impossible under the prevailing conditions. As a consequence, the first intelligence of the massive armada approaching the coast of France was when it was sighted off Omaha Beach. Complete surprise had been achieved.

By 0140 on the morning of D day, the heavy ships of Force Utah had reached their bombardment positions and anchored. About 0500, at first light, a coastal battery opened up on two destroyers. BLACK PRINCE, on the exposed flank,

immediately commenced firing, although counterbattery was not scheduled until H minus 40. Orders were given to engage all coastal batteries assigned in the bombardment plan. The six heavy ships of Force Utah commenced firing, employing ship spotting, since air observers were not available until H minus 40. At that time, aircraft spotters came on station and counterbattery continued. Ships' reports indicate that the lack of previous training with these air spotters was a major handicap, initially, but that as firing continued, the results improved.

In spite of Allied concern, coastal artillery had only a minor impact on operations. Typical naval operations, such as minesweeping, transport unloading, fire support, and the ship-to-shore movement, were not adversely affected. Only a small number of landing craft were hit during the ship-to-shore movement. While it is true that artillery fire fell on the landing beaches and continued in diminishing effectiveness until D minus 11, this fire did not seriously interfere with troop operations.

As the assault continued, a plan for bringing all known batteries under immediate fire whenever shelling of the beaches began proved effective. Due to the lack of effective opposition from the German Air Force, it became possible to employ aircraft for artillery spotting on special missions, and ships' observation aircraft rejoined their ships and took up spotting duties by D plus 7.

The experience of the British invasion force was equally favorable, as described in official history.

> Beneath the protection of...fighters, the bombarding warships had taken up their stations, moving to [their] positions. On the most vulnerable and therefore most strongly-defended eastern flank the powerful bombarding force (Force D) included three ships mounting 15-inch guns--H.M.S. Warspite, Ramillies, and Roberts. Shortly before 5:30 a.m. these opened fire on the coastal defences east of the river Orne, Warspite engaging the most distant battery at Villerville from a range of about 30,000 yards, Ramillies and Roberts attacking the batteries at Benerville and Houlgate, respectively. All along the British front the battleships and cruisers opened fire on the targets....
>
> For the most part the reply from batteries ashore was desultory and ineffective and soon faded away almost completely; but a few garrisons showed more spirit and determination. The four-gun battery at Longues was engaged by AJAX at 5:30 a.m., but just before six o'clock it opened fire on the headquarters ship Bulolo anchored in the lowering position in Gold areas. By 6:20 a.m. it had been silenced but soon afterwards resumed the attack on Bulolo, causing the ship to move seaward. After further engagements by Ajax and Argonaut it was at last silenced at about 8:45 a.m.; its reduction had needed a hundred and seventy-nine shells from the cruisers; two of its four guns had been put out of action by direct hits through embrasures. The battery at Benerville, silenced initially by the Ramillies, afterwards opened on the Warspite (which had

to shift berth), and during the day, prompt counter-battery action was called for when some other batteries showed renewed activity.

> The enemy's long-range fire had been effectively subdued by naval bombardment and air attacks, and under cover of the support fire of all arms, the assault craft approached the shore with little to trouble them except the difficulty of navigation in the turbulent sea and sea-sickness, which was not confined to soldiers.[45]

Support of the Landings. Meanwhile, off Omaha Beach, the assault troops started their 23,000-yard jaunt to the beach in a rough sea that often required bailing by the embarked troops. About 4000 yards out, many troops were passed bobbing around in life jackets. These were the tank crews of the 32 amphibious tanks scheduled to land on the right half of Omaha. Rough seas had broken the canvas compartments providing flotation, and only five of these tanks were to reach the beach.

Gunfire on the beach strongpoints started on schedule at H minus 40. Destroyers reported that the fires on the first target were delivered effectively, but when the time came to shift to their second and last prearranged target, so much smoke and dust had built up that visibility was hampered. Nevertheless, they proceeded, losing all visibility after the rocket ships laid down their 9000-round barrage. Of the 16 experimental Landing Craft Tank carrying two M-4 tanks, five were lost and did not participate. It is presumed that the remainder fired their 6000 rounds of 105s, no doubt, severely handicapped by the rough sea and reduced visibility.

The major failure in the fire plan was the absence of the 480 B-24s and their sorely needed 1300 tons of bombs. No bombs were seen by any observer on the beaches. What had happened? About a week before D day,

> ...the CG 8th Air Force informed SHAEF and First Army that unfavorable weather on D-day would necessitate the use of blind bombing equipment, with which a dispersal of as much as 7,000 feet would be anticipated in an attack on a pin-point target. The night before D-day, the 8th Air Force decided that it would be more beneficial if the number of bombs dropped along the shore line were reduced and if a majority of them should be dropped in the communication and reserve areas behind the beach proper. This would lessen to a considerable degree the effectiveness of the bombing on assigned targets, but, at the same time, it would reduce to a negligible factor the possibility of dropping any considerable number of bombs on the assault craft and naval forces that would be approaching the shore line. A delay of from five to thirty seconds was ordered in releasing bombs which would have the result of locating the center of the bomb patterns some two

> miles inland. In addition, it is believed that warnings to the bombardiers against premature bombing may have led bombardiers delay further the release of bomb loads.[46]

The Commander of Western Task Force and his subordinates who had promulgated the gunfire plan for Omaha were not aware of this significant change in the fire-support plan.

Thus, the fire plan for the neutralization of the strong defense had been severely weakened by omissions, and the assault infantry had to pay the price. They had other troubles too. The set of the current to the eastward proved to be stronger than anticipated, and, in spite of all the effort that had been put into actually beaching the boats in their assigned sector, most of the landing craft during the first hour came in east of their appointed sector.

> Sometimes the margin of error was as much as 1,000 yards or more. More often the error was in the order of a few hundred yards, but this could be enough to undo assignments for taking out a key stronghold. The resulting difficulties of the boat teams were heightened by frequent separations of sections of the same company and some unit formations of landing craft were broken up enough to result in widely scattered landings.[47]*

Ninety-six tanks, the demolition units, and eight assault companies were to carry out the first assault missions. As already noted, only five of the 32 amphibious tanks reached the shore. Of the remaining 16 tanks in this battalion, 11 reached the beach and took up the assault. In the 116th Regiment's sector, half of the first tank company to land lost eight of 16 tanks to artillery fire. The remaining 32 landed without initial losses. Thus, of some 96 tanks, only 43 were ashore firing.

The demolition units, faced with the task of blowing lanes through the numerous obstacles, did not fare much better. Half of the 16 teams reached the beach 10 minutes late, and, of these, only five hit their appointed sectors. Of 16 bulldozers, only six reached the beach, and three were immediately disabled by artillery. In spite of heavy enemy fire that caused over 40-percent casualties, and interference from own troops, six complete gaps and three partial gaps were blown, as opposed to the goal of 16 gaps. However, the loss of the gap-marking equipment vitiated this work almost entirely.

The assault infantry in landing craft came under fire beginning a quarter-mile out, then grounded on sandbars 50 to 100 yards from the low-water mark and suffered their heaviest casualties just after landing. Small arms, mortars, and artillery concentrated on the landing craft, but the worst casualties were caused by automatic weapons.

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* This material is paraphrased.

Survivors from some craft report hearing the fire beat on the ramps before they were lowered, and then seeing the hail of bullets whip the surf just in front of the lowered ramps. Some men dove under water or went over the sides to escape the beaten zone of the machine guns. Stiff, weakened from seasickness, and often heavily loaded, the debarking troops had little chance of moving fast in water that was knee deep or higher, and their progress was made more difficult by uneven footing on the runnels crossing the tidal flat. Many men were exhausted before they reached shore, where they faced 200 yards or more of open sand to cross before reaching cover at the sea wall or shingle bank. Most men who reached that cover made it by walking, and under increased enemy fire. Troops who stopped to organize, rest or take shelter behind obstacles or tanks merely prolonged their difficulties and suffered heavier losses.

There were fortunate exceptions to this general picture. Several hundred yards of bluff west of les Moulins draw were obscured in heavy smoke from grass fires, apparently started by naval shells or rockets. Blanketed by this smoke, enemy guns and emplacements were unable to deliver effective fire on the end of Dog Beach, and units landing there were comparatively unscathed.

Perhaps the worst area on the beach was...directly in front of the strongpoints guarding Vierville draw.... Company A of the 116th... with Company C of the 2d Rangers on its right flank...came in on their targets. One of the six LCA's carrying Company A foundered about a thousand yards off shore.... At H+6 minutes the remaining craft grounded.... Mortar fire scored four direct hits on one LCA, which "disintegrated." Casualties were suffered all the way to the sand, but when the survivors got there, some found that they could not hold and came back into the water for cover, while others took refuge behind the nearest obstacles. Remnants of one boat team on the right flank organized a small firing line on the first yards of sand.... In short order every officer of the company...and most of the sergeants were killed or wounded. Some of troops were later able to make the sea wall by staying in the edge of the water and going up the beach with the tide. Fifteen minutes after landing, Company A was out of action for the day. Estimates of its casualties range as high as two-thirds.[48]

In summary, of the eight companies landed in assault, only one on the extreme eastern flank of the beach was ready to operate as a unit after crossing the lower beach.

The next scheduled landings called for the remainder of the assault regiments to land from H plus 30 to H plus 70. By and large, the later waves of the assault infantry fared much better--five of the eight companies landing, with

sections well together and with relatively light losses. Some had been shielded by burning grass, but the better fortune was probably due to the fact that, as landings increased in volume, enemy positions still in action were not able to concentrate on the many targets offered.

As headquarters units arrived about 0730, they found much the same picture in whatever sector they landed. Along 6000 yards of beach, behind seawall, or shingle embankment, elements of the assault force were immobilized in what might well appear to be hopeless confusion. Engineers, naval personnel from wrecked craft, shore fire-control parties, and elements of other support units were mixed in with the infantry. In some areas, later arrivals found it impossible to find room behind the shingle and had to lie in the open sand. Behind them, the tide was drowning wounded men and carrying bodies ashore. Disasters to the later landing waves were still recurring. At 0800, German observers on the bluff a few hundred yards away were justified in reporting that the invasion was stopped at the water's edge.

The shore fire-control parties had begun their landings with the assault units at Hplus 30. Only one of these succeeded in establishing early communication, resulting in effective fire being delivered. This party, unfortunately for the main assault, was with the 2d Rangers, which had landed well to the right flank and so did not affect the operations on the beach proper. Communications were established at 0728, and the first round from the destroyer SATTERLEE was on the way some 3 minutes later. Thereafter, SATTERLEE rendered continuous support on one target of opportunity after another. It is not unreasonable to presume that the Rangers were maintained in their precarious position atop a cliff by this timely and effective fire.

As for the remainder of the assault units, it can only be positively determined that destroyers CARMICK and DOYLE established communications with the shore fire-control parties of two assault battalions by H plus 100. Neither of these parties designated any targets, due in the CARMICK's case to the spotter's leaving the radio transmitter key open so that he could transmit but not receive. CARMICK states in her report that she could hear the very uncomplimentary remarks of the spotter as he waited for a reply to his urgent transmission.

As a result of a combination of unfortunate incidents, casualties to personnel and radio equipment, separation of parties from command elements of their battalions, there was a resultant reticence to designate targets, even when satisfactory communications were established. When officers were contacted for permission to open fire, advice was usually given not to fire, due to the proximity of troops and a lack of knowledge of what advances, if any, had been made. One shore fire-control party contacted General Cota, the ADC of the 29th Division on the beach about 0730, for permission to fire. It was denied because of the proximity of own troops to the target.

Without effective contact with shore fire-control parties and under strict orders not to fire without clearance from these parties, ships could do nothing but stand by, helpless to intercede. A commander of a fire-support division of destroyers for Omaha said:

> It was most galling and depressing to lie idly a few hundred yards off the beaches and watch our troops, tanks, landing boats, and motor vehicles being heavily shelled and not be able to fire a shot to help them just because we had no information as to what to shoot at and were unable to detect the source of the enemy fire.[49]

But a break in the stalemate was to come from an unexpected source:

> LCT-30 drove at full speed through the obstacles in front of Exit E-3 with all weapons firing on the emplacements to the front. The craft beached and continued to fight it out, silencing the enemy guns. At the same time, LCI(L)544 also rammed its way through the obstacles, firing on machine guns in the house at the exit. It landed its men and, at the same time, kept up the bombardment knocking out the nests. The action of these craft had two results--they facilitated further advances up the E-3 draw and established the fact that the beach defenses could be breached by ramming. Other craft followed their example, and from then on landings were almost continuous. A destroyer began firing at German positions, first concentrating on the emplacements and houses at Les Moulins at D-3 draw, then continuing to the east. This fire was highly effective and played an important part in neutralizing the enemy defenses.[50]

The action of a destroyer, probably CARMICK, was the result of an order by Admiral Hall, issued over the TBS at 1016, directing "all ships to close the beach and render all assistance possible." This was all the authority the destroyers needed, and within 30 minutes, eight or nine were in position from 800 to 1000 yards from the beach. CARMICK, watching the fire of some tanks, used the point of impact of the tank projectiles as an aiming point. She fired on a total of about 12 targets of opportunity during late morning and early afternoon. HARDING fired on three targets of opportunity and then shifted to the demolition of all houses and structures off Dog Green, completing this mission around 1437 with the aid of TEXAS. Similarly, the other destroyers engaged beach targets.

> On the right of E-1, a battalion found a pillbox still in action. Fire from a tank supported the infantry in the first attempt but the attack was stalled. A shore fire control party in contact with a destroyer about 1,000 yards offshore coordinated its action with the infantry; the DD's guns firing

only a few yards over the the crowded beach got a hit about the fourth round and the pillbox surrendered. Twenty Germans were taken prisoner. Thus, at about 1130, the last German defenses in front of E-1 draw were reduced. E-1 became the main funnel for movement of troops off the beach.[51]

A V Corps observer, lying off the beach in a landing craft, sent the following message at 1140, "Troops advancing up west slope Exit E-1, thanks due destroyer," and another message sent just before noon, "Troops moving up slope of Fox Green and Red. Join you in thanking God for our Navy."[52]

Beginning then with opportune action of a few landing craft, followed by the ordering into action of all destroyers with a blanket order to do all in their power to assist the troops, the situation improved rapidly.

By 1500, further improvement in the situation was apparent. Artillery fire still covered all exits, and small arms fire continued around D-1 and D-3 draws, but troops on the eastern half were less harassed. Movement off the beach continued. By evening of D day, while far short of the assigned objectives, a precarious foothold had been established. Our forces had penetrated inland about 1500 to 2000 yards and were engaged in driving elements of the enemy from the towns of Colleville and St. Laurent. Shore fire-control communications improved slowly throughout the day as personnel and material casualties were remedied, so that by night approximately half of these teams were in communication with their assigned ships.

The difficulties experienced by assault troops on Omaha were in marked contrast with those experienced on Utah Beach. The landing of assault elements on Utah succeeded surprisingly well, assisted by the fire of support ships and the bombing of the 9th Tactical Air Force, in spite of the loss of two control vessels which resulted in the displacement of the leading assault waves some 1000 yards east of the intended landing point. In fact, this error seemed to assist the landing, for the obstacles and defenses in this area were less formidable. The amphibious tanks launched in relatively calm waters landed 20 minutes late, but this did not seem to delay the infantry assault, which quickly overran the beach defenses, apparently before the strongpoint defenders could recover from the shock of the pre-H-hour fire. In this connection, the fire support was more closely integrated with the troop movement to the beach and did not lift until leading elements were within 700 yards of the strongpoints, while machine-gun fire from support craft was held in even longer. Then, too, the defenses had been subjected to twice the 5-inch firepower as compared with those on Omaha. In short order, elements of the 4th Division were on their way inland to join the airborne divisions, and, by evening of D day, contact with one of these divisions had been made. Thus, the landing that had been expected to cost the greatest number of casualties had succeeded beyond all expectation.

Post-Landing Fire Support. Fire support of 1st Army did not end with the beach assaults. Initial shortages of artillery and tanks continued to put a premium on naval gunfire support, particularly on D plus 1 and 2. Even after the landing of artillery (155-mm and 8-inch), the range and weight of ordnance delivered by main batteries of heavy ships made a unique and continuing contribution to the success of the advance, while destroyers with the lighter weapons were still effective in supporting movement of the infantry along the coastal approaches to Cherbourg. In addition to the continuing responsibility for counterbattery directed at coastal batteries and field artillery, targets ran the gamut, the most important of which were infantry and tank counterattacks the Germans were mounting, with the hope of containing the Allied bridgehead. TEXAS, NEVADA, ARKANSAS, and heavy cruisers took such targets under fire on numerous occasions. As an example, on 9 June, NEVADA fired on a concentration of 90 tanks and vehicles using 70 rounds of 14-inch projectiles at 23,500 yards. Her air spotter reported all tanks or vehicles destroyed or damaged. On 11 June, when NEVADA returned to Plymouth for ammunition and replenishment, she had expended 926 rounds of 14-inch and 3490 of 5-inch ammunition. Similarly, TEXAS took a German tank and troop column under fire and dispersed it.*

The heavy ships also made significant contributions to attacks against German positions, particularly those centered around the numerous stone villages and towns which became natural German strongpoints. For example, H.M.S. GLASGOW and TUSCALOOSA supported attacks on the towns of Isigny and Montebourg. Destroyers contributed to troop advance by taking coastal targets of all types under fire, including artillery, infantry counterattacks, and enemy positions. Destroyer JEFFERS fired on three coastal batteries and then shifted fire to a pillbox; after firing ten salvos, a white flag was raised and the Germans surrendered to U.S. troops. By D plus 9, U.S. troops had advanced beyond the range of ships' batteries, and naval gunfire support was terminated.

A similar pattern of support was obtained in the British invasion sector. An average of two battleships, up to 10 cruisers, and a few destroyers were employed regularly in similar missions. Since the bulk of the armored counter-attacks were directed against the British sector, heavy-gun support was even more important than in the American sector and was to continue until 17 July--

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* Additional examples of post-D-day missions on 8 and 9 June include: ARKANSAS--138 twelve-inch rounds on troops, tanks, vehicles, and batteries; TEXAS--130 fourteen-inch rounds in support of an attack on Isigny and German counter-attacks in response to U.S. assaults; H.M.S. GLASGOW--120 eight-inch rounds in support of attack on Isigny; NEVADA--five missions against batteries and strongpoints with 14-inch rounds; TUSCALOOSA--18 missions on various targets with 8-inch rounds; QUINCY--138 eight-inch rounds on eight missions; DD LAFFEY--11 missions in support of attacks by 4th Infantry Division on 8 June and 12 missions on 9 June.[53]

a period of 41 days. As an example of this type of support, the British official history reports:

> At about half past six aircraft reported forty German armoured fighting vehicles [in close proximity to British troops]. On the request of a forward observer bombardment officer these were engaged by H.M.S. Orion [8-inch guns] about an hour later...three armoured vehicles were hit and the remainer scattered.[54]

But the best testimony regarding the effectiveness of the heavy-caliber naval guns comes from the Germans themselves. Even before the Allied invasion, General von Rundstedt was aware that on Sicily and at Salerno, German reserves, although located near the coast, had been unable to counterattack across open terrain under heavy Allied naval gunfire. He had pointed out to Hitler's headquarters that armor could not influence the battle unless German aircraft, particularly torpedo bombers, could interfere with the firing of Allied heavy ships. As we have seen, the German Air Force was unable to intervene in force, nor was the German force of destroyers, torpedo boats, and submarines successful in attacking the ships. Even so, the actual impact of the naval guns came as a distinct shock. Contemporary records of the German High Command bear this out. On 10 June, von Rundstedt's War Diary noted that "the Seventh Army is everywhere forced on the defensive."

The following day, von Rundstedt and Rommel met to discuss the serious situation. Both agreed that success of any counterattack plan was jeopardized by Allied air and naval gun superiority. Specifically, they reported that:

> The guns of most enemy warships have so powerful an effect on areas within their range that any advance into this zone dominated by fire from the sea is impossible.[55]

In a subsequent meeting with Hitler in France on 17 June, Rommel and von Rundstedt met to discuss the deteriorating military position and measures to be taken. Hitler himself was so impressed with the impact of the Allied heavy guns that he caused a message to be sent to Admiral Doenitz, the German Naval Commander in Chief that stated:

> Even Hitler, in his directive of 29 June, "made it clear that he regarded the destruction of the enemy's battleships of outstanding importance."[56]

On 29 June, General Hauser, Commander of the I and II Panzer Corps, reported that the Panzer counterattack:

> ...was scheduled to begin at seven o'clock in the morning but hardly had the tanks assembled when they were attacked by fighter-bombers. This disrupted the troops so much that the attack did not start again till two-thirty in the

> afternoon. But even then it could not get going. The murderous fire from naval guns in the Channel and the terrible British artillery destroyed the bulk of our attacking force in its assembly area. The few tanks that did manage to go forward were easily stopped by British anti-tank guns.[57]

On the following day, Army commanders under Rommel and von Rundstedt demanded an immediate evacuation of the "killing ground" of Caen, where most of the Panzers were concentrated, and a retirement to a new line beyond the range of naval guns that were causing appalling casualties and disruption in the assembly areas. Rommel passed this appreciation to von Rundstedt, which was forwarded to Hitler with von Rundstedt's endorsement. Hitler's reply was brief and to the point:

> The present positions are to be held; further breakthrough by the enemy will be prevented by tenacious defense or by local counterattacks; assembly of armor will continue.[58]

However, the heavy naval gun action and support of forces continued until D plus 41, when the forces advanced beyond the range of bombarding ships.

Conclusions

The Allied naval guns played a major role in negating German defensive strategy. These weapons were significant, if not decisive, in the success of the Normandy invasion. The contribution of the guns had an impact on all aspects of German defensive strategy, as follows:

1. Partial destruction and neutralization of the extensive system of German coastal and field artillery batteries.

2. Partial neutralization of the beach strongpoints on four of the five landing beaches prior to and during the landing, thereby assisting assault troops in the penetration of the beach defense system. On Omaha Beach, neutralization of the beach defenses was not achieved; however, subsequent intervention by destroyers after the landing was the key element in the successful breakout.

3. Participation in neutralization and destruction of positions occupied by German reserves, particularly those positions organized to take advantage of protection afforded by stone construction in French villages and hamlets.

4. Participation in the neutralization and destruction of German infantry and armored counterattacks.

KOREA—25 JUNE 1950 TO JULY 1953

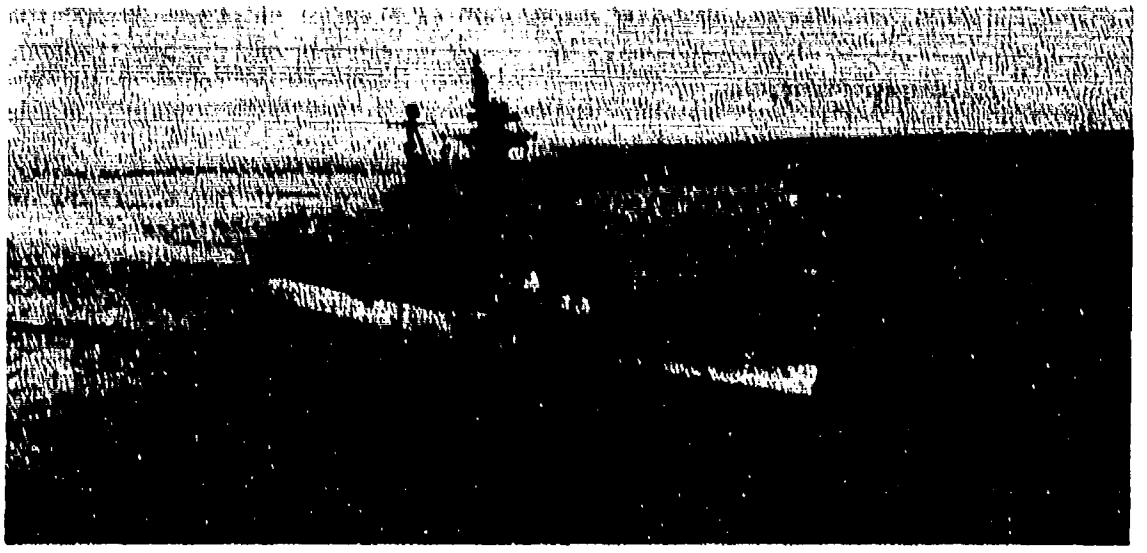
Korea was a classic demonstration of projecting sea power. In the 3 years of U.S. involvement, the naval contribution to the campaign covered a broad spectrum of support activities. First and most important, the absolute control of the sea and air and the imposition of a naval blockade denied the communists the use of the sea lanes for troop movement and logistic support and, of equal importance, secured the seaward flanks of the ground forces. The amphibious weapons system, with its associated transports, landing craft, fire-support ships, carrier aircraft, and ancillary forces, together with a trained landing force of marines, made the Inchon strategy of MacArthur a reality. Amphibious withdrawals at Hungnam, Pohang, and Inchon extricated U.S. and Korean troops from varying degrees of communist military pressure. Amphibious demonstrations and raids kept the communists off balance and forced them to withhold significant reserves to meet potential amphibious landings behind the lines. Also, as in World War II, support of the ground forces by air and, on the coastal flanks, by naval guns was important to the ground campaign. Finally, the interdiction of communist ground lines of communication by carrier air and naval guns forced the communists to invest enormous resources in order to maintain a viable level of resupply for their ground forces.

BACKGROUND

At 0400 Sunday morning, 25 June, 12 divisions of the North Korean Peoples Army struck the South Korean Army of six divisions and sent them reeling in disorder to the south. News of the invasion triggered a state of frenzied activity in Washington. By 0200 the next morning, a decision had been made to seek U.N. intervention, and by 1500 on the 27th, the U.N. Security Council voted in favor of a U.S. resolution, calling on North Korea to desist from aggression. Happily for the success of the resolution, the Soviet representative chose to boycott the meeting. In the meantime, MacArthur, Commander in Chief, Far East (CINCFE), had been directed to evacuate U.S. nationals from Korea by sea and air, and the 7th Fleet was ordered to Korean waters. On the 27th, U.S. air and naval support was directed to support the Korean Armed Forces. In the afternoon, the Security Council acted affirmatively on a U.S.-sponsored resolution, calling upon U.N. members to assist Korea in repelling the attack.

On the 29th, gloom deepened with MacArthur's warning that South Korea could not contain the aggression without reinforcement by U.S. ground forces. Authority to commit Japan-based U.S. forces was promptly passed to CINCFE. On the 4th of July, a naval blockade of Korea by U.N. forces was broadcasted worldwide.

> The President of the United States, in keeping with the United Nations Security Council's request for support to the Republic of Korea in repelling the Northern Korean invaders and restoring



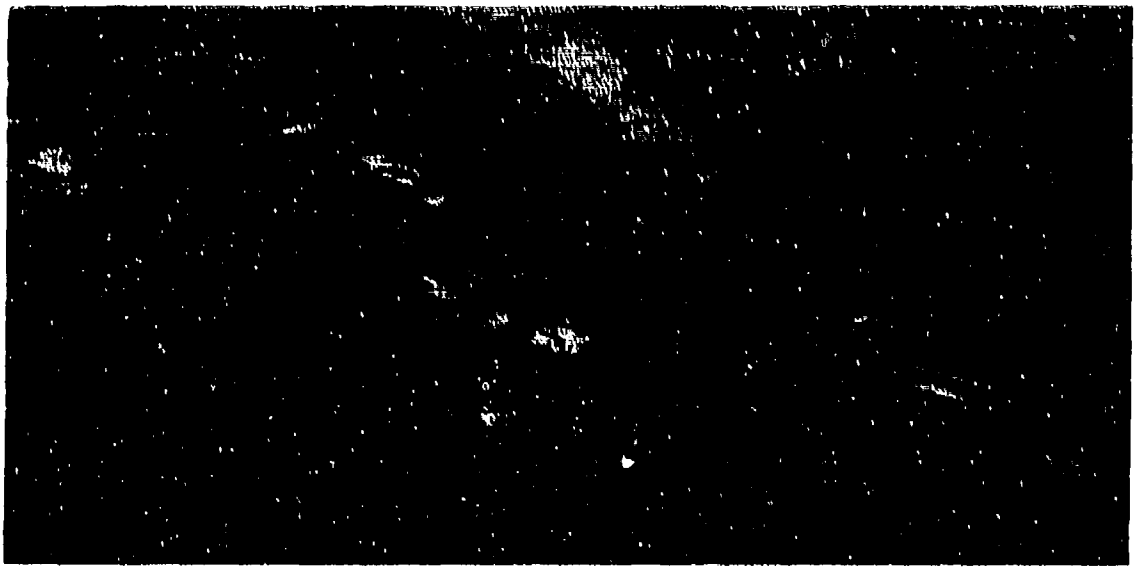


Photo 29. Battleship NEW JERSEY and heavy cruisers BREMERTON and ST PAUL operating in Korean waters.

peace in Korea, had ordered a naval blockade of the Korean coast.[59]

In accordance with international law, Admiral Sherman, Chief of Naval Operations, defined the blockade as applying to all ships, other than warships not under U.N. command, excepting North Korean naval forces. Further, the imposition of a legal blockade meant that the entire coastline had to be under surveillance once every 24 hours by ship. Aircraft surveillance could not be substituted. The imposition of the blockade was to lead an unprecedented involvement of U.S. naval forces, and the coastline was to be held under continuous observation until the armistice in July 1953.

In the meantime, Commander in Chief, Naval Forces, Far East (CINCNAVFE), Admiral Joy, was marshaling his meager naval resources. On the night of 28 June, he issued his first operation order, informing his forces that President Truman had ordered the fullest possible support of South Korean Forces south of the 38th parallel to permit these forces to reform, and directed the 7th Fleet to prevent a communist invasion of Formosa. Task Force 95.5, composed of JUNEAU (a light cruiser armed with 16 five-inch guns) and four SUMNER-class destroyers, was designated the South Korean Support Group and ordered to patrol coastal waters, oppose hostile landings, and deliver fire support. On the 29th of June, JUNEAU fired the first bombardment of the war at enemy troops moving along the coastal route.

On the same day, the British Admiralty placed Royal naval units at the disposal of Admiral Joy; on the next day, similar action was taken by the Australian government. Canada directed three destroyers to sail, while New Zealand set two frigates in motion toward the Yellow Sea. British reinforcements were not insignificant; they consisted of a light carrier and, more importantly from the standpoint of gunfire support, a total of six light cruisers.

On the evening of 29 June, COMNAVFE requested the UK naval command to reinforce Admiral Higgins Support Group with JAMAICA (CL) and four frigates. This combined U.S. and UK force of two light cruisers, four destroyers, and four frigates was responsible for establishing the blockade off the east coast, with similar responsibilities assigned to a UK naval task group operating in the Yellow Sea. As the war progressed, this force was to be augmented, although not simultaneously, by U.S. heavy cruisers ROCHESTER, TOLEDO, BIRMINGHAM, ST. PAUL, and LOS ANGELES. MISSOURI was to join from the Atlantic Fleet, while the mothballed IOWA, WISCONSIN, and NEW JERSEY were recommissioned and sent into action. The destroyer types were to grow from one division to nearly 50 in all.

STRATEGIC ENVIRONMENT

As events were to prove, the blockading and gunfire-support forces of the U.N. enjoyed almost complete control of the air and the sea. No active

surface naval opposition was to develop, nor did submarines prove to be a factor. However, the possibility of air intervention by Soviet forces did require that carrier forces be protected at all times against such a contingency. Thus, as in the late phases of World War II, naval resources could be almost solely dedicated to the projection of sea power ashore.

Nevertheless, geographic and hydrographic conditions posed both problems and opportunities for naval blockade and support. The western coast, with its 30-foot tides, consisting of a network of embayments, offshore islands, vast mud banks, and numerous shoals and uncharted rocks, presented major problems for naval support operations. On the other hand, the eastern coastline is generally straight, with mountains rising abruptly from a narrow coastal strip containing the east-coast road and rail net. Here, the 100-fathom curve lies close to the shore. Coastal shipping was exposed and fire-support ships could readily fire on the coastal road and rail net (Figure 11). These hydrographic and geographic factors shaped the contribution of naval guns during some 37 months of operations.

GUNFIRE-SUPPORT CONSTRAINTS

Gunfire support was provided under a series of constraints, some of which were temporary, while others were most persistent and continued throughout the 3-year campaign. In the early phases, lack of suitable bombardment charts containing both hydrographic and geographic features of the target area was a considerable handicap, which was only partially overcome by innovative efforts of Fleet gunnery personnel. An enduring constraint in furnishing fire support for U.S. Army and ROK troops on the flanks was the lack of trained naval gunfire officers, shore fire-control parties, and essential communications. Only the 1st Marine Division had organic personnel and communications trained to furnish the link between the ships' guns and the forces ashore. The Air and Naval Gunfire Company of the the Fleet Marine Force, Pacific, with its shore fire-control parties and the tactical air control parties, was seldom assigned to troops on the coastal flanks where it could do the most good. However, considerable ingenuity was demonstrated by the naval forces in establishing links, but support never achieved its full potential because of this constraint.

Spotting of fires for the heavy ships was never adequately solved. Organic helicopters, when available, were useful when hostile antiaircraft fires were limited. Otherwise, ships had to depend on the intermittent assignment of fast-carrier pilots with little or no training in spotting naval gunfire. Unlike in World War II, when specially trained high-performance squadrons were dedicated to the spotting role, no special air spotting means were organized. Reliable damage assessment by air photos was seldom employed (except in assessing damage to interdiction targets such as bridges, rail lines, tunnels, and roads). Nevertheless, in spite of these limitations, the naval guns were

Figure 11. The Korean Theater[60]

to demonstrate their effectiveness against a variety of targets, just as they had in World War II.

THE ENEMY

The nature of the communist enemy, both North Korean and Chinese, and his tactics and techniques differed markedly from those encountered in the Mediterranean and European Theaters. Relatively few tanks were contained in the communist inventory, and they were seldom employed in mass. When the communists took the offensive, gunfire was particularly effective against attacking infantry formations, artillery positions in the open, truck convoys, and supply dumps. On the other hand, when the communists were on the defensive, their burrowing proclivities rivaled those of the Japanese in World War II. Dugouts, bunkers, covered artillery emplacements, and command posts were heavily protected with whatever materials were at hand--concrete, logs, rock, earth, and sand. In order to escape artillery fire, many positions were located on reverse slopes, with forward defenses being manned only when attacks by U.N. forces were imminent.

The interdiction campaign by air and surface forces introduced new target categories for naval guns: bridges, road and rail tunnels, the rail lines, as well as freight locomotives and cars. As the interdiction campaign progressed, the effectiveness of the naval guns against interdiction targets forced the communists to emplace an ever-increasing number of coastal defense guns in order to inhibit the delivery of naval fire. In typical oriental style, these weapons were cleverly concealed and protected to minimize effects of air and gun attack.

COASTAL NAVAL GUNFIRE SUPPORT

Because of favorable hydrographic and geographic conditions along the east coast of Korea, guns were to play an almost continuous major role in support of troops on the eastern flank. On the west coast, where hydrography was unfavorable, the employment of naval guns for support of troops was of less utility, although some support was rendered in operations north of Seoul where conditions were somewhat more favorable than further south. Coastal support was particularly important to ROK forces on the eastern coastal flanks because these forces did not possess the organic artillery resources that characterized the U.S. forces.

Early July found the 3d ROK Division retreating south on the eastern coastal route under pressure by the 5th North Korean Division in plain view of the ships of Admiral Higgin's Task Force 95.5. While some limited support had been delivered by JUNEAU as early as 29 June, just four days after the surprise attack by the North Koreans, more effective support was initiated in direct support of the 3d ROK Division. During the period 6 to 14 July,

forcement from units to the south, the 3d ROK Division regained Pohang, with continuing support from the fire-support group.

On the night of 31 August, the North Koreans launched an all-out counter-attack to crush the forces manning the Pusan perimeter (Figure 13). On the night of 5 September, the 3d ROK Division at Pohang, again under particularly heavy pressure, requested the fire-support ships to call for air support to check an attack that was seriously endangering the division. Air support was not available, but the immediate threat was checked by fire-support ships. Fire by cruiser TOLEDO and destroyer DEHAVEN broke up a tank attack and destroyed enemy artillery, but heavy attacks continued and Pohang was lost on the following day. Additional enemy attacks were even more threatening, and the 8th Army was forced to commit all reserves. Final success at Pusan rested on impending operations at Inchon.

INCHON--THE STRATEGIC MASTERSTROKE, 15 SEPTEMBER 1950

The strategic impact of a successful amphibious operation was never more clearly demonstrated than in the assault at Inchon. As we have seen, for nearly 3 months the U.N. ground forces in southern Korea had been retreating under the onslaught of the North Koreans, until only the narrow confines of the Pusan perimeter remained in U.N. hands. Yet on 15 September, the course of the Korean War was reversed with dramatic suddenness by the Inchon landing. In 10 short days, the Peoples Army of North Korea, which had been on the threshold of victory, was in full retreat to the North, pursued by General Walker's 8th Army.

Inchon was MacArthur's brainchild. A general of lesser stature could never have persuaded the Joint Chiefs of Staff to authorize the offensive thrust and overcome the reservations of the naval commanders regarding the feasibility of the assault. There were reasons enough for such reservations. Hydrographically speaking, the approaches to Inchon were a nightmare. The tides at Inchon, some 33 feet at maximum, produced currents of over 5 knots and, at low water, mud banks extended 6000 yards offshore. The approach channel was narrow, tortuous, and difficult, even in daylight; so narrow that damage to one ship could block the channel and the approaches to potential landing sites.

The tides controlled the date of landings. There were only 4 days each month when tank landing ships could be beached; thus, the invasion had to take place during a 4-day period in September (13-17).

There were no beaches, in the accepted sense. Instead, the waterfront ended abruptly in concrete seawalls, averaging 15 feet high. Immediately inland lay the city of Inchon, with its masonry buildings, ideal defensive positions for the garrison. To add further complication, the island of Wolmi Do, connected with the mainland by a narrow causeway, dominated the approaches to potential

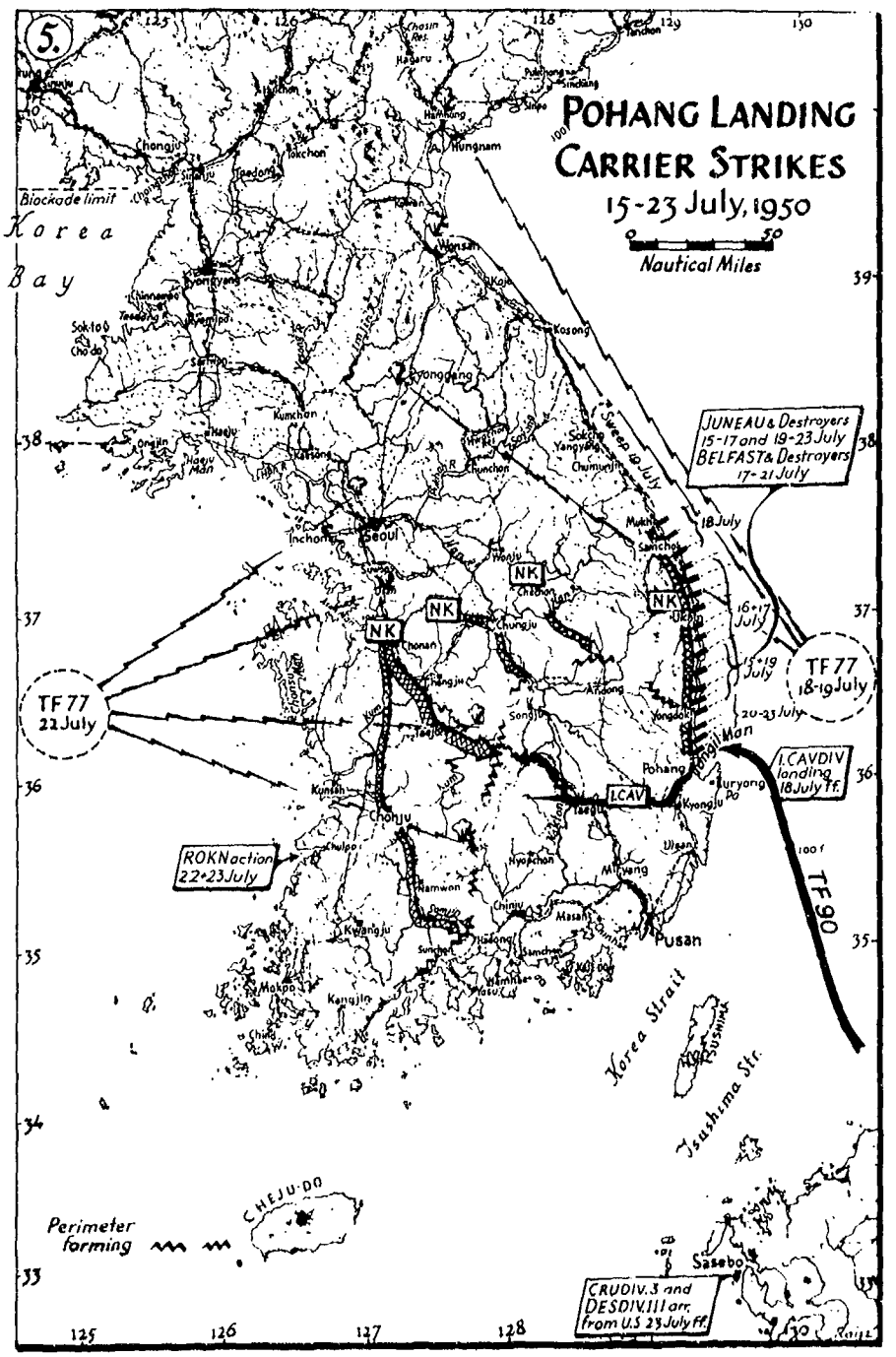


Figure 12. East-coast gunfire support missions, 15-23 July 195063

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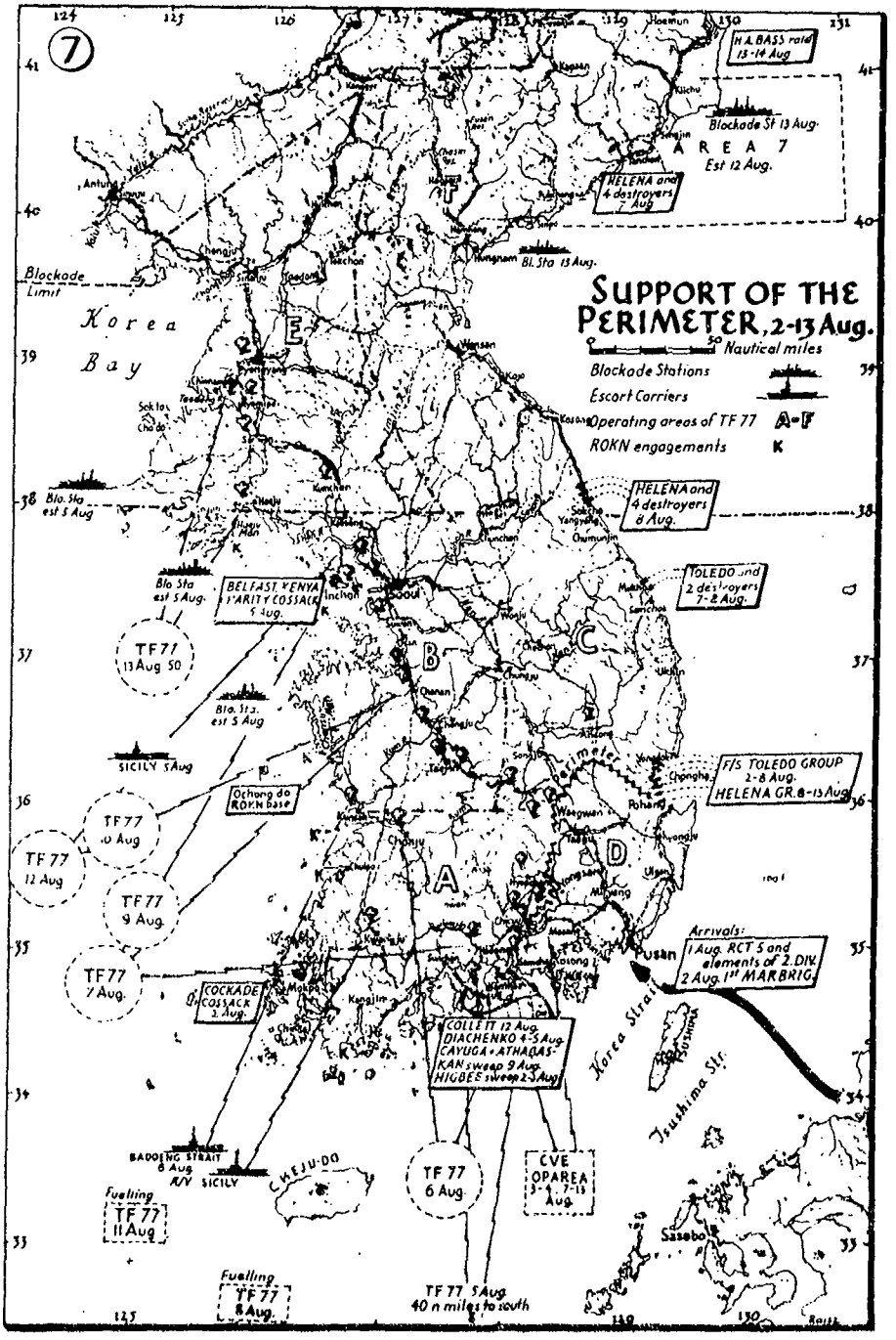


Figure 13. Support of the perimeter, 2-13 August 1950[64]

landing sites. Since it was known to be defended with coastal batteries and a garrison, its defenses would have to be at least neutralized, if a landing were to be successful.

In terms of defenses, Inchon did not present the problems of Normandy or Iwo Jima, and no dramatic new performance by the naval guns was to be demonstrated. Rather, the problem lay in overcoming the restricted hydrographic conditions that confined the firing ships to a narrow channel without sufficient room to reverse course or maneuver under fire (Figure 14).

In order to ensure that the defenses of Wolmi Do were taken out, it was decided, after considerable debate, to conduct preliminary destructive operations, even though this might result in loss of surprise and the possibility that the defenses might be reinforced prior to the landing. Diversionary operations to the north and south were employed in an attempt to mislead the enemy and prevent reinforcements from reaching Inchon prior to the landing.

Preliminary operations were to begin on D minus 2, 13 September, when six destroyers would proceed in column up the narrow Flying Fish Channel where they would anchor around Wolmi Do Island, forcing the coastal guns to reveal their positions. In this, they were "sitting ducks" for the North Korean gunners. Once the batteries were revealed, the destroyers would proceed to deal with them. According to Admiral Struble (COM 7th Fleet), the "sitting duck" concept was not taken lightly, but it was believed imperative to draw fire from coastal guns in order to locate and destroy them. This was a far cry from pre-World-War-II gunfire doctrine, which had required ships to fire from long ranges while maneuvering at high speeds to escape counterbattery. Instead, in the narrow confines of the Flying Fish Channel, thin-skinned ships would lie off about 800 yards to bait enemy gunners into opening fire. The destroyers were to be backed up by two U.S. and two British cruisers firing from positions in the channel to the south, using air spotting against targets in Inchon proper. Fast- and escort-carrier aircraft would also participate in preliminary operations.

The D-minus-2 pattern would be repeated on D minus 1, 14 September. Additionally, a battalion of marines would land on Wolmi Do to wipe out the remaining resistance and ensure that the landing would not be disputed by flanking fire from this island. Two light artillery battalions would then be landed to furnish covering fires for the D-day assault and subsequent advance inland.

The landing, scheduled at 1700 on the 15th to coincide with the high tidal conditions that would permit the beaching of tank landing ships, with followup equipment and supplies, was to take place on two beaches. Defenses were to be neutralized by the fires of the destroyers, cruisers, and rocket ships, together with beach strafing runs by marine aircraft of the escort carriers.

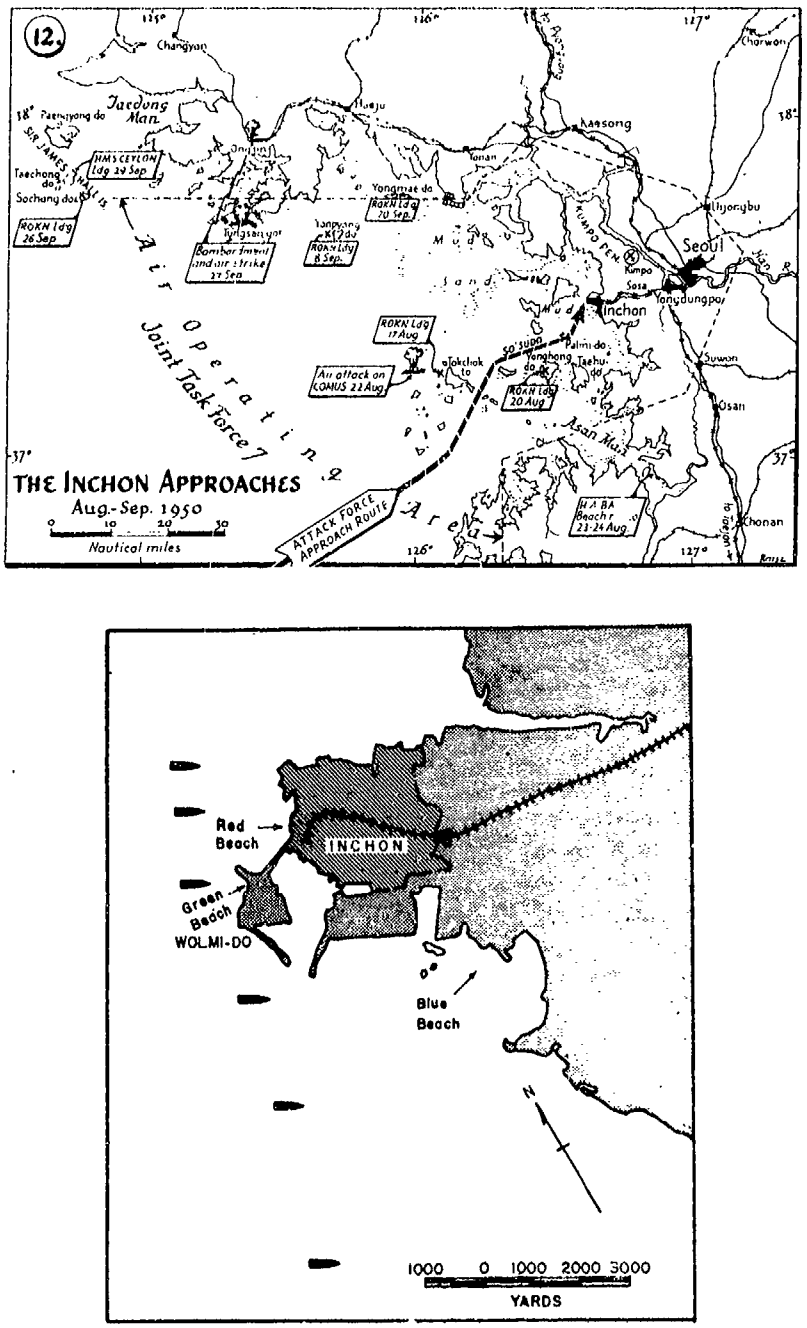


Figure 14. The Inchon approaches, August to September 1950[65,66]

At 0700 on D day, the gunfire-support group, with six destroyers leading, headed toward Flying Fish Channel on a flooding tide. Here another hazard was revealed--the presence of mines exposed by the low tide. These were taken under fire by the destroyers, one of which dropped off to blow up the remaining mines. In the meantime, the four cruisers fell out of the formation to take position on the east flank of the channel. Under cover of air attack on Wolmi Do, destroyers arranged in a crescent formation around the objective.

> De Haven opened fire first, shortly before 1300, followed by Collett. Not until 1303 was there any fire returned from Wolmi, and and it was concentrated on the three destroyers nearest the island: Gurke, Swenson, and Collett. The first enemy shots were over, then short; at 1306, Collett took her first hit. She was struck again at 1310, again at 1320, and again at 1329. The last shell was 75 mm. armor-piercing shell which broke into two pieces, one piece going into the engineroom and fracturing a low-pressure steam line, the larger half plowing into the plot room, where it broke the firing selector switch and wounded five men. Collett shifted to individual control and shifted her anchorage....
>
> Gurke was hit next in two places, neither seriously. The Swenson took near miss....
>
> "As the first hits were reported to me," said Vice Admiral Struble, "I directed Captain Woodyard to heave short and have the Rochester stand by to enter the narrow channel to Inchon in order to support the destroyers if it developed that they would be unable to handle the problem themselves.[67]

But the bombardment proceeded without further casualty, the MANSFIELD being narrowly missed during the retirement.

The destroyers steamed out of the anchorage at 1400, having blasted the island for more than an hour, supported by shellfire from the cruisers in the lower bay. As the destroyers steamed clear, the planes from Task Force 77 resumed the air attacks.

> "After the bombardment," said Vice Admiral Struble, "the entire advance force departed from the area off Inchon and proceeded down Flying Fish Channel to produce the illusion, if possible, that we were retiring.[68]

On D minus 1, the blasting of Wolmi Do defenses continued, with the same forces following the pattern of the preceding day. This time, not a shot was fired by the defenders until 45 minutes of bombardment had been inflicted, and unlike the preceding day, none of the destroyers were hit. Silenced and shrouded in smoke, Wolmi Do was ready for capture.

Under cover of darkness on the morning of the 15th, a marine rifle battalion, embarked in three destroyer transports and a landing ship, preceded by three destroyers and followed by three rocket support ships, five destroyers, and four cruisers, approached Wolmi Do. At 0545, the gunfire ships covering the approach of the assaulting marines opened up, along with a final strafing run of Corsairs from escort carriers just before touchdown. Resistance was light. In less than 3 hours, the island was in U.S. hands, with a cost of only 20 wounded, and was being prepared for the reception of two light artillery battalions, which were to be emplaced to furnish artillery support for the main landings and advance inland.

The landings of the main assault on the two landing sites were carried out at 1700 under 45 minutes of covering fire from the gunfire-support ships, supplemented by strafing runs of carrier aircraft. Initial reaction to the landings was light, but the tank landing ships following the assault waves came under heavier fire from small arms and mortars. But by nightfall of the 16th, the Inchon and Kimpo airfield had been taken, the 7th Infantry Division had been landed, and the attack on Seoul was to begin. However, heavy fighting would be encountered before Seoul could be captured on the 28th of September.

In the meantime, to the south the North Koreans ordered a general retreat, which shortly turned into a rout. By the end of September, the North Korean Army ceased to exist, as communist troops were captured or dispersed in the hills. The Inchon gamble had turned out to be a strategic masterstroke, made possible, in part at least, by confidence in the power of naval guns to operate in restricted water and to reduce hostile defenses. Without such confidence gained through World War II operations, it is unlikely that the Inchon stroke would have ever been contemplated, much less executed.

THE HUNGNAM WITHDRAWAL—7 TO 24 DECEMBER 1950

On 24 November 1950, MacArthur's objective of seizing North Korea up to the Chinese-Soviet border was rudely interrupted by a massive Chinese offensive. Although the presence of Chinese ground forces had been established as early as October, the Chinese attack caught the U.N. command by surprise. On the 24th, Chinese forces, consisting of two Chinese corps of seven divisions, struck elements of the 1st Marine and 7th Army Divisions near Chosin Reservoir, about 50 miles from the port of Hungnam (Figure 15). The classic record of "the attack in another direction," as General Smith of the 1st Marine Division described the successful withdrawal under intensive pressure, will not be retold here. The point of interest is that an amphibious withdrawal of three divisions at the port of Hungnam, an amphibious operation in reverse, was conducted on short notice with brilliant success.

Responsibility for the withdrawal was assigned to Admiral Doyle, the veteran of the Inchon landing. Cover for the evacuation was furnished by the four fast carriers and three escort carriers, while gunfire support was

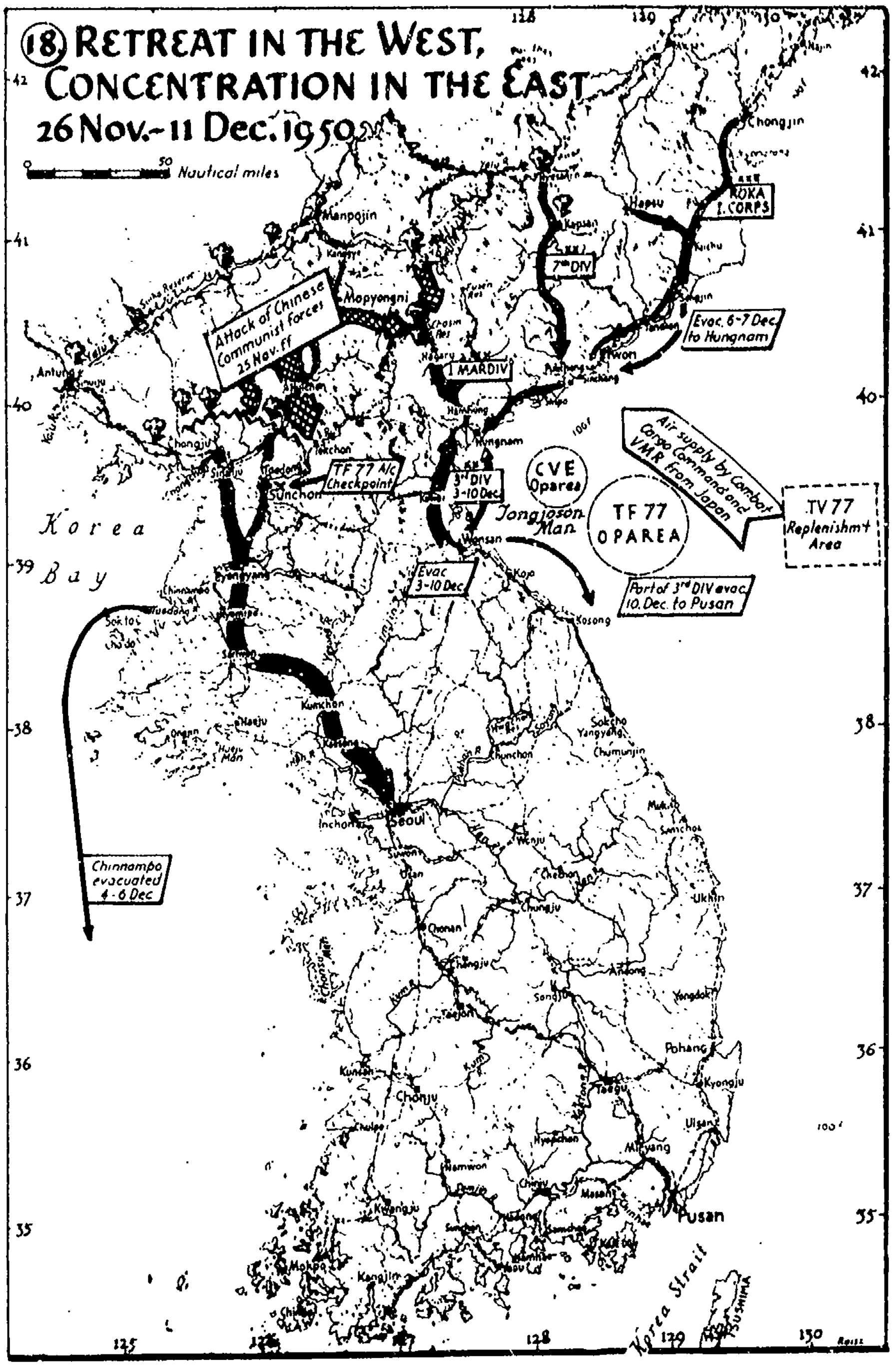


Figure 15. Hungnam withdrawal, 26 November to 11 December 1950[69]

to come from MISSOURI, ST. PAUL, and ROCHESTER, seven destroyers, and three rocket ships.

The embarkation plan specified the withdrawal of the 1st Marine Division on arrival at Hungnam, which turned out to be the 10th of December, followed by the ROK units and the 7th and 3d Army Divisions, in that order. On 15 December, elements of the counterattacking Chinese came within range of the heavy guns of the support ships.

The gunfire-support group commenced firing at ranges up to 10 miles, delivering both 8-inch interdiction and harassing gunfire, as well as 5-inch illumination. For this gunfire, the ships were deployed to preselected stations at sea and in the swept channel. The swept areas allowed the bombarding ships to maneuver in an area 10 miles to the north and south of Hungnam (Figure 16).

As the operation progressed and the perimeter contracted (Figure 17), fire-support ships were moved closer to obtain better firing positions. Rocket ships blasted the reverse slopes near Hungnam, and on two occasions the three rocket ships were used to fire barrages on the right flank onto the high ground overlooking Hungnam where enemy troops were reportedly concentrating.

MISSOURI began main battery fire on 23 December at road targets between Ori-ri and Hungnam. She quickly got a hit on an enemy troop shelter, and the air spotter reported that the Chinese communists were running out in all directions. In addition to her main battery fire, MISSOURI's 5-inch batteries contributed harassing and illuminating fire in covering the withdrawal of the last ground elements.

As 10th Corps artillery was loaded aboard ships and withdrawn between 22 and 24 December, naval gunfire took over. The shore fire-control parties reported the naval gunfire as "very effective" and credited it with "destroying large numbers of enemy troops." In at least one instance, naval gunfire was reported to have broken up an enemy attack larger than company size.

For the final D day of withdrawal, 24 December, a concentrated naval gunfire barrage was maintained in a strip approximately 2,500 yards wide and 3000 yards from the beaches and harbor. The only enemy troop movement observed on the final day was seen by Admiral Doyle and General Almond from the flagship MOUNT McKINLEY at the final withdrawal.

> "As we pulled out with all friendly troops embarked," said Doyle, "Almond and I, through our binoculars, saw Chinese Communist troops coming over the ridge behind Hungnam, only three or four miles away. I asked my gunfire support officer CDR Arlie Capps to direct some gunfire in the direction of the approaching troops."[70]

Destructive bombardment of the port area itself was also begun. Ships gunnery officers concentrated on the destruction of railroad cars and locomotives.

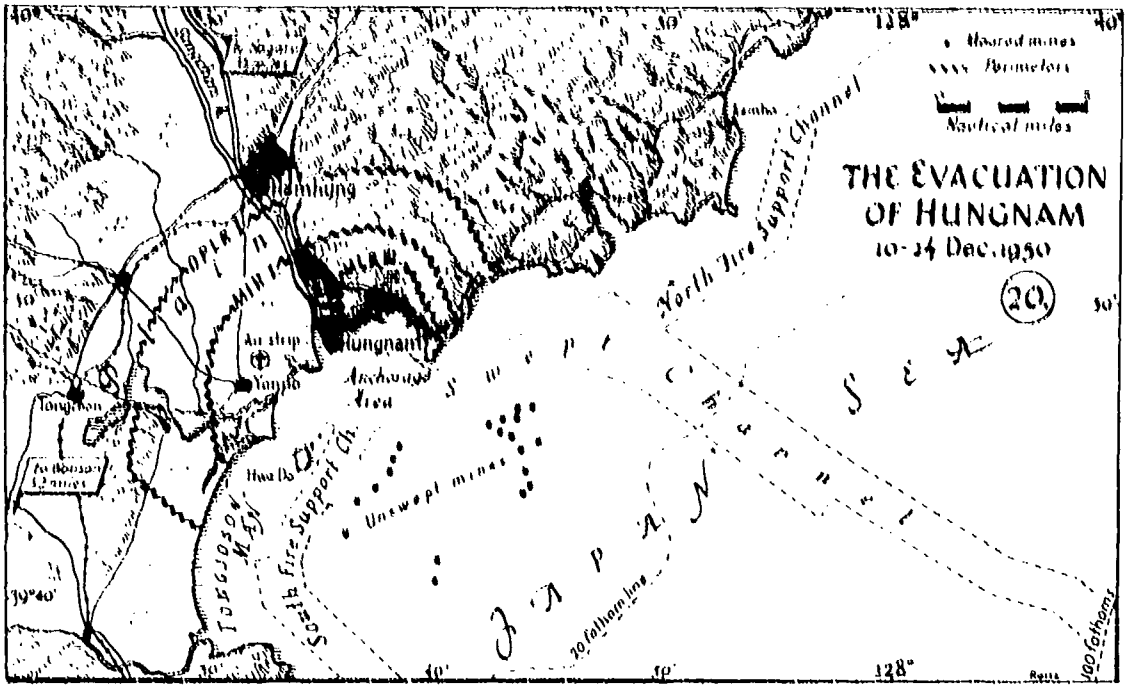


Figure 16. Evacuation of Hungnam, 10 to 24 December 1950[71]

Demolition crews ashore blasted everything of military value. At no time did the enemy attempt to interfere with the Hungnam evacuation, either from the air or from the sea.

> "It is a mistake, however, to say there was no opposition at Hungnam on the ground," said Admiral Doyle. "Although the First Marine Division had rendered seven Chinese Communist Divisions ineffective, attacks were made on our perimeter every night during the period of withdrawal. Our ships were constantly called on for gunfire, rockets and star shells."[73]

From 7 to 24 December, the gunfire-support ships of Task Force 90 fired a grand total of 162 rounds of 16-inch, 2932 rounds of 8-inch, 18,637 rounds of 5-inch, and 71 rounds of 3-inch projectiles, as well as 185 rounds of 40-mm ammunition and 1462 rockets.

By way of comparison, approximately 800 more 8-inch and 12,800 more 5-inch rounds were expended in defensive fire support at Hungnam than had been expended in support of the Inchon amphibious assault.

> "It should be borne in mind," said Doyle, "that Inchon only lasted a couple of days while our fire support effort at Hungnam lasted from the 15th to the 24th of December. All of it was "call-fire" as requested by the troops. Our logistic forces deserve great credit for doing a magnificent job keeping us supplied with ammunition.[74]

THE LONG STALEMATE--JANUARY 1951 TO JULY 1953

By late January 1951, the "Entirely New War," as McArthur put it, had passed the crisis point. The "Chinese Hordes" were not going to drive the U.N. forces into the sea, as McArthur had gloomily predicted, and the 8th Army was again on the offensive. However, the amphibious nature and strategy of the Korean War had been irretrievably altered. The X Corps, including the 1st Marine Divsion responsible for the amphibious assault at Inchon and the landings on the east coast, had been disbanded and integrated into the 8th Army. Although the focus of action had always been on land, the campaign in Korea was more than ever a ground war, and the question of how to integrate a naval force into a ground campaign again arose. The Amphibious Forces, the most important weapons system in the war, now took a back seat. The 1st Marine Division, firmly meshed in the ground forces, was no longer available for amphibious end runs. Maritime strategy, which had played a pivotal role in the first 6 months of the war, was to be subordinated in subsequent operations during the remaining 30 months.

But tasks remained for the naval guns. Support of ground forces on the coastal flank was to continue and a new task, that of interdiction of the coastal

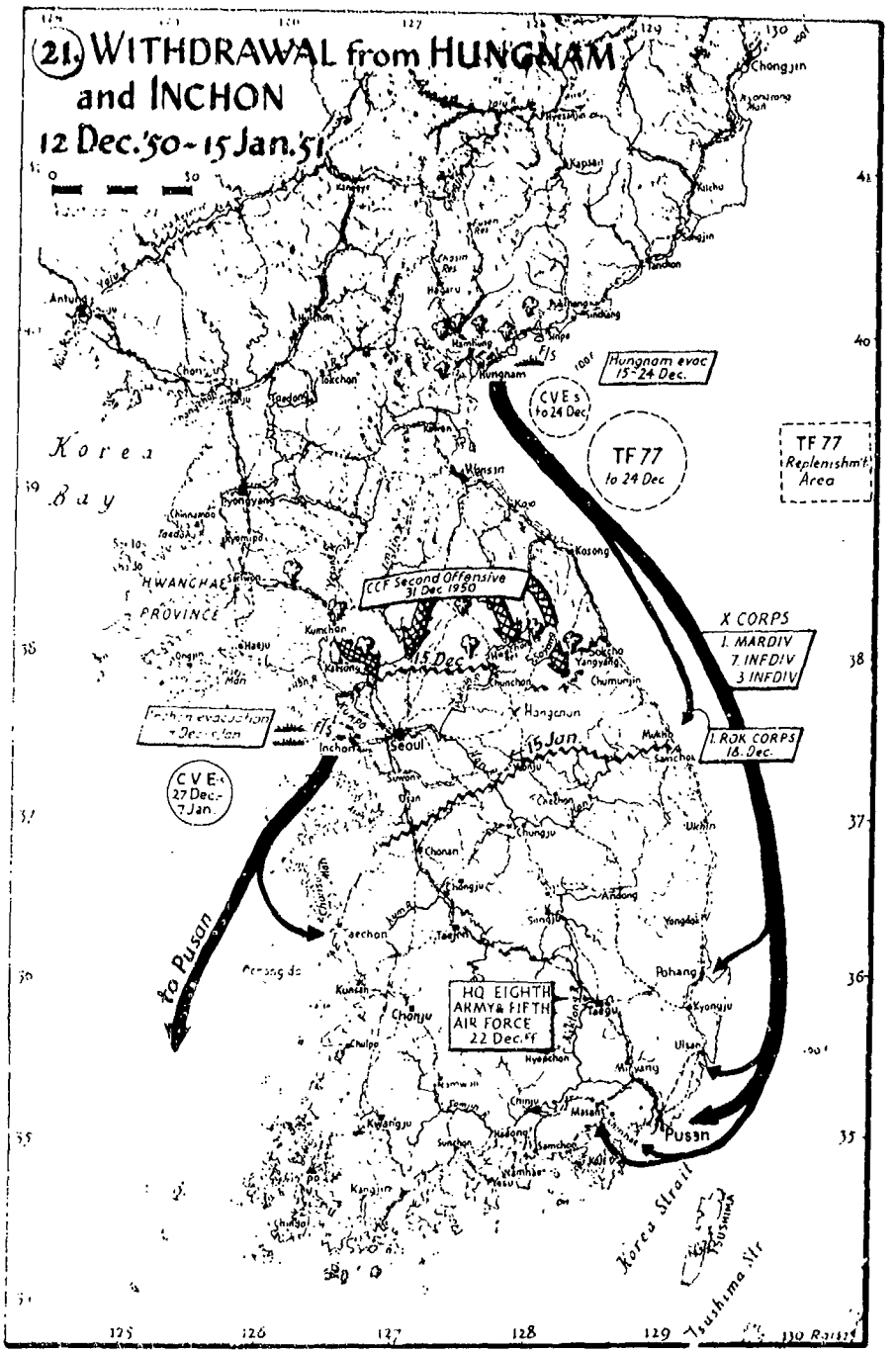


Figure 17. Withdrawal from Hungnam and Inchon, 12 December 1950 to 15 January 195172

routes, was to assume great importance and would heavily involve the carrier task forces and surface combatants.

Unlike the early period of the war, U.N. forces were on the defensive. The U.N. objectives had been reduced from the reunification of Korea to one of simply ensuring the continued existence of South Korea. With the commencement of truce negotiations at Panmunjon, military initiative was even more in the hands of the communists. Consequently, the level of gunfire support for ground operations depended on communist operations, which were characterized by short periods of intensive offensive operations to bolster their position at the armistice table, interspread with lengthy periods of military stalemate.

The I ROK Corps, which was entrusted with holding the east coast flank, was to receive continuous support from destroyers, cruisers, and on occasion from battleships. For example, during September 1951, LOS ANGELES delivered almost 200 rounds of 8-inch and 125 rounds of 5-inch fire at attacking communist troops, with commendatory reports from the troops as follows:

> Many enemy casualties. Explosion observed with considerable smoke and spreading fire.... Rounds flushed enemy troops who began fleeing inland. Fire landed among them. In one incident, troops began running back over a small hill, and as they reached the top of the hill, a series of eight-inch air bursts exploded about twenty-five feet above their heads....Your firing destroyed at least three enemy gun positions and caused an untold number of casualties.[75]

NEW JERSEY also got in the act during the following month, with equally glowing reports:

> 24 September: "...27 rounds of 16-inch were fired with good effect on Hills 1190 and 951, with many bunkers destroyed, others revealed, and many casualties inflicted on the enemy...."
>
> 2 October: "...four missions were fired, expending 136 rounds on Hills 802 and 951. Air observers and enemy POWs reported 25 counted enemy bunkers destroyed, 45 estimated destroyed; 200 killed, 400 wounded...."
>
> 3 October: "...New Jersey fired 81 rounds on Hills 796 and 802 with good effect...."[76]

On the night of 21 November, LOS ANGELES again came to the rescue and was credited with beating off a powerful attack. According to Admiral Clark, Commander TF 77:

> "In early November...intelligence sources indicated a strong buildup of enemy forces, with increased artillery and automatic weapons fire in the Kojo area. During the night of 21 November I

received an urgent call for assistance to the First ROK Corps, then on the line near Kojo. General Van Fleet's headquarters reported that the enemy was breaking through the Korean lines, and had captured a hill on which an important outpost was located. The First ROKs had run out of ammunition, and the enemy was mauling them very badly."

"The location of the break-through was beyond the range of destroyer fire. The only heavy ship I had was the heavy cruiser Los Angeles."

"I proposed sending her, but my staff called attention to a standing order requiring that one heavy cruiser or battleship be kept with the fast carrier task force at all times to provide AA protection in the event of an air attack. Another reason for this requirement was in case any of those Russian cruisers came out of Vladivostok and ran down into our area during the night."

"These seemed like pretty worthless reasons just then, so I overrode the requirements and ordered the Los Angeles to get down there at high speed."

"She arrived off Kojo about 0230 and her 8-inch guns turned the tide of battle. Her 91 rounds of 8-inch fire drove the Communists back and gave the First ROK Corps a breathing spell until morning, when they were able to replenish their ammunition supplies."[77]

This vital assistance was typical of the type delivered in support of I ROK Corps during the 2 years of the ground stalemate.

On the west coast, where hydrographic conditions were less favorable for gunfire support, Commonwealth destroyers furnished the bulk of gunfire support, often penetrating up the Han River under the guns of the communist forces. These "small boys" were largely responsible for forcing the communists to give ground adjacent to Seoul, a communist objective.

The most comprehensive record of coastal support was that delivered on the 1st Marine Divsion front. That division, assigned to an east-coast sector about 9 miles from the sea, was quick to recognize the potential of the heavy naval guns. The unique tactical situation facing the division was succinctly described by the Commanding General in the dispatch to Commander 7th Fleet:

This division has blasted preponderance opposing enemy forced off forward slopes. Enemy has fully developed trenches and firing positions on forward slopes which he mans only with sentry forces while preponderance his forces remain on reverse slopes in area

effectively protected from our arty and tank fire. His positions are so constructed as to be invulnerable to all but heaviest ordnance. Medium and heavy arty ammo severely limited and in general cannot destroy the desired targets. Quantity Close Air Support available is miniscule in proportion to targets available requiring destruction. High level bombing rarely hits these targets NGF only weapon available to this command to destroy the targets desired.[78]

Because of the comprehensive records of performance of the naval guns kept by the 1st Marine Division (Table 5), their report is quoted in some detail, including a tabulation of all missions fired, together with the appraisal of effectiveness:

(a) In Terrain such as is found in East Central Korea, observed naval gunfire, even when fired at or near maximum effective range, is effective in the destruction of enemy installations. This question was one that caused some speculation originally, and for that reason, among others, a complete record of all missions had been kept. It was originally thought that execution of such missions would require an expenditure of main battery ammunition excessive in relation to the damage inflicted. It is believed that the average number of rounds expended per target, and the reported results, bear out the conclusion that the support rendered during this period was both effective and justified.

2. Air spot furnished by the Artillery Regiment's air observer section, is preferred over ground observation in this particular tactical situation. This conclusion is borne out by the following facts:

(a) The air spotter uses less rounds per mission. While the statistical analysis shows only .2 rounds per mission less are used by the air spotter, one factor not shown by the data is that the air spotter is able to get a quicker adjustment on a target, and more of the ammunition expended is actually delivered on the target in "fire for effect". Furthermore an air spotter is less likely to "lose" his initial salvo, an occurrence that is not too uncommon for a ground spotter in hilly terrain.

(b) Not shown by any statistical data are the following factors in favor of using air spotters as opposed to ground observation. First, the primary mission of the ships in this particular situation was to take under fire those targets that were inaccessible to organic arms. Location of these targets required an air spotter who was thoroughly familiar with the

Table 5. First Marine Division naval gunfire statistical summary

	23 Sep-31 Dec 51	1 Jan-18 Mar 52	Total
1. Number of missions:			
16"	55	43	98
8"	119	103	222
6"	3	32	35
2. Number of rounds:			
16"	968	977	1945
8"	2023	1661	3684
6"	51	470	521
3. Average number of rounds per mission:			
16"	17.6	23	
8"	17.0	16	
6"	17.0	15	
4. Average number of rounds per mission by type of spot:			
Air	17.0		
Ground	17.2		
5. Results reported:*			
Personnel: Estimated casualties	2023	1555	3578
Artillery pieces	23 DES/10 DA**	6 DES/18 DA	29 DES/18 DA
Bunkers & pers shelters (underground)	209 DES/3 DA	225 DES/232 DA	432 DES/235 DA
Mortars	5 DES/3 DA		
Ammunition dumps	19 DES/- DA		
Buildings	5 DES/5 DA		
Machine guns	5 DES/3 DA		
OPs	4 DES/- DA		
6. Average range:			
16"	32,500 yards		
8"	22,000 yards		
6"	18,000 yards		

* These results are as reported by individual spotters. They do not include incidental damage done to roads, trenches, etc. Personnel casualties are totals of both counted and estimated KIA and WIA. From past experience, these estimates are considered to be about 80-percent correct.

** DES--Destroyed; DA--Damaged.

terrain in our sector, and one who had been briefed on those targets which were considered both important and suitable, just prior to take-off. This of course is impossible when a spotter who is not organic to the Division is used. On two separate occasions air spotters other than those organic to the division were used, and on both occasions the results were highly unsatisfactory.

3. Naval Gunfire Support in a tactical situation such as prevailed during the period had been controlled as a general support arm, and assigned according to the needs of the Division as a whole. This has assured economy of effort, and complete coordination with other supporting arms.[79]

As soon as naval gunfire support became available on a fairly regular basis, the 1st Division G-2 directed the prisoner of war (POW) interrogation team to question incoming POWs on the effectiveness of our naval gunfire bombardment. Results of this interrogation indicate that naval gunfire was effective. The following excerpt from the interrogation reports is given:

POW heard that on 22 January 1952, the 45th Division CP was hit by Naval Gunfire which caused considerable damage. It is estimated that approx half personnel of the 45th Division CP were casualities.

(NOTE: On 25 January 1952, USS Wisconsin fired 100 rds 16" HC at area in question. Air Spot and Aerial Photo Interpretations reported 29 caves closed, 10 KIA counted, estimated 36 other casualties from one round that hit a group of personnel).

All POW reports were not this indicative of the effectiveness of the naval support, but they generally indicated that the enemy had a healthy respect for the major-caliber firing. On one occasion, a POW stated that he had been told by his battalion political officer that the UN was firing "atomic artillery shells" because of the size of the craters that the 16-inch shells made. All of these POW reports have been checked with records of firing, and it has been determined that it was naval guns that had been fired. An indication of the adverse morale effect caused by major-caliber bombardment was the statement of another POW who said that he was induced to surrender after his unit had suffered "heavy casualties" in one bombardment, and when one shell landed near his position and failed to go off, the size of the dud, a 16-inch HC shell, convinced him that it was time to surrender.

In spite of the spotting problems caused by the difficult terrain and the extreme ranges that the ships had been called on to fire, the naval gunfire support rendered the 1st Marine Divison was excellent.

> In view of the unusual circumstances confronting the 1st Division, it is felt that the fire-support ships played a valuable and unique role in applying pressure against enemy military positions and morale.[80]

Several conclusions are apparent from statistical data on major-caliber naval gun support of the 1st Marine Division:

1. Ammunition expenditure for destruction of hard bunker and personnel shelters was not excessive, averaging about 20 rounds per mission.

2. The support missions were fired at particularly long ranges, using the range capabilities of battleships and cruisers to a maximum. Battleships' average range was 32,500 yards, while that of the 8-inch cruisers was 22,000 yards. While no data are available on the maximum and minimum ranges employed, it can be presumed from the inland position of the 1st Division that a number of these missions were delivered at extreme ranges of the respective calibers.

3. The use of aerial observers was a vital factor in mission success.

OPERATION STRANGLE—THE INTERDICTION CAMPAIGN

The entry of the Chinese communists into the Korean War in November 1950 marked the beginning of a unique role for the aircraft of the carrier task forces and for the naval surface combatants. In late December, General Ridgeway, in command of the 8th Army, requested the Navy to interdict the east coastal road from the front lines as far north as practicable, and later, that naval aircraft undertake the cutting of rail lines by attacks on key bridges and the destruction of rolling stock on the east-coast rail net. The task was described by Admiral Joy, CINCFE, in more precise terms:

> Rail route northeast coast between Wonsan and Chongjin is of continuing value to enemy as a major route over which supplies, equipment, and troops are being transported to immediate battle areas. The enemy's known capability for quickly effecting temporary repairs to the damaged portions of this route can be seriously impaired by deliberate methodical, total destruction of all piers, spans, approaches and embarkments of each vital bridge in each critical area. The enemy cannot accomplish makeshift repairs when nothing remains upon which to make them. Naval air and naval gunfire are good weapons to accomplish this job....[81]

This eastern network (to be the scene of the Navy's long interdiction effort) included 1140 miles of track, 956 bridges, and tunnels. The average tunnel length was 1200 feet.

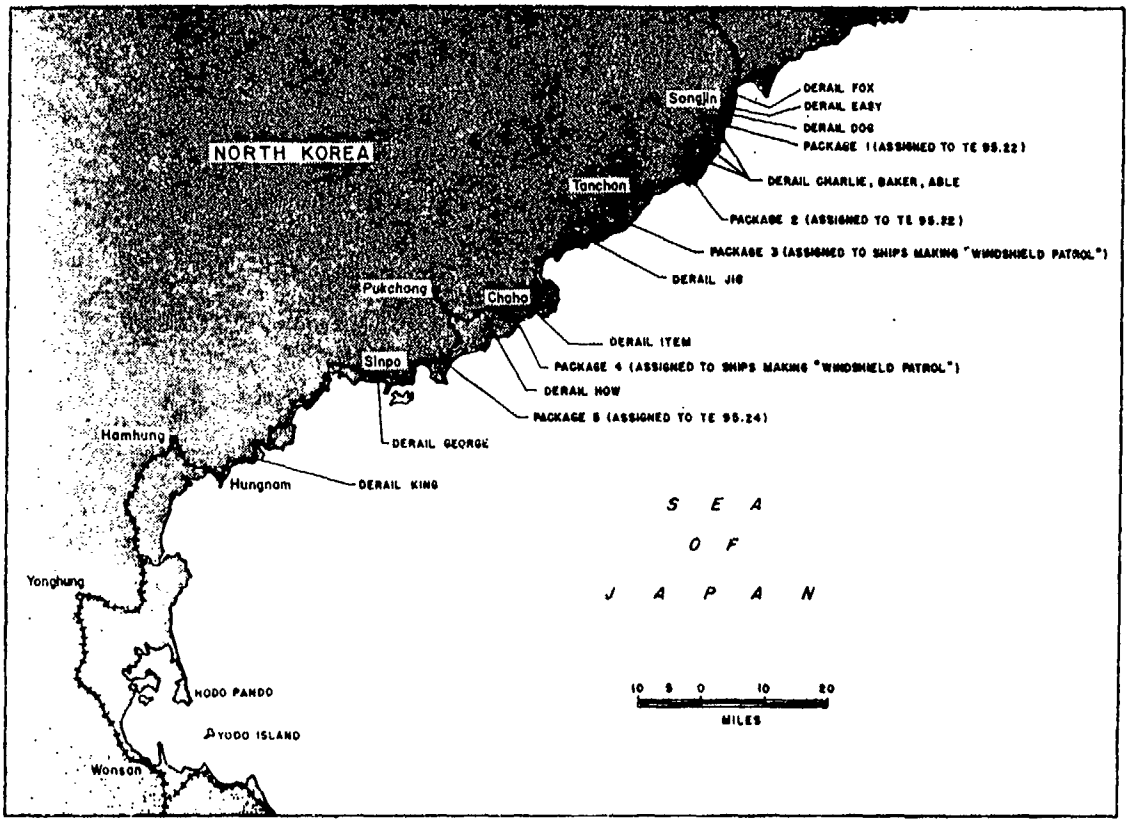
Before the signing of the armistice in July 1953, the interdiction campaign was to go through a series of phases. The first was a concentration on rail bridges, the second was directed at making the highway network untenable, and the third was to continue concentration on the rail bridges and to add the task of rail track cutting. The heavy ship mission was to destroy bridges and tunnels, while destroyers were assigned the task of preventing bridges, tunnels, and rail cut repair by communist working parties and the destruction of locomotives and freight cars. This was the so-called "train busting" program. All types of ships were forced to deliver counterbattery against the numerous coastal defense and antiaircraft guns that the communists emplaced in ever-increasing numbers to hamper carrier aircraft and surface combatants in their interdiction efforts.

In mid January 1952, two programs (known as Package and Derail) were introduced to coordinate more effectively carrier air and gun strikes (Figure 18). The Package program contained a list of targets along the coastline, suitable for attack by both weapons systems. Five points along the east-coast rail net were selected, of which three included bridges. Primary responsibility for attack of Package targets was assigned to carrier air. Thereafter, continuous reconnaissance kept the breaks in the rail line under observation. When it was necessary to prevent repairs, rails were again brought under attack. However, when carriers were replenishing or inoperative due to bad weather, the surface combatants assumed the task of maintaining the breaks in the rail network. In addition, patrolling destroyers, using radar buoys planted offshore from Package targets, would take work gangs under fire to prevent repairs. The second program, Derail, consisting of eleven rail targets, was assigned to the heavy ships for destruction. Data on the effectiveness of the major-caliber program against bridge targets are indicated in Table 6. As the war progressed, the primary mission of carriers shifted from interdiction to support of the front lines, and the primary interdiction task was more and more assumed by the surface ships.

Several conclusions are apparent from data on bridge destruction:

1. Ammunition expenditure for bridge destruction was not excessive, ranging from 10 to 44 rounds, depending on bridge hardness and the competence of air spotters. When employing organic helicopter spotting, maximum expenditures dropped from 44 to 26 rounds. This can be attributed to greater efficiency of a ship's own spotter operating in organic helicopters, as compared with the employment of carrier air spotting. Ammunition expenditure compares favorably with aircraft sortie requirements for bridge destruction. Specifically, 12 to 16 attack aircraft (AD type) sorties were required for bridge destruction.

2. Bridge destruction missions were fired at an average of 15,400 yards, with a 7500-yard minimum and a 28,000-yard maximum. These ranges can be attributed to the fact that all heavy-ship bombardment was conducted, for the most part, from firing positions to seaward of the 100-fathom curve to avoid mineable waters. It is interesting to compare these relatively long



"PACKAGES" AND "DERAILS"

Figure 18. Package and Derail programs[82]

Table 6. Effectiveness of BBs against interdiction target

Ship	Period	Interdiction Missions (Bridges/Tunnels)	Ammo Expenditures (*)	Bridge Destruction	Percent Destroyed	Average Ammo Helicopter Spot	Expenditure Carrier Air Spot	% of Salvos with First Hit: Helicopter Spotter	% of Salvos with First Hit: Carrier Spotter	Remarks
MISSOURI[1]	7 days	39	1167-16	20	70	26	44	8[2]	14[2]	MISSOURI bridges mostly (reinforced concrete).
PAC Fleet Evaluation Memo MAR 1951										
NEW JERSEY[2]	May-Nov 1951	65	767-16	29	60	12	27.6	4[2]	6.1[2]	10 Mission failed because of spotting/deficiencies. NEW JERSEY bridges harder than missions.
PAC Fleet Evaluation Memo No. 19 Nov 1951										
NEW JERSEY	24 Apr 1953	10	148-16	5	3-60		Average Ammo Expenditure			No data on spotting means; presumably organic helicopter.
NEW JERSEY Serial of 25 April 1953	25 Apr 1953			5 tunnels			-17 rd/bridge -8.8 rd/tunnel			
IOWA	27 May 1953	9 (5 bridges)	96-	5	100		Average Ammo Expenditure 10 rd/target			No data on spotting means; presumably organic helicopter.
TE 77.15 Report of May 1953		(4 tunnels)		4 tunnels	100					

NOTES: [1]No data listed for ranges in references. However report on "Characteristics of NGS in Korea" covering period May 1951 to March 1952, lists 15,400 yards as average range against bridge targets (with 7500 minimum and 38,000 maximum).
[2]Above reference lists an average of 3.6 salvos for 1st hit in analysis of 110 firings against bridge targets (with 2 salvos minimum and 8 salvos maximum).

ranges used for bridge destruction with those employed for hard-target destruction of blockhouses and pillboxes during the Central Pacific campaign of World War II in which ranges of 2000 to 4000 yards were characteristic.

3. The mean point of impact was adjusted on the target on an average of 2.6 salvos, with 2 salvos as a minimum and 8 salvos as a maximum. These data tend to indicate reasonably effective range designation and air spotting, combined with effective functioning of the gunnery personnel in position fixing.

4. It should be noted that continuity of operations favored the ship guns when compared with aircraft engaged in bridge destruction. Not only was it necessary to withdraw carriers for replenishment about every 3 days, but the carrier aircraft were more sensitive to adverse weather conditions.

Destroyers participated in the interdiction campaign by delivering fire on communist working parties attempting to repair the rail lines, but the greatest relief to the monotony of constant blockade and interdiction was found in "train busting." Commander of DD ORLECK described this unique employment as follows:

> "On July 15th the Orleck crept in to about 3,000 yards from 'Package Two'. Our topside blowers were secured and the ship was lying quietly to.
>
> At 0100, the OOD...heard the sound of a train approaching from the north. He illuminated immediately and simultaneously opened fire, aiming for the northern tunnel.
>
> We hit the last car--a caboose--and knocked it athwart the tracks, stopping the train. Further illumination disclosed 15 cars trapped between the tunnels; only the locomotive and tender were able to reach shelter in the southern tunnel.
>
> The rest of the night was devoted to the systematic and leisurely destruction of this prize; five gondola cars loaded with ten heavy field pieces, a flat car with a tank embarked, and about nine boxcars containing explosives. The exploding of these latter cars made for a completely satisfying night's work.
>
> Our success that night stirred a competitive spirit between my OOD's--and this competition was 'waiting at the station' --again 'Package Two'--for a train. At 2200...the OOD, spotted a flickering light moving from south to north between the tunnels. He immediately gave orders to illuminate and commence destructive fire. The results were a locomotive, one tender, and one boxcar destroyed."

As a result of these successes we received...: CONGRATULATIONS TO THE DESTROYER ORLECK, TRAIN SMASHER. DESTROYING TWO ENEMY TRAINS IN 12 DAYS IS SUPERB FIGHTING. THE EIGHTH ARMY IS PROUD OF YOU AND YOUR SHIP'S COMPANY. VAN FLEET.[83]

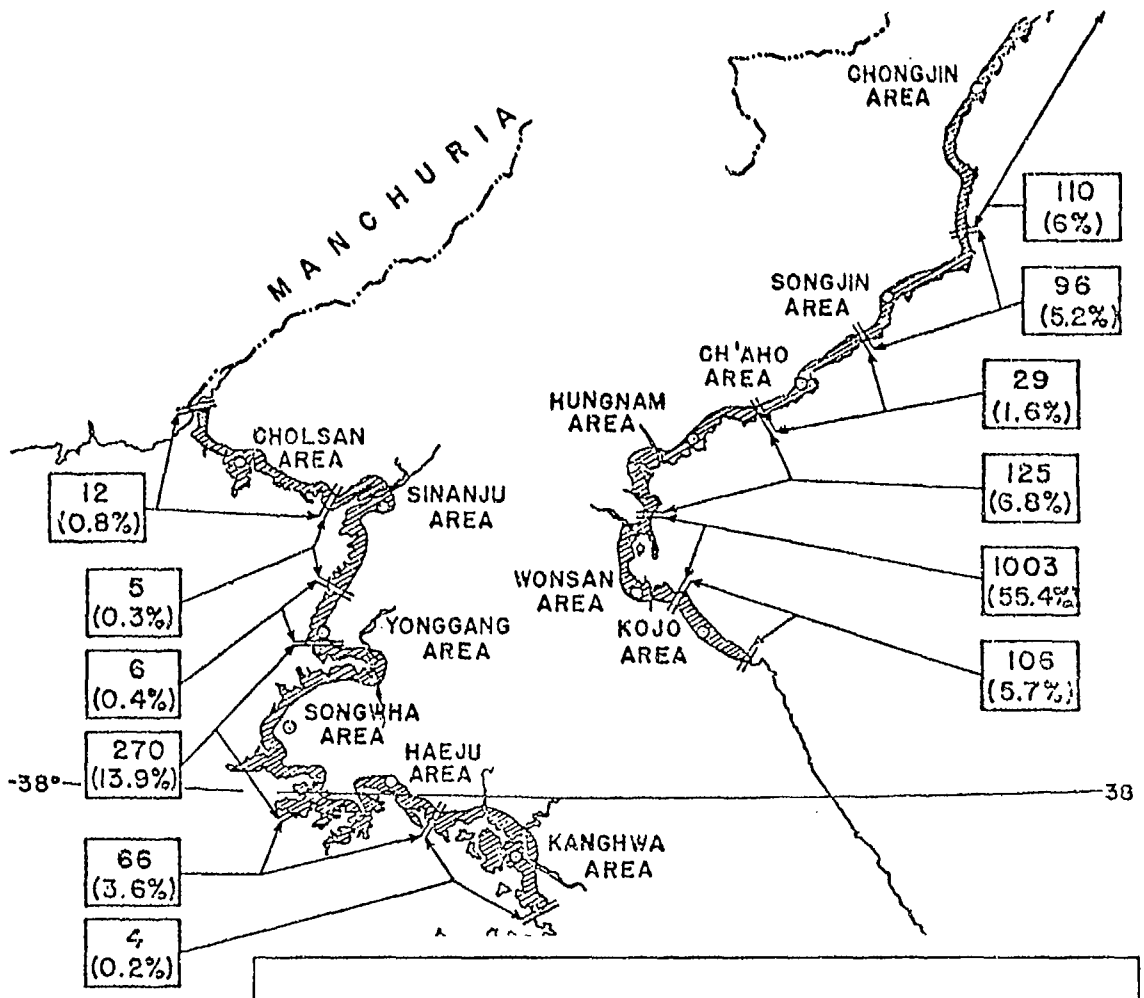
Figure 19 shows the total number of artillery pieces, positions, and mortars on the North Korean coast above the battle line, reported to COMNAVFE from 1 July 1951 to 1 July 1952. Fifteen hundred gun positions had been reported. Several models for gun installations were employed, which tend to emphasize protection at the expense of accuracy and field of fire. Batteries consisted of three guns spaced from 20 to 80 meters apart. Each battery had at least two, and sometimes three, observation posts connected by telephone, and in some cases radios were located with firing batteries. Command posts with more than one battery had optical range finders (Figures 20 and 21).

In the process of the interdiction campaign covering a period of about 30 months, these communist shore batteries were engaged by all types of ships, especially the destroyers, which were responsible for preventing repair of rail and bridge cuts by delivering fire on repair parties. They were exposed to the fire on an almost continuous basis. In all, 110 ships, mostly destroyers, were hit and damaged by coastal fire, although none were sunk.

The analysis of the effectiveness of the various calibers of naval guns is so well stated by the Commander of the Blockade Force that his report is quoted in full as follows:

a. During the course of the conflict and particularly during the latter stages the Communists became highly skilled at building practically invulnerable emplacements, underground shelters and the like. In addition to the extremely rugged construction, the Communists were most adept in camouflage. In many cases, new gun positions were not detected until gun flashes were seen when fire was opened. In fact, in many instances ships were unable to detect the fact that they were under fire until the splashes were observed. Five inch gunfire had little or no effect against these emplacements and shelters unless a direct hit were scored destroying the gun or sealing off an opening. Short of complete destruction the Communist shore batteries thus protected returned to action very shortly and in some cases continued firing while under attack.

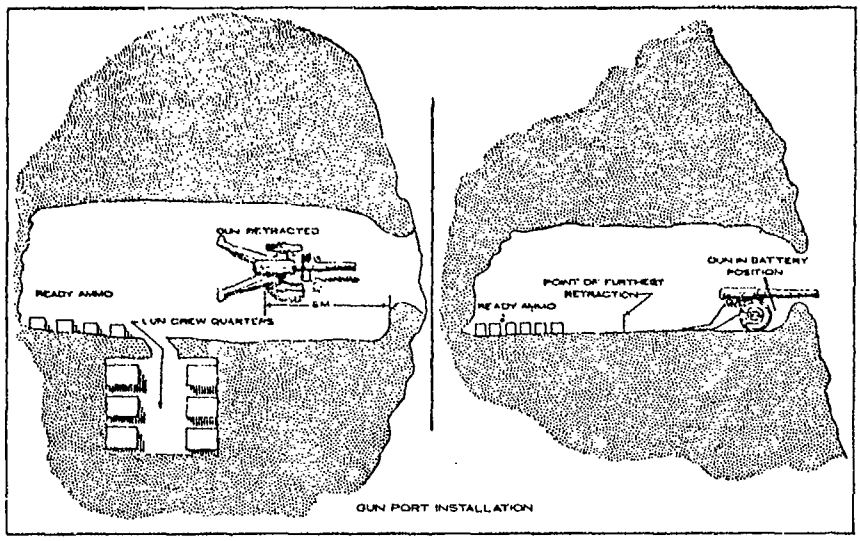
(1) On 15 March 1953, the BRUSH closed to within 6,000 yards of battery of two 76mm guns firing on YODO. The destroyer reported several direct hits which silenced the battery. BRUSH received one hit in return. Upon withdrawal of BRUSH the battery reopened fire on YODO.



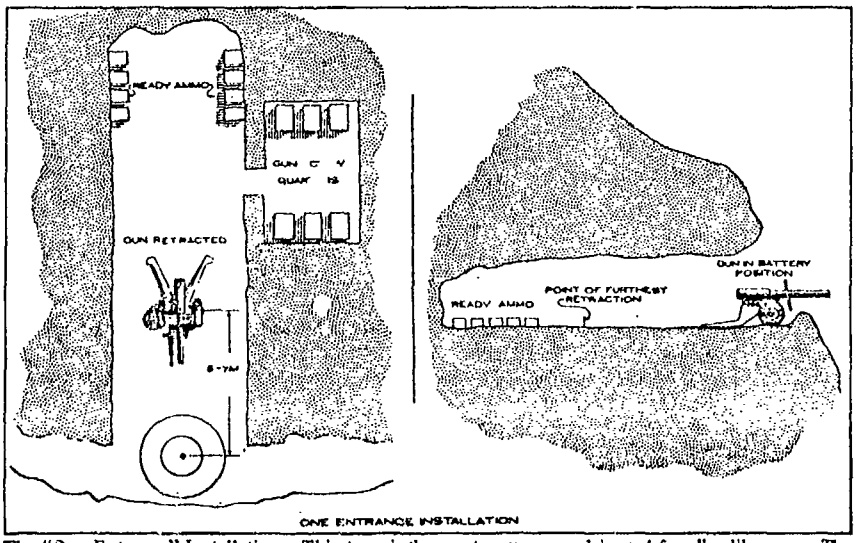
This plot shows by areas the total number of artillery pieces (75MM and larger), artillery positions, and mortars (81MM and larger) on the North Korean Coast above the battle-line which were reported to COMNAVFE during the period 1 July 1951 to 1 July 1952, inclusive. Underneath the total number listed in each block are percentages which show the relationship of the number reported in one area to the total reported for all North Korea. It is believed that the percentages should be utilized to indicate relative concentrations of artillery pieces by area, since order of battle intelligence indicates that the strength of enemy units employed in coastal defense is disposed in approximately the same proportions. The great preponderance of enemy units employed in coastal defense are so organized and equipped that they can be employed on the main battle-line if required. Their major coast defense weapons, in nearly all cases, are standard field artillery pieces, rather than immobile or semi-mobile guns. In addition, the rotation and movements of these units make it very difficult to produce any acceptable estimate of the number of artillery pieces in a specific area at a given time. For the above reasons, figures shown in the blocks cannot be considered absolute.

(From COMNAVFE intelligence 1 July 1952)

Figure 19. Artillery pieces, positions, and mortars on the North Korean coast[84]



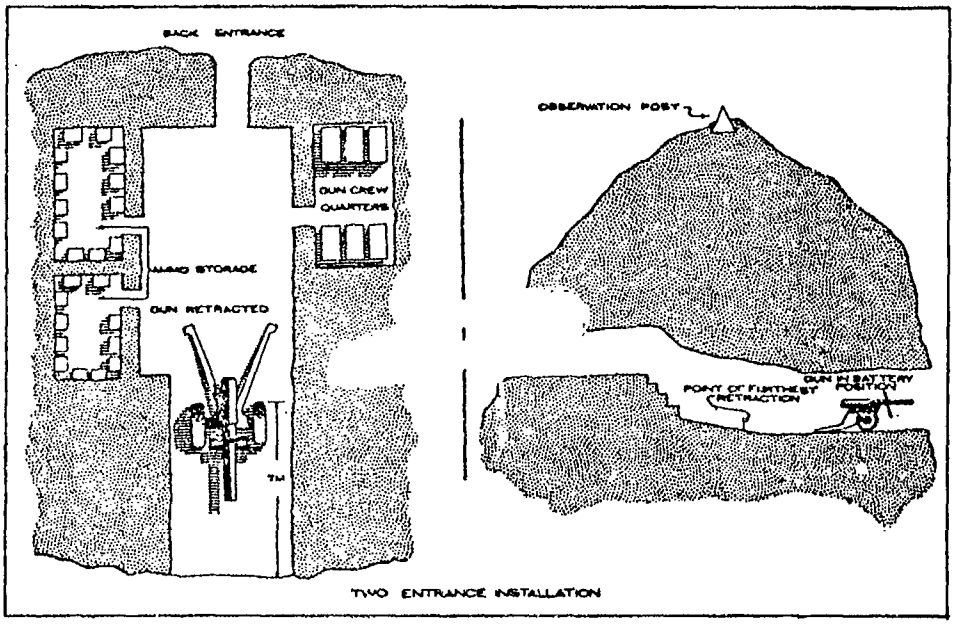
The "Gun Port" Installation: Insofar as is known, this type is used for guns not larger than 76.2MM which are positioned in close range of friendly naval gunfire positions. The position, usually in rock, consists of a room for the gun with a single firing port forward. The firing port is usually not larger than 2 meters wide and 1¼ meters high. The arc of fire is not wide. The room is but little wider than the carriage of the gun, but is long enough to retract the gun from the "battery" position for a distance of about 5 meters. Behind the gun's retracted position, there is space for ready ammunition and the gun crew. In a few cases the gun crew have bunks in a separate, connecting room. The area around the firing port is usually reinforced with concrete, and the port itself is camouflaged.



The "One Entrance" Installation: This type is the most common and is used for all caliber guns. The position is constructed in the forward slope of a hill or rise from which the gun obtains the desired field of fire. The single entrance is as large as the interior. Immediately in front of the entrance is a level, circular or semi-circular space where the gun is sighted and fired. When not being employed, the gun is retracted a distance of 5 to 7 meters. Some positions are 20 meters or more deep and become smaller at the rear, where the ready ammunition is stored. Gun crews sometimes bunk in the same cave at the gun, however, bunks are usually in a separate, connecting room. These positions, which are frequently dug into forrested slopes are often camouflaged with tree limbs, but netting is sometimes used. Most entrances to such positions are about 4 meters wide and 2 meters high. Such an installation is very difficult to hit.

(From CINCPACFLT WOD 24-52 of 24 August 1952)

Figure 20. Chart of "gun port" installation[85]



The "Two Entrance" Installation: This type, usually positioned a short way below the crest of a hill, is accessible from the reverse slope of the hill. It is utilized primarily for heavy caliber guns. Such positions are nearly always located at greater ranges from ship gunfire areas than most gun positions. Ready ammunition storage and crew quarters are located in separate connecting rooms. Guns in such installations usually have to be moved from the interior to firing positions. The withdrawal distance is about 7 meters. Rail car mounted guns are usually located in such an installation. In addition to artillery pieces, Soviet and U. S. tanks and self-propelled guns often occupy cave-type positions and are similarly moved from the interior to firing positions. Tanks and self-propelled guns are frequently positioned on reverse slopes of hills which are near the shore line. When this occurs, they often have to be moved around the hill before a satisfactory firing position is obtained.

(From CINCPACFLT WOD 24-52 of 24 August 1952)

Figure 21. "Two entrance" installation[5]

(2) On 17 June 1953, the IRWIN, ROWAN, and HENDERSON were taken under fire from the batteries on HODO PANDO and reported that the enemy fire continued despite complete area saturation.

There is no doubt that five inch fire inflicted some damage to guns and crews and certainly caused the enemy to cease fire on many occasions, but due to the type of emplacement, destruction was virtually impossible with medium caliber naval guns.

b. Gunfire of heavier caliber, from battleships and heavy cruisers, had a much greater effect. On occasion, batteries were permanently silenced by inflicting such heavy damage that the Communists abandoned them. In other cases they were placed out of action for long periods. Three specific examples of this are:

(1) The NEW JERSEY fired 115 rounds into the HODO PANDO complex on 5 May, following which these guns were not active again until 27 May.

(2) The NEW JERSEY, BREMERTON and MANCHESTER conducted gunstrikes against TWIKOTCHWI between 24 May and 30 May 1953. This complex, which fired 389 rounds in May prior to the gunstrikes, was silenced until 12 July, when 4 rounds were fired. On this date, NEW JERSEY fired 62 rounds into the complex, and up to the end of the hostilities no more rounds were fired from TWIKOTCHWI.

(3) The NEW JERSEY fired 164 rounds into the HODO PANDO Complex on 11-12 July 1953, which had fired approximately 468 rounds since returning to action on 27 May and 7 July. Up to the cessation of hostilities no more fire was received from HODO PANDO.[87]

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ABOUT THE AUTHOR

Major General Donald McPherrin Weller retired from active duty in the Marine Corps 1 August 1963, following 33 years of commissioned service.

General Weller was born 1 May 1908 in Hartford, Connecticut, and graduated from high school in Pittsburgh, Pennsylvania, in 1925. He then studied for a year at Carnegie Tech before entering the U.S. Naval Academy. Upon graduation from the Academy, 5 June 1930, he was commissioned a Marine second lieutenant.

During his first years of service, Lieutenant Weller completed the Marine Officers' Basic School and the Infantry Basic Course at Marine Corps Schools, Quantico; served aboard ARKANSAS with the 1st Battalion, Tenth Marines; and was a detachment officer at Marine Barracks, Norfolk Navy Yard, Portsmouth, Virginia. On rejoining the 1st Battalion, Tenth Marines, he was promoted to first lieutenant in January 1935 and later completed the Army Field Artillery School, Fort Sill, Oklahoma.

During his tour at Fort Sill, Lieutenant Weller first became interested in the application of naval gunfire to the amphibious assault through study of the Gallipoli campaigns and the preparation of a term paper on the subject.

In June 1937, Lieutenant Weller went aboard TUSCALOOSA as commander of the Marine detachment. He was promoted to captain in August 1937.

During his TUSCALOOSA tour, Captain Weller served as Control Officer of a 5"/25-caliber antiaircraft battery, and in so doing advanced his knowledge of the potential of the naval gun in support of landing operations.

Captain Weller served on TUSCALOOSA until June 1939. The following month, he again joined the 1st Battalion, Tenth Marines, at Quantico. After serving there as a battery commander until September 1940, he was named Artillery and Naval Gunfire Advisor on the Staff of the Commanding General, 1st Marine Brigade, and participated in extended Caribbean maneuvers from October 1940 to March 1941. He then returned to Quantico, where he continued to specialize in naval gunfire matters as Assistant Operations Officer of the Amphibious Corps, Atlantic Fleet. He was promoted to major in January 1942 and to lieutenant colonel in August 1942.

During his assignment as Naval Gunfire Officer, Major Weller was instrumental in the reorganization of the Naval Gunfire Shore Fire-Control Party, the link between the supporting ship and the troop unit ashore. He also trained Navy, Marine, and Army officers of the 1st Marine Division, 1st Army Division, and 9th Army Division as Naval liaison officers and spotters to serve in shore fire-control parties. In addition, Major Weller instructed naval aviators of the Atlantic Fleet surface combatants in tactics of landing forces and in spotting

gunfire on land targets and prepared instructional material for landing forces in employment of naval gunfire support--all in close coordination with the Staff of the Atlantic Fleet.

Lieutenant Colonel Weller departed Quantico for San Diego, California, in September 1942 and became Assistant Operations Officer of the Amphibious Corps, Pacific Fleet, the following month. In January 1943, he took command of the 2d Battalion, Twelfth Marines, 3d Marine Division, and a month later embarked with that unit for the Pacific area. He led the 2d (75-mm howitzer) Battalion at Bougainville and Guam. For meritorious achievement in these campaigns, he was awarded the Bronze Star with Combat "V" and a Gold Star in lieu of a second.

Following the Guam campaign, Lieutenant Colonel Weller was named Naval Gunfire Officer, Fleet Marine Force, Pacific, in August 1944. For outstanding service in this capacity during the planning and combat stages of the Iwo Jima invasion, he was awarded the Legion of Merit with Combat "V." He returned to the United States in June 1945, then served for six months as Chief of the Naval Gunfire Section, Troop Training Unit, Training Command, Amphibious Forces, Pacific Fleet, in San Diego.

Following this, Lieutenant Colonel Weller completed the Army-Navy Staff College in Washington, D. C., and the Instructors' Orientation Course, Marine Corps Schools, Quantico. In June 1946, he began a three-year tour as Chief of the Naval Gunfire Section, Marine Corps Schools, Quantico. While there, he was promoted to colonel in February 1948.

Upon his detachment from Quantico, Colonel Weller entered the Naval War College, Newport, Rhode Island, in August 1949, and completed his studies there in June 1950. During the next two years, he was stationed at Headquarters Marine Corps, Washington, D. C., serving as Chief, Strategic Planning Section; Executive Officer, Division of Plans and Policies; and Chief, Policy Analysis Division, respectively.

In July 1952, Colonel Weller reported to Camp Lejeune, North Carolina. There he served as Commanding Officer, Tenth Marine Artillery Regiment and Artillery Officer, 2d Marine Division, until June 1953 when he became Chief of Staff, Marine Corps Schools, in August 1954. He was promoted to brigadier general in November 1955.

General Weller remained at Quantico until May 1956. Ordered to Paris, France, he served as Deputy J-3 to the Commander in Chief, European Forces, from June 1956 until April 1958. Following this assignment, he returned to the United States and in June 1958 assumed duties as Assistant Chief of Staff, G-1, Headquarters Marine Corps. He was promoted to his present rank of major general in July 1958.

Departing Washington for the Far East in August 1960, General Weller reported on Okinawa that same month as Commanding General, 3d Marine Division (Reinforced), Fleet Marine Force. He was transferred to Hawaii in September 1961, where he served as Deputy Commander, Fleet Marine Force, Pacific, until his retirement, 1 August 1963.