THE CAPITAL SHIP PROGRAM
IN THE UNITED STATES NAVY,
1934-1945

DISSERTATION

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By
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"Until I see that other nations have ceased to build line-of-battle ships, they are not yet an antiquated prejudice."

--Henry John Temple, Viscount Palmerston, ca. 1855
Tune:
"I'm a ramblin' wreck from Georgia Tech"

(Chorus)

It's a comfortable way to fight the war,
In the good ship Iowa;
The food is always tasty,
Twice a month we draw our pay;
We never get in action, every night we hit the hay,
It's a comfortable way to fight the war,
In a good ship Iowa.

1. We sail the broad Pacific seas,
   And never sight the foe;
The birdmen do the fighting,
   They're always on the go;
Marines land on the islands and the Army steals the show,
   The Iowa just steams along and never strikes a blow. (Chorus)

2. The food supplies are rationed,
   Back in the U.S.A.;
The scotch is bad, gin can't be had,
   Unless you want to pay;
The transportation problem is terrific, so they say,
   We're glad we're here and not back there, we like it out this way. (Chorus)

3. At Truk we steamed at 30 knots
   To catch the crippled ships;
Torpedoes, bombs and bullets,
   Were thrown at us by the Nips;
"Don't waste your ammunition", the Force Commander cried,
   The cruiser boys will do the job, You're just here for the ride". (Chorus)

4. We've been in all the battles,
   Since the start of forty-four;
Our campaign bars are filled with stars,
   For victories galore;
The Nips come out to meet us, but they know we're pretty hot,
   So when we appear, they run away, we never fire a shot. (Chorus)

by Frank L. Pinney, Chief Gunnery Officer, USS Iowa, 1944-45
INTRODUCTION

From the days of the Spanish Armada, the big gun and its carrier, the ship of the line and later the battleship, had been the ultimate arbiter of sea warfare. The size and complexity of these vessels made them necessarily expensive; as a result, some nations attempted to buy sea power cheaply through technological innovation. Some of these challenges to the battleship, such as Jefferson's gunboat navy, were frivolous. Others, such as torpedo-firing destroyers and submarines, posed a more real threat at the beginning of the twentieth century. Nonetheless, the battleship managed to weather these storms and emerged from World War I as the "backbone of the fleet" in the eyes of most naval experts.

The rapidly developing airplane proved more difficult to manage. The controversial sinking of the Ostfriesland by General William Mitchell's bombers in 1921 unsettled public faith in the capital ship, although big ship advocates stressed the inconclusive nature of the test. Consequently, the debate over sea control through the airplane or big gun continued unabated during the 1920's and early 1930's. But by 1934, the battleship was in a peculiar position. Its development had been arrested since 1921 as a result of the Washington Naval Conference, while
the airplane had greatly improved in capability. In an
event unparalleled in military history, the evolution of
one weapon had been artificially suspended while others
had gone on apace.

As a result, all American battleships in 1934 were
of First World War vintage, and the question of the re­
placement of the oldest of these vessels was a pressing
one in light of the threatening international situation.
The Navy was facing what would later be known as "block
obsolescence," and the latest naval arms limitations
pact, the London Conference of 1930, was due to expire on
December 31, 1936.

However, the replacement of the outdated ships by new
construction required great expenditures and a
heavy drain on naval construction facilities. Although
Congress might be increasingly generous with money as the
1930's drew to a close, the rejuvenation of atrophied
armaments plants would prove a difficult task. An even
more fundamental problem facing naval planners was the
extent to which rearmament should be devoted to the air­
craft carrier and its untied main weapon, the airplane.

In fact, there was little debate on the question.
The principal policy-making organ of the navy--the
General Board--was of practically one voice that the
battleship was the ultimate weapon of sea control, and
this belief was echoed by the top admirals in the fleet.
The senior line officers' opinion was seconded by the civilian leadership of the Navy Department and by President Franklin Roosevelt, a chief executive who took a close interest in naval affairs. Some authorities also pointed to useful secondary roles for the battleships, although purists objected to violating the integrity of the battle line.

The continued dependence on the battleship has been severely criticized with the advantage of hindsight, even by many sympathetic to the navy. Yet in the light of the foreign building programs of the time, it is hard to fault the planners. Not a single fleet was putting its trust in aircraft carriers. In fact, America's most probable enemies seemed notably unenthusiastic about carrier construction. The Japanese had pushed for their abolition in 1935 and German and Italian programs emphasized traditional capital ships, as did the announced plans of the British and French. In addition, the Soviets were soon pressing for American technical assistance in starting a modern capital ship program of their own.

Thus, it would seem only basic prudence that Roosevelt should have pushed secret preparations for the resumption of battleship construction as soon as the treaties expired. Unhappily, the dead hand of treaty restrictions placed severe constraints on the design of the new ships. Displacement was limited to 35,000 tons. The General Board was therefore faced with a difficult
choice: should the new battleships follow the traditional American practice of emphasizing protection and gunpower over speed or should an attempt be made to match the new foreign ships, some known to be designed for thirty knots or better? The question was regarded as of such strategic and tactical importance that a secret advisory panel of civilian experts was established to review the deliberations of the General Board. In the end, the navy broke with tradition and began its first high-speed battleship, a vessel of twenty-seven knots. Yet the new ships seem to give nothing away in either armament or armor, despite the strictly limited displacement. Charges have since been leveled that these vessels were indeed overweight and thus in deliberate violation of international agreement. While the truth of the matter is difficult to determine, it is certain that any American breach of treaty was dwarfed by the Japanese construction of the 64,000 ton battleships of the Yamato class, then unknown to the office of naval intelligence.

To counter such construction, the United States Navy in the late 1930's undertook the first billion dollar program in its history. Six battleships, ostensibly of 35,000 tons each, were laid down, and when the limit was raised to 45,000 tons, six ships of the new size were ordered that would exceed the speed of any competitor and additionally would make a fine nucleus for a fast task force.
Finally, in 1940 with the shock of totalitarian advances in Europe and Asia, all treaty restrictions went by the board. The Two-Ocean Navy Bill provided money for five huge battleships of 60,000 tons apiece and six battle-cruisers, a type which had never before served in the United States Navy.

Pearl Harbor and the loss of British capital ships off Malaya in December, 1941 made the completion of these ambitious plans impossible. Indeed, the disasters confirmed the opinion of many that the battleship was as obsolete as the Roman trireme. Consequently, prominent naval officers writing their memoirs often pass hurriedly over the battleship's role in World War II, as if to do otherwise would stamp the authors as antediluvian. Overshadowed by the carrier, the wartime record of the fast battleship has received little attention, even though the United States employed as many modern battleships as did the three Axis countries combined.

True, it cannot be disputed that by the last years of the war, the battleship had yielded pride of place in naval warfare to the aircraft carrier. However, the fast battleship proved surprisingly important in auxiliary roles. With its large size, high speed, and heavy protection, the battleship was perfectly fitted for use as a flagship for carrier task forces. With its great oil reserves, the battleship was most valuable in serving as an "armored oiler" to keep screening vessels fueled and the carrier
More publicized was the use of the fast battleship for shore bombardment, but since the ships lacked training in this highly specialized occupation, the early results could be charitably described as mixed. Of considerably more substance was the use of the ship for close-in antiaircraft protection for the carriers, an interesting reversal of pre-war doctrine. It was this employment which was to draw the highest plaudits for the battleship and was to enable Chief of Naval Operations Ernest J. King to secure the added construction of battleships in 1944.

Nonetheless, this study maintains that it was in its intended role that the fast battleship could have been most profitably used in World War II. When employed with dash, as at the critical occasions of Casablanca and Guadalcanal, the fast battleship proved devastatingly effective. With these successes under its belt and with its antiaircraft capabilities dramatically proven at Santa Cruz, the mid-war naval campaigns offered a perfect opportunity for the fast battleship to totally vindicate itself by forcing a fleet action. Yet the ships were husbanded throughout 1943 awaiting the arrival of new carriers. And in 1944, the battle line, while still existing on paper, was broken up in reality as the battleships were parcelled out among the carrier task groups. Training for a fleet engagement with Japanese surface ships suffered. Thus, when the opportunity was twice afforded
the fast battleships to make a decisive contribution to
the naval war in 1944 at the Philippine Sea and Leyte Gulf,
they were mishandled, in the latter battle with almost
disastrous consequences.
CHAPTER I

THE BACKBONE OF THE NAVY

The battleship, more than any other military instrument, made America a world power. Upon this one type of warship, the resurgent United States Navy based its strength and lavished its attention from the 1890's through World War I. By settling on a standard design philosophy of great guns and thick armor, the Navy produced a homogeneous fleet of vessels of consistently high quality and with some surprisingly innovative features. After the First World War, this battle fleet alone brought the United States Navy acknowledged equality with the mighty Royal Navy. Paradoxically, the battleship was by this time attacked as both costly and vulnerable.

In early American naval history, the ship of the line had made little impact. A few first rates were ordered during the War of 1812, but were finished too late to see action. By the Civil War, these ships lay in ordinary; the coast line monitor became the premier vessel of the wartime Navy. After 1865, the United States, with no foreign aspirations and no threat from abroad, neglected the Navy altogether. American policy was profoundly defensive in conception. In the unlikely event of war, the Navy, equipped with monitors and wooden frigates,
would undertake its traditional dual mission of coast defense and commerce raidings.

By the 1880's, however, the material condition of the Navy degenerated to such a degree that the Cleveland administration authorized the first sizeable vessels in decades. Reflecting the unsettled state of naval architecture and the nebulous strategic thought in the Navy Department, the Texas and Maine were curious designs. Both were lightly protected, but had good speed for the day (18 knots), and both carried fairly large guns, four 10-inchers in the Maine and two 12-inchers in the Texas. Given these characteristics, the Navy regarded the mission of the ships with uncertainty and variously described them as "armored cruisers" or "second class battleships."¹

By the end of the decade, the confusion ended and a consensus on doctrine and design emerged. In 1890, the president of the Naval War College, Captain Alfred Thayer Mahan, laid the historical groundwork for construction of first-rate ships in his magnum opus, The Influence of Sea Power upon History, 1660-1783. While making no outright plea for the construction of battleships, Mahan claimed that the control of the seas could be gained only by defeating the enemy fleet. Historically, he said, the only tool adequate for the purpose was a rival battle line. Commerce raiding, the traditional American tactic, was dismissed by Mahan as "unsubstantial and evanescent."²
Mahan's ideas made an impact even before his book's publication. In late 1889, he helped Benjamin Harrison's energetic Secretary of the Navy, Benjamin F. Tracy, write his first annual report to Congress. In a tabular comparison of American and European fleets, Mahan and Tracy concluded that the "United States cannot take rank as a naval power"; that in the event of war a descent upon America's coasts would be likely; and that the "iron-clad" was the only means of countering such an assault. Battleships, "the real bone and sinew of any naval force," could raise a blockade, drive off the enemy fleet before its arrival, or best of all, divert the opponent from American shores by threatening the enemy's own coasts, "for a war, though defensive in principle, may be conducted most effectively by being offensive in operations."

If this were not enough justification for building battleships, a more ambitious claim was shortly advanced by one of Mahan's admirers. In 1897, Assistant Secretary of the Navy Theodore Roosevelt, declared that the battleship could actually deter war. Addressing the class at the Naval War College at Newport, R.I., he remarked: "Those who wish to see this country at peace . . . will be wise if they place reliance upon a first-class fleet of first-class battleships. . . ."

On the same occasion, the president of the Naval War College, Captain Caspar F. Goodrich, dealt with the
strategic employment of battleships. Traditionally, American heavy ships had been scattered around various stations as flagships and in wartime had usually been employed on independent operations. Referring to exercises conducted on the new war game board, Goodrich said that the problems showed:

most conclusively the necessity of concentrating the fighting forces of the fleet. Strong scouting detachments may, and often must be sent out from the main body, but he who scatters the fighting force (the battleships) of the fleet is vanquished at the outset. The fighting forces should be like a spider at the center of its web. . . . Concentration means strategic life, dispersion strategic death . . . . It may be accepted as strategically wrong ever to divide the fighting force into detachments.7

The contest with Spain the next year supported the contentions of Goodrich, if not of Roosevelt. Spanish armored cruisers proved unable to stand up to the concentrated, if inaccurate, fire of the first American battleships, the fruits of the Tracy program. Mahan was vindicated in every particular. Again, he wrote, events had shown that "a navy which wishes to affect decisively the issues of a maritime war must be composed of heavy ships--'battleships.'"8 Just as important, Mahan claimed the war had proved once more that "battleships in all ages are meant to act together in fleets; not singly, as mere cruisers."9

But with the return to peace, the battleships were once again parcelled out as flagships at the various fleet stations. This practice was ended forever when Theodore
Roosevelt became president. In 1902 he called together all battleships for large scale maneuvers. At the conclusion of the exercises, the battleships were split into only two groups: an Atlantic fleet of eight ships and one in the Pacific of three battleships. In 1906, concentration was carried to its logical end when all battleships were stationed permanently in the Atlantic.  

War gaming had proven the value of concentration; so had the recent Russo-Japanese War. Russia had begun the conflict with a powerful fleet, but one split into several isolated detachments. This navy was defeated in detail by a numerically inferior, but concentrated Japanese fleet. And in the decisive action, Tsushima, the battleship was the ultimate arbiter of victory. In 1907 the Navy Department concluded that the war had demonstrated again that the battleship was the "backbone of the fleet." 

This was fortunate, for the Navy had invested very heavily in battleships. In 1889, Tracy and Mahan had called for a most ambitious program of twenty battleships, twelve for the Atlantic and eight for the Pacific. In justifying such an effort with no foe on the horizon, they pointed to the long construction times that a battleship entailed. Congress understandably balked at such an undertaking and authorized only three ships in 1890 and two years later added a fourth. The Depression of 1894 prevented the funding of additional vessels, and while the
Cleveland administration ultimately started five battleships in 1896 and 1897, the earliest of these was not finished until two years after the war with Spain.  

The Spanish-American conflict brought on a renewed spurt of building. Three battleships were begun during the war, and the navy started construction on five more in the next two years. With Roosevelt in office an additional eight were authorized by 1904. Apparently, America's new overseas empire justified such an enlarged establishment, although there was little serious strategic discussion behind the program. When the recently instituted General Board called in 1903 for a fleet of forty-eight battleships by 1920, some observers suspected that the number of states and territories was of greater weight in setting the final figure than any concrete needs of the fleet. This program was too grandiose even for Roosevelt. In 1905, with twenty-eight battleships completed or under construction (as opposed to the five that had fought the Spanish a few years earlier), he decided that further expansion was unnecessary. In March, he wrote General Leonard Wood:

I have now reached my mark. ... This Navy puts us a good second to France and about on a par with Germany; and ahead of any other power in point of material, except, of course, England. For some years now we can afford to rest and merely repair the ships that are worn out or become obsolete. ...
On the whole, Roosevelt's boast about the excellence of the American ships was well-founded. Although the Texas had been designed in Great Britain, all the later ships were the products of American naval architects. The latter were not given a free hand, however. In contrast to the common practice in Europe where designers were restricted solely by the generosity of appropriations, in the United States, Congress sketched the basic characteristics of each new class by specifying maximum tonnage and insisting upon "the heaviest armor, the most powerful ordnance, and the highest practicable speed."

While broad requirements like these gave ample latitude to the architects at the Bureau of Construction and Repair, on one occasion (1905) Congress deliberately restricted the displacement of two battleships to a figure well below current practice in the interests of economy. The resulting vessels, the Mississippi and Idaho, proved a perfect example of false economy in defense spending. They were of such limited endurance and so slow that they hampered the performance of the whole fleet and were sold after a few years to Greece. Usually, however, the legal displacements were adequate to enable the Navy to match contemporary designs abroad, especially since the finished American vessels invariably sailed from their building yards considerably heavier than their authorized weight.
Every warship represents a compromise between the demands of ordnance, protection, and speed. From the beginning, the United States Navy emphasized the first two characteristics. The *Indiana* of 1890, for instance, carried four 13-inch rifles, heavier than the 12-inchers customarily mounted abroad, plus a powerful secondary battery of eight 8-inch guns, a feature not adopted by the Royal Navy for another decade. Over a quarter of the ship's weight was devoted to armor, which had a maximum thickness of 18 inches on belt and turrets.  

Speed was necessarily sacrificed. The three *Indianas* could touch sixteen knots, about two knots slower than their foreign counterparts. This handicap was accepted, since gaming at the Naval War College showed that at the relatively short ranges at which battles would be fought, shell damage would slow both lines before the faster could maneuver decisively and "cross the T." Additionally, high speed was of little significance in the coast defense role, and by legal definition, the first fifteen American battleships were "seagoing coast line battleships." When in 1900, the statutory pretense of coast defense was abandoned, nothing changed. Offensive and defensive power still held sway over mobility. Indeed the first two "seagoing battle ships," the *New Jersey* and *Rhode Island*, were identical sisters to the preceding three "seagoing coast line battleships" of the *Virginia* class.
For the most part, the early designs were rather conventional. Innovations centered in gunnery. One attempt to squeeze more firepower from a limited displacement was the superimposed turret. Medium caliber guns were mounted in a two story turret above the main battery weapons in the Kentucky and Virginia classes. Despite great initial enthusiasm for the idea on the part of Line officers, the imaginative design proved quite unsuccessful, and Commander William S. Sims wrote that "the Kentucky is not a battle-ship at all. She is the worst crime in naval construction ever perpetrated by the white race."  

The Michigan class authorized in 1905 offered a more practical, but even more revolutionary approach to increased gunpower. The secondary battery was cast aside altogether and the number of 12-inch guns doubled from four to eight. In an equally daring move, the big guns were disposed in four center-line turrets, two of which were placed in a super-firing position.

The exquisite simplicity of this arrangement never received the attention that it deserved. With the leisurely pace of construction in the private yards, neither ship was commissioned until 1910. Therefore, the title of first all-big-gun ship went to the British Dreadnought, although this vessel had been authorized after the American ships and mounted its main weapons in a far less economical fashion.
But the Dreadnought was clearly superior to the embryo American design in terms of speed. By using geared turbines, the Admiralty managed to boost their new ship to twenty-one knots, while the Michigan with its reciprocating machinery could make only eighteen knots, the standard predreadnought speed. With the hurried completion of the Dreadnought in late 1906, the British had a weapon that could overtake and destroy any existing battleship.

Surprisingly, Mahan, the apostle of sea power, failed to see the implications of the new design. He had always preferred moderate dimensions and regarded the all-big-gun ship as a mistake. He was especially opposed to an increase in speed. "Assuming that ... the faster fleet arrives first," he exclaimed, "of what advantage would it be, if the gain in time has been due to speed obtained at the sacrifice of fighting power?" That the enemy fleet might be unwilling to arrive on schedule failed to impress him.

On these issues, Mahan represented distinctly a minority voice in the Navy. The one-caliber armament was so obviously superior to the old mixed battery, not only in terms of explosive weight, but also in standardization of ammunition supply and in spotting the fall of shot. Speed, too, was increasingly important for many officers. Recent battle experience in the Sino-Japanese War, the Spanish-American War, and the Russo-Japanese War had
pointed to the value of fast vessels. In the Prize Essay in the *United States Naval Institute Proceedings* in 1905, Commander Bradley Fiske maintained that "the first quality to be demanded in a fleet fight is speed. . . . It is in attaining positions of strategical and tactical importance that speed has its crowning value." In 1906, writing in answer to Mahan's attack on the dreadnought concept, Sims, now the gunnery expert in the Navy, pointed to the advantages that superior speed could confer: the ability to accept or refuse battle; to choose the range; to control the rate of change of range; and to control the compass bearing and thus assume a favorable weather position. He concluded that a slow fleet "must inevitably be defeated by a faster fleet of equal power, and can be defeated even by a faster fleet of less power" since the latter could concentrate on the head or tail of the enemy formation.

If the *Dreadnought* was the ship of the future, then the new battleships of the Roosevelt program just coming into service were at one stroke rendered obsolescent. The president's boast in 1905 that the Navy was "adequate" no longer held true. As a result, Congress appropriated funds for eight of the new dreadnoughts between 1906 and 1910. In gunnery, these followed the lead of the *Michigan* by having all center-line turrets, although the number of guns was increased from eight to ten and then twelve; in the *New York* class of 1910, the armament jumped to ten 14-inch rifles. Protection was up to the best British
standards, and the progressives urged and received an increase in speed to twenty-one knots.\(^{26}\)

In 1911, American naval constructors repeated the coup of 1905 and once again "led the world in battleship design" with the Nevada class. These two "remarkable vessels" with ten 14-inch guns introduced the triple turret into the United States Navy.\(^{27}\) More important, they advanced the "all-or-nothing" principle in protection. Armor of medium thickness was omitted and vital areas such as the machinery spaces, magazines, and turrets were protected by extremely heavy plates up to 18 inches in thickness. This principle was to be employed with little modification for all succeeding American battleship designs through 1940.

From 1912 to 1915, Congress voted funds to begin seven more ships on the same lines as the Nevada. All followed the formula of powerful armament and heavy protection, with speed maintained at twenty-one knots. This was contrary to British, Japanese, and even German design, for these three navies were increasing the speed of their vessels to twenty-three or twenty-four knots. The American practice was defended on the grounds that "change of speed more than anything else causes ships to become obsolete before their time. Just so long as they can keep up with the battle fleet, they are not obsolete."\(^{28}\) Additionally, the importance of speed was deprecated by war gaming at Newport. For example, after 120 plays of one particular game,
the wargamers decided that "the value of 20 per cent superior speed to a fleet of ships of the line of battle is less than one twelfth of its total tactical force." 29

So the speed of the battle line was to be maintained at the level of the first dreadnoughts. However, the Navy no longer had just the superior speed of foreign battle-ships to consider because in 1908 the Royal Navy completed the first of a new type of warship—the battlecruiser. These vessels were equipped with guns as heavy as those in contemporary battleships, and carried the weapons at high speeds of twenty-five knots and then twenty-eight knots. To reach such figures, armor had to be compromised, and even then, the weight of machinery and long hull required ships of a size greater than companion battleships. The role of the battlecruiser was to sweep the sea of enemy raiders, to press home a scouting mission against opposition, and to serve as a fast wing for the battle fleet if necessary. The powerful and expensive new type was soon grouped with the battleship under the generic heading of "capital ship," the obvious implication being that the two were of equal value. The battlecruiser found favor in the German and Japanese navies and by 1912, the British had ten finished or under construction, the Germans six, and the Japanese four.

To meet the foreign programs the Navy asked Congress in 1912 to fund two battlecruisers. The request was rejected and met the same fate when it was resubmitted in
1913. For one thing, the Navy had only recently completed ten large armored cruisers of considerable size and expense. For another, battlecruisers would be too long for most existing docks. Most important, there were serious doubts in Congress and on the General Board about the utility of this new, untested type. One Naval War College study pointed out that most functions of the battlecruiser could be filled by any large cruiser of high speed, although when employed as a fast wing of the battle fleet, the battlecruiser's "tactical efficiency . . . is great." In this role, however, the battlecruiser would inevitably be exposed to heavy caliber fire, and its light armor made its battleworthiness suspect under those conditions.

Consequently, some naval officers began to advocate combining the best characteristics of the battleship and battlecruiser into the fast battleship. The genes of the idea in the United States Navy can be traced to a lecture given at the Naval War College on July 12, 1912 by Richard H. Robinson, Naval Constructor. Robinson wanted "to merge the two types to advantage keeping the heavy armor and armament of the standard battleship and the speed of the high speed battlecruiser." The most obvious drawback was the size and cost entailed. Robinson presented a series of design studies to illustrate the problem. All his fast battleship sketches had one common feature: an armament of eight 14-inch guns. Robinson showed that with moderate range and light protection, a battleship of
twenty-six knots could be built on 29,300 tons, a relatively large ship for the day. At the other extreme, with very heavy armor and a great radius, a battleship of the same armament capable of thirty-two knots would displace an incredible 79,000 tons.33

While nothing concrete came of Robinson's proposal, the fast battleship idea was tested on the gaming board at Newport in the spring of 1914. The type proved so useful that its construction was endorsed by the current class, who also pointed to reports "that England intends to stop building battlecruisers and to favor the fast battleship."34 These reports were correct. In 1912, the First Sea Lord, Sir Francis Bridgeman, and the First Lord of the Admiralty, Winston Churchill, had arrived independently at Robinson's conclusion. In Churchill's words:

To put the value of a first-class battleship into a vessel which cannot stand the pounding of a heavy action is false policy. It is far better to spend the extra money and have what you really want. The battle cruiser, in other words, should be superseded by the fast battleship, i.e., fast strongest ship, in spite of her cost.35

Churchill got what he wanted. In 1912, the five Queen Elizabeth class battleships were ordered; the ships had eight 15-inch guns, 13-inch armor, and a speed of twenty-four knots. They were "the most perfect examples of the naval constructor's art ... yet put afloat."36 No further battlecruisers were authorized. As Americans learned of these ships, naval officers like Sims and the Assistant
Naval Constructor B.S. Bullard pushed for similar vessels. The war in Europe, however, revived the prestige of the battlecruiser. In the opening months of the conflict, British battlecruisers at Heligoland Bight and the Falklands swiftly annihilated lesser German cruisers. In January 1915 at Dogger Bank, the large German armored cruiser Blücher fell prey to Admiral David Beatty's battlecruisers. In contrast to this dashing record, the battleships saw no action at all. As a result, the Royal Navy revised its building program and used materials earmarked for further battleships to begin the Renown class, the largest, fastest (thirty-two knots), and most heavily gunned (six 15-inchers) battlecruisers so far. Protection was cut to the bone. Later in 1915, three even more extreme ships of the Courageous class were laid down.

Naturally enough, there was renewed interest in the United States Navy in the battlecruiser. Late in 1915, the General Board asked Congress for four on the grounds that all possible rivals—Germany, Japan, and Great Britain—had them. By early 1916, the navy raised its request to six, and on May 24, the House Committee on Naval Affairs approved five. The design of these ships was most ambitious. Having no experience in battlecruiser construction, the American naval architects, "with a courage that demands admiration," envisaged vessels of the highest speed and greatest gunpower. The Lexingtions were designed
as 35,000 ton ships with a speed of thirty-five knots and a main armament of ten 14-inch guns. Had they been completed as originally planned, they would have been faster than any capital ship ever designed. To obtain this extraordinary speed, the blueprints of the class incorporated a number of novel features including the first bulbous bow, no less than seven funnels, and so many boilers that some had to be placed above the armored deck. Needless to say, armor was meager. 39

Along with the battlecruisers, the General Board also requested ten battleships. Four, the Maryland class, were designed with eight 16-inchers, the first ships to carry such a weapon. The latter six of the South Dakota class were to be of unprecedented size of 43,000 tons and a speed of twenty-three knots, the first increase for American dreadnoughts. But the legislators struck all ten off the list, partly because the Navy already had seventeen dreadnoughts built or building. One week later, the greatest naval clash of the war threw all these calculations into doubt.

Jutland was the only engagement between the full British and German battle fleets, and the only time their battleships came into contact. The action engendered intense controversy, mainly due to the inconclusive nature of the struggle. Neither side could claim a clear victory. In fact, losses were surprisingly small and, among the
heavy ships, concentrated in the battlecruiser type. Three British battlecruisers blew up with great loss of life; one German succumbed after taking terrific punishment. No modern battleships were lost, although several on each side were seriously damaged.

In the United States Navy, Jutland started a debate that was to continue for several years. Some top officers contended that the battlecruiser had taken a beating. Admiral William S. Benson said that the battlecruiser had proved "a tragic demonstration of error" at Jutland. George Dewey of Spanish-American War fame wrote in the *Scientific American* one month after the action: "The battlecruiser was crumpled up and its unfitness to play a leading role in naval dramas was demonstrated." He lauded the ability of the British battleship *Warspite* to take punishment, which proved "the correctness of the theory of those experts who have held that it is wise to sacrifice much possible speed for heavy armor and big guns." Dewey had not done his homework; the *Warspite* was one of the fast *Queen Elizabeth* class. In any event, Dewey concluded that Jutland had once more shown the battleship to be the "backbone of the fleet."

Other officers were not at all sure that the battlecruiser had done so poorly. Some junior officers concluded that "at Jutland the battlecruiser, faster and more maneuverable, requiring less protection, had done the
heaviest damage to the Germans." The president of the Naval War College, Rear Admiral Austin M. Knight, agreed that "the importance of the battlecruisers has been vindicated and a field of enlarged usefulness proved."

Given this confused state of naval opinion, Congress in August voted to retain the five battlecruisers in the naval expansion program and even added the sixth that the Navy had originally requested. More importantly, the ten huge battleships stricken by the House Committee on Naval Affairs were reinstated. These ships, if complete, would make the United States battle fleet the most powerful in the world. There was some criticism then and more later that the Navy should have concentrated on antisubmarine vessels rather than battleships. In retrospect, this would seem valid enough. Yet in August 1916, the U-boat campaign was not menacing, the Germans had a number of powerful capital ships on the stocks, and the British had just taken a beating in materiel at Jutland. A disaster to the Grand Fleet was not utterly inconceivable. If this occurred, the United States would need a strong fleet of battleships on hand, since they would be impossible to build quickly. In the event of another sort of emergency, such as a renewed submarine offensive, the requisite smaller craft to counter this could be (and were) built much more quickly.
Also included in the landmark August 29th act was a clause directing the Secretary of the Navy to submit to Congress "a report on the largest battleship which can be undertaken in the United States in the present state of the shipbuilding and engineering sciences and ... on the desirability of building one or more such vessels." This idea was the brainchild of Senator "Pitchfork Ben" Tillman of South Carolina, who had been pushing it since 1912. He wanted a ship with the maximum thickness of armor, the largest size gun, the highest practicable speed, and the longest possible range. The only limiting factor was to be the ability to transit the Panama Canal. Tillman in 1912 had put the purpose of his resolution in flowery language: "to make the very best battleship or cruiser that the world has ever seen or will ever see; to have this country own the greatest marine engine of war ever constructed or ever to be constructed under known conditions." Tillman proposed the name Terror for the vessel and claimed that it would become "the peacemaker of the world." Some of the more maverick naval officers favored a project to outstrip the competition at one jump. Bradley Fiske pushed a "compromiseless" ship; so did William A. Moffett, who was later to be a champion of naval air power. In 1916, Moffett pointed to the steady increase in battleship displacement over the preceding two decades and concluded that such progression would continue until the size limit imposed by the locks of the Panama Canal
was reached. "Why not go to the limit at once?" he asked. Of course, such ships would be very costly, but that was merely to the advantage of the United States since "we could stand the cost better than any other nation. . . ." 49

As directed by Tillman's resolution, the Bureau of Construction and Repair prepared several designs for ships displacing between 70,000 and 80,000 tons. Speeds ranged from twenty-five knots, which the General Board considered "ample," to the thirty-five knots preferred by Moffett. Fifteen 18-inch guns were to be mounted in five turrets. There was no armor in existence that could have resisted shells from these weapons. 50

The ships, larger than any battleship ever constructed, were too extreme for the General Board. In February 1917, Secretary of the Navy Josephus Daniels reported to the Senate with considerable understatement that "ship for ship, such vessels would be of greater military value than battleships of the present size." Nonetheless, a single ship of the type would not be suited to act in unison with the existing units of the fleet. A division of five would have to be built, and the General Board, presumably on the grounds of cost, recommended against the construction of any such ships. 51

In fact, with the entry of the United States into World War I, the whole ambitious program of 1916 came into question. For one thing, the German High Seas Fleet was
inactive; the battleships and battlecruisers on the ways at Kiel and Wilhelmshaven were suspended as the German Navy concentrated on the unrestricted submarine campaign. Therefore, American naval efforts had to be devoted to countering this grave challenge and the 1916 program was placed in abeyance; none of the battlecruisers and only one of the battleships were started during the war.

American battleships played little active part in the World War. The older ships did prove valuable in training duties; and six of the dreadnoughts reinforced the Grand Fleet at Scapa Flow as the Sixth Battle Squadron. Three of the newest ships were stationed in Ireland to guard against a breakout by fast German raiders. None saw any action; and yet the blockade of which these ships were a part sapped Germany's ability to carry on the war.

Thus, naval experts after the armistice regarded the prestige of the battleship as undiminished. The hero of Jutland, David Beatty, now First Sea Lord, issued a statement concluding that the "capital ship remains the unit on which sea power is built up. So far from the late war having shown that the capital ship is doomed, it has on the contrary proved the necessity of the type." The highly regarded German admiral Reinhard Scheer declared: "The big ship—battleship and battlecruiser—is, and will be, the main strength of naval power." Such proclamations were borne out by the dominant influence
exercised by battleships in naval operations in the Black Sea in 1919 and the Sea of Marmora in 1920. 54

The United States Navy, therefore, was determined to get the capital ships it had been promised in 1916. However, the General Board gave some thought to cancelling the battlecruisers and substituting a division of thirty-two knot battleships. The bureaus favored the change, as did Secretary Daniels. Captain Ernest J. King in the U.S. Naval Institute Proceedings supported the move to faster battleships. "Time is everything," he wrote, "and speed directly affects time and so helps to overcome lack of foresight and errors of judgment." 55 Such top admirals as Sims, Benson, and Henry T. Mayo, the Commander of the Atlantic Fleet, were emphatically in favor of the fast battleship, "the greatest naval development of the war" according to Benson. 56

Naval opinion was not unanimous on Benson's point. As one traditionalist opponent put his case: "Would this vessel if she dashes here and there at high speed, making a few hits here and a few there, do a greater sum total of damage than if she settled down to fight an opponent in the old-fashioned way?" 57 A more convincing argument in favor of continuing the original 1916 plan was that new designs for fast battleships would be time-consum ing to prepare. The General Board estimated that the building program would be delayed by at least a year
if the fast battleship were adopted, and in the end this consideration was decisive. 58

Nonetheless, something had to be done about the Lexington class battlecruisers. They had already been redesigned once in late 1916 when it was discovered that the British Renowns were mounting 15-inch guns. Since Congress required that the American ships have "as powerful armament as any vessel in their class," their main battery had been changed from ten 14-inchers to eight 16-inchers, 59 but their extremely light armor remained unaltered. By the end of the war, most naval architects agreed that Jutland showed above all the importance of adequate protection. In early 1919, the British allowed a party of American naval officers under Admiral David W. Taylor, the Chief of the Bureau of Construction and Repair to make a close inspection of the new battlecruiser Hood. This ship, too, had been redesigned after Jutland, but with the emphasis on upgrading the armor. Fitted with a 12-inch belt, the Hood was "a revelation" to Taylor, who decided that it represented the best model for the Lexington class. On June 24, the General Board recommended that battlecruisers be built as a distinct type, but that the design be changed to incorporate improved resistance to both gunfire and underwater attack. Two knots were sacrificed in compensation. In final design, the American battlecruisers displaced 43,500 tons, carried eight 16-inch guns at thirty-three knots, and were protected by a 7-inch belt
and 11-inch turrets. Obviously, these ships were still too lightly armored, and it is probably fortunate that they never had to face combat in this configuration.  

The Navy's willingness to accept such ships was partly due to the need to get quickly fast vessels to counterbalance the battlecruisers of America's new rival, Japan. For a variety of reasons, the relations of the United States with Japan were growing increasingly tense. In 1919, half the American battle fleet was sent to the West Coast, the first time American dreadnoughts were stationed in the Pacific.

Japan, like the United States, had profited financially from World War I, and in 1918 the Imperial Navy started an ambitious naval program, the "8-8 Project," which called for sixteen capital ships (half battleships and half battlecruisers) to be completed by 1927. The first of the battleships, the Nagato and the Mutsu, were on the ways before the Armistice. They were equipped with 16-inch guns and had a considerably higher speed (26 1/2 knots) than advertised. Two similar but heavier vessels were begun in 1920, and in 1921, the Japanese had four additional ships under construction and were preparing to lay down four more. While the distinction between battleship and battlecruiser was still officially perpetuated, the lines of difference were becoming blurred. The eight latest ships were all fast (30 knots), adequately protected, and heavily armed with ten 16-inchers.
Finally the Japanese in late 1921 drew up plans to over-trump the American 1916 program with four superdreadnoughts of eight 18-inch guns. The cost of these projects was enormous. If the race continued, the government would have to budget $400 million for capital ships alone in 1927.62

Under the circumstances, the British could hardly stand aloof. Reluctantly, the Admiralty in 1921 ordered four battlecruisers that became the most powerful capital ships ever designed for the Royal Navy. They reflected the newfound British penchant for protection with their 8-inch decks, 14-inch sides, and 17-inch turrets, and were really fast battleships by any definition of the term. Although their armament of nine 16-inch guns was by far the heaviest ever put into a British design so far, the Admiralty contemplated an 18-inch battery for a following class of even larger battleships.63

Faced with the unpalatable fact that the ships of the 1916 program might be totally outclassed by Japanese and British vessels with 18-inch guns, the United States Navy began work on a similar weapon. In tests, this gun fired the longest shots ever ranged at the Dahlgren proving grounds. The weapon was so large that a ship of 70,000 tons would be necessary to carry it effectively.64

Yet the acquisition of such monsters was completely out of the question. Public opinion by late 1921 had turned against the naval race. Battleship competition between the
United States and Great Britain was rightly regarded on both sides of the Atlantic as senseless. If Japan could be persuaded to curb her naval program, there would be no reason to continue capital ship construction.

The resulting Washington Conference of 1921-1922 had important results for the battleship. By setting capital ship ratios at 5:5:3 for Great Britain, the United States, and Japan, it meant an end to an age of naval competition in terms of lengthening lines of ever larger battleships. By establishing a maximum size of 35,000 tons and 16-inch guns for new construction, the treaty straitjacketed the naval architect; all ships designed under treaty restrictions would invariably be imperfect ships with certain essential qualities compromised to give a modicum of efficiency in other, equally important areas. And by junking virtually all ships still building, the treaty cost the United States Navy most of the cherished 1916 program. Three battleships of the Maryland class were retained, but the fourth, the Washington, and all six battleships of the larger and faster South Dakota class, some of which were well along, were stricken. None of the six Lexington battlecruisers could be finished either, although two were converted into aircraft carriers. Thus, the treaty froze the speed of the American battle line at twenty-one knots, which was two to three knots slower than the corresponding British and Japanese lines. It also
deprived the Navy of a counter to the Japanese battle-cruisers. The Navy's reaction to the treaty was one of outrage, little tempered by the equally heavy cuts that the British and Japanese were forced to make.  

From the standpoint of the big-ship enthusiast, the treaty was a disaster in another respect. It suspended development of the capital ship at a time when its very existence was under attack from a new front—the air. In 1921, the American General William Mitchell made a number of startling claims for the airplane at the expense of the battleship. Echoing the concepts of Italian air power advocate Guilio Douhet, Mitchell claimed that the bomber offered a much cheaper instrument of national defense than did the battleship. His enticing slogan of "a thousand aircraft for a battleship" was based on the purchase price of the two weapons and took no account of operational or depreciation costs, which favored the naval vessel. In fact, the British later calculated that only forty bombers could be kept in service for the cost of operating one battleship.  

Of even greater moment, Mitchell maintained that the battleship was terribly vulnerable to bombing. Some of his claims bordered on the absurd. In March 1921, he publicly predicted that one direct hit on a battleship would jam turrets, fill the engine room with "noxious gasses," cause fires to break out, and explode antiaircraft
ammunition. The blast would kill all personnel on the upper decks and would shell-shock virtually everyone else aboard. One bomb, he said, would put completely out of action a ship as tough as the German Derfflinger, which had survived numerous heavy shell hits at Jutland.  

In the summer of 1921, the outspoken general got a chance to back up his theories by bombing surrendered German vessels, the most sizeable being the early dreadnought Ostfriesland. When this obsolescent vessel, immobile, unmanned, and undefended, was finally sunk after a series of direct hits and near misses, the death of the battleship as a type was widely proclaimed. Bills were introduced in Congress to convert capital ships into "airplane carriers." Some prominent naval officers espoused the new faith. Rear Admiral W.F. Fullam wrote in the New York Times that battleships were "helpless in modern war" since their screening vessels could easily be destroyed by aircraft. On the basis of a series of games at the War College, Sims repudiated the battleship and later remarked that in "case of . . . an attack, the best position for the battleships would be as far up the Mississippi as they can go."  

This was hardly the view of the majority of officers. The Eberle Board, specially constituted to look into the controversy, agreed that air power "has introduced a new and highly important factor in warfare" and that its influence would undoubtedly increase in the future. But
the Director of Gunnery, Captain William D. Leahy, testified that the Mitchell experiments pointed to the "improbability of a modern battleship being either destroyed or put out of action by aerial bombs." Nonetheless, the Board called for improvements in battleship design to counter the airplane, and in the early twenties, the Navy expended considerable effort in this direction. Antiaircraft guns were placed aboard all battleships, and alterations made in the South Dakota class before the Washington Conference to improve their antiaircraft capabilities. Catapult fighter planes were assigned to each battleship, although they were soon abandoned in favor of carrier aircraft. In 1925, the General Board sought congressional funds to improve passive defenses by the addition of increased deck armor and blisters, or bulges. At the Naval War College, the students were often required to solve problems that demanded considerable attention to the air and underwater forces of modern fleets.

Still, the battleship reigned supreme in theory and in fact. The General Board again named it "the backbone of the fleet," and said that "relative [naval] strength could therefore best be assessed on the basis of the total tonnage of that class possessed by each power." In 1924, Secretary of the Navy Curtis D. Wilbur told a House Committee: "It is believed that modern naval engagements between first class powers . . . will be fleet
engagements. . . ."73 The Secretary did not have to specify that by "fleet" he meant "battle fleet." Battleships were the "monarchs of the sea" and "the keystone to the arch of fleet strength."74

Naturally, Jutland was extensively studied. At Newport the action was so thoroughly rehashed in some classes to the detriment of other fields that one wag called it "a major defeat for the United States Navy."75 In the fleet, the surest road to high command lay through the Gunnery Branch or "The Gun Club." Battleship experts invariably occupied the two top slots of Chief of Naval Operations (CNO) and Commander in Chief, U.S. Fleet (CINCUS). In training, ceaseless attention was devoted to main battery practice. Battleships were kept in such intense competition that the Commander in Chief was forced to fly his flag in an obsolete cruiser so that no battleship would be handicapped by being taken out of the line as flagship.76

At the end of the decade, the question of capital ship construction was raised again. The Washington Conference had fixed the life of a battleship at twenty years. Several ships in each of the great navies were now nearing that limit, but with the political situation essentially unchanged and the world economy in collapse, no government was anxious to begin building once more. President Herbert Hoover, who believed the battleship to
be vulnerable to air power, was especially interested in a supplementary conference to extend the Washington Treaty.77

At the London Naval Conference of 1930 all three powers were amenable to suspending replacement of capital ships during the life of the new agreement, which was to be in force through December 1936. Additionally, some of the oldest capital ships were consigned to the scrap yard. A dispute did erupt, however, over a proposal supported by both Great Britain and Japan to reduce the maximum displacement of capital ships to 25,000 tons. Having few bases and great stretches of ocean to traverse to her Far Eastern interests, the United States successfully defended the 35,000 ton ship.78

With this agreement, the Navy's battleships slipped again from the limelight. Fewer in numbers and increasingly aged, the big ships remained the core of the Navy's strength. Their heavy guns and thick armor were the warrants of their power; their meticulous condition testified to their pride of place in the Navy. But their eminence, their employment, their very utility rested primarily on hypothetical calculations. Only the very oldest officers could have seen action in battleships; the lack of concrete wartime experience was to hobble the battle fleet in the rapidly changing conditions of the 1930's.
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CHAPTER II

PLANNING FOR RENEWED CONSTRUCTION

By the mid-thirties, the naval equilibrium established by the Washington Conference began to break down in an atmosphere of heightened international tension. Renewed competition for supremacy in sea power seemed certain. One problem facing American planners was the role of the capital ship in an era of increasing technological change. Traditionalists argued that the battleship would fill its place in the battle line as it always had; other high ranking officers showed more prescience in seeking new missions for the more technologically sophisticated capital ship that they proposed.

In 1934, the question of battleship construction again became a pressing matter. The older ships that had been granted a new lease on life by the London Conference of 1930 were reaching the age when they could be legally replaced. To avoid the expense of such a program, the signatories of the earlier pacts agreed to another conference, which opened at London in 1935. However, prospects for an amicable agreement were far less bright than they had been in 1930. For one thing, the Italians had announced in May 1934 that they were going to build two 35,000 ton battleships. While this was undeniably within their treaty rights, the new ships would outclass existing
battleships, and France and Great Britain regarded the Italian program with considerable misgiving.\(^1\)

Another serious handicap for the negotiators was the increasing tension in international affairs. Hitler was making clear his intention to rearm. The intransigent line taken by Japan was of even greater moment. The government of that country had fallen under the influence of chauvinistic junior officers of both services. Under heavy pressure from these young firebrands' assassination tactics, the Navy General Staff by 1934 secretly argued for unrestrained naval competition. Publicly, the Imperial Navy insisted on parity with Great Britain and the United States in capital ship tonnage, or alternately the total abolition of the battleship, which would leave the powerful Japanese cruiser squadrons with control of the western Pacific. The English and Americans rejected both demands, whereupon the Japanese denounced the pacts of 1922 and 1930. Consequently, a continuation of the capital ship holiday was out of the question. An agreement to place some sort of qualitative limit on new construction was the best that could be hoped for.\(^2\)

Unfortunately, the two western powers were not in complete accord with one another. Both wanted restrictions on the size of new vessels, but the Admiralty was in favor of cutting back to ships of 25,000 tons with 12-inch guns. The General Board, on the other hand, preferred to retain 35,000 ton ships and 16-inch riflés.
The Pacific dictated large vessels with great cruising radius, and as American officers pointed out at London, heavy armor was essential to meet the increasingly serious challenge from the air. Ultimately, the General Board agreed to limit the size of the main battery weapons to 14-inches as a compromise measure to placate Great Britain, but insisted on the 35,000 ton limit. Since the resulting agreement was signed only by France, Great Britain, and the United States the diplomats added an escape clause that restored the 16-inch gun in the event the Japanese or Italians did not accept the smaller weapon by April 1, 1937.  

Japan waited until the last minute (March 27, 1937) before formally refusing to adhere to the 14-inch maximum. Japan was now legally free to build battleships that would outclass any warship in existence, while the three western powers remained bound to 35,000 tons and 16-inch guns. The restriction of naval competition by treaty had received a mortal blow, although as late as the spring of 1938, a few Americans such as Representative Hamilton Fish and diplomat Norman Davis called for conferences to limit battleship construction.  

Before this time, however, official opinion in Washington was heavily in favor of naval rearmament. The principal architect of the new capital ship program was the President himself. Franklin D. Roosevelt had considerable expertise in naval affairs that started with his
service as Assistant Secretary of the Navy during World War I. His interests in the Navy ran the gamut from broad questions of policy to narrow technical details much like his philatelic hobby. During his presidency, Roosevelt took an important, sometimes a decisive role in such diverse matters as the basic design characteristics of the Navy's most powerful capital ships, the caliber of main battery and antiaircraft guns, improvements in battleship protection, the selection of the men to command the battle fleet, and even the naming of individual warships. As one authority, Mark S. Watson, has remarked: "Nobody, reading the record, can doubt that the determining influence in the making of military policy in the prewar days was that of the President as Commander in Chief. . . ."\(^5\)

The civilian leadership of the Navy Department had far less voice in the capital ship program. The Secretary, Claude Swanson, was physically decrepit, and his Assistant Secretary was not well. Harold Ickes archly remarked in his diary:

\[\ldots\] Assistant Secretary Charles Edison is very ill. He seems to be threatened with blindness and already is so hard of hearing that he has to carry an Acousticon. This leaves the Navy in charge of Swanson, who is only about ten per cent alive.\(^6\)

Swanson's forte was not really naval affairs in any case. In April 1937, at the height of the debate over 14-inch versus 16-inch guns, he proclaimed that the 14-incher was as effective as the larger weapon and that the navies
using the latter had been disappointed in it. Neither assertion was correct. Perhaps because of this lack of technical knowledge, Swanson and Edison were often overruled by Roosevelt on matters of naval design, departmental organization, and lesser matters as well. Swanson's successor, Frank Knox, fared little better, being omitted from major wartime conferences and the distribution list of JCS papers. The only administration official who had a significant impact on the capital ship program was Under Secretary James V. Forrestal, appointed in 1940 at the height of the rearmament effort.  

Roosevelt, in fact, preferred to by-pass his secretaries and deal directly with the senior officers. He set capital ship building policy with the CNO, discussed battleship design details with the technical experts and the chief of the Bureau of Construction and Repair, and talked over the lessons to be derived from fleet problems with his naval aide. In 1939, the President, in a little noticed order, institutionalized this unofficial working arrangement by bringing the top Navy (and Army) officers immediately under his "direction and supervision." But with Roosevelt's attention only occasional, the Navy Department lacked effective civilian control, at least until Forrestal was appointed.  

A skeptic, basing his observations on the formal organizational structure of the Navy, might have doubted the ability of that service to plan and carry out a large
capital ship program. Lines of authority were hazy at best. In designing a major warship, the General Board, the Naval War College, the fleet commanders, the bureaus, and the CNO all had significant voices. This situation attracted unfavorable comment both within and outside the Navy. One Congressman redundantly called the bureau system a "rather complicated labyrinth." The Navy's War Plans Division in a memo complained that:

coordination is lacking . . . in the general arrangements in new construction. The General Board lays down the military characteristics of new ships. The material bureaus plan ships to fill the military characteristics. At present there is no central agency charged with the coordination of details of arrangements on board new vessels unless it be the Fleet Maintenance Division of the Office of the Chief of Naval Operations.

Early in World War II, this organizational confusion caused a bottleneck in the Navy's building program. Generally though, the CNO held the whiphand and made the final decisions in priorities and technical matters. This trend toward centralizing power in the CNO's office was vastly accelerated when Admiral Ernest J. King took over the post in early 1942; even so the Navy came out of the war with substantially the same organization it had had at the beginning of World War I.

In any naval construction program, the willingness of Congress to provide the funds was, of course, essential; but in the mid-thirties, Congress showed considerable resistance to any such expenditures. Anti-military sentiment,
as typified by the Nye investigation, was high. Some Congressmen charged that the United States was the principal culprit in the failure of the London negotiations; others believed that large sums spent on battleships in the midst of a depression would trigger a revolution. To make matters worse, the relations between Congress and Roosevelt during much of his second term were chilly, and his leverage consequently slight.¹³

Fortunately for the capital ship program, there were a number of countervailing influences on the Hill. For one thing, Congressmen friendly to the Navy advanced the argument that new construction meant new jobs. Carl Vinson, the chairman of the House Naval Affairs Committee, claimed that 85 percent of the money spent on building a warship went into the pockets of labor; materials for a battleship came from forty-four of the forty-eight states. Moreover, the Congressional leaders on the committees dealing with the Navy were generally friendly with top officers and receptive to their wishes. For instance, the key law authorizing new construction in 1934 was actually drafted by William Standley, the CNO, although it was introduced "word for word" in the Congressional Record as the Vinson Bill. In 1936, Senator James F. Byrnes, chairman of the Senate Appropriations Committee, backed the funding of the the first pair of modern battleships after a friendly golf game with Standley. Nevertheless, even Charles Beard, an inveterate opponent of the Navy, was unable to find a
single instance of elected officials caving in to Navy demands because of unseemly pressure. Congressmen who voted for increases in shipbuilding did so out of their own convictions.\textsuperscript{14}

This did not mean that renewed capital ship construction would have smooth sailing. Battleships were attacked on a number of counts. Beard saw them as the consummate symbol of unrestrained navalism. He testified before Vinson's committee that Roosevelt would use battleships for "an aggressive policy of collective action," perhaps to impose a "quarantine."\textsuperscript{15} In 1940, Beard wrote that the latest battleships under construction "with a large cruising radius, were for use in distant waters, rather than for defense in American waters," as "even kindergartners in naval affairs knew."\textsuperscript{16} Beard's view was echoed by retired Marine General Smedley D. Butler, who called for a return to the coast defense principle in battleships as exemplified by the old Oregon.\textsuperscript{17}

Of greater substance, the air arm of the Navy with its implicit challenge to the battleship was developing at a rapid pace. The General Board supported carrier experiments; top admirals before Congress defended fleet aviation as essential. By the mid-thirties, the British concluded that the United States was far advanced in the application of carrier-based air power. But it is possible to overemphasize the place of the aircraft in the prewar Navy. With the dominant role played by the carrier during
World War II, some later writers give the impression that aviation preoccupied naval strategists in the decade before the war. 

This was not the case. The prize essays in the U.S. Naval Institute Proceedings dealt principally with the battleship. In the three years preceding Pearl Harbor, not one sentence in the thirty-six issues suggested that the carrier would replace the battleship as the main weapon of the fleet. Many authorities simply did not believe the battleship was really vulnerable to aircraft attack. Hanson Baldwin, the respected military analyst, pointed to bombing experiments on the uncompleted Washington in 1924 and concluded that a "bomb would have little effectiveness against a modern man-of-war--barring a lucky hit down the funnel." Admiral A.J. Hepburn said that he attached little importance to aerial attack, since the probability of hits was small. He did feel that if a battleship were struck by a bomb the damage might be considerable. Admiral Ernest J. King believed that with optimum conditions, bombers might expect to get 5 percent hits. The findings of the Royal Navy were very similar. In 1934, the First Sea Lord told the Prime Minister that all Admiralty studies showed the battleship to be "impervious" to air attack. War gaming rules in the United States Navy reflected this conviction. One naval aviator recalled an incident in the early 1930's:
We were ordered to attack the 'enemy,' three California's and three Idaho's. We came in from 22,000 feet, effected complete surprise with 74 aircraft and roughly 54 half ton bombs.

... The Chief Umpire, going by War College rules, slowed one BATDIV [battleship division] two knots!!!

The Navy's attitude toward its antiaircraft capabilities was a mixture of unconcern and overconfidence. D.F. Sellers, CINCUS in 1933, admitted that ranking officers simply did not have time to study antiaircraft gunnery. In the 1934 edition of the General Tactical Instructions, less than one page (out of 292) dealt with antiaircraft fire. The Navy vastly overestimated the effectiveness of its existing defenses. For instance, staffers at Newport calculated that if forty planes attacked three battleships, sixteen of the aircraft would be shot down and the rest so disorganized that they could not carry through their assault. The Navy relied especially on the .50 caliber machine gun for close-in defense. This weapon did possess a tremendous rate of fire (over six hundred rounds per minute) and had proven quite deadly when mounted in fighter planes, but too many officers overlooked the fact that ranges in aerial combat were virtually point blank. In 1938, Admiral Leahy optimistically told Senators that the battleships of the United States Navy with their screening cruisers and destroyers presented the greatest concentration of anti-aircraft firepower in the world.

Despite the general complacency, there were some warnings that not all was well. During the fleet problem in
1935, the battle line "suffered" considerably from aircraft attack. Efficient distribution of antiaircraft fire proved particularly difficult. Some officers believed that there were too few light guns afloat and called for the installation of large numbers of antiaircraft weapons to deliver a "smothering fire." Toward the end of the decade, the problem of defense against air attack received more attention. The chief of the Bureau of Aeronautics warned that bomb hits might well be more numerous than shell hits in the next war; Admiral Thomas C. Hart, the chairman of the General Board, agreed and asked for strengthened deck armor to counter bombs. An article in the U.S. Naval Institute Proceedings suggested the creation of antiaircraft cruisers to protect the battle line. In 1939, King, then commander of a carrier unit in the annual fleet problem, dedicated his post-exercise comments solely to the question of antiaircraft defense, with special emphasis on fire control.23

The outbreak of World War II brought the issue squarely to the fore. In the spring of 1940, Admiral King was ordered to make a survey of the fleet's antiaircraft defenses. While in the midst of the study, the British destroyer Gurkha became the first ship ever to succumb to hostile air attack (on April 17). Other casualties followed quickly; in May, King reported that the Royal Navy regarded antiaircraft cruisers as "worth their weight in gold."24 King ultimately concluded that the defenses of
the United States Navy against aircraft were seriously deficient. In the Pacific, Admiral James O. Richardson, CINCUS, reached the same verdict. In two years, his fleet had fired on drone aircraft on 307 occasions. The drones were damaged seriously enough to halt an attack only 5 percent of the time. In 83 percent of the runs, they were not hit at all.25

By 1941, the pendulum had swung in the other direction. Some officers regarded bombing damage as inevitable even if the Navy possessed air superiority: "the bomber will always get through." Consequently, one suggested remedy was to keep capital ships out of the range of land-based planes altogether. Richardson tried the more optimistic remedy of sharpening the fleet's gunnery with more realistic practice. But the panacea that appealed to most tacticians was added antiaircraft firepower. Lieutenant Franklin Percival wrote in the U.S. Naval Institute Proceedings that battleship design should be entirely recast with a view to this end. The Bureau of Ordnance called for more light antiaircraft guns and was seconded by the Director of Fleet Training, Captain Willis A. Lee, Jr. The chief of the Bureau of Ships, Samuel M. Robinson, asked Congress in January 1941 for $300 million for just this purpose. This attempt to retrieve lost ground would ultimately bear fruit, but there is no doubt that the Navy's antiaircraft defenses had slipped badly during the thirties.26
During this period, air enthusiasts also attacked the battleship on the grounds of expense. Naval officers, foreshadowing Robert McNamara, countered with complex equations before Congress to show that the battleship with its long life and great supply of ammunition was twice as effective in terms of cost as an equivalent force of aircraft. Even if expense were disregarded, no other vessel could take the place of the battleship, its supporters claimed. The aircraft carrier with its unarmored flight deck was easy prey for bombs; its striking power was robbed by bad weather. One strategist theorized that, without accompanying battleships, a fleet of carriers could not defend America's Far Eastern possessions since the ships would run out of fuel while constantly maneuvering at high speed to avoid surface action. In any event, battleships were a more important long-term investment since carriers could be built quickly.27

The vertebrae analogy for the battle line was as much in fashion as ever. The battleship was called "the backbone of the fleet" by such diverse men and institutions as Vice Admiral A.L. Willard, Assistant Secretary H.L. Roosevelt, Lieutenant Brockholst Livingston, the General Board, and Fortune magazine. Admiral William L. Leahy used the phrase before both the House and the Senate Naval Affairs Committees. Other authorities applied more colorful language. The War Plans Division compared the battleship to a man hurling (and standing up to) big bricks;
a contributor to the Naval Institute Proceedings called the battleship "the nation's bank account"; the author of a popular work gushed that the battleship was "the most impressive single symbol of civilization. It epitomizes man's genius and attainments in the fields of invention and science." 28

Advocates of the battleship pointed out that historically it was the sole constant in naval warfare. Flotilla craft might change, but the relative strength of the opposing battle lines had remained the determining factor in naval warfare since the seventeenth century. To many, the battleship's position was unassailable. Even Glenn Martin, the founder of an aircraft firm, admitted that the battleship would probably play a vital role in naval warfare forever. Orthodox naval opinion held that the battleship, with its heavy artillery, would both outrange and outgun all other classes in a fleet action. On the other side of the coin, battleships could absorb the most damage; one authority made the unfortunate statement in 1941 that the modern battleship was "almost unsinkable." 29 In comparing the value of types of ships, the Navy arrived at a numerical scale to show the "final relative merit of efficiency" of each class. Battleships were ranked as 100, carriers 56, cruisers 54, destroyers 37, and submarines 24. Paradoxically, some officers at the Naval War College felt that the battleships, representing great investments in time and money, should not be exposed to risks; there
would probably be only one decisive fleet engagement during a war. Every ship would be required in the line for the final showdown.30

Traditionalists saw this clash between fleets as the raison d'etre for the battleship. Staff officers at Newport often emphasized that the strategic function of the Battle Fleet was to fight a decisive engagement with its opposite number. To ensure the enemy's defeat, the battle line should remain concentrated. Admiral Arthur J. Hepburn (CINCUS in 1937) stressed that "our major battleships could not be used separately; that it would be unsound to detach even one ship."31 Leahy agreed. Some officers were more restrictive. Admiral J.M. Reeves felt that the battleship was unsuitable even for fighting other types of naval vessels. Admiral Joseph K. Taussig wrote that the sole suitable employment for the battleship was the fleet action, and Lieutenant Commander Charles Gray added that "rarely, if ever, do battleships take part in the miscellaneous and auxiliary operations of other and lesser ships.32

In this conservative world, combat ships other than battleships were truly auxiliary. In a fleet fight, all action would center around the battle lines. One instructor told his class at the Naval War College: "Other weapons are brought into the engagement to aid the gun or to take advantage of situations created by it."33 The organization of the fleet reflected this scenario.
All battleships were routinely grouped in one command; the lesser vessels were split up in similar fashion. Training usually took place within the type structure, and ships of the various types did not often work together. The alternative organization of several types into task forces had existed for many years in the Navy, but it was not until 1940 that numbered task forces were permanently established and regular exercises conducted on this basis. Nonetheless, type commanders retained the upper hand in day to day affairs since they controlled the money allotted to individual warships.34

As before, battleship command was the road to the top in the Navy. The system was self-perpetuating: the Bureau of Personnel picked the most promising young officers for the gunnery branch; it also selected the members of the General Board, generally from the list of battleship commanders. Once on top, officers were not usually inclined to turn their back on their specialty. Two examples will illustrate this process. In four years (out of twenty-one) at sea, Joseph Richardson served on two battleships under eight different captains. Every one of the eight was promoted to flag rank. In 1933, Admiral Standley held for two weeks the post of Commander, Battle Force, with the rank of admiral to "qualify" him for the job of CNO. This system doubtless produced some men "who could not see beyond the splash of a sixteen-inch shell,"
in William Howard Gardiner's words. It also brought some capable men to the fore in the pre-war years. Leahy and Harold R. Stark were members of the "Gun Club," and both proved flexible enough to serve in top posts in Europe during World War II. Admiral Reeves proved a shrewd tactician and experimented very early with independent operations for carriers. Roosevelt's naval aide, Daniel J. Callaghan, was a big gun specialist.

If the pick of the Navy's officers were in gunnery, this branch of the service should have witnessed some advances in its art. There was great room for improvement from World War I practice. For instance, at Jutland the fighting between the capital ships opened at a range of 15,000 yards, but much of the action took place at less than 10,000 yards. While gunnery conditions were poor, the shooting was wretched. The British, on whom the Americans modeled their methods, hit with barely 2 percent of their heavy shells (100 out of 4,598); the highly touted German gunnery was not much better: 120 hits out of 3,597 shells fired (3.33 percent). Consequently, in the 1920's, the United States Navy devoted painstaking effort to improving its battleship gunnery. By 1926, American ships with the aid of scouting planes were carrying out battle practice at 30,000 yards.

This was a breakthrough, although the Navy kept the news highly confidential. There were now two zones in
which battleship armor could be penetrated: at close
range as always, and at extreme range (the "Outer Zone" the
Navy called it). For instance, a modern 14-inch gun would
pierce the belt of a Japanese battleship below 20,000
yards and above 30,000 yards. By the early 1930's, the
United States Navy was prepared to defeat its opponent in
the Outer Zone; the fleets would never even sight each
other. American battleships in training showed their
ability to shoot effectively at unseen, maneuvering targets
with full salvos fired by remote control from a single
firing key. The Navy made further refinements later in the
decade with automatic fire control systems to produce
smaller patterns, better rangefinding, and increased rates
of fire. Admiral Reeves told Secretary Swanson that the
ability to fight in the Outer Zone was the greatest advan­
tage the United States Navy possessed. Immediately before
Pearl Harbor, Captain Willis A. Lee reported that the
gunnery of the Battle Line was "good to very good" and
superior to the Fleet as a whole. One admiral wrote that
"even officers who had been closely associated with ord­
nance and gunnery for years were awed by the Navy's sur­
face gunnery."38

The fact that the most capable officers were battle­
ship experts also resulted in a host of new ideas on the
employment and characteristics of the capital ship. Many
thinkers favored an expanded role for the battleship.
Lieutenant Commander Melvin Talbot, writing in the U.S.
Naval Institute Proceedings, proclaimed:

The battleship is no longer bound to the line. We have passed from the old era of column fighting. We have entered the age of far-flung battle forces. In this new and vaster tactical picture, the little center of heavy battleship forts has become a kind of mobile big-gun supporting group. 39

Admiral Frederick J. Horne, later one of King's deputies, felt that there might never be a fleet action in the next war and that battleships would be most useful in support of advance forces. Another of King's proteges, Charles M. ("Savvy") Cooke, believed that the American Battle Fleet should be ready to "spread out" to counter independent operations by opposing heavy ships. So did Admiral E.C. Kalbfus, president of the Naval War College in 1935. Captain R.S. Crenshaw of the War Plans Division also maintained that "eccentric" battle operations requiring small groups of strong ships were more likely than another Jutland. 40

Some officers advanced even more unorthodox proposals. Kalbfus suggested using battleships as a raiding force. Others wanted to follow the British practice of giving increased attention to night tactics. The American expert on Jutland, Lieutenant Commander Holloway H. Frost, cited John Paul Jones, Oliver Hazard Perry, and David Farragut as precedents for forcing action at night. However, the Navy avoided night training before 1940 because of the risks of collision, and loss of life. Many in the Battle Fleet thought that radar, which was just around the corner,
would be necessary before night exercises could be adopted with any degree of safety. 41

This was beside the point for some of the radicals. A number of articles appeared in the U.S. Naval Institute Proceedings calling for more vigorous use of battleships and damn the risks. Talbot won the prize for best essay in 1938 by arguing that Nelson "spent his ships as a gallant industrialist lays out his capital rather than telling it over as a miser tells his board." 42 In another prize essay, Lieutenant Franklin G. Percival attacked the British for treating their capital ships at Jutland "like art treasures in a museum." 43 Frost was especially critical of Admiral Jellicoe's refusal to risk his battleships in that engagement, thereby casting away his chance for a decisive victory. 44 Frost wrote emphatically:

The importance of decisively defeating the enemy battle fleet is so great that every opportunity for action should be seized; in addition, we must endeavor in every possible way to bring about and force such opportunities, which must not be missed just because all the conditions are not in our favor. These opportunities occur so seldom to a superior fleet that they should be regarded as absolutely priceless and distinctly unfavorable battle conditions should be accepted if necessary. 45

According to some officers, there were other, less dramatic roles that the battleships could fill too. They might guard convoys or defend a newly seized base. Battleships might even serve as floating depots for destroyers or submarines operating in remote waters. In peacetime, the Navy could use battleships more aggressively as
a deterrent by moving them into disputed areas.46

Some strategists also considered roles that were to prove especially important in World War II: the protection of aircraft carriers and shore bombardment. The latter was hardly a new mission for battleships. For hundreds of years, navies had used ships of the line to attack forts and to support amphibious operations, generally with disappointing results. Lord Nelson's adage that "a ship's a fool to fight a fort" seemed to be borne out in the Gallipoli campaign, the most ambitious combined attack of the First World War. That unhappy incident became a standard object lesson at the Naval War College; battleship opponents often cited it as a further indication of the uselessness of big ships. The very successful bombardments of Zeebrugge and Ostend received much less attention.47

Planners saw several major obstacles to a successful shore bombardment. For one thing, naval gunfire with its flat trajectory seemed unsuitable in most fire support situations; and the armor-piercing ammunition stocked in battleship magazines was relatively ineffective against shore targets. Friendly troops would be endangered by misses. Moreover, the battleships would be exposed to attack by land-based aircraft and submarines, and especially to the fire of any coastal artillery in the target area. Fleet exercises in 1929 confirmed these doubts. Battleships "attacked" the Army's Chagres River batteries
at the Panama Canal and the Canal itself. The ships had
some success, since the umpires ruled that the Canal was
badly damaged and out of service for a month, but the fleet
commander, Henry A. Wiley, reported: "It must not be con-
cluded that a seal of approval is placed upon attacks of
shore defenses by ships as a general principle."^48

For several years thereafter the Battle Fleet had
little interest in the support of amphibious assaults. In
the 292 page edition of General Tactical Instructions
issued in 1934, there was no mention of shore bombardment
at all. If it were essential to land on enemy beaches,
aircraft would provide the needed cover. Admiral William
A. Moffett of naval aviation was confident that this job
was within the capabilities of his force. Marine Corps
officers agreed; one wrote in the U.S. Naval Institute
Proceedings that the subjugation of enemy guns before the
troops hit the beach was "a suitable mission for tanks
and aircraft."^49

By the mid-thirties, the Navy gave some study to the
problem again. In 1935, the two oldest battleships in
the fleet, the Arkansas and Wyoming, carried out firing
exercises at Culebra Island, and over the next four years,
battleships in the Atlantic repeated the drill. The
Pacific Fleet in 1937 undertook a series of amphibious
operations. Early in the year, six battleships partici-
pated in landing exercises at San Clemente; in May, five
of the most modern battleships covered an assault on
Lanai Island, part of the Hawaiian chain. In the 1938 fleet problem, battleships sailed into submarine waters for bombardment purposes before a protected anchorage had been established. Admiral Claude C. Bloch, CINCUS, judged that "this is not to be considered as being a desirable war-time operation . . .," and the exercises languished.50

With the outbreak of World War II and the successful British shelling of ports such as Valona, Bardia, Genoa, and Tripoli, the United States Navy once more paid half-hearted attention to shore bombardment. Part of the impetus came from Roosevelt, who was concerned enough to propose using the training battleship Wyoming to cover assaults. But some of the officers in the Navy saw the problem too. Lieutenant Percival argued in the 1940 prize essay in the U.S. Naval Institute Proceedings that support of a landing operation was "a task which the fleet of any great power should manifestly be fully prepared to carry through. It is second in importance only to the winning of a decisive fleet engagement."51 In December, the same author wrote that "the first question relating to battleship design . . . is: What changes are necessary to enable these vessels to function more effectively in amphibious warfare?"52 The commander of the Battle Force, William S. Pye, had directives for fire support prepared for each type of warship. He also had all the ships in his command carry out simulated bombardment exercises. Unfortunately, simulation was the best Pye could do. The Navy had
virtually no high capacity (bombardment) shells on hand or even under development until late 1941, despite calls for such ammunition since 1937. The closest approximation to high capacity shells that the Navy had were thin-walled bombardment projectiles left over from World War I. But as one instructor at Newport said, "the concensus [sic] of opinion among officers of our services is that the airplane will have to furnish the chief support for our landing forces in an attack." 53

The Navy was more advanced in using battleships to protect its carriers. From the completion of the first aircraft carriers in the 1920's, fleet commanders realized that the new vessels with their large size and scanty protection were unusually vulnerable to both air and surface attacks. But their defense proved to be a very difficult problem for the fleet. When the carriers were conducting air operations, they generally had to operate apart from the battle line. If an air attack threatened, the doctrine at first was for the carriers to draw as far away from the battleships as possible in the hopes of escaping detection. But by 1938, fleet problems had shown that the carriers were better off under the shelter of the anti-aircraft guns of the battleships, and this became the standing operating procedure. 54 By 1940, the battle line was under orders to conform to the movements of carriers conducting flying operations unless there were pressing
reasons to do otherwise. If a surface engagement was in prospect, tacticians feared that the thin-skinned ships would be exposed to enemy capital ships or cruisers. One solution was to place them at a safe distance on the disengaged side, but this left them open to a thrust by the enemy's light forces. Admiral Reeves, while CINCUS, concluded from the 1936 fleet problem: "If you have no heavy cruisers for [their] protection, then the carriers must stay with the battleships. I don't care how often they shuttle."\(^{55}\)

But this subsidiary role was just what the naval aviators opposed. Tethered to the twenty-one knot battle line, the mobility of the carriers was drastically cut. As early as 1923, there were suggestions that task groups be built around the carriers with battleships in distant support. In the 1929 fleet problem, battleships backed up the Navy's new carriers in a surprise attack on the Panama Canal. By 1932, King was able to say: "The carrier group is now a definite unit comprising a carrier, plane guard destroyers, and protecting vessels (battleships and/or cruisers). . . ."\(^{56}\) But a task group of this nature formed with the ships available in 1932 would be hobbled by the slow speed of existing battleships. The construction of a fast battleship would provide an obvious solution to the problem. In 1936, the General Board concluded:
The advent of fast carriers, to which we are heavily committed, has changed the picture since we last built capital ships. To avail to the full of the offensive power of our carriers, a support of strong ships having high speed is requisite.57

The Bureau of Construction and Repair agreed with this reasoning. Admiral Standley, then CNO, suggested that the Navy form units of fast heavy ships with one aircraft carrier and two battleships. Fleet exercises showed that combating such a force would be very difficult.58 But other officers thought that these task forces were wasted effort. Admiral Reeves wrote to Secretary Swanson:

These eccentric operations or raids are at best minor operation [sic] which cannot of themselves determine the issues of war. I do not believe that we should sacrifice battleship tonnage for this purpose.59

In fact, with the construction of battleships on the horizon, the speed of the new vessels with all of its attendant implications became the most pressing question in top naval circles in the mid-thirties. Opinion was almost equally divided over the issue. In 1935, a count by Admiral Pye revealed that nine of the active flag officers favored the fast battleship, whereas the remaining seven wanted the more traditional ship. Institutionally, the Navy was split too. The Naval War College was one of the strongest advocates of the fast ship, and usually the General Board supported this stand. Not surprisingly, the Bureau of Ordnance led the opposition, and was generally backed by the CNO's office. However, the lines were never
rigidly drawn, as officers changed assignments or (in some cases) their minds. Indeed, the debate dragged on into 1940.60

The conservatives had some cogent arguments. No one opposed high speed per se. The point at issue was the degree to which armor and gunpower should be compromised for mobility. If speed were emphasized at the expense of the other two basic qualities, the resulting battleship might be unable to fight its foreign counterpart successfully. Admiral Reeves maintained that in a contest between two battleships, excess speed "can be usefully employed once engaged only in an effort to escape."61 The commander of the Battle Force, Admiral Bloch, said that high speed was useful only in operations extraneous to the battle line. And as the War Plans Division pointed out, any speed over twenty-one knots in the battle line would be wasted for many years to come. Even in 1940, when the planners had finally settled on relatively high speed for the new American battleships, some writers in the U.S. Naval Institute Proceedings argued for a return to slower ships. In a number of provocative articles, Lieutenant Percival advocated battleships that could bull their way into sensitive enemy waters in the face of both air and surface opposition and thus force the opposing fleet out to a decisive battle. Carrier raids, he said, would have the same result; thus, superior speed in battleships was no longer necessary to compel action.62
On the other side, the advocates of the fast ship claimed that speed would bring multifarious advantages, such as the ability to obstruct the enemy's commerce, to back up scouting forces, and to act as a fast wing of the battle line. One member of the General Board mentioned that a fast battleship could control the destroyer attack point ahead of the opposing battle lines, thereby giving friendly destroyers a chance to launch torpedoes and denying that maneuver to the enemy. Also, the speedier side usually had the option of accepting or rejecting battle and of choosing the range while engaged. But for the progressives, the most pressing reason for the construction of fast ships was to maintain pace with foreign competition. The American battle line, with a nominal speed of twenty-one knots, was the slowest in existence. Often the fleet could not reach this speed. Ships long out of drydock were slowed by marine growth or worn machinery: in 1940, the Pennsylvania could hardly make fifteen knots, and the California was even slower.63

Some strategists felt that the battlecruiser should be resurrected to fill the need for a fast, powerful ship. Early in the thirties, Admiral William V. Pratt proposed a thirty-two knot ship with twelve 12-inch guns to smother an enemy battleship with rapid fire in conditions of poor visibility. In 1938, an article in the Proceedings revived this concept by arguing for such a ship equipped with high explosive (rather than armor piercing) shells
to destroy range finders and periscopic sights on enemy capital ships. William Hovgaard, the noted marine architect, was more realistic. He advocated a squadron of battlecruisers to act as the "queen of the chessboard" by sweeping the opposing light forces off the seas, and by carrying out raids and scouting missions. The Naval War College thought such ships justified by the long period of cruiser and commerce warfare that would probably precede a decisive fleet battle. Some of the most conservative admirals were willing to go along with battlecruiser construction as long as they got their heavily armored, slow battleships. On the other hand, the War Plans Division felt that the aircraft carrier could take over the job of the battlecruiser: "Combined with their airplanes they [the carriers] can reach farther and faster than any battle cruisers ever promise to do and they can fight battle cruisers on their own terms and ground rather than on that of their enemy."64

So there were a great many choices facing the Navy in the mid-1930's. Officers had reached a consensus that some sort of capital ship would be built, but it could not be designed in a strategic vacuum. The characteristics of the new vessel would inevitably be shaped by the nature of its intended employment, by the lingering restrictions of the treaty era, but most of all by its probable opponent. And if the international situation
dictated the construction of a number of ships, only a her­
culean effort could reestablish the requisite heavy arma­
ments industry. The pace for the Navy promised to be
frantic over the next several years.
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CHAPTER III

THE NORTH CAROLINA CLASS

The United States Navy was not alone in regarding the battleship as the mainstay of sea power. Every major navy laid down new capital ships in the late 1930's. For American designers, one severe constraint was the need to produce a ship that did not go over the 35,000 tons allowed by the London Treaty. Ultimately, American naval architects produced such a powerful vessel under this restriction that they were suspected of cheating on the tonnage limit.

In drawing up plans for new battleships, the designers faced another major consideration: the need for a yardstick against which to measure the proposed ships. The Naval War College asked: "Where will the Fleet most probably operate during future wars, and what will be the chief objective of its operations?"\(^1\) Admiral William Standley, while CNO, wrote to the General Board at the height of the debate over battleship speed: "We must be guided in our decision by the forces against which we are going to operate or, in other words, . . . we must look to the next enemy."\(^2\) For virtually all American officers, "the next enemy" was assumed to be the Imperial Japanese Navy. It was the only force which might conceivably
challenge the United States Navy. Consequently, the bulk of the American battle fleet had been permanently stationed in the Pacific since 1922; at Newport, ORANGE (Japan) was almost invariably the opposing force on the game board. By the thirties, Japanese intrusions into Manchuria and China and their withdrawal from the London Conference made war a much less remote contingency.³

In the event of such a clash, the Navy planned to take the offensive and force a decision in the western Pacific. Publicly, spokesmen for the Navy talked in optimistic terms of the chances for success in such an operation. Captain W.D. Puleston wrote in 1941:

The American Fleet would cross the Pacific at about the speed of translation of a cyclone—between 10 and 15 knots. It would resemble the cyclone in a more important phase, leveling everything in its path except a stronger fleet—and a stronger fleet does not at present exist.⁴

Privately, officers viewed operations against the Japanese Navy with considerably less assurance. For one thing, the American fleet was so slow that it was subject to severe attrition by submarines and destroyers during the long passage. Games at the Naval War College repeatedly showed that as the speed of the fleet increased, the attrition diminished.⁵

Once the fleet arrived in the western Pacific, it would find its hands full with the Japanese main body. Surprisingly, the oldest Japanese ships were the most difficult to counter. These four vessels of the Kongo
class had originally been built as battlecruisers with eight 14-inch guns and twenty-six knots. After World War I, they had been reclassified as battleships. From the earliest BLUE-ORANGE war games, they proved a thorn in the side of the United States Navy, since they could destroy any force powerful enough to catch them. Strategists worried that the Japanese would avoid contact with the American battle line and would concentrate on sweeping up American carriers and cruisers with the Kongos. The Navy hoped that its carriers would be able to contain the fast Japanese ships, but many planners advocated the construction of American battlecruisers as a more certain counterweight. Some officers also worried about the speed of the rest of the Japanese battleships. Although the slowest of them was officially listed at twenty-three knots, this still gave the Japanese battle line an advantage of two knots over the American battleships. In the 1935 fleet problem, the United States Navy, sent to relieve the Philippines, was weakened by the attacks of ORANGE submarines and destroyers, and then annihilated by the swifter Japanese battleships, which crossed the "T."^6

Ironically, Japanese planners were working with the same scenario and getting the same results. To harry the American battle line, the Imperial Navy built large submarines of extraordinary range. It placed even greater trust in its surface-fired, oxygen-driven torpedo, a superb weapon with double the speed, range, and explosive
charge of its American counterpart. Both Japanese destroyers and cruisers carried these "Long Lance" torpedoes; some old light cruisers were modified to mount forty of them. The Imperial Navy intended these ships to throw the American fleet into confusion at the beginning of the final clash. From 1937 onwards, carrier planes were also to play a part in whittling away at the American battle line.  

Through such tactics, Japanese admirals believed that the American superiority in numbers could be reduced substantially. In the climactic fleet engagement, the old Japanese battleships would trade punches with the American ships. Like the United States Navy, the Japanese always placed great emphasis on rapid fire gunnery and had tried to lead in heavily gunned ships (in 1913 the Kongo was the world's first warship to carry 14-inch guns; in 1920 the 16-inch Nagato commissioned before similar American vessels). Unlike the United States Navy though, the Japanese also stressed battle line speed. In the Sino-Japanese War, superior speed had been the main factor in defeating the more strongly armed Chinese; at Tsushima, speed was Admiral Togo's main advantage over the larger Russian fleet. For the Imperial Navy, speed meant the ability to dash ahead and execute the classic maneuver of crossing the enemy's "T." As a result, during the 1930's, the speed of the Japanese
battle line was raised by extensively rebuilding each cap-
tital ship. The Kongos could make thirty knots after their
reconstruction; the rest of the battleships came out of
the dockyards able to reach at least twenty-five knots.
The Japanese kept the exact details of these alterations
confidential, and although the United States Navy had its
suspicions, it did not learn the precise figures until 1940
when they came as a considerable shock.  

The capstone to the entire Japanese plan lay in the
reinforcement of the battle line with new ships of un-
precedented size. Design work on the first pair, the
Yamato and Musashi, began in the strictest secrecy in 1934.
The original plans called for ships of 69,500 tons and
thirty-one knots speed, but these were too gargantuan for
the Navy's General Staff. After twenty-three separate
designs, acceptable blueprints finally emerged in March,
1937. The naval architects reduced the tonnage to 64,000
and speed to twenty-seven knots. Nothing else was sac-
ificed. The main armament comprised nine 18.1-inchers,
the largest guns ever carried to sea. They fired shells
of 3,220 pounds apiece to a maximum range of 45,275 yards
or over twenty-five miles. The secondary armament in-
cluded twelve 6.1-inchers for use against torpedo craft
and twelve 5-inch antiaircraft guns. All light weapons
were protected by shields, since the blast pressure from
one of the 18.1-inch guns at fifty feet could tear the
clothes from exposed men and knock them unconscious. Protection was equally impressive. The belt armor exceeded sixteen inches and the face plates on the main battery turrets were over twenty-five inches thick, the heaviest armor ever fitted on a warship. The Japanese calculated that the Yamato could successfully resist attack by 1,000 pound bombs and 18-inch shells.  

Japanese strategists proposed that in a fleet action the Yamatos, protected by an "air umbrella," would fight at the extreme range of 40,000 yards. While the lesser battleships slugged it out, the Yamatos, with their good speed, would stay outside the range of the American ships and destroy them at leisure. So appealing was this vision that its advocates calculated that the construction of the Yamato and Musashi alone would lift the Imperial Navy to a position of absolute supremacy over the American fleet. By starting work on the plans in 1934, Japanese officers hoped to get a five year jump on the United States Navy. The first two ships were laid down in 1937 and 1938; the Yamato was completed within two weeks of Pearl Harbor and the Musashi in early August, 1942. In 1940, the Japanese started work on two similar vessels and projected three more. One of the latter trio was to be a repeat Yamato; the other two were to carry six 20-inch guns. None of the five was ever finished. Of the first pair, hull 111 was cancelled on the outbreak of war; the Shinano was converted to the largest aircraft
carrier in the world after the Battle of Midway and sunk on its trial run in November 1944. The remaining three were not even started. Japan's shipbuilding facilities simply did not have the capacity to work on these mammoths and cope with war repairs and alterations at the same time.¹⁰

Some admirals, notably Isoroku Yamamoto and Shigeyoshi Inoue, were deeply skeptical of this reliance on the doctrine of "huge battleships and big guns" (taikan kyoho shugi) and preferred to stake Japan's future on air power. But this was distinctly a minority position in the Imperial Navy. After all, the battleship had proven itself in war after war and had been instrumental in Togo's greatest triumph, Tsushima. Faith in the battleship was reflected in every aspect of the Navy: fleet organization, education, maneuvers, and, of course, the building programs. It even found its way into print before the war. In two separate books, naval officers described the final destruction of the American fleet, pared down by aircraft and submarine attacks, by the Japanese battle line. In fact, the General Staff of the Navy, led by the chief battleship exponent Admiral Nobumasa Suetsugu, was willing to abolish the aircraft carrier altogether and unsuccessfully tried to get such an agreement at both London Conferences in 1930 and 1934.¹¹

The success of the Japanese war plans depended on being able to match the Yamatos against standard size battleships.
Therefore, the Navy instituted extraordinary security precautions to hide the true nature of the ships. Foreign naval officers were not allowed to visit Kure or Yokosuka where the vessels were under construction; the first westerner to see either ship was the German naval attache, who visited the Yamato in October 1942. The building docks themselves were screened by immense curtains of sisal rope (causing a temporary sisal shortage and complaints from fishermen). The actual technical specifications of the ships were apparently kept on a "need-to-know" basis. Top Japanese officers, including Vice-Admiral Takeo Kurita, who flew his flag at one time in the Yamato, denied during post-war interrogation knowing the exact caliber of the main battery pieces or the maximum speed of the ships. One gunnery officer stated: "In the Navy College we were not permitted to talk about these ships. The guns were listed as '40 Special.' I think that they were 46 cm. (about 18 inches)."

This atmosphere of intense secrecy naturally bred rumors. The earliest whisperings were the closest to the truth. The Survey of International Affairs wrote that in May 1936, there were reports of a 55,000 ton Japanese battleship. The same year, the Admiralty received "reliable" word of a Japanese 18-inch proof gun, but chose to disregard it. While such hints did not entirely die away, later rumors were much more modest and consequently
misleading. In February 1938, French newspapers reported that the Japanese battleships were 46,000 tons; at the same time, the Italian naval attache in Japan told his American counterpart that three battleships of just that size were under construction.13

This was the first concrete bit of information that had reached the United States Navy. The month before Admiral William Leahy reported to Congress that it had been impossible for Naval Intelligence to uncover any details at all about the new Japanese ships. A special advisory board on battleship design was so disappointed at the lack of hard facts on foreign programs that it recommended "large expenditures of time, effort and money" to develop an efficient secret service. Now, with an approximate idea of the size of the vessels apparently established, intelligence officers attacked the problem from a monetary angle. In April, 1939, the naval attache in Tokyo stated that, based on costs and money appropriated, the Imperial Navy was building eight battleships of about 40,000 tons. The United States Navy gave this estimate wide currency; in 1940 Admiral Harold Stark reported it to the Senate Naval Affairs Committee as "reasonably certain." Naval Intelligence listed with a "small margin of error" eight battleships armed with twelve 16-inch guns as a conservative figure. The Naval War College was less apprehensive; in June 1940, officers
there used only four modern ORANGE battleships with nine 16-inch guns on the game board. 14

In fact, Japanese motives were commonly misunderstood or their capabilities underestimated. One officer wrote in the U.S. Naval Institute Proceedings that the Japanese had withdrawn from the London Conference in order to get additional prestige in Asia. He reasoned: "To assume that Japan refused to sign just in order to regain liberty as to size, would suppose an amount of chivalry which, in our day, is associated with medieval and, perhaps, seventeenth and eighteenth century warfare only. . . ." 15 Other analysts believed the Japanese simply did not have the capability to build oversize ships or the desire to start a competition in types. Puleston pointed to the enormous amount of work that went into designing new ships and concluded that the Technical Division of the Imperial Navy probably could not lay down two conventional battleships by 1938. Reports of an 18-inch gun were downplayed. A spokesman for Naval Intelligence, unaccountably overlooking the 18-inchers mounted on HMS Furious and two monitors in World War I, told the General Board that all efforts up to the fall of 1938 to build guns of such size had failed and that no ship under construction was mounting anything larger than a 16-inch weapon. Both Secretary of the Navy Charles Swanson and CNO Leahy wrote Roosevelt that the Japanese would use the 16" rifle. In
1941, the General Board in planning for the last class of American battleships, the Montanas, computed armor thicknesses in anticipation of fending off 2700 pound 16-inch shells.\(^\text{16}\)

The picture slowly began to clear only in the first year after Pearl Harbor. By April 1942, the name Yamato appeared for the first time in the files of the Map Room, Roosevelt's top secret military office. The ship, however, was listed as 35,000 tons with nine 16-inch guns. The name Musashi was first listed on August 3, 1942, two days before the battleship was fully operational. In early 1943 an appreciation of the size of both vessels was still wide of the mark, and one officer dismissed reports of large Japanese battleships as "Nipponese rodent propaganda."\(^\text{17}\) But Naval Intelligence was improving rapidly. In July 1943 the office of the Commander-in-Chief, Pacific Fleet (CINCPAC) reported tentatively that the Yamato and Musashi had nine 17.7-inch and eight 8-inch guns, two midget submarines, and five or six planes. Although the submarines and secondary battery details were in error, the significant revelation, of course, was the size of the main battery, which indicated a much larger ship than hitherto believed. A year later, September 1944, a captured Japanese officer confirmed the essential accuracy of these details. Whether the United States Navy ever knew the precise specifications of these ships during the war is open
to question. Admirals Samuel Eliot Morison and Edwin Hooper both recall hearing of the 18-inch guns, but as late as May 1945, Naval Intelligence still listed the rifles as 17.7-inchers.  

After the war, some Americans charged that the Yamatos were proof of Japanese duplicity and treaty-breaking. In actuality, the Imperial Navy laid down neither ship until the treaties expired. No provision of any agreement outlawed design work; the United States Navy itself drew up sketches in 1934 for enormous battleships of 72,500 tons with eight 20-inch guns. True, on at least one occasion (May 1937), the Japanese Navy Minister, Admiral M. Yonai, denied outright that his country was contemplating ships larger than treaty size. Usually though, Japanese statements were either evasions or half-truths. For example, a Japanese diplomat in January 1938 replied to American queries by noting that Japan, while motivated by a "spirit of nonmenace and nonaggression," was not required by any treaty to communicate information about her building program. On two other occasions, Navy spokesmen refuted the charge that their service had laid down any ships of 40,000 or 45,000 tons." These answers could be called truthful only in the narrowest sense of the word, and one of the admirals was unable to suppress a smile as he spoke to the New York Times correspondent.  

These denials made it difficult for American advocates of rearmament to justify large building programs. One
Senator remarked that the Navy was making "a shot in the dark" in asking for more battleships. A Congressman asked Assistant Secretary Charles Edison: "You realize that we are embarking upon quite a program, perhaps, based entirely upon newspaper reports . . . ?" Without positive information about Japanese construction, the Navy defended its own capital ship plans on other grounds. At one point, Edison claimed that it did not greatly matter what other countries did; the defense of the United States was purely a local problem. More convincing was his statement that the Navy needed new battleships because other countries besides Japan were building them. His answer is worth quoting in full:

The program is not based on what Japan alone is doing, because, under the treaty, or the agreement in 1936, we have information about England and France, and we know something about what Germany is doing. Japan is one that we do not have full information about.

There could be certain obvious objections to this justification. Germany, at worst, was a very distant threat. France in sea power and inclination was no menace whatsoever. Great Britain clearly possessed a strong navy, but a war between the United States and England was simply out of the question. True, the Naval War College did plot clashes between the two navies on the game board, but one graduate recalled that this was just to be able to say that ORANGE was not the invariable enemy. It required some imaginative staffers at Newport even to establish any
sort of political preconditions for an Anglo-American conflict. In 1938, for instance, the operational problem pictured Germany and Great Britain in league to divide Latin America. Some naval officers attacked such games as a waste of time. Lieutenant Commander Melvin Talbot wrote in the *U.S. Naval Institute Proceedings*: "No presupposition ... so creaks at the knees with political artificiality as that which imagines a British fleet appearing with hostile intent in the waters of the Western Hemisphere."²²

Nonetheless, American planners, lacking any better yardstick, often used the Royal Navy as a standard of comparison. The Bureau of Construction and Repair pressed for more speed in American battleships partially because the British had fast ships. The Naval War College drew the same conclusions. In March, 1936, Roosevelt proposed putting off final design details of American battleships until the exact specifications of the new British ships became known. This information was not long in coming, for with growing tension on the Continent, the Admiralty wanted to lay down five ships in 1937. But to co-ordinate the production of the armament with the hull, the turrets had to be ordered ahead of time. Since there was no certainty in the spring of 1936 that the Japanese would refuse to go along with the 14-inch gun, the Royal Navy in May decided to accept this weapon. Accordingly, the five ships of the *King George V* class were to carry twelve
14-inch guns in quadruple turrets, but when tests showed that more protection was desirable, the Admiralty reduced the armament to ten 14-inchers to stay within the 35,000 ton limit. The redesign of one turret to mount two guns delayed construction at least a year; consequently the name ship of the class was not finished until the end of 1940, two more (Prince of Wales and Duke of York) were completed in 1941, and the final pair (Anson and Howe) in 1942. The ships had good speed (29-1/4 knots) and heavy armor (15-inch belt, 16-inch turrets), but the main armament was always a sore point, especially with Churchill. In a letter to the First Sea Lord in 1941, he wrote of the modern American battleships: "It is when we come to compare nine sixteen-inch guns with ten fourteen-inch guns that sorrow rises in the heart, or ought to." The Admiralty attempted to remedy the error in 1939 when it placed orders for the four 40,000 ton battleships of the Lion class armed with nine 16-inchers. The outbreak of the war caused the suspension of all four, since dockyards had to concentrate on ships that could be finished quickly or on repair work.

The mobilization of industry for a large capital ship program was a problem for the United States Navy as well. One basic constricting factor was the number of building ways large enough for battleships. In 1938, there were five of these in navy yards (two at New York, two at Philadelphia, and one at Norfolk), but not all
of these would be available for battleships, since aircraft carriers required large berths too. In 1940, Congress appropriated funds to add five graving docks, but each would take a year to build. Another answer would be to use the large ways owned by private concerns. There were six of these, two each at Newport News Shipbuilding, New York Shipbuilding, and Bethlehem at Quincy, Massachusetts.25

The Navy faced one great obstacle in regard to private yards: costs. It was much more expensive to build a battleship outside a government facility. For example, in letting the contract for the hull and machinery of the Washington in 1937, Newport News Shipbuilding was the low bidder among the private companies at $46,212,500. In contrast, the Philadelphia Navy Yard turned in a figure of $36,789,000, and the New York Navy Yard was not $500,000 over that. When the navy yards were naturally awarded the orders for the first two battleships, the corporations exerted great political pressure to get the contracts switched despite the cost differences. In 1938, the situation was reversed and the shipbuilders held the whip hand. The Navy was most anxious to get more battleships underway, but did not have the space in government yards. When the contracts were opened for bidding, the private concerns exhibited disinterest. They claimed they would be "fettered" by profit ceilings (a 10 percent maximum) and minimum wage and hour legislation. Besides, they said
the construction of a battleship was financially risky unless the government reverted to the old "cost-plus" basis of World War I. The shipbuilders were finally coaxed into building the battleships, but the government paid dearly for them at an average cost of $61,391,000 as opposed to $41,237,000 for treaty-size battleships built in navy yards. The owners ascribed the substantial difference to a variation in bookkeeping procedures. It certainly was not due to any better treatment of labor on the part of the corporations. In fact, navy yard workers received 25 percent better wages and benefits rare in private industry such as paid sick leave, four weeks paid vacation, and weekends off. Consequently, labor migration from the shipbuilding companies to the navy yards was so great that the owners complained to Congress.26

All the makings of a scandal on the "merchants of death" line were present. A few Congressmen evinced interest in the issue, and the New Republic belatedly devoted some space to excessive profits for shipbuilders. But in the atmosphere of national emergency, the companies received more lenient treatment than ever. In May 1940 the Judge Advocate General of the Navy, at the instigation of the private builders themselves, initiated action to drop profit limitations "to speed construction." The Navy also cast aside a requirement that all contracts be open to competitive bidding. To obtain further building capacity quickly, the government used public money to
expand construction facilities in the private shipyards. Congress voted to this end $141,000,000, well over half of what was appropriated for the enlargement of the public yards ($223,000,000). Judged solely in terms of capital ship construction, the country received more for its money from the government ways. The corporations turned out three 35,000 ton battleships and two 27,500 ton battle-cruisers; the navy yards built three 35,000 ton and four 45,000 ton battleships.27

The construction of these capital ships (or any large vessel for that matter) required great effort on the part of numerous and diverse groups. Merely drawing up the plans was a time-consuming task. It often took two years to produce the final blueprints for a battleship after work had started on the preliminary design. The 45,000 ton Iowa class required 30,000 separate plans. Blueprints for the Washington alone cost $3,000,000. In 1938, the New York Navy Yard had 350 of its 555 draftsmen working on battleship sketches. The construction of these ships necessitated subcontracting for a bewildering variety of miscellaneous equipment. For instance, the Iowa contained 900 electric motors, 2,000 telephones, 426 tons of ventilating ducts, 29 heads and 18 mess rooms. Much of the equipment was manufactured far from the shipyard, and construction was sometimes delayed because of transportation difficulties. For instance, the Wisconsin was held
up when the barge carrying the ship's one hundred ton rudder post casting was icebound.\textsuperscript{28}

Two problems in the construction of large warships were peculiar to battleships: big guns and thick armor. At the start of any program, the armor was always of the most immediate concern since it was tailored for the individual ship and worked into the hull relatively early. Although individual plates might be very large, armor was sometimes called "jewelry steel" because of its expense and difficulty of manufacture. It was designed to be as light as possible and still to resist shells weighing over a ton. Esoteric processes such as face-hardening chromium-nickel-steel plates in a gas atmosphere were used in its production. Unfortunately for the Navy, the Washington Treaty had dealt a heavy blow to the armor industry. After 1922, personnel versed in the manufacture of armor transferred to other areas. Only one man at U.S. Steel's Homestead plant was retained in his specialty. Research in the Navy almost ground to a halt as well. Prior to 1939, there were only two officers and three civilians working in this field. As a result, with renewed battleship construction, the Navy faced the serious problem of a bottleneck in armor, since each battleship needed more than 15,000 tons of it. In 1939, after strenuous efforts to remedy the situation, the entire industry was able to turn out only 19,380 tons of armor. The quality of the finished product was at first also low.\textsuperscript{29}
Early 1940 was the nadir. The existing program of ten battleships on order was straining the armor-making facilities to the utmost. In April, Admiral Harold Stark testified before the Senate Committee on Naval Affairs that if Congress authorized more battleships, the Navy could not build them because of the shortage of armor. As a result, when the legislators voted more battleships anyway, they also provided $200 million to expand the armor manufacturing facilities. In addition, Congress gave the same sort of favorable treatment to the steel companies that it had to the shipbuilders. The private companies had complained that armor production was risky and unprofitable because of the ceilings imposed on earnings by the Vinson-Trammell Act and the need to buy expensive machinery with no peacetime application. Congress therefore repealed the offensive clause in the Vinson-Trammell Act, suspended the minimum wage law for the armor industry, and leased the Navy ordnance plant at Charleston, West Virginia to U.S. Steel. The result of all these measures was the desired increase. By the middle of 1940, armor output jumped to 40,800 tons annually, and the chief of the Bureau of Ordnance, Admiral William R. Furlong, later answered charges of favoritism to big business:

"If this Bureau had not taken the bull by the horns in the beginning . . . [we] would be eating nothing but fish and rice today, with damn little saki to go with it."30

After Pearl Harbor, the plants went to a twenty-four hour
day, seven days a week, and new factories belonging to Midvale and Bethlehem opened. By the end of 1942, the United States had a potential production of 15,700 tons monthly. Quality was very much improved, and the armor bottleneck disappeared.  

When the battleship program first got underway, some planners were afraid that shortages might also develop in the production of 16-inch guns. The forging industry had lain dormant since the early twenties. Only one plant, the Naval Gun Factory at Washington, D.C., could turn the forgings into guns. The assembly of a battery was a three years' process; the turrets, weighing 1,800 tons a piece, had to be built, dismantled, and then reassembled in the battleship's hull. Tolerances were as fine as 1/64 of an inch. Both the New York and Philadelphia Navy Yards needed new turret shops (at a cost of $1 million each) if they were to construct more than one battleship at a time. And unlike armor, big guns had to be periodically hoisted out and returned to the Naval Gun Factory for relining. Battleships based in the Pacific had their guns shipped across country by railroad. Since this was time-consuming, the Bureau of Ordnance tried to keep one spare gun on hand for every artillery piece afloat.  

However, a number of factors alleviated the gun supply problem. For one thing, there was more time to get production rolling, since turrets were not installed until a month after a ship was launched. Also, the companies
that produced the forgings, Bethlehem and Midvale, and kept some of the essential boring and turning equipment made for World War I battleships and battlecruisers, although much of this machinery required extensive reconditioning. The Bureau of Ordnance had saved certain items too, such as projectile hoist drives from the scrapped ships of the 1916 program, and the architects incorporated these pieces into the new battleships. Finally, the Navy started work after Pearl Harbor on a second plant capable of building and servicing major caliber weapons. By mid-1943, this new factory, called the Naval Ordnance Plant, was in operation at Pocatello, Idaho and soon took over a substantial part of the relining and manufacturing work from the Washington, D.C. facility. The net result of these developments was that production of 16-inch turrets ran well ahead of schedule, and the feared bottleneck in heavy artillery never appeared.\(^{33}\)

The Navy was in even better shape in regard to secondary armament. In the early thirties, the Bureau of Ordnance developed, with money siphoned from New Deal unemployment funds, the famous 5"/38 dual purpose gun. By the outbreak of war, this weapon had been thoroughly tested and production facilities set up. Although some officers thought that the gun might have inadequate range for anti-destroyer work, it proved so successful that it is still in common use with the fleet forty years after its inception.\(^{34}\)
The light antiaircraft situation was far less happy. The .50 caliber machine gun, which had been the mainstay of close-in defense, was ineffective at anything beyond point-blank range. The Bureau of Ordnance, after much work, had come out with a heavier weapon, the 1.1-inch gun in a quadruple mount. There were great hopes for this piece, but "bugs" plagued it from the beginning. Production was slow; in 1940, the Navy finished only thirty-six mounts. Thus, as early as November 1938, President Roosevelt indicated his dissatisfaction with the Navy's antiaircraft situation.35

Fortunately, alternate weapons were available. To replace the 1.1-inch gun, the Navy checked out the British two-pounder "pompom," but settled on the 40mm Bofors, a weapon with a checkered history. The Krupp factory in Germany had designed it immediately after World War I, but the Versailles Treaty forced development work to be carried out in Stockholm. Ultimately, the Swedes took over production completely and sold some of the weapons to the Netherlands. In 1940, the Dutch government in exile offered to let the United States Navy test an example. As Bernard Brodie, the naval historian, later wrote:

The demonstration was about as international an affair as it could well be. American planes towed targets for a Dutch ship firing Swedish guns with a combined Dutch-German fire control system, the whole taking place in the Caribbean Sea off a British port.36
The results of the tests were impressive: the 40mm fired a shell twice as heavy as the 1.1-inch gun at the same rate and at a greater range. The only drawback to the weapon was weight, for a quadruple 40mm mount weighed thirty-six tons and a quad 1.1-incher seventeen tons. Nonetheless, the Swedish gun was adopted at the end of 1941, and production was well underway by the next summer.37

For the inadequate .50 caliber machine gun, the Navy found a substitute in the 20mm Oerlikon. The route of this weapon into American hands was as circuitous as that of the 40mm. The Swiss Oerlikon Works developed this gun; ironically, they first sold it to the Japanese Navy in the early thirties. With the profits the factory perfected the weapon. In the summer of 1940, the United States Navy imported the plans along with a complete sample after a number of cloak-and-dagger escapades. Experts estimated that the gun was eight to ten times as effective as the .50 caliber machine gun. By the end of 1941, it also had been ordered into production. These two foreign weapons gave excellent service throughout the war.38

Thus the Navy ultimately marshalled the requisite industrial resources for a very large capital ship program. That there was some waste of money and effort is hardly exceptional, considering the haste in which the program was conceived and executed. In fact, until the mid-thirties, there was little reason to believe that such an effort would be necessary at all. In the somnolent
twenties and early thirties, the existing battleships had seemed quite adequate. But by 1936, the War Plans Division pointed out: "Recent correspondence has focused attention sharply on the serious deficiencies of our latest battleships, in horizontal deck protection, fire control, speed, main propulsion and proper draft." Reconstruction could rectify some of these defects. This had been a course taken by the Japanese and, to a lesser extent, the British and Italians, but it was simply impossible to raise speed substantially in the American ships since they were shorter and wider than their foreign counterparts. The greatest increase that could be attained would be one and one-half knots. By 1941, some American officers saw the old battleships as of use only on the strict defensive.

The failure of the London Conference in 1935 made the replacement of the old ships a pressing matter. The Arkansas would be officially overage in September 1938; thus a new ship could legally be laid down as early as September 1935. Between 1937 and 1939, six more battleships could be started to take the place of vessels that were nearing the statutory retirement age of twenty-six years. With the lengthy amount of necessary planning in mind, Roosevelt secretly pushed preparations for battleship construction. In July 1935 he wrote to Secretary Swanson:
In regard to the battleship, I think it important that nothing be said in regard to this for a few months to come—until we are more clear in regard to the Naval Treaty. This does not mean that work on designs for the battleship should be held up but there should be no publicity of any kind.41

In a private meeting with CNO Standley, the President ordered the Navy to be ready to build battleships on the termination of the existing treaty at the beginning of 1937. Roosevelt also assured Standley that if the Japanese bolted the conference, the United States would lay down three battleships for every one they started. There was considerable opposition in the Cabinet to this, however. At its first meeting after the failure of the London talks, Admiral Standley formally recommended that the Navy proceed with the planning for at least one battleship. In his words:

The expected pacifist reaction was instantaneous. Madame Perkins exploded with, 'Ah, horrible thought.' Secretary Wallace chimed in, 'A tragic decision for world peace.' And Vice-President Garner, 'Mr. President, the very mention of building battleships will cause an explosion on the Hill.'42

Standley rejoined that rearmament was popular with many Americans and that any "explosion" in Congress over new battleships would mean votes for the Democratic party. Roosevelt, however, was so wary of Congressional and public opposition that he attempted to get funds for battleship planning without mentioning battleships in the bill at all. And when this subterfuge failed, Franklin Roosevelt publicly defended renewed battleship construction with "very deep regret."43
The major problem in justifying the new construction was the secretiveness of the Japanese. Standley was "morally certain" that the Imperial Navy had a program underway, but the Navy had no proof. Therefore, British construction became the stalking horse for the Navy's battleship plans. When the Admiralty announced in March 1936 that it was starting two battleships in 1937, Congress promptly voted the funds for two battleships with the contingency that the ships were not to be laid down until the President ascertained that one of the other treaty powers was undertaking capital ship construction. In January 1937 Roosevelt, citing the British program, gave the green light for work to start on the first two American battleships since 1921. Fittingly, he too decided on the names for the new ships: North Carolina and Washington. The latter name was hardly propitious: more ships in the history of the United States Navy carried the name Washington than any other, but no Washington had ever seen action since the British had sunk Benedict Arnold's galley on Lake Champlain.44

In any case, at a press conference in January 1937, a reporter asked Roosevelt if the designs for the new ships were complete. The President replied with some lack of candor that the Navy had only drawn up rough sketches. Actually, the Navy had already expended terrific effort on the ships. Design studies had begun four years previously. By 1935, more than fifty variations
were considered. Most top officers had a voice in the technical details. As Admiral A.J. Hepburn, CINCUS in 1937, wrote:

The proposed battleships are the first ships of this type we have built for many years, they are the most interesting to the Navy as a whole, and promise to be the most powerful offensive units ever built. In order that they should be built to the maximum degree of satisfaction to all concerned it is vital that all concerned by [sic] given an opportunity to participate as fully as possible in the details of their design even at the expense of slowing up their construction somewhat.45

Consulted on the ships were such powers as the President, the Secretary of the Navy, the General Board, the CNO, the War Plans Division, the Bureau of Ordnance, and the Naval War College. Admirals in billets afloat, such as the Commander, Battle Force, had their say as well. Memos on the plans even went to the heads of the Fleet Training and Fleet Maintenance Divisions, the Director of the Shore Establishment, the Commander of the Air Squadrons, and the Commandant of the Puget Sound Navy Yard. In 1937, the Navy established the Battleship Advisory Board to review the finalized designs. The five members, all civilians, included Professor William Hovgaard and W.F. Gibbs, both naval architects.46

Naturally, with so many cooks there was lively dispute. Rear Admiral Emory S. Land pointed out: "In taking up this capital ship we have as a fixed characteristic only one idea, namely, the width of the locks of the Panama Canal."47 This meant a beam no wider than 108 feet,
since the Canal's width was 110 feet. Land should have added, however, the crucial qualification that displacement was restricted to 35,000 tons. With these two restrictions in mind, officers could still draw up a great variety of ships.

The most bitter argument concerned speed. Some planners were willing to accept a slow battleship of twenty-three or even twenty-one knots. The majority preferred a faster ship of twenty-five to thirty knots. By late 1936, the General Board had narrowed the field to four designs, the slowest a ship of twenty-seven knots, the fastest a thirty knot ship with one-third less gunpower. All members of the General Board, with one important exception, picked the fastest ship and pointed to the high speed of new French and Italian ships in addition to the usual arguments in favor of high speed. However, Admiral J.M. Reeves, the dissenter and senior member of the Board, submitted a minority report emphasizing the need for gunpower over speed. His view carried the day. William Standley, the CNO, agreed that twenty-seven knots was adequate, and Secretary Swanson initialed his conclusion. Two months later, Swanson openly said that a thirty knot ship sacrificed too much protection and that "the American Navy is going to build battleships, not armored cruisers. . . ." 48

Late in 1937, the advocates of high speed got a second chance when the Battleship Advisory Board began its
hearings. In reply to questions from board members, officers gave "no definite reasons . . . for adopting the speed of twenty-seven knots or any other speed." After twenty-one meetings and testimony from forty officers, the board found that the major defect in the design of the North Carolina was insufficient speed and recommended unanimously that the plans be altered to give the ships thirty knots. This was well within the capabilities of the Bureau of Engineering. An officer from that branch testified that an addition of only 360 tons of machinery to the existing 3,181 tons would raise the speed to thirty knots. The delay involved in the change was three months, but most members of the General Board by this time felt that any weight saved should go to protection. Only Admiral Ernest J. King supported the proposal; the CNO, Admiral Leahy, agreed with the majority and the alteration never materialized.

Nonetheless, the North Carolina was six knots faster than any previous capital ship in the United States Navy, by far the greatest jump yet made in battleship speed. To get this increase, the designers took the risk of placing all the machinery in four large compartments; subdivision consumed too much weight. More positive innovations helped push up the speed. For instance, the Navy abandoned the reliable but heavy electric drive in favor of geared turbines. The hull design featured a bulbous bow to increase efficiency at high speed. More
significantly, the Bureau of Engineering took a radical step and ordered the installation of high pressure, high temperature boilers. The result was an increase in both horsepower and fuel economy. For example, when operating in 1942 with HMS King George V, the Washington used one-third less fuel, even though the two ships were the same size. As for speed, the Bureau of Construction and Repair officially listed the North Carolina and Washington as having "27 knots." Other reputable sources have put the highest speed actually attained as 28 or 28-1/2 knots.

At full load and ready for combat, the ships were not quite as fast. In November 1942, the Washington, recently out of dock, was able to reach a top speed of 26.6 knots.51

When CNO Standley overturned the General Board's recommendation for a thirty knot ship in November 1936, he decided at the same time in favor of heavy armament. Here though, Standley could not issue exact specifications because the ultimate decision lay with the Japanese. If they signed the London Agreement, the North Carolinas would mount twelve 14-inch rifles in three quadruple turrets, a novel arrangement in American naval architecture. If the Japanese refused, the battleships could carry nine 16" guns in three turrets. There was no question about which battery the Navy preferred. The 16-inch battery fired a 25 percent heavier broadside, but this was not the important difference. The 16-inch shell with its greater
weight (2700 pounds against 1600) had much greater penetrative power, especially at extreme ranges. Admiral Reeves wrote to Secretary Swanson:

If . . . we reduce the caliber of our guns from 16" to 14" we will lose the ability to penetrate vital armor in the Outer Zone. . . . Our naval personnel lose in one stroke the fruits of their labor. We lose the ability to fight effectively in the Outer Zone. We lose the great advantage possessed by our navy today.52

Swanson reported to Roosevelt that a nine 16-inch gun ship would almost certainly win a fight with one armed with twelve 14-inchers. He added: "I do not need to invite your attention to the fact that such unanimous concurrence of opinion is unusual among technical and engineering authorities generally."53 In fact, Navy designers went to the extraordinary trouble of planning turrets for both 14-inch and 16-inch guns with hopes that they would be able to mount the latter weapon at the last minute. This was something the British had been unable to do, partly because of a more immediate need to get ships into production and partly because they lacked sufficient draftsmen.54

The issue in the United States Navy went right down to the wire. Japan declared late in March 1937 that it would not be bound by the 14-inch limit. Still, Roosevelt procrastinated. He told Swanson that he would not allow America to be the first country to adopt the 16-inch standard and said the North Carolinas would probably have to carry the 14-incher, but he did ask when a change to
the 16-inch gun would be impossible. The Navy Department replied that if the switch were made by July, it would entail a delay of only two months. After the end of the year, the 16-inch mount would be virtually impossible to install. In early July, Roosevelt finally decided in favor of the heavier weapon. The reason officially given was that Japan would not accept the 14-inch limit. Actually, Roosevelt's decision had not been so simple. He apparently changed his mind only when the Soviet and German governments announced that they reserved the right to mount the 16-inch gun. There was great rejoicing in the Navy.

Admiral Stark exalted to Admiral Claude Bloch:

AT LAST we have the decision on the gun caliber for the capital ships and thank the Lord it is 16". . . . The word is just now out from the White House. I had the pleasure of telling the President personally my own feeling about the matter. . . .

One of the few drawbacks to the 16-inch caliber was the arrangement of the three turrets: two forward and one aft. The Navy preferred a balanced arrangement, but this was a minor consideration. In practice, the novel layout of the armament proved satisfactory. The new turrets featured a number of improvements, such as a lower silhouette, more thorough compartmentation, updated safety measures, and fully automatic control. The 16-inch/45 Mark 6 gun was a completely new model: it had a considerably heavier shell than the 16-inch/45 Mark 1 in the Maryland class (2,700 vs 2,100 pounds) and a higher rate
of fire (two rounds per minute as opposed to one and a half). Bureau of Ordnance reports concluded after the war that no other nation had turrets of comparable efficiency.\textsuperscript{57}

There was another minor drawback in the changeover to the 16-inch caliber: the North Carolinas had been designed with armor to resist 14-inch shells. An old rule of thumb in the Navy insisted on protection equal to the size of the main battery guns. Despite the feeling that the ships were now out of balance, it was too late to change this aspect of their design. In some ways, though, the armoring of the North Carolinas was up to the best standards. The architects paid special attention to the protection of the steering gear; the side armor was inclined fifteen degrees from the vertical to present a more oblique target for plunging shells. More significant, the quality of the armor itself was greatly improved during the 1930's. Although details on this whole issue are clouded even today, the Carnegie-Illinois subsidiary of U.S. Steel apparently obtained two samples of the revolutionary homogeneous armor plate produced by the Krupp works. The German Navy installed this armor, called "Wotan hart," on the Bismarck, where it had ample opportunity to prove its worth. Like previous important advances in armor, the new type allowed a reduction from 16-inch to 12-inch in thickness without any sacrifice in protection. Specific information about this was strictly classified; the United States Navy
unofficially issued information that was misleading at best. Spokesmen stated that the protection of the North Carolinas and later battleships was equal to the standards set by the 1916 program battleships. For years thereafter, Jane's credited the North Carolinas with 16-inch belts and 18-inch turrets; the official publication, the Dictionary of American Naval Fighting Ships, listed 18 inches as the maximum thickness of armor on the North Carolina. In fact, the belt was 11.25 inches, the turret faces 16 inches. Even more confusion exists over the ship's deck protection; it was of unprecedented thickness (up to 5 inches in spots) for the United States Navy. The heavy deck armor was to serve two functions: to protect against long range shellfire and against aircraft bombs. When the Battleship Advisory Board suggested that vertical protection be increased at the expense of deck armor, the General Board, citing the uncertainty of future airplane capabilities, rejected the idea.

For more active antiaircraft defense, the General Board toyed with the idea of having a carrier always in company to provide fighter cover for the North Carolinas. Fortunately, the planners quickly rejected this inflexible arrangement and asked for twenty of the excellent 5-inch/38 dual purpose guns to be mounted in ten turrets. It was a radical step to combine the heavy antiaircraft guns and the anti-destroyer battery. The French had pioneered the concept in 1930 with their Dunkerque, but
they soon thought better of it and reverted to the 6-inch single purpose gun in the Richelieu. The Italians, Germans, and Japanese all mounted similar weapons in their new ships. Only the British and Americans chose the more logical and economical arrangement of doing away with the single purpose guns altogether. In the North Carolinas, the Navy also paid special attention to giving the anti-aircraft weapons unrestricted arcs of fire. At first, the allotted light antiaircraft armament was meager: eight .50 caliber machine guns (soon increased to eighteen) and three quadruple 1.1-inch mounts if space permitted. In 1940, the Navy realized the shortcomings of the North Carolinas in this area, and they then received the highest priority for new antiaircraft weapons.\textsuperscript{59}

The ships featured a number of other design innovations. To avoid the sea washing over the stern, a common problem in the old battleships, the North Carolinas were flush-decked with more freeboard at the stern than amidships. To improve hull strength, the ships had no port-holes, which meant that forced air ventilation and totally artificial lighting were necessary below decks. The cage masts that had distinguished American battleships for almost three decades were replaced by a pyramidal superstructure less sensitive to vibration. The living arrangements were also improved, and as a result, the ships drew fire as "hotels."\textsuperscript{60}
Some analysts felt that with the treaty limitations, better living facilities severely handicapped the American ships in competition with foreign designs. The Battleship Advisory Board calculated that 435 tons would be saved if the vessels were equipped according to 1897 standards; this weight could give the ships thirty knots instead of twenty-seven, for instance. But as one admiral remarked: "Men would not live on a battleship today under the same conditions they did forty-one years ago." In actuality, the ships were none too commodious for 1,500 officers and men. Designers also figured that the stature of American sailors cost an additional 420 tons, since the shorter Japanese could afford to provide less space between decks. In addition, American officers complained that their need for long range ships imposed additional handicaps, even though the treaties excluded fuel and reserve feed water from the 35,000 ton limit. In 1938, the Bureau of Construction and Repair told Secretary Swanson that "we still have to provide . . . tank space and structure to carry such quantities of fuel and water." These worries mirrored, of course, the Navy's concern with meeting the 35,000 ton limit. After all, the designers had packed into a ship of limited displacement a variety of powerful military characteristics: relatively high speed, a great radius of action, strong protection, and nine 16" guns. Some observers simply did not believe
that this was possible. When the **King George V** (with ten 14-inch guns) was finished, the Admiralty figured that with last-minute additions after the outbreak of the war the ship displaced 36,750 tons. Churchill asked the First Sea Lord: "We have exceeded the treaty limit by 1750 tons, while the Americans with the sixteen-inch guns are either within it or only two hundred tons over it. Can this be true?" The Italian ships of the **Littorio** class (nine 15-inchers, 30 knots) went over 41,000 tons. So did the **Bismarck** and **Tirpitz** (eight 15-inchers, 30 knots). The **Richelieu** (eight 15-inchers, 30 knots), when finished, weighed in at 38,500 tons. Consequently, the German authority Siegfried Breyer has recently charged that the American battleships also exceeded the limit, probably by at least 5,000 tons.

Some peripheral evidence would seem to support this charge. The large aircraft carriers **Lexington** and **Saratoga**, nominally of 33,000 tons, were definitely 3,000 tons overweight, and the Navy admitted as much by 1938. In a battleship design study in 1935, the Naval War College calculated that a ship of eight 16-inch guns, 30-1/2 knots, and 13.5-inch belt armor, would "materially exceed" the treaty limit. Admiral Edward Kalbfus, then president at the college, added: "This, of course, is a matter beside the point, as regards the Naval War College. . . ." But none of this proves that the **North Carolinas** as designed and built were actually overweight. To the
contrary, any researcher who has spent some time looking at the official records must come away impressed by the great pains the Navy took in meeting the treaty terms. Top admirals would not spend hours worrying about the weight of improved messing facilities and empty fuel tanks if they were cheating the treaty by 5,000 tons.  

The blunt fact is that only the British and Americans (and possibly the French) strictly observed the tonnage limitations of the naval agreements. The Admiralty had such faith in the naval treaties that it simply did not believe early intelligence that the Bismarck was 7000 tons overweight. British trust in American intentions was better placed. After the war started, Churchill asked Admiral Stark if the North Carolina had gone over 35,000 tons. Stark replied: "No, but they [the designers] had given up the five hundred tons they used to keep to veer and haul upon." In other words, the North Carolinas were right at the limit.  

How, then, did the Navy manage to get such powerful ships on such restricted tonnage? For one thing, all weights were cut to the bone. To give another example of this, in April 1937, the Bureau of Construction and Repair recommended reducing the number of .50 caliber machine guns from eighteen to twelve to save thirteen tons. Another factor contributing to lightness was the extensive use of welding instead of riveting. In all, the ships were 35 percent welded. But this author believes that the
most significant factor was the low weight allotted to protection. The armor on these ships was two to three inches thinner in most places than the armor carried by foreign contemporaries. Since every square inch of armor weighs forty pounds per square foot, the savings adds up to at least three hundred tons per inch on the belt alone. The Admiralty calculated that if it kept to protection on the American standard, it could build a ship similar to the North Carolina on 35,200 tons. Thus, in one respect, the American battleships did sail under a false flag. They were not over the limit as some suspected; they were really less well-protected than advertised.68

Once the two ships were laid down (North Carolina in October 1937, Washington in June 1938), construction was reasonably quick considering the many novel features in their design. Both were launched in June, 1940 and commissioned in the late spring of 1941. As the first of the new battleships, they attracted a great deal of attention. The North Carolina was nicknamed the "Showboat"; navy men regarded either ship as a prime assignment. On the Washington "officers and crew alike were conscious of having been hand-picked for ability. They were Old Navy right down to the water tenders and radio strikers...."69 This battleship, with her excellent combat record, always carried the reputation in the Navy of being a "smart ship."70
Thus, by the end of 1937, the Navy had managed to get its capital ship program well underway. The shipyards, gun foundries, and armor plants were gearing up, and not a moment too soon. The naval architects had boiled down seemingly innumerable options into a well-balanced design. Indeed, so successful were the North Carolinas that their essential features remained unchanged through the next two classes of ships.
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At the Washington Navy Yard, there is a face plate (intended for one of the later ships never completed) that has been pierced by an American 16-inch shell, although almost certainly not at battle ranges.


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CHAPTER IV
BATTLESHIPS FOR TWO OCEANS

In the two years after construction was started on the North Carolina, Congress attempted to make up for lost time by appropriating money for six additional battleships. Then, in 1940, with the threat of an Axis victory in Europe, Congress authorized the greatest capital ship program in naval history. By the end of that year, there were twenty-three new battleships and battlecruisers under construction or on order. Numerically, this program surpassed the modern capital ship strength of the rest of the world's navies combined.

American anxieties about the capital ship program reflected the increasingly tense international situation. In the fall of 1937, Norman Davis of the State Department recommended to Roosevelt that the only way to bring the European armaments race to a halt was "to let other powers know that this country would match their building programs ship for ship." The Panay incident in December 1937 emphasized the threat from the Far Eastern quarter and convinced most Cabinet members that a large increase in the Navy was necessary. Congress consequently voted funds for four more battleships in 1937 and early 1938. Once again, Roosevelt picked the names for the new vessels: South Dakota, Indiana, Massachusetts, and Alabama.
Because the 35,000 ton limit was still in effect, these ships were very similar in basic outline to the preceding *North Carolina* class. The Navy wanted to produce battleships that could form a homogeneous unit with the first two vessels, but did hope to make some improvements in areas where the original designs were weak. Naval officers regarded the basic armament distributions of nine 16-inch guns in three triple turrets with complete satisfaction, and this arrangement was duplicated. In regard to the secondary armament, Admiral W.R. Furlong of the Bureau of Ordnance wanted to mount some single-purpose anti-destroyer guns, but happily, this regressive step was not taken. Instead, the heavy secondary battery of twenty 5-inch dual-purpose guns was repeated, except in the *South Dakota* where two twin turrets were sacrificed for increased flag accommodations. The light antiaircraft battery was also virtually identical to that carried by the *North Carolina*.  

The main difference between the two designs lay in the improved armor of the *South Dakota* class. Naval officers privately considered protection the weakest point in the *North Carolina*. The Bureau of Construction and Repair adopted a totally new armor arrangement for the 1938 ships by mounting the belt internally. Although this was a more complicated arrangement and hence more difficult to build and repair, it did offer increased
resistance. The Navy also paid special attention to torpedoes; the Philadelphia Navy Yard built two quarter-scale caissons for $190,000 to test the new scheme. Since increased protection naturally weighed more, a shorter ship was necessary to stay within the treaty limit. But a decrease in length meant that more power was required to maintain speed at twenty-seven knots. The Bureau of Engineering successfully used again the high-temperature, high-pressure boilers despite the protests of the private shipbuilders. Unfortunately, machinery spaces remained as vulnerable as before to flooding. There were only four large compartments in the South Dakota compared to nineteen in the old West Virginia. Another area that caused concern was freeboard. The Commander of Battleships worried that the guns of the forward turret would be dangerously close to the water in the event of a close range duel in rough weather. With considerable foresight, Admiral Claude C. Bloch pointed out that later alterations to the ships would inevitably add weight and make freeboard an even greater problem, in addition to putting much of the armor below the waterline. In his words:

Our entire investment in these ships may be jeopardized if . . . . a method is not provided by which important military improvements may later be incorporated without vitiating the protective features built into the ships.
Lack of space was another shortcoming in the South Dakotas. In the name ship, flag space was only 57 percent of that in the old California, and in that vessel, some officers had had to work in their rooms. On the whole, though, the new battleships were successful designs. Their compact superstructure made them a difficult target, and they proved surprisingly maneuverable in combat. Best of all, with most of their features pioneered by the North Carolinas, their construction was quite rapid. The yards co-operated in turning the ships out and finished each one ahead of schedule. In fact, the Navy commissioned the Indiana less than thirty months after its keel-laying, the shortest building time for any modern American capital ship.\(^5\)

By the spring of 1938, some American planners were becoming increasingly nervous about the qualitative state of the new American ships. The principal concern was that Japan had outsize ships under construction. If this were true, the situation would be analogous to the introduction of the Dreadnought at the beginning of the century. Then a large number of expensive new American battleships had been rendered obsolescent at one stroke by a vastly superior ship. The respected commentator Dudley Knox wrote in Atlantic: "The matter of individual size of battleships is of outstanding importance because a few 'monster' ships could so far outclass current types as to defeat a whole fleet of them."\(^6\) But in reply to
Congressional queries, Admiral William Leahy could only claim total ignorance about the Japanese program. However, he told Roosevelt privately that Japan was "undoubtedly" building battleships in excess of the treaty limits; he thought they were probably vessels of about 44,000 tons. In February, the countries still adhering to the 35,000 ton limit tried one last time to learn by diplomatic means what the Japanese were doing. Britain, France, and the United States presented virtually identical notes "asking whether Japan would furnish assurances that it would not, prior to January 1, 1943, lay down any vessel not conforming to the limits of the London Treaty." The Japanese failed to give any such guarantee. Therefore, at the end of March, the three signatories announced that 45,000 tons was the limit henceforth for capital ship construction.

President Roosevelt pushed to get ships of the new size on the ways as quickly as possible. At a Cabinet meeting in the middle of March, he told Secretary Swanson that he wanted battleships larger than anything afloat, with the unprecedented speed of thirty-five knots and the ability to cruise at fifteen knots for six months. Swanson was so taken by the idea that he proposed enlarging the last two battleships of the South Dakota class to these dimensions. However, plans had gone too far forward on those ships for them to be altered without a great delay. When some Congressmen balked at the larger
ships, Roosevelt called Representative Carl Vinson to the White House to explain personally the necessity for them. With Vinson’s prodding, the legislature funded two of the giants in 1939 and four more in 1940. By this time, Roosevelt was finding it a chore to choose the names for ships; deluged by petitions, letters, and resolutions, he fell back on the system of naming battleships for the states that had been the longest without a ship named for them. He noted with relief: “This rule is so simple that it will avoid any heartburnings by the proponents of other states.”

The first four, the Iowa, New Jersey, Missouri, and Wisconsin, were all laid down before Pearl Harbor. The last pair, the Illinois and Kentucky, were not started until much later.

With 45,000 tons, the Navy could build a battleship that it really liked. All military qualities could be upgraded. For years, observers had castigated the slow speed of American battleships, but the Iowas would end such criticism for good. Their machinery was by a wide margin the most powerful yet put in a warship. With a rating of 212,000 shaft horsepower, the vessels were designed for a speed of thirty-three knots. They were so fast that some sources, including the authoritative Jane’s Fighting Ships, credited them with attaining thirty-five knots in service. The Navy has never released any official trials figures. One officer who served for years on the Iowa recalls that
the highest speed ever recorded on the ship's pitometer log was about 32-1/2 knots. Regardless, the Iowas were the fastest capital ships ever built.$^9$

Extravagant claims have also been made in reference to the protection of the Iowas. For almost two decades, Jane's listed the ships with a 19-inch belt, 18-inch turrets, and 11-inch decks. The popular writer, Richard Hough, asserted in his error-studded book Dreadnought that the Iowas were the "most heavily protected Dreadnoughts ever built."$^{10}$ This is nonsense, for the scale of protection on the Yamato dwarfed that of the American ships. Nonetheless, the Iowa was the most heavily armored American ship ever commissioned. The actual protection included a 12.1-inch belt, 17-inch turrets, and 6-inch armor for the thickest deck. The Navy also added some unusual features such as a lower belt of 13.5-inches to shield the propeller shafts. As in the South Dakota, the side armor protruded inward to give lowered hull resistance and higher speed. A less happy carry-over from the earlier designs was the lack of subdivision in the engineering spaces; the original plans called for only four large compartments. Top officers afloat complained bitterly. The commander of the Battle Force, Admiral Edward Kalbfus, noted that one underwater explosion at a vulnerable point could disable half the propulsion machinery. In late 1939, the General Board ordered further subdivision to produce eight main compartments instead of four and even considered
armoring the bottom of the hull, although this idea was ruled out on grounds of increased draft.\textsuperscript{11}

At first glance, the armament on the Iowas was identical to that carried by the preceding two classes: nine 16-inch and twenty 5-inch guns. However, the 16-incher was a longer gun than the one mounted in the South Dakota (16"/50 as opposed to 16"/45) and consequently had a greater range at 42,345 yards, or twenty-four miles. A disadvantage to the new weapon was decreased life with three hundred rounds before relining instead of four hundred for the 16"/45. Early in the planning, the General Board recom­mended using the 16-inch guns left over from the cancelled 1916 vessels, but by designing a modern mark in a new turret, the Bureau of Ordnance saved 1,023 tons per ship. With fully automatic control in train and elevation, these were the most accurate guns ever installed in an American vessel. Despite a suggestion that sixteen dual-purpose 6-inch guns be substituted for the customary twenty 5-in­chers, the Navy retained the smaller weapon. As usual, the light antiaircraft battery originally contemplated (twelve 1.1-inchers and twelve .50 caliber machine guns) turned out to be utterly inadequate. But by early 1941, the General Board proposed switching to sixteen 40mm and eight 20mm.\textsuperscript{12}

In other areas the Iowas were more satisfactory. Their cruising range was very great, over 18,000 miles at
twelve knots. They possessed excellent maneuverability and acceleration for ships of their size. The naval dockyards built the first pair very quickly; the *New Jersey* commissioned in thirty-two months, and the *Iowa* in thirty, hardly more time than the smaller *Indiana* took.13

From the beginning, the Navy had great confidence in the *Iowas*. Admiral Harry E. Yarnell enthusiastically wrote in early 1939 that when the new battleships were finished, the United States Navy would be "ready to meet all comers."14 In view of their powerful artillery, thick armor, and extraordinary speed, some officers began calling them "battle-ship-battlecruisers." Charles Edison, by now Secretary of the Navy, wrote to Congress:

> [the *Iowas*] are the greatest battle cruisers built or building in the world today. Furthermore, by reason of their excellent power of resistance, they are eminently suitable for use in the battle line . . . because they are the equal, if not the superior, of any existing or projected capital ship.15

In 1939, the War Plans Division saw the *Iowas* as especially valuable in countering Italian or German raiders, such as the *Graf Spee*. The high speed of the American ships also made them ideal companions for fast carriers in raiding expeditions or striking groups. In the spring of 1939, the War Plans staff wrote:

> In the strategic studies of operations in the Atlantic and particularly in the Pacific, the value is apparent of a strong really threatening striking force of fast battleships accompanied by carriers and destroyers. Our having
available such a force would, it is believed, profoundly affect Japanese actions and strategy. 16

In late 1939, the Navy pushed for an additional pair of Iowa beyond the four already authorized and gained Roosevelt's backing for the proposal. 17

There was opposition in Congress to this request, but not because of anti-military sentiment. Many legislators by this time were willing to give the Navy a blank check on battleships. At the end of 1938, the House had even considered a resolution that would have put capital ship funding on a systematized basis until the year 2013. When the administration forwarded the Navy's request for the two additional Iowa, the chairman of the House Sub-Committee on Naval Appropriations, J.G. Scrugham, shot back: "The time has arrived for the United States to cease imitating and merely matching foreign nations with respect to the power of battleships...." 18 The 45,000 ton battleship was disappointing. His committee wanted a "marked superiority" for American battleships and suggested a vessel of 75,000 tons, thirty-five knots, and twelve 16-inch guns. 19

As a matter of fact, the Navy had recently considered a ship of such dimensions. Interestingly, it was basically a huge vessel sketched for the Russians by the Gibbs & Cox firm. William F. Gibbs had submitted this design to the Navy Department early in 1938 where it found an
enthusiastic sponsor in Assistant Secretary Edison. He nicknamed it "Ship X" and wrote to Roosevelt: "Like Belgium in the World War, it might be just enough to change history." It was to be a ship of 62,000 tons, twelve 16-inch guns, thirty-five knots, and with a flight deck for thirty-six planes. A particularly suitable mission for such a ship, its proponents argued, would be independent operations in areas of enemy communications. Edison proposed that he be given special authority to oversee the construction of "Ship X." He told the President: "A single point of authority is required if tradition is not to overwhelm imagination and the experimental viewpoint in this 'blue chip' enterprise."

The General Board considered the proposal and agreed that "Ship X" had some merits. The over-all superiority of the vessel, especially in speed, to every known design was favorably noted. The planners also agreed that the construction of such an expensive capital ship would allow the United States to use its economic power to exert political pressure on potential enemies. On the other hand, top officers believed that these strengths were outweighed by certain disadvantages: the ship could not use a number of harbors, drydocks, or the Panama Canal; it could not be built on existing ways; and it would be difficult to co-ordinate tactically with the rest of the fleet. The General Board concluded that the United States could exert its economic leverage equally well by
outbuilding potential enemies in existing types, such as the Iowas. Thus, by early 1940, the Navy seemed committed to the "moderate" 45,000 ton battleship. If any other country came up with a huge ship or 18-inch guns, the Navy felt it could counter with two smaller battleships.²²

In reality, the United States Navy, by the spring of 1940, was falling behind the Imperial Navy in battle line strength despite the ten battleships on order. Under the various Fleet Replenishment programs, the Japanese were planning seven Yamatos and in addition had modernized all their old capital ships. While these details were, of course, unknown in the West, some American planners were growing very concerned about the Navy's position in capital ships. Chief of Naval Operations Harold Stark told Congress that Japan might have as many as twelve battleships under construction. The General Board warned Secretary Edison that the Japanese would have superiority over the United States in battleships by 1942. Some officers worried increasingly about the Atlantic. Naval Intelligence reported that the Axis alliance of Germany and Italy had sixteen battleships under construction or completed. Given the worst possible circumstances, then, the United States might face an enemy coalition possessing thirty-four battleships. The General Board recommended that American shipyards go to multiple shifts to speed the hulls already on the stocks.²³
But this would not make up for the deficiency in numbers. The Navy's ultimate goal in early 1940 reflected its changing perception of danger. The War Plans Division wanted a "3-3 ratio in the Pacific" and a "4-3 ratio in the Atlantic as regards Germany and Italy." The sudden collapse of France made the threat from Europe much more immediate. Thus, Congress voted on July 19, 1940 the largest tonnage increase in the history of the United States Navy. The Two Ocean Navy Bill provided the Navy with a 70 percent boost, or an increase of 1,325,000 tons of which 385,000 tons was allocated to capital ship construction. In addition to the generosity of these appropriations, Congress surrendered control over the characteristics of the individual warships to the Navy Department. In turn, the new Secretary, Frank Knox, gave supervision of the "70% Bill" to the Under Secretary, James V. Forrestal. However, the CNO and the General Board still made most of the decisions as to naval requirements and the specifications of individual vessels. Over this modified set-up, the President still retained ultimate control; in an agreement with Admiral Stark, Roosevelt was to initial any major change in the program.

At first, the Navy considered building seven battleships identical to the four of the Iowa class that were already funded. In a conference on the night of July 25, Roosevelt agreed to the construction of an additional pair of these ships, but did not approve the remaining five
because planners were having second thoughts on the subject. Congress had already criticized the Navy for not taking the lead in battleship design, and protection in the Iowa was not all that the General Board wished for. Admiral A.H. Van Keuren of the Bureau of Ships argued that the new vessels might well be the last battleships the Navy would get for a long time; therefore, the Navy should consider ships up to 100,000 tons. In an article in the U.S. Naval Institute Proceedings that appeared at the same time, Admiral J.K. Taussig pointed to Japanese secrecy and rumors of ships with 18-inch guns and summed up his feelings on the new American battleships with his subtitle, "The Bigger the Better."  

At the end of 1940, the General Board finally agreed on the ultimate capital ship design in the United States Navy. There were to be five new battleships displacing 60,500 tons each. Following Roosevelt's formula, they were named Montana, Ohio, Maine, New Hampshire, and Louisiana. Much of the increased weight went to protection, since the General Board believed that the Iowas were inadequately protected against 16-inch heavy projectiles. In the Montanas, armor was upgraded to resist these shells, although not 18-inchers. The armor plates (some 16-inches in thickness) were so large that existing facilities would have been pressed to the limit had the program gone through. To produce the great quantities
of thinner forged armor needed for these ships, the steel companies developed new techniques which later proved valuable in turning out armor for heavy cruisers. The Bureau of Ships worked special defensive features into the Montanas, such as 6-inch armored tubes to shield the electrical leads to the steering gear, and full protection under the bottom of the ships for the magazines. The machinery spaces were minutely subdivided, thus correcting one of the most glaring flaws in the earlier battleships. Without a doubt, these were the most battleworthy vessels ever ordered by the United States Navy.\textsuperscript{27}

Top officers also gave some thought to upgrading the caliber of the main armament to 18-inchers. Early in 1938, the General Board had taken the heavier gun under consideration, and agreed that it was theoretically an ideal weapon. But a ship armed with 18-inch rifles suffered all the drawbacks usually associated with large size, so the Board concluded that the 18-inch gun should be adopted only to counter a similar weapon abroad. In 1940, the question came up again with rumors of oversize Japanese ships and guns. Taussig, in his article, advocated the 18-incher. Most members of the General Board agreed that the United States would have to move to that caliber if there was concrete evidence of similar German or Japanese construction. In fact, the Bureau of Ordnance worked on a proof 18-inch gun with 3,800 pound shells. But full
development of a complete battery would have taken a great deal of time, and the Navy already had tested designs for the triple 16"/50 turret. For the Montanas, then, the General Board ultimately decided to mount four of these turrets in a balanced arrangement, two forward and two aft. The secondary armament was beefed up as well. The Bureau of Ordnance replaced the 5"/38 gun of the earlier ships with the longer 5"/54 dual purpose weapon developed especially for these ships and later mounted on Midway class aircraft carriers. Initially, the light antiaircraft defense was made up of four quadruple 1.1-inchers and twelve .50 caliber machine guns. However, the Navy quickly substituted 40mm Bofors and 20mm Oerlikons for the American weapons. After Pearl Harbor, the number of guns was rapidly increased, until, by April 1942, the plans called for forty 40mm and forty-eight 20mm.28

There was the usual debate over speed. The War Plans Division preferred to sacrifice armament for speed because the Japanese, Germans, and Italians were all building fast vessels. Admiral Van Keuren wanted at least thirty-one knots in order "to step out and lead the world."29 The chief obstacle was weight, of course. Even with 60,500 tons, the Navy could not have a ship with twelve 16-inch guns, extremely heavy protection, and very high speed. A number of planners, generally representing the CNO's office, felt that the Navy had recently
paid too much attention to speed to the detriment of other qualities. Their view prevailed, and the Montanas were designed for twenty-eight knots. The General Board also turned down suggestions that the ships be powered by diesel engines, which it did not believe were sufficiently well developed.30

With the five Montanas and two additional Iowas of the Two Ocean program, American planners finally felt that they had the upper hand in the naval race. They were not mistaken, for just to keep up with the 1940 program, the Imperial Navy would have to double its Fifth Replenishment Plan of three Yamatos. The Japanese simply did not have the industrial resources to do this. In early 1941, Roosevelt really pushed the Montanas. The chief of the Bureau of Ships told the commandant of the New York Navy Yard:
"The administration is anxious that the utmost effort be exerted in the advancement of the construction of these ships."31 Nothing less than the "utmost effort" was required. Before the Montanas could even be started, five separate graving docks had to be constructed because the ships were too heavy to be launched safely on building ways. At first, the Navy hoped to finish all five battleships in the latter part of 1945. However, the projected armor bottleneck and the unavailability of suitable building facilities pushed back the scheduled completion dates to February 1946 for the earliest ship and May 1947 for the last one.32
By the middle of 1941, a number of top planners began to have second thoughts about the Montanas. Admiral Richmond Kelly Turner, the Director of War Plans, argued before the General Board that the Navy would be unable to get the material to deliver them by 1947. In any case, he said, they were too slow and unnecessarily well-protected.

Another outspoken opponent of the Montanas was the commander of the Atlantic Fleet, Ernest J. King. He was especially concerned about servicing the battleships since most drydocks would not take them. Only four Navy yards, Bremerton, San Francisco, Norfolk, and New York, had the facilities to handle them, and these ports would require dredging before the ships were even able to enter the harbors. Nor could the Montanas with their great width transit the Panama Canal. Turner said that they should be abandoned in favor of improved Iowas. Any deficiency in protection could be corrected by the addition of three to six thousand tons of additional armor at a sacrifice of a couple of knots. Turner said: "For future operations we need numbers of high speed ships for use in widely dispersed areas rather than a ponderous battle line."\(^{33}\)

Both King and Admiral James O. Richardson advanced essentially the same suggestion.

Another factor weighing against the Montanas was the desperate need for space in the shipyards for Lend-Lease construction. In late June 1941, the British Supply Council
asked for one hundred destroyer escorts from the United States, but this request could only be met by building new yards, displacing American destroyer construction or deferring the Montanas. Surprisingly, the General Board recommended the last course. The Bureau of Aeronautics immediately jumped on the bandwagon. If the Montanas were to be put off, perhaps the yards could find space for a heavy aircraft carrier. Admiral Stark, the CNO, ended this enticing speculation by deciding that the British would have to wait until additional facilities were finished. The idea of replacing the Montanas with modified Iowas was rejected as well. As the Director of Fleet Training Willis A. Lee said, any changes at this date would cause serious delays in the completion of the battleships, so the Montanas stayed in the program as designed.  

Also included in the Two Ocean Navy was a novel type of ship for the United States—the battlecruiser. Of course, the Navy had started the Lexington class after World War I, but none were finished as battlecruisers because of the Washington Treaty. After that agreement, there were only eight such ships in service in the world, four belonging to Great Britain and four to Japan. The type got a new lease on life, however, in the early thirties when the French and Germans began the construction of high speed, lightly protected vessels with big guns.
The three German ships of the Deutschland class were especially interesting. They had six 11-inch guns and twenty-six knot speed on an ostensible 10,000 ton displacement. With diesel engines and a long range, they made perfect commerce raiders, able to sink almost all vessels that they could not escape. The Admiralty regarded them as a special challenge. So did President Roosevelt. Soon after coming into office, he instructed the Bureau of Ordnance to design a gun suitable for combating the Deutschland. He was even willing to give additional money in the penurious days of 1934 to enlarge the design bureaus to get sketches for a ship to carry the new weapon. 35

There were fears that Japan would follow Germany's lead. Roosevelt wrote to Admiral J.M. Reeves in November 1934: "There are reports that Japan is seeking new types of vessels, supposedly along the line of the German pocket battleship [the Deutschland]." 36 The New York Times reported in 1938 that the Imperial Navy was building at least two "pocket battlecruisers" of about 15,000 tons with eight 12-inch guns and thirty-two knots. The War Plans Division also believed the Japanese had such ships. Not only were there reports of such construction, but, War Plans noted, it would be in Japan's best interest to build battlecruisers. They could be used, for example, to sweep up American heavy cruisers. In 1942, Naval Intelligence included in the Map Room files five battlecruisers for Japan, two of 14,000 tons and three of 19,800 tons. 37
In reality, the Japanese had no such ships at all. In 1933, one of the officers in the Imperial Navy had recommended 20,000 ton ships with twelve 12-inch guns and forty knots to destroy heavy cruisers, but nothing came of the proposal. Ironically, the first modern battlecruiser designs did not appear in a Japanese program until 1940 and then only as replies to the American battlecruisers of the "Two Ocean Plan!" As first designed, the Japanese type B-65 was of 32,000 tons and nine 12.2-inch guns, but the armament was quickly changed to six 14.2-inchers when details of the American ships became known. After Pearl Harbor, these ships were cancelled along with the entire Fifth Replenishment Program, and United States Naval Intelligence finally dropped Japanese battlecruisers from its rolls altogether in October 1942.38

However, to meet the "pocket battleship" type, Roosevelt in 1939 proposed a ship of light cruiser size (about 8,000 tons) carrying four 11-inch guns. This concept of large guns in small ships had a long and generally unsuccessful history dating to the gunboats of the Jefferson navy and in more modern times to Japanese cruisers of the 1890's. As one of the members of the General Board noted, every navy had considered the idea and ultimately rejected it. If the Navy wanted a ship carrying 11 or 12-inch guns, it would need a vessel of good size. And many top officers enthusiastically backed such a ship, despite Julius Furer's contention that the President was the
driving force behind the Navy's battlecruisers. Members of the General Board saw a great number of roles for a high speed ship of about 25,000 tons armed with 12-inch guns. It would be ideal for defending American commerce against surface raiders. "Savvy" Cooke argued that the Navy would otherwise have to withdraw battleships from the main fleet to cover convoys. Ernest King, one of the principal advocates of the battlecruisers, saw them as especially valuable for countering Japanese heavy cruisers. One officer referred to the battlecruiser as a "cruiser-destroyer." 39

Some strategists proposed other roles for the new ship in connection with the aircraft carrier. Admiral John Towers of the Bureau of Aeronautics felt that the two types would make an "almost ideal" raiding force. More significant, many officers believed that the battlecruiser would solve the long-standing problem of providing surface support for the carriers in their operations with the fleet; some planners hoped to build one battlecruiser for each carrier in the Navy. Also, by adopting the 25,000 ton battlecruiser, the Navy would get a jump on foreign nations and thereby silence criticism of its design policies in Congress. However, sentiment was not unanimous on the battlecruiser. Admiral H.F. Leary thought the ship a "hybrid type" since it would be very large, yet its protection was suspect. Admiral E.C. Kalbfus, president of the Naval War College, pointed out that with fast
battleships under construction, the line of demarcation between the battlecruiser and the battleship was being obliterated. He opposed any increase in cruisers beyond the standard 10,000 ton type.\footnote{40}

The minority position was defeated when, on July 25, 1940, Roosevelt approved the construction of six of the ships. They were all named for American possessions: \textbf{Alaska, Guam, Hawaii, Philippines, Puerto Rico, and Samoa}. The General Board had considered a number of designs, including vessels up to 38,700 tons with twelve 12-inch guns, but finally settled on a 27,500 ton ship armed with nine 12-inchers in three triple turrets. The Bureau of Ordnance designed a completely new gun which fired a much heavier shell than the old 12-inch rifle on the \textbf{Arkansas} (1,140 against 870 pounds). The turrets were of a new model as well and were pushed forward at such a pace that neither the Naval Gun Factory nor the Proving Ground could properly test them. As a result, they gave a great deal of trouble at first and required three months of constant modification before they worked correctly. There were other drawbacks to the new armament. Since it was not standard equipment, it was quite expensive; the 12"/50 turrets on the \textbf{Alaska} cost more ($1,550,000 each) than the 16"/50 turrets on the \textbf{Iowa}. The ammunition for the ships later presented a constant supply headache for the Navy, because the heavy 12-inch shells were an "odd size."\footnote{41}
The ships were also unusual in their protection scheme. Overall, they were not armored on sufficient scale to resist gunfire from a 12-inch battery. Most of their protection was designed to defeat 8-inch shells; only the turret face plates were thick enough to keep out 12-inch projectiles. Although their compartmentation was quite good, their deck protection was so thin that one General Board member worried that they were unable
to take even a reasonable amount of air jeopardy and bombing. These big cruisers are going to have to be kept out in open waters where they will not be in jeopardy of land based planes or else their use will have to be premised on control of the air when they get into close waters.42

In other respects, the Alaskas were not completely satisfactory. The bridge had less space than a destroyer's and was located high on the tower mast where the ship's rolling motion was especially apparent and disconcerting. The catapults for the spotter planes were carried amidships for the first time in an American capital ship and took up a great deal of space. The ships were not even unusually fast for cruisers. Although Richard Hough claims that the Alaskas could reach thirty-six knots, the Navy never credited them with more than thirty-three knots.43

In fact, there was always some confusion in the Navy as to whether these ships were actually capital ships or big cruisers. Officially, they were described in the fleet organization as "cruisers, large," and they bore the
symbol "CB." On rare occasions, officers did refer to them as large cruisers, but ordinarily everyone from enlisted men to admirals called them "battlecruisers." The Bureau of Ordnance historians, overlooking such foreign ships as the Dunkerque and Scharnhorst, wrote: "The Alaska . . . was in reality a battle cruiser, the first to be built by any Navy since the Washington Conferences."44

In spite of their shortcomings, the ships enjoyed a high reputation in the Navy from the beginning. The lower deck believed that the guns of the Alaskas could outrange 16-inchers and that the ships could sink a battleship. The War Plans Division was confident that the battlecruisers could defeat the Scharnhorst (26,000 tons, nine 11-inchers) and might be able to beat one of the Kongos. From more powerful, fast enemy battleships, the Alaskas "must and can run," reported War Plans to CNO Stark. In the summer of 1941, some officers moved to add further battlecruisers to the Navy's building plans. Admiral Turner remarked in a General Board meeting: "That ship, in my opinion, is one of the most important in the entire program."45 He said that he could not recommend building any more carriers unless the Navy increased its number of Alaskas. He proposed an additional six to be given high priorities for quick construction. In July 1941, the General Board agreed that four more battlecruisers might be completed by the end of 1946 to add to the original six that would be finished
the preceding year. The primary opposition to the supple-
mentary program came from Captain Willis A. Lee. He pre-
ferred a heavy increase in carrier construction and told
a fellow officer:

The value of the large cruiser is open to question. The General Board states that 'its availability to
the United States would probably be highly advan-
tageous.' There is no question about the value of
the aircraft carrier.46

Nonetheless, Admiral Stark decided after some hesitation
to ask Congress for an extension in the Two Ocean Bill to
build four additional Alaskas (in addition to six car-
rriers).47

Before Congress could act, the Japanese struck the
American battle fleet at Pearl Harbor. Their attack not
only decimated the existing battle line, but brought the
future of the new capital ships into serious question. The
changing nature of naval warfare that became so evident in
the succeeding months would demand important revisions in
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CHAPTER V

CAPITAL SHIPS UNDER ATTACK: 1942

The initial response of the Navy to losses at Pearl Harbor was to reemphasize the capital ship program. Two factors, however, made an extension of battleship construction impossible. For one thing, the great importance that carriers now assumed meant that they would get first call on scarce resources. Secondly, the success of aerial assaults on capital ships in December 1941 struck a devastating blow at the prestige of the big gun ship. By the middle of 1942, the entire capital ship program was in jeopardy. But surprising battleship victories later in the year reinstated some of the vessels in the Navy's production schedule, although the heart of the Two-Ocean Navy, the Montanas, could not be saved.

The Japanese attack on Pearl Harbor was truly crippling for the American battle line. The Navy had seventeen battleships in commission; eight of these were in the Atlantic, the oldest six on Neutrality Patrol and the two North Carolinas in training. The nine remaining ships formed the nucleus of the Navy's strength in the Pacific, and eight were at Pearl Harbor on December 7, 1941. Three went to the bottom, and all the rest suffered extensive damage. The long-laid American plan for a
decisive advance into the western Pacific by the Battle Force was thrown into limbo.

This was perhaps fortunate, for the American fleet might well have met the fate of the two British capital ships that attempted to counter the Japanese invasion of Malaya. Three days after Pearl Harbor, the new battleship Prince of Wales and the World War I vintage battlecruiser Repulse were sunk by Japanese torpedo bombers at a seemingly trifling cost to the attacking force. As Samuel Eliot Morison wrote: "The effect of this action was, literally, terrific." The American casualties at Pearl Harbor could be ascribed to the fact that the ships were "sitting ducks." The Royal Navy vessels however were combat ready, had a commander of unquestioned ability, and had plenty of sea room. In fact, there were mitigating circumstances here as well, although they were not obvious at first glance. Neither ship had a fully effective antiaircraft armament. The Repulse was equipped with a single-purpose secondary battery, and the Prince of Wales was so new that it had never had a chance to develop full operating efficiency.

There was no British air cover whatsoever to meet the well co-ordinated Japanese assault of eighty-four planes. Damage to the attacking force was heavier than immediately apparent. Although the capital ships shot down only three planes, they damaged twenty-eight others.

Nonetheless, this disaster, coming close upon the heels of the Pearl Harbor debacle, threw the value of the
battleship sharply into question once again. As Admiral Chester W. Nimitz remarked with considerable understatement to Admiral Charles Little of the Royal Navy on December 10: "We must be prepared for a re-opening of the old argument as to the value of capital ships versus aviation. . . ." To provide some ammunition for American battleship advocates, the British officer promptly sent over the next day a contrasting pair of German articles. The first from early 1940 attacked the battleship, but the second, published a year later, called the type essential for control of the seas. Admiral Little concluded: "The considered British view is that experience of the present war has vindicated the previous United States and British view that the battleship is a necessary foundation of sea power." The General Board also took up the question and at the end of December submitted a balanced study which pointed out that battleships were subjected to especially severe attacks because they were the strongest ships in the fleet. The study claimed in addition that battleship losses were due in part to the artificial limitations imposed on them by the treaties and to ineffective defenses both by fighter planes and antiaircraft guns.

To compensate for losses at Pearl Harbor, President Roosevelt on December 10 directed that the four South Dakotas "be advanced as much as humanly possible."
Admiral Harold Stark and General George C. Marshall of the Joint Board therefore asked that the ships receive the highest priorities, and the vessels were accordingly assigned an "A-1-a" rating. The third highest precedence also went to battleships. The first two Iowas were ranked immediately behind five aircraft carriers scheduled for completion in 1943. When modifications to the antiaircraft battery and to the magazines in early 1942 threatened to delay the South Dakotas, Secretary of the Navy Frank Knox emphatically scrawled an order: "Please let no changes in design delay the delivery of these ships by a single day." Knox's special assistant, J.W. Powell, even advocated reassembling the turret crews from the sunken Pearl Harbor ships to get the new battleships in service as soon as possible. In fact, the four ships were finished in record breaking time. For example, the original contract on the South Dakota had called for completion of the ship on April 15, 1943, but the vessel was fully operational by the summer of 1942. The other three were six to nine months ahead of schedule as well, which was fortunate since they provided reinforcement at a critical phase in the war.

Some top naval figures pushed for additional battleship construction to make up for the Pearl Harbor losses. Charles Edison, by this point governor of New Jersey, urged Roosevelt to revive the Gibbs & Cox "Ship X" project. He wrote:
I cannot resist wondering what such a ship could have done to those lines of Japanese transports or in keeping the lanes open to Singapore. . . . I cannot help thinking what MacArthur would give to know that one of those ships was helping him tonight. . . .

I urge you to at least talk it over with Ernie King. Please!9

The President agreed that such ships would prove their worth in combat, but raised King's objection that the difficulties of servicing them would be prohibitive. Of greater importance, the Chief of Naval Operations, Admiral Stark, advocated in a study for a joint American-British "Victory Program" the construction of two additional battleships to give a total of thirty-four American vessels by 1948. He further suggested that one new battleship be started annually to replace outdated ships and that the number of Alaskas be doubled to twelve as planned. The General Board seconded these proposals.10

But the advice of these planners no longer carried the weight it once had. For one thing, the General Board was rapidly losing much of its authority to the CNO's office, and the head of that organization by March 26, 1942 was no longer Admiral Stark, but Admiral Ernest J. King. The latter, although by no means unsympathetic to the battleship, was not a member of the "Gun Club" as Stark had been. For another, the prestige of the battleship had plummeted as a result of the events of December 1941. The idea that the battleship was useless gained widespread currency in the Navy itself. Admiral
Herbert F. Leary remarked to a friend soon after Pearl Harbor: "This is an airpower war. There's no place for an old battleship horse like me." Roosevelt himself said in early 1942 that the older battleships were no longer valuable for anything but convoy duty. The hypothesis that capital ships were helpless before land-based air power became dogma for many officers. The Naval War College, which had just concluded after a long examination that the battleship was an essential element of sea power, was asked to reconsider the question. Even the British turned against the type that they had employed so successfully. In the summer of 1941, Churchill had closely looked at the idea of resuming work on the Lion class, but when the Admiralty in early 1942 proposed large anti-aircraft destroyers as escorts for capital ships, Churchill remarked to the First Sea Lord: "The fact that you have to construct these immensely powerful and costly (to the war effort) destroyers to protect the battle fleet is another point telling against the whole conception of the battleship."

By April 1942, the large American battleship program was coming increasingly under fire, especially because an acute shortage in steel had developed. Although this was due more to faulty administration than to a lack of mill capacity, planners considered a flat 30 percent reduction in the shipbuilding program. On May 1, Roosevelt decided
that high priorities should be given only to those warships scheduled to be completed before July 1, 1943. Under this new scheme, only the four South Dakotas and the first two Iowas of the authorized capital ship program would receive precedence. Lower priorities for the last four Iowas, the five Montanas, and the six Alaskas really meant that materials would not be available for these ships at all, and they would be indefinitely delayed as a consequence. Under Roosevelt's plan, eight 27,000 ton aircraft carriers of the Essex class would also be postponed. King protested that with the Navy on the attack in 1943, the anticipated heavy losses would make it "impossible to keep open the lines of communications necessary to maintain the offensive in Europe and Asia." With this prodding, the President ultimately gave warship construction a higher priority in relation to the rest of the defense effort.

However, the course of the war to this point had emphasized the desperate need for more carriers. Admiral King wanted to increase the production of Essex class carriers to eight per year after 1943. He hoped to augment this number by conversion of light cruisers on the stocks to 10,000 ton carriers and briefly considered a similar conversion of the Alaskas. In addition, the Bureau of Aeronautics wanted a 45,000 ton ship with an armored flight deck, a feature that had proven its worth on British carriers in the Mediterranean. King agreed that the Navy's
program should include at least four of these giants. He hoped to get these dramatic increases in the Navy's air arm without deferring or delaying any of the capital ships in the existing program. But this was simply unrealistic. The United States could not undertake simultaneously two programs of unparalleled dimensions.\textsuperscript{14}

Something had to give. If all the capital ships on order were retained, the Navy could get only four \textit{Essex} class ships in 1944. If some of the battleships and battle-cruisers were deferred, the Bureau of Ships calculated that the Navy could build eight or more of the 27,000 ton carriers. Admiral John H. Towers of the Bureau of Aeronautics recommended that this latter course be adopted, and King and Secretary Knox forwarded the proposal to the General Board for consideration. On April 24, that body returned its findings to Knox. It agreed that the maximum number of aircraft carriers was essential but concluded "that the building of the battleships in the current building program should not be deferred but should be prosecuted with the utmost dispatch."\textsuperscript{15} The General Board also recommended against the conversion of light cruisers to carriers. Admiral Frederick Horne, the Vice Chief of Naval Operations, disagreed and wrote to King on May 4 that he thought the \textit{Montanas} should be suspended in favor of carriers and cruisers. Three days later, the Battle of the Coral Sea took place. A Japanese force was turned back
by the power of American carrier aircraft alone. Part of the price paid for this victory was the loss of the *Lexington*, one of the two largest carriers in the Navy.\textsuperscript{16}

The next day, May 8, King recommended to Knox that construction of the *Montanas* be stopped in favor of aircraft carriers and heavy cruisers, and an order to this effect went out on May 19. Little in the way of concrete effort was lost on the *Montanas*. None of the ships had been started; the commandant of the New York Navy Yard reported: "With the exception of the laying down of lines in the Mold Loft and the making of a few molds, no Yard work has been done on [them]."\textsuperscript{17} At the same time, four of the six battlecruisers were also deferred. This must have hurt King sorely. He had been the driving force behind the 12-inch cruisers, he had rejected the idea in March of replacing them with carriers, and in April he had fought to keep them in the program with high priorities. He had said tersely to Admiral Nimitz: "[the] proposal to reduce number of CB's [large cruisers] is not acceptable."\textsuperscript{18} Now only the two ships that had actually been started, the *Alaska* and *Guam*, would be proceeded with.

Nor were these the only changes in the capital ship program. The ships still on order were downgraded in priority. On the list of precedence, landing craft and destroyers leapfrogged ahead of the *Alabama*, the only 35,000 ton battleship still in the yards. The *Iowa* and *New Jersey* dropped from their fifth spot that they had
assumed in March well down the list to tenth place behind cruisers (including the two Alaskas) and submarines. The four remaining Iowa class ships were given such low priorities that King regarded them as indefinitely delayed, although work did proceed on the Missouri and Wisconsin. On the other hand, the Kentucky, which had been laid down was dismantled to make way for more pressing construction.¹⁹

The basic outline in this change of emphasis from battleship to carrier was made public on June 17, shortly after the Battle of Midway. The House voted an additional 1.9 million tons of warship construction "with the accompanying statements that no battleships were included in its provisions and that the Navy had suspended its plans for the new class of 58,000 ton battleships."²⁰ Long-time Congressional supporters of the battleship agreed that its place had been superseded by the carrier. Allen Ellender said that the events of December 1941 had been the turning point in the old argument of air power against surface vessels and that the Coral Sea and Midway actions simply confirmed the lesson. Carl Vinson confessed that he believed the carrier was now "the backbone of the fleet," and he referred to battleships as "mammoths" and "sea dinosaurs." He thought it unlikely that capital ships would ever again fire directly at one another.²¹

Other comments were less restrained. Franklin G. Percival remarked in the U.S. Naval Institute Proceedings:
"It has been shocking to note radio commentators, editors, columnists, and magazine writers jubilantly proclaiming the death of the battleship, as if that were the best possible news." The *Boston Herald* ran an editorial cartoon showing a battleship fleeing from a swarm of planes and crying: "This is no place for me." The *Chicago Tribune* gave a front page spot to a similar cartoon featuring a sign: "U.S. Battleships for Sale in Exchange for Bombers." Other periodicals called the battleship "a sitting duck" and "the huge muscle-bound booby of the high seas." The battleship was also berated for its lack of activity. The author of an article entitled "The Inoffensive Battleship" in *Flying* magazine queried: "I don't know why it is that a carrier or a cruiser is apparently regarded as expendable material, while a battleship must be conserved, possibly to serve as a floating museum at the war's end." One naval aviator was quoted as saying: "Leave the precious battlewagons home where nothing can happen to them." Another aviation enthusiast asked: "What have battleships done in this war, but sink?" One of the foremost exponents of air power, Alexander de Seversky, published a best-selling work entitled *Victory Through Air Power* in which he constantly sniped at the battleship's helplessness and inutility. Under Secretary James Forrestal later admitted that it would have been popular had the Navy announced suspension of work on all battleships.
The battleship did find some defenders. King's deputy, Admiral Horne, said in a speech to a Chamber of Commerce gathering:

There are those who would tell you that because battleships have been sunk from the air, they are no longer an important factor in sea warfare. We might as well say that because linesmen do not carry the ball, and it is the backs who score the touchdowns, we do not need linesmen on a football team.31

Congressman Vinson supported continued battleship construction as essential insurance in case carrier attrition reduced sea warfare to an "old-fashioned slugging match."

Admiral Nimitz took the time to write to the National Geographic:

Even the much abused battleship still has its place in the naval scheme of things. The Navy that has sufficient naval aviation to furnish an air umbrella and sufficient destroyers to provide the required anti-submarine screen, can take its battleships to critical areas and make use of their concentrated powers of destruction. . . . We are not yet ready to scrap battleships, simply because they have not had much use during the present war.32

The most respected naval commentators were generally still willing to back the capital ship. Bernard Brodie pointed out that the battleship fared better under air attack than any other type. Every navy but the American, he said, had lost a lower proportion of battleships to bombers than they had any other type of combat vessel. The Seversky book came in for sharp criticism. Dudley Knox wrote a lengthy letter to Hanson Baldwin noting the inaccuracies in Victory Through Air Power. Brodie was
especially opposed to Seversky's willingness to scrap all battleships and rely completely on aviation. Other analysts noted that neither the Japanese nor the Germans had given up battleships. (In fact, Hitler at this time was investigating ships with 20-inch guns.) One defender of the battleship emotionally wrote to the *New Republic*:

> It is the battleship that has blockaded Germany, and has prevented Germany from leveling a similar blockade against England, which would have caused her defeat, and therefore the defeat of Russia, and the loss of the Near East, and therefore Africa, and then India, and then China, and then the United States.  

Still, no one was willing to call for renewed battleship construction. According to the *Army and Navy Journal*, the lengthy building time required for a modern battleship made it "infinitely wiser" to use scarce resources for vessels that could be turned out more quickly. Brodie drew a parallel between the situation of the United States in 1942 and that of Great Britain in 1914, when the Admiralty had halted new battleship construction to finish the ships already begun. When the American program was completed, the United States would have superiority over the Axis in this class, so further construction was unnecessary, he said.  

The final end to the Montana class came in 1943, when King asked Roosevelt for his approval of a plan to build four additional carriers and a large number of smaller ships. King also requested that the third battlecruiser,
the *Hawaii*, be reinstated in the program. To avoid asking for legislative approval, King proposed that the tonnage be obtained by cancelling altogether the suspended *Montana* class battleships and the three remaining *Alaskas*. Roosevelt agreed, and on July 21, the eight ships were dropped.

But paradoxically, the capital ship was undergoing a minor renaissance by this time. Articles appeared in the *U.S. Naval Institute Proceedings* arguing the case for renewed battleship construction, albeit of ships with the heaviest antiaircraft batteries. Admiral Horne defended battleships before a subcommittee of the House:

> Our battleships at the time of Pearl Harbor lacked the speed and flexibility necessary to become a part of a present-day task force, as well as the antiaircraft armament for their own and a task force's protection. However, the modern battleship is a different story. In the few instances where they have had the opportunity to prove themselves in battle, they have shown that the day of the battleship is far from being ended.35

Although Horne did not recommend additional funds for battleships, the CNO's office was determined to go ahead with the remaining ships of the *Iowa* class. The first of these, the *Iowa*, had commissioned in February 1943, and the *New Jersey* was due to enter service in May. In both instances, construction had been hurried, and the ships finished over a year ahead of schedule. Work on the second pair, the *Missouri* and *Wisconsin*, was going on at a fairly good pace, and both were supposed to be commissioned in the spring of 1944. The construction of the *Alaska* and *Guam* was similarly
advanced. These battleships and battlecruisers retained a moderately high priority, although they were listed behind most other major combatant ships.36

Only the 45,000-ton Illinois and Kentucky remained to be started, although the yards had assembled a considerable amount of material for them. Admiral E.L. Cochrane, the head of the Bureau of Ships, felt that this equipment could be more profitably diverted to other purposes, and he ordered plans drawn up to incorporate the machinery of the Kentucky into one of the large armored carriers. When the Norfolk Navy Yard asked whether work was to continue on the Kentucky, Cochran answered in the negative and then decided the question was so important that it should be forwarded to the CNO's office. Admiral S.M. Robinson, chief of the Bureau of Procurement and Material, backed Cochran's stand. However, King replied:

Work on [the Montana class] has already been suspended . . ., and to extend it to these two ships would rapidly bring us to a point where no more BBs [battleships] would be under construction, and it would then be too late to undertake a new program. I cannot acquiesce in a complete cessation of BB construction; these ships with their combination of gun power, 32 knot speed and ability to withstand damage are highly valuable and more than justify expenditure of the time and materials required for their construction.37

He ordered work on them to proceed "forthwith," and hoped that they too could be finished well ahead of their projected completion dates of 1946 and 1947.38

Surprisingly, this was not the end of the matter. In October 1943, J.F. Byrnes, the former Supreme Court
Justice who now oversaw the Office of War Mobilization, attempted to reduce the Navy's building program. In a letter to Admiral William Leahy, Byrnes specifically mentioned the Illinois and Kentucky as ships that were expendable. From the standpoint of existing capital ship strength, the jurist had a good case. The Director of Naval Intelligence reported on November 1 that the Allies had on hand forty-nine battleships to oppose twenty in the Axis navies. In ships under construction, Naval Intelligence estimated that the Allies also held the edge by a five to three margin. Nonetheless, King and Secretary Knox went to Roosevelt, who gave specific instructions that work on the two ships be continued. To placate Byrnes, the President noted that the Montana class had been cancelled earlier. 39

Another major obstacle to the last pair of Iowas lay in the scarcity of building facilities. King originally hoped to have the Illinois begun in late 1943 and the Kentucky the following spring. However, the ships already on the scheduled ways were not launched as quickly as anticipated. In the summer of 1944, neither ship had been started, and Admiral Nimitz, the head of the Pacific fleet, suggested that they be put off once again in favor of additional aircraft carriers, although he was anxious to get the battlecruiser Hawaii as soon as possible. King believed any further delay in the battleship program unwise; consequently the Kentucky was laid down on December
6, 1944, and the **Illinois** on January 15, 1945. King still thought that both ships could be completed by dint of extraordinary effort before the end of 1946. In fact, he began to consider ways of further reinforcing American battleship strength. In July 1944, he ordered the Bureau of Ships to prepare plans for an improved **Iowa** to insure "progress in design and to guard against attrition in this category." 40 King even contemplated for a time using the surrendered Italian **Littorios** in the Pacific, although he eventually rejected the idea because of their non-standard ammunition and poor defensive characteristics. 41

In Great Britain, this same reversal of opinion on the value of the battleship was taking place among top planners. Churchill recommended that the four battleships of the **Lion** class sanctioned by Parliament in 1939 be started as soon as possible, and he also asked that construction on the **Vanguard** (45,000 tons, eight 15-inch guns) be speeded up so that the vessel could be sent to the Pacific in 1945. In looking ahead to the postwar fleet, Churchill asked the First Lord of the Admiralty to plan on a potential force of twelve battleships, including the two **Littorios**. He wrote:

"This of course depends upon whether the battleship is not rendered obsolete by inventions. So far this has certainly not been the case. On the contrary, the U-boat danger to battleships has been largely mastered and the air menace to them is under much better control than before." 42
So the battleship had come back from the nadir after Pearl Harbor. Part of its recovery was due to success at critical junctures in its intended role as mainstay of the fleet. However, its revived reputation could be credited even more to its success in important, but often unintended, auxiliary missions.
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CHAPTER VI

NEW MISSIONS

As the fast battleships entered service, few had the opportunity to engage in combat against other surface vessels. However, they soon proved their value to the fleet in a number of other roles. The battleships partially vindicated themselves in providing various services, ranging from supplies to rescue aircraft. At the end of 1943, they also found employment for their big guns by shelling land targets in lieu of the enemy fleet.

One of the auxiliary duties most successfully assumed by fast battleships was refueling escorting destroyers at sea. The short range of these vessels had imposed serious restraints on the flexibility of the fleet in the past. Consequently, in the years before the war, the United States Navy devoted a great deal of effort to replenishment of ships underway. In 1924, the Arizona experimented with fueling by a hose over the stern, but by the thirties, the battle force was practicing the more efficient broadside method. In the design of the fast battleships, the Bureau of Construction and Repair took special pains to include increased oil capacity for refueling purposes. The Iowa, for instance, could carry enough fuel to steam over 18,000 miles, thus giving an ample surplus for the needs of destroyers.¹
In the very first wartime operations in the Pacific for fast battleships, the North Carolina fueled the destroyer Gwin on the night of August 7-8, 1942 during the approach to Guadalcanal. Although such nocturnal fueling was highly experimental, the task was accomplished successfully. Refueling, both by day and night, soon became routine. Navymen jokingly referred to fast battleships as "armored oilers." The Washington reported in 1945: "Fueling destroyers in the forward combat areas continues to be one of the most important functions of the fast battleship." As a result, officers spent much of their time simplifying techniques and making them safer. For instance, the fast battleships often fueled destroyers along both sides simultaneously. The heavy ships pumped a lot of oil. The Alabama reported in the summer of 1945 that it fueled four to six destroyers every three to five days. In turn, it had to top up its bunkers from a tanker every fourth day. The Wisconsin, which joined the fleet late in 1944, had by the end of the war refueled 250 destroyers. The work involved in all this was considerable, and one officer on the Alabama complained that fueling a destroyer on strike days took 120 men from the antiaircraft batteries and masked much of the antiaircraft armament down one side.

The fast battleships provided other services for the ships in task groups. The large vessels carried great quantities of extra provisions, ranging from ice cream to
spare parts. Some quartermasters had a tendency to "sit on" much of this material, and when a homeward bound battleship was required to turn over excess supplies, the results were sometimes surprising. A naval officer reported:

[one battleship] disgorged baled rags in excess of the entire amount held by other ships at a busy anchorage. Another was found to have one hundred and eighty clocks on board when a sister ship had only twenty to fill an allowance of forty.4

As expected for vessels of their size, battleships carried complete hospital facilities, including an operating room. Because the ships were the steadiest sea boats in the Navy, badly wounded sailors were often transferred to a battleship where they would receive the best medical attention.5

Another auxiliary mission was that of flagship. The fast battleships were ideal for this role on a number of counts. They were fast enough to keep up with the rest of the ships in a task force and were large enough to provide space for an admiral and his staff. They offered heavily armored command facilities with their conning towers, although these were rarely used because of cramped conditions. More important, as the aircraft carriers became increasingly the primary object of enemy attack, the battleships provided a relatively secure command post for top brass. Admiral William L. Halsey, an aviator who would have preferred to fly his flag in a carrier, ultimately chose Iowa-class battleships for just this reason.6
Battleships also offered a commander unrivaled communications facilities and radar outfits. Incidentally, fast battleships on occasion were the first to spot surfaced Japanese submarines with their superior radar sets. For example, on February 3, 1944, the New Jersey had a radar contact with a vessel twenty-one miles away. Two escort vessels went to the spot and sank the I-21, the submarine that had been the vanguard of the Japanese force at Pearl Harbor. Similarly, the Missouri picked up I-56 on radar, April 17, 1945, with fatal results for the Japanese warship. In any event, all the fast battleships except the Alabama and Indiana flew admirals' flags at one time or another, and the New Jersey, Iowa and Missouri served as fleet flagships for either Admirals Halsey or Raymond Spruance.7

On one occasion, the Iowa carried an even more important passenger in the person of Franklin D. Roosevelt. Soon after completion, this ship was detailed to carry the President and his delegation on the first leg of their journey to the Cairo and Teheran conferences. On November 11, 1943, the Iowa met the presidential yacht Potomoc and picked up Generals George C. Marshall and H.H. Arnold along with Admiral Ernest J. King. The next day, Roosevelt, his adviser Harry Hopkins, and Admiral William Leahy came aboard. The President held up the sailing of the ship until just after midnight so that the voyage would begin on a Saturday. Whether Roosevelt was genuinely
superstitious about sailing on a Friday or whether he was trying to show that he was an old salt is an open question. Security precautions were rigorous. The dignitaries stayed below deck at Hampton Roads; once at sea, the *Iowa* maintained a steady twenty-five knots. Because no destroyer could sail across the Atlantic at this speed without exhausting its fuel, the initial escort of three destroyers was relieved by two additional trios. Two escort aircraft carriers stationed along the route provided air cover. The only incident occurred when the destroyer *William D. Porter*, using the *Iowa* as the target for dummy torpedo runs, accidently fired a live torpedo at the battleship. The *Iowa* took radical evasive maneuvers, and the ship's antiaircraft gunners ultimately exploded the errant weapon. Roosevelt clearly relished the excitement. He yelled to his valet to take him over to the rail so that he could see the approaching torpedo and later protected the guilty officer on the destroyer from King's wrath.

On November 20, the *Iowa* landed the President at Oran and picked him up at Dakar on December 9 for the return journey, which ended a week later.  

The use of capital ships to transport most important persons undoubtedly dated to ancient times. A more modern auxiliary function for the battleship was to scout for the fleet by using its catapult aircraft. The earliest American experiments with aircraft flying from turret tops were conducted at the close of World War I.
The Navy found the planes useful for spotting the fall of shot in addition to their scouting role, and all battleships received an aviation complement during the twenties. In designing the fast battleships, the naval architects placed the catapults at the stern in order to make for a more compact superstructure and to remove volatile aviation gasoline to the extremity of the ship. This position had its disadvantages, however, for the planes were more exposed to blast from the main battery and to bad weather. For instance, the Massachusetts lost one of its floatplanes during Hurricane "Viper" in June 1945, and the salvos from the South Dakota's after turret blew both planes overboard during the Battle of Guadalcanal.9

Unfortunately, the battleship aviation units did not live up to the high expectations the Navy had for them. One problem was that the standard spotting plane, the OS2U "Kingfisher" with a maximum speed of 164 miles per hour was, at best, obsolescent in comparison with carrier planes and with its Japanese counterparts. As the war continued, the slow planes were burdened with armor, machine guns, and other modifications. An aviator from the Alabama wrote:

All this extra load was added to the already overworked engine which is rated at only four hundred horsepower! . . . In order to regain the necessary range and endurance, gasoline once again has to be carried in the main (unprotected) tank; whereupon it again becomes very vulnerable. The aircraft is, by this
time, so overloaded that maneuverability is a forgotten factor and rate of climb practically nonexistant. Note that this is the aircraft that has to hover over enemy AA batteries during bombardments and also to visit enemy lagoons where rescue submarines cannot enter. The slow speed of the "Kingfisher" was not always a detriment. During the attack on Saipan in 1944, Japanese antiaircraft fire invariably exploded far ahead of the American spotter planes. One of the pilots reported: "Evidently their mistake was in assuming the performance of our OS2U seaplane was on a par with that of their 'Rufe'" (which had a speed of 270 miles per hour and was relegated to second line duties by 1944).

In contrast to the Japanese, who used their top-notch battleship planes most successfully for scouting, American naval officers found that their slow floatplanes were incapable of performing this mission, and carrier aviation assumed the job. One flier admitted in 1945: "Until a better seaplane is furnished, scouting may be considered a surrendered function in fact if not in name." In carrying out spotting missions, the battleship pilots fared little better. They had no opportunity to call fire against enemy capital ships at sea—one of their primary duties—and had little success in the beginning in directing battleship artillery against shore targets. The latter task took quite a bit of practice. At Casablanca in November 1942, the observers could not see the impact of the shells at all. Two years
later at Saipan, it was the heavily camouflaged Japanese defenses that proved difficult to distinguish. However, by the final bombardments of the war, the pilots had much improved with experience. For example, aviators from the South Dakota and Indiana spotted fire for the British battleship King George V shelling Kamaishi, Japan and were judged to have "performed admirably."

Nonetheless, the record of the aviation units in their intended roles had proven distinctly disappointing by 1944. Occasionally, there were attempts to use the planes for antisubmarine patrol, but positive results here were nil. As a result, battleship aviators flew less and less frequently. A pilot from the Massachusetts reported that it was not uncommon for two or three months to elapse without a single flight. On the South Dakota, pilots "waited patiently until the ship is safely back in a harbor to see if they still remember how to fly—or for the off chance of encountering the enemy fleet and spotting main battery gunfire." On the span of a year, the Alabama made fifty-four launchings. The three aviators thus averaged one flight every three weeks.

As early as November 1942, there were attempts by the Bureau of Ships and Vice Chief of Naval Operations Frederick Horne to remove the catapults from battleships still under construction and to substitute increased antiaircraft firepower. But the General Board disapproved, and Secretary Frank Knox adhered to the more conservative position.
At sea, battleship planes "were openly the laughing stock of Fleets' [sic] Aviation," one pilot from the Alabama reported. This attitude changed in the spring of 1944 when the floatplanes began to be used on a regular basis for the rescue of downed aviators. Although this task was not completely new to battleship pilots (at Casablanca, planes from the Massachusetts picked up four fliers in the water), by 1944 it became the most important mission for the floatplanes.

This type of duty could be quite hazardous. In June, a plane from the New Jersey rescued three men while under fire from Guam. With such a load, the floatplane could not take off and had to taxi fifteen miles to safety. In August 1945, two volunteers flying Kingfishers from the North Carolina attempted to save a downed aviator on the beach of northern Honshu within sight of a Japanese base. The first plane landed in the surf successfully, but as its pilot stood up to throw out a cork float, a wave knocked him from the plane. When he fell, his foot hit the throttle, and the Kingfisher taxied quickly away toward the enemy base. Fortunately, the Japanese gunners concentrated their fire on the runaway, giving the second floatplane the opportunity to land and pick up both Americans. North Carolina pilots also held the record for the most productive single rescue mission. On April 30, 1944, one Kingfisher picked up ten fliers downed off
the great Japanese bastion of Truk. Grossly overloaded, the floatplane managed to taxi to the submarine \textit{Tang} before sinking. This sort of performance changed the derisive laughter of carrier aviators to accolades. Admiral Frederick Sherman praised the battleship pilots: "This kind of teamwork played a large part in maintaining the wonderful morale of our aviators." \textsuperscript{18} One of fliers from the \textit{Alabama} reported of his unit's attempt to get help in fixing a Kingfisher's VHF radio:

The set was taken to a carrier where our representative was told that the repair or replacement of it was not possible at that time. A discussion of the Aviation Unit's plight did no good until it was mentioned that the prime reasons for having the VHF was for radio communication during Air-Sea rescues. Almost instantly, the Aviation Unit had a newly reconditioned VHF to return to the \textit{Alabama}.\textsuperscript{19}

It is ironic then that when a replacement plane, the SC-1, for the "Kingfisher" finally reached service, it proved to have markedly better performance, but no second seat for rescue work. Since the SC-1 was prone to mechanical failure in addition, it saw very little action. \textsuperscript{20}

Another area in which the new battleships were slow to find themselves was shore bombardment. Prior to World War II, some admirals, such as Richmond Kelly Turner, were interested in the support of amphibious operations, but most planners paid little attention to the problem. The specialized high capacity (HC) shells for this work were not even under development by the Bureau of Ordnance until late 1941. Most battleships carried only armor-
piercing (AP) ammunition. This was not completely useless for bombardment purposes, for it was the only type of projectile that could destroy a heavy concrete fortification such as a blockhouse. Nevertheless, in most circumstances the AP shell, with its small bursting charge and its delayed action fuse, was ineffective against lighter works because it tended to bury itself deeply in the ground before exploding. The Navy did have some bombardment projectiles left over from World War I, but only for 14-inch guns and even then in quite limited quantities.  

This proved to be a real drawback in the first American battleship bombardment of the war. In support of the landings at Casablanca on November 8, 1942, the Massachusetts attempted to destroy French shore batteries with 16-inch AP shells. The ship's officers had made every effort to procure HC projectiles, but such shells simply were not available. Consequently, the battleship was unable to silence permanently the coastal guns that continually bedeviled the invading forces. The Massachusetts did explode an ammunition dump and drove the French gunners to cover time and again, but they would return to their weapons after a lull of ten or fifteen minutes. The fast battleship's action report concluded:

To do a satisfactory job on a shore installation high capacity shells with instantaneously acting fuzes are required. With such ammunition these ships can be used effectively for bombarding shore installations in that their range, speed,
and maneuverability is such that they can avoid enemy fire while at the same time deliver a high rate of fire on the enemy's fortifications.\textsuperscript{22}

Despite these recommendations, both doctrine and materiel for the use of fast battleships in this mission lagged. In the face of some opposition from conservatives, the Bureau of Ordnance did undertake experiments with different types of fuses and started production on HC 16-inch shells, although none reached the fleet until the end of 1943. Even in 1944, the Fleet Tactical Publication paid little attention to the use of battleships to back up landing operations. However, on December 3, 1943, Admiral Spruance, commander of the Fifth Fleet, made a marginal notation on a letter from a fast battleship officer that his ships, so far used only to support the carriers, "could also help bombard."\textsuperscript{23}

Just five days later, fast battleships turned their guns on shore targets for the first time in the Pacific. Five of the vessels shelled Nauru with special emphasis on the airfield. The operation was outwardly spectacular, as indeed any main battery shoot was. The ships approached the island at high speed, turned smartly to the firing course and opened up at long range with both 16-inch and 5-inch guns. Viewed from the covering ships, the 16-inchers emitted "a flash of sulphurous light and a peal of thunder."\textsuperscript{24} Aboard the battleships, the gunfire was even more impressive. As one sailor described the experience:
[The concussion from the 16-inch guns] is tremendous, but it builds up. It's like being hit by a slow truck wrapped in sofa cushions. The 5-inchers, damn them, hit you like a plank.  

The results of the shelling at Nauru did not justify all this fury. Despite the expenditure of 810 16-inch and 3,400 5-inch shells, only eight to ten planes were destroyed. The rest had "flown the coop" before the battleships had reached the island. In addition, the meager results were partially attributable to the fact that the battleships still had no HC ammunition for the main battery rifles and also to the ineffectiveness of the 5-inch gun for bombardment purposes except at very short ranges. One officer from the Indiana said: "It was great for morale, but I'm sure we did no harm." The action report of the South Dakota made essentially the same observation but did point to one benefit of the operation:  

Lacking an enemy surface target, this bombardment is believed to have been an extremely valuable influence in drawing the units of the fast battleship type of combatant vessel together as a mutual supporting and effective fighting group. The intangible effect on the temperament and morale of personnel is equally important.  

The fast battleship turned in a considerably better performance at the end of January 1944 in an attack on Roi and Namur islands, part of Kwajalein atoll. After making a fast approach, the South Dakota, North Carolina, and Massachusetts settled down to a deliberate assault. There were no enemy aircraft about and after a futile attempt to wheel a field piece into position, the Japanese
defenses were quiet. The three battleships closed to 7,000 yards at one point, and with the advantage of air spotting, they had "target shooting at its best." The ships for the first time used HC ammunition and expended 992 rounds of this in addition to fifty-four AP shells. Each battleship recorded an individual success: the South Dakota used the AP projectiles to good purpose on a concrete blockhouse; the North Carolina sank a supply vessel in the lagoon; and the Massachusetts hit an ammunition dump. Debris from the last flew almost a mile in the air, eliciting the signal from the captain of another ship: "You hit the jackpot that time!" Officers of the South Dakota concluded that this bombardment coming after the ineffective Nauru operation "have brought her [the South Dakota] quickly to a realization of the many factors and details involved so that high effectiveness may be expected of her in destroying designated defenses."

However, the next bombardments were not as well done. On March 18, the Iowa and New Jersey used their big guns in action for the first time in a "practice" shelling of Mili. In Samuel Eliot Morison's words: "Mili showed an unexpected row of teeth. . . ." Despite firing full nine-gun salvos with HC ammunition, the big ships were straddled repeatedly by shore batteries. The gunnery officer of the Iowa later wrote: "We put several salvos right on the emplacements, and after each, as the smoke
and dust rose, four gun flashes would appear as the Japs got off another salvo." Apparently, the choice of HC ammunition was incorrect in this instance, because the Japanese guns were sited in heavy concrete emplacements. Consequently, the "practice" bombardment turned into a two-sided affray. The Iowa was hit by a pair of shells (either of 6-inch or 8-inch caliber), although damage merely amounted to a scratched cheek on the pointer of a 16-inch turret. This is apparently the only instance of a fast battleship being hit by coastal artillery. 

On May 1, the seven fast battleships on the line in the South Pacific shelled Ponape, just east of Truk. Although there was some fear that the Japanese might have guns as heavy as 16-inchers on the island, the only opposition came from antiaircraft weapons. After pounding the seaplane base, airstrip, and town for seventy minutes, the commander of the force, Admiral Willis A. Lee, suspended fire for lack of apparent targets. Concrete results of the bombardment were few. Morison felt that the main value of the operation was to give the crews practice on a live target. One of the battleship officers involved in the operation concluded:

"It is difficult to determine how much damage is done during such bombardments but they must have been very terrifying to the inhabitants. I couldn't help thinking of the natives who must have had a hard time." 

The next bombardment was even more disappointing. On June 13, the fast battleships attempted to soften up Saipan
in preparation for the landings there. Seven of Lee's vessels threw 2,432 16-inch and 12,544 5-inch shells into the island. Unfortunately, the ships did all their firing at ranges of 10,000 yards or greater, since Admiral Spruance refused to risk them to the fire of shore batteries or in waters that were possibly mined. The gunners concentrated on conspicuous targets of little military importance such as houses and a sugar mill. One sailor described the operation as "a Navy-sponsored farm project that simultaneously plows the fields, prunes the trees, harvests the crops, and adds iron to the soil." 35

Although the captain of the Massachusetts believed that the shelling accomplished all that could reasonably be expected of "an area bombardment," virtually every other authority agreed that it was simply a waste of ammunition. The next day, eight of the old battleships illustrated the proper technique by closing the beaches and subjecting the defenses to unhurried, methodical fire. Henceforth, there would be no question as to the proper employment of the veteran battlewagons; they became specialists in amphibious support and proved their worth to such a degree that the Navy kept some until the end of the 1950's when they were close to forty years old. 36

Part of the difficulty with the fast battleships in shore bombardment lay in complete lack of training. The ships had no experience whatsoever before their first combat shoots. Finally, in October 1944, Admiral Nimitz
ordered that all battleships in training on the West Coast or at Pearl Harbor should include complete bombardment exercises in their programs. This became standard procedure. As a new ship reached the Pacific from the building yards or as an old ship refitted, it would commonly go through the bombardment training courses at Sam Clemente. After this, the Alabama confidently noted that it was well prepared to provide effective bombardment of any type. On the way out to the fleet, the battleship would sometimes polish its technique by firing at Japanese-held islands withering on the vine. For instance, one of the last bombardments of the war was carried out by the New Jersey which shot 106 16-inch shells into Wake on August 8, 1945.37

After the ineffectual performance at Saipan, the fast battleships waited more than half a year before they got a chance to redeem themselves as bombardment vessels. On January 25, 1945, the Indiana took part in the attempts to "soften up" Iwo Jima. For the final stages of the preparatory shelling, Admiral Spruance promised the commander of the expeditionary force, Admiral Richmond Kelly Turner, the use of the North Carolina and Washington. Accordingly, the two vessels offloaded most of their AP projectiles (the North Carolina kept only 700) and took aboard a large number of HC shells (1,746 in the North Carolina). At the last moment, however, Spruance withdrew the two battleships from Turner's command and
included them in his own task force that would soon be attacking Japan. This created a teapot tempest. The Marines were already irritated that more of the fast battleships were not ready with HC ammunition to provide gunfire support, although there were too few lighters at Ulithi to shift the large numbers of shells required. Turner's plans were upset even though Spruance did promise that the two battleships would be back in time to take part in the later phases of the campaign. In fact, Spruance had very valid reasons for wanting the battleships with him, for the Japanese still possessed a fairly powerful surface force in home waters, and the American carriers needed every antiaircraft gun to keep the kamikazes at bay.  

The North Carolina and Washington finally reached Turner just as Spruance had promised, although with no time to spare. The two battleships rendered yeoman service. The North Carolina adopted the methodical style of the more practiced old battleships. A single turret would fire salvos for an extended period, and then another turret would take over the work. In this manner, the crews of the unengaged batteries could eat a relatively relaxed meal, and the turrets could be thoroughly ventilated. The gunnery of the Washington was especially effective. On February 20, the battleship silenced a Japanese strongpoint that was dug into a rock face by placing 16-inch
salvos at fifty yard intervals on the cliff, thereby touching off an avalanche that covered over the emplacements. During that day, the Washington fired steadily for over ten hours and gave such valuable support that Morison later remarked: "Nobody could convince the Marines that battleships were obsolete." For the first time too, a constant supply of ammunition was guaranteed, because the Service Force had finally developed techniques for underway replenishment of main battery magazines.

In the succeeding Okinawa invasion, bombardment results for the fast battleships were decidedly mixed. On March 24, five battleships, including the Missouri and Wisconsin which were firing their big guns for the first time in action, shelled the island. During the ensuing campaign, battleships occasionally split off from the main fleet to deliver fire support. The ships also carried out bombardments of smaller islands such as Minami Daito, where the 12-inch gun crews of the Alaska received their baptism of fire. On occasion, the ships inflicted considerable damage on the enemy. For example, the Missouri hit a truck pool and a large ammunition dump that sent flames one thousand feet in the air. Three battleships used Minami Daito as guinea pig for experimental incendiary shells and for projectiles with "super quick" nose fuses.

For the most part though, the fast battleships were exhibiting once again the low side of their erratic
bombarment record. The damage inflicted by the Missouri was real enough, but that entire March 24 operation was a diversion to draw Japanese attention away from the actual point of the landing. The commander of BATDIV 9, Admiral E.W. Hanson, concluded: "In spite of an expenditure of 1,400 rounds of main battery fire by the battleships, it is not believed that this bombardment will materially assist the successful capture of Okinawa." Too often, there were no worthwhile targets to shoot at. Officers on the South Dakota reported of one mission:

Main battery fire accurate and installations above ground in assigned target areas were without doubt effectively hit. Pinpoint targets were notably lacking.

With no military targets to be seen, the Massachusetts concentrated its gunfire on the towns of Komesu and Medeera. Evaluators assessed the former as 85 percent destroyed and the latter as 40 percent ruined. The action report of the Wisconsin concluded of the shelling of Kutaka Shima:

No specific targets were listed in this area and none were revealed during the firing except a grounded hulk (a lugger) about fifty (50) yards off shore. . . . Near misses on the hulk were obtained and brush fires started in the surrounding area.

The Indiana noted that the results of the expenditure of 180 16-inch shells were "substandard" due to confusion caused by a reef appearing on the radar screen as the shore line. Admiral Hanson felt that even if little had been achieved in concrete terms, the bombardments were justified for the sake of both experience and morale.
And in fact, when British battleships arrived on the scene late in the spring, they were also assigned a mission that "was really a morale booster and nothing else."44

However, Admiral Nimitz shortly used the gunnery capabilities of the fast battleships in a new role: strategic bombardment. In early July, he ordered the ships to shell "certain vital areas of the Japanese mainland in order to destroy vital industries, demoralize transportation, and lower the will to resist of the Japanese people."45 The first target was the Japan Iron Company at Kamaishi, on the northeastern coast of Honshu. The South Dakota, Indiana, and Massachusetts under Admiral John F. ("Big Jack") Shafroth were entrusted with this first shelling of the Japanese mainland since the bombardment of Shimonoseki by the British, French, and Dutch in 1864. The three battleships accompanied by their screen approached undetected and at ten minutes after noon, July 14, the South Dakota, flying the signal "Never forget Pearl Harbor," opened fire at a range of 29,000 yards. In all, the battleships expended 802 16-inch shells, most of which fell inside the iron works. The resulting damage was spectacularly visible. Coke ovens exploded, shells tore large holes in the roof of the factory, and one blasted the top third off a tall smokestack. Moreover, fires sprang up in the city itself. Most of these were caused by the concussion, which spread lunchtime cooking fires. The whole action lasted for over two hours with no retaliation from the
Japanese defenses. Thirteen hours later, fires from the burning city were visible forty miles at sea. After the war, an evaluation team estimated that the Japan Iron Company lost two and a half months of coke production and one month of pig iron production because of this shelling.46

The day after the Kamaishi bombardment, three battleships, the Iowa, Missouri, and Wisconsin under the tactical command of Admiral Oscar C. Badger, attacked the Nihon Steel Company and Wanishi Ironworks at Muroran, a city inside a large bay at the southern end of Hokkaido. Along for the ride was Admiral Halsey, Third Fleet Commander. He later wrote:

Right into the enemy's jaws. The chart justifies my metaphor; during the hour that we shelled . . . Muroran . . . we were landlocked on three sides. We opened fire from 28,000 yards and poured in 1,000 tons of shells. It was a magnificent spectacle, but I kept one eye on the target and the other on the sky. Our three-hour approach had been in plain view, as would be our three-hour retirement, and I thought that every minute would bring an air attack. None came . . . but those were the longest six hours in my life.47

Of the 860 heavy shells fired, 170 landed within the target area. The Japanese lost ten weeks of coke production and a similar amount of pig iron output. Muroran itself also suffered considerable damage.48

Just two days later, a third Japanese city, Hitachi, only eighty miles northeast of Tokyo, came under the guns of fast battleships. This bombardment was the first to be conducted at night. More ships took part than in any other operation against the Japanese home islands. The
North Carolina, Alabama, and HMS King George V reinforced Badger's three Iowas. The task group fired over 1,200 shells at six major industrial plants. In spite of the concentration of force and the lack of opposition, direct damage was slight, partly because of bad weather conditions and the attendant difficulties of spotting shellfire. Only three of the areas were hit, but the bombardment was a heavy blow to Japanese industry nonetheless. The morale of the plant workers declined badly. Many copper miners henceforth refused to go into the pits for fear that another shelling would damage the pumps. Copper output dropped from 40,000 tons per month to 1,500 tons. Another factory at Hitachi ground to a halt for a month because of absenteeism. Additionally, since many of the inhabitants of the city fled in terror, a raid by B-29's the next evening caught the fire department seriously undermanned. Almost 80 percent of the city was burned out.49

In fact, bombardment by large caliber naval weapons almost always had a severe effect on the morale of those on the receiving end. Americans who had suffered at Guadalcanal under the 14-inch shells of the Kongo and Haruna remembered the event as the worst of their lives. Japanese civilians who experienced both incendiary and high explosive bombing considered shelling more terrifying. Demoralization was not inevitable, however. At the Wanishi Ironworks at Muroran, the spirits of the workers
actually rose in a sort of "London-blitz" effect, and extraordinary efforts were made to increase production.\(^50\)

On July 29, night bombardment was tried a second time. Shafroth's three battleships, the *South Dakota*, *Indiana*, and *Massachusetts* were joined by the *King George V* in an attack on Hamamatsu, about 125 miles southwest of Tokyo. The principal target was the Japan Musical Instrument Company. The *Massachusetts* reported of this seemingly incongruous target: "The attack was not an advanced form of musical criticism but arose from the fact that the factory had been converted to the manufacture of aircraft propellers."\(^51\) The shelling was heavier than any other strategic bombardment of Japan; the three American battleships alone shot 1620 16-inch rounds at the target. Some observers were optimistic about the results. When the *King George V* fired its first broadside, the ship's spotter, an American "Black Widow" pilot, radioed back "Geezus--smack on the kisser."\(^52\) Officers of the South Dakota concluded that the Hamamatsu bombardment showed that naval guns could hit specific targets at long ranges at night by resort to area coverage.\(^53\)

In reality, the battleships had been less successful than these early estimates indicated. Although Japanese morale suffered the usual blow, concrete damage was slight. Postwar researchers showed that the *Massachusetts*, for instance, had hit one of its targets with only nine of
109 shells. Admiral John S. McCain, the commander of Task Force 38, felt that the aircraft on combat patrol for the battleships could have done more damage to Hamamatsu than the battleships did themselves. Part of the difficulty was due to wear and tear on the battleships. For example, the main battery guns of the *Massachusetts* were suffering from large-scale barrel erosion. Night operations offered certain inherent limitations as well. Shafroth reported that it was hard to fix a ship's position and hard to spot the fall of shells. The action report of the *Massachusetts* pointed out in addition that security from air attack was greatly reduced and concluded: "The advantages of a night bombardment are obscure, but the disadvantages are obvious."\(^{54}\)

For the last bombardment of the war, the *South Dakota*, *Indiana*, and *Massachusetts* returned to Kamaishi. Nimitz had briefly considered directing the fast battleships to shell the major Japanese ports of Yokosuka and Yokohama. However, these large cities had powerful coastal defenses, and the plan was cancelled. So, in a heavy daylight attack, the three battleships fired at the Japan Iron Company and surrounding area again with over 1,300 16-inch shells (Morison claims 803). Targets of opportunity were few; an accompanying British destroyer claimed "that she had blocked a coastal road ahead of a pedal cyclist, causing him to swerve into a ditch."\(^{55}\) Damage inflicted on the Japanese was a matter of debate. An American officer POW
on the scene noted that the Japanese regarded repairs to the plant as hopeless, and a postwar evaluation team found extensive damage. But the commander of BATDIV 6 thought that the bombardment had only superficial effect because of the lack of suitable fuses for use against heavy machinery. He noted that 16-inch shells with point detonating fuses would explode instantaneously, thereby stripping away great sheets of roofing, but leaving intact the main roof supports and machine tools on the floor below. 56

In the final analysis, the fast battleships had taken part in twelve major bombardments. Of these, only the assaults on Kwajalein, Iwo Jima, and the Japanese ports could be called truly successful. The spotty record was partially due to the lack of both practice and proper ammunition, but of course, underlying these factors was the feeling that shelling shore positions was a secondary mission at best. The slow battleships remained the bombardment champions. But the fast battleships, with their speed, could undertake an assignment beyond the capabilities of the old battleships: that of antiaircraft support for carrier task forces.
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CHAPTER VII

THE ANTIAIRCRAFT RECORD

The most significant subsidiary role undertaken by the fast battleship was the provision of antiaircraft support for the carrier task forces. This was somewhat surprising in view of the weakness of the antiaircraft equipment of the battle fleet at the start of the war. But the necessary material was quickly improvised, and before the end of the first full year of combat, fast battleships had proven themselves against Japanese aircraft in two very successful actions. Later in the war, the enemy adopted new tactics that were especially hard to counter, but even then, the battleship proved a valuable asset for task force commanders.

Until 1942, the Navy unquestionably had an inadequate antiaircraft defense. Fleet publications gave little space to the problem, and tactical preparation was often misguided. For example, priority in distributing antiaircraft fire went to strafing planes and horizontal bombers, with the more dangerous dive bombers and torpedo planes at the bottom of the list. Materially, the General Board noted right after Pearl Harbor that the battle fleet was weak in antiaircraft guns, fire control gear, and ammunition. Even before that disaster, top officers, such as Admiral James O. Richardson, had
called attention to the Navy's deficiencies in this area, and remedial efforts were fortunately well along by the time of the Japanese attack.1

The Navy was in the process of replacing the inadequate light battery of 1.1-inch and .50 caliber machine guns with the Swiss 20mm Oerlikon and Swedish 40mm Bofors. The Bureau of Ordnance tested the latter weapon in both twin and quadruple mounts early in 1942 and began large-scale production in the summer. The Bofors was so promising that Admiral Harold Stark recommended adopting this gun as the Navy's sole lightweight antiaircraft weapon. Fortunately, the Navy also kept the Oerlikon, and this proved to be the most effective antiaircraft gun until the last year of the war. By the fall of 1944, the heavier 40mm had become the primary antiaircraft gun and accounted for 50 percent of all kills by antiaircraft fire.2

In 1942, the Navy added these guns to battleships in unprecedented numbers. For instance, the 1941 plans of the *Iowa* called for twenty-four 40mm and forty 20mm guns. By October 1942, Vice Chief of Naval Operations Frederick Horne wanted the number of Bofors increased to a minimum of forty guns. A month later, he complained that even this allowance was inadequate and asked for sixteen quadruple mounts in addition to sixty 20mm guns as the "ultimate battery." He wrote: "War experience to date shows that the safety of a capital ship demands the maximum close-in battery that can be carried."3 A Bureau of Ships
officer noted with some prescience in the margin of Horne's memorandum: "The use of the word ultimate can be classed as wishful thinking." In June 1943, as the Iowa was fitting out, the ship's captain asked for a "considerable increase" in the already heavy antiaircraft battery. By this point though, deck space was very much a limiting factor. There were antiaircraft guns crammed into every corner. Despite all objections, the Bureau of Ships then sited quadruple 40mm mounts on turret tops and even placed two 20mm Oerlikons in the ship's eyes. Serving the latter pair of guns must have been either an exhilarating or terrifying experience, for this location at the uttermost extremity of the ship's bow would be lonely and exposed with the seas rushing by on all sides. In any case, the Iowas ultimately carried up to eighty 40mm and fifty-two 20mm guns. The 35,000 ton battleships had their antiaircraft batteries upgraded in similar fashion. The North Carolina, for instance, mounted sixty 40mm and fifty-six 20mm guns by the end of the war.

However, these increases had cost time and weight. While the transition was being made to the 40mm and 20mm guns, the yards were held up in design work on the later battleships since precise details on the new weapons were hard to obtain. Once the Navy made the specific decision to change over to the new weapons, the mechanical work involved in the substitution meant a delay of four months on the South Dakotas, which was just too much in the
emergency atmosphere of early 1942. The ships were accordingly completed with some of the old weapons aboard. As more and more mounts were added, the Navy ran into a problem of overloading the battleships. The huge antiaircraft armament finally carried by the Iowa diminished the freeboard of that ship by half a foot. Protection afforded by the armor belt was thereby cut. Wartime additions to other areas increased the seriousness of this problem.\(^6\)

To add to the antiaircraft capabilities of the battleships, planners early in the war gave some thought to using the big guns to supplement the lighter weapons. An article in the U.S. Naval Institute Proceedings called for high angle mounts for the 16-inchers to lay a barrage of antiaircraft fire. Nothing came of this suggestion, but the Navy did experiment with shooting heavy projectiles into the sea to throw up columns of water in front of torpedo planes. Only the Japanese put these ideas into practice. They developed a special 18.1-inch shell filled with almost 10,000 bursting charges, and the Yamato fired these unsuccessfully in April 1945. The basic problem, of course, was the difficulty of tracking a fast moving plane with the ponderous turret guns. Also, the blast from these huge weapons made it impossible to man the smaller antiaircraft guns in exposed positions, as the officers on the South Dakota noted in 1942. In action, there was also the considerable danger
of hitting friendly ships by mistake. Consequently, the United States Navy gave up the whole project.\(^7\)

Immediately after Pearl Harbor, the Navy had to make up for lost time in the field of antiaircraft fire control. This area had been widely neglected between the wars because the planners felt that the .50 caliber machine gun would compensate for any inaccuracies with its great volume of fire. Fortunately, the Navy had developed prototype antiaircraft directors. Although these were basically sound, they were heavy and susceptible to vibration. Nevertheless, they were made to serve throughout the entire war by constant updating. (One model underwent ninety-two modifications.) To increase the flexibility of the antiaircraft armament, officers on the *North Carolina* in 1942 interconnected the heavy and light directors so that the 5"/38 mounts could be employed for close-in work and the 40mm *Bofors* could fire at night using the radar facilities of the larger gun. These arrangements became so complex that the navymen on the *Iowa* rigged "an electric status board to keep up to date on which mounts were controlled by which computer and which director."\(^8\) These samples of Yankee know-how served well enough. Ordnance experts concluded after the war that the United States Navy had the best antiaircraft fire control in the world.

Despite the acquisition of excellent guns and directors, a weak link remained in the system. The
standard antiaircraft shells were fitted with time fuses, which were inherently inaccurate due to variations in manufacture and to the necessity to set them manually. The Bureau of Ordnance consequently embarked on a most ambitious project to produce a fuse that would detonate automatically when the shell passed close to an airplane. The ultimate result was the "VT" fuse which was, in effect, a tiny radar set in the nose of a 5-inch shell. It first saw action in January 1943; from that time on, enemy pilots computed American fuse settings and "did a damned accurate job of it," in the words of Admiral William Blandy. In the long run, the VT fused projectiles were four times as deadly as conventional ones. Unfortunately, miniaturization had not developed to the point that the VT fuse could be fitted to 40mm or 20mm shells.

Beginning in 1942, battleships devoted literally hundreds of hours to antiaircraft practice. Crews would shoot at target drones, balloons, or even a puff of smoke left by another antiaircraft shell. When the Washington first joined the British Home Fleet in 1942, the ship gave a sensational exhibition of practice shooting. According to the gunnery officer: "We just put five bursts ahead of the target like we always would, then five astern of it and then shot it down. The British stood there with their mouths open. . . ." By 1944, ships were spending so much time in antiaircraft exercises that Admiral Ernest J. King had to admonish them not to neglect surface firing. The military analyst, Bernard Brodie, calculated that by the end of 1943 the effectiveness of the battle fleet's
antiaircraft gunfire had increased one-hundredfold in two years.12

In the Guadalcanal campaign, the fast battleship got its first opportunity to prove its antiaircraft prowess. When the North Carolina had first arrived at Pearl Harbor on July 11, 1942, the ship had made a great impression: "[the] first new American battlewagon to roll over the Pacific surges, bringing a 16-inch main battery to blast the Japs, her topsides bristling like a porcupine with the new allowance of anti-aircraft guns. . . ."13 Admiral Chester W. Nimitz later remembered the thrill of the battleship's arrival. But when he offered the vessel to Admiral Frank Jack Fletcher for the forthcoming Guadalcanal invasion, Fletcher wondered what use he could make of the ship. One of his staff officers, Cato D. Glover, suggested that the North Carolina's antiaircraft guns (at the time, four quadruple 1.1-inch, forty 20mm, and twenty-six .50 caliber machine guns) could be of value. Accordingly, Fletcher teamed the battleship with the carrier Enterprise in Task Force 16 under Admiral Thomas C. Kinkaid.14

On August 24, these ships were involved in a desperate action, later named the Battle of the Eastern Solomons. Thirty-six Japanese bombers managed to elude American fighters and attacked the Enterprise, which was in the center of escorting vessels with the North Carolina trailing the formation by 2,500 yards.
Fortunately, some of the Japanese aviators concentrated on the battleship. The antiaircraft fire that rose to meet them from the North Carolina was so heavy that observers on the Enterprise thought the battleship was hit and in flames. Batteries on the ship fired constantly; some guns continued to shoot while changing targets. The light machine guns opened up while the aircraft were still out of range. Analysts agreed that this method did not bring down many planes, but was justified in view of the "multiplicity of targets and the extreme danger...."\textsuperscript{15}

The 5-inch battery proved especially successful. Some guns fired as many as seventeen rounds per minute and did good work in dispersing attacks at long range. One 5-inch turret damaged a circling American plane with its first salvo, thereby drawing rueful congratulations from the pilot. The 20mm Oerlikons earned high marks, too. Even the 1.1-inchers were praised in an off-handed fashion:

The guns maintained their rate of fire despite frequent jams. At one time all four guns of one mount jammed. Jams were caused by small pieces of cork and residue accumulating on greased cartridges during passage from clipping rooms to guns. A man was stationed under each 1.10 quadruple mount and each time a gun jammed, would knock the cartridge out with a chisel and hammer. This is far from a safe procedure, but inasmuch as there were about 50 such jams, it was effective and justified.\textsuperscript{16}

In all, the North Carolina expended in nine minutes of hectic firing 841 rounds of 5-inch, 1,067 of 1.1-inch,
7,425 of 20mm, and 8,641 of .50 caliber. The ship was credited with destroying seven planes, although some analysts believed the score might have been as high as fourteen. Losses on the North Carolina amounted to one man killed by a strafing plane. The Enterprise, however, was hit by a bomb that did considerable damage, and many officers felt that mistake had been made in separating the two big ships. The commander of the North Carolina recommended that in the future, carriers should decrease their speed slightly so that escorting battleships could keep pace.17

In spite of these qualifications, there was considerable rejoicing in the top ranks. The battleship's commander, Captain George H. Fort, wrote:

I consider that the North Carolina has proved the value of her type in a fast task group. She can do anything that a heavy cruiser can do except maintain speeds in excess of twenty-seven knots. She has a much more effective ... AA battery plus 16" guns available in case of need.18

He cautioned that in forming conclusions as to the value of the fast battleship, naval officers should remember that the North Carolina had had an unusually long training period with an exceptional dose of target practice. Admiral Kinkaid reported to Admiral Nimitz that the presence of the North Carolina in the task force was "a distinct asset." Staff officers at King's headquarters concluded after study that:
A fast battleship is a desirable addition to a carrier task force. The North Carolina was not only a strong support to Task Force 16 against sea and air attacks on 24 August but drew a considerable portion of the attacking planes to herself thereby reducing the number attacking the Enterprise. . . . The splendid job done by the North Carolina makes our AA prospects most encouraging. . . . 19

This evaluation was dramatically borne out two months later at the Battle of Santa Cruz. This time it was the new South Dakota that was charged with protecting the Enterprise. Happily, the battleship carried the 40mm Bofors, which replaced the troublesome 1.1-inch mounts, and 20mm fitted with a much improved gyroscopic sight. 20

The South Dakota was also fortunate in having as its captain Thomas L. Gatch, the most flamboyant officer to command a fast battleship. A religious man, he revived the Old Navy practice of reading the lesson at divine service. An admirer of Shakespeare, he claimed to have read Hamlet two hundred times. Yet he maintained an extraordinary hold over his men, which Samuel Eliot Morison partially attributed to the fact that:

. . . as a close student of the Civil War, Gatch had reached the conclusion that taut, spic-and-span units never fought well; so he let the men wear anything or nothing—'they looked like a lot of wild men.' He let the ship get abominably dirty and directed all his men's energies to perfecting their shooting. 21

Some observers thought that the South Dakota was probably the dirtiest ship in the Navy in late 1942, but its crew had unquestioned esprit de corps. Nevertheless, Gatch was inwardly uneasy about his men's readiness for combat.
The South Dakota had been rushed into the war zone with only one-third the normal peacetime shakedown. To make matters worse, the majority of the crew was green. Sixty percent had spent less than a year in the Navy. Some farmboys from the Appalachians had found the workings of the telephone to be a mystery. Gatch later confessed that he was not completely sure of his ship's ability to stand up to air attack.

The Santa Cruz action on October 26 began inauspiciously for the United States Navy. Enemy planes crippled the carrier Hornet, a ship fighting without battleship escort. The Japanese then turned their attention to the Enterprise. The South Dakota's radar picked up the approaching strike; in little more than an hour, seventy-two torpedo planes and dive bombers assaulted the American force. Weather conditions very much favored the attackers, for the sky was filled with low-lying clouds in which the Japanese planes could hide. This handicapped the 5-inch and, to a lesser degree, the 40mm guns in getting their sights on the suddenly appearing planes. The radical evasive maneuvers of the task force added to the gunners' difficulties both by the constant change of bearings and by putting the main deck aft awash. Some 20mm gunners were knee-keep in water. Nonetheless, it was the Oerlikons that did the greatest execution, expending 52,000 rounds to 7,890 for all the larger weapons combined. Since the South Dakota stayed within one thousand yards of the carrier, it got its best shots
at aircraft that pulled out of their dives as close as two hundred yards away after attacking the Enterprise. Many of these planes crashed in the water right by the battleship. One fanatical pilot crawled out on the wing of his sinking plane with pistol in hand, only to be blasted by a Filipino gunner. The Japanese bombers that flew just above the water had the best chance of escaping, since the Oerlikons were not mounted flush with the deck of the battleship, and the gunners had to stand on tiptoe to fire at low-flying aircraft. Throughout all this, the paymaster broadcast a running account for the benefit of the men below decks, who later said that "they had never heard such a thrilling report from any broadcaster."23

There was plenty of excitement that morning. Midway through the action, a Japanese plane crashed into one of the accompanying destroyers, the Smith. The skipper of this ship, faced with an uncontrollable blaze forward, had the presence of mind to put the bow of the Smith within a few yards of the South Dakota's quarter. The wake from the speeding battleship extinguished the fire, and as the destroyer pulled away, its "prow was sizzling like a flat iron."24 Shortly thereafter, in the last attack of the day, a Japanese bomber slipped through the battleship's defense and dropped a 250kg bomb directly on the top of the forward 16-inch turret. The armor stood up well and inside the turret, only one officer at the
periscope was even aware that a bomb had exploded directly overhead. Outside the turret, however, fragments from the bomb wounded most of the mess stewards at their gun position, and a piece of metal hit Captain Gatch, who was outside the cramped conning tower on the catwalk in front of the bridge. Gatch's jugular vein was severed, and only prompt action by the ship's quartermaster saved his life. Steering control was shifted to the executive officer in the armored control tower aft, but in the confusion, he had no communication with the helm for a minute. The South Dakota, which had been handled so superbly up to this point, headed for the Enterprise on a collision course. The aircraft carrier turned away just in time, and control was soon restored on the battleship.25

Although the task force successfully weathered the Japanese attacks, the Enterprise was damaged by three bombs. More serious, the Americans had to abandon the stricken Hornet and retire from the area in the face of superior Japanese surface forces. But the South Dakota had done very well indeed. The battleship claimed thirty-two enemy planes destroyed and later was officially credited with twenty-six. Kinkaid, the task force commander, told Nimitz that the battleship's performance had been "splendid." Nimitz' chief of staff, Admiral Raymond Spruance, wrote to King that the South Dakota had proven "invaluable." King's staff concluded in a report intended for distribution to the fleet:
One of the most gratifying aspects of the engagement was the outstanding performance of the new battleship South Dakota's antiaircraft batteries in action for the first time. Their tremendous firepower contributed in large measure to the successful defense of the Enterprise. 26

In early 1943, the Navy released sketchy details of the Santa Cruz action. Press reports claimed that an unidentified battleship, quickly dubbed "Ship X," had downed thirty-two Japanese planes. Gatch, no slouch at public relations, published a lengthy article entitled "The Battle Wagon Fights Back" in the Saturday Evening Post. Santa Cruz, he said, had shown that the modern battleship "was not the antiquated dodo of the fleet," and he lauded the "battleship-carrier team." 27 At the same time, an article in the U.S. Naval Institute Proceedings maintained that a modern battleship would add more antiaircraft strength to the fleet than any other type of ship. 28

But as the United States Navy marshalled its resources, the fast battleships saw little action of any sort for almost a year. Finally in November 1943, the Massachusetts, North Carolina, and Indiana got a chance to prove their nocturnal sharpshooting abilities. On two nights in a row, the battleships took an important part in repelling Japanese attacks of up to a dozen planes at once. The 5-inch guns were, of course, directed by radar and fired VT fused shells. The North Carolina alone claimed three sure kills. In February 1944, during
the first strike on Truk, the **South Dakota**, **Alabama**, and **North Carolina** helped hold six or seven radar equipped Japanese bombers at bay for two hours with antiaircraft fire. When Admiral Marc Mitscher silenced the guns to give his night fighters a chance to shoot down the intruders, one succeeded in torpedoing the carrier **Intrepid**. By this time, battleships crews looked on their antiaircraft capabilities with confidence. The **South Dakota** reported of an action during the retirement from Truk:

> As the first bogies came into range the ship quieted down in a rather routine manner and the tracking, firing, and maneuvering took on all the aspects of practice night exercises. But the bringing down of a Betty always explodes an irrepressible cheer that penetrates the bowels of the ship.²⁹

At the **Battle of the Philippine Sea**, June 14, 1944, the battleships got their first major test against Japanese aircraft in over eighteen months. In preparing to meet the enemy aerial attacks, Admiral Spruance took the unusual step of withdrawing the battleships from their normal screening positions and stationing them fifteen miles on the engaged side of the carriers. This placed the battle line directly in the path of the Japanese strikes. From this position, the battleships were also able to use their excellent radar equipment to good advantage. The **Alabama**, equipped with a new type of set, spotted the first attackers at the extraordinary range of 190 miles. The commander of the battle line, Admiral Willis A. Lee, somewhat incredulously asked the **Iowa** to verify the
contact, and the older equipment on this ship picked up the enemy planes at 130 miles. After the battle, Lee radioed: "To Iowa, well done. To Alabama, very well done." This radar warning gave the fleet time to send out its fighter patrols and to ready its antiaircraft defenses.

The Japanese struck in four large waves. The few planes of the first group that survived the gauntlet of American fighters attacked Lee's battleships. The South Dakota received a direct hit, but the 250kg bomb failed to penetrate the armored deck, and the combat readiness of the battleship was unimpaired. Fifty men were killed or wounded, though, and Lieutenant Commander Harold Stassen, who was aboard making arrangements to outfit the South Dakota as Admiral William Halsey's flagship, had to cancel his plans. In any event, not a single Japanese airplane of this first wave broke through the battle line to Spruance's carriers.

About twenty aircraft of the second group reached Lee's ships. One of the escorting destroyers observed: "The battleships, cruisers, and destroyers . . . put up a tremendous barrage which, together with the burning planes all around the horizon, created a most awesome spectacle." Some battleships had narrow escapes. Two bombs narrowly missed the Alabama, and a torpedo heading straight for the Indiana exploded less than fifty yards from the ship's side. The Iowa also managed to
avoid a torpedo. Only the Indiana was hit during this attack when a crippled plane crashed into the side of the battleship. Fortunately, the torpedo aboard the aircraft failed to explode. The Indiana's armor saved the ship from damage, and the only injury suffered by the crew came when a sailor, eager for a souvenir, burned his hands on a hot part of the plane. Of the twenty aircraft that had reached the battle line, only six got through to the carriers, and they did no damage. After the utter failure of this attack, Americans listening in to enemy radio transmissions overhead:

the Japanese . . . direct the raids to approach on course 300. This would allow them to reach the carriers without first running the gauntlet of fire sent up by the ships of TG 58.7 [the battleships].34

The last two raids did avoid the battle line, but they were so disorganized and cut up by Hellcat fighters that they scored no hits either.35

Although the antiaircraft performance of the fast battleships at the Philippine Sea was everything that their proponents had hoped for, the establishment of a separate formation to face air attack was never tried again. Henceforth, the battleships stuck close by the carriers, and the Navy worked out new dispositions to take advantage of the antiaircraft firepower of the armored ships. King's office finally gave as much attention to antiaircraft tactics as it did to antisubmarine matters in fleet publications. To obtain reliable data, an elaborate form
for submitting information on aircraft attacks was distributed to all ships, although it cautioned: "a) REPEL ATTACK FIRST--then collect data for this report." The great importance that the antiaircraft role had assumed was emphasized in April 1945 when an aviator reported as Admiral Lee's gunnery officer.

However, the battleship's job became increasingly difficult as the Japanese largely abandoned conventional daytime attacks for night operations and kamikaze missions. The latter, pushed through with fanatical courage, were very hard to defeat, especially since the attacking planes would often appear without warning from the clouds in a high angle dive. These new tactics revealed certain gaps in American antiaircraft equipment. For instance, there was no high angle radar to search the skies directly overhead. As a result, the captain of the Alabama stationed lookouts on their backs to cover this zone. In addition, the top limit of the fire control computers was 250 knots, and as Japanese planes exceeded that speed, antiaircraft bursts lagged behind. Battleship officers reported that their calculators were so slow that up to twenty-three seconds would elapse between the first sighting and the opening of fire. Officers on the Washington complained that much of the huge antiaircraft firepower of their ship was wasted by the inability to "get on" enemy planes quickly. The "Action Report" of the South Dakota sarcastically remarked:
Considering the present state of development of our radar-controlled antiaircraft gunfire, it would seem that the safest and most effective course of action for an enemy snooper being chased by one of our night fighters would be to close the Task Group within gun range! This done, the night fighter would be broken off, and the prospective target ships could be located by tracers emanating from them.38

The need to respond quickly to aircraft attack brought heightened concern about shooting down friendly airplanes. Accidents of this sort happened with distressing frequency, even in broad daylight. There was a radar identification device (IFF), but it was prone to failure. The Wisconsin noted:

If our single planes are absolutely forbidden to approach the formation except when so instructed, it is felt that the number of successful suicide attacks will be substantially reduced. Too much time is wasted making certain that we do not shoot down a friend, not to mention the strain on the nerves of all hands.39

In the same vein, sailors were constantly worried about hitting other ships in their task group with antiaircraft shells. In April 1945, the North Carolina was struck in a director by a 5-inch shell that killed three men and wounded forty-four. The same month, the Missouri accidently fired a fusillade of 5-inch, 40mm and 20mm projectiles into the destroyer McDermut. Some officers felt that such accidents during a heavy attack were virtually inevitable, but the commander of the Alabama maintained that improved formations would greatly lessen the difficulty. Some accidents almost appeared to be acts of
fate. For instance, in firing at a high altitude snooper (at 25,000 feet), the Alaska shot 5-inch shells that failed to explode and fell back into the destroyer Hailey. Perhaps the most unusual antiaircraft accident occurred in February 1944 when one of the Alabama's 5-inch mounts that was tracking a plane fired directly into another. Five men died and another eleven were injured.40

Difficulties with the antiaircraft situation were compounded by the lack of action for long periods of time. The Indiana fired at just one Japanese plane between June 1944 and March 1945. The Wisconsin operated for four months in the combat area before it engaged an enemy aircraft. Thus, fire discipline was a natural problem. Officers of the Wisconsin admitted that their men shot at Japanese planes that were not in a clear sector or that were tumbling out of control.41

Given these circumstances, the battleships had an increasingly difficult time guarding their charges. On October 24, 1944, the light carrier Princeton, part of a task group of four carriers escorted by the Massachusetts and South Dakota, was bombed and sunk by a single Japanese plane. Over the next month, the New Jersey had the bizarre experience of winging planes on two occasions and seeing them nonetheless manage to crash the same carrier, the Intrepid. In 1945, five large carriers accompanied by fast battleships were damaged by air attack, often with hundreds of casualties. The fast battleships
themselves were relatively immune to this carnage. Only one, the Missouri, was hit by a kamikaze. The resulting fire was out in three minutes, and "the ship repaired the only damage with a paintbrush." The simple fact was that the Japanese had long been concentrating on the carriers, and the casualty figures showed it. The only men the Alabama lost during the ship's entire wartime career were the five killed in the turret accident. Similarly, the Indiana lost six men operationally but none to enemy action. The fast battleship longest in service, the North Carolina, had six killed and sixty-seven wounded.

Some carrier sailors were bitterly resentful of this situation. One staff officer on the Lexington made no attempt to hide his envy of the security that battleship personnel enjoyed. When the Iowa and New Jersey first joined the fleet, the cocky attitude of their smartly dressed officers especially irritated carrier veterans. Admiral Frederick Sherman, in his rumpled khakis, cuttingly remarked: "I don't care whether or not you can shoot your 16-inch guns, but you'd better know how to use your antiaircraft batteries!" And many of the aviators felt that the battleships were not carrying their weight in this all-important area. One lieutenant who served on both types of ships noticed that "in combat conditions, when griping was the rule, there was plenty of complaint on the carriers that the idlers on the battlewagons were living the life of Riley, with no risk, and--worst of all--
Yet battleships did have some marked antiaircraft successes even late in the war. The Missouri, at sea for only a few months, fired on sixteen enemy aircraft off Okinawa. Of these, the ship downed five and assisted with six more. During the same campaign, the Massachusetts received full or partial credit for destroying six planes out of the eight fired upon. Scores like these were atypical; the usual average was closer to 33 percent. On occasion, the fire control equipment also proved fully adequate to the task at hand. In the Wisconsin's first contact with the enemy, the ship picked up all approaching Japanese planes with 5-inch directors at over 30,000 yards, and even used main battery equipment to track low flying aircraft at ranges up to 50,000 yards. The Missouri reported in February 1945:

As expected, the performance of the ordnance equipment left nothing to be desired. . . . It was a great boon to the morale of this ship to open fire for the first time against an enemy target and to splash the bandit with the first few bursts at a range of over 9,500 yards, at night.46

The more experienced men of the Iowa mastered the tricks of the trade and were especially careful about fire discipline. The "Action Report" of that ship concluded after one fight: "It is not necessary to shoot up our own side in order to shoot down Japs."47 To cut down on accidents and to increase the effectiveness of defenses
against enemy planes, battleship gunnery officers in early 1945 experimented with plans to co-ordinate the antiaircraft fire of an entire task group. 48

Over the course of the war, some battleships ran up respectable totals. For instance, the North Carolina was officially credited with twenty-four planes, the Massachusetts with eighteen, and the Alabama with twenty-two. All three ships assisted in the destruction of many more. Although these scores are not high in comparison with the kills by fighter planes, they were in most cases achieved in desperate, "last-ditch" circumstances. Precise tallies are not terribly meaningful in any event. Morison points out that it is very difficult to allot credit between ships' fire and carrier planes since duplications and uncertainties were common. It is often harder to assign responsibility to a certain ship in the task group. As one naval officer noted: "When you back into a buzz saw, you can't tell which tooth hits you first." 49

It is certain, however, that the fast battleship's heavy antiaircraft armament gave a definite edge to those carriers protected by it, even late in the war. Officers on the New Jersey concluded after Okinawa:

In spite of continued attacks, enemy aircraft failed to effect more than minor damage to any ship while the U.S.S. New Jersey was in company. It is felt that this ship contributed in full measure to the excellent anti-aircraft results obtained. 50
It is instructive to note that the carrier most seriously damaged in 1945, the Franklin, was without heavy ship support when it was hit by bombs. Given the choice, Japanese pilots preferred to attack those carriers farthest from the battleships in a task group. Admiral Philip Vian, the commander of the British force off Japan, confessed after sending his two battleships, the King George V and Howe, on a bombardment mission: "I was not sufficiently alive to the effect on our defensive system which . . . the temporary absence of the radar sets and antiaircraft armament of the battleships [would have]. The Japanese were." They promptly hit two British carriers with kamikazes. Perhaps most indicative of the value of fast battleships as antiaircraft vessels is the fact that only one American carrier, the Princeton, was sunk while being escorted by them, whereas four large carriers (Lexington, Yorktown, Wasp, and Hornet) without battleship protection were lost to aerial attack.

Some carrier men were willing to give the battleships credit for their assistance. A junior officer on one of the Essex class ships doubtless echoed the feelings of many of his fellows upon hearing that the Washington and North Carolina were to reinforce his task group on a raid: "I like that news. I've got a feeling we're going to need every gun we can beg or borrow." Admiral Forrest Sherman, for years one of the greatest advocates of naval aviation, in June 1945 publicly praised the battleship for
its success in defending carriers against air attack.

Admiral Vian concluded that the British battleships gave "very powerful" support to his carriers. King's staff rendered a final accounting of the importance and accomplishments of the antiaircraft arm of the entire fleet:

Although considered a hopeless problem by many, antiaircraft efficiency drove the enemy to new and more desperate tactics culminating in the suicide attack. The fluidity of the air weapon in changing tactics was clearly demonstrated as was the necessity for forward thinking on the part of our defense. During the war some 7,600 enemy aircraft broke through to within gun range and of these over 2,600 were destroyed by antiaircraft fire. 53

The twelve capital ships destroyed their share of these. It is safe to attribute to the ten battleships a minimum of 150 planes brought down with many more "assists." The actual number might be considerably higher. When considering the overall record, the fast battleship certainly contributed substantially to the survival of the carrier Enterprise on two critical occasions. If later actions did not see as many planes downed as in 1942, the battleships had fewer and more difficult targets to aim for. Certainly they did a creditable job in what was an unintended role.
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CHAPTER VIII
ATLANTIC OPERATIONS

Despite the usefulness of the battleship as a bombardment or antiaircraft vessel, ship-to-ship combat was the raison d'etre of the type. Surprisingly, the first assignment for the fast battleship in this role was in the Atlantic, an ocean of very secondary interest to Navy planners since 1919. It was doubly ironic, then, that the main battery ordnance of the modern battleship got its first test against French ships in an African port.

The debut provoked immediate controversy, but after careful examination, the basic gunnery arrangements proved sound. This was fortunate because the 16-inch equipment simply could not undergo the hasty modifications made to the antiaircraft armament. In fact, the big guns aboard the fast battleships performed satisfactorily throughout the war.

Although turret accidents were not unknown in the older ships, the only such incident aboard a modern ship occurred almost at the end of the war. During the Okinawa campaign, the South Dakota suffered a powder explosion in the 16-inch magazine of the second turret. The battleship's captain, Charles B. Momsen, took quiet action in flooding the magazine and thereby saved the
ship. Momsen, an officer of considerable scientific ability, theorized that the explosion was caused by the static electricity generated when crew members slid the silk-encased powder charges into their steel containers. The Bureau of Ordnance was skeptical of this explanation, but a month of testing proved Momsen correct. Appropriate changes were made in the ammunition handling facilities.¹

Surface fire control gear went through the war with almost as few alterations. Even before Pearl Harbor, these systems were almost completely automatic, and with some modification, they gave good service in combat. The great new gunnery development, of course, was radar, although many ordnance officers were reluctant to experiment with it at first since the reliable and expensive optical equipment were operating satisfactorily. As the Bureau of Ordnance historians explained the situation:

Thus, despite all its promise, radar was a stepchild slow to win affection. [It] was the familiar dilemma of the inexperienced man who wants to get a job to gain experience.²

Nonetheless, the new battleships mounted fire control radar as standard equipment. In August 1942, the Indiana received an improved set (Mark 8), which remained the main battery radar aboard capital ships until 1945. This piece of electronic equipment was to give American battleships their main edge against their opponents.³

For a time, it seemed as if American battleships might see their first action in the Atlantic before war
was actually declared. The sortie of the *Bismarck* in May 1941 made a powerful impression on top government officials. Roosevelt himself worried that the German battleship might try to take possession of French Martinique in the Caribbean, and he considered the use of American naval forces to prevent this. Although the British solved the problem by sinking the *Bismarck*, the extraordinary strengths of that vessel caused Anglo-American planners to view the completion of the ship's sister, the *Tirpitz*, with anxiety. In August 1941, when the British began contemplating the reinforcement of their Far Eastern fleet with modern battleships, the First Sea Lord, Dudley Pound, argued that the threat of the *Tirpitz* required the stationing of the three new British battleships in home waters unless the United States would "provide a sufficiently strong striking force of modern battleships capable of engaging the *Tirpitz* and be prepared to allow one of their ships to replace one of our *King George V* class if damaged."^4

Admiral Harold Stark, then Chief of Naval Operations, agreed that the German menace was great enough to justify the reinforcement of the three old battleships in the Atlantic, since the *New York*, *Texas*, and *Arkansas* would have been sacrificial lambs before the *Tirpitz*. He wrote to Roosevelt on September 18:

> Whatever we do, I am anxious that our first real shooting contact with the enemy be successful.
Particularly would I like to get the Tirpitz, if opportunity comes our way. Each victory would breed confidence and be a wonderful stimulent.5

The President concurred. However, the disasters of December, which included the disabling of two British battleships in the Mediterranean, required fresh Allied capital ship distributions. The United States Navy made plans to rush the North Carolina and Washington, the only new battleships in commission, to the Pacific. But early in 1942, Churchill asked Roosevelt to send them instead to Scapa Flow to reinforce the Home Fleet during the spring. This would enable the British to seize Madagascar, which was threatened by Japanese forces operating in the Indian Ocean. The Allies very much needed a strong capital ship force in the North Atlantic at that point, for the Tirpitz and the big cruisers Scheer and Hipper were operational, and the Scharnhorst, Gneisenau, and Prinz Eugen appeared ready to join them after the dash through the English Channel. On March 11, the Tirpitz actually sailed from its Norwegian base, and even though the battleship quickly turned back, the incident convinced Admiral Ernest J. King to accede to the British request. He ordered the commander of the Atlantic Fleet, Admiral Royal E. Ingersoll, to ready the two new American battleships for service with the Home Fleet.6

At the last minute, King decided to retain the North Carolina in the western Atlantic to have one modern
battleship on Ingersoll's station. Accordingly, the Washington became the flagship of Admiral John W. Wilcox, Jr., commanding Task Force 39, which included two cruisers and the carrier Wasp. On the passage across, Wilcox was lost overboard. The incident has been a minor mystery ever since. Samuel Eliot Morison attributed his death to accident, but some officers thought suicide the probable cause. Wilcox had been extremely nervous at planning conferences, and during the voyage, he would slip away to stand all alone at night in the lightlock of the navigation bridge. Other officers suspected that "the hard-bitten old sun-downer" had been pushed over the rail. Despite an extensive search that cost an airplane and its crew, no trace of him was found, and Admiral Robert C. ("Ike") Giffen took over his command.  

The British welcomed the American ships with open arms. The previous December there had been considerable animosity between the crew of the Washington and English sailors aboard the battleship Resolution, then being repaired in Philadelphia. Fights had broken out when the British snickered at the white glove inspections aboard the American battleship. Now, King George VI reviewed the American vessels and publicly pronounced himself "deeply impressed by the smart and efficient appearance of the ships and ships' companies. ..." More impressive to Royal Navy personnel was the performance of the Washington
in exercises. When Admiral Sir John Tovey, the commander of the Home Fleet, pulled a surprise gunnery practice, the Washington did much better than the Duke of York in both main battery and antiaircraft shooting.\footnote{9}

In fact, the officers and men of the Washington were confident of their abilities and eager to get into action with the Tirpitz. They had worked especially hard on obtaining early hits at long range because the Bismarck had sunk the Hood before that ship had fired five salvos. However, the Germans were satisfied to play a waiting game. As a Kriegsmarine spokesman pointed out to Hitler, one strategic function of the Tirpitz was to tie down enemy ships in the Atlantic so they could not operate elsewhere. This the German battleship was doing admirably by staying in its Norwegian fjord and making threatening gestures on occasion. Consequently, the Washington's tour was one of frustration, compounded by an accident on May 1 when the King George V ran over the escorting destroyer Punjabi. As the British vessel sank, its depth charges went off under the Washington, which was following the British flagship. At first, damage seemed serious, but a thorough survey showed the hull to be sound. However, the shock of the blast deranged fire control instruments and several radar sets. Some officers worried that the effects of an actual torpedo or mine explosion would cause very severe equipment casualties.\footnote{10}
Despite the lack of action, Churchill angled in April for the **North Carolina** to come to Scapa Flow as well, and he pressed Harry Hopkins and General George C. Marshall hard on the issue. But in the face of the threatening situation in the Pacific, American planners wanted to bring the **Washington** home as quickly as possible. Many officers resented the whole situation; one called the deployment of the **Washington** in the eastern Atlantic "sacrificial." Admiral Jonas H. Ingram complained:

I note by the press that Ike [Giffen] over in Scapa Flow says he commands the fighting part of the American Navy. All the Huns have to do is to tie the **Tirpitz** up to a tree in Norway and allow all her crew to go on extended leave; she will still contain most all of the British Navy and likewise Ike's force.\(^{11}\)

By the middle of May, the decision was reached to withdraw the **Washington**, but Churchill managed to win an extension from Roosevelt to the middle of July when the **King George V** would be ready for service again.\(^{12}\)

Before the **Washington** sailed, however, it was peripherally involved in one of the naval tragedies of the war. As part of a force under Admiral Tovey's orders, the battleship helped provide distant cover in early July for Russia-bound convoy PQ 17. But when the **Tirpitz** ventured forth, the heavy ships were 230 miles from the convoy and further still from the German vessel, "and so beyond the possibility of protecting the one or handling the other."\(^{13}\) The **Tirpitz** never made contact, but the convoy was scattered at its approach, and twenty-three of the thirty-six
merchantmen were lost to aircraft and submarines. Church- 
hill later intimated that the Admiralty's cautious hand- 
ling of the situation was due to the presence of a sub-
stantial American force operating under British orders for 
the first time. Investigations by the Royal Navy found no 
evidence whatsoever to support this allegation. In any 
event, the PQ 17 incident had unfavorable repercussions in 
the United States Navy. King believed that the British had 
botted the job, and henceforth he looked on joint opera-
tions unfavorably.  

The next Atlantic operation gave American battleship 
sailors plenty of action. Under the command of "Ike" 
Giffen, the new Massachusetts sailed on its shakedown cruise 
as part of the covering force for the invasion of French 
North Africa. Its assigned tasks were formidable. The 
battleship was to assist the landings at Casablanca by 
neutralizing the strong shore batteries and, more impor-
tant, the French naval vessels in the harbor. The most 
powerful of these was the battleship Jean Bart, which had 
escaped in an incomplete state from the advancing German 
troops during June 1940. The ship had never been finished 
and in November 1942 was lying immobile alongside a quay 
with only its forward quadruple 15-inch gun turret oper-
atational. In addition to seeing that this ship did not 
interfere with the landings, Giffen had orders to guard 
against an appearance by the Jean Bart's finished sister
Shortly after dawn on November 8, the Massachusetts opened fire for the first time with its antiaircraft weapons when a group of French planes approached the task force. The gun flashes were spotted ashore, and both shore batteries and the Jean Bart joined the action. A few minutes later, the Massachusetts became the first American battleship to fire 16-inch guns in combat. (The ship also fired the last 16-inch shells of the war against the Japanese.) In the ensuing fight, the Massachusetts was straddled several times by the Jean Bart and took one French shell right through its commissioning pennant. Despite the dangerous accuracy of the French fire, the top officers directed the battle from the flying bridge as Thomas Gatch had done on the South Dakota with nearly fatal results at Santa Cruz just two weeks earlier. Fortunately, the Massachusetts quickly got on the target. Firing from a range of 29,000 yards, the Massachusetts scored five hits on the French battleship. Two of these shells exploded inside the ship, doing very considerable damage. One met insufficient resistance to detonate its fuse, and the final two hit heavy armor with glancing blows and failed to explode. Surprisingly, one of the last shells put the Jean Bart out of the fight. Although the projectile ricocheted off the barbette of the Jean Bart's forward turret, the force of the blow jammed the quadruple mount
for eight hours. The French crew managed to repair the
damage, but they cannily left the guns quiet and in the
same position until the Massachusetts left the scene.
They then opened fire once more and had to be silenced by
air strikes.  

While this action between the Massachusetts and Jean
Bart was going on, one French light cruiser and seven
destroyers took the opportunity to escape from the harbor
to attack the American landing craft. Although the French
were uncertain as to the nationality of their opponents,
they gave a good account of themselves. They almost reached
the amphibious vessels when the covering force came to the
rescue. The engagement following was very confused, with
the French ships twisting and turning. The big American
vessels, firing at a range of eleven miles, found it dif-
ficult to hit them. "Hurling 8-inch and 16-inch ammuni-
tion at these nimble-footed light craft was a bit like
trying to hit a grasshopper with a rock."  

However, the Massachusetts did find the range on the destroyer Fougueux,
which blew up and sank. The battleship also put a shell
into the engine room of the light cruiser Primauguet.
Morison believes that the battleship might have had a
hand as well in sinking the Boulonnais. In addition, the
French later credited the Massachusetts with hits on the
destroyers Albatros and Milan, which caused the latter ship
to beach itself. The action was not totally one-sided.
A French submarine fired four torpedoes at the
Massachusetts, but the battleship's captain skillfully combed the tracks. It had been a close call, for one torpedo passed fifteen feet from the starboard side. In addition, the shore batteries joined the melee and made one hit forward on the battleship. The shell exploded in an empty compartment and did no significant damage. The Massachusetts replied with an accurate fire that failed to achieve important results due to the lack of suitable HE ammunition.18

The ammunition situation was serious in another respect. After three hours of fighting, the Massachusetts had expended over 700 16-inch rounds, close to 70 percent of the ship's supply. Since the Richelieu might still sail from Dakar to try to interfere with the landing, the Massachusetts was taking quite a risk:

The American ships were lavish [in their ammunition expenditure], considering that they had no place to replenish their magazines that side of Hampton Roads. If the dreaded Dakar fleet had turned up next day, it is questionable whether the Covering Group would have had enough shells to defeat them.19

Fortunately, the Richelieu stayed in port, and the Massachusetts husbanded the remainder of its ammunition, except for ten minutes of firing in the afternoon.

There were other criticisms of the performance of the Massachusetts. The ship's equipment had failed the test in some cases. For example, all of the fire control radars were knocked out by shock. The ventilating system of the 16-inch magazines was not strong enough to draw
out all the ether and alcohol fumes. The "Action Reports" mentioned that:

During several of the lulls . . . some of the men laid down on the deck and went to sleep. It was difficult in some instances to awaken them. Apparently they had breathed sufficient ether to partially anesthetize themselves.²⁰

More important, there were charges that the 16-inch projectiles had been faulty. Some officers felt that the small craters and large shell fragments found around the French shore batteries showed that the shells had "low order detonations." The first analysts on the scene were even more distressed by the number of shells that had failed to explode at all. Particularly impressive were two of the huge projectiles flanking the French admiral as he received American officers for truce negotiations. One of these, unrecognizable after a French polishing, was the very shell that had put the Jean Bart's forward turret out of action before ricocheting down a Casablanca street. The result was a cause celebre. Demands for a full scale investigation came from many quarters, including the President himself. Sailors sang: "Praise the Lord and damn the ammunition." Years later, official naval historians were to write that "many" of the 16-inch AP shells fired at Casablanca had been duds.²¹

Actually, the extensive inquiry, which received complete French co-operation, but a different face on the matter. True the AP shells had not caused much damage in the shore bombardment, but this was only to be expected.
The shells that hit the Jean Bart performed normally; three of the five that failed to explode aboard the French ship either hit at very acute angles or passed through armor too thin to detonate their fuses. Overall, the Bureau of Ordnance was able to report that less than 10 percent of the 16-inch shells had been duds, a figure actually lower than anticipated.22

Other criticisms of the battleship's performance were more specious. One admiral, surveying the harbor littered with sunken hulks, including three vessels wrecked by 16-inch shells intended for the Jean Bart, observed that he "earnestly wished the Massachusetts had stayed home."23 The battleship's commander, Captain F.E.M. Whit­
ing, complained in his action report:

[The Massachusetts] was never designed as an off­
ensive unit to be used against submarines and destroyers, . . . and should not be used as such.
As a general principle the Massachusetts should close anything her size or larger and keep out of torpedo range of vessels which are or may be so armed.24

But it could be argued that the audacious handling of the Massachusetts provided the American force with one of its greatest advantages over the French defenders. The Massachusetts used its powerful main battery at the only critical moment of the entire landing to drive the French light vessels away from the amphibious forces. In regard to the ammunition question, some officers felt that the Massachusetts was fully justified in its liberal use of projectiles in order to get a quick decision, especially
important in this particular situation. Perhaps the results justified the risk. As Morison wrote of the Jean Bart action: "Thus, one of the primary defense of Casablanca, whose guns at extreme range might have been able to reach the transport area off Fedhala, was eliminated in sixteen minutes."25 And considering the fact that the Massachusetts was a very green ship testing a great variety of equipment in action for the first time, the Navy had much to be proud of. Except for the trouble with the ventilating arrangements (which had been foreseen and was not that serious anyway), the 16-inch turrets performed flawlessly. The battleship kept up a steady fire for over three hours without a hitch. The crew matched the excellence of the equipment. Of the 2,316 officers and men, only three were in sick bay during the battle. The personnel manning the turrets showed exceptional endurance in the tiring job of feeding 16-inch shells to the big guns for hours on end.26

The day after the landings (November 9), the Massachusetts left for home. This was not the end of Atlantic operations for American fast battleships, however. In December, Admiral Ingersoll organized a new task force centered around the Alabama, fresh from the builders, and the South Dakota, back stateside for battle damage repairs. The primary duty of the battleships was to counter any German raids by heavy ships into the North
Atlantic. With the American build-up in England for the Normandy invasion, there was a continuous stream of top-priority convoys to tempt the Germans out. Usually the troopships were covered by the three floating antiques, the Texas, New York, and Arkansas, but these ships were subject to breakdowns. Consequently, the modern battleships had to fill in for them. The Alabama and South Dakota got their first alert in March 1943 when the Scharnhorst put to sea. The American battleships sailed "with all possible haste" to intercept, but as was so often the case, the German quickly returned to port. 27

In May, the American force shifted to Scapa Flow. Once again, the underlying reason was to allow the British to use some of their heavy ships elsewhere, this time in the invasion of Sicily. The Alabama and South Dakota relieved King George V and Howe in keeping watch over the Tirpitz, Scharnhorst, and Lutzow. The British were hospitable as ever. One officer aboard the Alabama remarked that the people on his ship were especially well entertained by the Anson's officers. Generally, these two ships operated together, and the South Dakota was paired with the Duke of York. The presence of the American battleships remained a closely guarded secret, and the British always referred to them in radio transmissions as the Courageous and Black Prince. The former name actually belonged to a carrier lost early in the war, and the latter to a cruiser still under construction. 28
On this occasion, the American battleships patrolled more aggressively than the Washington had done. They made two trips to Iceland and went as far as Bear Island well above Norway's North Cape. They also attempted to lure the Tirpitz out by feinting close to Norway with a fake convoy. Here, they broke radio silence and made smoke to attract the Germans' attention, but with no result. Hitler had ordered his ships to avoid risks, and their movements were circumscribed by fuel shortages. Some American officers suspected that the Germans were not likely to challenge them and felt that their assignment to the Atlantic was superfluous in view of British capital ship strength. Indeed, many crew members felt the same way, and the veteran South Dakota for the first time had problems with morale. When the American battleships left Scapa Flow on August 1, their bands played "Auld Lang Syne," but most sailors felt relieved to be headed for the Pacific. King still maintained a capital ship presence in the Atlantic with the Iowa and New Jersey, which were carrying out trials but available in case of emergency. However, in September, British midget submarines damaged the Tirpitz so severely that the ship was permanently crippled, and in December, the Duke of York sank the Scharnhorst. With that action, any lingering worries American planners had about German raiders evaporated.  

In the end, American fast battleships made a measurable contribution to the Allied victory in the European
theater. Part of the accomplishment, the protection of supply lines against German heavy ships, was purely passive, but nonetheless essential. By relieving British units, the American ships participated indirectly in the occupations of Madagascar and Sicily. The role of the Massachusetts at Casablanca was less subtle. Without the availability of a modern battleship, it is doubtful that the United States would have dared to assault directly this important base.
NOTES


Ibid., 373, 420, 422-23.


4 Harold R. Stark to FDR, Sept. 18, 1941, Series 1, Ernest J. King Papers, NHD.


6 Ibid., 338-39.


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*NDL, "Commander in Chief, Atlantic Fleet,"* vol. 1, part 2: 337-38.

11. Ibid., 342.

12. Ibid., 334, 343-44.

Sherwood, Roosevelt and Hopkins, 536, 540.


E.B. Potter and C.W. Nimitz, *The Great Sea War: The Story of Naval Action in World War II* (Englewood Cliffs, N.J.: Prentice-Hall, 1960), 90. (These authorities to the contrary, PQ 17 did not cause King to withdraw the Washington from the Atlantic. That decision had already been made in May.)


16. Ibid., 96-98.

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22 Ibid.


24 Action Report #007, Nov. 8, 1942, p. K-2, Massachusetts, NHD.


26 Ibid., 111-113.

Bureau of Ordnance to Adm. G.J. Rowcliff, Dec. 7, 1942, File 420.6, General Board, NHD.

28 Roskill, War at Sea, 2: 402.
Karig, Burton, and Freeland, Battle Report: The
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29 Ibid.
Chicago Daily Tribune, May 14, 1944, 11.

CHAPTER IX

SURFACE ACTION IN THE SOUTH PACIFIC

Fast battleships did not reach the Pacific in time to participate in the opening battles of the war with Japan. When they did arrive to take part in the Allied offensive at Guadalcanal, top officers at first used them cautiously. However, as circumstances grew desperate, they were thrown into action and proved instrumental in a decisive victory over the Japanese at Guadalcanal. But they accomplished little in the next year, and when Admiral Raymond Spruance, a battleship expert, came into command, he employed them in a way that lessened their surface warfare capabilities.

In the first half of 1942, Pacific commanders keenly felt the absence of strong surface support. At Midway, for instance, Admiral Raymond Spruance was reluctant to pursue his initial victory for fear of running across Japanese heavy ships at night. Some officer concluded that had fast battleships been available to Spruance, he could have turned the Japanese defeat into a rout. In fact, Spruance might well have encountered the entire Japanese battle line, including the Yamato, with problematical results.¹

When fast battleships did reach the South Pacific in the late summer, they suffered from bad luck and missed

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chances. On September 6, the South Dakota struck an uncharted coral pinnacle in Lahi Passage near Tongatabu. Hull damage was so extensive that the ship returned to Pearl Harbor. Repairs took a month, but while the ship lay in drydock, workers added the new antiaircraft guns that served so well at Santa Cruz. Nine days after the South Dakota's accident, a Japanese submarine (either I-15 or I-19) torpedoed the North Carolina on the port side twenty feet below the waterline. The weapon hit just ahead of the first turret, a particularly sensitive area, and tore a hole thirty-two feet long by eighteen feet high in the ship's side. Because a flash from the explosion entered the handling room of the forward turret, Captain George Fort ordered the magazine flooded. But the ship stood up well despite the damage; it maintained station in the formation, even during radical maneuvers at speeds of twenty-five knots. Damage control quickly corrected a 5.5 degree list. The battleship spent two days with the repair ship Vestal at Tongatabu before going on to Pearl Harbor for a definitive renovation that lasted over two months. The Bureau of Ships concluded: "We feel rather well satisfied at the performance which the North Carolina system gave."²

Some commanders, however, were less happy with the way the fast battleships were being employed. After the Eastern Solomons action, analysts concluded that an opportunity had been missed to force a surface action.
Officers on Admiral Ernest J. King's staff wrote in one of the tactical publications circulated in the fleet: "We must use our surface ships more boldly as opportunity warrants." Likewise, in considering the Santa Cruz battle, CNO planners again pointed out that had the American surface force been stronger, it would have found a valuable chance to attack.

Even before this last action, Admiral Chester W. Nimitz was determined to use his fast battleships more audaciously. His fleet was reinforced in September by the Washington, which had just passed through the Panama Canal with a false name on the stern to confuse any spies. The battleship arrived in time to replace the damaged North Carolina in the South Pacific. The Washington flew the flag of Admiral Willis A. Lee, who was to command the fast battleships in the Pacific until April 1945. Lee was a man of unquestioned ability. He applied his excellent theoretical knowledge of mathematics to ballistics and was an expert in all guns from pistols to 16-inchers. A crack shot, Lee had participated in the 1920 Olympics as part of the American rifle team. Electronics interested him as well, and according to Samuel Eliot Morison, a personal friend, "he knew more about radar than the radar operators." Although Lee got along well with his crews, he was a no-nonsense perfectionist. He often ordered gunnery practice under unusual conditions, such as firings with relief crews. Although type commander
for battleships for much of the war, he was no hidebound conservative. As director of fleet training in 1941, he had pushed for the carrier over the battlecruiser and for increased antiaircraft defense. Lee's reputation stood very high in the Navy, although he was virtually unknown to the general public. Battleship officers were unanimous in their praise of him, aviators admired him, as did officers who never even served in the same command with him. One of the last, Admiral Henry Eccles, said: "I always regarded Admiral Lee as the most unrecognized of high ranking naval officers."[^6]

On October 8, Lee got his first chance when Nimitz asked that the Washington be moved closer to the action around Guadalcanal. The Japanese Navy was very active in this area. On the thirteenth, the battleships Kongo and Haruna shelled the airfield on Guadalcanal, but when the Washington neared the island, the Japanese spotted the ship and hastily cancelled their nightly supply runs. However, there were dangers involved in being in such a forward position, for Japanese submarines actively patrolled the combat zone. On October 20, one torpedoed the Chester, a cruiser accompanying the Washington. A week later, the battleship itself had two narrow escapes, and Admiral William Halsey, the new commander in the South Pacific, pulled the Washington out of the area.[^7]

The Japanese took advantage of the situation and stepped up their attempts to drive the Americans off the
island. On November 13, a strong force centered around the battleships Hiei and Kirishima tried to bombard the airfield. Unfortunately, the Washington and the South Dakota were escorting the damaged Enterprise and could not intervene. American cruisers had to be used to counter the Japanese force, and although they did a superb job, severely damaging the Hiei, they paid heavily in casualties. Officers on the Washington "made bitter comment over using their own iron colossus as an antiaircraft cruiser," while the cruisers were doing a battleship's work. The next night, Japanese cruisers shelled American positions ashore, and the battleships were still too far away to come to the rescue. However, Halsey did move them within one hundred miles of Guadalcanal in hopes that the enemy might attempt an offensive for the third evening in a row. Lee spent Saturday, November 14, trying to avoid detection.

He soon learned that the Japanese had a major effort underway to drive the Americans off Guadalcanal altogether. Eleven transports headed for the island; so did a separate bombardment force of eleven destroyers, four cruisers, and the battleship Kirishima under Admiral N. Kondo. The situation was critical. In Washington, Roosevelt worried that Guadalcanal might have to be evacuated. Under Secretary of the Navy James Forrestal later wrote: "The tension that I felt at that time was matched only by the
tension that pervaded Washington the night before the landing in Normandy."^10 Halsey was in a tight spot. Many of his staffers argued that it was too risky to use the new battleships in this situation. As Halsey later put it:

[The idea] flouted one of the firmest doctrines of the Naval War College. The narrow, treacherous waters north of Guadalcanal are utterly unsuited for the maneuvering of capital ships, especially in darkness. The shade of Mahan must have turned ever paler.11

However, Halsey had no other force capable of stopping the Japanese: "Lee's ships were my only recourse, so I ordered them in."12 Lee received a directive that his objective was the enemy transports "plus targets encountered."13

Lee's force was very much a scratch team. The Washington and South Dakota had worked together for less than a week. The flagship had never been in action and had put in no main battery practice since leaving Scapa Flow in July. The South Dakota, of course, could boast of its record at Santa Cruz. Scars from that action were still visible on the forward turrets and on Captain Thomas Gatch, swathed in bandages, which hid a paralyzed left arm. Lee, arguing for Gatch's return to active duty, told the senior surgeon: "After all, I don't expect him to strangle Japs."14 To cheers from the South Dakota's crew, Gatch went back to the bridge. To escort the two battleships, Lee picked the four destroyers with the fullest oil tanks. Unfortunately, all four were from separate divisions and had never worked together. The operation was mounted in
such haste that Lee lacked the time to prepare an operation order and instead had to signal his plans visually. He placed his ships in a column with the two battleships following the four destroyers. The personnel of the latter vessels felt that they were being used as decoys, a charge the Naval War College later considered justified.  

Fortunately, the Japanese were laboring under their own disadvantages. Kondo's heavy ships carried in their ammunition hoists HC shells for shore bombardment. More serious, the Japanese had no radar fire control equipment, and as usual, they splintered their forces into numerous small groups. Thus, seven of the lumbering transports, unprotected by the battleships and cruisers, were sunk by American aircraft as they neared Guadalcanal. But Kondo's warships, Lee's main worry, escaped attack and came on unscathed. A major fleet battle was in the offing. As Lee neared the island, he overheard American torpedo boats on patrol radioing that they had just sighted two unidentified large warships. He quickly realized that his battleships were the object of the report. To establish his identity as soon as possible, he used his Annapolis nickname in a plain language broadcast: "Refer your big boss about Ching Lee; Chinese, catchee? Call off your boys!" The torpedo boats stayed out of the way.  

Shortly before midnight, the Washington spotted the Japanese on radar at 18,000 yards. Lee quietly said: "You may fire when you are ready." Despite the radar
advantage, early American salvos were largely ineffective, but they certainly surprised the Japanese. The South Dakota reported after the action:

At this instant [that the American ships opened fire] Japanese voice transmissions . . . became excited and very numerous. Some thirteen different stations were on this frequency at one time.19

In firing at Japanese cruisers, the after turret of Gatch's battleship blew both floatplanes overboard—and later received two miniature flags for the achievement. However, the Japanese got in the first solid blows by damaging all four American destroyers with either torpedoes or gunfire. The battleships, trying to avoid the wreckage of their escorts, became separated. The Washington detoured away from the main Japanese force, but the South Dakota, which had momentarily lost its radar because of a power failure, passed on the near side of the stricken destroyers. The Japanese quickly pinned the battleship with their searchlights. Thirty-four of the "Long Lance" torpedoes miraculously went astray, but their gunfire was considerably more accurate. The South Dakota was hit by forty-two 8-inch shells. Two of the latter struck the belt with little effect. Damage in the upper works was extensive, however, All but one of the radar sets was knocked out and the radar plotting room demolished. The stern 16-inch turret was hit and became difficult to train. Personnel casualties totaled ninety-eight, many
of them in the sky control station high on the pyramid
foremast, which caught fire. Gatch later said:

I'd been dying for a cigarette and now I
thought I could have one, so I drew my
lighter. One of the men shouted, 'Cap'n,
Sir! You'll give away our position!'
I just looked up at the flames near the
top of our mast and finished the smoke.20

To this point, everything had gone in favor of the
Japanese, but the Washington now entered the fray. Lee's
flagship picked the Kirishima as the fattest target on the
radar scope. With an expenditure of only seventy-five 16-
inch shells, the Washington hit the Japanese battleship
nine times. The secondary battery contributed about forty
5-inch hits. The Kirishima was seriously damaged. The
engines were crippled and the steering knocked out alto-
gether, so the big ship steamed in circles. Not surpris-
ingly, the accuracy of the Japanese gunfire fell off, and
the Washington escaped injury completely, although shells
from the Kirishima passed close overhead, sounding to
American sailors "just like a big train climbing a grade
on a snowy night, puff, puff, puff."21 This exchange
ended the battle. The Japanese force turned back without
completing its bombardment mission. The Kirishima, mor-
tally wounded, was scuttled before sunrise. Gatch, in
charge of a blind ship, had already headed south toward
safety. Lee decided to retire also when he saw the
Japanese turn back.22
The South Dakota spent six days at Noumea being patched up by the Prometheus and then sailed to New York for an overhaul that lasted from December 18 to February 23, 1943. The battleship made very good copy for the newspapers despite the fact that reporters had to call the vessel "Old Nameless" and "Battleship X." Gatch received a Gold Star to accompany the Navy Cross won at Santa Cruz. He modestly quoted Dumas during all the publicity: "It is degrading to be thanked for having done one's duty." On the other hand, the crew of the Washington felt that their thanks was hardly enough. No newspaper mentioned any "Battleship W." Even staff officers of the Naval War College initially overlooked the ship in their presentations. Consequently, there was some bad blood for a time between the two battleships, although thinking sailors on the South Dakota admitted that the Washington had not received a fair shake.

Actually, there should have been enough credit to go around. Lee's initial claims of one battleship, three cruisers, and one destroyer sunk, plus three more ships damaged exaggerated the damage done to the Japanese. The actual score was one battleship and one destroyer sunk and two cruisers damaged. The fact remained that the Washington was the first American vessel in two world wars to sink an enemy battleship. Analysts in the CNO's office noted that it had taken five minutes of shelling with
16-inch guns to mortally wound the Kirishima, whereas that ship's sister, the Hiei, had two days previously suffered for hours under cruiser shells, aircraft bombs, and torpedoes. Gatch pointed out later that the two American battleships inflicted the worst surface defeat in modern history on the Imperial Navy to that point.25

The action, soon dubbed the Battle of Guadalcanal, had immediate consequences. It saved the airfield and American troops from what would have been a devastating bombardment. The next morning, the Marine commander ashore radioed his thanks to Lee via Admiral Halsey. Even more significant, the American victory convinced the top Japanese commander, Admiral Isoroku Yamamoto, to evacuate Imperial forces from the island. Thus,

... the Battle of Guadalcanal was decisive, not only in the struggle for that island, but in the Pacific War at large. ... The conclusion of this great battle was marked by a definite shift of the Americans from the defensive to the offensive, and of the Japanese in the opposite direction.26

The action also went far to retrieve the prestige of the battleship. Forrestal praised the ships in the Army and Navy Journal for saving "... Guadalcanal and the many thousands of gallant Americans on that bloodily contested jungle. ..."27 Nimitz commented publicly: "The engagement justifies our faith in battleships."28 Halsey ecstatically wrote to Nimitz:

I think we proved in Lee's night action that the day of the battleship is far from a thing of the past. How are all the experts going to
comment now? They certainly inflicted terrific damage that night. The use we made of them defied all conventions: narrow waters, submarine menace, and destroyers at night. Despite that, the books, and the learned and ponderous words of the high brows it worked.29

Not all officers saw the triumph as complete. Admiral Forrest Sherman, an aviator, believed that the damage done by Lee's ships was not commensurate with their power. A staff officer at the Naval War College asked after the war why Lee had neither finished off the Kirishima nor gone after the remaining Japanese transports. Lee himself admitted in his action report that his ships were not superior to the Japanese in experience, skill, or training. The margin of superiority of the American task force was due almost entirely, he said, to radar. But, as many officers recognized, this was sufficient. Captain Glenn B. Davis of the Washington wrote to Admiral Nimitz:

Our radar is effective for accurate gunfire at long ranges at night.
We should seek rather than avoid night action, opening at ranges as great as satisfactory solutions can be obtained.30

Articles appeared in the U.S. Naval Institute Proceedings applauding the venturous employment of the battleships at Guadalcanal and calling for more of the same. Captain W.D. Puleston argued forcibly:

Battleships cannot be considered obsolete because they may be sunk... If our battleships are fought boldly they will suffer heavily, but... they will probably inflict more loss on the enemy than they receive, which is all that
is required of any ship. Battleships were designed to be fought, not to be preserved for naval museums. They too, are expendable. 

It is ironic, then, that Lee's ships did not fire a shot in over a year despite an increase in strength from four fast battleships in January 1943 to six in August. Indeed, the big ships spent much of 1943 riding at anchor at Noumea. To relieve the tedium, some sailors guzzled cheap champagne bootlegged from Australia. Others went ashore and hunted wild hogs in the woods. The ships were not totally inactive. In January, the North Carolina, Indiana, and Washington provided cover for transports bringing reinforcements to Guadalcanal. In May, the same three ships escorted the carriers Saratoga and HMS Victorious near New Caledonia. The battleships also served their traditional function of providing sea billets for upwardly mobile officers. Both King and the Bureau of Personnel required that all candidates for flag rank have a major ship command before promotion. Thus, Admiral Richmond Kelly Turner sought such a post for his chief of staff and "luckily" landed the Indiana. In fact, that battleship had three different commanding officers between January and August 1943. The situation on the Massachusetts was virtually identical.

But the main duty of the fast battleships was to guard against a reappearance of the Japanese main body, and this force, building its strength, stayed within the bastion
of Truk. American planners worried that this fleet might launch an offensive in an area far removed from the American capital ship concentration. For instance, Halsey in July protested that he needed battleship reinforcements in the South Pacific, but officers on the CINCPAC staff at Pearl Harbor were concerned that the Truk fleet might try a stab at Midway. The argument became heated in November when Japanese cruisers attempted to impede the invasion of Bougainville. Halsey asked Nimitz for fast battleships. The latter sent a division of cruisers and replied: "The use of our fast BBs in the waters off Empress Augusta Bay within range of enemy shore based air and probably concentration of enemy submarines without adequate targets is not considered justifiable." Halsey was not satisfied and sent a second message: "I strongly urge that Third Fleet be at once reinforced with fast battleships. . . ." When Nimitz made the same reply, Halsey asked for fast battleships a third time. He received three aircraft carriers. Nimitz was hoarding all available fast battleships for a more important operation: the invasion of the Gilberts on November 10. In command of the covering fleet was a bona fide member of the "Gun Club," Admiral Spruance, who was anxious to force a showdown with the Japanese battle line. However, Spruance deployed his battleships in a surprising fashion. Short of cruisers and destroyers, he decided to split the fast battleships among the carrier
task groups in order to provide both antiaircraft and surface support. In theory, the battle line would not be dissolved. Lee retained his position as Commander. Battleships, and his staff, who prepared signals and operations plans for the unit. If the Japanese challenged with their heavy ships, Lee would pull his battleships out of the carrier task groups and form up for surface action. However, as long as the battleships sailed with the carriers, they were under the tactical orders of the carrier group commander. This arrangement proved so successful from the standpoint of carrier warfare that it lasted until the end of the war. Halsey said:

Putting Ching Lee and Pete Mitscher [the carrier expert] together was the smartest thing the Navy ever did. You had the best surface tactics and the best air tactics the world has ever known.36

In some respects, this continued existence of the battle line on paper masked the fact that the aircraft carrier was definitely assuming the top spot in the Navy. Thus, King's staff could still include in the 1944 edition of the "War Instructions" the statement: "In a major action the character of the action between the opposing battle lines establishes the type of action and battle plans are usually based on the idea that the gun action between the opposing battle lines is the focus of the fight about which the contributing efforts of the other battle task groups center."37 And although carriers for
the first time received more attention than battleships, the COMINCH officers still devoted a great deal of space to the traditional gunnery showdown. The Naval War College was even more conservative. In July 1944, students there faced the identical problem, featuring a clash between slow battleships, that their counterparts had confronted in 1942.38

The blunt fact was that the permanent assignment of the battleships to the carrier task groups condemned them to growing rusty in their surface role. Since Lee's ships were split among the carriers, he had little opportunity to assemble his commanders for conferences. Some of his chief subordinates were virtual strangers to him. Worse, his ships had almost no chance to exercise as a unit. By March 1944, Spruance became quite concerned about the matter, and he tried to give Lee a chance to hold practice maneuvers. But the situation was insoluble. Henceforth, the battle line rarely sailed as a unit. One officer who served with the fleet for the last six months of the war saw the battle line in formation just one time.39

The night training of the battle line especially suffered. In contrast to the Japanese, the United States Navy had never been very proficient in nocturnal operations. Radar provided a partial equalizer, as the Washington had vividly demonstrated at Guadalcanal, but only practice could make the personnel comfortable with ship
handling in the darkness. And Lee's ships did not receive this practice. Spruance worried particularly about this, for the Japanese surface ships generally sought night battle. But in March 1944, when a Japanese challenge to Spruance's task force seemed imminent, an officer asked Lee how he would form the battle line in the event of a night attack. Lee replied: "Boy, the Jap fleet ain't intended to come out during this operation."\(^{40}\)

Much of the reluctance to develop night techniques was due to a very legitimate fear of accidents. Even station keeping in standard formations was difficult enough. For instance, in April 1945, the New Jersey collided almost head on with an escorting destroyer. Although damage to the battleship was negligible, the upper works of the destroyer were demolished and the ship's captain crushed on the bridge by the New Jersey's anchor. In February 1944, a more spectacular accident occurred when the Indiana missed a turn and was rammed by the Washington. The noise of the collision was heard for miles. The Indiana lost two hundred feet of plating, and the forecastle of the Washington was "crumpled like cardboard" for sixty feet behind the bow. The task force, of course, pressed on, leaving the two battleships dead in the water with only a couple of destroyers for escort. Although the battleships returned safely to base, both were out of the war for three months. (Incidentally, the accident cost the Indiana's captain his chance for flag rank.) Some officers
attributed the collision partially to the fact that both the previous commanding officer and his executive officer had been relieved simultaneously only a short time before. 41

In any case, the unreadiness of the battle line to function effectively in the dark was doubly unfortunate. For one thing, American fleet commanders were thereby deprived of their only strong weapon in a night battle, since carrier capabilities had not advanced to this level. The 16-inch artillery laid by radar should have given task force commanders a powerful alternative to daytime aircraft carrier operations. The potential was certainly there; the fact that it remained undeveloped cost the fast battleships on two occasions the chance to deal crushing blows to the Imperial Navy.
NOTES

1 Adm. Raymond Spruance to Cmdr. Sheldon Kinney, Apr. 4, 1955, Series 1, Spruance Papers, NWC.

2 Capt. E.L. Cochran to General Board, "Additional Underwater Protection," Nov. 16, 1942, Hearings, General Board, NHD.
   Action Report #0128, Sept. 15, 1942, p. 4, North Carolina, NHD.
   War Diary, North Carolina, NHD.
   War Diary, South Dakota, NHD.


6 Interview with Adm. Henry Eccles, Sept. 10, 1975, NWC.
Interview with Adm. Edwin Hooper, Nov. 26, 1974, NHD.


NHD, General Board Hearings, 1941, "Building Program, Combatant Ships, 1943," June 27, 1941, 374.

Bernard Brodie, "Our Ships Strike Back," The Virginia Quarterly Review, 21 (Spring 1945), 197.


11 Halsey and Bryan, Halsey's Story, 128.

12 Ibid., 129.


15 Cmdr. G.H. Bowdey, "Battle of Guadalcanal--Part II," May 1, 1946, pp. 10-11, 16-17, RG 14, NWC.

Fletcher Pratt, "Campaign for the Solomons, 3," 575.

16 Ibid., 273. (This famous signal has been recorded in a surprising number of variations.)


18 Fletcher Pratt, "Campaign for the Solomons, 3," 575.


Aviation Unit, *South Dakota*, "History of Aviation Unit, South Dakota," p. 2, NHD.


S.E. Morison, *US Navy in World War II*, 5: 270, 276, 281. (Morison was in an especially good position to record this battle, because he served in the *Washington* a few months after it occurred.)


23 *Chicago Daily Tribune*, May 13, 1944, 3.

24 *War Diary, South Dakota*, NHD.


25. Leeming, Brave Ships of World War II, 212.


29. Halsey to Nimitz, Nov. 29, 1942, William F. Halsey Papers, LC.


Karig and Purdon, Battle Report: Pacific War: Middle Phase, 190.


Action Report #0165, Nov. 15, 1942, p. 12, South Dakota, NHD.


Roskill, The War at Sea, 2: 415.
The Indianapolis Star, July 22, 1945, 1.


Ibid., 1822.

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Reynolds, Fast Carriers, 90, 93.
Spruance to E.B. Potter, Mar. 3, 1956, Series 1, Spruance Papers, NWC.
Ibid., Adm. E.W. Hanson to Spruance, Dec. 3, 1943.
Forrestel, Spruance, 74, 83.

38 Ibid.  
"Exercise in Developing Task Force Dispositions--Statement of Problem," #2370 (July 23, 1942) & #2468 (July 31, 1944), Publications Office Curriculum Files, Record Group 4, NWC.

Hoyt, Nimitz and His Admirals, 376–79.


41 Ibid., 336–37.  

Smith, Indiana, 12, 43, 50.
As the Japanese became more desperate in the closing stages of the Pacific war, they finally committed the bulk of their battle line to action. But on two separate occasions, top American commanders missed the chance for a battleship encounter. At the Philippine Sea, caution held the fast battleships back; at Leyte Gulf, impetuosity shuttled them between two enticing targets without concrete results. Consequently the ships played no significant part in the death knell of the Imperial Japanese Navy. Yet surprisingly, they soldiered on for many years after the fleet they were designed to combat had vanished utterly and after every other battleship had disappeared from the lists of the navies of the world.

Despite the fact that the fast battleships were an integral part of the carrier task groups by the end of 1943, they operated as a separate formation on several occasions during 1944 when fleet commanders anticipated a major clash with the Japanese. Thus, in the attack on Kavieng in January, Admiral Willis A. Lee's battle line provided "cover" from a distance of 150 miles for the carriers, which had deeply probed the Japanese defenses. Admiral Frederick Sherman, a carrier commander, found the arrangement irrational:
[Lee's] mission was to come to our support in case we got into trouble or if strong surface forces appeared on the scene. Located by Japanese search planes, Admiral Lee was concerned about having to take an attack without air cover. We, for our part, would have liked to have had his ships and their antiaircraft guns in our disposition in case we were attacked.1

The lesson took hold, for never again were the heavy ships separated at such a distance from the carriers.

A month later, Admiral Raymond Spruance himself took two of the fast battleships on a flamboyant run around the great Japanese "Gibraltar" of Truk. Admiral Chester Nimitz planned the attack on Truk, to provide cover for the landings at Eniwetok, but Spruance hoped that he would find the Japanese Combined Fleet there and thus force a decisive engagement. Unfortunately, American reconnaissance missions over the base alerted the Japanese, and their main body escaped before Spruance's arrival. However, a laggard training cruiser, two destroyers, and a trawler were still off the atoll as the American ships came over the horizon. To catch them, Spruance formed a task group centered around the New Jersey and Iowa, both of which had just arrived in the Pacific. Actually, the carrier planes could easily have disposed of the fleeing enemy vessels, but Spruance wanted to give the Japanese a solid slap in the face.2

The mission was certainly popular aboard the battleships. The "Action Report" of the New Jersey remarked: "Heavy enthusiasm was noticed when it was announced that
the ship would proceed around Truk Atoll to destroy enemy vessels. The first victim was the trawler Shonan Maru #15, which the 5-inch guns of the New Jersey blew to pieces. As the 45,000 ton battleships swept by the wreckage, the solitary survivor defiantly shook his fist. While the American cruisers sank the Japanese training cruiser, the battleships concentrated on the two destroyers. They mortally crippled the Maikaze and straddled the fleeing Nowaki from a range of 35,000 yards. To catch this destroyer, the Captain of the Iowa demanded more steam from his chief engineer, who replied "that he had plenty of steam, but no place to put it as the throttles were wide open." Even though the two battleships reached thirty-three knots, the Nowaki escaped. The mission was further tarnished when the Iowa shot down an American plane by mistake. However, with no more action in prospect, Spruance ordered all his ships to break out the largest American flag. "With that symbol of victory waving from the gaff, the ships fell into formation and proudly, exultingly, paraded around the atoll in full view of the battered enemy stronghold."

Four months later during the invasion of Saipan, Spruance again placed great reliance on his fast battleships to defeat the Japanese fleet, which had finally come out in force. His initial plan for this Battle of the Philippine Sea read:
Our air will first knock out enemy carriers as operating carriers, then will attack enemy battleships and cruisers to slow or disable them. TG 58.7 [Lee's ships] will destroy enemy fleet either by fleet action if the enemy elects to fight or by sinking slowed or crippled ships if enemy retreats. Action against the retreating enemy must be pushed vigorously by all hands to ensure complete destruction of his fleet.6

Spruance turned over the responsibility for making more detailed plans to his two chief subordinates, Lee and Admiral Marc Mitscher, the top carrier commander. The latter quickly calculated that if the Japanese kept advancing, the American fleet, by moving to meet them, might force a surface engagement at night. He radioed to Lee:

Do you desire night engagement? It may be that we can make air contact late this afternoon and attack tonight. Otherwise we should retire to the eastward for tonight. . . .7

Lee answered:

Do not repeat not believe we should seek night engagement. Possible advantage of radar more than offset by difficulties of communications and lack of fleet training in fleet tactics at night. Would press pursuit of damaged or fleeing enemy, however, at any time.8

Spruance agreed that "the chances inherent in night fighting would neutralize American superiority," and the matter was dropped.9 Mitscher and his staff were "most disappointed," as was the majority of Nimitz' officers at Pearl Harbor. Aboard Lee's ships, some officers expressed surprise at their commander's decision. The chief gunnery officer of the Iowa later wrote:

I recall being surprised that the stated reason for not sending the fast battleships to look for the Japs in the Philippine Sea battle was lack
of practice in night engagements. As far as my gunnery department was concerned, all our engagements, except for shore bombardments had been night shoots against Jap planes, and the main battery under full radar control couldn't have cared less whether it was day or night. I believe the other gunnery officers felt the same way.10

Lee's refusal of night action changed Spruance's plan of battle. He adopted a much more cautious approach and stayed close to the invasion fleet, thereby letting the Japanese get in the first strike. It was at this juncture that Mitscher pulled Lee's seven battleships out of the carrier task groups and placed them on the engaged side of the carriers. Although the heavy ships would act as an antiaircraft screen in this position, Mitscher hoped to concentrate the fleet's surface strength in case another chance arose to use the big guns of the fast battleships. Interestingly, the Japanese adopted a similar battle array.11

After the Japanese air strikes had been turned aside with crippling losses, Mitscher again proposed, directly to Spruance this time, that the battle line forge ahead and hit the enemy at dawn. Spruance turned down the suggestion on the grounds that the battleships would be without air support and that they could not catch the Japanese in any case. Only the following morning, with the Japanese in full retreat, did Spruance order Lee to advance with air cover from two carriers. However, Lee's destroyers were so low on oil that the battleships slowed to eleven knots for three hours to refuel the escorts. Since the
Japanese were three hundred miles in front of the American task groups and were making twenty knots, the "chase" proved futile.  

Some officers on the battleships viewed the employment of their vessels during the Philippine Sea engagement with frustration. The commander of the South Dakota, Captain R.S. Riggs, concluded:

In my opinion the time has come to regroup our task groups. Except on special occasions battleships should be grouped in a separate task group with battle-line carriers accompanying as a surface striking force. . . . This striking force, by use of its speed, might be advantageously positioned to oppose the enemy for their destruction, the carrier groups serving as 'beaters' to cripple and drive the quarry (enemy surface group) into the battleline area. It is believed that the task groups might be separated tactically in order to accomplish this. Battleships and cruisers, as they are now used, are even more so than submarines weapons of opportunity with which to engage the Japanese surface fleet. Too often air strikes will not cripple a major combatant ship sufficiently to enable the battleline to catch up with it. The Japanese must be forced into a fleet action by some such tactical method, or ruse, in order that their battleships and heavy cruisers can be brought into range and sunk by gunfire.  

Captain Riggs could not foresee that four months later the Japanese would offer a fleet action at Leyte Gulf, but that the fast battleships would miss the fight, this time due to the impulsiveness of the top commander, Admiral William Halsey. In planning for this last-ditch battle, Japanese officers staked their hopes on their five fastest battleships, including the Yamato and Musashi, under Admiral Takeo Kurita. This force would have no chance
of reaching the American transports unless Halsey's task force, which contained Lee's six battleships and Mitscher's carriers, could be lured away from its position outside the San Bernardino Strait. To accomplish this, the Japanese dangled their carriers, which lacked aviation components of any consequence, as bait to the north of Halsey. This force, commanded by Admiral Jisaburo Ozawa, included two old battleships, the Ise and Hyuga, with flight decks added aft. Ironically, at the beginning of the battle, Ozawa's efforts to attract Halsey's attention came to nothing at first, so that Kurita's unit had to fight off large air strikes from the American carriers. After taking at least thirteen torpedoes and sixteen bombs, the Musashi sank, and Kurita retreated. In case he turned around again, Halsey issued a preparatory order designating four of Lee's ships as Task Force 34 to "engage decisively at long ranges." The other two battleships were to go north with Halsey against Ozawa, who had been discovered by this time.

However, Halsey failed to implement this sensible plan. Instead, he took all his ships north, leaving not a destroyer to watch the straits despite the news that Kurita was back on his original course. In his own defense, Halsey later said that this concentration "preserved my fleet's integrity, it left the initiative with me, and it promised the greatest possibility of
surprise. These reasons are not very convincing. Halsey admitted that he regarded the Japanese carriers as his primary opponent. To have left Lee's ships off the San Bernardino Strait, he would have had to provide them with air cover and thereby weaken his striking force, something he was loath to do.

Most of the officers in Halsey's task force were taken aback by his decision. Mitscher's chief of staff, Commodore Arleigh Burke, proposed suggesting to Halsey that four of Lee's battleships be detached to guard the strait, but Mitscher refused to forward the plan since Halsey had not asked for advice. On the Iowa, top officers, including Admiral Oscar Badger, "were unanimous in believing that a major error had been made." Lee was dismayed. His flag lieutenant later remembered:

We thought we could clean them up. . . . Lee . . . wanted to take his battleships and stand up and down in front of the straits. Lee's sole purpose was to take on the Jap fleet. It was the chance of a lifetime for the battleships.

Lee was even willing to forego air support if necessary.

He felt so strongly that he sent his unsolicited views to Halsey, whose only reply was "Roger." Lee tried again when more information about Kurita's eastward course was received, but to no avail. At Pearl Harbor, Admiral Spruance, listening to the reports coming in, placed his hand on the chart just east of San Bernardino Strait, and said quietly: "If I were there, I would keep my force right there."
Unfortunately, Halsey did not make especially good time in approaching Ozawa, since the movement occurred at night. He further delayed his fleet when he ordered Lee very early in the morning to form the battle line ten miles ahead of the carriers. This entailed pulling the battleships out of formation in total darkness, and Lee insisted that his ships slow to fifteen knots until the maneuver was completed. His chief of staff, Commodore Tom Jeter, protested: "Admiral, what are you trying to do? We've got to get the ships together." But Lee insisted that higher speeds would be too dangerous. Due to these delays, "the next morning [American sailors] woke to a cloudless sky, a bright blue sea and gentle breezes, steaming North at 20 knots with battle flags flying," but with Ozawa still over the horizon.

Halsey soon received word that Kurita's heavy ships were assaulting the American light forces covering the approaches to Leyte Gulf. But with the Japanese carriers only a short distance away, Halsey ignored the requests from the south for Lee's battle line. Finally, a needling query from Nimitz as to the whereabouts of the fast battleships convinced Halsey to turn back. "It almost broke Halsey's heart to pull out TF 34 just as the battleships were on the point of reaching good gunfire targets." In fact, Lee's vessels were only forty-two miles from Ozawa's force. Typically, Halsey took all six
battleships south, despite the fact that two would have allowed Mitscher to finish the *Ise* and *Hyuga*. Ozawa was informed of this action, and he sent these two ships to hunt American light forces. Happily, they made no contact.²³

Had Halsey turned back when the first alarms from south reached him, he would have caught Kurita's battleships on their withdrawal. As it was, his "run" south was not especially hurried. The battleships slowed to twelve knots for two and a half hours to fuel destroyers. Finally, Halsey took two ships, the *Iowa* and *New Jersey*, and forged ahead at twenty-eight knots. Even these, the fastest battleships in history, could not make up the lost time. They arrived three hours after Kurita had slipped back through the strait, which was just as well since they would have been seriously outgunned by the four Japanese battleships.²⁴

Although the Japanese had taken a severe beating at the Battle of Leyte Gulf, six of their most powerful battleships (including the *Ise* and *Hyuga*) escaped. Officers at many levels felt that the overwhelming American force, especially the battle line, had been mishandled. Admiral Thomas Kinkaid, the commander of the invasion forces that Halsey had left to fend for themselves, later noted angrily:

*The net result . . . was that the six strongest battleships in the world--except for the *Yamato*
and Musashi—steamed about 300 miles north and 300 miles south during the greatest naval battle of the Second World War and the largest engagement ever fought upon the high seas—and they did not fire a single shot. I can well imagine the feelings of my classmate, Lee.  

In Washington, King was livid about Halsey's failure to bring Lee's vessels into action. A few days after the battle, he wrote:

I regret that the fast battleships were not left in the vicinity of Samar when TF 38 started after the striking force reported to be in the north end of the Philippine Sea. . . . That the San Bernardino detachment of the Japanese Fleet . . . did not completely destroy all of the escort carriers and their accompanying screen is nothing short of a special dispensation from the Lord Almighty.

In the fleet, the Massachusetts reported laconically of Leyte Gulf: "There was no damage incurred by this vessel from enemy action and none inflicted on enemy forces by this vessel." Many battleships did not bother to submit action reports at all. Admiral E.W. Hanson, the Commander of BATDIV 9 pointed out to Nimitz:

Enemy cruisers and battleships do not become disabled by two or three torpedo hits unless they hit vital spots such as machinery spaces or propellers. . . . This does not detract from the potency of air, but it is a fact and one that must be appreciated. On the other hand, our own surface vessels made short work of the enemy fleet attempting to enter southern Leyte Gulf and we sustained very little damage in this action. It would therefore seem that, whenever possible, use should be made of our armored ships to sink enemy armored ships.  

The continued existence of the Japanese battleships remained an irritant to American commanders for some time to come. Planners worried that the enemy heavy ships might
try to interfere with Allied supply lines. Halsey was almost obsessed with the Ise and Hyuga, which had so narrowly escaped him. In January, he sent the New Jersey and Wisconsin with three carriers to the Indo-China coast to catch them, but the vessels were out of reach at Singapore. When Spruance reassumed command of the fleet, he inherited this concern. At both Iowa Jima and Okinawa, he had to prepare for a possible surface action, and partly for this reason, he took the North Carolina and Washington away from their bombardment mission at Iowa Jima. Finally on April 6 at Okinawa, the Yamato did appear, but alone because of the Japanese fuel situation. Although Spruance hoped that his battleships would get the chance to sink the pride of the Imperial Navy, 386 of Mitscher's aircraft got to the Yamato first. 29

This action was symptomatic of the triumph of air power in sea warfare, which was mirrored in the changing organization within the American fleet. In late November 1944, King gave his approval to the dissolution of the post of Commander, Battleships, Pacific Fleet, effective December 15. The battleships were split into two squadrons according to function. The First Squadron was made up of the old battleships, the specialists in amphibious support; the Second Squadron, with Lee as commander, comprised the fast battleships. In May 1945, Lee went back to the United States for the first time since 1942 with the assignment of finding ways to combat kamikazes.
Although he insisted he would return to his beloved battleships, he died of a heart attack in August. His place in the Pacific was taken by Admiral John F. Shafroth, an officer who had not seen much sea duty during the war, but who was a protege of King. The assignment caused one unhappy officer "to utter Gilbert and Sullivan's line: 'Just stay at your desk and never go to sea, and you will be the ruler of the King's Navee'—Ernie's of course."30

Despite the organizational demotion of the battleship, the strength of the battle line was at its zenith. The 45,000 ton Missouri and Wisconsin arrived at the end of 1944, and the battlecruisers Alaska and Guam early in 1945. These ships were promptly integrated into the carrier task groups and took part in the routine bombardment and antiaircraft missions in the waters south of Japan. However, in July the two battlecruisers were turned loose without air support on an anti-shipping sweep to the China coast. They came within sixty miles of Shanghai, but direct results were meager. Although several small coastal ships fell victim to the battlecruisers' escorts, the only action for the gunners of the Alaska came in firing 5-inch shells at a Japanese patrol plane.31

The battle line had a piece of unwanted excitement on June 5 when Halsey's ships were struck by Hurricane "Viper." In December of 1944, the fleet had undergone a similar trial, and the battleships had been the only
vessels able to maintain formation. This June storm was especially severe, and even the battleships had a hard time. Water coming over the forecastle of the Indiana reached the top of the second turret on occasion. The battleship lost an engine and steering control briefly. The Massachusetts passed through the eye of the storm. Visibility suddenly increased from a few hundred feet to five miles with a patch of blue sky overhead. The seas, however, were mountainous and very confused, yet the ship suffered only minor damage.32

Despite the eclipse of the battleship by the carrier, the ships received one final spot in the limelight. For the surrender ceremonies, top officers picked battleships to fly their flags. Thus, Halsey steamed into Tokyo Bay in the Iowa, and Nimitz made the South Dakota his headquarters. And, of course, the Missouri was given the ultimate accolade of being designated the site of the surrender itself. Carriermen felt that they were being cheated of their just due, but there were good reasons for choosing battleships. Halsey feared Japanese treachery and preferred to keep the carriers at sea where they could operate their aircraft. Interservice politics played a role as well. The Navy believed that the Army was receiving unearned prominence since General Douglas MacArthur was originally designated to sign as representative for the United States as well as for the other
Allied powers. By having Admiral Nimitz for the United States and by locating the ceremony aboard a warship, public attention would be focused on the Navy's role. Secretary of the Navy James Forrestal cannily picked the Missouri, since he knew President Truman would find it irresistible.

As the war in the Pacific drew to a close, the Navy began planning the composition of its peacetime fleet. No one seriously disputed the carrier's new place as the backbone of the Navy, but top officers still saw a prominent place for the battleship. King praised the battleship for its usefulness in the antiaircraft and shore bombardment roles, which, he said, "demonstrated that the battleship is a versatile and essential vessel, far from obsolete." Nimitz' deputy chief of staff, the aviator Admiral Frederick Sherman, said the battleship "still remains the most important type of fighting ship, not only because of its preponderance of fire power but in clearing areas for amphibious operations." In October, the Navy Department officially stated that "through the years since World War I the battleship has grown in stature until today it is the most formidable fighting machine ever developed." Staffers at the Naval War College also believed that the battleship retained great offensive and defensive potential. In May 1945, King proposed that the postwar fleet contain fourteen carriers, eleven battleships, and three battlecruisers on active service
with thirteen carriers and seven battleships in reserve. Some aviators opposed this scheme. In September 1945, Admiral Mitscher told Forrestal that it was "fallacious" to keep the battleships to support carriers. The armored ships "could not use their main and antiaircraft batteries simultaneously, they required air protection when out of formation in their battle line, and they would not need their big guns anyway in the presence of carrier air—as proven at Saipan and during the run north from Leyte." This viewpoint won out, and with the drastic demobilization immediately after the war, the fast battleships and battlecruisers were gradually decommissioned until by 1949, only the Missouri remained on active duty. The three vessels still in the shipyards were not completed. The Illinois, barely 20 percent finished, was cancelled altogether; the Kentucky and Hawaii were suspended.

The Korean War called the three mothballed Iowas back to the fleet to augment the Missouri in fire support duties. After that conflict, the four battleships remained in commission for several years, and there were reports that the Iowa and Wisconsin carried 16-inch shells with nuclear warheads equivalent in power to the Hiroshima bomb. Some officers suggested completing the Kentucky and Hawaii as guided missile or tactical command ships. Work on these plans were well advanced, and Congress even authorized the conversions. But the contracts were never
awarded, and the Navy sold both hulls for scrapping in 1958. That same year, some officers talked of stripping the Iowas of their guns and mounting launching platforms for ballistic missiles. In 1961, the Navy considered removing the after turret and part of the power plant from the Iowas to make space for twelve helicopters and 1,800 Marines, but the $65 million price tag was too high.  

The end of the battleship seemed imminent in the early 1960's when the North Carolinas, South Dakotas, and Alaskas were stricken from the Navy list. Five were scrapped, and the North Carolina, Alabama, and Massachusetts preserved as relics by their name states. However, the Vietnam war gave the Iowas a new lease on life. With almost half the targets in Vietnam within range of the 16-inch guns, it made good economic sense to recommission a battleship. Consequently, the New Jersey, with modestly updated communications gear and a reduced crew, served a tour of duty in the South China Sea. Although taken from the active fleet in 1969, this ship, together with the three other Iowas, are still on the Navy's reserve list.  

This is a remarkable record of survival for a type of vessel that many had regarded as a failure thirty years earlier. In fact, the American fast battleship program suffered from a barrage of criticism at its inception, through World War II, and in retrospect. Much of the last was simply uninformed, such as the indictment by the sensationalist writer, William B. Huie:
[the fast battleships] were built with scarce labor and scarce steel. They were manned by thousands of scarce men. The Navy spent millions on propaganda for them. Yet no super-battleship ever sank an enemy ship; not one of them ever fired a justifying shot.\textsuperscript{41}

The authors of the United States Strategic Bombing Survey delivered a more reasoned, but equally scathing attack on the record of the fast battleship in World War II:

\ldots even though naval tactics and strategy were modified more fully to exploit the Naval Air Arm, construction and training programs for powerful surface units other than carriers and submarines were continued. This diversion of national resources and civilian and military manpower to the production, operation, and protection of heavy surface warships logistically and tactically weakened the major Pacific offensive operations, including Navy carrier power and the Navy submarine strength. \ldots \textsuperscript{42}

Some naval authorities have rendered essentially the same verdict. Thus, the popular naval writer Richard Hough concluded that without command of the air, the battleship was "by 1941, a hopelessly vulnerable fighting ship."\textsuperscript{43} Theodore Roscoe, a more thorough researcher, wrote: "Even before the advent of the atomic bomb, aircraft bombs and torpedoes had made battleships as obsolete as the triremes of Ancient Rome."\textsuperscript{44} Many naval officers, particularly in aviation, felt the same way. One veteran carrier staffer in February 1945 waved his hand at the \textit{New Jersey} and remarked: "There's a shameful waste of the taxpayers' money."\textsuperscript{45} This feeling so permeated the Navy after the war that officers writing their memoirs were quick to distance themselves from the "Gun Club." For instance,
Admiral James O. Richardson took considerable pains to prove that he was not "a battleship admiral." The few Gun Club officers who did write autobiographies, such as William Standley and William Leahy, focused on other aspects of their careers.

Certainly the critics were justified in questioning the effort in manpower and material expended on the capital ship program. The monetary cost alone was high. The heaviest ships, the Iowas, took about $112 million a piece just to build. The lightest, the Alaskas, cost $74 million a vessel. Including the money spent on the Kentucky, Illinois, and Hawaii, together with the design work on the Montanas, the total expenditure for construction was certainly over $1 billion, the first weapons system in the history of the nation to top that mark. To man the ships, the Navy required about 30,000 officers and men, a significantly high figure.

Did the big ships provide an adequate return for this investment? It must be admitted immediately that these vessels did not win the war. Except for two crucial occasions, at Casablanca and Guadalcanal, the fast battleships did not inflict significant direct damage on enemy warships. However, the battleships proved unexpectedly valuable in a number of auxiliary roles, including the provision of hospital facilities, stores, and oil for the rest of the fleet, but as one officer pointed out, "standing alone, [these duties] would not warrant the outlay
for, or even the operating cost of such vessels." More important, of course, was the performance of the fast battleship in the antiaircraft and shore bombardment roles. Here, the ships drew mixed reviews. In protecting carriers against Japanese aerial attacks, the battleships proved invaluable at the Eastern Solomons and Santa Cruz. Later actions were less spectacular, partly because fewer Japanese planes got through the fleet's fighter planes, and those that did were tougher to bring down. In shore bombardment, the fast battleship improved with practice, and their speed was useful in making quick strategic strikes at Japanese industries in the closing days of the war.

High speed was a prerequisite for operations with carriers, and the fast battleships gave a solid backbone to the task groups built around the fragile carriers. Until fast battleships reached the Pacific in numbers, American commanders had to be cautious in their offensive employment of carriers for fear of suddenly encountering strong Japanese surface forces. Without battleship support, the carriers had little staying power, and their deployments were mainly in hit and run operations. As King said:

"[the fast battleships] made possible the revolutionary concept of a mobile striking force, involving both air and surface fire power of great strength, capable of moving into waters previously controlled by the enemy." 49

The fact was that within the range of its guns the battleship remained unquestionably the most powerful type
of warship, both offensively and defensively. The basic problem facing battleship commanders was to bring their ships into contact with the enemy, which invariably exposed the irreplaceable battleships to risks. Throughout the war, sailors ranging from ordinary bluejackets to high ranking officers called for a more audacious employment of the big gun ships, but they were saved for the climactic fleet showdown that was narrowly missed on two occasions. Other navies fell victim to the same caution. The Japanese hoarded their most powerful battleships through the Guadalcanal campaign, even though they might well have turned the tide.

Nonetheless, the fact that a full-fledged, battle line action did not occur is no indictment of the entire fast battleship program. Surface ships were a significant threat during World War II. Of the twenty-three large combatant ships that the United States Navy lost during World War II, ten were lost to surface ship torpedoes or gunfire. Capital ships retained to the end a high degree of resistance to battle damage, as the Japanese battleships amply proved.

Thus, even without reference to the varied auxiliary roles that the fast battleships filled, the construction of these vessels was justified as insurance against the failure of the untried air weapon. The fast battleship remained a viable weapon in the sea control mission. Only bad luck and cautious employment kept it from a fuller vindication.
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   The National Archives also holds essential documents. Much information of value on design considerations is to
be found in the records of the Bureau of Construction and Repair, later the Bureau of Ships (Record Group 19) located either at the National Archives Building or at the Washington National Records Center, Suitland, Maryland. The voluminous files of the Secretary of the Navy (Record Group 80) contain crucial materials, including correspondence at the Cabinet level and the extensive findings of the Battleship Advisory Board.

Outside Washington, useful sources are located at the Franklin D. Roosevelt Library, Hyde Park, New York. The Map Room records preserved there give intelligence reports on enemy capabilities. Both the Official File (OF 18) and the President's Secretary's File (PSF) contain presidential correspondence related to the capital ship program.

The Naval War College at Newport, Rhode Island maintains among its records curriculum files (Record Group 4), student problems and solutions (Record Group 12), and staff presentations (Record Group 14). Especially valuable material on battleship design and employment is in the Intelligence and Technological Archives (Record Group 8).

Private Papers. The personal correspondence of top naval figures is not especially rich in information on the capital ship question. Nonetheless, significant, even essential, documents are contained in the papers of
Ernest J. King held by the Naval Historical Center and of Raymond A. Spruance at the Naval War College. Of lesser value, but having some interest, are the papers of John Shafroth at the Library of Congress, and the Daniel J. Callaghan, Charles Edison, and Charles Swanson folders at Hyde Park. The papers of Frank Knox and Alan G. Kirk, and those of William F. Halsey, Claude C. Bloch, Frederick J. Horne, and Dudley W. Knox at the Library of Congress are surprisingly skimpy, although not totally devoid of value. The King papers at the latter repository consist of memorabilia such as wedding invitations and newspaper clippings.

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