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THE MISAPPLICATION OF A WEAPONS SYSTEM: THE BATTLE CRUISER AS A WARSHIP TYPE

In the early years of the 20th century, Sir John Fisher of the Royal Navy concluded a remarkable series of reforms which produced the dreadnought and the battle cruiser. These reforms resulted in a wholesale discarding of the obsolete vessels of the fleet and produced the prototypes for a new era in naval construction. One of these new ship types, the battle cruiser, was often misemployed during its career and, as a result, gained an undeserved reputation as a poor warship design. Its misuse was the result of a failure of communication between Sir John Fisher and the officers who decided where and how the battle cruiser would be used.

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The Development of the Battle Cruiser and Dreadnought. From the emergence of the first ironclad warships in the 1850's to the development of a relatively standardized capital ship design in the 1890's, there occurred a period of great flux in naval architecture. During this time there was a prodigious variety of ship designs, both within each respective national fleet and on a comparative basis between fleets. This was largely caused by two factors. It was during this era that both metallurgy and ordnance were making very rapid advances, and it was not unusual for ships to be obsolete before they were launched. Naval artillery progressed from the 15-inch Dahlgren aboard the second-generation Civil War monitors to the relatively advanced 12-inch gun of the 1890's. The latter employed smokeless powder, and its barrels possessed greater tensile strength, both of which added significant range to naval gunfire. Adding to

gunfire development was an improvement in protective armor. The wrought iron plates of the *Virginia* were replaced by nickel alloy, and this revolution in metallurgy made itself felt in propulsion in the form of gaining greater speeds and efficiency through increased boiler pressures. This rapid advance in technology placed naval engineers and tacticians in a dilemma of how best to adapt the new revolutionary technology to ship design and fleet tactics.

A second factor which contributed to the problem of design and tactical coherence was the presence of a school of naval thought which regarded all capital ships as obsolete. In France this took the form of the *Jeune Ecole*, in which Adm. Theophile Aube was a major voice. As Marine Minister in 1886, Aube canceled the construction of all heavy warships, favoring instead the fast corsair cruiser and the seagoing "autonomous" torpedo boat. He hoped to use the cruisers in a manner similar to

the employment of the Confederate ship *Alabama* which reduced shipping under Union control by frightening shipowners into changing the registry of their vessels. He saw the torpedo boat equipped with the new self-propelled Whitehead torpedo as the answer to the capital ship. A group of such boats, he reasoned, could destroy any capital or merchant ship within their radius of action at small cost to themselves.¹ The result was a relaxation of capital ship construction which was felt not only in France, but throughout Europe.

By 1890, however, the situation had crystallized sufficiently so that several distinct ship types were recognizable. Alarmed by the imminent prospect of a Franco-Russian alliance, Sir William White, the British Director of Naval Construction (1885-1902), produced the *Royal Sovereign* battleship design, which served as the prototype for the predreadnought battleships of the major naval powers. No sooner was it completed than Adm. Sir Frederick Richards called for a sizable building program to create a fleet of such vessels larger than that of both France and Russia.² By 1905 Britain possessed approximately 40 of these predreadnought battleships. Each of these ships had good armor protection, a speed on the order of 18 knots, an armament of four 12-inch guns and eight 8-inch guns, plus an assortment of smaller weapons to be used against torpedo boats at close range. Their tonnage was approximately 16,000, and the cost of each ship of this class was approximately of 1,200,000 pounds.³ Other powers duplicated this design in its essential characteristics with minor modifications in armament and construction. The primary purpose of such ships was to take their place in the line of battle and to participate in a gunnery duel with their opposing numbers. As effective gunnery during this period was restricted to about 4,000 yards, both the 12-inch and 8-inch would be within

range, and the designers expected the heavier but slower firing big guns to inflict about the same damage as their lighter companions.

From a practical viewpoint, such armament was illogical, and it is strange that this was not noticed sooner. The presence of two gun sizes to be used over the same range produced an unnecessary diversification of ammunition size which yielded no corresponding advantages. As gunnery was restricted to this relatively short range, it would have been far better to have built ships with only one gun size. The choice of gun caliber could be determined by examining relative performance over the effective range.

The second type of vessel generally accepted as an element of the fleet at this time was the armored cruiser. The armored cruiser was in tonnage (14,000) almost the equal of the predreadnought (16,000), but its design and function were different. It was protected with armor on the sides, deck, and turrets, though this armor was usually not as thick as the predreadnought's. The speed of these vessels was 20-22 knots, 4 knots faster than the predreadnought. Armament varied widely, although the most frequent choice was four 8-inch guns. Several American vessels of this class were armed with four 10-inch guns, and others in Europe had only 6 inch.⁴ This vessel had a dual function. It could either take its place in the line of battle with the predreadnought, utilizing there its armor and 8-inch guns, or it could use its superior speed to avoid battle with predreadnoughts and engage in commerce raiding or other independent missions. Its speed gave it immunity to the predreadnought, when properly handled, and its armor and guns made it more than a match for any lighter ship.

The next ship in type was the protected cruiser, so called because its defensive armor was limited to the deck and turrets.⁵ Closely following this was

the light cruiser, whose light guns and lack of armor made possible increased speed. Both of these were designed for reconnaissance and independent missions.

Following the advent of the torpedo boat, a need was felt for a light vessel with quick-firing guns which could counter attacks by such ships. The result was the torpedo boat destroyer, later shortened to destroyer. Torpedoes later became standard on these vessels, and the destroyer usurped the functions of the vessel it was originally designed to counter. It also retained its original mission of preventing enemy torpedo carriers from reaching the capital ships of the fleet. To this picture was added, in 1900, a relatively effective submarine whose technological limitation at first relegated it to coast defense.

For approximately 10 years (1890-1900) naval technology remained stabilized along these lines. Beginning about the turn of the century, however, improvements in optical range finders and increased gunnery practice altered the situation in favor of the big gun.

The man who stimulated the next phase of technological advancement was Sir John Fisher, the commanding officer of the British Mediterranean Fleet from 1899 to 1902. Fisher was concerned over the poor gunnery of his command, and he attempted to remedy it by instituting long-range gunnery practice as a standard fleet activity. This policy began in 1899, when the *Caesar* engaged a 6-knot towed target at 6,000 yards. Eventually Fisher offered a Challenge Cup for the vessel displaying the most accurate gunnery. Meaningful advances in this area were made possible by the development of optical range finders at the Fleet Gunnery School at Whale Island by Sir Percy Scott.⁶ Because of these new instruments plus continued practice, the range of effective gunnery was raised from 4,000 yards to 15,000 yards, the maximum range of the 12-inch gun.

It was during this era that the British fought a frustrating Boer War with questionable effectiveness and little imagination. This conflict coupled with the German naval laws of 1898 and 1900, which provided for the construction of a fleet of predreadnoughts rivaling that of Great Britain, motivated a group of English naval officers to seek reforms in their fleet. One of these was Sir John Fisher. Fisher served as Second Sea Lord from June 1902 to August 1903, and on 21 October 1904 he became First Sea Lord, responsible only to the government for the administration and operation of the Royal Navy.

It was also at this time that Parliament became restless over the fact that British naval expenditures had risen 40 percent in the last 15 years, faster than those of other naval powers. They were therefore anxious for economics, and Fisher was willing to oblige them if he could also increase or maintain the efficiency of the fleet in the process. His first step was to deactivate 154 older battleships and cruisers, most of which dated from before 1887. He followed this up by discarding a large number of small coastal patrol boats stationed in the colonies, which were incapable of combat and had been preserved only to show the flag to the natives. With the personnel thus displaced, he increased the readiness of the remaining reserve vessels laid up in the docks. The manning of these vessels was increased from a small maintenance party to two-fifths of the wartime complement, including all essential personnel. The resulting economics in repairs alone amounted to 850,000 pounds.⁷

In examining the possibilities of new battleship construction, Fisher was influenced by an article in the 1903 issue of *Jane's Fighting Ships* that suggested a warship which mounted ten 12-inch guns.⁸ Such a ship would be able to open fire upon a predreadnought at a range beyond the predreadnought's 8-inch guns—the older ship could only

reply with its four 12-inch guns. If the new ship also possessed a speed advantage which allowed it to choose the range, the predreadnought's lighter 8-inch guns would be virtually useless. Thus, one capital ship mounting ten 12-inch guns would be as valuable as two or three of the older predreadnoughts and would cost only slightly more.

Acting on this reasoning, Fisher ordered the preparation of plans for the H.M.S. *Dreadnought*, the keel of which was laid in October 1905. Within a year this new ship joined the fleet, complete with the first turbine drive. This new propulsion system reduced overhaul time and gave the *Dreadnought* a speed of 21 knots, 3 knots faster than the now obsolete predreadnoughts. The tonnage of the new ship was increased from 16,000 tons to 17,900 in comparison with the predreadnoughts, while the cost rose from 1.2 million pounds to 1.5 million pounds.⁹ Scarcely had the *Dreadnought* completed her trials when Fisher laid down the keels for six more of the same type—the *Bellerophon*, *Superb*, *Temeraire*, *St. Vincent*, *Collingwood*, and *Vanguard*. In the first 6 months of 1909 still another three were laid down, and by August of 1911 Great Britain possessed 10 dreadnoughts, each armed with ten 12-inch guns.

Having completely altered the line of battle, Fisher next turned his attention to the other components of the fleet, one of which was the commerce raider. With a speed of 22 knots or more, the armored cruiser could still make good its escape from a dreadnought, and as a commerce raider it could only be engaged, with any reasonable hope of success, by other armored cruisers. Light cruisers or destroyers could catch the armored cruiser, but they could not outfight her. While an armed merchant ship might reasonably expect to resist an unarmored light cruiser, it was at a hopeless disadvantage vis-a-vis the armored cruiser with its 8-inch guns and

substantial armor protection. Fisher was also concerned over the fact that the newest German passenger liners, which boasted a speed of 23 knots, also had mounts for 6-inch guns and could be fitted out as commerce raiders in time of war.

To this double dilemma Fisher produced an intelligent solution. As the 12-inch gun was now reliable at long ranges, why not produce a dreadnought-class vessel which sacrificed armor protection for greater speeds. Such a vessel could catch the armored cruiser or the passenger liner, choose a range outside that of the 8-inch but within its own 12-inch, and destroy the raider. Destroying corsairs would then become only a problem of locating them.

Thus the concept of the battle cruiser originated. It is important to note that such a ship was primarily designed to combat corsairs, a mission for which it would need no armor protection. It was never intended to take a place in the line of battle or to combat dreadnoughts.

In February 1906 Fisher laid down three vessels of the battle cruiser type, the *Invincible*, *Indomitable*, and *Inflexible*. These ships were designed for a speed of 25 knots but made 28 knots on their trials. They were armed with eight 12-inch guns and had a displacement of 17,250 tons. Fisher declined at this time to follow his idea to its logical extreme by wholly eliminating protective armor and gave the battle cruisers armorplating equal to most of the armored cruisers then in existence (6 inches on the belt and 7 inches on the turrets). In February of 1909 Fisher laid down three more battle cruisers—the *Indefatigable*, *Australia*, and *New Zealand*, the latter two of which were financed by their namesakes in the face of the developing naval race with Germany—of the same type, and these were completed by the middle of 1913.¹⁰ These six ships made armored cruisers obsolete.



British Armoured Cruiser HMS *Indomitable* (1906) (*Jane's Fighting Ships*, 1909)

The reaction of Germany to this revolution of seapower was immediate and threatening, and Fisher's critics did not hesitate to condemn him for introducing a weapon which shattered, without an enemy blow, Britain's long lead in predreadnought capital ships. In July of 1906, while the *Dreadnought* was still unlaunched, Fisher's opposite number, Alfred von Tirpitz, laid down four dreadnoughts. These were the *Westfalen*, *Nassau*, *Posen*, and *Rheinland*. In accordance with Germany's usual procedure, the four were designed primarily for operations in the North Sea. Their living quarters were cramped as the crew would spend most of their nights in barracks ashore. Range was limited, and the weight thus conserved was invested in heavy armor protection and increased compartmentation. These four ships were armed with twelve 11-inch guns, which almost equaled the British 12-inch in range and penetrating power. They used reciprocating steam engines, however, which limited their top speed to 19½ knots. These ships were not completed until May of 1910, almost 4 years after the *Dreadnought* joined the fleet.

The German Government also induced the Krupp works to expand its metallurgical capabilities to the point where it could produce heavy turrets for eight dreadnoughts a year, a capacity equaled only by Great Britain.¹¹ Orders for this new equipment were not long in coming. The German naval law of 1908 provided for the construction of four

dreadnoughts a year in 1908 and 1909, and two a year thereafter. Nine additional dreadnoughts, making a total of 13, were completed by the outbreak of the war. These last nine were fitted with turbine engines, which provided a speed of 20 knots. Their armament was increased to twelve 12-inch guns for the first four and ten 12-inch guns for the last five. Four more were completed in early 1915. (See appendix.) All of these vessels were well protected and had effective damage control procedures.

The German designers did not imitate their British competitors in battle cruiser design. By using 11-inch guns instead of 12-inch, reducing range and berthing space, and increasing tonnage slightly the Germans gave their battle cruisers a speed of 26 knots or better while retaining an armor protection equal to that of British dreadnoughts. Such ships were designed to fight with the dreadnoughts, contrary to Fisher's concept. Yet they still had the speed necessary to outrange them. The design was thus truly versatile, and the six such ships which participated in the war gave excellent service.

Surprisingly enough, the U.S. Navy Board was apparently not impressed with the battle cruiser design during the first 5 years of that design's existence. No mention of it was made in the annual reports until 1911, but in the following years the construction of such ships was recommended with increasing emphasis.¹² Not until the battle of the

Falkland Islands had demonstrated the soundness of the battle cruiser concept did the administration and Congress stir themselves sufficiently to allocate funds for the construction of such vessels.¹³

The same tardiness was not evident, however, in their evaluation of the dreadnought. While Fisher was developing the plans for the *Dreadnought*, American designers were designing the *South Carolina* and the *Michigan*, which hoisted eight 12-inch guns and a speed with reciprocating engines of 18½ knots. These were begun in November of 1906 and completed in December of 1909.¹⁴ By that time four others, with turbines and ten 12-inch guns, were in the docks. By August of 1914, 10 dreadnoughts composed the battle fleet of the United States.

While a total of nine other states built ships of the dreadnought type before 1914, only Japan followed the British and the Germans in producing battle cruisers. In January of 1911 she laid the keels of the *Kongo*, *Hiei*, *Haruna*, and *Kirishima*. These were completed in 1915, survived the First World War and the Washington Conference, and participated in World War II. Two of them hunted unsuccessfully for the *Repulse* and *Prince of Wales* in 1941, shortly before those ships were sunk by air attack. The four were designed by Sir George Thurston of Great Britain as slightly modified versions of the British *Lion* class of battle cruisers, and one of them, the *Kongo*, was built in a British yard. The remaining three were built in Japanese yards, and their construction there marked the end of Japan's dependence upon foreign yards for her naval construction.¹⁵

The British responded to the large German naval program of 1908 by designing a larger dreadnought (22,500 tons) designed to carry 13.5-inch guns in its main battery. Twelve of these were in the line or almost completed by the outbreak of the war.

The battle cruiser also shared in this increase in gun size. Four ships of the *Lion* class were completed before the outbreak of the war, boasting eight 13.5-inch guns, a speed of from 26 to 29 knots and a tonnage of 26,350 to 28,500, depending on the individual ship (see appendix). The armor protection of these vessels was slightly increased over that of the earlier *Invincible* class, but as events were to show, it was folly to deploy these ships against heavily armored dreadnoughts.

Thus, when war came in August of 1914, the British had available 18 dreadnoughts, plus two seized from Turkey which were being built in British yards, and nine battle cruisers. The Germans had ready 13 dreadnoughts and six well-armored battle cruisers.

One other significant prewar development deserves mention. In 1909 the British "raised the ante" in regards to gun size by abandoning the 12-inch gun for the 13.5-inch. In 1912 they repeated the process, this time with the 15-inch gun. This was not tremendously significant in itself, but the new ship design which accompanied it was. The tonnage of these ships, the *Queen Elizabeth* class, was raised to 27,500, and they were equipped with oil-fired boilers for the first time. But the significant feature was the speed—25 knots. This speed was only 3 knots short of the first generation of battle cruisers, and it was accomplished without any reduction of armor, range, or habitability. The lesson was plain: as the size of capital ships increased, the point would soon be reached where the dreadnought's large tonnage would allow both heavy armor protection and engines capable of the same speed as the battle cruisers. Thus the battle cruiser's original function, the destruction of fast commerce raiders, could be accomplished by the fast battleship. At that point the battle cruiser would become obsolete, and that obsolescence was already visible on the

horizon as the First World War, commenced.

The Battle Cruiser in the First World War. A major portion of the blame for the lack of success of the battle cruiser in the First World War must be laid at the door of Sir John Fisher himself. Fisher failed to convey to the British naval officer corps a firm and accurate conception of the function of the battle cruiser. In 1914 many officers had no conception of what a battle cruiser was supposed to accomplish or, worse, harbored a misconception. Adm. David Beatty, the officer in charge of the battle cruiser squadron of the Home Fleet at the beginning of the war, thought his mission was to push aside the enemy's light scout forces and to "form a fast division of the Battle Fleet."¹⁶ Had such a lack of understanding been remedied prior to the war, the battle cruiser would never have been placed in battle opposite the dreadnought.

The first significant action involving battle cruisers took place on 28 August 1914. On that day the British sent a squadron of light cruisers to raid the German destroyers patrolling the waters around Heligoland—a small island off the German coast which had been obtained by the Germans from the British in 1890 in a colonial trade and was thereafter made into one of the strongest naval fortresses in the world. These light cruisers were intercepted by a superior force of German light cruisers and retired seaward. Beatty, waiting offshore in a support role, came to the assistance of the British force, surprised the Germans, and sank three light cruisers and three destroyers with his heavy guns before the remainder of the German force escaped.

An even more successful operation followed. At the time war was declared, the ships of the German China squadron, composed of the armored cruisers *Seharnhorst* and *Gneisenau* and the light

cruisers *Leipzig*, *Nürnberg*, and *Dresden*, were operating in the Far East. These ships were commanded by Admiral Count von Spee, were manned by regulars, and in annual gunnery practice had displayed some of the best marksmanship in the German fleet. Fearing a rendezvous with the capital ships of the Japanese fleet, Spee took his squadron to South American waters.

The British officer in command of the South American Station was Rear-Admiral Sir Christopher Craddock. Craddock had under his command the old predreadnought battleship *Canopus*, the armored cruiser *Good Hope*, and the light cruisers *Monmouth*, *Glasgow*, and *Otranto*. All of these vessels were part of the reserve fleet and had recently been mobilized and manned by reservists. The squadron's speed was inferior to that of the Germans, even without the *Canopus*. Craddock had requested the dispatch of a battle cruiser to reinforce his squadron. The Admiralty, however, refused and suggested instead that he hold his squadron within range of the 12-inch guns of the *Canopus* in order to assure the safety of his ships.¹⁷

After receiving word of the whereabouts of the German squadron, Craddock concluded that he would have no hope of overhauling it if he were burdened with the slow *Canopus*. He therefore left the *Canopus* to escort the squadron's colliers and proceed with only his cruisers. He intercepted the German force at Coronel, and in the ensuing battle Craddock was killed and his squadron destroyed as an effective fighting force. The Germans, whose excellent gunnery carried the day, received six hits and suffered only two casualties. "The victory ought to have been Kit's [Craddock's] if they had only done what they ought, and sent the *Invincible* and *Inflexible* out to him long ago."¹⁸

Humiliated by this defeat, the British now proceeded to use their battle cruisers, three of which were dispatched to

destroy Spee. The *Princess Royal* was sent to the Panama Canal to block that entrance to the Atlantic, while the *Invincible* and *Inflexible* were ordered to the Falkland Islands, to which the *Canopus* had retreated. So quickly did these ships arrive that Spee was not aware of their presence in the area. Trying to reach Germany, Spee decided to stop long enough to raid the Falklands, having heard that there was a weak cruiser squadron there. Much to his surprise he discovered the *Invincible* and the *Inflexible*, which were in the process of raising steam for a sortie. Realizing the odds, Spee's squadron turned and fled.

In the ensuing battle the battle cruisers were used in exactly the manner Fisher had foreseen. They remained out of range of Spee's 8-inch guns and used their own 12-inch guns to destroy his ships. At one point in the battle, however, Spee was able to get within range by making a sudden turn while the vision of the British ships was obscured by smoke. This allowed Spee's armored cruisers to gain a few hits on the battle cruisers. These hits were not serious, however, and the range was soon opened again. The battle cruisers thus proved themselves capable of completing the type of mission for which they were designed.¹⁹

The outstanding success of the battle cruiser type at the Falkland Islands and at Heligoland convinced the British Admiralty that more ships of such type were needed. Fisher, now back in the Admiralty after resigning under pressure several years before, took the lead in demanding new ships of this type. Two battle cruisers were on the point of being laid down when the war began, but their construction had been halted in the belief that the war would be short. Fisher now was determined to carry the concept of the battle cruiser to its logical extreme, and he ordered the Director of Naval Construction to revise the plans for these two battle

cruisers. The new design was ready on 29 December 1914. The new ships were to have a tonnage of 26,500, a speed of 32 knots, and six 15-inch guns. The armor on the belt and deck of these vessels was reduced still further, while substantial armor was left on the turrets. The result was a ship with greater speed, less armor, and fewer guns. These two vessels were laid down in January of 1915 and were completed in September of 1916 as the *Renown* and the *Repulse*.

[This design] was conceived as a direct result of the Falkland Islands Battle and also on account of the experience gained during the action fought on the 28th of August 1914, which showed the immense value of very high speed with long-range powerful gunfire and large radius of action, which qualities, in association, enable a ship to run down those of the enemy under any circumstances, with the power of enforcing or declining action, as may be considered desirable. Features of such magnitude could only be obtained if the armour protection were comparatively light, unless very great size of ship were accepted.²⁰

Winston Churchill, who was also in the Admiralty at this time, opposed the construction of these ships.

To put the value of a first-class battleship into a vessel which cannot stand the pounding of a heavy action is a 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... in spite of her cost.²¹

Fisher obtained the support of Admiral Jellicoe, the commander of the Battle

Fleet, and in the end the Cabinet overruled Churchill and authorized the two new battle cruisers.

Fisher was not satisfied with the *Renown* and the *Repulse*, but no funds were available for further capital ship construction. He therefore supervised the designing of two "large light cruisers" of 18,600 tons. These ships made 33 knots, carried four 15-inch guns, and had virtually no armor protection. They were laid down in May of 1915 and completed in January of 1917. A third ship of this class had two 18-inch guns instead of four 15-inch. These ships were named the *Courageous*, *Glorious*, and *Furious*, but they were known universally in the fleet as the *Outrageous*, *Uproarious*, and the *Spurious*.²² They were the ultimate development of the battle cruiser idea, a light and economical ship that could catch and destroy enemy cruisers with its great speed and long-range fire. From a technological point of view, however, the idea was carried too far, for the spotting devices of the time needed at least six heavy guns of the same caliber to observe a fire pattern properly. After the war these ships were converted into aircraft carriers.

While the British were using their battle cruisers to destroy Admiral von Spee's squadron in the South Atlantic, the High Seas Fleet in Wilhelmshaven under Adm. Frederick von Ingenohl were using theirs for shore bombardment. On 3 November 1914, four German battle cruisers plus the armored cruiser *Blücher* sortied from their base to bombard the British coastal town of Yarmouth. The success of the raid was so encouraging that the Germans attempted a similar bombardment on 15 December accompanied by a scouting force of light cruisers and destroyers. The British, who had obtained a copy of the German code books, deciphered the wireless orders and set a trap for the German battle cruisers, commanded by Adm. Franz von Hipper.²³ Four battle

cruisers commanded by Admiral David Beatty, supported by six dreadnoughts, were waiting for Hipper when on the morning of 16 December he completed his bombardment of Harwich and Humber and turned again towards Wilhelmshaven. "We went on tenterhooks to breakfast. To have this tremendous prize—the German battle cruiser squadron whose loss would fatally mutilate the whole German navy and could never be repaired—actually within our claws . . ." ²⁴ Unknown to the Admiralty, it was the British force which was in danger, for Ingenohl had brought the High Seas Fleet out to support Hipper and was then only 10 miles from Beatty's force.

Here at last were the conditions for which the Germans had been striving since the outbreak of the war. A few miles away on the port bow of the High Seas Fleet, isolated, and several hours steaming from home, was the most powerful homogeneous battle squadron of the Grand Fleet, the destruction of which would at one blow have completed the process of attrition and placed the British and German fleets on a precisely even footing as regards numerical strength.²⁵

This situation, which had such great possibilities, ended harmlessly. Ingenohl, being incorrectly informed by his scouting forces that the entire Grand Fleet lay ahead, returned to base. Hipper, being similarly warned, changed course and escaped northward through heavy rain squalls.

In January of 1915 the Germans made a third attempt to use their battle cruisers for shore bombardment. Once again the British overheard their wireless and planned an interception with Beatty's battle cruisers. Beatty successfully made the interception and sank the slower armored cruiser *Blücher*, but

due to a signaling error the three German battle cruisers made good their escape. The Germans learned during this engagement the importance of installing antirash protection on their ships to prevent a hit in the turret from following the ammunition train down to the magazine. This lesson the British were later to discover more painfully.

Until 1916 the British public and naval establishment found little fault with the battle cruiser. The victories at Heligoland and the Falklands appeared to justify the type, and few criticisms were heard. It was the Battle of Jutland that first brought the charge that the battle cruiser was poorly designed, vulnerable in combat, and a poor investment.

By May of 1916 the British Grand Fleet included 26 dreadnoughts and 9 battle cruisers plus the light cruiser and destroyer forces for scouting and torpedo work. The High Seas Fleet, now commanded by Adm. Reinhard Scheer, included 16 dreadnoughts, 5 battle cruisers, and 6 slow predreadnoughts foolishly included in the main force for sentimental reasons. Despite the excellent example of effective battle cruiser action which they had observed at the Falklands, the British still envisioned the battle cruiser as an integral part of the battle fleet rather than a special-purpose vessel. Their battle orders indicated no reluctance to use battle cruisers against enemy dreadnoughts.²⁶

The British battle cruisers were commanded still by Earl David Beatty, while the Third Battle Cruiser Squadron, a subdivision of his command, was commanded by the Rear Adm. Horace Hood. Adm. Hugh Evan-Thomas commanded the Fifth Battle Squadron which included all of the new 15-inch gunned superdreadnoughts of the *Queen Elizabeth* class.

In late May of 1916 Scheer made a sortie with the High Seas Fleet, hoping to draw the Grand Fleet out of its base at Scapa Flow, where there were sub-

marines waiting, or to catch a single squadron alone. Unknown to him the Grand Fleet was already at sea, and its battle cruisers and fast superdreadnoughts were separated from the rest of the fleet by a distance of 69 miles. Contact was made between the British and German battle cruisers, and the firing began at 15,000 yards.

A series of severe disasters now ensued. The *Lion*, Beatty's flagship, took the first serious hit in one of its turrets. A fire began which a few minutes later flashed downward through the ammunition hoist until it reached the magazine. The ship was only saved by the prompt and timely orders of Maj. F.J.W. Harvey of the Royal Marines, who, with both legs blown off, ordered the flooding of the magazines. Major Harvey received a posthumous Victoria Cross for this effort.²⁷ Scarcely had this occurred when two volleys hit the *Indefatigable*. The big ship exploded almost immediately, leaving only two survivors. In all probability it suffered the fate which was narrowly averted in the *Lion*.

Beatty was now reinforced by the fast battleships of the Fifth Squadron. They entered the fray and quickly scored hits with their 15-inch guns. Fortunately for the Germans a great many of these hits exploded on the decks and sides of the ships rather than penetrating into the interior.

Up until this time the German ships had received no important hits. As Hipper later stated: "The fire of the English battle cruisers resulted in no serious damage to our battle cruisers. . . . In contrast to this, the fire of the ships of the *Malaya* class and later of ships of the main fleet created an excellent impression."²⁸ Encouraged, Beatty used his advantage in speed to close further. The *Queen Mary* now suffered the same fate as the *Indefatigable*, leaving only 20 survivors and bringing forth from the Beatty the immortal

comment, "There seems to be something wrong with our bloody ships today."²⁹

The main body of the High Seas Fleet now appeared, and the chase turned in the other direction as Beatty attempted to draw Scheer into the Arms of the Grand Fleet. During this stage the fast battleships bore the brunt of the engagement, with the *Malaya* receiving a severe pounding and the *Barham* losing its wireless apparatus.

The Third Battle Cruiser Squadron, commanded by Horace Hood, now joined the engagement, having proceeded to the battle ahead of Jellicoe's main body. Scarcely had they arrived when the third battle cruiser disaster occurred. The *Invincible*, with Hood aboard, was struck by long-range plunging fire and exploded, apparently having received a hit in the magazine. Only six of the crew survived.

Jellicoe now came up with the main body of the British fleet, including all of the first generation dreadnoughts. Scheer, realizing the odds, turned his battle line away. Just when it appeared that he had escaped, he for obscure reasons turned his fleet again and proceeded toward the British once more. Again a hail of gunfire convinced him the odds were too great, and again he turned away.

In order to cover this move, Scheer ordered both his destroyers and his battle cruisers to attack the British line. The battle cruisers, already seriously damaged, reached a position within 7,000 yards of the British dreadnoughts before receiving a signal to retire. Miraculously, none of them were sunk or disabled. The German destroyers, however, caused Jellicoe to turn away, much to the chagrin of the more aggressive officers of the British fleet. Darkness then intervened, and during the night Scheer broke through Jellicoe's destroyer screen and made

good his escape, losing the predreadnought *Pommern* in the process.

Although the Germans failed to alter the strategic situation by this engagement, they inflicted greater losses on the British than they themselves suffered. The British public, longing for a Trafalgar, was critical of the Grand Fleet, and the brunt of their criticism fell upon the battle cruiser. Three British battle cruisers were lost under circumstances which suggested inadequate protection, while the German battle cruisers received a tremendous beating but still lost only one of their number, the *Lutzow*, which had to be scuttled on the return voyage. The postmortems and evaluations which followed this battle generally concluded that the battle cruiser was poorly protected and vulnerable.

Jellicoe provided fuel for much of this criticism when he made the following statement in his official report of the battle. "The facts which contributed to the British losses were, first, the indifferent armour protection of our battle cruisers, particularly as regards turret armour and deck plating, and, second, the disadvantage under which our vessels labored in regard to the light."³⁰

These criticisms, however, did not take into account several mitigating factors. Two of the three battle cruisers lost exploded due to the failure to install antirash protection on the ammunition hoists between the turrets and the magazine. The Germans, having had a narrow escape with the *Seydlitz* early in 1915, had installed such protection and did not have a similar difficulty.³¹ Presumably, if the British had installed antirash protection these two disasters would not have occurred so readily.

On a larger scale, however, the basic problem was the employment of a weapons system in a mission for which it was not designed. The battle cruiser was not designed to fight it out with

ships that were more heavily armored than itself. It was designed to overhaul its opponents and outrange them, thus staying clear of enemy fire. In this type of action it would have no need of armor protection. It was a tactical error, therefore, to expose a battle cruiser to the fire of a heavily armored vessel, and as the German battle cruisers had sacrificed radius of action for additional armor protection, it was a mistake to match them with ships of the *Invincible* or *Queen Mary* class. The *Invincible* class had only one mission, and that mission had been effectively illustrated at the Falkland Islands. Their proper deployment was not opposite the High Seas Fleet, but in the cruising squadrons which protected the British shipping lanes. The German "battle-cruisers" were, in fact, fast dreadnoughts of limited range, and the only type of vessel the British had which could counter them were the superdreadnoughts of the *Queen Elizabeth* class. It was these ships that should have met Hipper, not Beatty's *Invincibles*.

These arguments were not appreciated at the time, however. It was concluded that the battle cruiser needed more armor, and additional deck armor was added to the *Repulse* and *Renown*, still under construction. As a result these two ships were reduced in speed, making them less capable of catching

commerce raiders and yet still incapable of fighting in the line. The officers of the battle cruiser fleet, chagrined at the unfavorable publicity their ships were receiving, felt that they had been used as the bait for a trap which had not been sprung due to Jellicoe's timidity.

The results of Jutland doomed, in the minds of the Admiralty, Fisher's designs for the *Courageous*, *Glorious*, and *Furious*. The admiralty judged that these ships, almost totally unprotected, would be even more likely to suffer the fate of the *Invincible*. That was quite true, provided anyone was so stupid as to commit them to the line of battle. As corsair hunters, however, they possessed all the virtues of the *Invincible* class, plus 5 knots additional speed and bigger guns. Despite these increments they weighed and cost no more, due to an almost total lack of armor. If the spotting problem could have been solved, they could have given excellent service in British shipping lanes against armored cruisers, light cruisers, and converted merchant vessels.

The British did not abandon, however, all construction of battle cruisers. In addition to the *Renown* and *Repulse* they now laid down the *Hood*, which was destined to suffer the same fate as its illustrious namesake. The tonnage of the *Hood* was increased dramatically in order to allow great range, more armor,



HMS Hood (1920) (Brassey's, 1923)

a speed of 31 knots, and eight 15-inch guns. Completed in March of 1920, the *Hood* was the largest ship in the Royal Navy for 20 years, a status abruptly terminated by the *Bismarck*. Although given greater armor protection than any other British battle cruiser, the *Hood* was still at a tremendous disadvantage when placed against the heavily armored 35,000 and 45,000 ton battleships of the 1940's, as events were to show.

The Battle Cruiser in the Interwar Period. The scuttling of the German High Seas Fleet at Scapa Flow in 1919 temporarily eliminated one contestant from the naval race, but it did not abate in the least the persistence of the other three. The United States in the Naval Act of 1916 authorized the construction of 10 dreadnoughts and six battle cruisers within 3 years, and, although forced to postpone this program temporarily to counter the German submarine menace, it resumed this construction after the war ended.³² The Japanese in 1917 launched their "8-8" program, which envisaged the construction of eight battle cruisers and eight battleships, the last four of which were to displace 47,000 tons and mount eight 18-inch guns.³³ The British, whose war debts limited their capabilities in this area, nevertheless laid the keels for four new battle cruisers and completed the plans for a new class of battleship.³⁴

The domestic pressure for cuts in military expenditures was great enough, however, to motivate an agreement on arms limitation. At the Washington Conference in December of 1921, the major naval powers agreed to freeze capital ship strength for 15 years and define the tonnage and armament of battleships, cruisers, and the new aircraft carriers. There was also a mutual scrapping of older ships, including all of the first generation dreadnoughts armed with 12-inch and 13.5-inch guns. This freeze resulted in the British having only 12 old battleships and three battle cruisers

(the *Renown*, *Repulse*, and the *Hood*) at the commencement of World War II, while the United States was left with 14 battleships and no battle cruisers (the battle cruisers of the 1916 program whose keels had already been laid were converted into the carriers *Lexington* and *Saratoga*), and the Japanese with six battleships plus the four *Kongo* class battle cruisers. France and Italy, exhausted by the war, were not required to scrap any obsolete vessels, for their entire capital fleet consisted of such vessels. No significant new development in capital ship construction occurred for the next 7 years.

In 1928 the naval designers of the Weimar Republic modified the battle cruiser idea in order to create a lighter ship which was designed for commerce raiding. This ship, the *Deutschland*, displaced 12,100 tons and had a speed of 26 knots, greater than any battleship but not greater than the three British battle cruisers. By reducing its armor protection and using diesel engines for propulsion, the designers extended the range to 10,000 miles. Six 11-inch guns, capable of high-angle fire, were mounted in two turrets, and weight and water resistance were reduced by electric welding.³⁵ This ship was capable of outrunning any battleship then in existence, while it could outfight any cruiser with its 11-inch guns. Thus only a battle cruiser or a squadron of 8-inch cruisers could hope to successfully engage her. This ship was closely followed by two sister ships, the *Graf Spee* and the *Admiral Scheer*. While these ships were known as "pocket battleships," they might better have been labeled "pocket battle cruisers." They brought to light the fact that the battle cruiser idea could be employed by corsairs themselves as well as by ships seeking to destroy corsairs.

In 1934 the Hitler government laid the keels of the first full-sized battle cruiser Germany had designed since 1918. These ships were the *Scharnhorst*

and *Gneisenau*, armed with nine 11-inch guns and boasting a speed of 32 knots, sufficient to outrun the *Hood*. These two ships displaced 31,000 tons, yet their speed and armament made them dangerous to British convoys throughout the Second World War.

In 1935 the German Government adopted the Z-plan of naval construction, which provided for the construction by 1945 of a fleet of battleships and battle cruisers which would play a major role in destroying British commerce. The first two ships constructed under this program were the battleships *Bismarck* and *Tirpitz*, which equaled the *Hood* in gunpower, had much greater protection, and were only one knot slower. These were followed in 1940 by six other battleships which were never named. These ships were to displace 56,000 tons, mount eight 16-inch guns, and utilize diesel engines to gain a speed of 29 knots and an extremely long range. They were abandoned in 1940 because of the great demand for steel in other weapons.

The final big ships planned by the Germans were three unnamed battle cruisers, armed with six 15-inch guns and displacing 32,000 tons. They were powered by cruising diesels up to a speed of 25 knots, after which an auxiliary turbine raised the top speed to 33½ knots. Construction on these never began.³⁶

Throughout the interwar period the French displayed a marked reluctance to rely on British seapower to contain Germany at sea, and on several occasions their parliamentarians firmly insisted that France must be able to control her vital shipping lanes without aid from the British. As a result they participated in capital ship construction also, spending resources which might better have been invested in aircraft or land armored vehicles. Following the completion of the German pocket battleship, the French laid the keel for their first battle cruiser, designed spe-

cifically to catch the *Deutschland* and her sister ships. This ship was the *Dunkerque*, which was followed closely by the *Strasbourg*. These ships were begun in December of 1932 and completed in 1938. They displaced 26,500 tons and had a top speed of 29½ knots. They mounted eight 13-inch guns, which only slightly outranged the 11-inch guns of the *Deutschland*. The *Dunkerque* and the *Strasbourg* were designed to accomplish the battle cruiser's true mission, the destruction of commerce raiders, but they fought their only major naval action at Oran against British battleships and carrier aircraft.

Thus, when the Second World War began, Britain had the same three battle cruisers allotted to her by the Washington Conference, the Germans had two battle cruisers plus their three pocket battleships, and the French had two battle cruisers designed to counter the German pocket battleships. The United States still had none.

The Demise of the Battle Cruiser. By the time the Second World War began, the battle cruiser was already obsolete as a ship type. It had been made so by two technical developments—the fast battleship and the aircraft carrier. In June of 1940 the United States laid the keel for the first ship of the *Iowa* class, which had a displacement of 45,000 tons and was armed with nine 16-inch guns. Even more important, the *Iowa* managed to combine in one ship, due to her great size, the speed of the battle cruiser and the armor of the dreadnought. Her top speed was 33 knots, two knots faster than the *Hood*. Yet the armor protection on her belt totaled 19 inches, compared to the *Hood's* 12 and the *Invincible's* 6. This one ship, therefore, could perform the missions of both battleship and battle cruiser. It could catch a raiding cruiser as well as stand in the line of battle. The battle cruiser was no longer necessary.

At the same time, the interwar years

had seen the rapid development of carrier aviation. The disaster at Pearl Harbor, the sinking of the *Repulse* and *Prince of Wales* off Malaya, and the sinking of the Japanese 68,000 ton battleships *Yamato* and *Musashi* at Leyte Gulf and Okinawa by means of carrier airpower all revealed that a new element of naval power had come of age. The fast aircraft carrier, which could stand off further than any gunship and deliver an attack, could outperform the battle cruiser at its own mission. It could reasonably expect not only to outdistance and sink raiding cruisers, but it could do the same to the battleships themselves. Just when it appeared that the proximity fuse might once more restore the balance between the battleship and aircraft carrier, the nuclear bomb appeared and decisively ended the argument.

loss, and the days of the battle cruiser were over.

The United States, ironically, built its only two battle cruisers after the type was already obsolete. In December 1941, several months after the sinking of the *Hood*, the United States laid the keels of the *Alaska* and *Guam*, the only battle cruisers ever completed in this country. The two ships were launched in September of 1944, and their speed of 33 knots was no greater than the *Iowa*. They each mounted nine 12-inch guns and were highly compartmentalized to offset the lack of armor protection. These ships were the last battle cruisers ever built. The future belonged to the carrier and the submarine.

Despite its eventual demise, the battle cruiser was an effective and economical weapon for its time. In 1905 the battle cruiser made the armored cruiser



U.S. Battle Cruiser USS *Alaska* (1944) (U.S. Navy photo)

The time of the battle cruiser's passing can be readily identified by the destruction of the *Hood*. This 31,000-ton ship, the last and greatest of the British battle cruisers, was sent by the Admiralty to counterbalance the new German battleship *Bismarck*. When the *Bismarck* made its sortie and was intercepted, Jutland repeated itself. The *Bismarck*'s sixth heavy salvo struck the *Hood* at a high angle and apparently penetrated its magazine. Within 2 minutes the big ship sank with heavy

obsolete and was a potent weapon for destroying commerce raiders. This efficiency at its specific mission was illustrated at the battle of the Falkland Islands. This potency was obtained without the heavy financial sacrifice which would have been required at that time to construct a fast battleship. The battle cruiser's difficulty came not from its design, but from its utilization. The officers in charge of battle cruisers never fully realized the fallacy of exposing their weak armor to the fire of capital

ships. On the contrary, they persisted in regarding the battle cruiser as itself a capital ship rather than a specialized vessel designed for a particular purpose. This was due to a failure on the part of its creator to communicate his intentions to his subordinates.

To be used in accordance with its design capabilities, the British battle cruisers should have been deployed on the shipping lanes which were subject to raids by armored cruisers or converted fast merchantmen. It is in this environment that their speed and long-range cannon would have quickly cleared the seas of such vessels which dared to attack. No battle cruisers should have been deployed with the Grand Fleet, for they would invite destruction by the fast German dreadnoughts. Such scouting capability as the battle cruiser had could readily have been performed by cheaper light cruisers and destroyers.

It is also obvious, in retrospect, that the British did not need the large numbers of battle cruisers which they constructed before and during the First World War. Three or four such vessels would have been quite adequate, as they were at the Falklands, to provide protection for the areas threatened by raiders. The remainder of the funds allocated for battle cruiser construction could better have been utilized in the construction of dreadnoughts or other vessels.

By the end of the First World War, it should have been obvious that the rapid-

ly rising tonnage of capital ships would soon reach the point where such ships would be fast enough to usurp the battle cruiser's function. The construction of such ships as the *Hood* and the *Amagi* class of battle cruisers in Japan was shortsighted. It would have been far better to have used the resources for these vessels to make the next quantum jump in battleship tonnage which would retire the battle cruiser altogether.

In the last analysis, the history of the battle cruiser provided a classic example of the misuse of a weapons system. It is not enough to construct a weapons system with phenomenal capabilities. The personnel who man that weapon must be taught its function as well as its operation.

BIOGRAPHIC SUMMARY



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FOOTNOTES

1. A good account of French naval policy during this time can be found in Dr. Theodore Ropp's unpublished Harvard dissertation, "The Development of a Modern Navy: French Naval Policy, 1871-1914" (Harvard University, Cambridge: 1937).
2. Arthur J. Marder, *From the Dreadnought to Scapa Flow: the Royal Navy in the Fisher Era, 1904-1919* (London: Oxford University Press, 1961), v. I, p. 7.
3. Randolph Pears, *British Battleships, 1892-1957* (London: Putnam, 1957), p. 47.
4. Harold H. Sprout and Margaret T. Sprout, *The Rise of American Naval Power, 1776-1918*, rev. ed. (Princeton: Princeton University Press, 1942), p. 260.
5. *Ibid.*, p. 188.
6. Marder, v. I, p. 12-13, 34-35.
7. *Ibid.*, p. 40.

8. Vittorio Cuniberti, "An Ideal Battleship for the British Fleet," *Jane's Fighting Ships, 1903* (London: Sampson Low, Marston, 1903), p. 407.
9. Pears, p. 53.
10. Marder, v. I, p. 179.
11. *Ibid.*, p. 155-157.
12. U.S. Navy Dept., *Annual Report 1911* (Washington: U.S. Govt. Print. Off., 1912), p. 39; *Annual Report 1912* (Washington: U.S. Govt. Print. Off., 1913), p. 26; *Annual Report 1913* (Washington: U.S. Govt. Print. Off., 1914), p. 29; *Annual Report 1914* (Washington: U.S. Govt. Print. Off., 1915); p. 60.
13. This was partially due to the U.S. policy of building battleships first, due to their long construction time.
14. Marder, v. I, p. 57.
15. Anthony J. Watts, *Japanese Warships of World War II* (London: Allan, 1966), p. 13.
16. Filson Young, *With the Battle Cruisers* (London: Cassell, 1921), p. 21-22.
17. Arthur J. Marder, *From the Dreadnought to Scapa Flow; the Royal Navy in the Fisher Era, 1904-1919* (London: Oxford University Press, 1965), v. II, p. 108.
18. Admiral the Earl David Beatty, quoted in Marder, v. II, p. 129.
19. Geoffrey M. Bennett, *Naval Battles of the First World War* (New York: Scribner, 1968), p. 118.
20. Marder, v. II, p. 95.
21. Winston L.S. Churchill, *The World Crisis* (New York: Scribner, 1923), v. I, p. 132.
22. Marder, v. II, p. 96.
23. This copy of the code books was obtained from the Russians, who salvaged them from the wreck of the light German cruiser *Madgeburg*, grounded off Finland in August 1914. A section of the Admiralty known as "Room 40" was established to decipher German wireless messages.
24. Marder, v. II, p. 138.
25. *Ibid.*, p. 136.
26. Arthur J. Marder, *From the Dreadnought to Scapa Flow; the Royal Navy in the Fisher Era, 1904-1919* (London: Oxford University Press, 1966), v. III, p. 25-26.
27. *Ibid.*, p. 58-59.
28. *Ibid.*, p. 69.
29. Baron Alfred E.M.C. Chatfield, *The Navy and Defence* (London: Heinemann, 1942), p. 143.
30. Gt. Brit., Admiralty, *Battle of Jutland 30th May to 1st June 1916. Official Despatches* (London: H.M. Stationery Off., 1920), p. 2.
31. The *Seydlitz* was struck in the turret at the Dogger Bank action of January 1915. The explosion of the magazine was only prevented by the executive officer, who, on his own initiative, flooded the magazines.
32. Sprout and Sprout, p. 344-345. Congress pruned this program to five battle cruisers, but the Senate, after the news of Jutland, reinstated the program to be completed in 3 vice 5 years. The administration and the House accepted this.
33. Watts, p. 18.
34. Samuel E. Morison, *History of United States Naval Operations in World War II* (Boston: Little, Brown, 1947), v.I, p. xxxviii.
35. H.T. Lenton, *German Surface Vessels* (Garden City, N.Y.: Doubleday, 1966), v. I, p. 8.
36. *Ibid.*, p. 49-51.

APPENDIX I—DREADNOUGHT AND BATTLE CRUISER CONSTRUCTION 1905-1946

Great Britain—Dreadnoughts

Name	Tonnage	Speed (kts.)	Guns	Belt Armor	Date Completed
Dreadnought	17,900	21	10-12"	11"	Oct 1906
Bellerophon					
Superb					
Temeraire	18,600	21	10-12"	10"	Apr 1910
St. Vincent					
Collingwood					
Vanguard					
Neptune					
Colossus	19,900	21	10-12"	11"	Aug 1911
Hercules					
Orion					
Thunderer	22,500	21	10-13.5"	12"	Nov 1912
Monarch					
Conqueror					
King George V					
Audacious	23,000	21	10-13.5"	12"	Oct 1913
Centurion					
Ajax					
Erin (Reshadieh)	23,000	21	10-13.5"	12	Jul 1914
Agincourt					
(Sultan Osman I)	27,500	22	14-12"	9	Jul 1914
(latter two vessels built in British yards, seized from Turkey in 1914.)					
Iron Duke					
Marlborough	25,000	21	10-13.5"	12"	Nov 1914
Benbow					
Emperor of India					
Queen Elizabeth					
Warspite					
Valiant	27,500	25	8-15"	13"	Feb 1916
Barham					
Malaya					
Royal Sovereign					
Royal Oak					
Resolution	27,500	25	8-15"	13"	Sep 1917
Ramillies					
Revenge					
Nelson	33,900	23	9-16"	14"	Aug 1927
Rodney					
King George V					
Duke of York					
Prince of Wales	35,000	28	10-14"	15"	Aug 1942
Anson					
Howe					
Vanguard	44,500	30	8-15"	14"	Apr 1946

APP I—DREADNOUGHT AND BATTLE CRUISER CONSTRUCTION 1905-1946 (cont'd)

Great Britain—Battle Cruisers

Name	Tonnage	Speed (kts.)	Guns	Belt Armor	Date Completed	
Invincible Indomitable Inflexible	17,250	25	8-12"	6"	Oct	1908
Indefatigable Australia New Zealand	18,000	27	8-12"	6"	Jun	1913
Lion Princess Royal Queen Mary	26,350	28	8-13.5"	9"	Sep	1913
Tiger	28,500	29	8-13.5"	9"	Oct	1914
Renown Repulse	26,500	32	6-15"	6"	Sep	1916
Courageous Glorious Furious	18,600	33	4-15" 4-15" 2-18"	3"	Jan	1917
Hood	41,200	31	8-15"	10"	Mar	1920

Germany—Dreadnoughts

Westfalen Nassau Posen Rheinland	18,900	19½	12-11"	12"	May	1910
Thüringen Helligoland Ostfriesland Oldenburg	22,800	20	12-12"	12"	Jul	1912
Kaiser Friedrich der Grosse Kaiserin Prinzregent Luitpold König Albert	24,700	20½	10-12"	14"	Nov	1913
König Grosser Kurfürst Markgraf Kronprinz Wilhelm	25,390	21	10-12"	14"	Jul	1915
Baden Bayern	28,000	22	8-15"	14"	Mar	1917
Deutschland (Lützow) Admiral Graf Spee Admiral Scheer	12,100	26	6-11"	4"	Nov	1934
Bismarck Tirpitz	41,700	30	8-15"	15"	Mar	1941

APP I—DREADNOUGHT AND BATTLE CRUISER CONSTRUCTION 1905-1946 (cont'd)

Germany—Battle Cruisers

Name	Tonnage	Speed (kts.)	Guns	Belt Armor	Date Completed
Von der Tann	19,100	26	8-11"	10"	Apr 1910
Moltke Goeben	22,640	27	10-11"	11"	May 1913
Seydlitz	25,000	29	10-11"	11"	May 1913
Derfflinger					Jul 1914
Lützow	27,500	29	8-12"	12"	Oct 1915
Hindenburg					Oct 1917
Gneisenau Scharnhorst	31,300	32	9-11"	13"	Jan 1939

United States—Dreadnoughts

South Carolina Michigan	18,500	18½	8-12"	11"	Dec 1909
Delaware North Dakota	20,000	21	10-12"	11"	Apr 1910
Utah Florida	21,800	21	10-12"	11"	Sep 1911
Arkansas Wyoming	26,000	21	12-12"	11"	Sep 1912
New York Texas	27,000	21	10-14"	12"	Apr 1914
Oklahoma Nevada	27,500	21	12-14"	14"	May 1916
Pennsylvania Arizona	31,400	21	12-14"	14"	Oct 1916
New Mexico Idaho Mississippi	32,000	21	12-14"	14"	Mar 1919
California Tennessee	32,600	21	12-14"	14"	Sep 1921
Colorado Maryland West Virginia	32,600	21	8-16"	16"	Dec 1923
North Carolina Washington	35,000	28	9-16"	16"	Mar 1942
Alabama Massachusetts Indiana South Dakota	35,000	28	9-16"	18"	Nov 1942
Iowa New Jersey Missouri Wisconsin	45,000	33	9-16"	19"	Jun 1944

APP I—DREADNOUGHT AND BATTLE CRUISER CONSTRUCTION 1905-1946 (cont'd)

United States—Battle Cruisers					
Name	Tonnage	Speed (kts.)	Guns	Belt Armor	Date Completed
Alaska Guam	32,000	33	9-12"	9"	Sep 1944
Japan—Dreadnoughts					
Settsu Kawachi	21,400	20½	12-12"	12"	Jan 1912
Fuso Yamashiro	29,300	22½	12-14"	12"	Apr 1917
Ise Hivga	29,900	23½	12-14"	12"	Apr 1918
Nagato Mutsu	32,700	23	8-16"	13"	Oct 1921
Yamato Musashi Shinano	68,200	27	9-18"	18"	Aug 1942 Aug 1942 (converted to carrier)
Japan—Battle Cruisers					
Kongo Hiei Haruna Kirishima	27,500	28	8-14"	8"	Apr 1915
France—Dreadnoughts					
Courbet Jean Bart Paris France	23,400	20	12-12"	12"	Aug 1914
Bretagne Lorraine Provence	23,200	20½	10-13.4"	11"	Jul 1916
Richelieu Jean Bart	38,500	30	8-15"	16"	Jun 1940
France—Battle Cruisers					
Dunkerque Strasbourg	26,500	29½	8-13"	11"	Dec 1938