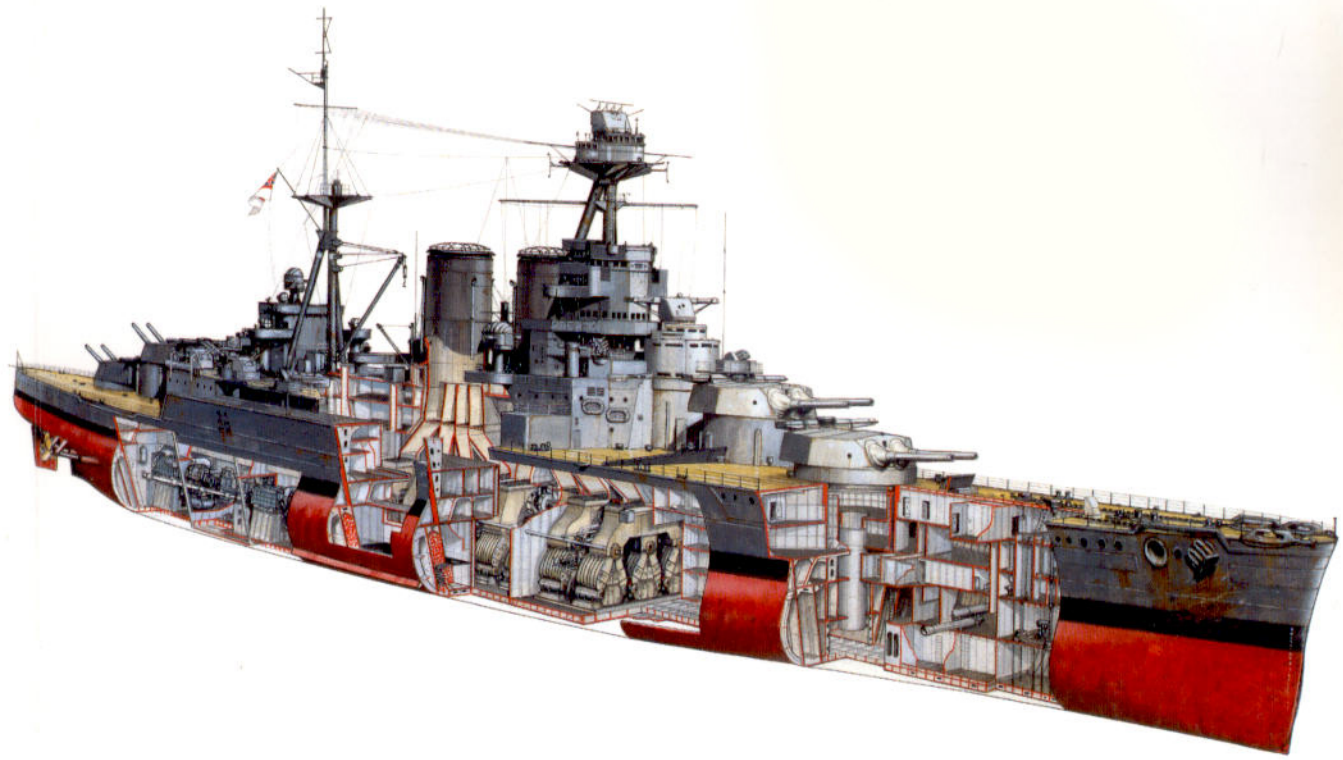
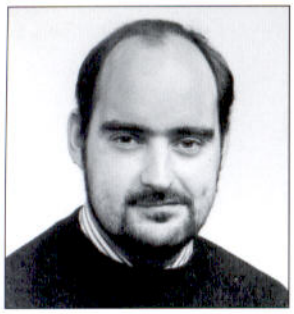
New Vanguard

OSPREY
PUBLISHING

British Battlecruisers 1939–45



ngus Konstam • Illustrated by Tony Bryan



ANGUS KONSTAM hails from the Orkney Islands and is the author of over 20 books, many of which are published by Osprey. Formerly the Curator of Weapons in the Royal Armouries at the Tower of London, he also served as the Chief Curator of the Mel Fisher Maritime Museum in Key West, Florida. His maritime titles for Osprey include New Vanguard 74: ***British Motor Torpedo Boat 1939–45*** and an ongoing series of titles detailing the vessels of the American Civil War. Angus lives in London, where he combines a free-lance museum consultancy business with a career as a historian and writer.

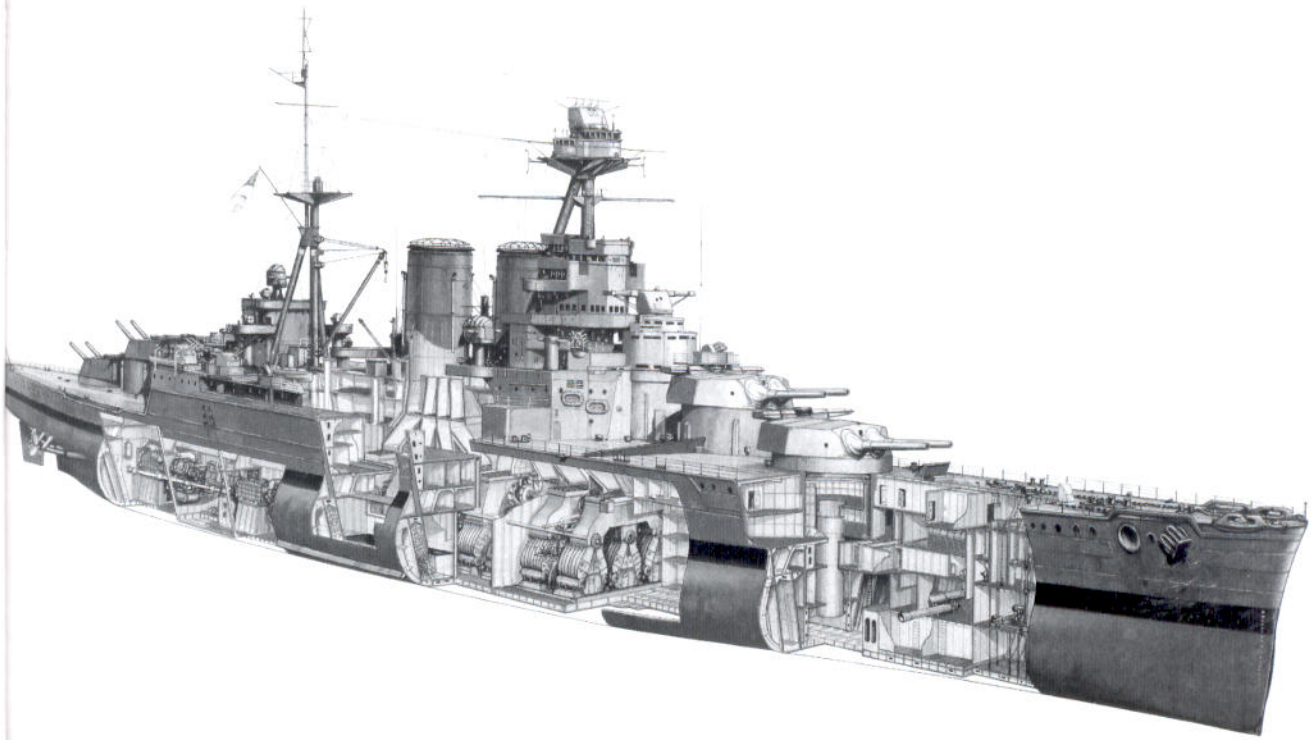
TONY BRYAN is a freelance illustrator of many years experience. He initially qualified in Engineering and worked for a number of years in Military Research and Development, and has a keen interest in military hardware – armour, small arms, aircraft and ships. Tony has produced many illustrations for partworks, magazines and books, including a number of titles in the New Vanguard series.

CONTENTS

New Vanguard • 88

OSPREY
PUBLISHING

British Battlecruisers 1939–45



Angus Konstam • Illustrated by Tony Bryan

First published in Great Britain in 2003 by Osprey Publishing, Elms Court, Chapel Way, Botley, Oxford OX2 9LP, United Kingdom.
Email: info@ospreypublishing.com

ISBN 1 84176 633 X

Editor: Simone Drinkwater
Design: Melissa Orrom Swan
Index by Alison Worthington
Originated by Grasemere Digital Imaging, Leeds, UK

Printed in China through World Print Ltd.

03 04 05 06 10 9 8 7 6 5 4 3 2 1

For a catalogue of all books published by Osprey Military and Aviation please contact:

Osprey Direct UK, P.O. Box 140, Wellingborough, Northants, NN8 2FA, UK
E-mail: info@ospreydirect.co.uk

Osprey Direct USA, c/o MBI Publishing, P.O. Box 1, 729 Prospect Ave, Osceola, WI 54020, USA
E-mail: info@ospreydirectusa.com

www.ospreypublishing.com

Artist's note

Readers may care to note that the original paintings from which the colour plates in this book were prepared are available for private sale. All reproduction copyright whatsoever is retained by the Publishers. All enquiries should be addressed to:

Tony Bryan, 4a Forest View Drive, Wimbourne, Dorset, BH21 7NZ, UK

The Publishers regret that they can enter into no correspondence upon this matter.

BRITISH BATTLECRUISERS 1939–45

INTRODUCTION

The origins of the battlecruiser can be traced back a hundred years or so before its heyday during the First World War. For centuries, commerce raiders had played an important role in naval strategy. American frigates acted as long-range cruisers during the War of 1812, and in the American Civil War, Confederate cruisers ranged the globe in search of Union shipping. The success of these regular commerce raiders prompted the British Admiralty to order three unarmoured iron frigates in the late 1860s. Designed by Sir Edward Reed, they were completed between 1869 and 1876, at which time they were reckoned to be the fastest warships afloat. *Inconstant*, *Raleigh* and *Shah* were given the armament of contemporary line-of-battle warships (which at this time were becoming known as 'battleships'), but they lacked any armour protection. They were also faster than most other warships, prototypes for the radical British policy of exchanging speed and firepower for protection. The term 'battlecruiser' had still not been coined, but the basic elements of its design were already in place. Although designed as fast cruisers, their powerful armament made it tempting for commanders to send them into battle against better-armoured warships. In 1879 HMS *Shah* was fortunate to avoid serious damage during an engagement with the Peruvian rebel ironclad *Huascar*. The tendency to use 'battle-cruisers' in roles for which they were not designed was not, therefore, a new phenomenon when they had their greatest test at Jutland in 1916.

The battlecruiser *Hood* at anchor in Scapa Flow, the anchorage of the Home Fleet. Orkney was an ideal location for a naval base for a war against Germany, as it placed the fleet between the enemy and the North Atlantic. The photograph was taken in early 1941. (Imperial War Museum, London)

Little had changed by the time the Royal Navy's new generation of battlecruisers was built during the closing stages of the First World War. The *Hood*, *Repulse*, *Renown*, *Courageous*, *Glorious* and *Furious* all shared the same attributes and faults. Graceful, fast and mostly well armed, they were also lightly armoured, and incapable of standing up to conventional battleships in action. By the time they were launched, the concept of the battlecruiser was already considered flawed. Three (*Courageous*, *Glorious* and *Furious*) were converted into aircraft carriers and although modifications were made to the remaining three vessels during the inter-war years, little was done to improve their armour protection. In effect, in the Second World War battlecruisers similar to those which had proved so vulnerable at Jutland in 1916 were to be pitted against the most modern battleships in the world, and the latest naval aircraft. This is the story of these flawed warships, two of which were lost in action during the Second World War, one to Japanese aircraft and the other to the guns of the battleship *Bismarck*. The crews of the *Hood* and the *Repulse* paid the ultimate price for a wrong turning in warship design made some 70 years before.

DEVELOPMENT

The concept of the battlecruiser

In the decade before 1914, the Royal Navy underwent something of a revolution. Under the guidance of capable and visionary senior officers such as Admiral Sir John Fisher, the fleet embraced the latest technical developments in naval warfare. The result led to the replacement of the main battle fleet with dreadnought warships, larger, more powerful and more capable than the pre-dreadnought battleships which had hitherto formed the bulk of the battle fleet. In effect, Fisher and his contemporaries embraced these technical developments in order to maintain Britain's position as the world's principal naval power.

It is somewhat ironic that while Sir John Fisher is best remembered as the man who designed the *Dreadnought*, he was not a great advocate of the battleship. As Britain's First Sea Lord in 1904–11, he was the man responsible for creating the fleet with which Britain would enter the First World War. From his writings, it is clear that he considered the days of the battleship were numbered, and indeed he seems to have envisaged that in any future war, mines and submarines could be used to counter enemy battlefleets in European waters. For Fisher, the torpedo rather than the big gun would be the likely arbiter of victory at sea. While Britain's traditional reliance on her main battlefleet meant that Fisher had little option but to approve the construction of new and powerful dread-

HMS *Inflexible*, one of the first batch of three battlecruisers built for the Royal Navy. Part of the *Invincible* class, she entered service in 1908, prompting the commissioning of a second batch of larger and more powerful battlecruisers the following year. She was fortunate to survive the Battle of Jutland unscathed, but three of her fellow battlecruisers were lost during the action. (Imperial War Museum, London)

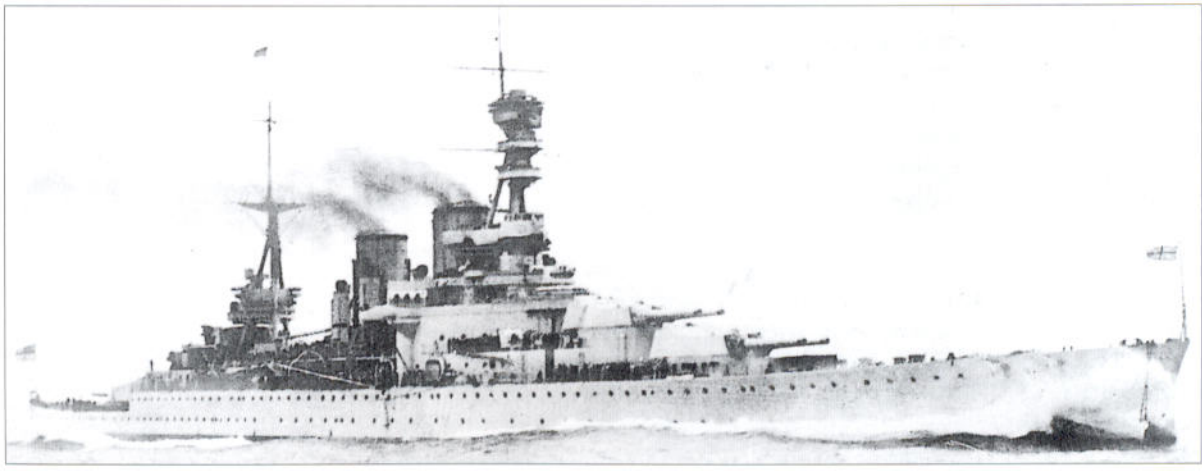
nought battleships, he also sought more innovative ways to increase British naval power.

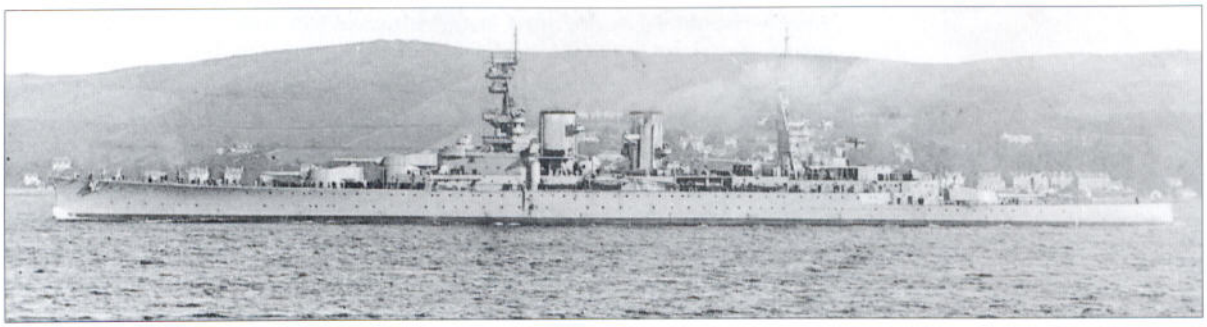
In the pre-dreadnought navy, the cruiser fleet was divided between armoured and unarmoured (or 'protected') cruisers. Later, the terms heavy and light cruiser would be applied to the two ship types, by which time the difference between them relied more on the size of armament (8-in. or 6-in. main guns) rather than armour protection. Fisher saw the need for a third type of cruiser. To him the role of Britain's armoured cruisers was to counter the activities of enemy cruisers or raiders on the high seas. Fisher therefore saw the need for a 'super' armoured cruiser, or 'battlecruiser', fast enough to intercept and destroy any enemy cruiser. Long-range cruisers rather than mainstays of the battlefleet, they would be ideally suited to hunting down enemy light forces on the high seas.

Unfortunately, Fisher also came to believe that battlecruisers could play a role in support of the main battlefleet. Ideal as fast scouts, with the armament to brush aside enemy cruiser screens, they would also have the speed to keep out of reach of enemy battleships. The danger was that he sacrificed armour in order to increase the armament of these ships. In naval design, the trinity of armour, armament and speed are inevitably inter-related, so that an increase in one element usually has to be compensated for by a reduction in another. Fisher was willing to trade armour for firepower and speed. While this was acceptable if battlecruisers were deployed as long-range cruisers, it made them vulnerable in action against enemy capital ships. In effect the battlecruiser would become a hybrid, too powerful to waste in one role, and too weak for the other.

During the Russo-Japanese War (1904–05), the Japanese deployed large, fast, armoured cruisers with a mixed armament of 8-in. and 6-in. guns. Lacking sufficient capital ships to match the Russians, Admiral Togo deployed these armoured cruisers in support of his main fleet. The Japanese victory at the battle of Tsushima (1905) appeared to suggest that these ships could indeed serve successfully as part of the battlefleet. This was a dangerous precedent, but it played a part in persuading the British authorities to go ahead with the 'super' armoured cruisers that Fisher was contemplating. Fisher's first battlecruiser entered service in 1908, less than two years after the introduction of the battleship *Dreadnought*. By that time the Germans had already begun

HMS *Renown*, as she appeared in late 1918. Like her sister ship, her forward funnel was raised slightly shortly after she entered service. Note the scuttles (portholes) along her side, a sure indication that her armour belt was extremely thin when first built. (Royal Naval Museum, Portsmouth)





The *Repulse* in August 1916, steaming down the River Clyde bound for Scapa Flow. She had just left the John Brown Shipyard after completing her fitting out. Modifications were made in early 1917, when her forward funnel was raised so that smoke from it would rise clear of her after funnel. (Museum of Naval Firepower, Portsmouth)

work on their own battlecruiser squadron. The problem was that, since these vessels carried a similar armament to the dreadnought battleships of the time, it was almost inevitable that a commander would feel obliged to use these powerful assets in a fleet action. During the First World War it turned out that the greatest risk to the battlecruiser was not an enemy battleship but another battlecruiser. The development of battlecruiser squadrons by both the British and the Germans meant that a clash between battlecruisers became inevitable.

However, during the First World War, battlecruisers were not always deployed in support of the battlefleet. At the battle of the Falklands (1914), the British battlecruisers *Invincible* and *Inflexible* were used to intercept and destroy a powerful enemy cruiser force. Operating far from their home ports, the two warships proved ideally suited to this role. The following year, during the battle of Dogger Bank, battlecruiser was pitted against battlecruiser for the first time. After this, both German and British commanders deemed it vital that their battlecruiser squadrons remain concentrated in case of further clashes. From that point on, battlecruisers were forced to perform a role for which they had never been designed.

The British battlecruiser force built up before the First World War can be divided into two groups. The first comprised up-gunned versions of contemporary armoured cruisers. These battlecruisers, launched between 1908 and 1912, consisted of two sub-groups: the *Invincible* class of three ships and the *Indefatigable* class, also of three ships. All were armed with 12-in. guns. The second group, commissioned between 1912 and 1914 (*Lion*, *Princess Royal*, *Queen Mary* and *Tiger*) represented a change in design. Unlike the vessels of the first group, they carried the same 13.5-in. armament as contemporary British dreadnought battleships, but of course they lacked the armour protection carried by these battleships. The third generation of battlecruisers laid down under Admiral Fisher's direction in 1915 and 1916 continued this tendency towards increased armament and speed at the expense of armour. They were also able to take advantage of the new 15-in. guns, which had entered production at the same time and which formed the armament of the second generation of British dreadnought battleships. While the opportunity to modify these warships in light of wartime experience presented itself, little was done to alter their basic design until after they entered service. The *Renown*-class battlecruisers which entered service during 1916 were little more than up-gunned versions of the earlier battlecruisers which had performed so badly at Jutland (31 May 1916). No amount of later modifications or refits could alter the fact that the

reputation of the battlecruiser had been destroyed before these ships joined the fleet, and senior naval commanders realised they had been designed around a flawed premise.

Renown and *Repulse*

After the commissioning of HMS *Tiger* in October 1914, the Admiralty decided not to build any more battlecruisers. This policy changed with the re-appointment of Admiral Fisher as First Sea Lord later that month. As the leading advocate of the battlecruiser, Fisher saw the success of the *Invincible*-class battlecruisers at the battle of the Falklands as a vindication for his creation. He was able to reverse the decision, and consequently an order was placed for two new battlecruisers. When critics argued that the war would be over before the ships would enter service, Fisher replied that they would be built as fast as the *Dreadnought* was a decade before. The *Repulse* and the *Renown* were laid down in January 1915 and, true to his word, Fisher made certain that they entered service less than 20 months later. Joining the fleet shortly after the Battle of Jutland, they helped replace the three battlecruisers sunk during that engagement, but precisely because of that experience by that stage the value of the battlecruiser as a weapon of war was being questioned.

HMS *REPULSE* AND *RENOWN*, 1916

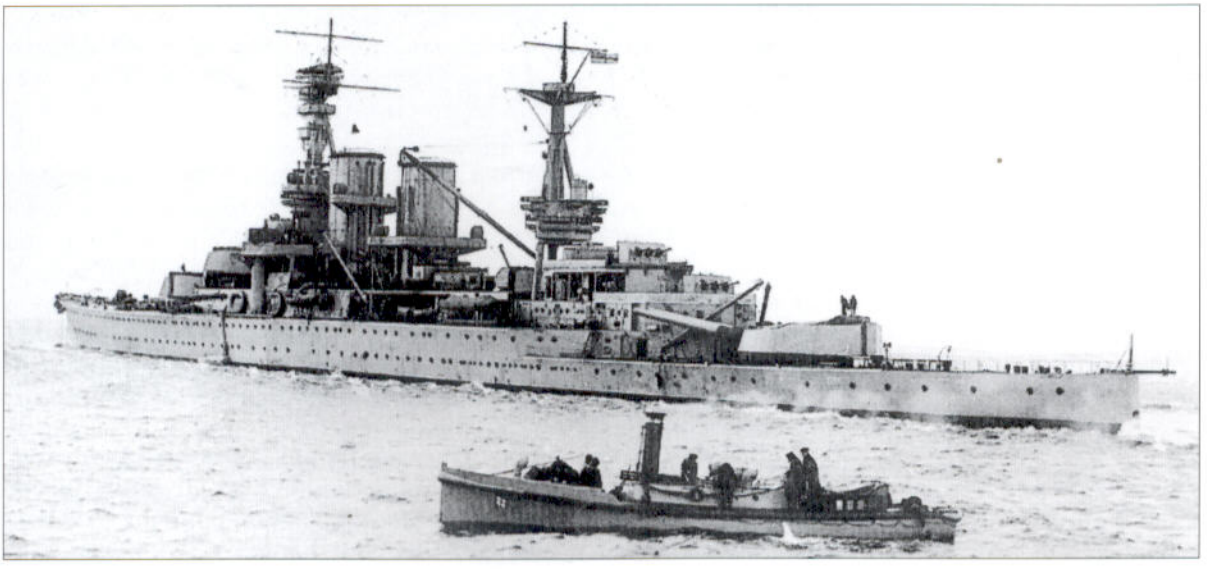
Repulse
Laid down: 25 January 1915 (John Brown Shipyard, Clydebank)
Launched: 8 January 1916
Commissioned: August 1916
Renown
Laid down: 25 January 1915 (Fairfield, Glasgow)
Launched: 4 March 1916
Commissioned: September 1916
Both ships:
Displacement: 26,500 tons
Length overall: 794ft
Beam: 90ft
Draught: 25ft 6in.
Machinery: 4-shaft Brown-Curtis turbines, 42 Babcock & Wilcox boilers; 112,000shp
Maximum speed: 31 knots
Armour: Belt: 1.5–6in.
Bulkheads: 3–4in.
Barbettes: 3–7in.
Turrets: 7–11in.
Control tower: 10in.
Deck: 0.5-in. to 3in.
Armament: 6 x 15-in./42-cal. Mark I guns in three twin turrets
17 x 4-in./44.3-cal. Mark IX BL guns in five triple PXII mounts, and two single mounts
2 x 3-in. 20-cwt Mark I anti-aircraft guns
2 x 21-in. submerged torpedo tubes
Complement: 1,024 men

The design of the *Renown* class was heavily influenced by existing plans for the *Revenge*-class battleship, as Fisher's speed of production could only be achieved through the wholesale adoption of the 15-in. gun mountings, turntables and barbettes used in that class. Indeed, con-

struction of the *Revenge* class was delayed slightly because gun mountings allocated to them were re-allocated to the battlecruisers. This emphasis on using what was available at the time meant that, while the Germans were building battlecruisers with eight guns, the next generation of British battlecruisers employed only six 15-in. guns. Fisher's influence can also be seen in his selection of secondary armament for the vessels. Originally, the battlecruisers were allocated five triple 4-in. gun mountings and two single 4-in. mounts. These triple mountings were extremely awkward to operate, and although the majority were deployed along the centreline to allow the guns to fire on either beam, they proved less efficient than a more conventional form of secondary armament.

Unlike the *Hood*, as will be seen, the armour of these ships was based on that of the pre-war *Invincible* class, rather than on more modern designs. To Fisher, propulsive speed was important, but politically, speed of production was paramount. Therefore, although the Director of Naval Construction (DNC) advocated the use of new lightweight turbine machinery and small-tube boilers (as used in the *Hood*), Fisher opted for the same machinery as used in the *Tiger*, although additional boilers were added, giving the new battlecruisers a top speed of 30 knots.

When the battlecruisers joined the Grand Fleet in October 1916, the commander-in-chief, Admiral Sir John Jellicoe, immediately recommended that they be given additional armour protection. By early 1917 both warships had been sent back to the shipyard, where 500 tons of additional armour plating was added to the decks and to the belt in the vicinity of their engine rooms, steering areas and magazines. In addition, the hulls needed additional stiffening, as it was discovered that they lacked longitudinal strength. The DNC examined both ships and reported that they still lacked sufficient armour to make them proof against 15-in. shells. In July 1918 it was decided to use the 9-in. armour belt from the former Chilean battleship *Almirante Cochrane* to augment the protection of one of the two battlecruisers. This British-built warship had been bought into Royal Naval service in 1917, and was being converted into the aircraft carrier *Eagle*. During this process her armour



HMS *Repulse* in the Firth of Forth, photographed during the spring of 1917 when she completed a brief refit at Rosyth. This view shows the triple 4-in. gun mountings fitted above 'Y' turret. (Museum of Naval Firepower, Gosport)

plating was removed, then allocated to the *Renown*. This vital refit took just under three years to complete. The *Repulse* had to wait until 1933 for her armour upgrade. Other DNC proposals such as the addition of anti-torpedo bulges or improvements to the secondary armament had to wait until after the war.

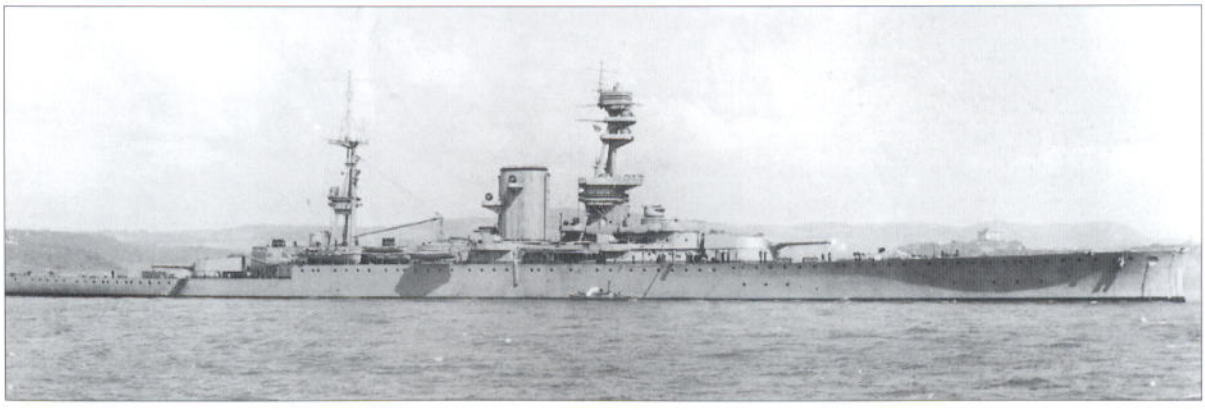
Other wartime modifications included the addition of an 'aircraft flying-off platform' mounted on top of the 'B' turret of the *Repulse*, making her the first British capital ship to carry her own spotter plane. The first aircraft carried on board was a specially converted Sopwith Pup. The *Renown* received her own aircraft in early 1918.

For the rest of their lives, both warships paid frequent visits to the shipyards, and underwent so many major alterations that they became known in the service as 'Refit' and 'Repair'. These refits transformed the two battlecruisers, making them very different from the ships originally designed by Fisher. Although they were initially identical, the refits resulted in the ships taking on a visibly different appearance from each other, as the refitting to the *Repulse* concentrated on her armour and the work on the *Renown* concentrated on her upper works. Although the *Repulse* was lost to air attack in 1941, the *Renown* went on to receive further refits, and by the end of the Second World War she had been transformed into a fully modernised battleship rather than a battlecruiser, and was a useful member of the fleet.

Courageous and *Furious* classes

For someone who was not strictly a believer in the battlefleet, Admiral Fisher was responsible for the construction of more capital ships than any other First Sea Lord in history. After ordering the *Renown*-class battlecruisers, Fisher faced a renewed Cabinet ruling against the construction of new capital ships. He circumvented this by ordering three 'large light cruisers' in early 1915, designed to support potential British naval landing operations in the Baltic Sea. In effect, the three warships were light battlecruisers, sharing the characteristics of having a shallow draught and light armour. The two vessels of the *Courageous* class (*Courageous* and *Glorious*) were laid down in the spring of 1915, and both entered service in January 1917 as light battlecruisers. Sceptics in the fleet and the press immediately nicknamed the two ships 'Curious' and 'Spurious', and generally their value to the fleet was considered minimal.

HMS *Courageous*, as she appeared when she first entered service in January 1917. This light battlecruiser was nicknamed 'Curious' by the rest of the fleet due to her unusual appearance. From the photograph it appears that the painting of her hull with a splinter camouflage pattern has only just got under way, as only one dark grey panel can be seen. (Imperial War Museum, London)



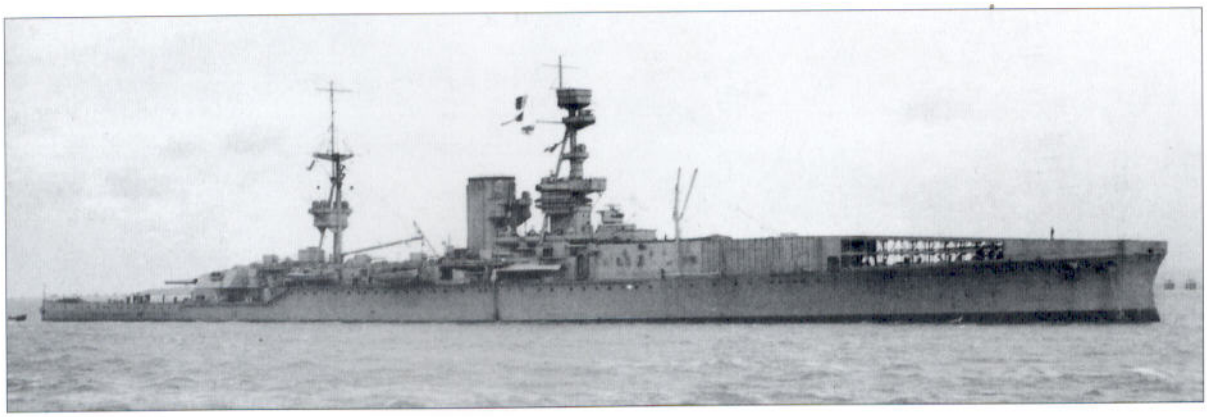
HMS *GLORIOUS* AND *COURAGEOUS*, 1917

Courageous
Laid down: 28 March 1915 (Armstrong, Elswick)
Launched: 5 February 1916
Commissioned: January 1917
Converted into an aircraft carrier, 1923
Fate: Torpedoed by U-boat, 17 September 1939

Glorious
Laid down: 1 March 1915 (Harland & Wolff, Belfast)
Launched: 20 April 1916
Commissioned: January 1917
Converted into an aircraft carrier, 1923
Fate: Sunk by German battlecruiser *Scharnhorst* off Norway, 8 June 1940

Both ships:
Displacement: 22,690 tons (fully laden)
Length overall: 786ft
Beam: 81ft
Draught: 23ft 4in.
Machinery: 4-shaft Parsons turbines, 18 Yarrow boilers; 90,000shp
Maximum speed: 31.5 knots
Armour: Belt: 2–3in.
Bulkheads: 2–3in.
Barbettes: 3–7in.
Turrets: 11–13in. (on face)
Control tower: 10in.
Deck: 0.75–1.5in.
Armament: 4 x 15-in./42-cal. Mark I guns in two twin turrets
18 x 4-in./44.3-cal. Mark IX BL guns in six triple PXII mounts
2 x 3-in. 20-cwt Mark I Anti-Aircraft guns
2 x 21-in. submerged torpedo tubes
Complement: 828 men

The *Furious* was laid down in June 1915 and entered service two years later, some six months after the other two vessels. If the original batch of battlecruisers represented the ultimate development of the armoured cruiser, these vessels did the same for the light cruiser. No class of capital ship ever built for the Royal Navy represented such a radical cross-over between existing ship types or such a hybrid appearance as the light battlecruisers. These vessels were based solely on the plans of one senior officer for use in one particular operation. As Fisher's Baltic invasion never took place, the navy was left to find a role for these peculiar warships.

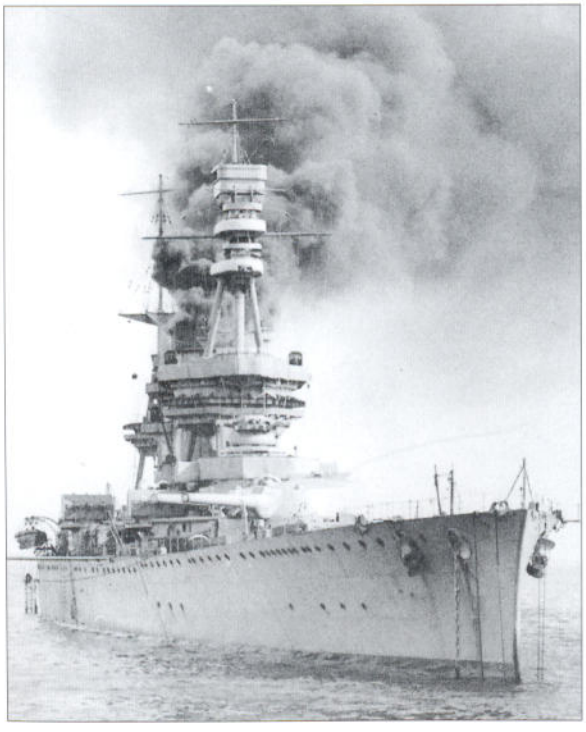


HMS *Furious* as she appeared when she first entered service in July 1917. Her forward turret was replaced by a small flight deck before the battlecruiser was completed, and the ship was used to conduct experiments into naval aviation during 1917. (Imperial War Museum, London)

HMS *FURIOUS* (1917)

Laid down: 28 March 1915 (Armstrong, Elswick)
Launched: 5 February 1916
Completed as battlecruiser: September 1917
Converted to full aircraft carrier: December 1917
Fate: broken up in 1948
Displacement: 22,890 tons (fully laden)
Length overall: 786ft 6in.
Beam: 88ft
Draught: 19ft 9in.
Machinery: 4-shaft Brown-Curtis turbines, 18 Yarrow boilers; 90,000shp
Maximum speed: 31.5 knots
Armour: Belt: 2–3in.
Bulkheads: 2–3in.
Barbettes: 4–7in.
Turrets: 9in. (on face)
Control tower: 10in.
Deck: 0.75–3in.
Armament: 1 x 18-in./40-cal. Mark I gun;
11 x 5.5-in./50-cal. Mark I BL guns in single mounts;
2 x 3-in. 20-cwt. Mark I Anti-Aircraft guns in single mounts;
2 x 21-in. submerged torpedo tubes
Aircraft: up to 10 (but deployment was experimental only)
Complement: 928 men

HMS *Glorious* preparing to get under way, 1917. When the light battlecruiser entered service in January 1917, she was considered too lightly armoured to risk her participation in a naval engagement against other battlecruisers. Despite these reservations, both *Glorious* and *Courageous* participated in an action off Heligoland Bight on 17 November 1917, when they damaged the German light cruiser *Königsberg*. (Imperial War Museum, London)

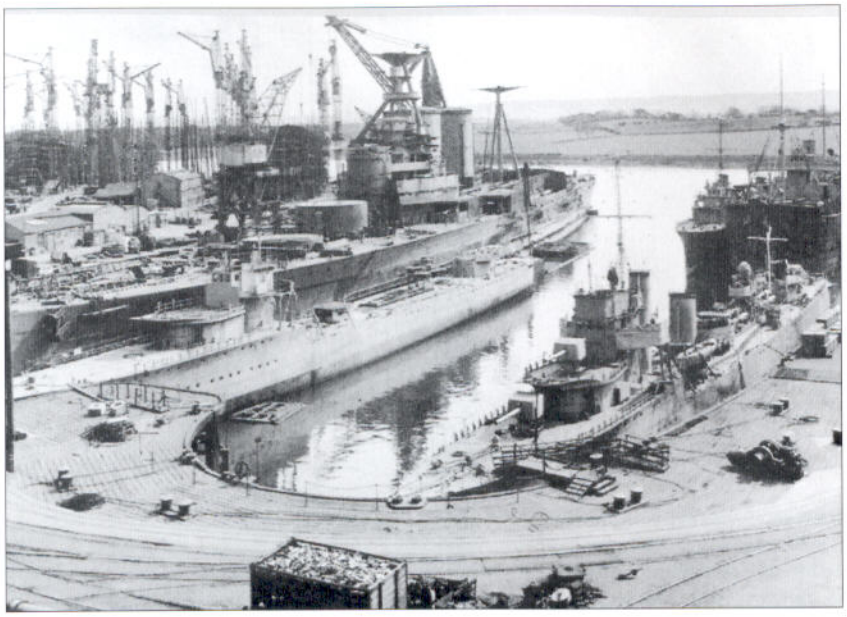


The design of these warships was as unusual as their original role. They carried very little armour, making them largely unfit for service in the battlecruiser squadrons. Also, *Courageous* and *Glorious* both carried four 15-in. guns in two twin turrets, a broadside armament which was considered insufficient to guarantee success in an action with enemy capital ships, although the guns were of a larger calibre than those carried by most other battlecruisers. In the end, the light battlecruisers were attached to the cruiser squadrons of the Grand Fleet and served out the last years of the First World War in the North Sea. Fortunately, they rarely saw action. Even more curious was the projected main armament of the third of the group. The *Furious* was designed to mount two 18-in. guns in two single turrets, one forward and the other aft. She was never completed as Fisher intended, as only her after gun was ever mounted. Before she was completed the forward portion of the ship was given a flight deck, and she became the only aircraft carrier in history to carry an 18-in. gun.

Although viewed as misfits or freaks, Fisher's light battlecruisers were only a failure because they were never used in the one role which would have suited them best. Large, well-armed and lightly armoured battlecruisers would have made ideal long-range commerce raiders or would have been perfect to hunt down enemy raiders. Two decades later, the Germans perfected this idea when they produced the pocket battleship.

After the war *Furious* became a fully fledged aircraft carrier, while the large and fast hulls of the

Courageous and *Glorious* were also deemed ideal for conversion, and from 1923 the two light battlecruisers were converted for use as fleet carriers.



HMS *Hood* being completed in the John Brown Shipyard on Clydeside. After her launch in August 1918, the fitting out of the battlecruiser took another 18 months. At the time, she was the largest warship ever built in the yard. (Royal Naval Museum, Portsmouth)

Hood

In late 1915 the Admiralty asked the DNC to draw up plans for an experimental shallow-draught battleship, incorporating the latest notions of anti-torpedo protection. In theory, the design would also incorporate any lessons learned during the first year of the war. Admiral Jellicoe argued that a fast battlecruiser was more useful to him than another slow dreadnought, so the Admiralty leaned towards the creation of a new, improved battlecruiser, similar to the latest *Queen Elizabeth*-class 'fast' dreadnoughts then in production, and capable of carrying the same armament. It was also envisaged that the new warship would have an unbroken freeboard (or upper deck), to improve her seaworthiness. Although several plans were produced by the DNC, two battlecruiser designs (labelled '1' and '2') became the firm favourites. The first of these was ordered in early 1916, and the *Hood* was duly laid down in May, ironically on the same day as the battle of Jutland was fought.

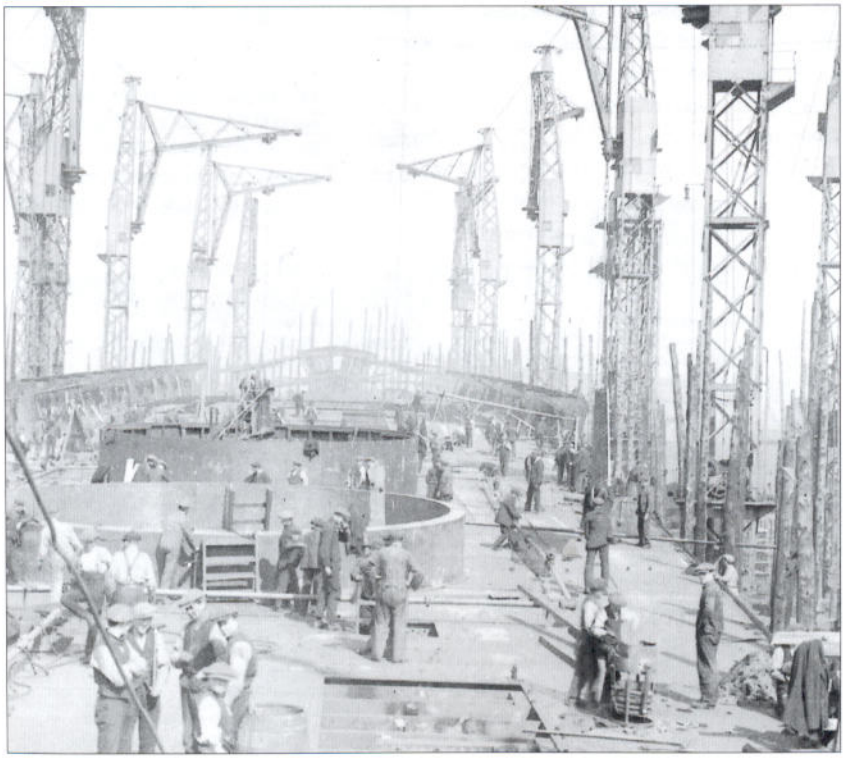
HMS *HOOD* (1920)

Laid down: 31 May 1916 (John Brown Shipyard, Clydebank)
Launched: 22 August 1918
Commissioned: May 1920
Displacement: 41,200 tons (fully laden)
Length overall: 860ft
Beam: 104ft
Draught: 28ft 6in.
Machinery: 4-shaft Brown-Curtis turbines, 24 Yarrow boilers; 144,000shp
Maximum speed: 31 knots
Armour: Belt: 5–12in.
Bulkheads: 4–5in.
Barbettes: 5–12in.
Turrets: 5–15in.
Control tower: 9–11in.
Deck: 1.5–3in.
Armament: 8 x 15-in./42-cal. Mark I guns in four twin turrets
12 x 5.5-in./50-cal. Mark I BL guns in single mounts
4 x 4-in./45-cal. Mark V QF Anti-Aircraft guns
4 x 21-in. above water torpedo tubes in two fixed twin mounts;
2 x 21-in. submerged torpedo tubes
Aircraft: 2
Complement: 1,418 men

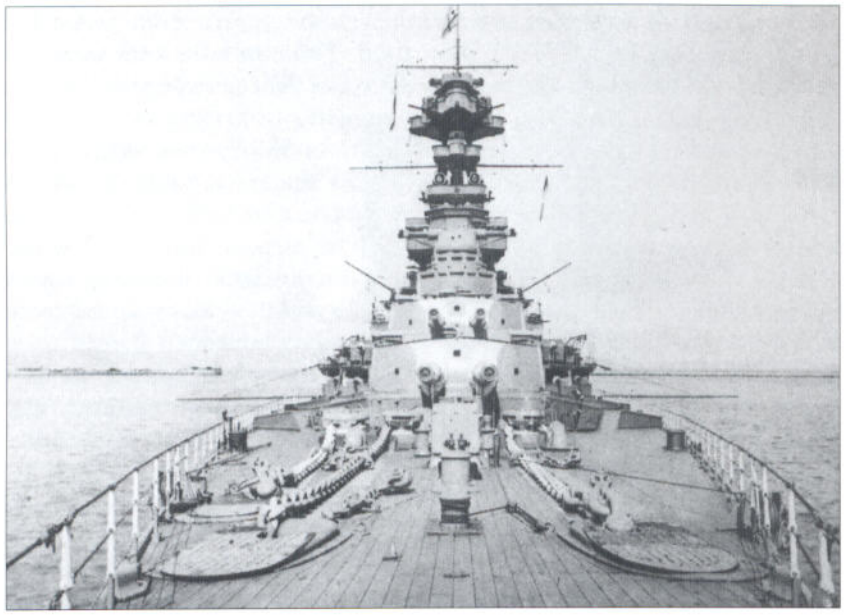
The loss of three battlecruisers in the action caused a temporary panic in the Admiralty, and all work was halted. Three months later work was resumed, the design having been modified in light of experience gained during the battle. This involved improvements to her armour belt, and an increased displacement. This time, nobody objected when speed was sacrificed in exchange for armour. Her shallow draught was meant to reduce her vulnerability to torpedo attack, and further anti-torpedo protection was incorporated in the form of torpedo bulges below her waterline. Her hull was also given a distinctive flare, ensuring enemy shells could not strike the hull at right angles and therefore increasing the protective qualities of the armour. A secondary effect was that it made the hull extremely elegant. Another lesson learned at Jutland was that secondary armament was often mounted too low to be of much use. Consequently *Hood* carried her secondary guns on her main deck rather than in sponsons set in the hull.

By this time Jellicoe had changed his opinion of battlecruisers, and argued that naval resources would be better spent by creating more destroyers and escort vessels than another battlecruiser. At least he was now being consistent, as he also criticised the designs of the *Renown* class and the *Courageous* class. His comments were noted but ignored, and work continued. Originally the Admiralty planned to build four *Hood*-class battlecruisers (*Hood*, *Rodney*, *Howe* and *Anson*). When the Germans abandoned their battlecruiser programme in early 1917, three of the four British battlecruisers were cancelled, and in 1918 their hulls were broken up on the stocks. The building of the *Hood* was too far advanced to cancel, and her construction was allowed to continue. Further small modifications were made during the final years of her construction, including the removal of part of her above-water torpedo armament. Despite these changes, little was done to implement fully the lessons learned at Jutland. Even the DNC noted that the original design of the *Hood* reflected pre-Jutland notions concerning armour and not much had been changed to remedy any defects in these ideas in the light of experience.

The battlecruiser *Hood* under construction at the John Brown Shipyard on Clydeside. The photograph was taken during late 1919 from the quarterdeck of the vessel. The barbettes of 'X' and 'Y' turrets are both nearing completion, while her light deck plating is still being bolted into place. (Imperial War Museum, London)



This said, *Hood* marked the high point of battlecruiser design. Essentially she was a battlecruiser that was capable of fighting off other battlecruisers, her improved armour protection giving her an edge over her rivals. As such, the *Hood* was the British answer to the late-war German bat-

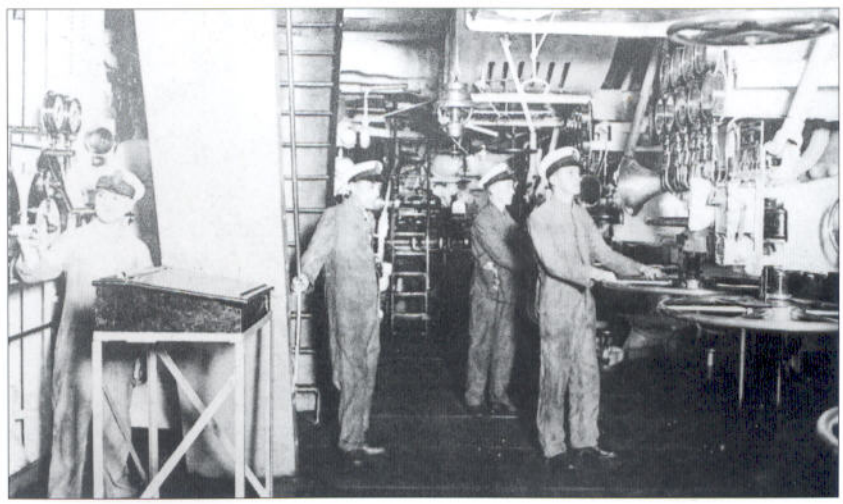


The long, graceful forecastle of HMS *Hood* measured over 50 metres from the tip of the bow to the breakwater immediately forward of 'A' turret. The open hatch amidships leading to the forward heads obscures the view of the main capstan, located immediately forward of the three cable holders which controlled the movement of the battlecruiser's three forward anchor cables. (George Malcolmson Collection)

tlecruisers, which were reportedly being built to carry 15-in. guns. When the construction of these German ships was cancelled, the *Hood* became the unrivalled 'queen of the battlecruisers'. The *Hood* was originally designed to displace 36,000 tons, but by the time she was completed this had increased to 42,670 tons. At 860ft long, this made her the largest warship in the world when she was launched. Upon entering service in 1920 she was deemed 'a beautiful lady', and became the showpiece of the fleet. It was the press who dubbed her 'the mighty *Hood*', not the naval officers who realised her limitations. Although she would receive minor modifications during her career, she was never fully modernised. As such she remained a warship of First World War vintage, and as such she was sent to sea in 1941 to fight one of the most modern battleships then in existence.

It is worth noting that the *Hood* class was not the only 'super' battlecruiser design drawn up by the Admiralty. By the end of the war the British realised that the bulk of the fleet was virtually obsolete, as the early 12-in. dreadnoughts were outclassed by the new 'super-dreadnoughts' commissioned by the United States and Japanese navies. The latest American battleships carried modern 14-in. guns mounted in triple turrets, giving them a firepower far superior to most battleships in the British fleet. In 1919 the United States Navy ordered four battleships of the *Colorado* class, carrying 16-in. guns. This was followed in 1920 by an order for six

The forward engine room control space on HMS *Hood*, looking from the starboard end of the starting platform. The desk was used by the duty artificer to record readings or changes, and behind it a telephone cabinet provided a link between the bridge and the engine room. (George Malcolmson Collection)

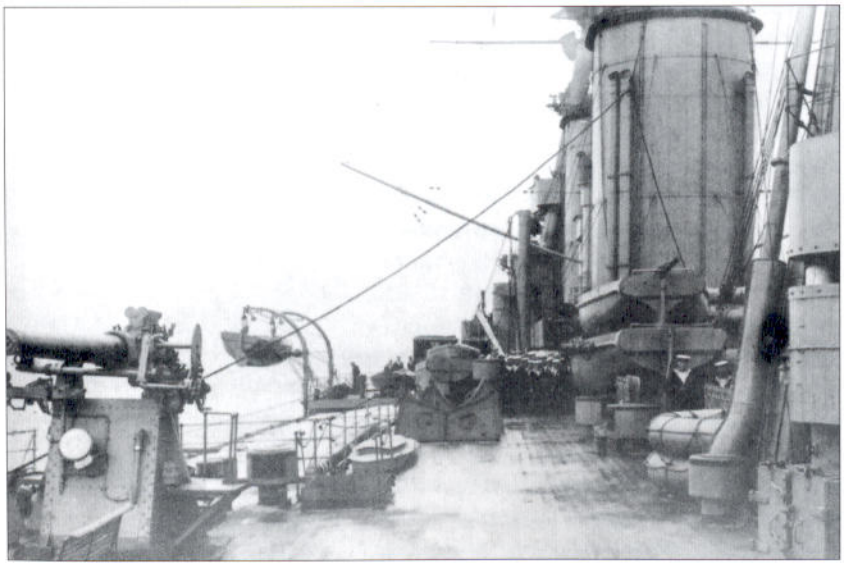


16-in. battlecruisers. British naval designers came up with a design for a new class of four battlecruisers based on experience gained during the war. These warships would be larger, better armoured versions of the *Hood*, but would carry nine 16-in. guns in three triple turrets. Designated 'Class G 3', the design was approved in August 1921, and orders were placed two months later. However, the programme was suspended within a month, pending the outcome of the Washington Naval Conference, and the project was abandoned under the terms of the final treaty. Elements of the design were later incorporated into plans for the *Rodney* class of battleships.

CONSTRUCTION

The way battlecruisers were built before the First World War was relatively straightforward, but after the losses incurred at Jutland, the design and construction of these vessels became a matter of national concern. The Hood was laid down in the John Brown Shipyard on Clydeside on the same day that the British battlecruiser squadron was going into action at Jutland. Similarly, while the construction of the *Repulse* and *Renown* followed standard contemporary practice, the events of 1916 forced the DNC to re-examine the design of these vessels, and to recommend ways in which their protection could be increased. One problem was that five days after the *Repulse* and *Renown* were laid down, the Germans had laid the first keel of four improved battlecruisers. The *Hood* was effectively the British response to this German initiative.

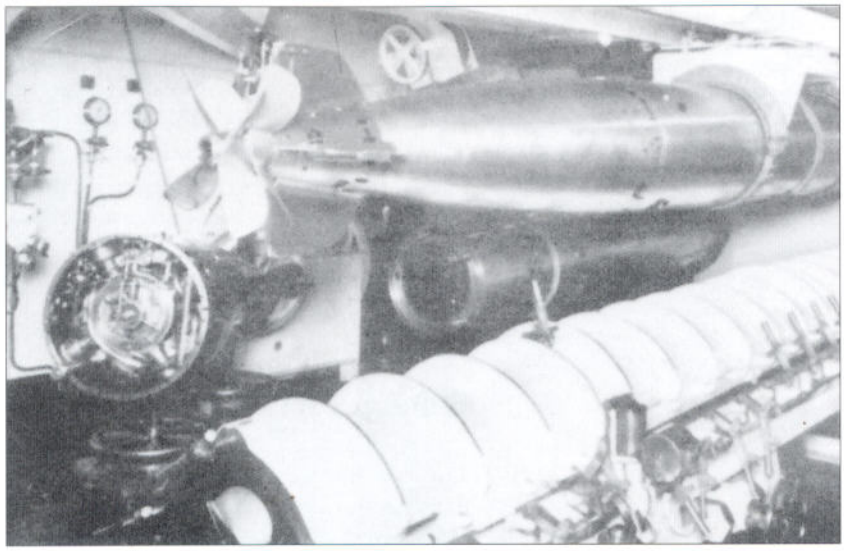
All the British battlecruisers built between 1915 and 1920 shared the same basic styles of construction. They all had one deck less than contemporary dreadnought battleships, partly due to the design legacy of the armoured cruiser, and partly to reduce weight and therefore increase the vessel's ratio of propulsive power to displacement. In other words, they were lower and sleeker than battleships. They also lacked decent armour protection. The *Renown* and the *Repulse* were being fitted out as Jutland was fought, and although these handsome ships were extensively refitted in due course, their underlying design was never any better protected than that of pre-war British battlecruisers.



The shelter deck of HMS *Hood*, viewed from the port side amidships, looking forward. On the left is a single 4-in. Mark V QF gun, on its extremely exposed Mark III mounting. Originally designed as a low-angle anti-torpedo boat weapon, it was converted into an anti-aircraft gun during the First World War. In the summer of 1939 *Hood*'s four Mark V guns were replaced by modern 4-in. Mark XVI QF guns on twin mountings. (Museum of Naval Firepower, Gosport)

The construction of all these ships involved the laying of a keel of boxed steel sections on top of a double bottom. Various longitudinal and transverse frames were added and then transverse beams were put in place to support the various decks. The tendency was to make decks

run throughout the length of the ship, which helped maintain the continuity of deck protection, and added strength to the vessel. Watertight bulkheads extended from the keel to the upper deck (or platform deck). Skin and plating were added before the armour belt was bolted into place. This was a period of continual improvement in armour protection, and while the *Renown*-class battlecruisers were built using straightforward armour plating, the *Hood* incorporated improvements in steel quality which made her protection superior to that of the latest *Queen Elizabeth* class of battleships. In addition, the sloping of her armour belt increased the protection afforded by this armour plate.

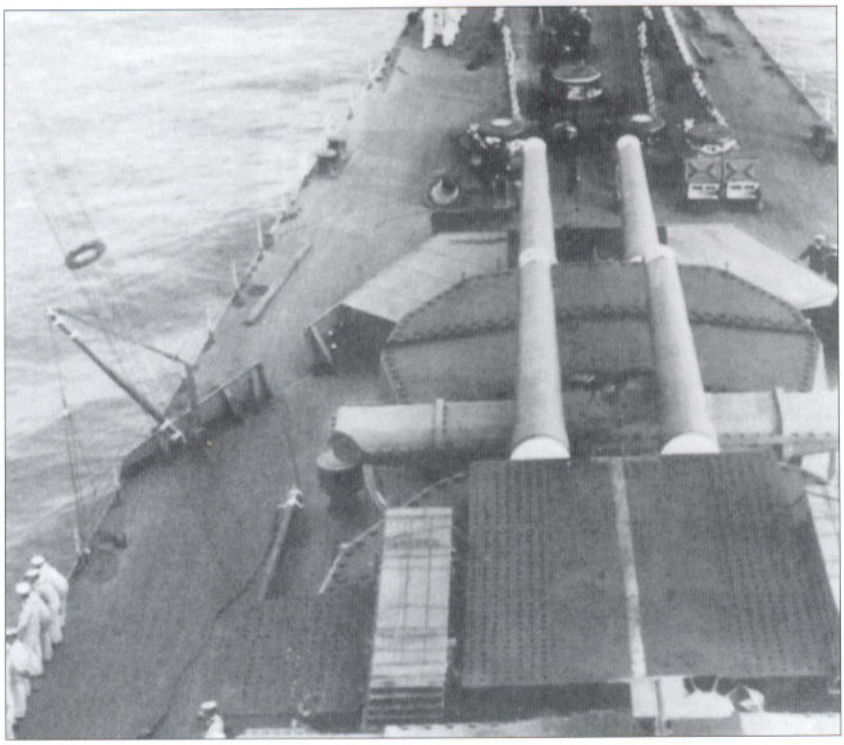


The starboard submerged torpedo tube room of HMS *Hood* contained space for the tube and approximately three reload torpedoes. The tube itself can be seen in the foreground, while a reload is suspended above it. In the background a third torpedo has been partly disassembled for maintenance. (Museum of Naval Firepower, Gosport)

The function of armour plating was to protect the ship, and to safeguard its fighting qualities. This usually meant protecting the propulsion systems, watertight integrity, and main armament and ammunition. This took two forms: above-water protection against enemy shells, and below-water protection against enemy torpedoes. Traditionally, the rule of thumb applied to the protection of capital ships was that they should be protected from shells fired by vessels of a similar type. This meant that a battleship carrying 15-in. guns should carry sufficient protection to prevent her armour belt being penetrated by enemy 15-in. shells, which required approximately 15in. of steel armour plating in her belt. This was the ideal, but battlecruisers traded protection for speed, while maintaining a powerful armament. The armour protection of most battlecruisers was approximately 30–50 per cent less than the thickness required by this simple formula.

The first dreadnoughts were expected to fight at ranges less than 12,000 yards, so the trajectory of incoming shells was relatively flat. As ranges increased, the likelihood that long-range shells would strike the deck of a ship increased. Experience gained during 1914–16 suggested that engagement ranges of 15,000 to 20,000 yards were now the norm. This meant that, increasingly, the protection of decks and turrets from plunging fire became almost as important as the protection of the hull by an armour belt.

Most forms of armour plating fell into two groups: armour plate or protective plate. The former consisted of carbon-enriched steel plates which were fixed to the hull by means of large bolts. This formed the belt. Protective plate was used on decks and bulkheads, and was the primary form of protection against plunging fire. It consisted of layers of toughened steel plates, riveted in place as part of the ship's structure. This was also known as horizontal protection. While the notion of vertical protection (belt armour), was highly developed, horizontal protection was



The forecastle of HMS *Hood* photographed at some time between 1920 and 1923. The flying-off platform fitted to the roof of 'B' turret is clearly visible. As the ammunition boom is deployed on the port side of 'A' turret, it appears that the battlecruiser was photographed while she was taking on board ammunition. (Museum of Naval Firepower, Gosport)

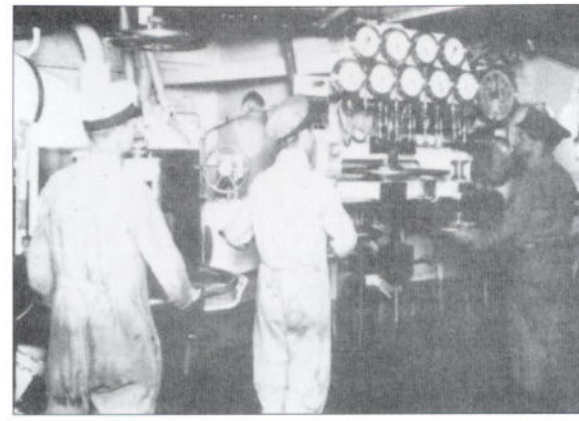
a relatively new phenomenon, brought about by the increased power of naval armament.

In all British battlecruisers built between 1915 and 1920, a layered system of horizontal protection was employed. Although this was usually insufficient to prevent the penetration of the deck, its main aim was to prevent damage to vital parts of the ship several decks down. Each deck of a battlecruiser consisted of relatively light protective plates, which meant that a heavy shell striking the upper deck vertically would probably penetrate through one or two more decks before it exploded. While later modifications improved the effectiveness of a horizontal protection in these ships, it remained an Achilles heel, and battlecruisers remained vulnerable to plunging fire.

Experience gained both before and during the First World War also showed that capital ships were vulnerable to attack by torpedoes. While it was considered impractical to provide underwater armour protection for an entire hull, methods were found to dissipate the blast of an underwater explosion, and to confine flooding to as small an area as possible. *Renown*-class battlecruisers were fitted with an experimental form of torpedo bulkhead, the result of a series of experiments conducted by the Royal Navy into the dissipation of explosive forces. *Furious*, *Glorious* and *Courageous* as well as the *Hood* benefited from special torpedo 'blisters', consisting of air and buoyancy spaces located outside the main hull, immediately below the waterline. The buoyancy space itself was filled with steel crushing tubes, intended to absorb the force of an underwater explosion, while the air space helped spread the blast along rather than into the hull itself. A third line of defence was provided by the oil fuel tanks themselves, located immediately behind the torpedo blisters. If hit, these would leak oil, but as the tanks were sealed units, watertight integrity would be maintained.

Apart from her protection and armament, the third principal element of the battlecruiser was its propulsive power. Extensive machinery was required to drive these battlecruisers at speeds of 30 knots, and large engine spaces, turbine rooms, boiler rooms and a steam plant formed an important part of the design and construction of any battlecruiser. In the *Hood*, small-tube boilers were employed for the first time in a major warship, saving weight and space. One important design consideration was the need to space the engines along the length of the

ship rather than concentrate them towards the stern. Although this created mechanical problems, it reduced the risk of losing all propulsive power if a section of the lower hull was flooded. The internal arrangement and layout of these propulsive systems varied from ship to ship, but these basic principles applied to all the British battlecruisers built during this period.



The control room of the *Hood*'s forward engine room, showing the engineer officer and the three artificers who made up the senior forward engine room watch staff while the battlecruiser was at sea. (Royal Naval Museum, Portsmouth)

Armament

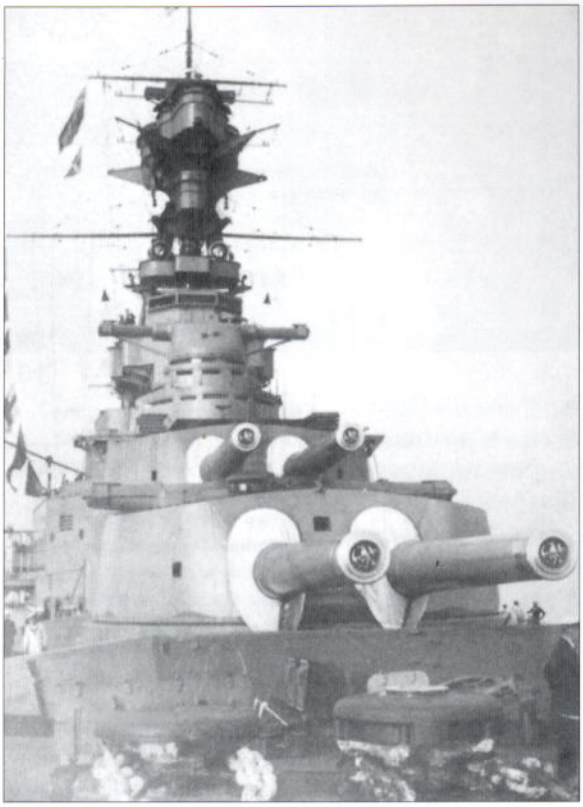
From 1915 onwards, most British capital ships were fitted with the 15-in. Mark I naval gun. By the time these weapons were fitted into the new battlecruisers the gun system had already been installed in the *Queen Elizabeth* class and *Royal Sovereign* class of 'super-dreadnought' battleships. It was used as the main armament for *Repulse*, *Renown*, *Courageous*, *Glorious* and *Hood*.

15-IN. BREECH-LOADING GUN, MARK I

Bore and calibre: 15-in./42-cal.
Barrel length: 54ft 2in.
Barrel weight: 97 tons
Ammunition types: Armour Piercing (AP), Explosive (CP*)
Shell weight: 1,920 pounds
Full charge: 428 pounds of Cordite MD45
Maximum range: 30,180 yards at 30° elevation (*Hood*)
26,700 yards at 20° elevation (*Repulse* and *Renown*)
Muzzle velocity: 2,462ft per second
Penetration: 15in. of armour at 14,300 yards (using AP shell)
Mounting: twin Mark I turret (Mark II on Hood), hydraulic-powered, giving turret rotation of 2° per second
Turret weight: 890 tons
Standard ammunition allowance: 640 rounds of AP, 160 rounds of CP per gun
* Common Pointed (Capped) Shell was the British precursor of the High Explosive shell (HE)

The 15-in. gun was essentially an enlarged version of the 13.5-in. Mark V, which had hitherto been the standard battleship gun in the Royal Navy. Although the range of the gun was only slightly greater than its predecessor, the increased weight of its shell ensured a much greater hitting power. It also represented a general move away from the Navy's experiment with high-velocity heavy guns towards weapons with an increased shell weight. It threw a 1,920-pound projectile with enough velocity for reasonable accuracy, and the greater energy and destructive effect of this shell overcame any potential loss of accuracy and penetration that might have come with a higher velocity weapon. Subsequent improvements to the gun-mounting systems, hydraulics and fire control ensured that the weapon remained extremely potent. It continued to see service in the Royal Navy throughout the Second World War.

Like the gun itself, the gun mountings for the 15-in. naval gun were little more than modified versions of the mountings used for the 13.5-in. gun. The gun mounts were strengthened to take the additional weight and recoil of the larger guns, and the barbettes were increased in



In this imposing view of the forward turrets and conning tower of HMS *Hood* the ship's crest can be seen, fitted to the tompions inserted into the muzzles of her 15-in. guns. This photograph was taken before 1925, when the searchlights fitted to the admiral's bridge above her conning tower were removed. (Royal Naval Museum, Portsmouth)

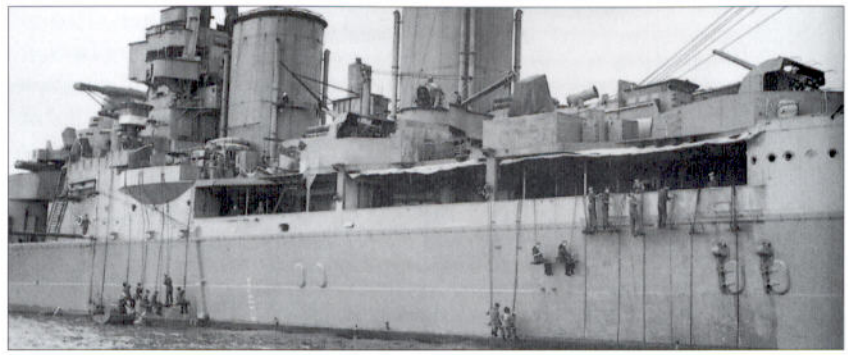
diameter. The twin mountings fitted to *Renown*, *Repulse*, *Courageous* and *Glorious* were virtually identical to those fitted to contemporary dreadnought battleships, although the thickness of the turret armour was reduced, and modifications were made to the shell-handling and shell-hoist mechanisms housed inside the barbette. After pre-war experimentation, the DNC had settled on the mounting of all guns on the vessels' centreline, usually with two turrets forward and two turrets aft, with 'B' and 'X' turrets 'super-firing' over 'A' and 'Y' turrets. Of course, this traditional layout only applied to the *Hood*. Both *Repulse* and *Renown* had no 'X' turret, while *Courageous* and *Glorious* had only 'A' and 'Y' turrets when they were first built.

After the Battle of Jutland the original Mark I gun mounting was modified to permit an increase of 10 degrees of elevation, which increased the range of the gun. This meant that by the time the 15-in. guns were fitted into the *Hood*, they could be elevated to 30 rather than 20 degrees. This involved further modification to the working area at the breech to allow for increased depression when the guns were fired at maximum elevation. These modifications resulted in the guns fitted to the *Hood* being re-designated 15-in. Mark II weapons. Power for the guns was provided by steam and a series of hydraulic pumping engines. In early battlecruisers, this steam power was barely sufficient, as improvements in gunnery direction meant that gun turrets were now usually expected to train in unison. From 1915 onwards, three or more hydraulic pumps were fitted, although in the *Repulse* and *Renown* the system still lacked power when the guns were 'run out' together. This problem was overcome in the *Hood* by the fitting of a pneumatic 'running-out' (loading) system. This improvement was retro-fitted into the two other surviving battlecruisers during the inter-war period.

Fire control systems were improved in the post-Jutland period. For decades the Royal Navy had used coincidence rangefinders, where the range-taker saw two images of the target, and when these images merged, the correct range had been determined. Splashes made by the initial salvo were observed and corrections were made to improve accuracy. Each turret was fitted with its own rangefinder, but by the Second World War this was only used for local control, when the main fire control system was inoperable. By 1920 gunnery was normally controlled from a director tower sighted in the main conning tower, a large armoured structure from which the ship was fought, steered and commanded. Improved optics led to a greater degree of accuracy, and by 1941 the British battlecruisers were capable of firing under either local or central control, or under radar guidance.

As for the secondary armament of these battlecruisers, unlike contemporary battleships, these guns were mounted high above the waterline. In the *Hood* her secondary 5.5-in. guns were arranged in 12 single mountings on her upper deck, six on either beam. Four of these could fire forward,

two aft, and six on either broadside. The approach adopted in the *Repulse* class was less conventional, with the secondary armament sited along the centreline of the vessel, in multiple mounts. The same unusual mounting system was adopted for the *Courageous* class of light battlecruisers. The 4-in. gun mountings fitted to these battlecruisers proved cumbersome to use in practice, and the guns lacked the stopping power needed to deter effectively an attack by smaller warships. During the inter-war years, extensive modifications were made to the secondary armament of all surviving British battlecruisers, and a greater emphasis was placed on anti-aircraft protection. In theory, the 4-in. gun was an anti-torpedo-boat weapon, but during the First World War modifications were made that allowed it to be used in an anti-aircraft role. In addition, 2-pdr. pom-pom guns and 20mm light anti-aircraft guns would be deployed in increasing numbers in the years preceding the Second World War.



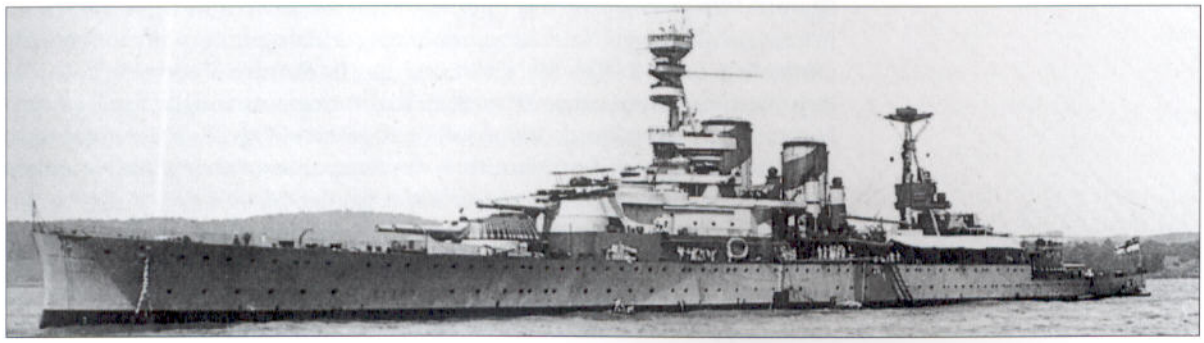
A working party painting the side of HMS *Hood* in August 1940, shortly after she emerged from her first maritime refit. The two hatches in her hull on the right of the picture were two of the fixed ports for her surface-launched torpedoes. The torpedo magazine was probably detonated by a shell from the *Bismarck*, with the resulting explosion detonating the *Hood*'s main magazine. (Imperial War Museum, London)

A surprising addition to the armament of these battlecruisers was the fitting of torpedo tubes. Although the torpedoes carried on these battlecruisers had a range of less than 8,000 yards, the weapon system was considered important enough to incorporate into the armament of these ships. A submerged torpedo room on either forward beam, and in the case of the *Hood* an additional above-water mounting on either beam, remained a rather incongruous reminder that battlecruisers had originally been designed to replace armoured cruisers. This armament was little more than a legacy of a bygone age. In the case of the *Hood*, her above-water torpedo tubes remained a weak point in her design, as their powerful explosive charges were sited on the main deck, immediately forward of and above her after magazines.

SERVICE MODIFICATIONS

During the 1920s the Royal Navy decommissioned most of its wartime battlecruiser fleet. *Indomitable*, *Inflexible*, *New Zealand* and *Princess Royal* were sold for scrap in 1922, and the *Lion* met the same fate in early 1924;

The *Repulse* during the closing months of the First World War, photographed at anchor in the Firth of Forth. By this stage aircraft flying-off platforms were fitted to 'B' and 'Y' turrets, and she was painted in standard Admiralty Disruptive Pattern camouflage: mid-grey on light grey, with dark grey splinter patches. (Imperial War Museum, London)



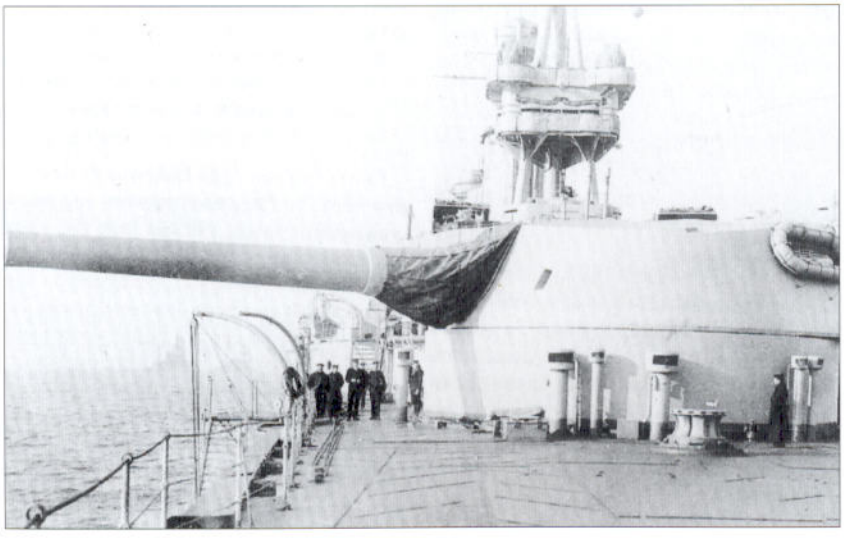
all disposed of under the terms of the Washington Naval Treaty of 1922. *Tiger* remained in the fleet until 1931 when she too was decommissioned and sold for scrap. The only modification made to her during the 1920s was the replacement of her secondary armament with four 4-in. quick-firing anti-aircraft guns in single mountings. Three more battlecruisers (*Furious, Glorious* and *Courageous*) were converted into aircraft carriers during the early 1920s. By 1932 the only battlecruisers left in the Royal Navy were the *Hood, Repulse* and *Renown.*

Furious, Glorious and *Courageous*

When *Furious* was nearing completion, an Admiralty committee was set up to study naval aviation, and to make recommendations on the creation of aircraft carriers. Its report recommended that the light battlecruiser *Furious* be modified to carry aircraft, and the suggestion was duly approved. By March 1917 the process had begun. The initial alterations were limited to the forward half of the ship; the forward 18-in. mounting was replaced by an enclosed hangar and covered by a planked flight deck, which sloped downwards towards the bow. Additional workshops, aviation fuel and ordnance stores were also added. Apart from that, the *Furious* was little altered, and she retained her after gun. Following deck-landing trials in the summer of 1917 it was decided that the flight deck (then known as the landing-on deck) should be extended to cover the full length of the ship. In November 1917 work began on the conversion of the *Furious* into a fully fledged aircraft carrier, the first vessel of this kind to enter service in the Royal Navy. From that point on, she was no longer a battlecruiser, but rather a prototype for a completely new naval capital warship. Further modifications were made during her career, and although she was placed in reserve in late 1944, she proved an extremely valuable asset to the Navy during the Second World War. She was finally broken up in 1948.

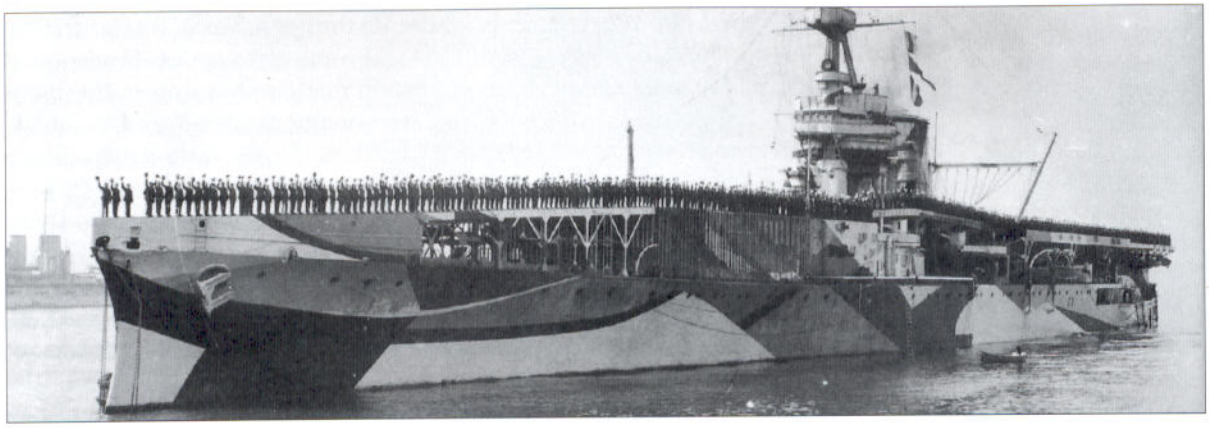
The 'large light cruisers' or light battlecruisers *Glorious* and *Courageous* may have been ridiculed in the fleet for their strange appearance, but they were undoubtedly large and fast ships, which made them ideal candidates for conversion into aircraft carriers. In 1923 work began on this transformation. Their superstructures were removed and long hangars were built in their place, and then topped with a flight deck which extended for three-quarters of the length of the ship. Like the *Furious*, these vessels were far more useful as aircraft carriers than they ever could have been as battlecruisers.

HMS *Furious* was designed to carry two 18-in. guns, but as the forward portion of the battlecruiser-cum-carrier was turned into a flight deck while she was being built, only 'Y' turret was ever installed. This single gun was the largest ever fitted into a British battlecruiser, but without the benefits of a full salvo of guns its value was limited. (Imperial War Museum, London)



Repulse and *Renown*

As already noted, the *Repulse* and *Renown* underwent a series of refits,



By 1918 HMS *Furious* had been converted into the Royal Navy's first fully fledged aircraft carrier, having her after 18-in. gun removed, and her flight deck extended to run the whole length of the ship. She proved far more useful in her new role than she ever would have as a light battlecruiser. (Imperial War Museum, London)

the first being the addition of improved armour protection. *Repulse* went into refit on 19 December 1918, when she was fitted with a 9-in. armour belt, adding some 4,300 tons to her displacement. In addition anti-torpedo bulges were added and her submerged torpedo tubes were replaced by four pairs of torpedo tubes on her upper deck. This refit was completed in October 1920. In 1924 some of her secondary guns were replaced by new 4-in. dual-purpose high-angle guns, but no other major modifications were made until 1933.

Renown underwent a major refit in 1923–26, when her armour was replaced by a 9-in. belt that was slightly more extensive than that fitted to her sister ship. Additional protective armour was added to her deck to protect the magazines and engine rooms from plunging fire. As in the *Repulse*, modifications were made to the secondary armament during this period.

HMS *REPULSE* (1941)

Commissioned: August 1916
Last major refit: 1938–39
Fate: Sunk by Japanese air attack off Malaya, 10 December 1941
Displacement: 28,300 tons (fully laden)
Length overall: 794ft
Beam: 90ft
Draught: 27ft
Machinery: 4-shaft Parsons turbines, 8 Admiralty boilers; 119,000shp
Maximum speed: 28 knots
Armour: Belt: 1.5–9in.
Bulkheads: 3–6in.
Barbettes: 4–7in.
Turrets: 7–11in.
Control tower: 10in.
Deck: 3.5–5.75in.
Armament: 6 x 15-in./42-cal. Mark I guns in three twin turrets
9 x 4-in./44.3-cal. Mark IX BL guns in three triple PXII mounts
6 x 4-in. HA guns in single mounts
24 x 2-pounder pom-poms in three eight-barrel mounts
16 x 0.5-in. machine guns in four quad mounts
8 x 20mm Oerlikon guns in single mounts
8 x 21-in. torpedo tubes in four fixed twin mounts
Aircraft: up to 4 Walrus seaplanes
Radar: Type 284 (fire control)
Complement: 1,181 men

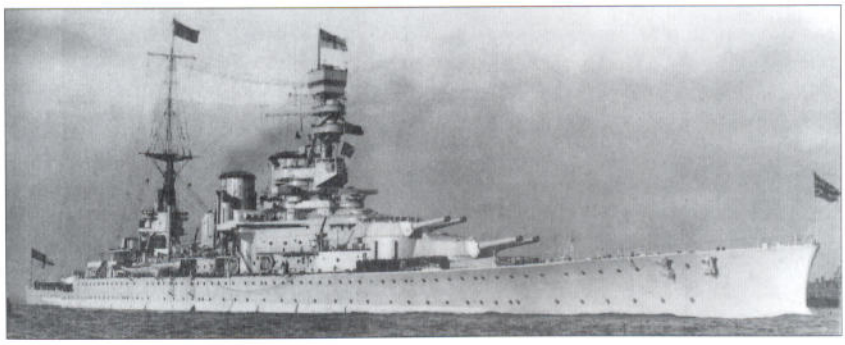
HMS *RENOWN* (1941)

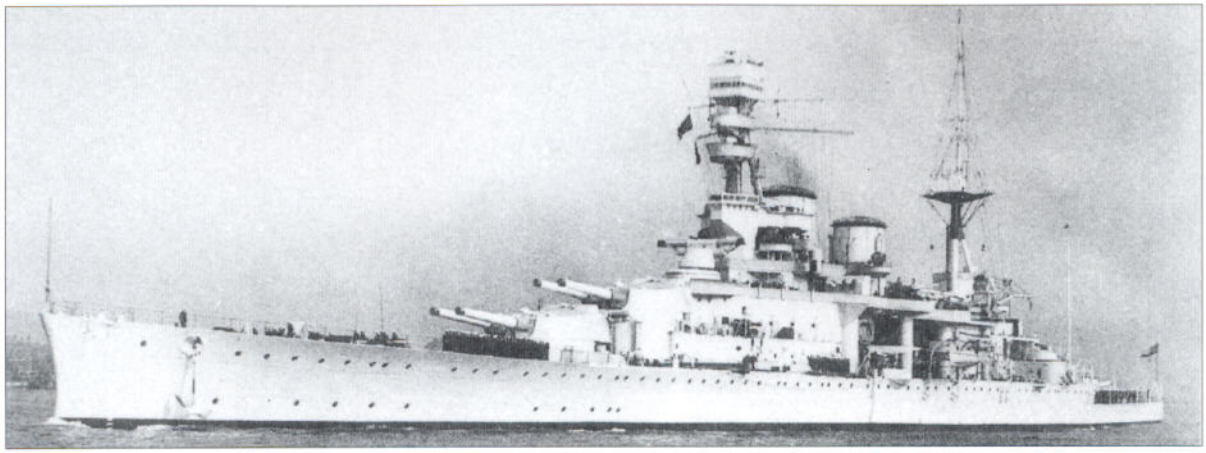
Commissioned: September 1916
Last major refit: 1936–37
Fate: de-commissioned and broken-up 1948
Displacement: 30,025 tons (fully laden)
Length overall: 794ft
Beam: 90ft
Draught: 29ft
Machinery: 4-shaft Parsons turbines, 8 Admiralty boilers; 126,300shp
Maximum speed: 27.5 knots
Armour: Belt: 3–9in.
Bulkheads: 3–6.5in.
Barbettes: 4–7in.
Turrets: 7–11in.
Control tower: 10in.
Deck: 4.25–9.5in.
Armament: 6 x 15-in./42-cal. Mark I guns in three twin turrets
20 x 4.5-in. Mark I guns in twin mounts
24 x 2-pounder pom-poms in three eight-barrel mounts
16 x 0.5-in. machine guns in four quad mounts
8 x 21-in. torpedo tubes in four fixed twin mounts
Aircraft: up to 4 Walrus seaplanes
Radar: Type 284 (fire control), Type 271 (search), Type 285 (air warning)
Complement: 1,200 men

During the 1930s the two battlecruisers underwent an even more extensive series of refits. In 1933 additional armour was fitted to the deck of the *Repulse*, and the protection offered by her lower protective decks was improved. Her midships superstructure was removed (which meant the loss of a triple 4-in. gun mounting), and a catapult was fitted spanning the beam of the ship on her upper deck. Two hangars were added abreast of her after funnel to accommodate seaplanes and two aircraft were provided for her. In August 1941 these aircraft were replaced by two Walrus seaplanes. At the same time her four twin 4-in. guns were removed and replaced by two single 4-in. anti-aircraft guns on her after deck. Her anti-aircraft armament was augmented by the addition of two 8-barrelled 2-pdr. pom-poms and two 0.5-in. quad machine-gun mounts. In 1938 two more old twin 4-in. guns were removed, and replaced by single 4-in. anti-aircraft mountings and two more quad machine-gun mounts were fitted to her after gunnery-direction platform. After the outbreak of the Second World War, her remaining 4-in. gun was removed and replaced by a third 8-barrelled 2-pdr. pom-pom and six 20mm anti-aircraft guns (two of which were fitted to the top of 'Y' turret). In late 1941 she also received a Type 284 radar, which was fitted to her foremast shortly before she sailed to the Far East.

In 1932–33 the *Renown* was equipped with two 8-barrelled 2-pdr. pom-poms, and in 1933 she also had her superstructure modified in order to create space for a transverse aircraft catapult. At the same time she lost

HMS *Renown*, photographed off Portsmouth in 1927 as she was leaving Britain for Australia, carrying the Prince of Wales on a goodwill tour. The battlecruiser had only just completed a major refit, when her armour belt was greatly improved by the addition of armour taken from a former Chilean dreadnought. (Museum of Naval Firepower, Portsmouth)





The *Repulse* photographed during the 1930s, before her last pre-war refit. Although her armour was improved, little attention was paid to her anti-aircraft defences, and by late 1941 they were woefully inadequate. (Museum of Naval Firepower, Portsmouth)

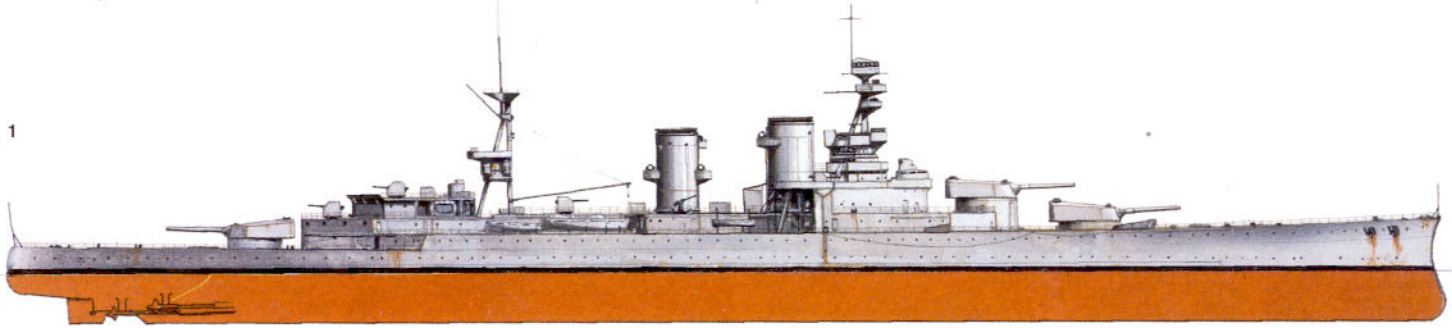
four 4-in. guns and in exchange received two quad machine-gun mounts. In 1936 she underwent a major reconstruction, involving the removal of her bridge structure and its replacement by a block bridge similar to that fitted to the modified *Queen Elizabeth*-class battleship *Warspite*. This meant that for the first time *Repulse* and *Renown* took on notably different appearances. Additional armour was provided to her deck and to her barbettes, and new Admiralty boilers and Parsons turbines replaced her existing fittings. New funnels also altered her appearance as they were mounted slightly further aft than before. Her secondary armament was removed entirely, and replaced by twenty 4.5-in. Mark I dual-purpose guns in twin mountings. Five mountings were fitted on each side of her forward superstructure. Finally, her submerged torpedo tubes were removed and replaced by eight surface tubes mounted on the upper deck. In late 1941 she was fitted with Type 284 radar, as well as Types 271 and 185 (giving her radar fire control and radar air warning capability).

After the loss of both the *Hood* and the *Repulse* during 1941, the *Renown* became the only battlecruiser in British service. During 1942 her quad machine guns were removed and exchanged for ten additional 20mm anti-aircraft guns. Another refit in early 1943 involved the removal of her aircraft catapult and hangars, and the fitting of an additional thirteen twin 20mm anti-aircraft mounts, and three single 20mm mountings. In January 1944 she was fitted with an additional 4-barrelled 2-pdr. pom-pom on top of 'B' turret, and seven more twin 20mm mounts and five single 20mm mountings. Finally, in 1945 her torpedo armament was removed, along with her

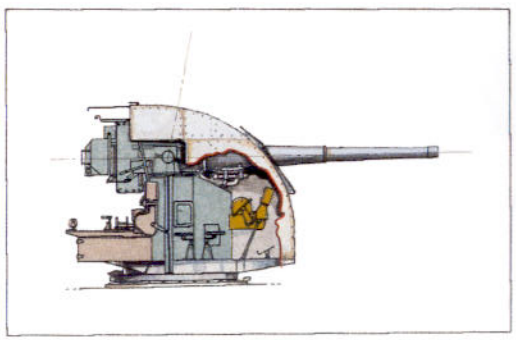
HMS *Repulse*, photographed in the spring of 1936, shortly after she completed a major three-year refit. This included the replacement of her bridge with a box-like structure, similar to that fitted to the battleship *Warspite*. (George Malcolmson Collection)

A: HMS *Repulse*

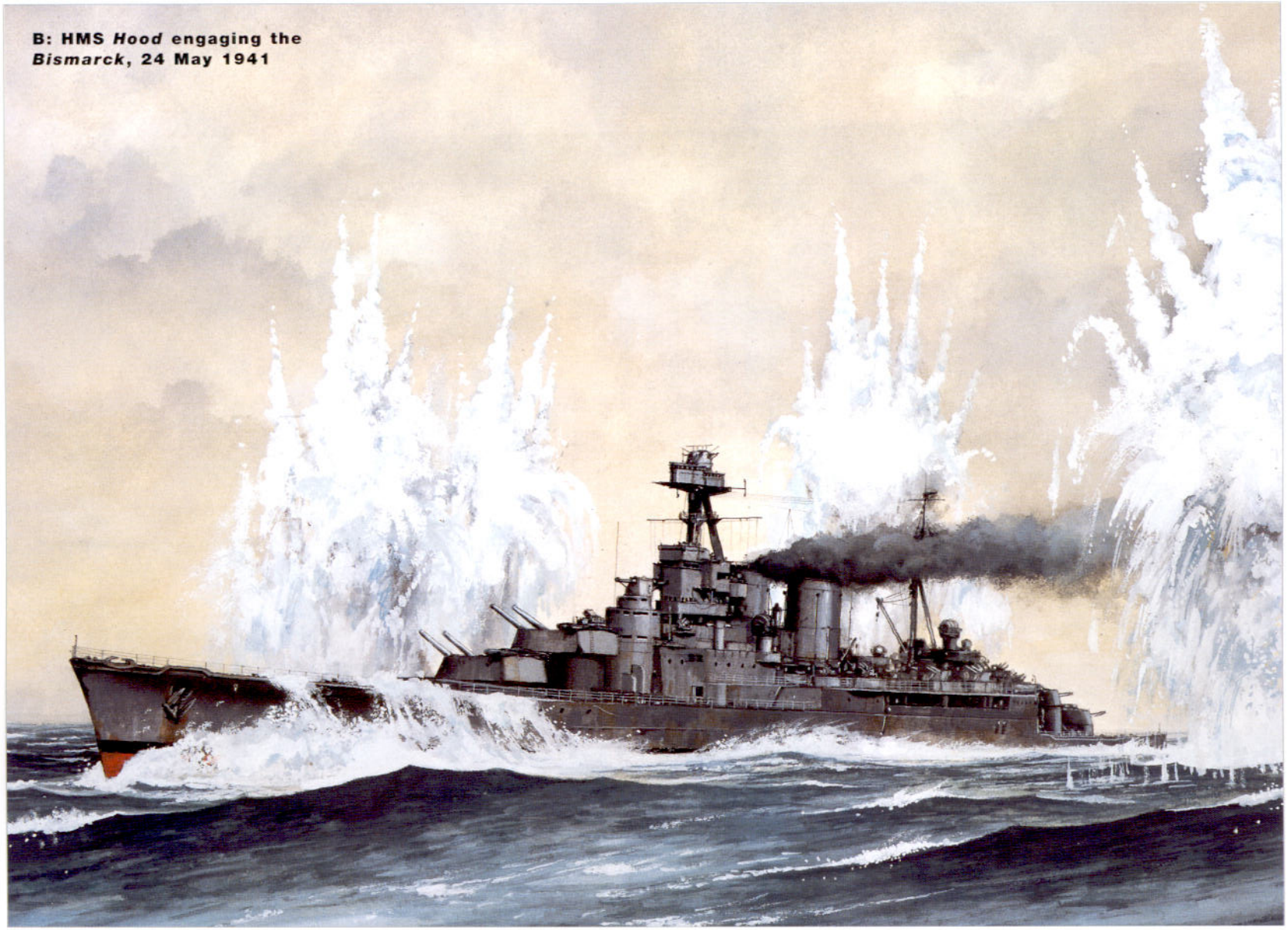
1



3

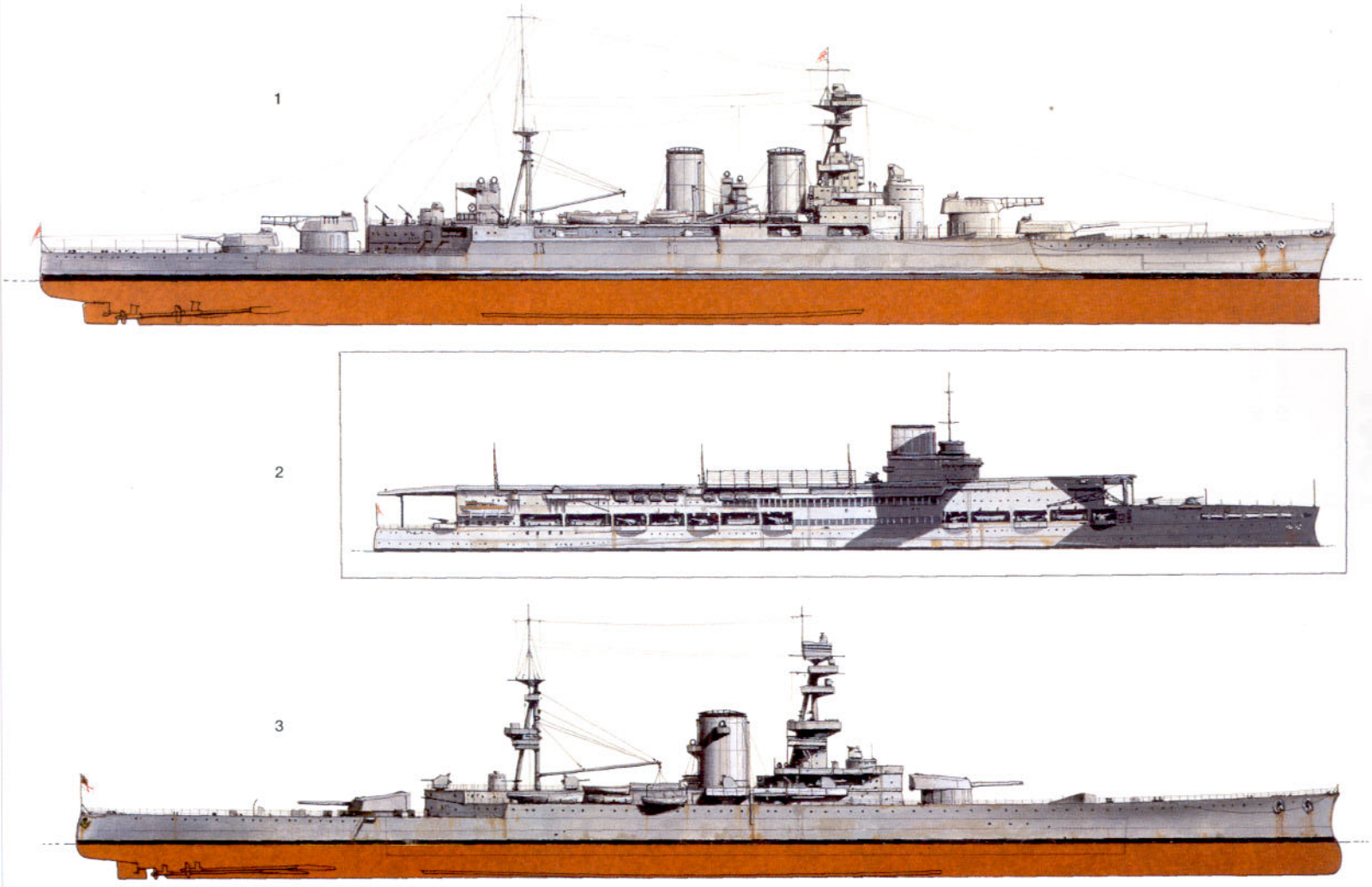


2



B: HMS *Hood* engaging the *Bismarck*, 24 May 1941

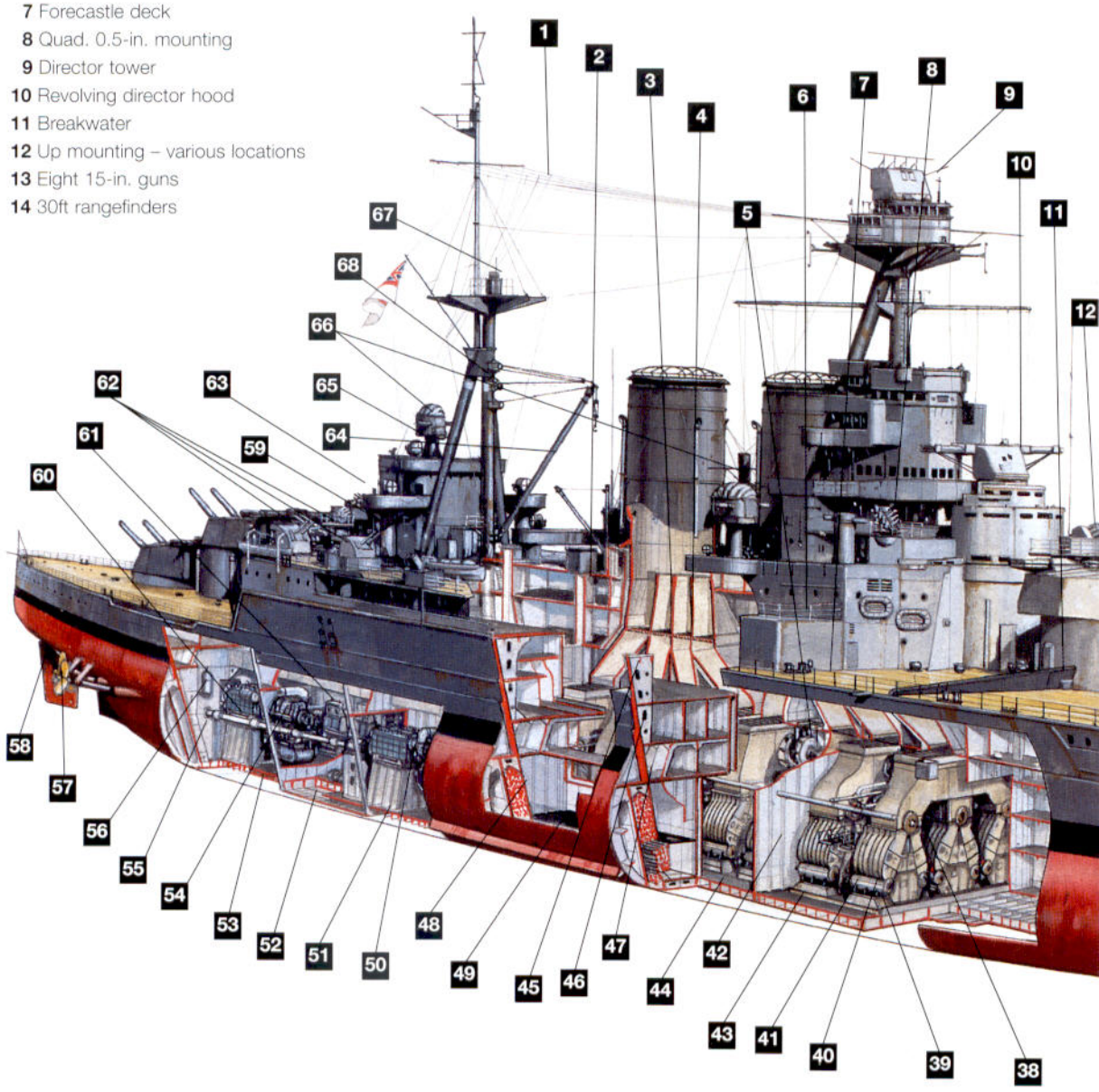
C: The late-war battlecruisers, c. 1917–20



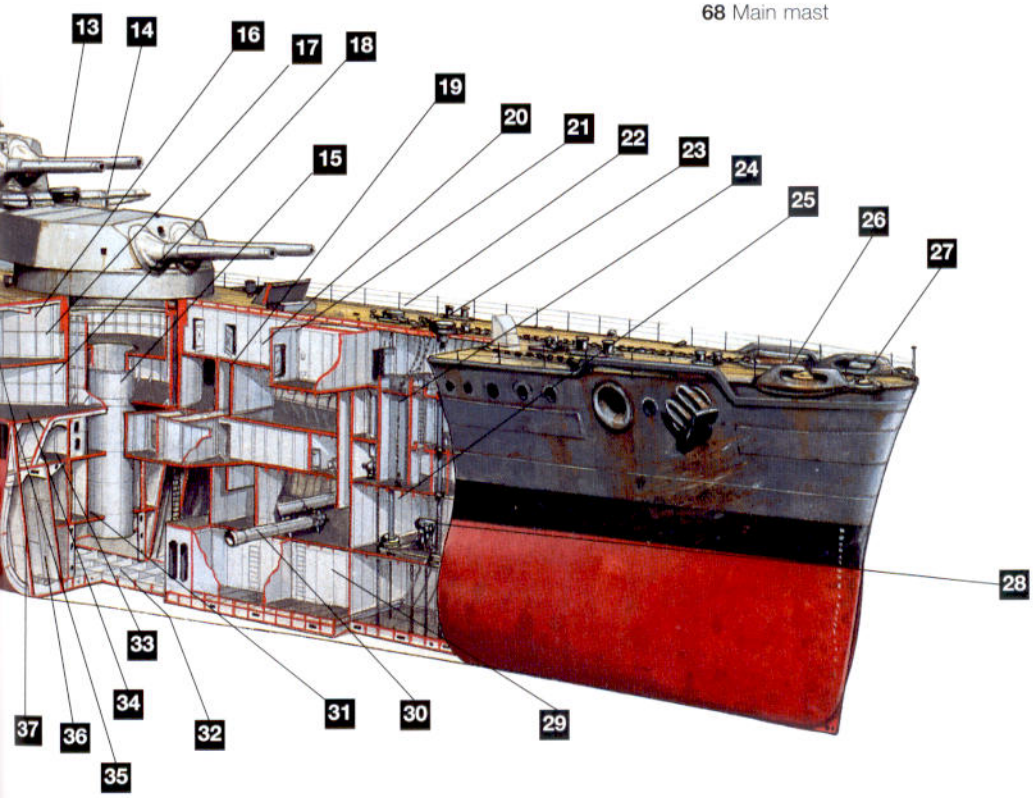
D: HMS *HOOD*, 1941

KEY

1 Main WT aerials
2 Engine room vents
3 Boiler up-takes
4 Armoured gratings
5 Fan compartments
6 Shelter deck
7 Forecastle deck
8 Quad. 0.5-in. mounting
9 Director tower
10 Revolving director hood
11 Breakwater
12 Up mounting – various locations
13 Eight 15-in. guns
14 30ft rangefinders
15 Hoist trunk tube (*see also* plate G)
16 4-in. armoured bulkhead (POs mess behind)
17 Isolation ward
18 Awning room
19 Torpedo body lifts

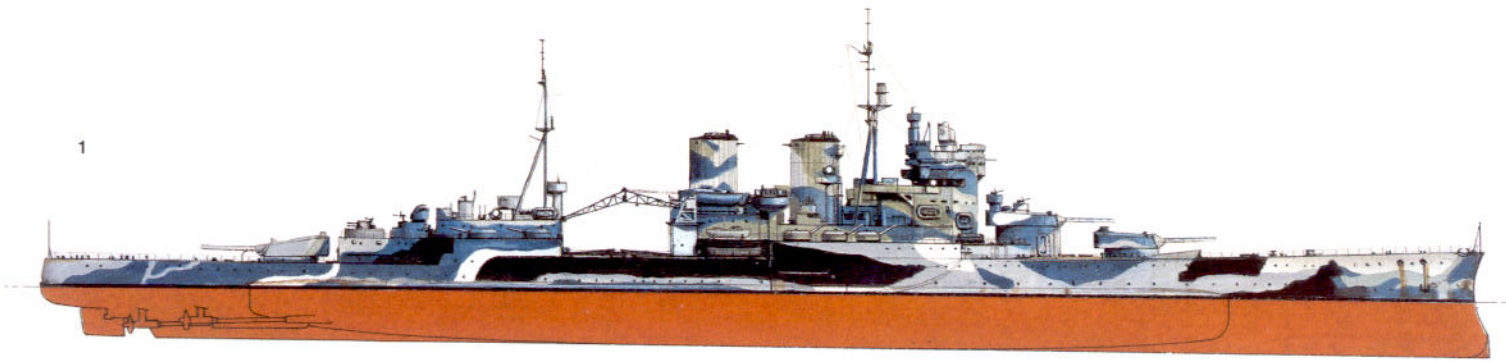


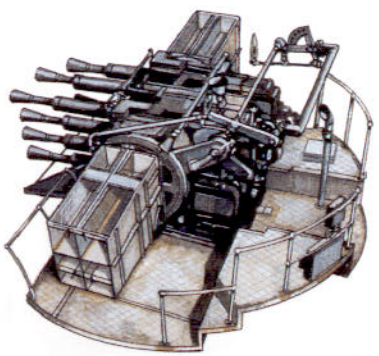
20 Sick bay
21 Operating room
22 Cable holder
23 Capstan
24 Cable locker
25 Cable holder spindle
26 Towing fairlead
27 Paravane fairlead
28 Capstan engine
29 Torpedo head magazines
30 Underwater torpedo tubes
31 Platform deck
32 Hold
33 Lower deck
34 Main deck
35 Upper deck
36 Buoyancy space
37 Watertight compartment
38 Stem drum
39 Boiler seating
40 Water drum
41 Four Yarrow small tube boilers (A, B, X, Y)
42 Boiler room bulkhead
43 Inner bottom
44 Double keel
45 5-in. armour plate
46 7-in. armour plate
47 12-in. armour plate
48 Crushing tubes
49 Oil storage
50 Gear case
51 Forward engine room
52 Middle engine room
53 Aft engine room
54 Low-pressure turbine (condenser under)
55 Bulkhead
56 Evaporators
57 Twin propellers
58 Rudder
59 Quad. 0.5-in. MG mount
60 Propeller shaft to forward (starboard)
61 Main circulating pumps
62 Twin 4-in. HA/LA mountings
63 8-barrel Mk VI pom-pom
64 Main derrick
65 44-in. searchlights
66 HACS Mk III direction finder
67 FH3 HF/DF office
68 Main mast



E: HMS *Renown*

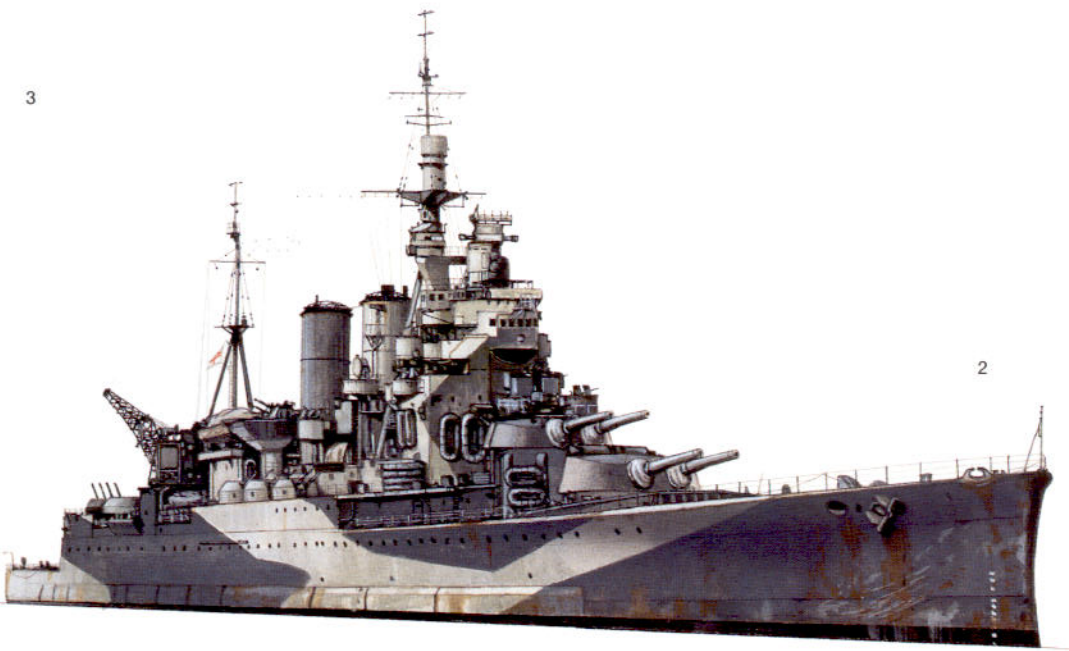
1

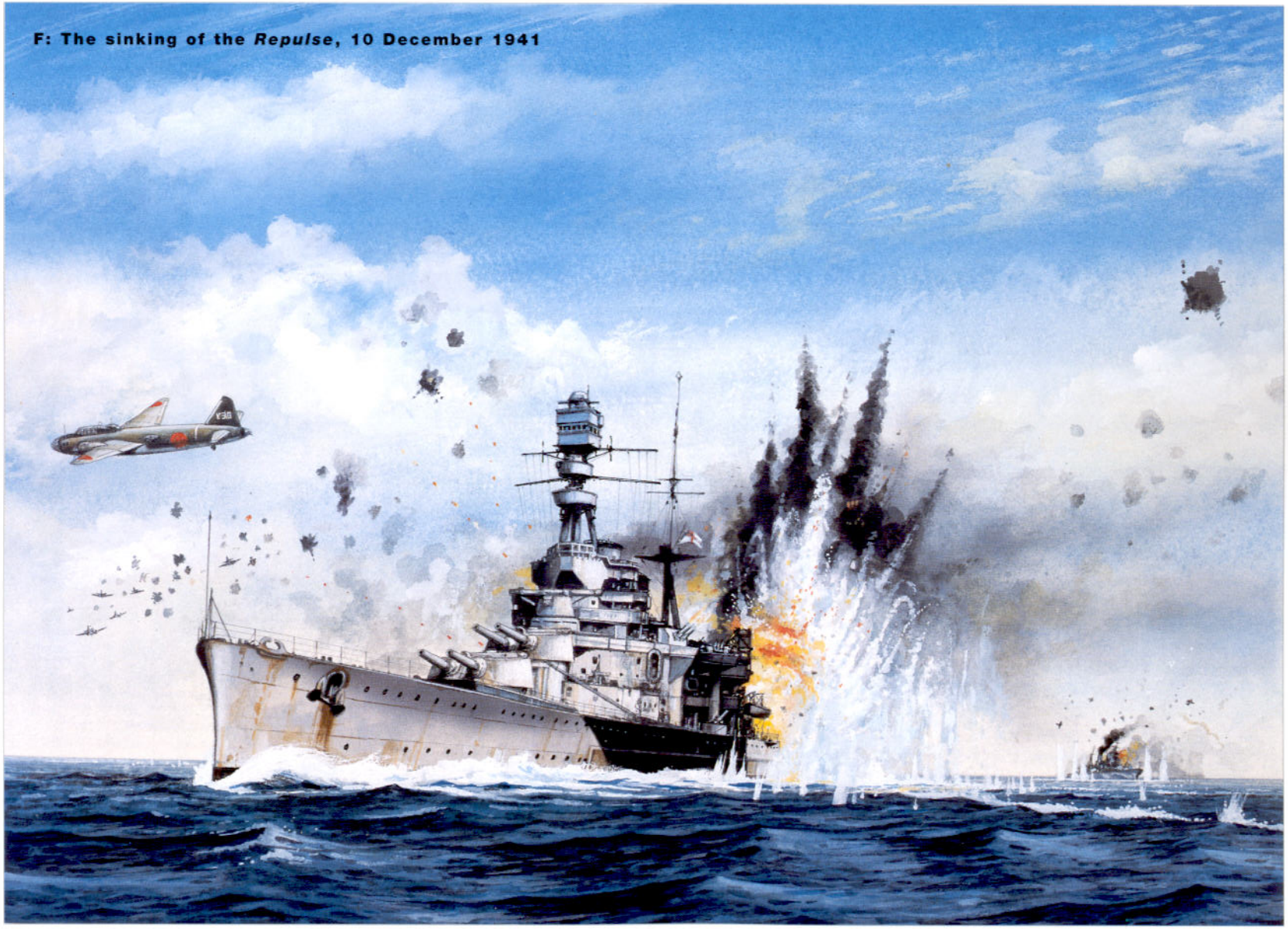




3

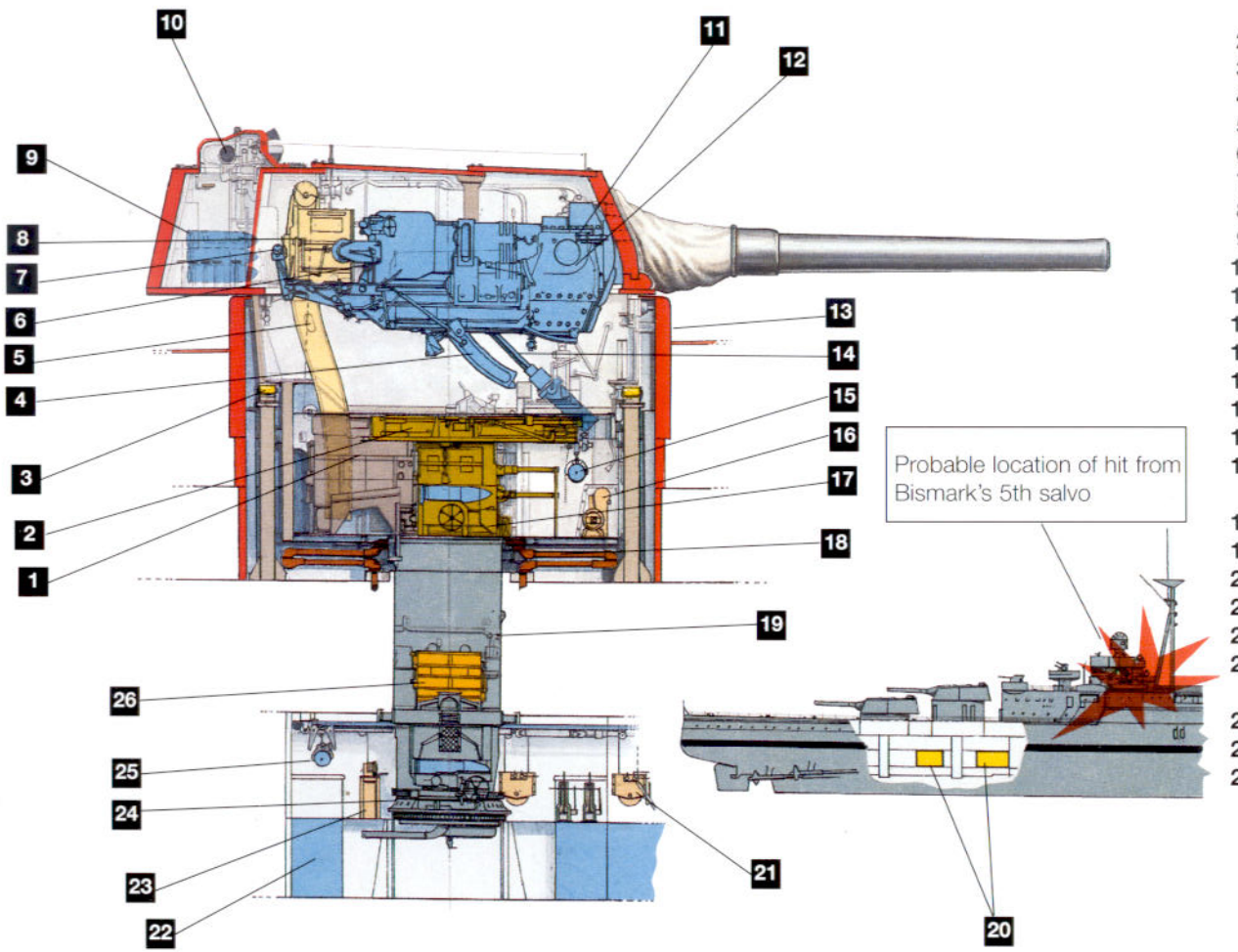
2





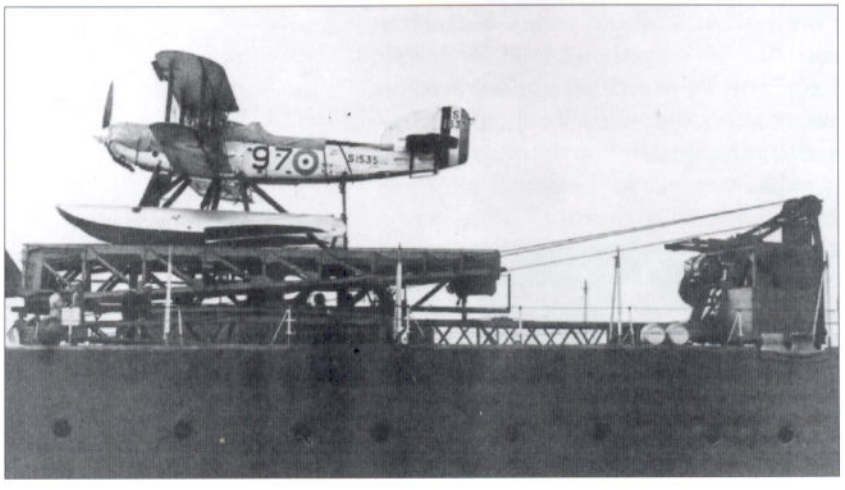
F: The sinking of the *Repulse*, 10 December 1941

G: Gun turret from the *Hood*



KEY

1 Flashtight box around gun-loading hoist
2 Central ammo. hoist press
3 Turret roller bearings
4 Lateral guide
5 Loading cage guide rails
6 Breech
7 Chain rammer motor (open)
8 Gun loading cage (raised)
9 Ready-use shell bin
10 30ft rangefinder
11 Telescopic sight
12 Trunnion
13 Armoured barbette
14 Elevator
15 Shell in grab
16 Electric pump
17 Flashtight box around cordite waiting position
18 Walking pipes
19 Trunk
20 Magazines
21 Traversing winches
22 Shell bins
23 Hand-operating shell-lifting winch
24 Revolving shell bogie
25 Shell in grab
26 Cordite hoppers



During *Hood*'s refit in 1929–31, the flying-off platforms were removed from 'B' and 'X' turrets, and an FIVH (Folding Mark IV Heavy) catapult was fitted to her quarterdeck. In this photograph the battlecruiser's Fairey IIIF floatplane is shown stowed on the catapult. The plane and its fittings were removed in early 1932, as they were too easily damaged by the *Hood*'s guns. (Fleet Air Arm Museum, Yeovilton)

six forward 4.5-in. guns. The days of the battlecruiser had passed, and her wartime refits reflected the fact that her modifications had effectively turned the *Renown* from a lightly protected battlecruiser into a well-protected battleship.

Hood

Completed in March 1920, this impressive warship was almost immediately subjected to the first of a number of minor modifications made to her over the next two decades. In early 1921 her bridge was modified, and two of her searchlights were removed, only to be replaced two years later. At the end of 1925 new gunnery range-finders was fitted to her after superstructure, which improved her high-angle fire control. She now boasted two 30-ft range-finders for her main guns and two 15-ft range-finders for her secondary armament. The opportunity was also taken to land her two searchlights again. From June 1929 until May 1931 she underwent her first major refit. She had originally been fitted with aircraft flying-off platforms on the top of 'B and 'X' turrets, although only the after platform was ever used, and that only saw occasional service. During this refit the platforms were removed, but a crane and launching facilities were added to her quarterdeck. Her bridge was modified a second time, and once again her missing searchlights were added. More importantly, her fuel tanks were enlarged, increasing her fuel capacity to 4,615 tons. Two 8-barrelled 2-pdr. pom-poms were also mounted between her funnels. The aircraft catapult was removed the following year, and from then on, the *Hood* became one of the few major warships in the Royal Navy to lack her own scouting aircraft. In 1932 two quad 0.5-in. machine-gun mountings were added on either side of her conning tower, and five years later in 1937 a single 8-barrelled 2-pdr. pom-pom was added to her after gunnery direction platform. At the same time two single 4-in. Mark IV high-angle mounts were added amidships, and two more quad machine-gun mounts fitted to her after superstructure. Her submerged torpedo tubes were also removed. In 1938, two of her 5.5-in. guns were removed from her shelter deck, and replaced by two single 4-in. high-angle guns.

Hood's last pre-war refit came in the summer of 1939, when the two single 4-in. high-angle guns were removed amidships and were replaced by four twin 4-in. Mark XIX high-angle guns. Perhaps inevitably, four more searchlights were also added. In early 1940 her last 5.5-in. guns were removed, along with a couple of searchlights. In exchange she gained three more twin 4-in. Mark XIX high-angle guns. Finally in March 1941 she was fitted with a Type 284 radar, which permitted her main armament to be directed by radar.

Throughout *Hood*'s service career plans were considered to improve her armour protection, particularly her 'protective' deck armour.

While the *Repulse* and *Renown* underwent a whole series of refits, it was deemed that the *Hood* was too valuable a symbolic asset for Britain to lose for the two years or so such a major refit would have taken. Consequently nothing was ever done, and the *Hood* sailed into battle against the *Bismarck* with virtually the same armour protection she had when she first entered service two decades before.

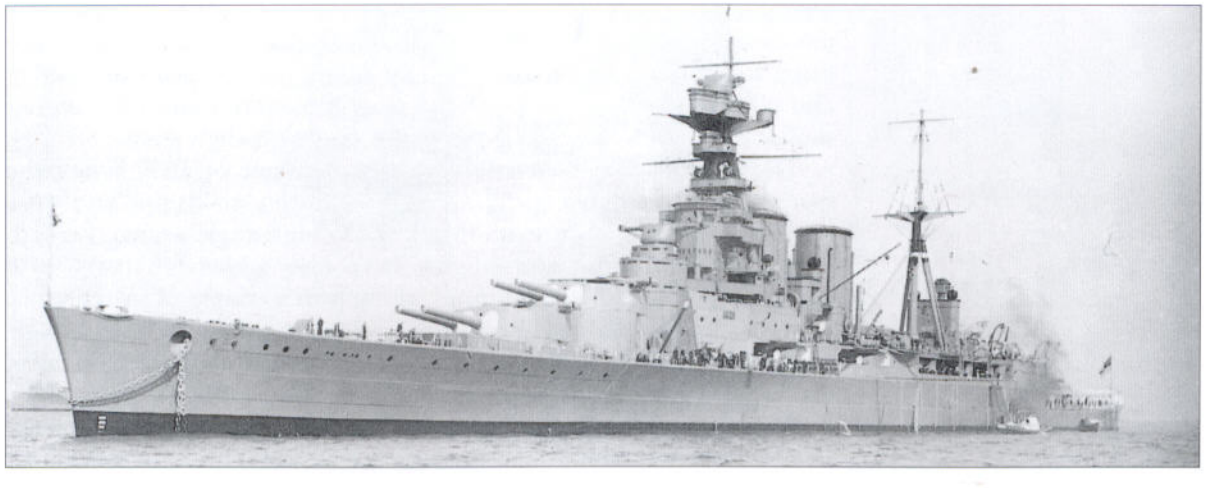
HMS *HOOD* (1941)

Last major refit: 1939
Fate: Sunk by gunfire from the battleship *Bismarck*, 24 May 1941
Displacement: 48,360 tons (fully laden)
Length overall: 860ft
Beam: 104ft
Draught: 28ft 9in.
Machinery: 4-shaft Brown-Curtis turbines, 32 Yarrow boilers; 144,000shp
Maximum speed: 29.5 knots
Armour: Belt: 6–12in.
Bulkheads: 4–5in.
Barbettes: 5–12in.
Turrets: 5–15in.
Control tower: 9–11in.
Deck: 1.5–3in.
Armament: 8 x 15-in./42-cal. Mark I guns in four twin turrets
8 x 4-in. DP guns in twin mounts
24 x 2-pdr. pom-poms in three eight-barrel mounts
16 x 0.5-in. machine guns in four quad mounts
4 x 21-in. above water torpedo tubes in two fixed twin mounts
Radar: Type 284 (fire control)
Complement: 1,423 men

SERVICE HISTORY

Due to limitations of space, only the three ships which saw service as battlecruisers during the Second World War are covered in this section. The three battlecruisers that were converted into aircraft carriers all saw action, but both *Glorious* and *Courageous* were sunk early in the war.

The battlecruiser *Hood* in 1933 while at anchor off Portsmouth. By this stage she was the most widely recognised warship in the Royal Navy, having 'shown the flag' throughout the world. During the 1930s she would see extensive service in the Mediterranean, participating in the blockade of Spanish ports and making courtesy visits to other countries. (Royal Naval Museum, Portsmouth)



Repulse

Repulse joined the 1st Battlecruiser Squadron in 1916 and was based at Rosyth, Firth of Forth. On 17 November 1917 she saw action with the rest of her squadron at the second battle of the Heligoland Bight, when she engaged the German battleships *Kaiser* and *Kaiserin*. During the action her guns damaged the German light cruiser *Königsberg*. After the war she was sent to Portsmouth for a major refit, and only rejoined the fleet in January 1921. For the next few years she 'showed the flag' with elements of the Atlantic Fleet, and in 1923–24 she participated in the world cruise of the Special Service Squadron, when she sailed in consort with the *Hood*. On her return to home waters she rejoined the Atlantic Fleet. In June 1932 she went into reserve in Portsmouth prior to a major refit which began the following spring. This overhaul of the battlecruiser took over three years, and she only rejoined the Atlantic Fleet in the spring of 1936. Due to the international tensions caused by Franco's rebellion against the Spanish government the *Repulse* was ordered to the Mediterranean, where she participated in the international blockade of Spain for almost two years. Before returning home in June 1938 she also spent time off the coast of Palestine, due to increased tensions in the region.

On her return to Britain *Repulse* went into refit again, emerging in March 1939 to join the Atlantic Fleet (now re-named the Home Fleet) once more. Following the outbreak of the Second World War in September 1939 she operated in the Atlantic in the hunt for German raiders before being transferred to the America and West Indies Command in October. For two months she escorted transatlantic convoys from Halifax to the Western Approaches, but by December 1939 she had resumed her old hunting role, participating in sweeps into the Norwegian Sea and Arctic Ocean in search of German raiders, including the *Scharnhorst*, *Gneisenau*, *Admiral Scheer* and *Admiral Hipper*.

During this time *Repulse* never saw any action, although she participated in a raid on Jan Mayen Island, and took part in the Norwegian campaign. The rest of the time she remained in readiness in Scapa Flow for a major German sortie which never took place.

In August 1941 she was sent south to escort a Middle East Convoy to Gibraltar, then on to Durban in South Africa, where she was transferred to the East Indies Command on 3 October. After a month in port she was ordered to join the 'Special Striking Force' which was being formed to deter any Japanese attack against British possessions in the Far East. On 28 November 1941 she arrived in Colombo in Ceylon, where she and the battleship *Prince of Wales* were designated Force Z. The two capital ships were ordered to Singapore, arriving on 2 December 1941, just five days before the Japanese attack on Pearl Harbor. On 8 December Force Z sailed north to attack a Japanese invasion fleet heading towards the Malay Peninsula. Two days later Force Z was caught by Japanese aircraft off the north-east coast of Malaya, and both *Repulse* and *Prince of Wales* were sunk, the *Repulse* being hit by at least five Japanese torpedoes.

Renown

After her completion in September 1916 *Renown* joined the 1st Battlecruiser Squadron of the Grand Fleet, based at Scapa Flow. Unlike her sister ship she did not see any action. After the war she went on three overseas tours, carrying the Prince of Wales to Canada and the United

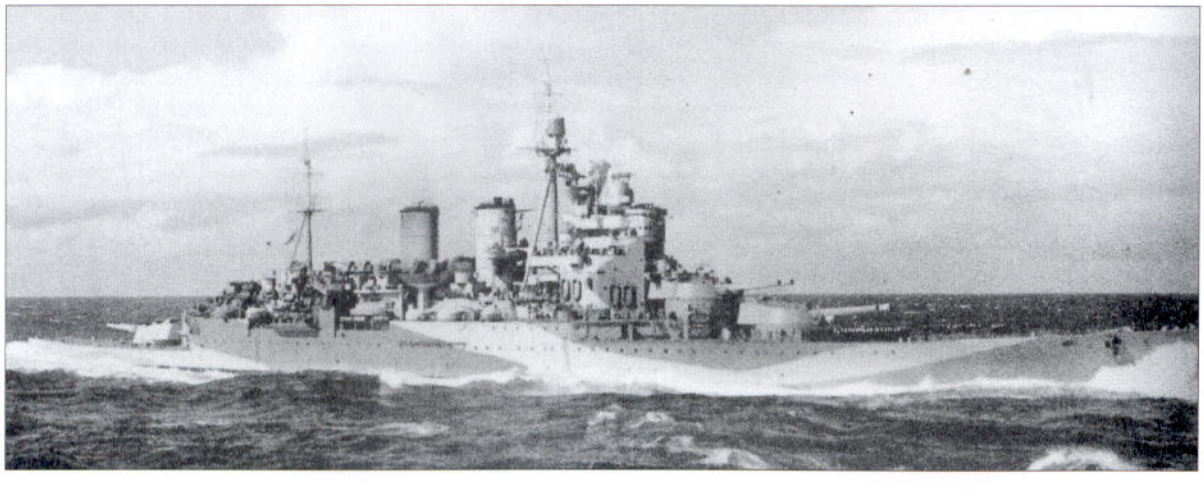
States in 1919, to Australia and New Zealand in 1920, and to India and Japan in 1921–1922. During this time she also underwent a refit in Britain (1920–21). *Renown* returned to home waters in June 1922, when she was placed in reserve for four years. After an extensive refit ending in 1926 she participated in another royal tour to Australasia in 1927. On her return to Britain she remained in the Atlantic Fleet until 1936, apart from two months in early 1935, when she underwent repairs following a collision with *Hood*. She was then sent to the Mediterranean to participate in the naval blockade of Spain, before entering a major refit in 1936. She was re-commissioned on 28 August 1939, and when the war began she joined the Home Fleet.

Renown spent the first month of the war patrolling the gap between Iceland and the Faeroe Islands, but in October she was ordered to the South Atlantic, where she formed part of Force K, based at Freetown. She participated in the hunt for the German pocket battleship *Admiral Graf Spee*, and although she never caught up with the raider, she did intercept the German armed merchantman *Watussi* in early December 1939.

In February 1940 she intercepted German merchant ships that broke out of a northern Spanish port, and was recalled to the Home Fleet in April when the Germans invaded Norway. On 9 April she fought a brief action with the German battlecruisers *Scharnhorst* and *Gneisenau* off Narvik, inflicting serious damage to the latter, while incurring only superficial damage herself. In August she was transferred to Gibraltar, where she became the flagship of Admiral Somerville's Force H. She entered the fray around Malta, escorting convoys before playing a leading part in the Battle of Spartivento off Sardinia on 27 November 1940. In February 1941 the *Renown* bombarded Genoa, then continued to escort Malta convoys until April. In May Admiral Somerville took her into the Atlantic during the hunt for the *Bismarck* and, although the *Renown* missed the final battle, Force H played a vital part in the destruction of the German battleship. After another Malta convoy, *Renown* returned home for a refit in August 1941. She was back in service by November, and spent the winter attached to the Home Fleet, based in Scapa Flow.

In April 1942 she joined Force W, returning to Malta while escorting the USS *Wasp* in a major operation to bolster the island's air defences. After a brief deployment to Iceland (where she provided long-range

HMS *Renown*, photographed as she sailed to join the British Eastern Fleet in the Indian Ocean during December 1943. Her camouflage pattern is the same as that depicted in plate E, and was retained until she returned to home waters in January 1945. By this stage of the war she carried a formidable anti-aircraft armament. (Imperial War Museum, London)



support for Atlantic convoys) the *Renown* was back in the Mediterranean, where she supported the Anglo-American landings in North Africa. In February 1943 she returned home for a five-month refit, before receiving orders to join the Eastern Fleet based in the Indian Ocean. She arrived in Colombo in January 1944, and for the rest of the year she supported various carrier operations and bombardments on the Andaman Islands and the Indonesian archipelago. By December she was in need of a refit, and spent four months in the shipyard in Durban before returning to Britain just as the war in Europe came to a close. In May 1945 she was placed in reserve, and was partially disarmed. In October she was decommissioned, and in August 1948 she was finally towed into a Scottish breaker's yard.

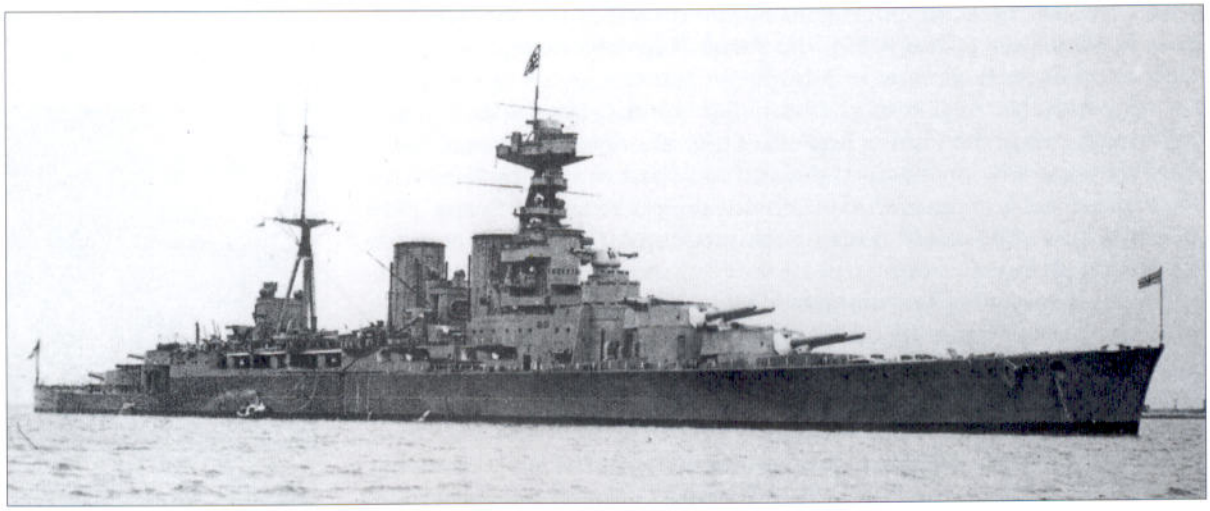
HMS *RENOWN* (1944)

All details as for 1941, except:
Armament: 6 x 15-in./42-cal. Mark I guns in three twin turrets;
20 x 4.5-in. Mark I guns in twin mounts;
36 x 2-pdr. pom-poms in four eight-barrel mounts;
40 x 20mm Oerlikon guns in twin mounts;
18 x 20mm Oerlikon guns in single mounts;
8 x 21-in. torpedo tubes in four fixed twin mounts
Displacement: 36,750 tons (fully laden)
Radar: Type 282 (fire control)

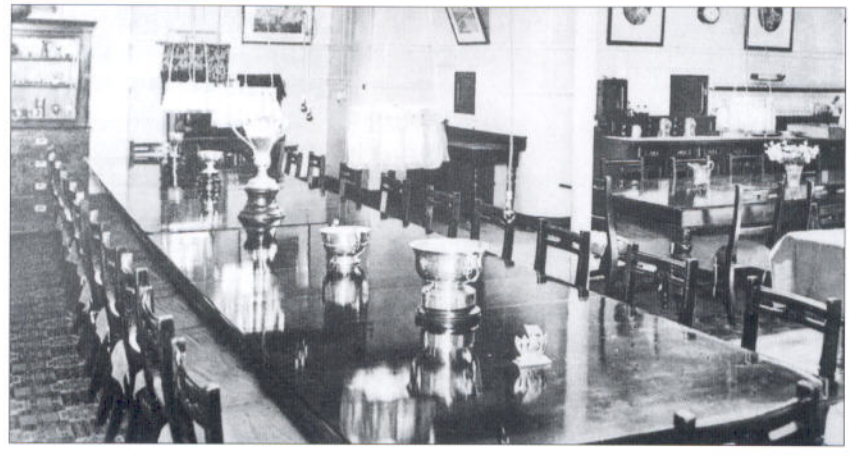
Hood

The *Hood* joined the Atlantic Fleet as the new flagship of the Battlecruiser Squadron in 1920 and, although ordered into action against the Soviets off the coast of the Baltic States, she never saw combat. Instead she was sent on a goodwill cruise to Sweden, Denmark and Norway. For the next two years she continued to 'show the flag', visiting Brazil and various ports in the Caribbean basin before returning to Britain in late 1923. When the Special Service Squadron was formed to 'show the flag to the colonies and dominions of the Empire', *Hood* became the squadron flagship, and spent the next year on a world tour in company with *Repulse* and the ships of the 1st Light Cruiser Squadron. This goodwill cruise lasted from November

HMS *Hood*, photographed shortly before the outbreak of the Second World War, probably in early September 1939. She was repainted in Home Waters Grey before she joined the Home Fleet, a slightly darker hue of grey than she had worn during her time with the Mediterranean Fleet. (George Malcolmson Collection)



1923 until September 1924, during which time *Hood* steamed some 40,000 miles, visiting South Africa, Ceylon, Malaya, Australia, New Zealand, Canada and the United States of America, before returning home via the Panama Canal, Jamaica and Nova Scotia. It was estimated that some 250,000 people visited the *Hood* during this deployment.



The wardroom of HMS *Hood* was located towards the after end of the forecastle deck, between the after funnel and the mainmast. The photograph was taken from its after end on the port side. On the far right is the buffet table, with portraits of the king and queen hung above it. Although relatively austere, the wardroom was the principal social and recreational space for the *Hood*'s officers, although a billiard room and a small lounge were also available. (George Malcolmson Collection)

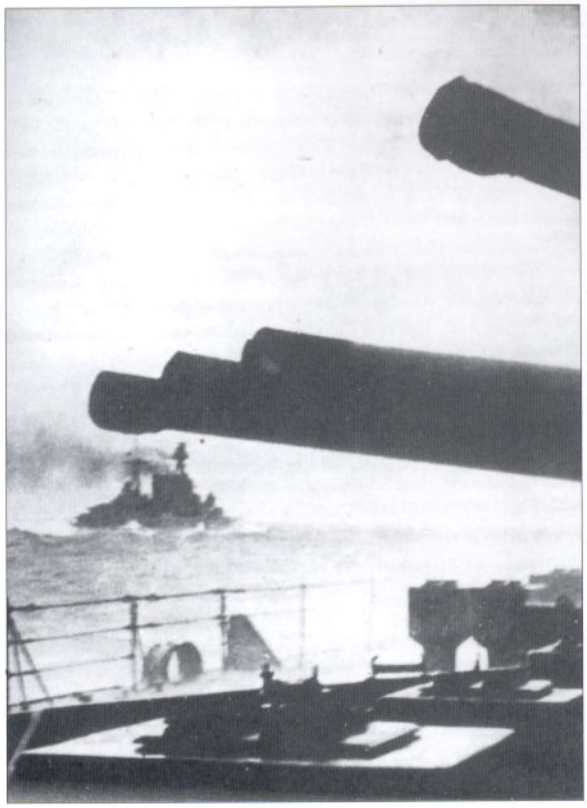
After a three-month refit in Plymouth *Hood* re-joined the Atlantic Fleet, becoming the flagship of the by now greatly diminished Battlecruiser Squadron in August 1928. In late 1934 she was sent to the Mediterranean, but following a collision with the *Renown* off the Spanish coast in January 1935, she was sent home for a refit. This was completed by July 1935, when she played a leading part in the Fleet Review held at Spithead in front of the king. In September she was sent back to the Mediterranean due to the Abyssinia crisis, and apart from a return home for a brief refit she remained in the Mediterranean until February 1939. During this period she combined showing the flag with blockade duty off the Spanish coast.

On her return to Portsmouth the *Hood* underwent another refit, and only rejoined the Home Fleet in August 1939, shortly before the outbreak of the war. When the war began she led several sweeps into the North Sea, the Atlantic and the Norwegian Sea in search of German raiders including the *Scharnhorst* and the *Gneisenau*, but she never saw action. After a brief spell covering troop convoys from Canada to Britain she was sent to Plymouth for a refit, which lasted from December 1939 until late May 1940. Once the work was completed she joined Force H in Gibraltar, becoming the force flagship.

Following the fall of France tensions between the French and British navies reached breaking point, and on the refusal of the Vichy French fleet to surrender to the Allies, the Royal Navy had no option but to destroy the French threat. On 3 July 1940 *Hood* took part in the attack on Mers-el-Kebir near Oran, where her 15-in. guns helped put a significant part of the French battlefleet out of action. In the summer of 1940 she escorted convoys to Malta and took part in the bombardment of Cagliari before returning to home waters, reaching Scapa Flow in mid-August. She would remain with the Home Fleet until her sortie against the *Bismarck*.

In the intervening ten months *Hood* took part in the hunt for the German pocket battleship *Admiral Scheer*, then underwent another refit in Rosyth during February and March 1941. That same month she sailed against the *Scharnhorst* and *Gneisenau*, but was unable to intercept the German battlecruisers. Finally, in May 1941 the *Hood* sailed on her last mission, when the powerful German battleship *Bismarck* attempted to sortie into the Atlantic. On 22 May 1941 she

Vice-Admiral Sir Lancelot Holland was the last of four wartime admirals to fly his flag in the battlecruiser *Hood*. He took over from Vice-Admiral Whitworth in May 1941, just days before he led the *Hood* and the *Prince of Wales* into battle against the *Bismarck*. (Royal Naval Museum, Portsmouth)



The last photograph ever taken of HMS *Hood*, as she raced to intercept the *Bismarck* off the western coast of Iceland. The photograph was taken from the forecastle of HMS *Prince of Wales* on 23 May 1941. The *Hood* appears to have made heavy work of the swell she encountered south of Iceland. (Imperial War Museum, London)

sailed from Scapa Flow accompanied by the newly built battleship *Prince of Wales*. Shortly after dawn on 24 May 1941 the two British warships encountered the *Bismarck*, accompanied by the heavy cruiser *Prinz Eugen*. During the short engagement that followed, the *Hood* was hit by a 15-in. shell from the *Bismarck* which detonated one of her after magazines. She blew up, and sank within three minutes. Out of a crew of over 1,400 men, there were only three survivors.

BATTLECRUISERS IN ACTION

Renown and *Gneisenau*, 9 April 1940

In April 1940 the *Renown* was operating off Norway, part of the British force sent to counter the German invasion of the country. In addition to troops, the Germans also sent powerful naval units into the Norwegian Sea, including their battlecruisers *Scharnhorst* and *Gneisenau*. Just after 3:30hrs on 9 April 1940, Captain C.E.B. Simeon of the *Renown* sighted two enemy ships through the darkness and rain squalls, steering a reciprocal course 10 miles ahead of him. Contact was lost, and Simeon turned north and increased speed to 20 knots. Five minutes later the enemy force was briefly sighted again. It was the *Scharnhorst* and *Gneisenau*. They also turned north and so the two forces were steering on parallel courses some nine miles apart, with the Germans to the east of the *Renown*. The weather was atrocious and both sides waited for a clear view of the enemy.

At 4:05hrs *Renown* opened fire, shooting three salvoes in as many minutes. The third salvo bracketed *Gneisenau*, the rearmost German ship. Although the British gunnery was good, German fire control was even better. As the *Gneisenau* returned fire, she bracketed the *Renown* with her first salvo. Two 11-in. shells struck the battlecruiser, one hitting the midshipmen's berth without exploding and the other detonating on the upper deck, damaging the radio antenna. The German ships then turned away. Admiral Whitworth, who was flying his flag in the *Renown*, gave the order to give chase and to increase speed. Ten British destroyers were escorting the *Renown*, but they could do nothing in the heavy weather and were ordered to disengage. The three battlecruisers were left alone, exchanging salvoes in between the rain squalls. The *Renown* concentrated its fire on the *Gneisenau*, using both her main armament and her starboard 4.5-in. secondary guns. Then, at 4:15hrs, a 15-in. shell from the *Renown* hit the *Gneisenau*'s bridge and command position, knocking out her gunnery control. The German battlecruiser immediately ceased fire. A second hit struck the *Gneisenau* amidships, causing extensive damage. She turned away, covered by *Scharnhorst*, and minutes later the two German ships broke off the fight, heading at full speed for the Norwegian coast. The chase

continued for another two hours until the onset of a full gale forced an end to the action.

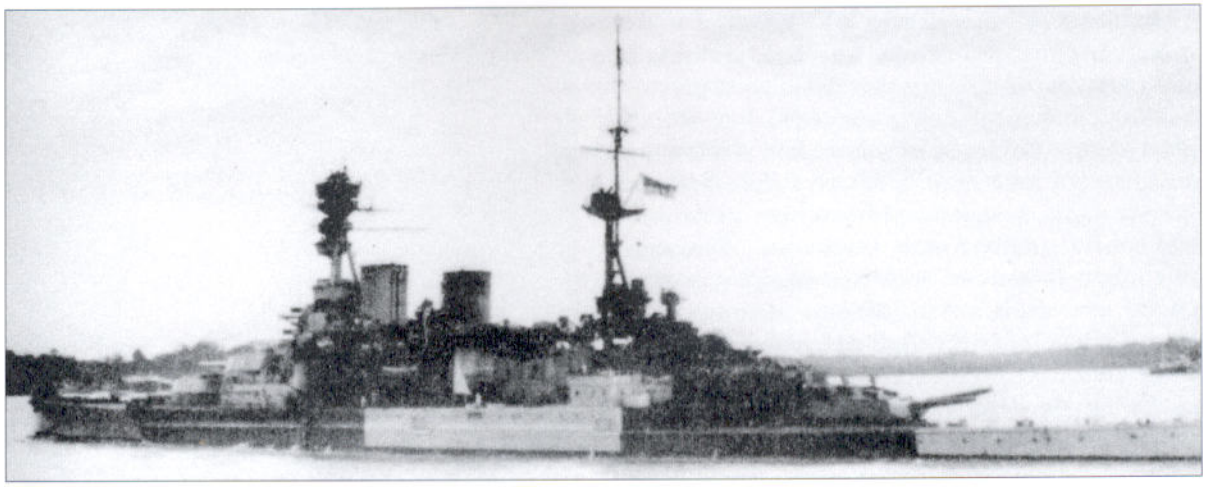
During this short engagement, the *Renown* had proved her worth, and the skill of her gunnery team was ably demonstrated. Ironically, her own guns caused her more damage than those of the Germans, as the blast from her forward 15-in. guns damaged the forward hatch, and breaking waves caused serious flooding as the force of the gale increased.

Hood and *Bismarck*, 24 May 1941

In April 1941 German naval commanders hatched a plan to launch their new battleship *Bismarck* on a raid against British convoys in the Atlantic Ocean. Accompanied by the heavy cruiser *Prinz Eugen*, *Bismarck* duly slipped out of the Baltic Sea, and by nightfall on 23 May the two German ships were north-west of Iceland, entering the Denmark Strait. They were sighted by British cruisers, who radioed the news to the rest of the British fleet. Admiral Tovey, the commander of the Home Fleet, ordered the *Hood* and the brand-new battleship *Prince of Wales* to intercept. At 5:37hrs, just as dawn was breaking, lookouts on the *Hood* spotted the German ships, some 17 miles (30,000 yards) away to the north. The British and German forces were steering roughly parallel courses, and both were in line ahead formation. The *Hood* led the *Prince of Wales*, while *Prinz Eugen* was ahead of the *Bismarck*. Vice-Admiral Holland altered course to intercept. Holland and the *Hood*'s commander, Captain Ralph Kerr, both realised that at long range the *Hood* was extremely vulnerable to plunging fire, so they decided to close with the enemy as fast as possible to reduce the risk. Below 20,000 yards, enemy shells were more likely to hit the hull than the deck.

At 5:39hrs Admiral Lütjens in the *Bismarck* also altered course, forcing the British to make a second turn in order to decrease the range. At that angle, only the forward turrets on the British ships were in a position to fire on their enemy. The two forces were now closing at a rate of just over 500 yards per minute. At 5:52hrs the British ships opened fire, at a range of 14 miles (25,000 yards). At that range, it took just under a minute for the shells to reach their target. One problem was that the gunnery crew on the *Hood* had assumed that the *Bismarck* was the leading German ship. It was an easy mistake to make, as the German vessels had a similar silhouette. While the *Prince of Wales* was correctly engaging the *Bismarck*, *Hood* was firing at the much less dangerous *Prinz Eugen*. Two minutes later, the German ships altered course to port, and the *Bismarck* increased speed in order to overtake her consort. Both German ships had also opened fire, concentrating on the *Hood*. A shell from the *Prinz Eugen* struck the upper deck of the *Hood* amidships, starting a small

HMS *Hood* exploding, photographed from the deck of the German cruiser *Prinz Eugen* when the two ships were approximately 11 miles (19,000 yards) apart. The British battlecruiser sank within three minutes, taking all but three of her crew down with her. (Museum of Naval Firepower, Portsmouth)



HMS *Repulse*, photographed as she sailed from Singapore in company with the battleship *Prince of Wales* on 8 December 1941. Within two days both British warships had been sunk by Japanese land-based aircraft. During her final months *Repulse* carried an unusual contrast camouflage pattern of black over mid-grey. (Imperial War Museum, London)

fire. Seconds later, a salvo from the *Bismarck* fell close to the British battlecruiser. Admiral Holland realised his flagship was firing on the wrong target. At 5:55hrs he ordered his ships to alter course to port, in order to bring all his guns to bear. The range was now 22,000 yards, and although the *Hood* was still vulnerable to plunging fire, the range was decreasing steadily. A third salvo from the *Hood* was unleashed against the *Bismarck*, but it fell short. By contrast, the third salvo from the *Bismarck* straddled the *Hood*. At 5:59hrs Admiral Holland altered course again, reacting to a German change of course to port. At this point, the *Bismarck* fired three more salvoes in two minutes. The shells took about 30 seconds to reach the target, at a range of 11 miles (19,000 yards).

The *Bismarck*'s fifth salvo landed at 6:00hrs and one of the shells struck the *Hood* close to her turrets. A huge flame was seen to shoot up from the base of the battlecruiser's after mast, followed by an immense explosion in the vicinity of her rear turrets. The *Hood* was torn apart, leaving only a large cloud of smoke hanging over the scene of the tragedy. In less than three minutes the remains of the once great battlecruiser were gone. The *Prince of Wales* swerved to avoid the wreckage, then altered course to port. The *Bismarck*'s guns turned on the British battleship, and within minutes the bridge of the *Prince of Wales* had been hit. Captain Leach broke off the action after further German shells and mechanical problems knocked out his main armament. The engagement, known as the Battle of the Denmark Strait, ended any remaining belief in the value of the battlecruiser. Although her guns were powerful enough to engage the *Bismarck*, the inadequate deck armour of the *Hood* had proved the battlecruiser's Achilles heel.

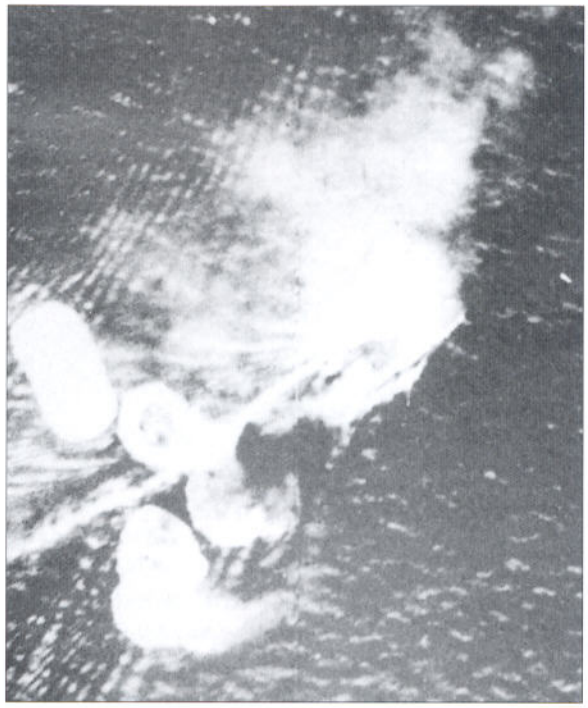
Repulse and *Prince of Wales*, 10 December 1941

In late 1941 Prime Minister Winston Churchill ordered the creation of Force Z, comprising the battlecruiser *Repulse* and the battleship *Prince of Wales*. Force Z was ordered to Singapore, where it would act as a deterrent against any Japanese threat to the region. The two capital ships arrived in the port just days before the Japanese attack on Pearl Harbor on 7 December 1941. The following day a Japanese invasion fleet was sighted heading for the upper Malay peninsula. Force Z was ordered north to intercept.

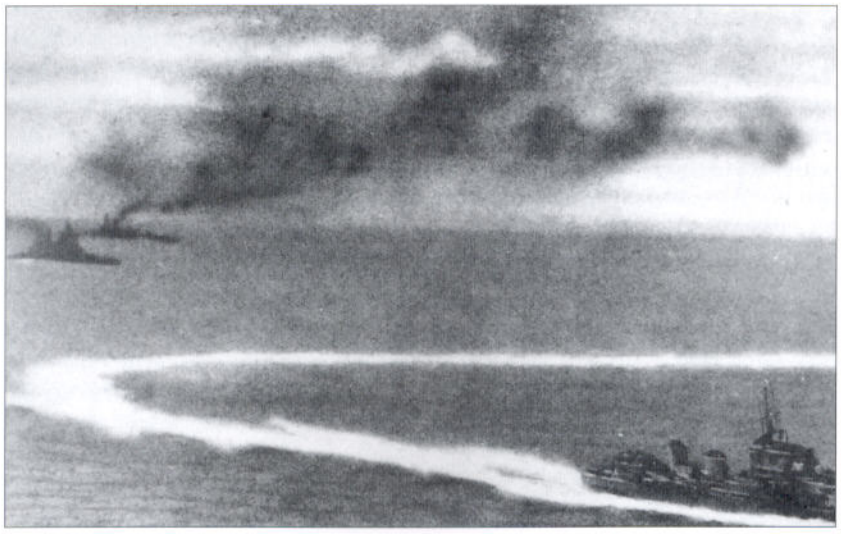
Before 1941 the *Repulse* had received additional armour protection but her secondary armament of triple 4-in. guns was only suitable for low-angle fire, while her single 4-in. anti-aircraft guns were considered obsolete. Her remaining anti-aircraft guns consisted of three 8-barrel pom-poms, four quadruple machine guns and eight new single 20mm Oerlikons. Although this might have been sufficient to deter a stray enemy aircraft, it was insufficient to protect the ship against a large and determined enemy aerial attack.

As the two British capital ships sailed off the east coast of Malaya, they were spotted by a Japanese submarine, which reported the sighting to the Japanese theatre commander. He had large numbers of aircraft at his disposal, including the 22nd Air Flotilla, based in airfields outside Saigon in Indo-China. The first high-level attack came at 11:15hrs, conducted by nine G3M 'Nell' bombers, which targeted the *Repulse*. Only one 550-pound bomb hit, striking the battle-cruiser's hangar. Twenty minutes later an attack by seven torpedo-armed Nells failed to damage the *Repulse*, largely due to Captain Tennant's skilful evasive manoeuvres. He also evaded the torpedoes launched at long range by another wave of eight torpedo-bombers. The *Prince of Wales* was not so lucky, being crippled by three torpedo hits after being attacked by another nine torpedo-bombers. With her engines badly damaged and the hull taking on water, the battleship was a sitting target.

The final wave of Japanese aircraft struck 30 minutes later: 26 torpedo-carrying G4M 'Bettys'. Nine aircraft attacked the *Prince of Wales*, while the remainder concentrated on the *Repulse*. *The Prince of Wales* could do little to avoid the attack, but Captain Tennant still had



The *Repulse* under attack from Japanese high-level bombers, the first attack she endured on 10 December 1941. The smoke that largely obscures her was the result of a hit on her hangar. (Museum of Naval Firepower, Portsmouth)



In this murky picture taken by a Japanese aircraft, the *Repulse* (right) and the *Prince of Wales* (left) try to evade the first air attacks launched against them on 10 December 1941. While the *Repulse* was successful, the battleship was hit and crippled by Japanese bombs. The vessel in the foreground is a British destroyer. (Museum of Naval Firepower, Portsmouth)

the ability to manoeuvre his ship. The Japanese split their attack, sending six aircraft to attack her on one side and three on the other. Captain Tennant was unable to avoid all these torpedoes, three striking *Repulse* on her port side. The gun crews of the *Repulse* managed to shoot down two Japanese aircraft, but a fourth torpedo hit, on her starboard side, proved too much for their old battlecruiser. The *Repulse* slowly listed to port and Captain Tennant gave the order to abandon ship. At 12:23hrs the *Repulse* sank stern first, taking almost 500 men down with her. Minutes later, the *Prince of Wales* also rolled over and sank.

In little over an hour, Japanese aircraft had managed to destroy Britain's only major naval force in the Far East. They also demonstrated the vulnerability of British capital ships to aerial attack. At least a lesson was learned from the battle; Britain's only surviving battlecruiser, the *Renown,* was hastily rearmed with a modern suite of anti-aircraft guns.

BIBLIOGRAPHY

Archibald, E.H.H.; *The Fighting Ship in the Royal Navy,* 1887–1984; Blandford Press, Poole, Dorset, 1984.

Bradford, Ernle; *The Mighty Hood*; Hodder & Stoughton, London, 1961.

Brown, D.K.; *The Design and Construction of British Warships, 1939–1945*; Conway Maritime Press, London, 1995.

Campbell, John; *Naval Weapons of World War Two*; Arms & Armour Press, London, 1990.

Chesneau, Roger; *Aircraft Carriers of the World, 1914 to the Present: An Illustrated Encyclopaedia*; Arms and Armour Press, London, 1984.

Chesneau, Roger; *Hood: Life and Death of a Battlecruiser*; Cassell Publishing, London, 2002.

Gardiner, Robert (ed.); *Conway's All the World's Fighting Ships, 1922–1946*; Conway Maritime Press, London, 1980.

Gardiner, Robert (ed.); *Conway's All the World's Fighting Ships, 1906–1921*; Conway Maritime Press, London, 1985.

Greene, Jack, & Massignani, Alessandro; *The Naval War in the Mediterranean, 1940–43*; Chatham Publishing, London, 1998.

Konstam, A; *Hunt the Bismarck*, Naval Institute Press, Annapolis, MD, 2003.

Mearns, David, & White, Rob; *Hood & Bismarck: The Deep-Sea Discovery of an Epic Battle*; Channel 4 Books, London, 2001.

Padfield, Peter; *The Battleship Era*; Pan Books, London, 1972.

Padfield, Peter; *Guns at Sea*; Hugh Evelyn Publishing, London, 1973.

Roberts, John; *The Battlecruiser Hood*; Conway Maritime Press, London, 1982.

Roberts, John; *Battlecruisers*; Naval Institute Press, Annapolis, MD, 1997.

Roberts, John; *British Warships of the Second World War*; Chatham Publishing, London, 2000.

Whitley, M.J.; *Battleships of World War Two: An International Encyclopaedia*; Arms and Armour Press, London, 1998.

Williams, David; *Naval Camouflage, 1914–1945: A Complete Visual Reference*; Chatham Publishing, London, 2001.

Winklareth, Robert J.; *The Bismarck Chase: New Light on a Famous Engagement*; Chatham Publishing, London, 1998

COLOUR PLATE COMMENTARY

A: HMS *REPULSE*

The side profile (1) shows the inital appearance of the *Repulse* when she entered service in 1916, emphasising the incredible transformation of this battlecruiser during her interwar years.

The *Repulse* (2) is then shown as she appeared during her final months, when she formed part of Force Z. In 1941 there was no firm ruling on camouflage patterns, although the Admiralty Camouflage Section issued general guidelines. Often it was left up to regional commanders or even individual ship captains to chose their own design. The Admiralty recommended that camouflage patterns covered not just the side of a ship but were continued onto the deck, following a prescribed scheme. While we have a good photographic record of the way the hull and superstructure of *Repulse* were painted in December 1941, no definitive record survives of her deck painting. The testimony of survivors suggests that her decks remained unpainted, so any attempt to re-create this deck camouflage would be purely speculative. The tops of 'A' and 'B' turrets were painted grey, and 'Y' turret black.

The *Repulse* was painted in Home Fleet Grey, or Home Waters Grey (darker than the normal grey used by the Royal Navy) until the spring of 1941, when an unusual contrast camouflage was adopted. Port and starboard sides of the ship were painted in an identical manner, with a base of Home Fleet Grey, and boxed sections of black

The inset (3) shows one of the 4-in. HA Mk XIX mountings, with cut away gun shield detailing the internal workings.

B: HMS *HOOD* ENGAGING THE *BISMARCK*, 24 MAY 1941

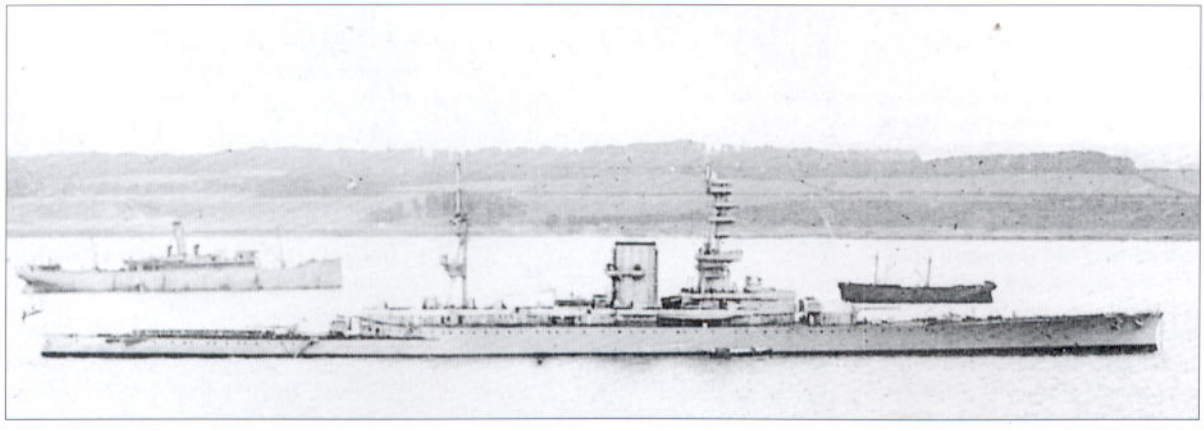
When *Hood* first sighted the *Bismarck* and the *Prinz Eugen* soon after dawn, she altered course to intercept the German ships. The range was about 17 miles (30,000 yards). This was just within the range of the *Hood*'s guns at maximum elevation (30,180 yards), but this was too far for her optical rangefinders to give the gunlayers an accurate range in the prevailing light conditions. This meant she needed to close the range to within 14½ miles (25,000 yards). Also, her officers knew the battlecruiser's deck armour was inadequate, and at ranges over 9 miles (16,000 yards) incoming shells were likely to fall almost vertically, increasing the risk of a hit on her deck rather than on her relatively well-armoured belt. This was another good reason to close the range. During the following 20 minutes, both the *Hood* and her German opponents made several changes of course, which made accurate rangefinding even more difficult. By 5:56hrs the ships were 22,000 yards apart, still within the *Hood*'s danger zone, but well within accurate gunnery range. Unfortunately the *Hood* was targeting the cruiser *Prinz Eugen*, her crew having mistaken her for the *Bismarck*. The confusion lasted until 5:59hrs, when the *Bismarck* fired a salvo which straddled the *Hood*; her third salvo at the target. She fired three more salvos within the next two minutes, and a 15-in. shell from her fifth salvo struck close to the rear turrets of the *Hood*, causing a small explosion. A split second later the battlecruiser exploded.

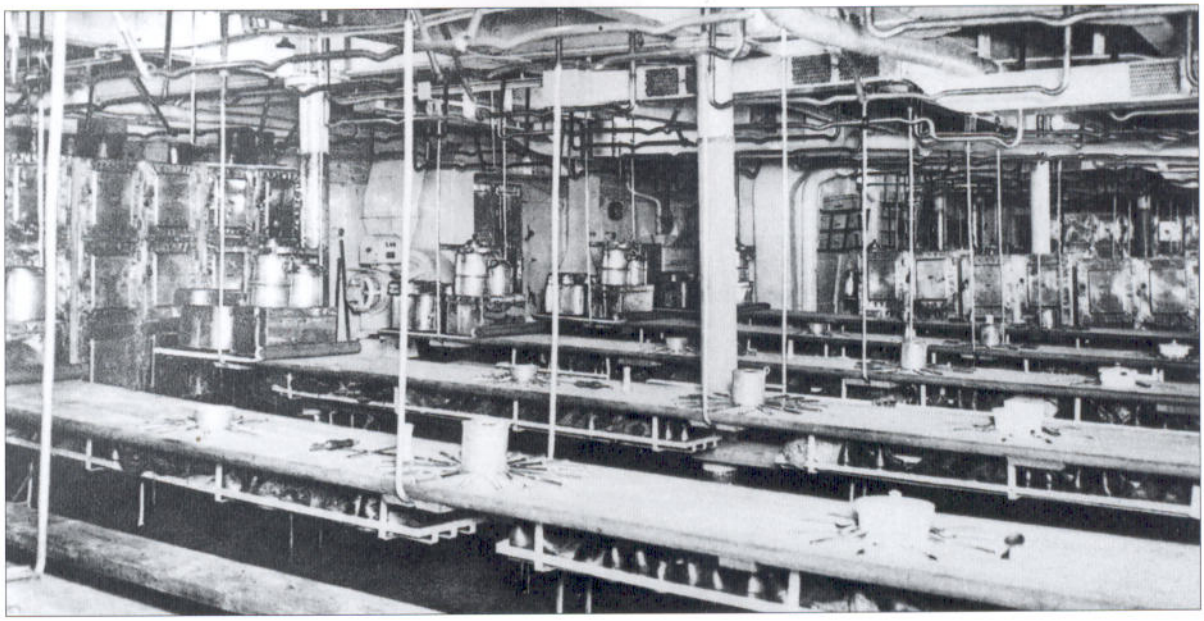
The plate shows the *Hood* about 30 seconds after 6:00hrs, when the third salvo from the *Bismarck* straddled the British ship. Less than 30 seconds later the battlecruiser received her fatal hit.

C: THE LATE-WAR BATTLECRUISERS, *c.* 1917–20

When the *Hood* (1) first entered service in 1920, her secondary armament consisted of 5.5-in. guns, designed to engage surface targets rather than aircraft. By this stage naval designers were slowly coming to understand the benefits (and threats) of naval aviation, at least for reconnaissance. Although it would take some years before the *Hood*'s anti-aircraft armament was improved, she was at least provided with two 4-in. anti-aircraft guns, which doubled as anti-torpedo boat weapons. The *Hood* was also duly fitted with her own scout plane, mounted on a flying-off

In the spring of 1917 HMS *Courageous* was fitted with minelaying rails on her quarterdeck, making her the largest minelayer in the fleet. The four sets of rails were nicknamed 'Clapham Junction' by her crew, but although designed to carry up to 222 mines, there is no record that she ever laid any. (Royal Naval Museum, Portsmouth)





A mess deck on HMS *Hood*, laid out for an inspection shortly before the Second World War. The long pine mess tables were secured to the deckhead by pairs of metal bars, and space was provided beneath them for the storage of eating utensils and kit. Bare metal lockers surround the mess deck, while the overhead bars were used to sling the crew's hammocks from at night. (George Malcolmson Collection)

platform built on top of 'X' turret. Another similar platform was briefly fitted to the top of 'B' turret. A Fairey Flycatcher was amongst the aircraft allocated to the battlecruiser during the 1920s. The platform was removed during her first major refit in 1929–31.

Other battlecruisers were even more closely linked to naval aviation. In 1917 the *Furious* entered service as a hybrid vessel, with a single 18-in. gun turret aft and a large flying-off platform forward. In effect she was half aircraft carrier, half battlecruiser. After aviation experiments in late 1917 she was sent back to the shipyard to be converted into the Royal Navy's first fully fledged aircraft carrier.

The light battlecruisers *Courageous* and *Glorious* were considered too poorly armed to join the main Battlecruiser Squadron, but they were long, fast and well built. When most of the fleet's remaining battlecruisers were scrapped in the 1920s, these two vessels were converted into aircraft carriers. The two profiles detail the appearance of the *Glorious* as built (3) and after its conversion into an aircraft carrier (2).

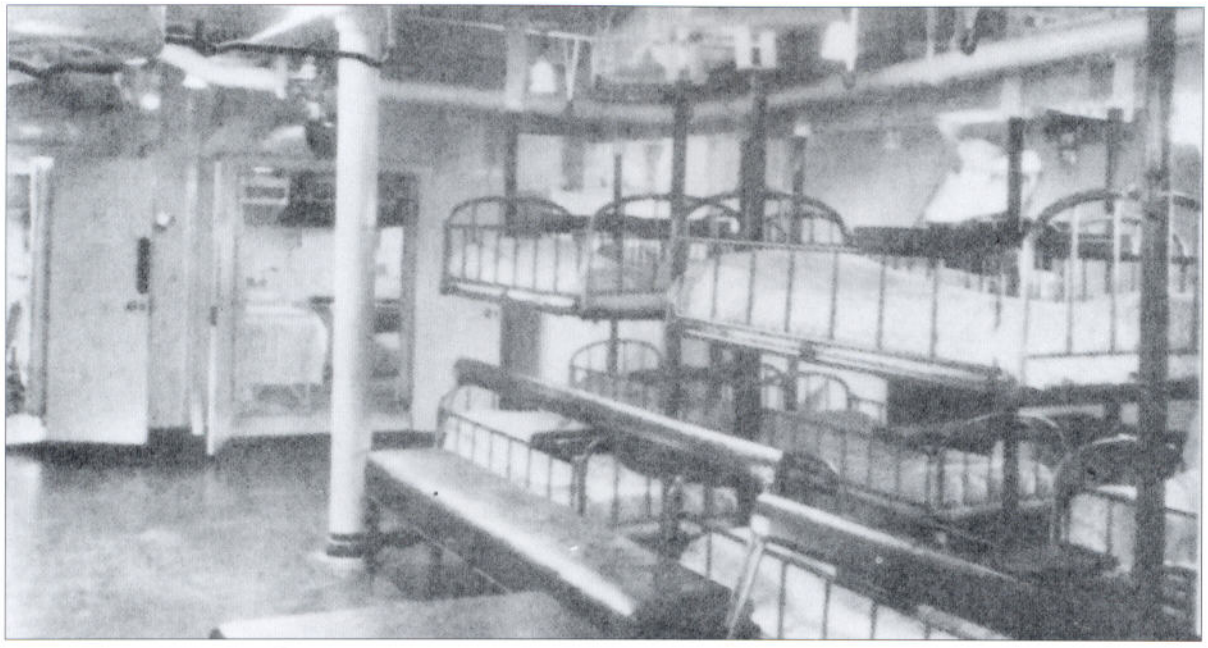
D: HMS *HOOD*, 1941

'The mighty *Hood*' is shown here as she appeared during the Battle of the Denmark Strait in May 1941. In her day *Hood* was the largest, fastest and arguably the most beautiful warship in the world. During the two decades of her career she toured the world 'showing the flag' as a floating symbol of British Imperial power. She also became the most widely recognised warship in the Royal Navy. By 1941 she was also outclassed by the latest battleships such as the *Bismarck*. Unlike the *Repulse* and the *Renown*, the *Hood* had only received the most basic improvements during the inter-war years and, while her belt and turret armour were adequate, the protection afforded by her decks to plunging fire was not. Her elegant teak decks were laid on top of a thin layer of armour; barely sufficient to provide protection against the plunging fire of a heavy cruiser like the *Prinz Eugen*, let alone salvoes fired from battleships such as the *Bismarck*.

While her secondary armament was somewhat improved during the inter-war years, her powerful main armament remained unchanged, save for improvements to her fire control systems. One of these improvements was the addition of a fire control radar, which should at least have made her gunnery direction as efficient as more modern capital ships in the fleet. This meant that when she engaged the *Bismarck* she had a fighting chance, as long as she could close the range quickly to reduce the risk of plunging fire hitting her lightly armoured decks. In the event, she was unable to close fast enough, and a single 15-in. shell from the *Bismarck* swooped down onto her after deck and sliced through her protective armour plating, leading to the detonation of the charges in her after magazine. The loss of the *Hood* shocked the world, and only the speedy destruction of the *Bismarck* could restore the pride of the Royal Navy.

E: HMS *RENOWN*

Although virtually identical when they were built, the appearance of the *Renown* later differed substantially from that of the *Repulse* as a result of modifications made during the inter-war years. These refits also made the *Renown* a far more formidable warship than her sister. For a start, the *Renown* was fitted with modern dual-purpose 4.5-in. guns in twin recessed turrets, and a heavier light anti-aircraft armament. Her engines were also improved, reducing weight, allowing for the addition of extra armour to her barbettes and



The sick bay of the *Hood*, looking towards the starboard side of the ship, towards the surgeon's examining room. The sick bay was located in the bow of the vessel, immediately underneath the forecastle. (Royal Naval Museum, Portsmouth)

deck. She was also fitted with a better radar suite than her sister. Following the loss of the *Repulse* in December 1941, the *Renown* was given additional light anti-aircraft guns, and further guns were added as the war progressed.

The battlecruiser was painted plain Home Fleet or Home Waters Grey until October 1941, when she was painted in the camouflage scheme shown here (1). The camouflage pattern was carried onto her foredeck and quarterdeck, and was the same on both sides of the ship. In the summer of 1943 she emerged from a refit with a new camouflage scheme (2). Her forecastle and upper decks were painted dark grey, while her quarterdeck was restored to its natural wood. This scheme was retained until mid-1944, when she was re-painted in Home Waters Grey (re-named Admiralty Standard Grey). She retained this appearance until she was decommissioned in 1948.

The inset (3) shows one of the 8-barrel 2-pdr. pom-pom mounts which formed part of the vessel's anti-aircraft defences.

F: THE SINKING OF THE *REPULSE*, 10 DECEMBER 1941

When the *Repulse* was sent to the Far East as part of Force Z in late 1941 she was only partially modernised. Although her armour and gunnery-direction system had been upgraded shortly before the outbreak of the Second World War, her anti-aircraft defences had received only minimal attention and were well below the standard expected of capital ships by 1941. Her 4-in. guns were not really able to engage high-flying aircraft, and she lacked suitable fire control for her anti-aircraft armament. This meant that, while she could probably fight off the odd roving enemy plane, she was ill-prepared to fend off co-ordinated attacks by modern aircraft.

When Force Z (consisting of the *Repulse* and the battleship *Prince of Wales*) were attacked by Japanese aircraft in the late morning of 10 December 1941, the British lacked any air cover, and were ill-prepared to meet the waves of Japanese planes. The captain of the *Repulse* managed to evade most of the bombs dropped on his ship by the first wave of attackers, although one bomb hit the hangar and caused minor damage. The next attack consisted of torpedo-bombers, and again the expert ship-handling of the *Repulse*'s crew meant that no torpedoes hit their target. Finally the Japanese attacked from two directions at once. Although the *Repulse* shot down two of her assailants, she was unable to avoid the Japanese torpedoes. Hit four times, she slowly rolled over and sank. The plate shows the scene as this final Japanese attack is going in.

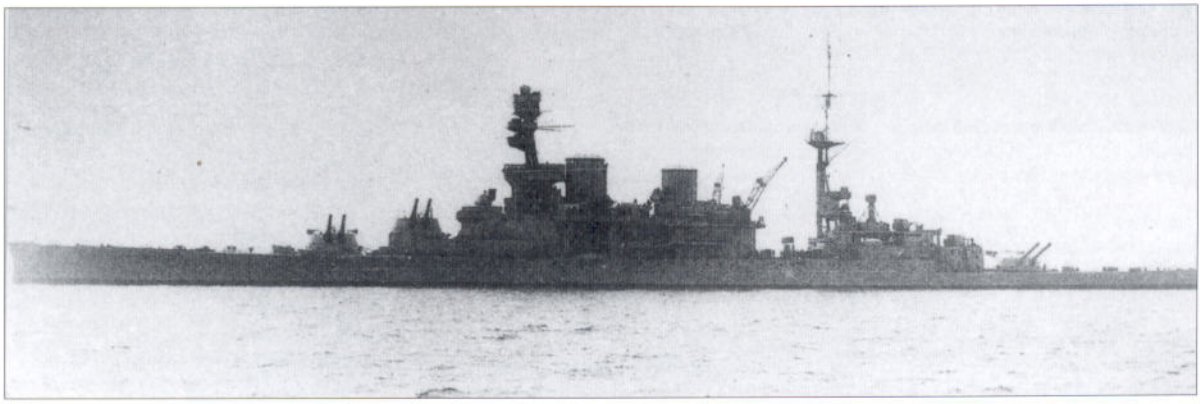
G: GUN TURRET FROM THE *HOOD*

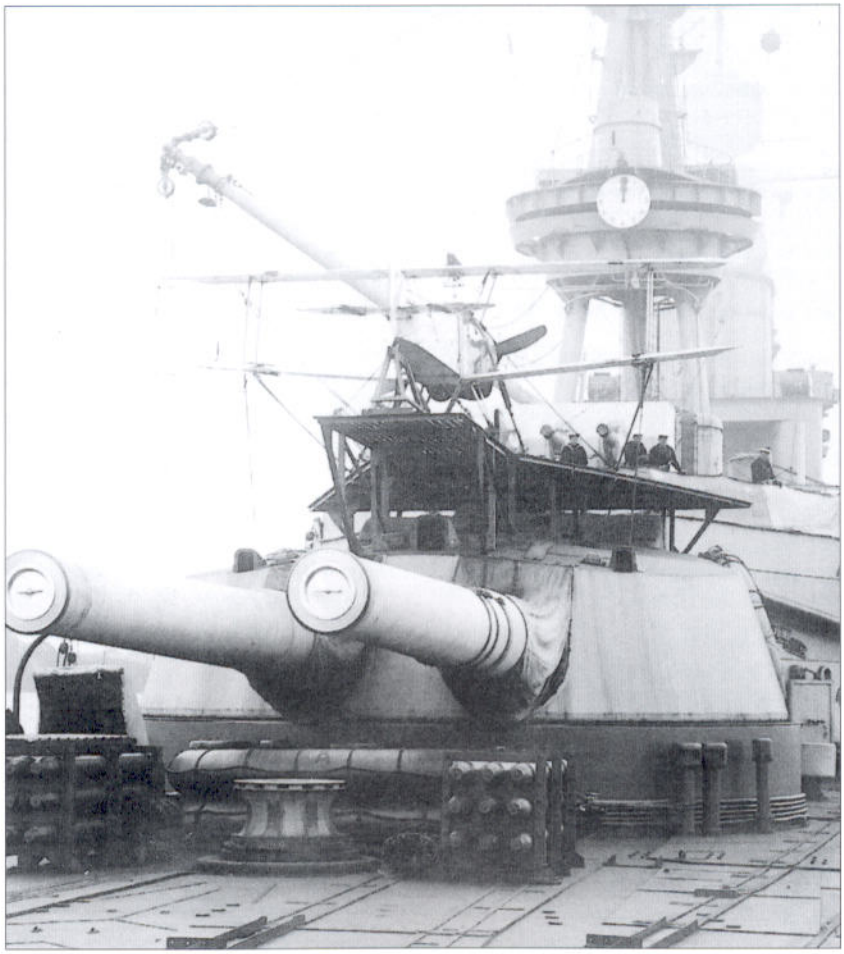
Like the *Repulse* and *Renown*, the battlecruiser *Hood* was armed with 15-in. guns, weapons originally designed during the First World War. These barrels weighed just under 100 tons apiece, and were housed in a heavily armoured turret, sited on top of an armoured barbette which protected the shell-handling spaces beneath it.

The guns rested on huge cradles, which allowed the rear of the gun to sink down into the barbette when the barrels were raised to their maximum elevation of 30°. Behind the cradle sat the gun-loading cage, where shells and propellant charges were brought by means of a mechanical lift and slide mechanism, before being rammed into the breech of the barrel by a hydraulic loading arm. To the rear of the gunhouse (the name given to the main body of the turret) was the gun control position. A rangefinder hood allowed the gun captain to direct the guns locally even if the *Hood*'s fire control system had been knocked out.

The barbette sited below the gun housed the turret's hydraulic turning mechanism, the barrel-elevating hydraulics and the main working chamber. Here the shells and charges were prepared manually before being fed into the loading hoist which took both shell and charge up to the gun. Below this a trunk housed the hoist which linked the turret to the magazine and shell room. A cordite hopper brought the charges up to the guns, and in the shell room a mechanical bogie was used to roll the shells onto the hoist.

The inset shows the likely cause of the explosion which sank the *Hood*. An initial explosion was seen below the after mast, and it is likely that a shell penetrated through her deck there to the torpedo magazine immediately underneath. This exploded, causing a flash to travel through the deck immediately underneath the barbette, down the hoist and into the shell room. This ignited the charges in the main magazine, and the resulting explosion tore the battlecruiser apart.





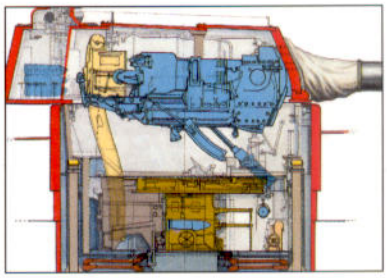
ABOVE **HMS *Repulse*, photographed in 1936. From this angle her hangar and aircraft catapult can be seen clearly. The hangar was struck by a Japanese bomb during the first air attack against the ship on 10 December 1941, then a series of torpedo hits (three to port and one to starboard) finished her off. (Museum of Naval Firepower, Portsmouth)**

LEFT **'Y' turret of HMS *Courageous*, photographed in the summer of 1918. In the foreground are minelaying rails, laid on her quarterdeck, while a spotter aircraft is carried on a flying-off platform fitted on top of her turret. (Museum of Naval Firepower, Portsmouth)**

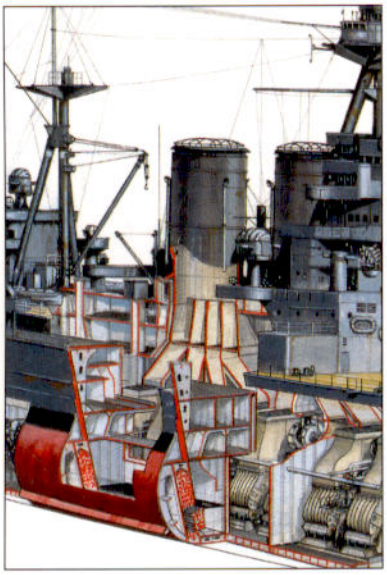
INDEX

The design, development, operation and history of the machinery of warfare through the ages.

Full colour artwork



Unrivalled detail



Cutaway artwork

Photographs

British Battlecruisers 1939–45

When war broke out in 1939, only three true battlecruisers remained in the Royal Navy. One of these was HMS *Hood*. Although the world's largest and fastest capital ship for much of her life, she was destined to be destroyed in action against the German battleship *Bismarck*. The remaining two battlecruisers were HMS *Repulse* and HMS *Renown*. *Repulse* was sunk by Japanese aircraft off Singapore, whilst *Renown* served with distinction until the end of the war. This book traces the pre-war development of these spectacular warships, through to their wartime exploits, whilst using this information to demonstrate their operational and mechanical performance. It also examines what life was like on these battlecruisers when they sailed into action.

OSPREY PUBLISHING

www.ospreypublishing.com

ISBN 1-84176-633-X

9 781841 766331