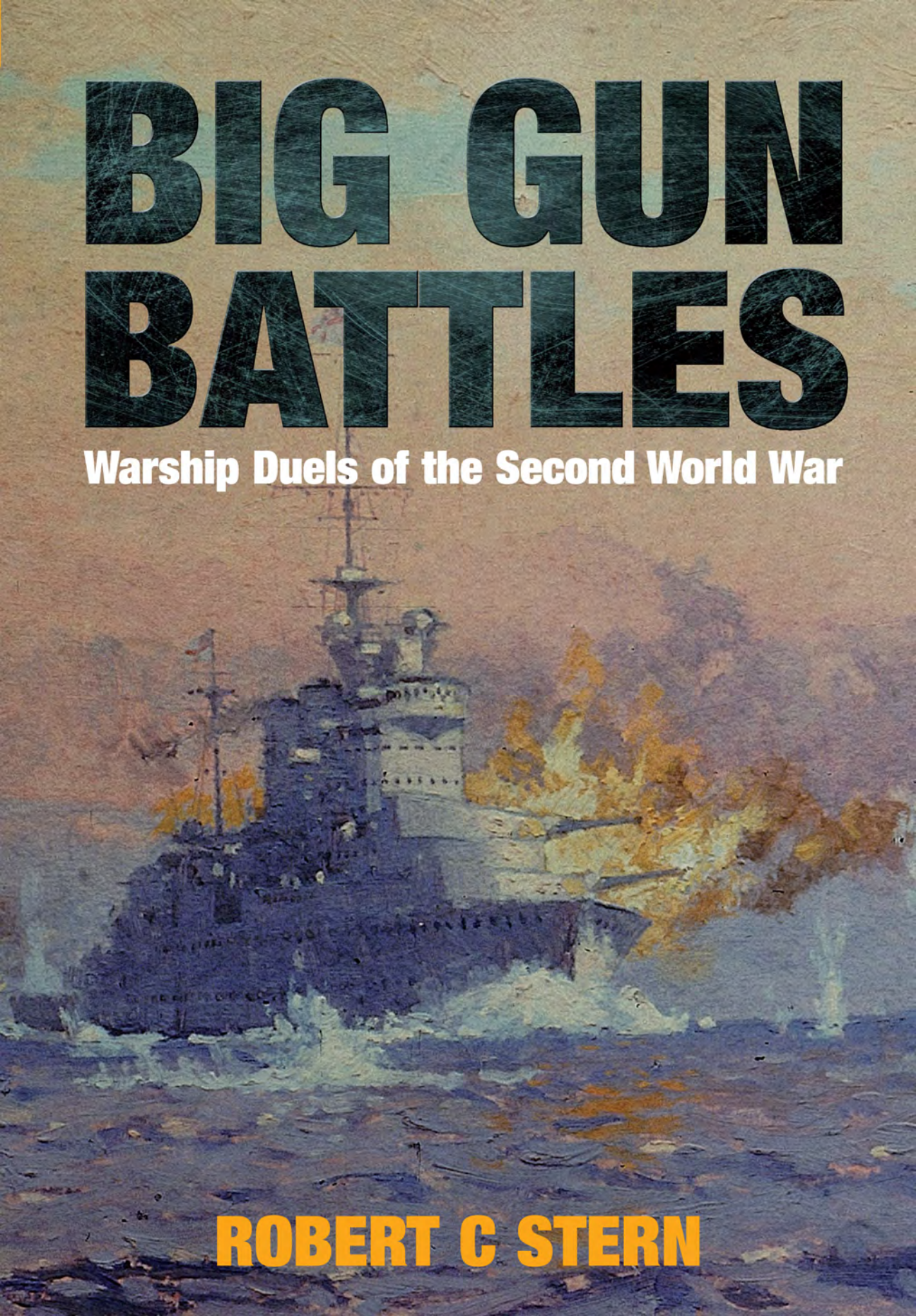
BIG GUN BATTLES

Warship Duels of the Second World War



ROBERT C STERN

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1. All the American battleships at Surigao Strait were supplied with flashless propellent for their main battery guns. As this image of *West Virginia* (BB48) firing a half-salvo from her after turrets attests, 'flashless' was a relative term. Flashless powder burned more quickly (and less completely) than the more conventional 'smokeless' powder developed for daylight engagements, meaning that more smoke and less flame emerged from the barrel behind the shell. It is easy to see how the gunfire of Oldendorf's battleships and cruisers produced enough light to silhouette the destroyers of Smoot's DesRon56. (*NARA*)

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ROBERT C STERN

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To my brother, Dick, for setting the bar high
before I was old enough to appreciate it
and for continuing to raise it higher now that I am.

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The help of all these fine people was invaluable, but, as always, any mistakes of omission or commission are mine alone.

Photo Credits

Most of the photographs come from the US National Archives, which contains the US Navy's photographic assets for the time period covered by this book. Others have been sent to me by friends and colleagues over the years and, if I was wise enough to record the source, are credited as such. If I happened to note the original source, that is credited as well. One source in particular needs special mention. Enrico Cernuschi generously made available to me a collection of photographs of Italian ships engaged in the Battle of Punta Stilo, which was given to him by Admiral Giovanni Vignati, editor of *Marinai d'Italia* magazine. The full credit for these images is 'Associazione Nazionale Marinai d'Italia. Fondo ANMI, collezione Castegnaro', which I have shortened in the captions to 'ANMI via Cernuschi'. I also wish to thank Toni Munday of the HMAS Cerberus Museum. Other photo sources are abbreviated as follows:

NARA	US National Archives and Records Administration
NHHC	US Naval History and Heritage Command
NRL	US Naval Research Laboratory
NZOH	New Zealand Official History
USAF	US Air Force

I would also like to thank Ken MacPherson, Bob Cressman and David Doyle, who have made photographs from their collections available to me over the years.

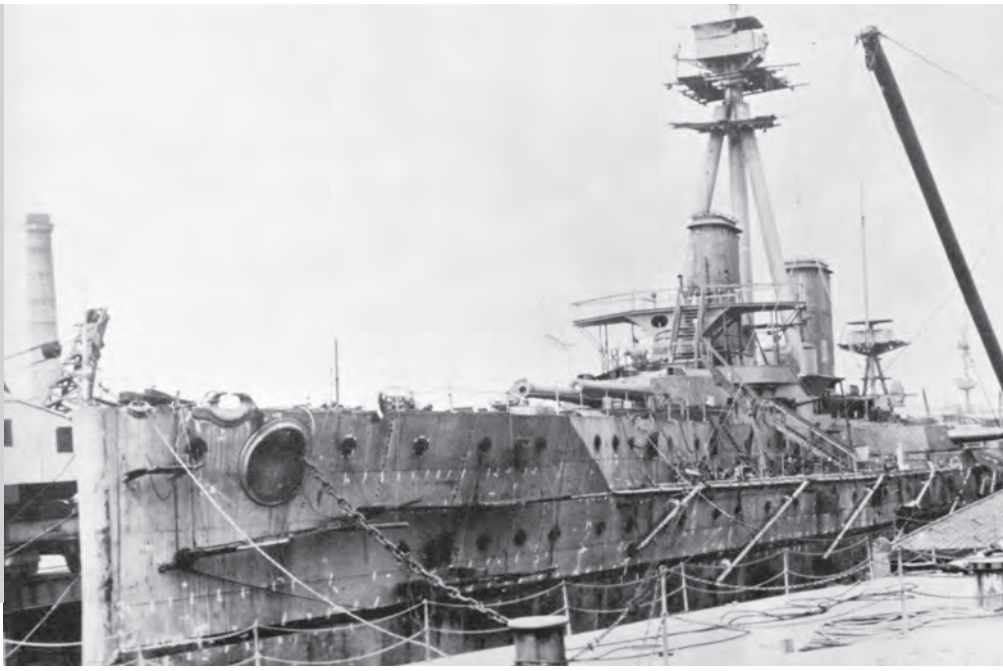
Introduction

The premise of this book is quite simple – to recount some of the most interesting and important naval gun battles of the Second World War. Possibly the most difficult part came at the very beginning, deciding which of the many naval engagements to describe, which to exclude and how much background was necessary to place them in context. As this author has always had a strong interest in the technology of naval warfare, one criterion was that, taken in sequence, the chosen engagements should trace the evolution of naval gunfighting from the beginning to the end of the war, showing how changes in technology helped (or hindered) the process of destroying enemy warships by gunfire. The author's intent has also been to include those engagements that are of the greatest interest because of their influence on the course of the war or because they involved the most intriguing ships and men.

To be considered for inclusion in this study, a battle must have been primarily decided by naval gunfire. This deliberately excludes not only the famous carrier air battles such as the Coral Sea and Midway, but also some very interesting engagements in the Solomons Campaign that were primarily exchanges of torpedoes. It also excludes engagements which, while not considered carrier air battles, were nonetheless primarily decided by air attack, such as the dramatic Battle off Samar. Finally, the author has chosen to exclude actions already described in detail in others of his books, such as the battles of Narvik or the naval battle of Casablanca.[1]

This still leaves a large number of engagements from which to choose. Therefore, in making the final selection, the author opted when possible to favour lesser-known engagements over more famous ones, to include engagements from all periods of the war and as many theatres and nationalities as possible and to include engagements involving both large and small warships. Ultimately, it is the author's hope that the result is a book that meets all these criteria, that is a coherent and interesting depiction of the ebb and flow of the Second World War at sea and at the same time pays proper tribute to the ships that carried the guns and to the men who manned them.

The single greatest driver of change in the practice of naval gunnery during the Second World War was the rapid development of more-capable sensor systems. In order to understand how the advent of vastly improved sensors, primarily radar, and the genesis of the necessary shipboard command facilities,



2. When the first of the all-big-gun battleships – HMS *Dreadnought* – was under construction in 1905, all that was thought necessary for fire control was a spotting top aloft on a tripod foremast, never mind that it was placed abaft her fore funnel, where it would often be shrouded in smoke. With four main battery turrets on each broadside, the need for more than spotting from the foretop became obvious to Royal Navy's gunnery experts, such as Captain John Jellicoe. (*NHHC*)

it is necessary to look briefly backwards at the revolution in warship design that took place in the century preceding these events. By the end of the 1850s, most warships being built for major navies were steam-powered and the first armoured ships were entering service. Admiral Nelson would have known how to fight these ships because, despite their steam propulsion and armoured sides, their guns were muzzle-loaders and were carried in individual mounts along the broadside, so the tactics of Trafalgar would have sufficed fifty years later. Fire control would also have looked the same, with ship's officers telling the guns when to start and stop firing and, in only the most general terms, where to aim. Everything else was left up to individual gunners.

A new tactical element was introduced in the American Civil War, with the invention of the ironclad ram. While armed with cannons and armoured against opposing cannon fire, the primary weapon of the CSS *Virginia* was a massive cast-iron ram, which she was able to use effectively only once.[2] During her first sortie in Hampton Roads on 8 March 1862, she rammed one of the Union Navy's blockading ships, USS *Cumberland*, leaving her sinking, but also leaving her ram embedded in *Cumberland*'s side. That night, USS *Monitor* arrived from New York, and the next day the two ironclads fought to a draw, but the impact of *Virginia*'s single successful sortie would be felt for many years, as larger warships were commonly designed with ram bows well into the 1880s. The ram also affected tactical thinking: at the Battle of Lissa in 1866, and as late as the Battle of the Yalu in 1894, one of the opposing fleets adopted a line-abreast formation, which would make ramming easier and being rammed less likely.

It was, however, another lesson from the Battle of Hampton Roads that had much greater and longer-lasting impact – the fact that neither ship had

been able to seriously damage the other. In what was to be a constant struggle between hitting power and protection, armour showed itself in this instance to be superior. This naturally led to the mounting of bigger and much heavier guns, which in turn meant that fewer guns could be mounted in a single hull. By the time the First World War broke out in 1914, the 'standard' battleship design, epitomised by the Royal Navy's *Iron Duke*-class, was a ship of 25,000t, mounting ten 13.5in naval long rifles with a range of over 20,000yd and protected by up to 12in of belt armour. While this ship was vastly more powerful than anything Nelson could have imagined, it was built by the main combatants in numbers he would have understood how to command. When the Royal Navy's Grand Fleet met Imperial Germany's High Seas Fleet off the Danish coast in 1916, the two sides mustered a total of fifty-eight similar behemoths – forty-four battleships and fourteen battlecruisers – plus scores of armoured cruisers, light cruisers and smaller craft. It is safe to say that never before and never since have so many ships and so many men been brought together expressly to fire guns at each other. As had happened at Hampton Roads, despite all the effort and staggering cost required to enable the Battle of Jutland to be fought, the result was tactically a draw.

Jutland was tactically indecisive for many reasons, not the least of which was poor visibility when the main fleets engaged late in the afternoon. (Visibility had been better earlier in the day, at least for the Germans, when the battlecruiser forces of the two sides met, which allows an examination of the still rudimentary state of fire control.) The British had a fire control system that employed a director position in the foretop and a Dreyer Table in the transmitting station below decks.[3] The director acted as a 'master gun'; it had a pair of telescopes used to designate the ship's target and estimate that target's course and speed. The ship's multiple rangefinders would follow the director. The ranges and the estimates of enemy course and speed they generated were supplied to the Dreyer Table. This was a hybrid instrument marrying a Dumaresq, a Vickers Clock and moving paper plotters for range and bearing.[4] The transmitting station would pass its adjusted range and bearing 'solution' to the guns, where the individual gunners would elevate their guns based on the known muzzle velocity of each barrel to achieve the desired range.[5] The guns were fired by a master key located at the director, thus allowing salvo fire.

The British fire control system proved to be slow in practice, both because of its complexity and because British gunners had come to depend on the generation of plots on the Dreyer Table, which required a large enough set of data points (rangefinder readings) for a 'smooth' rate to emerge, a process that could take several minutes. As a result, when Beatty's Battlecruiser Fleet encountered Hipper's 1st Scouting Group (six battlecruisers supported by four fast battleships versus five battlecruisers), the Germans opened fire first and, throughout the first phase of the encounter, maintained faster and more accurate gunfire.[6] This was only partly due to better visibility from the German side; the Germans also benefitted from significantly better rangefinders and a doctrine that emphasised firing a 'ladder' of ranging shots to find the range, rather than attempting to plot the range before opening fire.[7]

When the Americans entered the First World War in 1917, they brought with them a quite different approach to fire control. The American battleships that joined the Grand Fleet late in that year were equipped with various marks of the Ford Range-keeper. Designed by Hannibal Choate Ford – no relation to the automobile maker – the Ford was similar in concept to the Argo Clock developed by Arthur Pollen for the Royal Navy.[8] Both were 'synthetic' systems, meaning that they started calculating a firing solution based on initial data, assuming that this solution would be refined over time as more data became available; the Dreyer Table represented the alternative 'analytic' approach, which did not generate a firing solution until sufficient data had been plotted and 'smoothed', a process that was not only slower to arrive at an initial solution but was also less well-suited to handling rapid changes in enemy course and speed.

Even before Jutland, the Royal Navy began to appreciate the inherent problems with the Dreyer Table and the 'analytic' approach to fire control, and began to implement an approach that in many ways resembled the German system.[9] At the end of the war, a complete reassessment of fire control procedures was undertaken, resulting in a vastly improved Admiralty Fire Control Table (AFCT), which, in conjunction with an improved fire-control director called the Director Control Tower (DCT), incorporated the 'synthetic' solution found in Pollen's and Ford's computers. The first AFCT/DCT installations were in the new battleships HMS *Nelson* (28) and *Rodney* (29) commissioned in 1927. This proved to be an excellent and robust gunfire control system, later marks being installed in cruisers

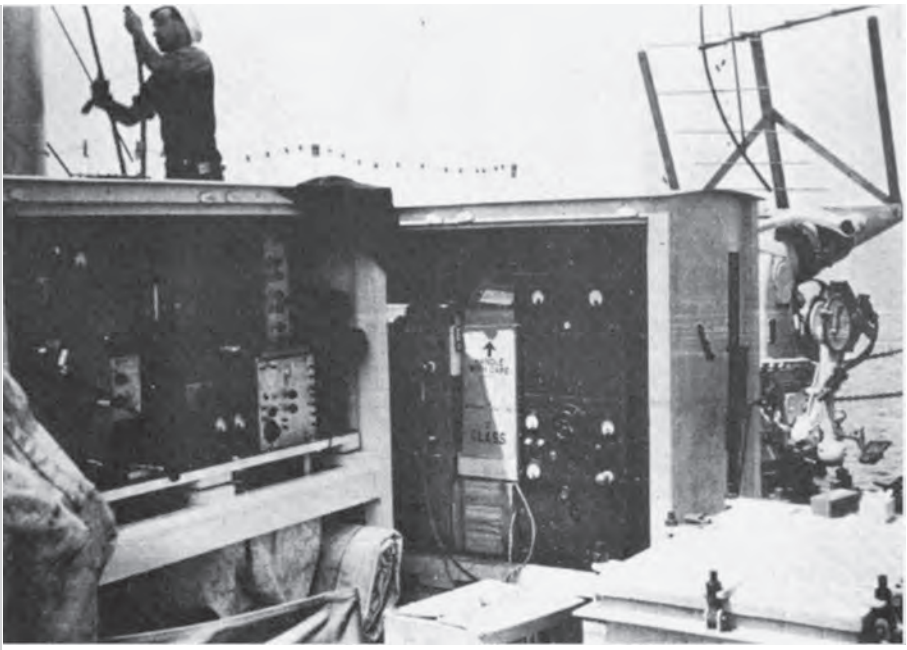
3. In 1920, HMS *Renown* (72) was modified to give her a high-angle control position at her foretop, including a 12ft rangefinder on the roof, acknowledging the growing threat represented by aircraft. Immediately below was a fully glassed-in spotting position that provided information to the main battery director position (located in the cylindrical 'office' one platform below the spotting top). Note the multiple communications tubes running from the spotting top to the main battery director position and to the legs of the tripod foremast where they were routed to the armoured main battery rangefinder mounted atop the conning tower in the lower right in this photograph and to the transmitting station below decks where the Dreyer Table was located. (*NHHC*)

4. HMS *Nelson* (28), seen soon after her completion in 1927, shows off the fully evolved Royal Navy capital ship fire control system that remained in use through the end of the big-gun-ship era, lacking only the radar antennas that multiplied along ships' upperworks beginning in the late 1930s. *Nelson* has an armoured main battery control position (minus the rangefinder) atop her conning tower, just forward of her massive tower foremast. There are four control towers atop the foremast: two secondary battery control towers to either side, a high-angle control tower on the tall pedestal and the first-generation fully evolved DCT in front. This can be seen more clearly to the right in this image, as there was an identical DCT mounted abaft her mainmast as an auxiliary control position. (*USAF*)

and in war-construction battleships. For smaller ships, the Royal Navy adopted a Vickers-built system called the Admiralty Fire Control Clock. The Americans continued developing the Ford Range-keeper; their larger warships in the Second World War being equipped with various 'Mods' of the Mk8 Range-keeper.

All of these fire control computers were analogue devices, clockwork mechanisms that calculated rates and ranges with gears and ratchets similar to the mechanical calculators used in financial businesses at the time. The versions in ships in 1939 differed from those in 1918 mainly in that much of the data, such as own-ship course and speed, wind data, etc., was entered by mechanical linkages rather than by human operators. The most significant difference between the fire control systems at the end of the First World War and at the beginning of the second was the emergence of radar as a rangefinding instrument.

The idea of radar was literally in the air in the 1930s. From the beginning of regular radio broadcasts in the previous decade, it was noticed that certain objects interfered with reception of radio signals. Once it was realised that any object of sufficient size and solidity, including ships and aircraft, could cause this interference by reflecting radio waves, the idea of radar followed logically.[10] The development of usable radar systems proceeded in fits and starts due to the need to conceive of and develop the electronic hardware necessary to co-ordinate (and eventually co-locate) the transmitting and receiving antennas.[11] In the US, development had reached the point where an experimental installation was made in April 1937 of a 1.5m-wavelength radar on the destroyer *Leary* (DD158) which proved reliable and capable of detecting an aircraft at 18nm. An improved version of this radar, complete with rotating and tilting 17ft^2 mattress antenna, designated



5. Radar experiments were being carried out in the late 1930s by the Royal Navy, Kriegsmarine and the US Navy. An early American experiment, in April 1937, saw the mounting of a complex Yagi antenna on the forward deck gun of the destroyer *Leary* (DD158). The electronics were housed in wooden crates placed on the deck behind the gun. This design met the Navy's criteria that a single antenna serve for transmission and reception and that it be trainable (as the gun was rotated). The set proved reliable, but was insufficiently powerful to obtain adequate range in the 1.5m-wavelength band. With an upgraded transmitter, this set went to sea again the following year as the XAF. (*NRL*)

XAF, was installed on the battleship *New York* (BB34) in December 1938. So successful were the tests that a production run of six sets, redesignated CXAM, was ordered in October 1939 from the Radio Corporation of America (RCA).

The British started experimenting with radar in the same time frame as the Americans, but pushed the idea forward faster in response to the ominous rise of Fascist Italy, Spain and Germany on the continent. The first experimental installation of the land-based Chain Home air-search radar dates to July 1935. The first naval radar installation was the Type 79X on HMS *Saltburn* (N58) in October 1936. The first production Type 79 was installed on HMS *Sheffield* (24) in September 1938. Like CXAM, the Type 79 was an air-search radar.

Also in 1936, the Germans began sea testing of a naval radar operating at 50cm wavelength. This was found to have inadequate range, leading to the decision to lengthen the wavelength to 60cm in order to gain power.[12] It was this still-experimental set, designated 'DeTe-Gerät' or 'Seetakt', that was installed in *Admiral Graf Spee* in January 1938. Later production sets operated at 80cm. Unlike the contemporary American and British radars, the Seetakt was intended from the beginning as a surface-search set for use in fire control. The first British and American production fire control radar installations came in June 1940 and June 1941 respectively.

Five other nations are known to have worked on radar development before the outbreak of the Second World War: Japan, Italy, France, the Netherlands and the Soviet Union.[13] For various reasons, none of these nations had an operational naval radar prior to their entry into the war.

At the beginning of the war, these technological developments actually had little impact on the outcome of engagements. It would take time and

hard experience to learn how to use the increasingly sophisticated fire control computers and radars available to some of the participants in these battles. They would have profound impact well before the end of the war, particularly as many of the engagements described in this book were between naval forces with far different access and ability to exploit these technologies. This is part of the story to be told here, but by no means all of it. Ultimately this is a book about men and ships which sought each other out in snow squalls or dank tropical nights to fight for control of patches of water that would otherwise mean little to most.

As this is a study of naval gun battles, it is only appropriate that particular attention should be paid in the following narratives to the physical act of projectiles striking the hull structure. Most ships of this era were made of steel, for the most part 'mild' steel, meaning low-carbon steel without hardening admixtures (such as nickel or chromium). Only the United States Navy made extensive structural use of armour steel, the so-called 'special treatment steel', a homogeneous high-tensile steel used for bulkheads, armoured decks and lower armour belts, as well as splinter protection for command spaces and gun houses. Generally, warships larger than destroyers were given some amount of armour protecting magazines, machinery spaces, gun turrets, barbettes and conning towers. This armour was often face-hardened, meaning it was cooled more slowly on one side than the other, leaving one side harder, but more brittle and the other side somewhat softer, but more ductile. The combination of a harder outer surface and a more flexible inner surface made for an armour plate that optimally combined resistance to penetration and reduced likelihood of spalling.

The rounds fired from naval guns during the Second World War generally looked much alike, differing in how large a bursting charge it contained, whether the shell had a hardened cap to assist it to penetrate armour plate and where the fuse for the bursting charge was located. Smaller main-battery guns, generally up to 5in calibre, were not expected to defeat armoured opponents, so guns of this size generally fired a 'common' round (often called high-explosive (HE) or high-capacity (HC)). These would have a relatively large bursting charge, often greater than 10 per cent of the weight of the shell. They might have a base fuse or a nose fuse (or both), depending on the 'softness' of the intended target. As guns of this size were sometimes 'dual-purpose' weapons, used against aircraft as well as surface targets, shells might be fitted with a timed fuse, in which case they would be referred to in the US Navy as 'AA common' rounds. Medium-calibre guns, the size used as the main battery for cruisers, generally were supplied with both a common shell and an armour-piercing (AP) shell, the latter having a bursting charge between 25 per cent and 10 per cent of that in a common round. Because it was considered unlikely that cruisers would very often find themselves fighting armoured opponents, the Royal Navy (RN) supplied their medium-calibre guns with a hybrid shell with a bursting charge midway between that of a common and an AP round and then provided this round with a hardened cap, coming up with a common pointed ballistic capped (CPBC, sometimes called a semi-armour-piercing capped (SAPC)) round that was carried by RN cruisers almost to the exclusion of any other type. The Germans differed in providing

two types of HC shells – a base fuse round and a nose fuse round, the latter having between 50 per cent and 100 per cent greater bursting charge. The ideal shape for an AP shell in terms of armour penetration was blunt-nosed, but this made for poor aerodynamics; therefore many nations developed an AP shell with a pointed cap, resulting in an armour-piercing capped (APC) round.

The impact of a shell hitting a ship varied depending on a huge number of factors, including (but not limited to) the shell's mass and type, its velocity at impact, the angle at which it hit, the nature of the structure hit (armour plate versus 'softer' surface) and whether the shell's fuse functioned properly. The initial damage was the result of the kinetic energy of the fast-moving shell striking a static structure; depending on the type of structure, the physical deformation could be considerable. Thin shell plating or other 'soft' structures could be torn apart, with pieces of the destroyed structure themselves fragmenting, adding to the damage. If the shell struck armour plate, the energy was often dissipated in distorting or fracturing the plate, reducing the damage in the area behind the plate.

Either way, the kinetic energy was soon spent. The rest of the damage caused by a shell came after the bursting charge exploded. As the name indicates, the primary function of a bursting charge is to break a shell into smaller pieces, thereby increasing the area of potential damage before the shell's energy was spent. An HE/HC shell, with a larger bursting charge and thinner shell wall, would break into a large number of smaller fragments (splinters) that, along with the explosion of the charge, could start fires and cause casualties, while the smaller charge and thicker wall of an AP shell made for fewer, heavier fragments which would do more structural damage deep inside a target ship.

To the extent possible, the narratives in this book will describe the impact of individual shells that affected the outcome of the chosen engagements. That this is possible at all is the result of the small percentage of hits obtained in many of these battles, meaning that the damage caused by individual hits can in some cases be determined. Despite improved fire control compared to the First World War, especially after fire control radars became common in the US and Royal navies, these battles so often took place at extreme range, in poor visibility or at night, that the percentage of hits was often 2 per cent or less. Even in those cases when individual hits cannot be isolated, the cumulative effect of gunfire on ship's structure and personnel will be documented to the extent possible.

A Note on Nomenclature and Units

Distances over water are given in feet (12in/304.8mm/abbreviated 'ft'), yards (3ft/0.91m/abbreviated 'yd') and nautical miles (2025.37yd/1.85km/abbreviated 'nm'). Distances over land are given in statute miles (1760yd/1.61km/abbreviated 'mi'). These are the units used by Allied seamen in the 1940s and remain in use in America and, to a lesser extent, Great Britain. Gun calibres are given in the system used by the nation to which a ship belonged. Radar wavelengths are given in metric units. Place names are those that would have been used by an educated English-speaker in the 1940s. Where those differ from the current name or spelling of a place, I give that current version when first mentioned. Ranks and rates for men of navies other than the US Navy, excepting only the

Royal Navy, are translated to the closest USN equivalent. Royal Navy ranks and rates were similar to, but by no means identical to, the US Navy's.

When first referenced, US Navy ships are identified by their hull number (e.g., *South Dakota* (BB57)) in which the letters designate hull type (BB – battleship) and the number is a one-up counter of hulls of that type ordered. Royal Navy ship pennant numbers are given when they are first mentioned (e.g., HMS *Nelson* (28)). Warship prefix designators, when appropriate, are also used only the first time a ship is mentioned. Some nations, such as Nazi Germany and Imperial Japan, used no such designator and none is used in this book.

List of Abbreviations/Acronyms

AA	Anti-Aircraft
AMC	Armed Merchant Cruiser (a merchant ship outfitted with guns to act as a commerce raider, scout cruiser or convoy escort)
AP	armour piercing
APC	armour piercing capped
AR	action report
B-Dienst	Beobachtungsdienst (reconnaissance service) German naval codebreaking organisation
CIC	In American usage: Combat Information Center (an evolving concept of shipboard tactical control by organising radars and inter-ship radio into a single command space, probably first attempted in the Solomons in late 1942; see http://destroyerhistory.org/fletcherclass/ussfletcher)_ In Royal Navy usage: Commander-in-Chief
CinC	In American usage: Commander-in-Chief
CO	commanding officer
CPBC	common pointed ballistic cap
CNO	US Navy Chief of Naval Operations
CPO	Chief Petty Officer
DCT	Director Control Tower
DesDiv	Destroyer Division (USN destroyer unit, generally four ships) – besides DesDivs, the USN has CruDivs and BatDivs for cruisers and battleships
DesRon	Destroyer Squadron (USN destroyer unit, generally eight ships)
DP	dual purpose (referring to guns that could be fired at aircraft and surface targets)
ESM	electronic support measures (In the Second World War, this comprised detectors to identify enemy radios and radars, and transmitters to jam them)
FAA	Fleet Air Arm (The afloat component of the RAF)
FuMB	*Funkmessbeobachter* (German word for radar detector)
FuMO	*Funkmessortung* (German word for radar device)
GC&CS	Government Code & Cypher School (the British codebreaking establishment eventually located at Bletchley Park; the source of ULTRA decrypts)

GFCS	gunfire control system (US Navy term for a system combining optical and electronic target detection and tracking with automatic gun pointing)
GRT	gross register tons (a measure of the volume of cargo a merchant ship can carry)
HA	high-angle (often used in Royal Navy parlance in the place of AA)
HC	high capacity (used interchangeably with HE)
HE	high explosive (used interchangeably with HC)
HMAS	His Majesty's Australian Ship (Royal Australian Navy warship designator)
HMS	His Majesty's Ship (Royal Navy warship designator)
HNOMS	His Majesty's Ship (used by the Royal Navy to designate Norwegian vessels)
HrMs	His Majesty's Ship (Royal Netherlands Navy warship designator)
IJA	Imperial Japanese Army
IJN	Imperial Japanese Navy
KM	Kriegsmarine (the German navy)
MV	motor vessel
RA	Regia Aeronautica (Royal Italian Air Force)
RAF	Royal Air Force
RAN	Royal Australian Navy
RFA	Royal Fleet Auxiliary
RM	Regia Marina (Royal Italian Navy)
RN	Regia Nave (Royal Italian Navy warship designator)
RN	Royal Navy
SAPC	semi-armour piercing capped (later name for CPBC)
SKL	Seekriegsleitung (High Command of the Kreiegsmarine)
TBS	Talk-Between-Ships (A high-frequency, low-power, line-of-sight voice telephony radio system)
TF	task force (USN designation for a large *ad hoc* force given a specific task)
TG	task group (USN designation for a subdivision of a TF)
TU	task unit (USN designation for a subdivision of a TG)
UK	United Kingdom
USA	United States Army
USN	United States Navy
USS	United States Ship (USN warship designator)
W/T	wireless telegraphy (Royal Navy term for radio, particularly Morse as opposed to voice communication)
XO	executive officer

Note: In USN parlance, it was common to refer to the commander of a unit, such as DesDiv14 as ComDesDiv14, with the exception of task designations, in which case the commander of TF14 would most often be referred to as CTF14.

The Curtain Rises

Royal Navy vs Kriegsmarine in the Atlantic August 1939–June 1940

1

Just over twenty years earlier, a dominant Royal Navy had watched the German High Seas Fleet steam into captivity in the Firth of Forth. Except for five American battleships forming the 6th Battle Squadron, and a smattering of ships representing France and the other Allies, the vast majority of the warships present to witness the German surrender on 21 November 1918 were British. The Royal Navy's Grand Fleet was one of the most powerful military forces of any kind assembled to date.[1]

However, this appearance of power was more than a little illusory. Many of the Grand Fleet's largest ships – battleships and battlecruisers – had been built early in the naval arms race with Imperial Germany and were obsolescent (and worn-out) by 1918. Gun calibre had increased from 12in in the earliest Dreadnoughts to 13.5in starting with the *Orion*-class in 1909, but even the ships of this interim generation were overshadowed by the 15in main batteries of the war-construction *Queen Elizabeth*- and *Revenge*-class battleships and *Renown*-class battlecruisers, and would be of questionable value in battle against any future opponent.

The Grand Fleet had been horribly expensive to create and maintain, and it was inevitable that this massive fleet would be dismembered soon after its great victory. The defeat of Germany and the fact that the nations possessing the next four largest navies (United States, France, Italy and Japan) were now nominally allies, removed a great deal of the impetus to maintain such a large fleet. Politically and economically, it would be hard to convince voters in Great Britain that the dozens of great ships sent to the breakers in the immediate post-war period would need to be replaced.

Despite the general euphoria at the war's end, it was obvious that the alliances forged against Imperial Germany would be unlikely to survive long in the years to come. In particular, the US and Japan had continued to build fast, modern capital ships during the war and, with economies unaffected by the conflict, were planning continued naval expansion. The Royal Navy drew up plans for a class of large, fast battlecruisers armed with 16in guns and another of battleships armed with an 18in main battery, but neither was ever started. With massive debt accrued from the war, politicians in Great Britain, supported by many in the US, opted in favour of a naval arms limitation process that started with the convening of the Washington Naval Conference in November 1921. Dragging along Japan, France and Italy, all reluctant to accept lesser status, the resulting

Five Power Treaty set fleet sizes for the five nations, set tonnage and gun calibre limits for various ship types and declared a ten-year 'holiday' on the construction of new battleships. To compensate Great Britain for the capital ships not ordered in 1921, the Royal Navy was allowed to design and build two battleships that conformed to the treaty's 35,000t displacement and 16in main-battery limits.

The Royal Navy of 1939

While a dramatic reduction in the size of the Royal Navy may have been inevitable following the end of the First World War, it was in no way inevitable that when Britain found itself at war with Germany again on 3 September 1939, the Royal Navy would be inadequate to meet the demands it would face. This sad state of affairs came about because the British had put too much faith in the arms limitation process and because, at the point in the early to mid-1930s when the newest of the First World War era warships still in service were in need of rebuilding or replacement, the political will did not exist to spend the necessary funds. The only major warships added to the Royal Navy between the wars were the two less than completely satisfactory battleships of the *Nelson*-class (*Nelson* and *Rodney*), three aircraft carriers constructed on light battlecruiser hulls (HMS *Furious* (47), *Courageous* (50) and *Glorious* (77)), one purpose-built aircraft carrier (HMS *Ark Royal* (91)) and forty cruisers of varying quality. Of the First World War vintage warships still in commission (ten battleships, three battlecruisers, five aircraft carriers and several dozen cruisers), the quality also varied considerably. Some, such as HMS *Warspite* (03), had been fully modernised with a new powerplant, upgraded armour, increased main-battery range and a rebuilt superstructure, but most of these older ships had received few, if any, similar upgrades. Simply put, the Royal Navy that went to war in September 1939 had too few of all types of ships to both protect the worldwide trade network on which the nation's survival depended and dominate the waters around Great Britain. This problem remained even if the excellent, but small, French Marine Nationale was added in on the British side, and Japan and Italy remained neutral, but within the first nine months of the war France had been defeated and Italy had come in on the German side, stretching the Royal Navy even thinner.

The British had a number of new warships under construction when war broke out, including a class of five new battleships, five large and one smaller aircraft carriers, and a score of light cruisers, though it would be mid-1940 before the first of these was commissioned, much less reached operational status.[2]

Problematical *Panzerschiffe*

To make matters worse, the British knew full well that by 1939 the Germans had rebuilt their Kriegsmarine – with British acquiescence – with several classes of large powerful ships for which they had no good answer. The ships that probably most alarmed the British were the large armoured ships (*Panzerschiffe*) of the *Deutschland*-class. At least nominally in conformance with the Versailles and Washington treaties when they were built, these were publicly declared to displace 10,000t and were armed with six 28cm/54 guns in two triple turrets.[3] This was an extremely heavy main battery for a ship the size of a heavy cruiser.

Their propulsion was equally as revolutionary. They were powered by four sets of MAN nine-cylinder, double-acting, two-stroke diesel motors producing 54,000shp for a designed speed of 26kt.[4] The decision to power these ships with diesel motors was made because the resulting powerplant was far smaller than a steam turbine installation generating similar power. It was hoped that it would also be lighter in weight, saving displacement, but this proved not to be the case.

So unique was the *Deutschland*s' combination of speed and armament at the time they were built that the British seemed to be at a loss as how to classify them and eventually came up with the term 'pocket battleship'. They truly embodied Sir Jacky Fisher's concept for the original battlecruisers, in that they were, when built, faster than anything stronger and stronger than anything faster.[5] By 1939, this was no longer the case, as several nations had built warships that were both stronger and faster. These included the French *Dunkerque*-class and German *Scharnhorst*-class battlecruisers.[6]

What made the *Deutschland*-class *Panzerschiffe* such a great concern at the outbreak of the war, even after they had been eclipsed by larger and faster German designs – not only the recently completed *Scharnhorst*-class, but also the two massive *Bismarck*-class battleships near completion – was their extraordinary endurance combined with high cruising speed due to their diesel propulsion. They could cruise at least 15,000nm at 13kt and between 8,900nm and 10,000nm at 20kt. (Contemporary Royal Navy cruisers had at least one-third less endurance.) With this range and speed, they would make ideal commerce raiders, exactly the type of vessel most feared by an understrength Royal Navy tasked with protecting distant trade routes.

Panzerschiffe into the Atlantic

The German naval leadership (Seekriegsleitung – SKL) was well-aware of the relative weakness of the Kriegsmarine compared to the Royal Navy, both in terms of numbers of ships and geographical position. (The British Isles were perfectly located astride the routes from Germany to the Atlantic. Any German warship would have to use the English Channel or one of several passages between Scotland, Norway, Iceland and Greenland to reach open water.) Early in 1939, Hitler had committed to the construction of a large and powerful navy to be completed by 1945, but when war broke out in September, none of the hundreds of promised ships had even been started. With the navy Germany possessed at the outbreak of hostilities, the best strategy available to Admiral Erich Raeder, head of the Kriegsmarine, was to maintain a 'fleet in being' while beginning an aggressive campaign against Allied commerce with the few U-boats then in service and his fast and long-legged *Panzerschiffe*.[7] With this in mind, as tensions rose in Europe over the 'Polish Crisis', the Kriegsmarine was put on a war footing. In April, the Kriegsmarine held a training exercise in the North Atlantic with the three *Panzerschiffe* and the battlecruiser *Gneisenau* and, afterwards, the newest of the *Panzerschiffe*, *Admiral Graf Spee*, had ostentatiously returned to Germany through the English Channel, attracting a great deal of attention.[8] She then operated as normal out of her home port of Wilhelmshaven, often leaving port for a day or two to exercise her weapons.

6. In April 1939, having completed a major fleet exercise in the North Atlantic, the newest of Nazi Germany's three *Panzerschiffe* (pocket battleships), *Admiral Graf Spee*, made a highly visible daylight passage up the English Channel, as if taunting the British. This view from off her starboard beam shows two of the type's most easily identifiable characteristics: the two massive turrets, each mounting three 28cm guns, and the long, uninterrupted row of scuttles from her quarterdeck to her bow, indicating that her armour belt did not extend very far above her waterline. (*via Bob Cressman*)

The approach of war triggered a carefully orchestrated plan, the first move of which was the departure from Germany on 5 August of *Altmark*, a modern motor oiler/supply ship purpose-built for the Kriegsmarine.[9] Designed to carry almost 10,000t of fuel oil and 2,000t of ammunition, stores and spare parts at a cruising speed of 15kt and a maximum speed of 21kt, she left Germany with her storage tanks nearly empty.[10] Taking the shortest possible route, she passed down the English Channel and then headed west across the Atlantic, making for Port Arthur, Texas.[11] After taking on 9,400 tons of diesel, she sailed out into the Gulf of Mexico and effectively disappeared. Her destination was the northern of two predetermined waiting areas, a large rectangle of rarely traversed ocean bisected by the Tropic of Cancer midway between Africa and the West Indies, where, appropriately enough, she was to wait.

She was waiting for *Graf Spee*, which departed Wilhelmshaven at dusk on 21 August. She slipped unnoticed up the Norwegian coast, avoiding all contact with passing ships, and passed into the Atlantic between the Faroes and Iceland three days later, heading southwest and then due south until she met the waiting *Altmark* on 1 September. *Graf Spee* was commanded by Hans Langsdorff, a young-looking forty-five-year-old captain with only limited command experience. Langsdorff was given considerable flexibility in choosing the area where he wanted to operate; in conjunction with Lieutenant Commander Jürgen Wattenberg, his navigator, he chose an area west of Freetown and north of the equator, in the middle of the narrowest part of the Central Atlantic between Brazil and Sierra Leone. After refuelling, the two ships sailed slowly south in loose company.

A similar pair of ships was assigned a waiting area just south of Greenland. The supply ship *Westerwald* – sister to *Altmark* – sailed from Wilhelmshaven before dawn on 22 August.[12] Like *Graf Spee*, she moved well inshore up the Norwegian coast until north of Bergen, where, at the point that the coast turns towards the northeast, *Westerwald* turned northwest and increased speed, heading for the Denmark Strait, between Iceland and Greenland. *Westerwald*

was followed two days later by the *Panzerschiff Deutschland*, the two meeting on 30 August at a point southeast of Cape Farewell (Kap Farvel/Nunap Isua), the southernmost tip of Greenland. The orders to the two *Panzerschiffe* were to remain undetected and to resupply regularly so they would be ready when ordered into action.

'Commence Hostilities against British Merchant Shipping'

That order came on 3 September, but it allowed the *Panzerschiffe* only to attack British shipping; all neutral shipping was still off limits, as was French shipping – despite the fact that France declared war on Germany only six hours after the British. This put the two captains in an awkward position. As long as they had to stop and identify a ship before sinking it, then a stopped French ship would be free to report the raider's location without fear of reprisal. This situation did not last long: four days later, before either *Panzerschiff* had even sighted a potential target, they were again ordered to avoid all contact and await further orders.[13] Apparently, Hitler hoped that, with the rapid defeat of Poland and the apparent reluctance of Britain and France to take aggressive action on Germany's western border, perhaps the Allies might be amenable to another negotiated capitulation. It was only on 26 September, after a reportedly tumultuous Allied meeting with Hitler, that the *Panzerschiffe* again 'were ordered to leave their waiting areas and commence hostilities against British merchant shipping'.[14]

The Royal Navy Stretched Thin

During the last month of peace, the British knew that the Germans were moving ships around, even that some were heading for the Atlantic, but the state of the Royal Navy's intelligence branches was still primitive. Making matters worse was the Royal Navy's shortage of cruisers, exactly the type of vessel most needed to protect far-flung trade routes. The Admiralty had consistently stated, based on First World War experience, that a minimum of seventy cruisers was needed to meet these needs, but, when war broke out in September 1939, the Royal Navy could dispose only fifty-eight cruisers, counting those contributed by Dominion navies.[15] Many of this already small number were 'C', 'D' and 'E'-class light cruisers dating back to the previous war, best suited for escort duties. Indeed, a number of the oldest light cruisers had been converted into anti-aircraft (AA) escorts by replacing their original single-6in mounts with twin-4in DP mounts. Because they were intended as escorts, it was mostly these older cruisers which were dispersed to the distant stations maintained by the Royal Navy at the beginning of the war. Two were based at Gibraltar as part of the North Atlantic command, four more were at Freetown, along with one newer light cruiser, constituting the South Atlantic command, while a separate South Atlantic Division under Commodore Henry H Harwood operated along the South American coast, nominally based in the Falklands, but effectively provisioning at any friendly port.[16] At the beginning of the war, this squadron comprised two heavy cruisers (HMS *Exeter* (68) and *Cumberland* (57)) and one light cruiser, HMS *Ajax* (22). Four cruisers (two heavy and two light) were assigned to the America and West Indies Station, based mainly at Bermuda and Trinidad, and there was a similar

number of ships assigned to the China Station. By far the largest of the fleet's detachments, other than the Home Fleet, was the Mediterranean Fleet based at Alexandria. While this force will play a major role in later chapters, it has no part to play in the opening moves of the Royal Navy and the Kriegsmarine.

All of these dispositions would be called into question on 30 September when *Graf Spee*, having steered west-northwest towards Pernambuco (Recife) since parting from *Altmark* three days earlier, stopped SS *Clement*, a British steamer carrying a cargo of kerosene to Salvador (Bahia). Her master, chief engineer and an injured crewman were taken aboard *Graf Spee*; the rest of the crew was allowed to board lifeboats and given directions to Maceió, the nearest landfall. Once the crew was clear, *Clement* was sunk by gunfire. Her radio operator had manged to send a raider signal before she was stopped, which was picked up by a passing ship and forwarded to the Admiralty, but even if that message had not been passed along, *Graf Spee* herself signalled the Olinda radio station near Pernambuco about the location of the lifeboats of the crew of *Clement*, signing the message with the peacetime callsign of sistership *Admiral Scheer* in an attempt to confuse any pursuit. A few hours later, *Graf Spee* stopped the neutral Greek steamer *Papalemos* further south along the coast. She was released after the three prisoners were transferred and after extracting from her master the promise that he would not report the encounter until she reached the Cape Verde Islands. Certain that the British were now well aware of his location, Langsdorff turned his ship away from the Brazilian coast and headed east towards Africa and the busy trade route between Cape Town, Freetown and points north.

History Repeating Itself?

In many ways, this situation was eerily familiar to the British. The First World War had started with a German force – in that case, the five cruisers of the German Pacific Squadron, commanded ironically enough by Admiral Graf Maximilian von Spee, namesake of the *Panzerschiff* – loose in the southern hemisphere. At the time, the Royal Navy was able to detach two battlecruisers from the Grand Fleet and send them south to reinforce a South Atlantic squadron already comprising five cruisers. Arriving at the Falkland Islands just the day before von Spee approached, the British squadron surprised and overwhelmed the German force. Only the light cruiser SMS *Dresden* escaped.

Almost exactly twenty-five years later, the situation seemed to be repeating itself, except that Langsdorff had advantages von Spee never had. With *Graf Spee*'s far greater endurance and support from *Altmark*, Langsdorff was effectively free of the need to find fuel for several more months, while von Spee's movements would have been constrained to a much greater extent by the need to find fuel. Knowing *Graf Spee* had many more options than her namesake, the Royal Navy was forced to disperse its search into numerous small groups, rather than concentrating its forces. Besides the ships already stationed in the West Indies, at Freetown and Gibraltar, the Royal Navy established eight 'lettered' hunting groups (including Harwood's South Atlantic Division, now called Force 'G') drawn from the Home Fleet, the China Station and the Mediterranean. They even went so far as to order HMS *Achilles* (70), one of the two cruisers

in the New Zealand Division (which did not officially become the Royal New Zealand Navy until two years later) to the Atlantic.

One Hunter Home; the Other Far Afield

The two *Panzerschiffe* loose in the Atlantic continued their depredations despite the best efforts of the Royal Navy. *Deutschland* moved slowly north, capturing the US steamer *City of Flint* on 9 October east of the Grand Banks, for allegedly carrying contraband to Great Britain, and beginning a saga with serious diplomatic repercussions that only ended over a month later at Bergen, Norway.[17] Five days later, she sank a small Norwegian steamer and then started a slow, looping route that took her north of Iceland again and finally down the Norwegian coast, through the Skagerrak and on to Gotenhafen (Gdynia), arriving safely on 16 November.

Graf Spee would have much greater success during this period and cover many more miles. Between the end of September, when she turned away from the Brazilian coast, and mid-November, she had found good hunting along the Cape Town–Freetown trade route, finding and sinking four merchantmen in October. Deciding that the Royal Navy was likely closing in, Langsdorff replenished again from *Altmark*, turned over the prisoners taken in October and headed his ship south, intending to round the Cape of Good Hope and try his luck off the east coast of Africa. At first, he found no traffic, defeating his purpose of drawing the pursuit away from the South Atlantic. It was not until he pushed north into the Mozambique Channel that he found a victim, sinking a small coaster on 15 November just a few miles offshore. The coaster's crew was put in lifeboats and, certain that they would shortly report the raider's presence, the *Panzerschiff* turned south and began to retrace her steps back into the South Atlantic.

An Unfair Fight in the Far North

In an attempt to draw attention away from *Graf Spee* and attack the Royal Navy's Northern Patrol, SKL ordered a sweep through the North Sea as far west as the Iceland–Faroes Passage by the battlecruisers *Scharnhorst* and *Gneisenau*, starting 21 November. The Northern Patrol was an essential part of the system of blockade of Germany set up at the outbreak of war. By denying passage to merchant ships heading for Germany, the enemy would be denied access to essential raw materials unavailable except by overseas trade. Controlling the southern route to Germany through the English Channel was relatively simple for the Royal Navy, but blocking the northern route, coming through the Denmark Strait or one of the gaps between Iceland, the Faroes and the Shetlands was much more difficult, especially given the Royal Navy's shortage of cruisers, which were the ideal craft to patrol these wide passages. Initially, this patrol was carried out by old cruisers recently reactivated from reserve, but these proved to be poorly suited to handle the rough weather and long distances involved in this work and they were largely replaced by armed merchant cruisers (AMCs), former passenger liners hastily armed with ancient 6in guns. For the purpose of stopping merchant shipping, these AMCs were more than adequate, but with primitive fire control and no armour, they were under standing instructions to

avoid any engagement with enemy warships of any size. The Northern Patrol was at full strength at this time, as the British still believed *Deutschland* to be making her way homewards.

For this reason, and because from many angles all major German warships looked much the same, it is understandable that Captain Edward C Kennedy of the AMC *Rawalpindi* identified the warship seen coming over the southeastern horizon at high speed in the dusk of 23 November as *Deutschland* when in fact it was *Scharnhorst*.[18] A sighting report from *Rawalpindi* was received by Home Fleet at 1531 and Admiral Forbes immediately ordered all warships supporting the Northern Patrol to make best speed to the AMC's position and ordered the battleships *Nelson* and *Rodney*, then at the Clyde, to put to sea as soon as possible.[19]

Kennedy ordered full speed and a sharp turn away from the approaching warship and towards a fog bank, but it soon became clear that *Scharnhorst* was closing too fast and it was already too late for this manoeuvre to succeed.[20] *Scharnhorst* signalled twice for the AMC to heave to, but Kennedy had no intention of allowing his ship to be taken so easily. After several more signals and a warning shot off her bow, *Rawalpindi* responded with a broadside of four 6in shells, leaving *Scharnhorst*'s Captain Kurt Hoffmann no choice but to return fire. At 1545, the two battlecruisers – *Gneisenau* having meanwhile approached – opened fire and disabled the former liner with surgical precision. Their first salvo destroyed the bridge, but Kennedy was unharmed; the second demolished the gun control station and one of the eight single-6in mounts; the third exploded in her engine room and cut power to the shell hoists serving the remaining guns. *Rawalpindi* was dead in the water and the crew was beginning to abandon ship when her forward magazine detonated at 1600 and the ship broke in two and rapidly sank. The explosion and sinking prevented the launching of most of *Rawalpindi*'s lifeboats and the close passage of *Scharnhorst* at high

7. A prewar image shows *Rawalpindi* before she was pressed into service as an AMC covering the escape routes from Germany north of the British Isles. Other than a coat of dark grey paint, she would not have looked much different when she encountered *Scharnhorst* at dusk on 23 November 1939. Armed with the same calibre weapons as *Graf Spee*, only more of them, the German battlecruiser made quick work of the converted liner, which was lost with most of her officers and men. (*via Bob Cressman*)