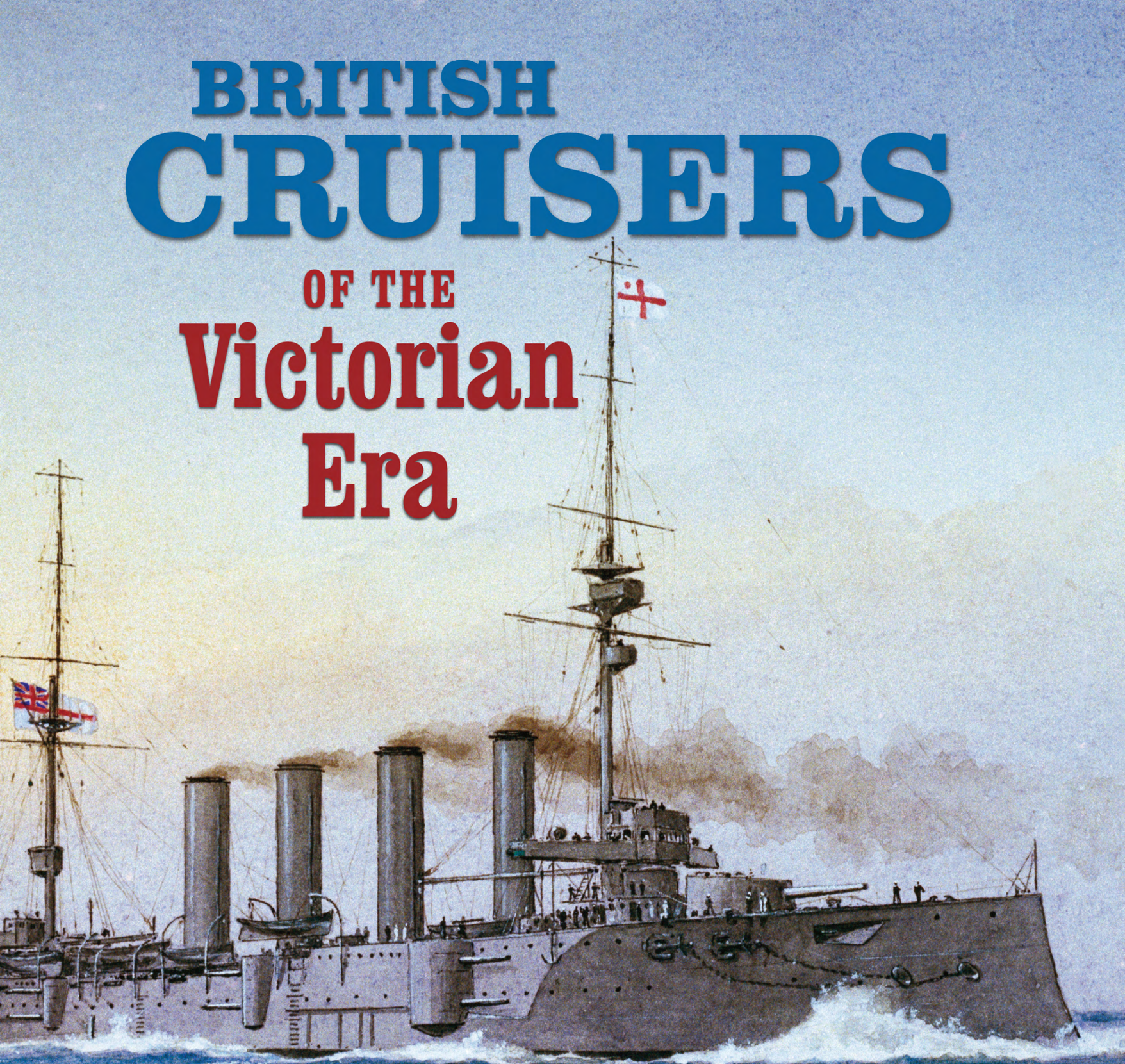
BRITISH CRUISERS OF THE Victorian Era



NORMAN FRIEDMAN
Ship plans by A D Baker III

BRITISH CRUISERS OF THE Victorian Era


BOADICEA

BRITISH CRUISERS OF THE Victorian Era

NORMAN FRIEDMAN

Ship plans by A D Baker III,
with additional drawings by Paul Webb

Seaforth
PUBLISHING

To absent friends:
Antony Preston, David Lyon, and David Topliss

Frontispiece: HMS *Boadicea* as refitted and rearmed in 1888. A closed embrasure for an aft-firing gun is visible above her false sailing-ship style quarter lights. The charthouse is barely visible just forward of the foot of the mizzen mast.
(National Maritime Museum G10330)

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Contents

Acknowledgements

My wife Rhea made this book possible. She helped me think through some of the key issues concerning dramatic changes in British exposure to trade warfare, which are vital to its thesis. As the scope of this book expanded to embrace the whole Victorian era (and a few years afterwards), I had to go back to various archives again and again, and Rhea encouraged me to do so. I could not have written this book without Rhea's loving support and encouragement.

Any project like this book benefits enormously from the help friends can provide. This one particularly benefited as its time scope grew from the late Victorian era (beginning with HMS *Iris* and *Mercury*). Anyone who has worked in the documents of this period will recognize that the extent and quality of documentation declines dramatically for the period before about 1870. For example, no policy documents explain the dramatic cut in cruiser construction in 1863-64. None of the Covers for the big iron frigates appear to have survived (it is as though Edward Reed decamped with all of his design documentation when he stepped down as DNC). I am therefore particularly grateful to those who helped with what documentation has survived. Dr Stephen S Roberts generously provided British material he had collected many years ago for his thesis on French naval development. Professor John Beeler, who is collecting and publishing the Milne papers, provided some key letters. Professor Andrew Lambert, who has specialized in the Victorian Royal Navy, generously provided several papers, one of them unpublished. Chris Wright, editor of *Warship International*, provided his thesis on the Royal Navy of this period, which greatly helped clarify the policy context. I benefited enormously from a lengthy conversation with Colin Jones and with John Houghton, and the latter generously provided a copy of his book on world navies of the early Victorian period.

For both the early and the later eras, I am grateful to Jeremy Michell and to Andrew Choong of the Brass Foundry outstation of the National Maritime Museum for their enormous help with plans and photos. I am also grateful to Bob Todd, photo curator at the Brass Foundry. For photos held by the US Navy, I would like to thank my friend Charles Haberlein, curator emeritus at the Naval Historical and Heritage Command, and his assistants Ed Finney and Robert Hanshew (who is Mr Haberlein's successor). I would like to thank the photo library staff of the US Naval Institute. I am grateful to the State Library of Victoria (Australia), which has made available the superb photography of Allan C Green which it holds. I am also grateful to the staff of the Public Record Office (now called the National Archives) at Kew and to Jennie Wraight, Admiralty Librarian at the Royal Navy Historical Branch in Portsmouth. I would like to thank Dr David Stevens of the Royal Australian Navy Historical Branch and Dr Josef Strazcek, formerly his assistant and an avid photo collector. Both supplied very useful photographs. Stephen McLaughlin very generously provided material on Vickers designs. I can only regret that no comparable record of Armstrong designs seems to have survived. That is particularly unfortunate because Armstrong built the great bulk of the export cruisers of the period covered by this book. I was fortunate to be permitted to use the Vickers collection at Cambridge University Library.

My good friend A D Baker III is listed as illustrator, but he is much more than that. As he painstakingly created drawings of British cruisers, he pointed out their many quirks and the relationships which he could see in the source drawings and photographs. Often they were not evident in other documentation. Mr Baker also kindly provided some of the photographs in this book. Both Mr Baker and I much appreciate the advice and assistance we received from our friend Alan Raven in the course of this project. I would like to thank Paul Webb for the drawings he contributed. I would like to thank Professor Jon Sumida not only for his assistance with this project, but for illuminating, many years ago, the economics of the Royal Navy – which for me explained a lot of what is described in this book.

As grateful as I am for the assistance I received, I am of course responsible for the contents of this book, including any errors.

Norman Friedman

Illustrator's Notes

The drawings in this book by myself and by Paul A Webb are based directly on official Admiralty 'as fitted' plans. Copies of the original plans, usually amounting to several sheets for each ship, can be ordered from the National Maritime Museum in Greenwich, England. The NMM's historic Brass Foundry building at the old Woolwich Arsenal houses one of the world's most extensive collections of ship plans, dating back many centuries into the age of pure sail propulsion. It also has an extensive collection of ship photographs. The expert staff at the Brass Foundry, in particular Andrew Choong Han Lin, has been extremely helpful in selecting and crisply duplicating the plan sets needed for this volume.

Many of the older original plans are now fading and, in some cases, have suffered damage over the past century and more. For some ships, only the basic hull and superstructure sheets have survived. For others, only preliminary plans remain. The actual ships experienced many changes before completion. Usually only one set of plans for one ship of a class survives. Thus the dates of depiction listed for each drawing depended heavily on what was available. 'As fitted' drawings are unusual in showing details not only of the exterior of a ship but also many details of the interior, all on the same sheet. For the period covered by this volume, deck plans often show details of equipment like voice pipes and fire mains that are actually below the deck depicted. Elevations usually do not show the masts beyond a few feet above the decks (in many cases the funnels are also truncated). For most of the ships in this book, rigging and/or sail plans survive, but where they did not, the masting and rigging was deduced from that of the closest contemporary classes and from photographs.

Thus the availability of high-quality photography is vital to producing plans as accurate as possible. For the first volume in this series, there was ample aerial photography, but aerial

views of Victorian era ships are, understandably, extremely rare. Thus details of equipment and deckhouses behind the characteristic midships bulwarks of the ships of that time are dependent on the surviving plans, a few on-board views, and photographs of contemporary ship models. The interpretation of period warship photographs is further complicated by the paint scheme used. A black-hulled ship shows few details of her sides unless the sun is at a particularly fortunate angle.

The British-designed cruisers discussed in this book were much more cluttered in appearance than are modern warships. The necessity to provide sturdy masts, first to support sails and the portable rigging for coaling, and then to carry as high as possible the antennas for primitive radio ('wireless telegraphy') required extensive supporting rigging. I have left in the footropes ('ratlines') on the mast support shrouds to help convey the complexity of the rigging and to suggest the amount of effort by the crew needed to maintain it, although regrettably this sometimes obscures some detail of the structures behind the rigging.

The vast profusion of ships' boats (which came in a great many different sizes and forms) also cluttered the ships' appearance. Most of the drawings for the book show the boats in both their at-sea stowage and in their 'swung-out' harbour positions. Due to a lack of reference material, plan view details of the innards of the boats are only shown in the rare instances where the 'as fitted' plans provided them. In the plan views, the outlines for boats stowed inboard are usually shown as dotted lines so that the details of their stowage racks and deck fittings below them could be depicted. In some of the elevation views, the boat profiles are shown as dotted lines for the same reason. One reason for the large number of boats, most of them oar propelled, was that life jackets only came into use late in the period covered by this volume. Carley-type liferafts only began to proliferate during the First World War.

To provide ventilation for the ships' engineering and accommodation spaces, the ships carried numerous cowl ventilators in a great variety of sizes and shapes. Adding to the clutter were exhaust pipes for individual coal-fired heating stoves in the berthing areas and portable supports for the vast amounts of canvas awning that was rigged when in port to keep the ships' interiors as cool as possible. Many of these features fouled the trainable armament and had to be taken down and stowed below or on topside deck racks before the ships could go into action. Most of the elevation and plan drawings also show the portable accommodation ladders, those aft for the officers and those amidships, where fitted, for the enlisted crew; these too had to be stowed on racks amidships when the ships cleared for sea. One feature not shown on the later cruisers was the wire netting that could be rigged amidships to provide some degree of protection for gun crews from splinters caused by shell-fire hits. Another defensive feature found on later, larger Royal Navy cruisers was the complex network of booms to support anti-torpedo netting, and the shelving along the ships' sides that was used to stow the rolled-up netting when the ships were underway.

All of the ships and powered craft in this book, even the tiny 2nd Class Torpedo Boats, were fuelled by coal, hence the numerous small concentric circles drawn on decks amidships that depict the scuttles leading to coal bunkers. Replenishing coal supplies, in addition to being a time-consuming and filthy task, also required rigging temporary lines to support gear, such as the ubiquitous 'Temperley Transporter' patent booms that rolled fore and aft along heavy cables slung between the masts. Numerous portable derricks and booms for coaling, bringing aboard stores, lifting out and retrieving ship's boats, and mooring boats alongside, also added further complexity, as did the clutter of anchor-handling equipment and chains.

Well into the 1890s, carved decorations were considered vital to a Royal Navy warship's portrayal of the power and might of the United Kingdom. Unfortunately, the elaborate bow and stern scrolling and, in some cases, figureheads, were only rarely shown on 'as fitted' plans. Where photos and drawings permitted, I have attempted to show some of the decorations, but for many ships that had them, the available photographs were inadequate. Also missing from the official plans were any suggestions of the equally elaborate striping on the sides of the ships, and no attempt has been made to replicate the paintwork on the drawings. In any case, as the photo illustrations show, such decorative features began to be removed from major RN warships during refits even prior to the universal replacement of black, white, and buff paint schemes with drab greys under Admiral Fisher.

The quality of the drafting on the original plans was almost invariably superb (with the exception of the earlier rigging and sail plans, which look hurried and rather sketchy). Considering that the draftsmen of the day were using ruling pens and large numbers of French curves and ships' curves for their work and had to do all the lettering by hand, it is remarkable how handsome and decorative their final drawings appeared. Paul A Webb's two drawings for the book were done using CAD, but the remainder employed Rapidograph ruling pens, numerous circle and oval templates, a set of ships' curves hand-made by a distant relative just about a century ago – and several magnifying glasses and an ever-busy electric eraser.

Dr Friedman photocopied hundreds of period photo prints and also took numerous photos of ship models during his visits to archives in the United Kingdom and the USA; these were of immense help in interpreting the original drawings. Many friends contributed material from their own collections, including Robin Bursell in the UK, Christopher C Wright (editor of the quarterly *Warship International*), Charles Haberlein, and Rick E Davis in the USA, and Darius Lipinski in Canada, all providing invaluable help. Sufer Printing in Williamsburg, Virginia, made numerous reductions of drawings for the book, and Capture All Ltd, of Falkirk, Scotland, did the precise high-definition laser scanning to reduce the finished drawings to fit the book's pages without loss of detail. The majority of the drawings were rendered in 1/16th of an inch to the foot scale.

Finally, I would like to add my deepest and heartfelt thanks to my wife, Anne, who patiently endured for a year and a half my several thousand hours hunched over the drafting table in our office. Without her constant support and encouragement, the work could not have been accomplished.

A D Baker III

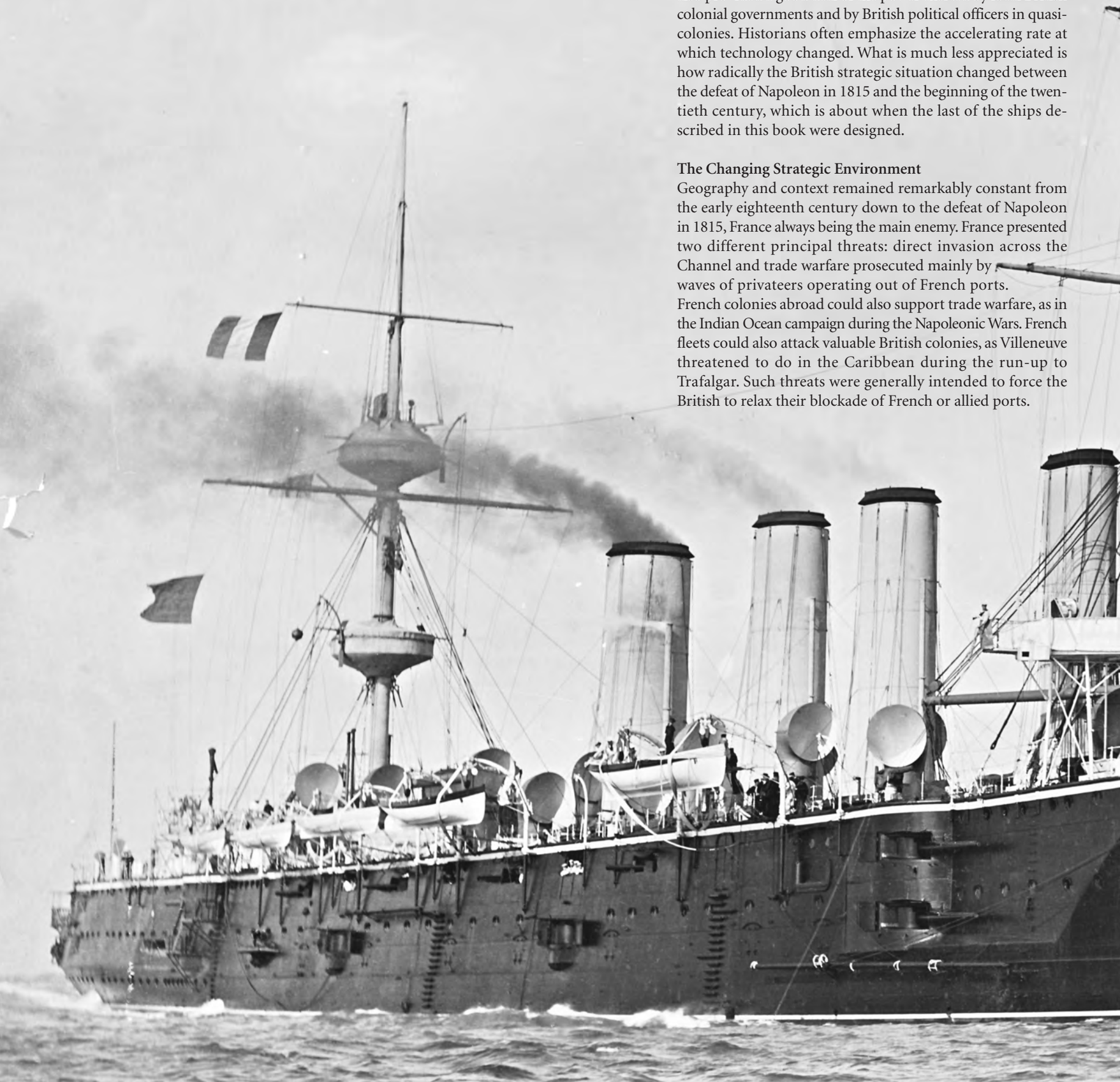
INTRODUCTION

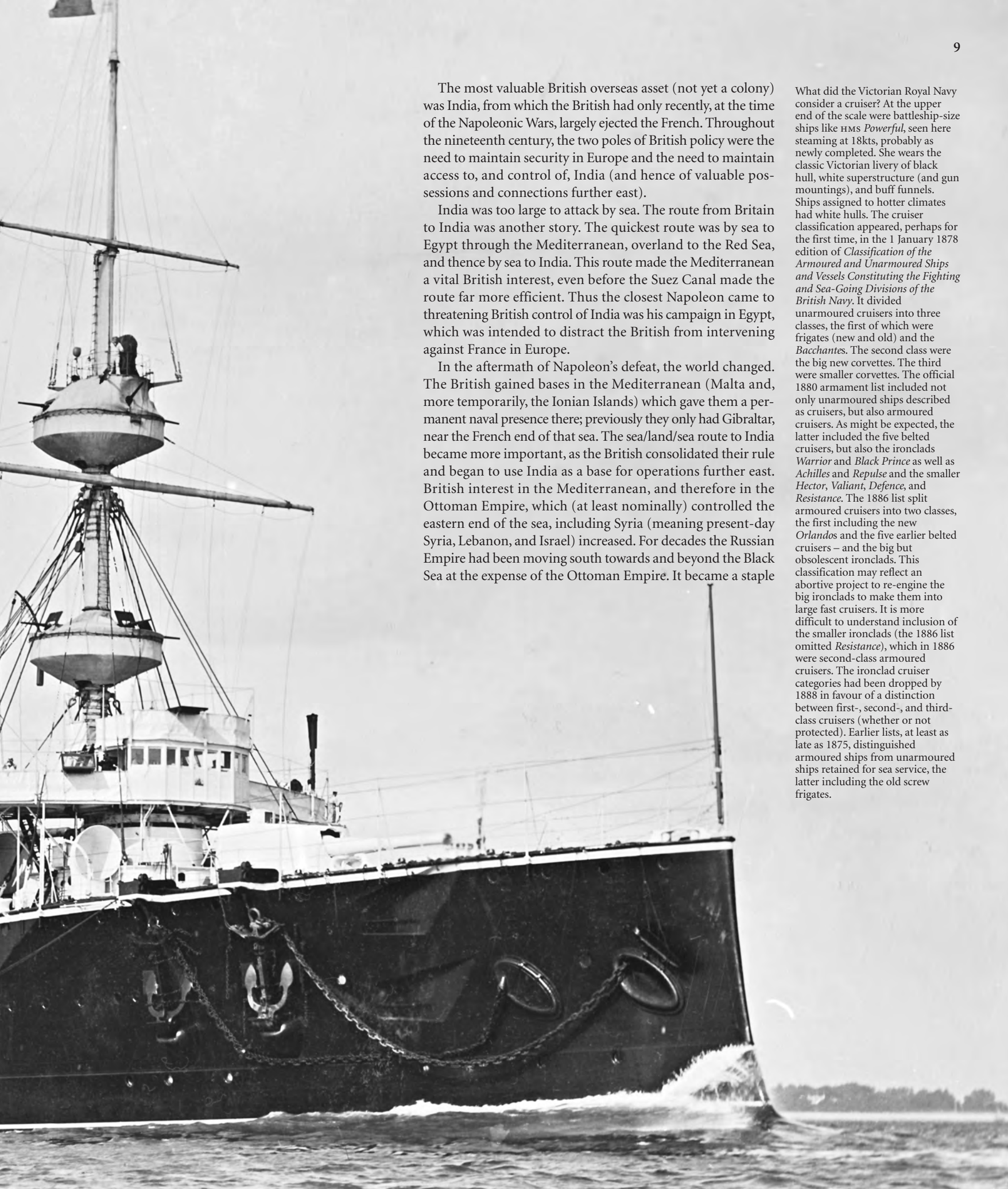
It used to be said of the Royal Navy that its battleships brought it command of the sea, but that its cruisers – the ships described in this book – exercised that control. Cruisers were expected to protect British trade in wartime and to run enemy commerce off the sea. In peacetime they and their lesser cousins, sloops, guaranteed what is now called 'good order at sea', dealing with pirates and other maritime criminals. They also provided a good deal of the power exerted by local British colonial governments and by British political officers in quasi-colonies. Historians often emphasize the accelerating rate at which technology changed. What is much less appreciated is how radically the British strategic situation changed between the defeat of Napoleon in 1815 and the beginning of the twentieth century, which is about when the last of the ships described in this book were designed.

The Changing Strategic Environment

Geography and context remained remarkably constant from the early eighteenth century down to the defeat of Napoleon in 1815, France always being the main enemy. France presented two different principal threats: direct invasion across the Channel and trade warfare prosecuted mainly by waves of privateers operating out of French ports.

French colonies abroad could also support trade warfare, as in the Indian Ocean campaign during the Napoleonic Wars. French fleets could also attack valuable British colonies, as Villeneuve threatened to do in the Caribbean during the run-up to Trafalgar. Such threats were generally intended to force the British to relax their blockade of French or allied ports.





The most valuable British overseas asset (not yet a colony) was India, from which the British had only recently, at the time of the Napoleonic Wars, largely ejected the French. Throughout the nineteenth century, the two poles of British policy were the need to maintain security in Europe and the need to maintain access to, and control of, India (and hence of valuable possessions and connections further east).

India was too large to attack by sea. The route from Britain to India was another story. The quickest route was by sea to Egypt through the Mediterranean, overland to the Red Sea, and thence by sea to India. This route made the Mediterranean a vital British interest, even before the Suez Canal made the route far more efficient. Thus the closest Napoleon came to threatening British control of India was his campaign in Egypt, which was intended to distract the British from intervening against France in Europe.

In the aftermath of Napoleon's defeat, the world changed. The British gained bases in the Mediterranean (Malta and, more temporarily, the Ionian Islands) which gave them a permanent naval presence there; previously they only had Gibraltar, near the French end of that sea. The sea/land/sea route to India became more important, as the British consolidated their rule and began to use India as a base for operations further east. British interest in the Mediterranean, and therefore in the Ottoman Empire, which (at least nominally) controlled the eastern end of the sea, including Syria (meaning present-day Syria, Lebanon, and Israel) increased. For decades the Russian Empire had been moving south towards and beyond the Black Sea at the expense of the Ottoman Empire. It became a staple

What did the Victorian Royal Navy consider a cruiser? At the upper end of the scale were battleship-size ships like HMS *Powerful*, seen here steaming at 18kts, probably as newly completed. She wears the classic Victorian livery of black hull, white superstructure (and gun mountings), and buff funnels. Ships assigned to hotter climates had white hulls. The cruiser classification appeared, perhaps for the first time, in the 1 January 1878 edition of *Classification of the Armoured and Unarmoured Ships and Vessels Constituting the Fighting and Sea-Going Divisions of the British Navy*. It divided unarmoured cruisers into three classes, the first of which were frigates (new and old) and the *Bacchante*s. The second class were the big new corvettes. The third were smaller corvettes. The official 1880 armament list included not only unarmoured ships described as cruisers, but also armoured cruisers. As might be expected, the latter included the five belted cruisers, but also the ironclads *Warrior* and *Black Prince* as well as *Achilles* and *Repulse* and the smaller *Hector*, *Valiant*, *Defence*, and *Resistance*. The 1886 list split armoured cruisers into two classes, the first including the new *Orlando*s and the five earlier belted cruisers – and the big but obsolescent ironclads. This classification may reflect an abortive project to re-engine the big ironclads to make them into large fast cruisers. It is more difficult to understand inclusion of the smaller ironclads (the 1886 list omitted *Resistance*), which in 1886 were second-class armoured cruisers. The ironclad cruiser categories had been dropped by 1888 in favour of a distinction between first-, second-, and third-class cruisers (whether or not protected). Earlier lists, at least as late as 1875, distinguished armoured ships from unarmoured ships retained for sea service, the latter including the old screw frigates.

of British policy to maintain the Ottoman Empire despite its increasingly decrepit state, both to maintain a balance of power in Europe and to keep the Russians from direct access to the Mediterranean, hence to the sea route to India. By 1840 the Admiralty considered the Mediterranean second in importance only to the Channel.

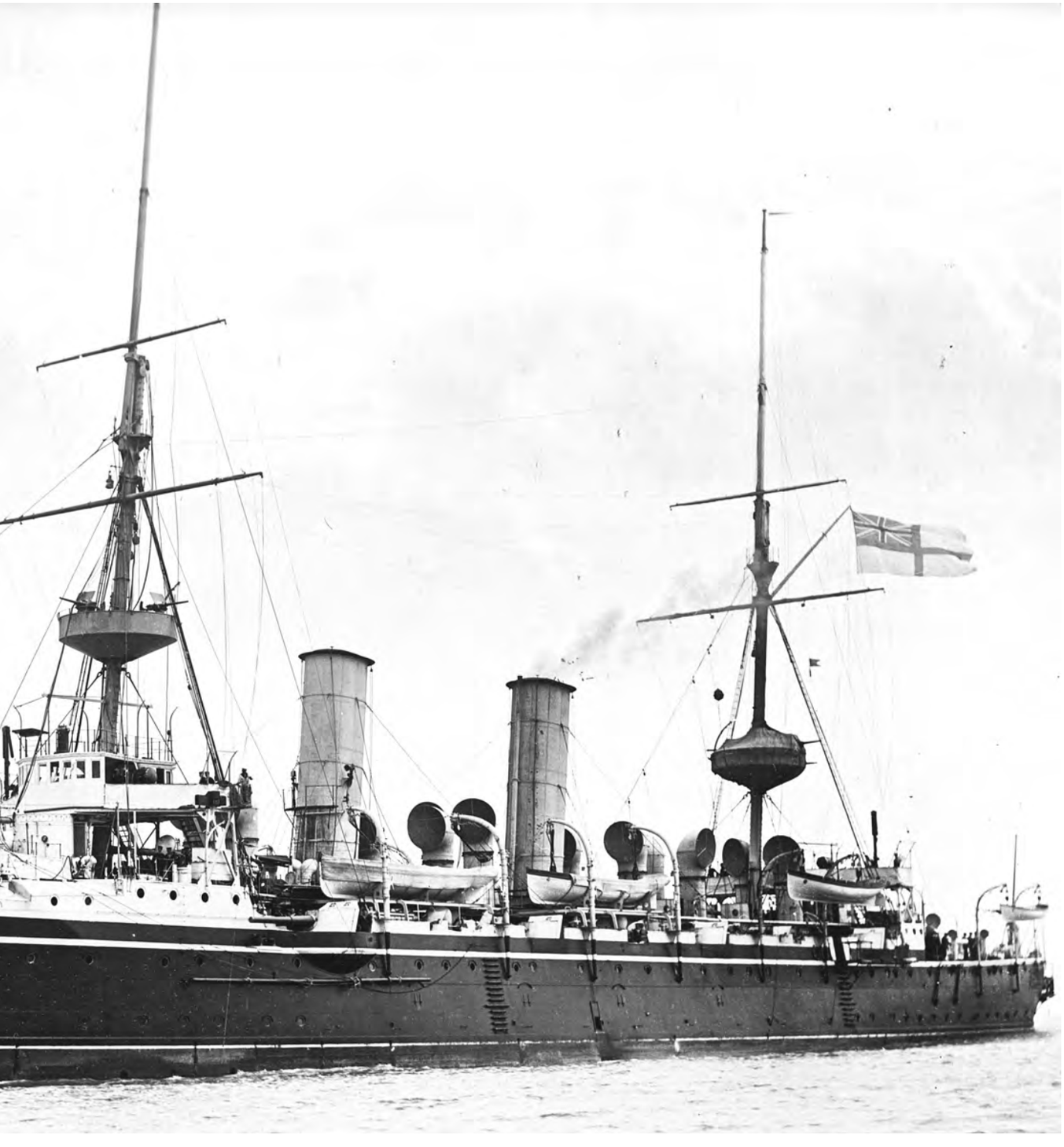
The French were the principal threat to the route to India via the Mediterranean. In 1830 they established themselves on its southern shore in Algeria. At its eastern end they became involved in Syria and Egypt in 1840. They also became involved in Italian politics leading to the consolidation of that country. The British could see these steps as moves towards French domination of the Mediterranean. By 1840 the largest active British fleet was in the Mediterranean, not the Channel.

The Spanish colonies in South America became independent countries which could, for the first time, trade openly with Britain. The United States began to expand, and it too was an enormous market. The combination of finance provided by the City of London, the British-based industrial revolution, and British shipping created an explosive increase in British ocean trade. In the past, colonies producing particular materials or goods (such as spices or sugar) had been key to national prosperity. Now colonies, except for India and connections further east, became less important economically, particularly after slavery (which had made Caribbean sugar production lucrative) was abolished in the British Empire. Trade itself coupled with manufacturing became much more important. As the centre of the industrial revolution, Britain had goods the world increasingly wanted. The British Government increasingly saw free trade as key to national prosperity.

The British Government adopted free trade policies, abandoning protective tariffs. Perhaps the most important case was the Corn Law, protecting British farmers, abolished in 1846. In addition, in 1849 the British Government abandoned the Navigation Acts, which had limited shipping between Britain and her colonies to British ships. The latter had been tolerated as a way of maintaining a large merchant fleet. British policy had been to keep a large fleet of ships in reserve, expecting to activate the ships in an emergency largely with crews of merchant seamen. In effect, abandoning the Navigation Acts favoured British shipbuilders and engine-makers, because in the 1840s and 1850s Britain absolutely dominated world shipbuilding in the new primary material, iron, and also the engine-building industry. The effect of abolishing the Corn Laws was gradually to move British food production offshore, an early example of what is now called globalization. Those who voted to abolish the Corn Laws expected that corn (wheat) would be imported mainly from Russia (Poland, which Russia controlled, was then the main productive region), but with the collapse of shipping costs, it turned out that Britain was fed mainly from North America and, to a lesser degree, Australasia.

This development changed the meaning of wartime trade protection. During and before the Napoleonic Wars, British merchant ships mainly carried manufactured goods and the raw materials to make them, such as cloth and cotton. Sinking or seizing the ships would certainly affect the British economy, but it could not destroy Britain, which was largely self-sufficient in food. Once Britain relied heavily on foreign sources of food, cutting British seaborne trade threatened starvation: the imported food had to reach Britain by sea. Furthermore, the new industries relied heavily on raw materials brought by sea from abroad. Cutting that traffic could destroy the ability to produce the weapons needed to defend the British Isles. The Victorian Royal Navy found it difficult to arouse public interest in so abstract an issue as trade defence. Too many in the United Kingdom equated defence simply to defence (by army and militia) against invasion.

During the same period, Russia became the greatest wheat-exporting country in Europe. Before about the 1850s grain pro-



Further down the scale were second-class cruisers like HMS *Minerva*. By the late 1890s they were by far the most numerous British cruisers. *Minerva* was placed in Chatham Reserve upon completion, then used for boiler trials in 1899-1903 as part of the Cruiser Training Squadron. She was later assigned to Devonport (1903-4), and then attached to the Mediterranean Fleet battle squadron in 1904-12 (during which she underwent a 1908 refit). She was then assigned to the new Third (reserve) Fleet's 11th Cruiser Squadron. serving as temporary depot ship for the 6th Destroyer Flotilla in 1912-13. On the outbreak of war the 11th Cruiser Squadron was mobilized for the West Coast of Ireland patrol (*Minerva* captured an Austrian merchant ship off Cape Finisterre in September 1914). She was assigned to the East Indies and then to Egypt in 1914-15, serving at the Dardanelles (she sank the Turkish torpedo boat *Demirhissar* off Chios on 17 April 1915). She remained in Egyptian waters through 1916, helping to defend the Suez Canal against a Turkish attack. Once that threat had gone, she served in East African waters in 1916-18, and at the Cape in 1918. She was sold in 1920.

duction was centred in the Baltic. By the 1850s, however, the Ukraine, with its rich black soil, was growing three times as much as the Baltic. This grain was exported through the Bosporus, the Turkish straits between the Black Sea and the Mediterranean. Quite aside from the exports, the Russians had long sought control of the straits. However, by the latter part of the nineteenth century exports through the Bosporus were their chief source of foreign exchange. That certainly sharpened Russian determination to control the straits, inevitably at the expense of Turkey. The situation was further complicated by the Russians' position as the centre of Orthodox Christianity, hence as the protectors of many Christians living in Turkish territories in the Balkans on the edges of the Black Sea. The Russians viewed themselves as successors to the Byzantine Empire ('the third Rome'), hence chosen to reverse the Turks' victory over Byzantium (Constantinople) four centuries earlier. Byzantium had been a maritime empire controlling the eastern Mediterranean. Thus Russian interests made collision with the British inevitable, given British sensitivity to any challenge in the Mediterranean, on the other side of the Turkish straits.

In the 1890s speed became the great distinction between cruisers – ships which could operate with the fleet – and the mass of cruising ships which maintained good order at sea and in British possessions. Until about 1885, however, many cruisers (corvettes) were not very fast at all. The corvette HMS *Rapid* was originally classified as a sloop, then rerated as a corvette, illustrating the fluid state of warship designations in the 1880s. The formal distinction was that a cruiser was a Captain's command, a sloop a Commander's.
(Allan C Green via State Library of Victoria)

Probably because Russia was a key grain exporter, the Russians particularly well understood how dependent the British were on grain imports. It was the nineteenth-century equivalent of a key OPEC member contemplating the vulnerability of Western oil-consuming states to an interruption in the flow of oil. As early as 1863 (in the context of a crisis over Russian suppression of a revolt in Poland), the Russians saw commerce warfare as a natural part of any war against the British. That year Russian squadrons visited New York and San Francisco. Americans saw the visit as valuable support during the Civil War. However, the point of the visit was to show the British that Russian warships could leave the Baltic (to attack their commerce) without the British observing them at all (the British seem not to have gotten this point). Once outside Russian waters, moreover, the squadrons could raid British commerce despite any blockade the British imposed (Russian geography, then and later, made it relatively easy to block access to the open sea). During the 1877-78 crisis the Russians sought to evade British blockade altogether by assembling the Russian Volunteer Fleet of commerce-raiding merchant ships in foreign ports.

There was a counter-current to British fears of trade warfare: by the 1850s British governments increasingly interested in commerce were less and less anxious to seize private property on the high seas. That applied particularly to the greatest free-trade country of all, the United Kingdom. For example, during the Crimean War – which contemporaries called the Great Russian War – no blockade was imposed. (It might, however, be suggested that the main goods the Russians imported by sea were manufactured goods from England, and that the British government of the day was not anxious to damage its own economy.)

The great scourge of previous wars had been privateers, privately-owned ships carrying special authorizations (letters of marque). Any civilian ship could be used in this way, so the number of commerce raiders could be immense. Similarly, all existing ports could be used as privateer bases. In 1859 the Treaty of Paris, signed by all the major sea powers except the United States, outlawed privateers. The potential scale of the commerce-raiding problem was dramatically reduced; navies had to choose between devoting resources to battle fleets and devoting them to war against trade.

The Treaty of Paris might even be read as abandonment of blockade. The British surrendered their 'ancient right' to seize enemy cargo carried in neutral ships. It seemed that shipowners could protect themselves in wartime simply by fleeing to other flags (as many did in 1914). Many in the Royal Navy thought this abandonment of the ancient rights of the maritime power had rendered sea power almost pointless. The treaty also limited what goods could legitimately be interdicted, food being an important exception. As the nineteenth century wore on, few British naval officers continued to believe that a ruthless enemy would care about either new rule – for them, enemy attacks on commerce increasingly carried the threat of starvation. The First World War showed that they were entirely correct.

Liberals led by William Gladstone sometimes argued that there was no point in planning for trade protection because the threat had been so dramatically reduced. At the least that made Gladstone, no friend of the Royal Navy, inclined against a fleet designed for blockade operations. Gladstone's first administration spanned the period 1868-74, which was exactly when the presence role of cruisers was far more important than the trade protection role. Naval officers pointed to the depredations of raiders operated by the Confederates during the American Civil War to show that the threat to trade – to British food – was still very real. *Alabama* and other successful Confederate raiders showed just how effectively a steam-powered cruiser could attack merchant shipping, which in the 1860s was still overwhelmingly sail-powered.

Meanwhile the geography of British sea power changed. British naval dominance of Europe depended largely on the fact that the British Isles blocked the exits from the Channel and from the North Sea and, by extension, the Baltic. Fleets based in the British Isles could blockade enemy bases in all these places, as indeed they had during the Napoleonic Wars. Once Britain had Gibraltar, she gained control (at least in theory) of the outlet of the Mediterranean. Any potential enemy with bases *outside* the area blocked by the British Isles and Gibraltar presented a new and potentially devastating threat, particularly to British trade. At the least it was a much more expensive threat to counter. That was certainly the case with the United States, whose naval policy through most of the nineteenth century was to be prepared to counter Britain, her traditional enemy, with a combination of trade warfare and coast defence. The United States had to be taken seriously as a danger because of its potential threat to Canada, which it had exercised (albeit not successfully) in 1812. Once the United States reached the Pacific, the British also had to deal with threats associated with the US–British Columbia border there.

Russian expansion into East Asia similarly brought them outside European geography. During the Crimean War, the Royal Navy raided the sole Russian Pacific base, Petropavlovsk. It had only limited value, as it was not large and also as it was closed by ice for much of the year. In 1860, however, the Russians set up an ice-free Asian port, Vladivostok, which posed a year-round threat to British Pacific trade.

Once the Suez Canal opened in 1869, the route to India and points east through the Mediterranean became far more important. The opening of the Suez Canal unfortunately roughly coincided with Russian denunciation of the clauses of the Crimean War settlement barring them from recreating a Black Sea Fleet. The two guarantors had been the two wartime allies, Britain and France, and the Franco-Prussian War (1870-71) paralysed France. The British alone were unwilling to enforce what the Czar of the time considered a gross humiliation. Grain exports did not figure in the Czar's comments, and the Russians did not immediately build up the Black Sea Fleet. However, it must have been obvious that once they did they could exert considerably more pressure on the British in the Mediterranean.

The Suez Canal was a Franco-Egyptian venture, but once in office in 1874 Prime Minister Benjamin Disraeli saw it as a vital British interest; he bought a controlling share by buying up the Egyptian Government's holdings. Although nominally part of the Turkish (Ottoman) Empire, Egypt was effectively independent, its government constantly in need of money.

Not too long after Disraeli bought the Canal shares, the Russo-Turkish crisis of 1875-77 threatened to place a Russian satellite state (Bulgaria) on the Mediterranean, within range

of the Canal.[1] In 1878, with Russian troops threatening Constantinople, a British battle squadron made the dangerous ascent of the Bosporus in a snowstorm. The Russians had no real Black Sea Fleet, but the British ironclads were placing themselves to shell the Russian troops if necessary (the threat forced a Russian withdrawal). This fleet was commanded by Admiral Sir Geoffrey Phipps Hornby, who had commanded the Flying Squadron, and who would be a key figure in the agitation leading to the Naval Defence Act of 1889.

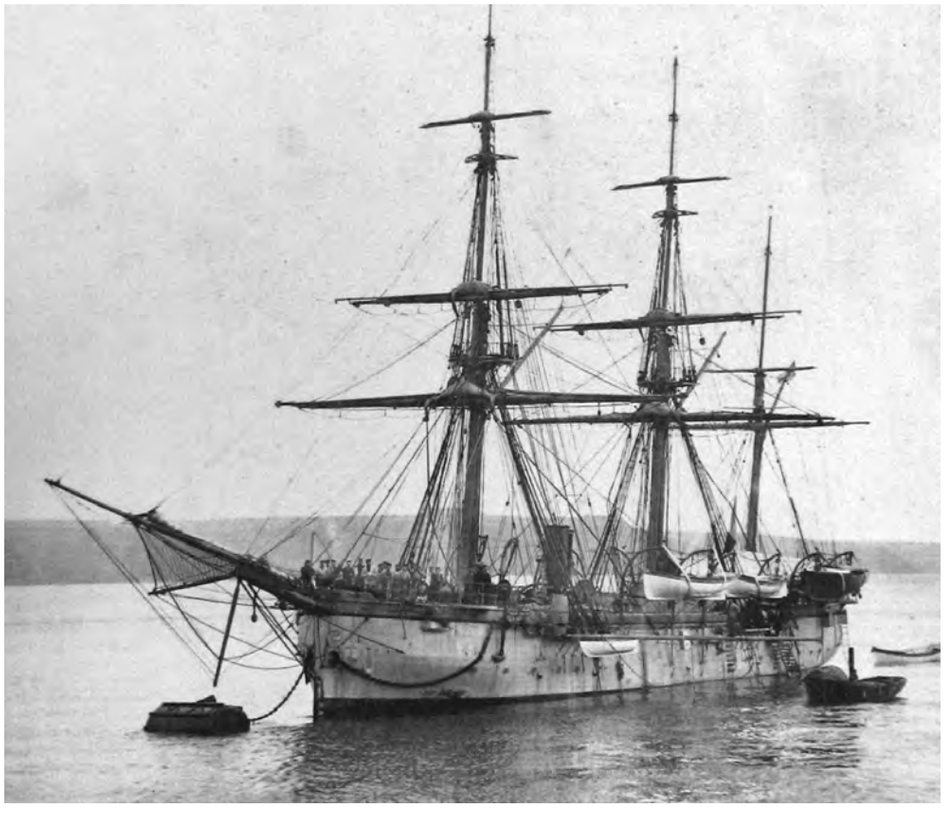
Although the ascent of the Turkish straits was a great success, other aspects of the British response were not. In addition to the standing Mediterranean Fleet, the Admiralty decided to assemble a fleet to penetrate the Baltic. To so do without removing the Channel Fleet (i.e., without presenting the French with the opportunity to invade), it tried to mobilize reserve ships and form them into a Baltic fleet. Mobilization proved difficult and far too slow. Intelligence had been collected, but at the crucial moment it could not be found. It proved impossible to maintain contact with Russian cruisers, which would have preyed on British trade had war broken out.

Ultimately the need to secure the Canal helped draw the British into making Egypt a quasi-colony.[2] At this time British colonies (apart from India) were generally fairly distant from anyone else's, approachable only by sea. Egypt was a very different proposition. It was close to other European colonies in North Africa, and it could be approached through Africa. Britain and France almost went to war in 1898 because French troops probing north met British troops at Fashoda in southern Egypt, suggesting that some larger thrust was planned (war orders were drafted, and one consequence of the war scare was a supplemental naval program). In this sense Egypt was analogous to India; in both cases defence included the defence of land frontiers. In both cases the land frontiers were considerably less approachable than maps suggested to governments in London.

British seizure of Egypt without French involvement made it difficult for the British to resist attempts by other European powers to seize parts of Africa. This scramble for Africa provided colonies the Germans, previously without colonial possessions, hoped to use as bases for cruisers during the First World War. The British found themselves seizing the German colonies not because they had enormous inherent value, but to deny them as bases for use against vital British trade.

The Mediterranean became so vital that the Mediterranean Fleet became the most important British naval formation of the late nineteenth century. With French bases circling much of the Mediterranean, it faced unusual conditions which brought forth special tactical solutions, not least for cruisers. As CinC of the Mediterranean Fleet, Admiral Sir John Fisher conceived many of his key ideas, which led in turn to the revolutions he pushed through at the Admiralty at the close of the period covered by this book.

Through the mid-nineteenth century the Russians drove south into Central Asia towards India. It might not be possible to overthrow British power in India by sea; the country was just too large. However, the British thought that the Russians planned to turn both Persia (Iran) and Afghanistan into vassal states, and it was conceivable that Afghans pouring across the northern frontier of India might have begun its conquest. This land threat was the substance of the 'Great Game' celebrated by Kipling and others. The naval aspect was that the best way for the British to counter Russian moves in Central Asia was to apply naval pressure in the one place most vital to the Russians: the Baltic.

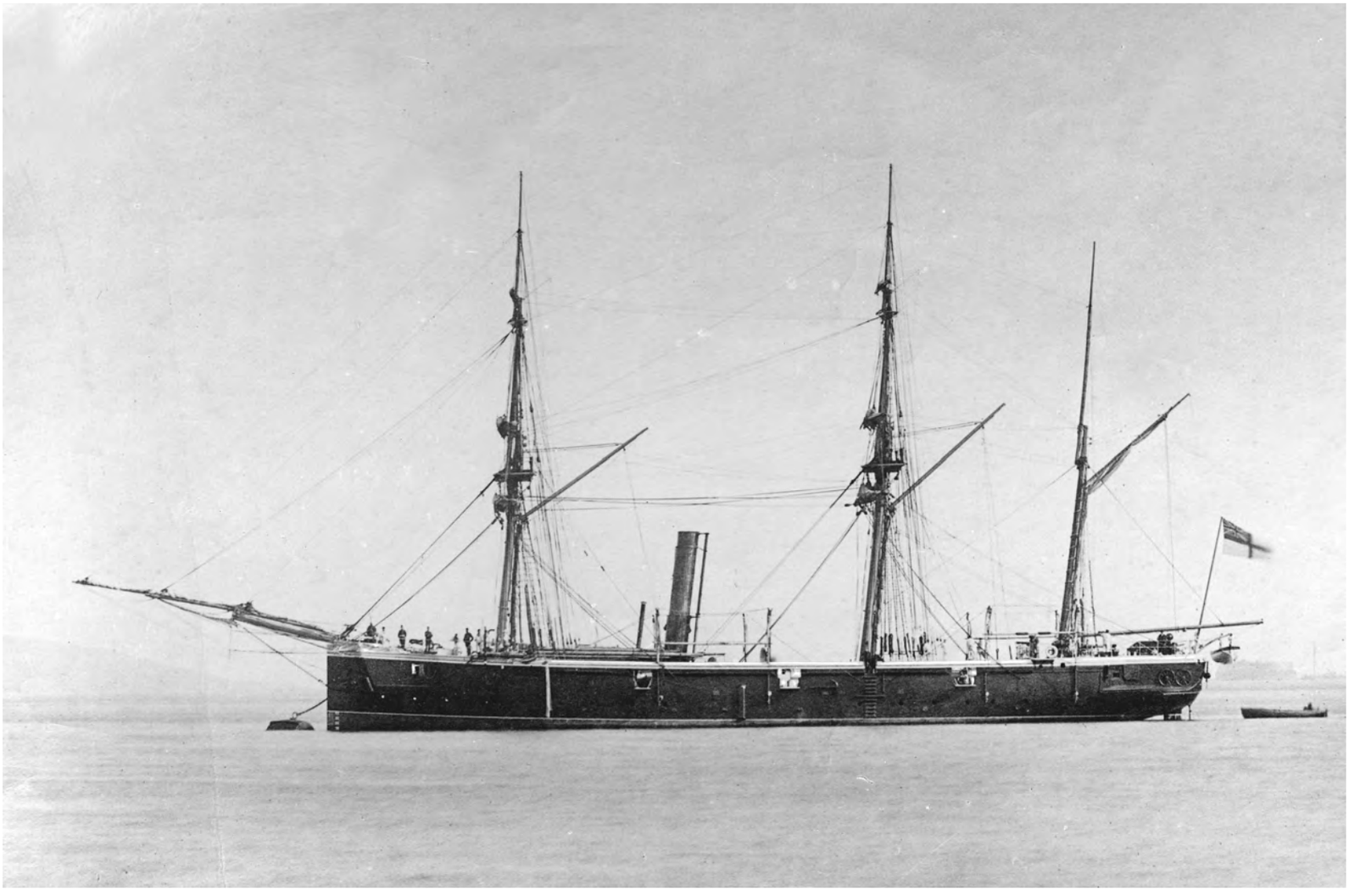


HMS *Egeria* was a *Fantome* class sloop, the size just below corvettes (which were later rated as cruisers). This class introduced the composite construction which DNC Sir Nathaniel Barnaby later applied to the *Satellite* class corvettes. Built at Pembroke, *Egeria* was launched on 1 November 1873. Designed displacement was 894 tons, but the ships displaced 949 as completed; the difference may have been due to miscalculation involving the new type of construction (dimensions: 160ft x 31¼ft x 12½ft). Armament comprised two 7in 90cwt and two 64pdr, all muzzle-loading rifles on slides (these were the largest British warships with an all-traversing armament). One 7in was between funnel and mainmast and one on the quarterdeck, both with ports so that they could fire on the broadside. The only major armament modification was to replace wooden with iron slides after the first commission (*Egeria* later had her armament reduced as a surveying ship). Ships like this needed sail power for endurance. As a sloop, *Egeria* was slower than Barnaby's corvettes: on trial she made 11.303kts on 1011 IHP. The class was rated at 1000nm at 10kts. Machinery comprised three cylindrical boilers and a two-cylinder compound engine (these were the first sloops with compound engines). Ballard described the class as easily handled under sail, free from yaw when running before a heavy sea, buoyant when lying-to, and stiff enough not to require any ballast. They did not hold a good lee, however. They were never faster than 11½kts even when scudding before a high wind. These sailing qualities mattered; like other Victorian sloops, they made their long passages under sail. Complement was 125. *Egeria* served initially on the China station (1874-81, receiving a relief crew in 1878). She grounded badly off Hainan in a fog in 1879, but was refloated successfully (she lost most of her false keel in the process). On her return she went into reserve for two years, and was then selected as a surveying ship, her 64pdrs and 7in guns replaced by four 20pdrs (to deal with pirates). She was ready in 1886, and she was not brought home until she had to be reboilered (in 1894). She was paid off at Esquimault in 1911.

The next Anglo-Russian crisis after 1878 (1885) was prompted not by a thrust towards the Turkish straits, but by a Russian probe into Afghanistan, which bordered India.[3] Without a large standing army, the only response available to the British was naval. In 1878 a fleet was sent up the Bosporus while another was mobilized to enter the Baltic. In 1885 there was no Mediterranean response, but a Baltic squadron was again mobilized, this time commanded by Admiral Phipps Hornby. When the immediate threat dissipated, the squadron was retained for manoeuvres, which were intended to test new technology. By this time the Russians had invested heavily in torpedo craft, and some of the exercises tested the fleet's ability to seize and maintain a base in the Baltic in the face of torpedoes and mines. Lessons learned deeply affected cruiser development. The 1885 exercises were considered so valuable a test of tactics and technology that they were made a nearly annual event. As in 1877-78, mobilization was not entirely successful, although there were notable improvements. For example, this time the navy was able to shadow Russian ships, precluding a major Russian offensive against British trade.

The French gained an ability to operate outside blockadable waters as they seized colonies in East Africa (such as Madagascar) and in Asia (Vietnam). Among other things, in the 1860s both the Russians and the French built second-rate

HMS *Penguin* was an *Osprey* class composite screw sloop, Barnaby's follow-on to the *Egeria* class. She had another two 64pdr guns. The embrasures for stern fire ran about half way along her poop. They are barely visible in this photograph because the hull was painted black. These ships came out light, the surplus of 35 tons being used for more coal. In effect these ships were half-scale models of contemporary composite corvettes, with the same kind of profile and embrasures at bow and stern (for end-on fire) and with the corvettes' sharp end lines and full midsections. Like Barnaby's corvettes, they had knee bows. The sharp tapering to the ends was accompanied by sharp rise of floor. This combination made them handy (as intended) but did not confer the desired speed. The lines did, however, make them remarkably suitable for meeting weather from any direction. In the worst gale they would rise or scud equally well under steam or sail. They did, however, roll too quickly to be efficient gun platforms, which suggests that metacentric height was greater than expected due to too low a centre of gravity (underestimated weights). Initially the ships had a light poop and forecastle, both open at the break, the poop covering two cabins with a chaser between them, and the forecastle covering the heads and another chaser. After the first commission both were strengthened and fully enclosed and machine guns mounted on top. Machinery divided the hull in two lengthwise, a narrow communication passage running along the starboard side through the upper part of the boiler and engine rooms, with a watertight door at each end. This was the first class to have glass scuttles in place of the older square hanging ports or 'rat hole' plug scuttles. Like the larger cruisers, these ships started out with two heavy guns, in this case 7in 4½-tonners on slides, one between funnel and mainmast and the other on the quarterdeck, both intended to fire on the broadside. They had two 64pdrs on the broadside and two more under the forecastle and poop as chasers. This combination gave them a heavy broadside, but using it put so much weight on one side (the heavy guns would be traversed to bear) that the ship heeled. Of this class, *Wild Swan* and *Pelican* were rearmed with breech-loaders. They were given two 6in at quarterdeck broadside ports, four 5in at broadside ports, and two 5in chasers firing through embrasures at bow and stern. *Penguin* received a pair of 5in breech-loaders on her poop instead of the single 64pdr below it. *Osprey* and *Cormorant* were never rearmed, because new guns were not available until they were too old. Due to the unusual hull form, space for the horizontal engines could be found just half-way between bow and stern, so the engines were, unusually, forward of the mainmast rather than abaft as in other three-masted Royal Navy ships of this period. That made for an unusually long propeller shaft, a source of trouble, and the mainmast had to be stepped on the main deck instead of the keel. Like *Egeria*, *Penguin* was relatively slow (she was the slowest of the class, making 9.875kts with 666 IHP; her Devonport-built sister *Pelican* made 12.241kts on 1056 IHP). After her first commission her machinery was replaced by Devonport-built compound engines. Built under contract (by Robert Napier and Sons), *Penguin* was launched on 25 March 1876. Displacement was 1130 tons (170ft pp x 36ft x 15ft 9in). Complement was 150. *Penguin* went to the Pacific on completion in 1877, returning in 1881 to have her machinery replaced. Unlike her sister *Wild Swan*, which went into the yard at the same time, she was not rearmed at this time with breech-loaders due to a shortage of guns. She went into reserve, recommissioning in 1886 for the East Indies. On return in 1889, she was selected for conversion to a survey ship, all her guns except a pair of broadside 64pdrs being removed. Space left vacant by the 7in guns was used for deckhouses and her boat complement was increased. In this form she commissioned in January 1890, not being paid off until March 1907, in Sydney, where she was reduced to harbour depot ship – the last of her class to remain at sea. She was transferred to the new RAN.



HMS *Doterel* was the name ship of a class very similar to the *Penguin*s, distinguishable by their vertical stems. They displaced 1130 tons (170ft pp x 34ft x 15ft) and were armed with two 7in 90cwt guns plus four 64pdrs, all on pivoted slides, plus four machine guns. They had three cylindrical boilers feeding a horizontal compound engine: *Doterel* made 11kts on 900 IHP. Endurance under steam was 1480nm at 10kts. *Doterel* was launched at Chatham on 2 March 1880. She was lost on her maiden voyage, exploding and sinking off Sandy Point, Punta Arenas on 26 April 1881.
(Allan C Green, courtesy of State Library of Victoria)

armoured ships specifically to operate in Eastern waters, far from their concentrated fleets. Viable British presence in the Pacific required that cruisers be backed by armoured ships. This requirement created the first ships rated by the Royal Navy as armoured cruisers (though quite unrelated to the armoured cruisers of the late nineteenth and early twentieth centuries).

Given the emergence of foreign colonies as potential raider bases, British war planners of the late nineteenth century envisaged attacks on them. This was not the colonial warfare of the past, in which colonies were worth seizing for their rich resources; rather it was a coldly strategic counter to commerce raiding. Thus when the British contemplated war against France in 1898 their arrangements included convoys of troops (escorted by cruisers) to seize French naval bases abroad. This anti-raider mission is why, for example, the British were so anxious to seize Tsingtao in China and German East Africa in the opening phase of the First World War. Without bases, enemy raiders at sea would not last for very long, whether or not they were sucked into a focal area. The German squadron based at Tsingtao certainly caused considerable havoc when it was forced to sea, but it seems unlikely that it could have remained at sea for very long with limited resources – many of which the Admiralty indirectly controlled.

It was bad enough to face the French *or* the Russians, but beginning in the 1880s the two threats merged, particularly in the Mediterranean.[4]

In the 1850s and 1860s the British also faced the possibility of conflict with the United States due, among other reasons, to disagreements over the border with Canada. For example, in 1858 there was a considerable scare as the French seemed about to match or even to surpass British naval strength. First Naval Lord Admiral Sir Richard Dundas pointed to the possibility that the United States would feel encouraged to attack British possessions in North America in the event of a war with France.[5] Second Naval Lord Admiral Martin considered that the United States might fight if the Royal Navy imposed a blockade against France. At this time the French navy nearly equalled the Royal Navy in size, and France had more frigates (though fewer smaller cruisers). Thus it could be argued that France could blockade England (which was already importing much of her food) quite aside from the usual threat of a direct invasion by the large French army.

The US Navy had a long-standing war policy of raiding British commerce, as it had no hope of challenging the British fleet. In the past it had built unusually large fast frigates like USS *Constitution* in hopes of overwhelming British convoy es-

corts. In 1854 it announced plans for five new fast screw frigates and a screw corvette. The British were led to design their own fast screw frigates as answers to these ships; in the process they pushed wood hull construction as far as it could go. It turned out that the British frigates were much faster than their US counterparts, but also that their powerful engines overstrained their hulls. There was a real possibility of war against the United States several times during and immediately after the American Civil War, but it was always averted. The United States disappeared as a naval threat only when the large fleet built up to fight the Civil War was allowed to decline precipitously in the early 1870s.

Trade Protection

During the centuries leading up to the end of the Napoleonic Wars, the Royal Navy relied heavily on convoy to protect seaborne trade. Convoy Acts forced merchant ship owners to submit to Royal Navy orders and to join convoys with escorts. Many historians have observed that this apparently successful policy was discarded after 1815, and it is often suggested that the Royal Navy's failure to protect vital shipping from U-boats in 1914-17 could be traced to a lack of interest in trade protection and to the abandonment of a previously successful policy in favour of an emotionally satisfying offensive (rather than defensive) strategy. None of this seems to match reality. For the Royal Navy, perhaps the most interesting lesson of the American Civil War was the striking success of Confederate raiders. Blockade could not deal with them, because they were built and armed abroad (British connivance in Confederate raiding was a major source of post Civil War tension). The closest approach to blockade, which netted the very successful CSS *Alabama*, was to station the cruiser USS *Kearsage* off the port of Cherbourg, in the expectation that the Confederate ship would have to put into port for resupply. There was no hope whatever of patrolling the open Atlantic, and the Union Navy lacked resources for any kind of convoy strategy

It is difficult to trace the evolution of British thinking about trade protection, because responsible officers only rarely had to explain themselves to civilians, such as the First Lord of the Admiralty, who were not already familiar with their thinking. The considerable volume of the program to build small cruisers (frigate down to gun-vessel) during the 1840s and 1850s suggests an attempt to maintain the small-ship force which in the past had escorted convoys. In 1858 Surveyor Captain Walker commented that the size of the French steam frigate force, roughly equal to the British, suggested an intent to conduct trade warfare, and he decried the inability of the Royal Navy to concentrate its forces in the Channel due to the need to protect British trade as well as British possessions overseas.

In two cases British cruisers were built specifically to run down fast cruisers built by the United States explicitly to operate as raiders in wartime, in accordance with settled US naval policy. In 1854 the US Navy announced plans to build five large steam frigates and one large steam corvette, and the Royal Navy responded with large fast frigates of its own. It turned out that the US ships were not nearly as fast as had been expected. The British ships were not repeated because they were so expensive; commerce protection, certainly as then understood, demanded numbers. During the American Civil War, Confederate raiders like CSS *Alabama* devastated Union merchant shipping. The Union response was a series of what were expected to be very fast cruisers capable of running such raiders down. They were also potential commerce raiders, and again they demanded a British response. It came in the form of a program for six large fast steam frigates, only three of which were ultimately built (*Inconstant*, *Raleigh*, and *Shah*). Again they were too expensive to be constructed in any numbers.

It is not clear when British naval officers realized that the combination of an explosion in the sheer number of British merchant ships and the nature of steam power (in the 1870s and early 1880s cruisers could not match the endurance of merchant steamers) made the old convoy policy obsolete. Nor was the lesson of the Napoleonic Wars entirely clear. One witness before the Carnarvon Commission, an experienced and thoughtful shipowner, explained that a convoy attacked by overwhelming force would be annihilated – as had happened on several occasions. An effective convoy defence would have required that each convoy be escorted by a force capable of beating off the most powerful enemy ships. It may be that the ability simply to crush an enemy's ports seemed for a time a sufficient guarantee against large-scale commerce raiding.

The first internal document formally laying out the desired cruiser force seems to have been a statement prepared by First Naval Lord Admiral Milne in December 1874 for the First Lord, in connection with the First Lord's attempt to frame a rational naval program.[6] Milne's paper on unarmoured ships was written to help the First Lord frame estimates. It is impossible to say whether it reflected widely-accepted ideas, which were not expressed on paper because they were not worth writing down. Explaining the navy's thinking to a civilian First Lord was a different proposition.

Milne mentioned both the need to protect the trade on which the country relied, and also what might now be called presence missions, such as suppressing the slave trade and piracy. Milne distinguished between the main fleet, which for him included fast frigates and corvettes, for general war and also for commerce protection, and smaller unarmoured ships for foreign and home service, surveying, despatch duty, and coast guard service. He also produced a paper on trade protection, perhaps the earliest one formally to advocate what was later called a policy of patrolling focal areas. 'It is well known to foreign nations that our trade is our great point of weakness, and that it is open to the attack of the cruizers of any enemy.' Recent intelligence showed that the Russians had planned to attack the Australasian trade during the 1863 crisis.

Milne argued that any seaman trying to destroy British trade would know the main trade routes, and would seek targets in particular places where they were concentrated. He identified eighteen such places, Each of these eighteen stations should be occupied by two or three ships, making a total of forty to fifty cruisers. Adding reliefs 'and separate ships for obtaining information' gave the total of fifty to sixty cruisers he sought.[7] By cruisers Milne meant frigates and corvettes, which he thought would soon be rerated as cruisers of the first, second, and third classes. Only a few of them were really fast.

Milne proposed a fleet of 20 frigates, 25 to 30 first-class corvettes, and 30 second-class corvettes, aside from lesser craft

(sloops and gunboats). He considered this a low estimate, and pointed out that a quarter would probably always be under repair or defective at any time. However, the figures seem to have been unaffordably high, so in a marginal note Milne called for a war establishment of 30 frigates and 25 corvettes, a total of 55 such ships. Actual numbers were falling rapidly. Of 26 frigates on the Navy List, 14 were fit only for harbour service, and of the remaining 12, 6 would have to be repaired or replaced within four years. Against a wartime requirement for 30 corvettes, 32 were on the list, but 11 had already been condemned. Of the remaining 21, 14 were in commission, and Milne expected three to be found unfit within three years. Another seven sloops had been commissioned as second-class corvettes, six of which had recently been repaired. No frigates were building, but three first-class and nine second-class corvettes were under construction, in addition to nine sloops and lesser vessels not considered in this book.

Milne pointed to the destruction of US commerce by Confederate raiders, most famously CSS *Alabama*, only about a decade before. He pointed to the failure of the US Navy to find sufficient ships to run down this Confederate raider. The British cruiser force was shrinking as the wooden ships of the 1850s and 1860s were being condemned much faster than they were replaced. Since 1 January 1868, 19 frigates had been stricken, and 3 built; 16 corvettes had been stricken, and 12 built; and 19 sloops had been stricken, and 12 built. As a minimum, Milne wanted an immediate program of six *Boadicea* class frigates to be laid down in 1875, another six following in 1876. The 1875 proposal was apparently vetoed by the Cabinet.

Focal area defence was part of a larger strategy. French bases abroad would be attacked so that they could not be used as bases for commerce raiders. The troopships used for such attacks would be convoyed, and some other unusually valuable ships might also be protected directly. The issue of convoy was whether such protection could be or would be extended to the mass of merchant shipping. The conclusion was clearly that such extension was impossible and unaffordable.

The enemy force which got to the focal areas had to be restricted; the British had to neutralize the French battleships. That was not too difficult in European waters, but it became far more difficult as the French gained colonies in Africa and in Asia. The British had to station their own armoured ships in the Far East specifically because a single French armoured ship could destroy the unarmoured cruisers which would execute the trade protection mission in wartime. Hence the British (and French) policy of building second-class armoured ships, many of them classed as armoured cruisers, for foreign service. The nature of these ships is obvious partly because their Ships' Covers are clearly marked 'second-class ironclad' rather than 'armoured cruiser'.

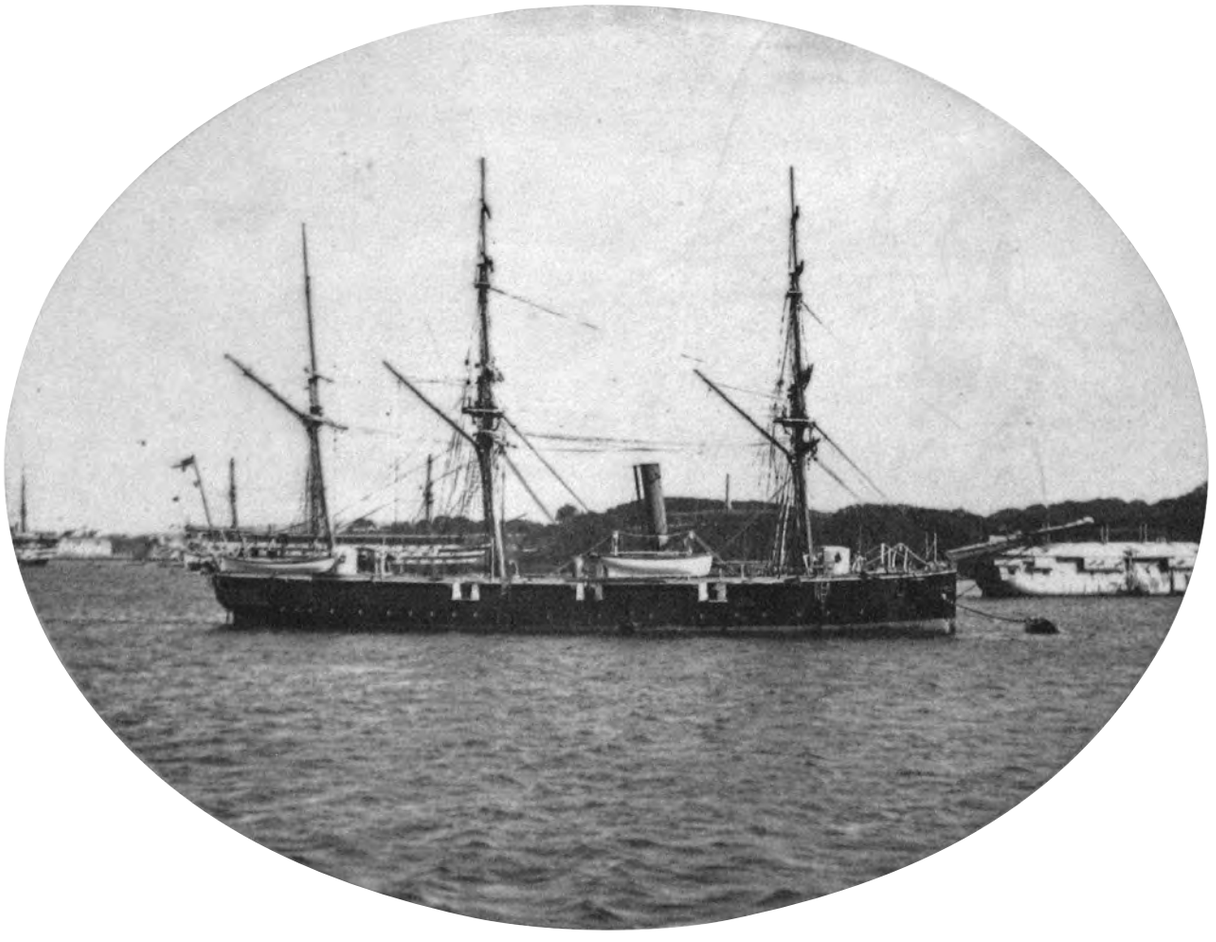
Milne also pointed to the varied peacetime (presence) roles of unarmoured British warships, such as presence missions for the Foreign Office and suppression of piracy and of the slave trade. He was embarrassed that he could not provide ships; there was no reserve apart from the Channel Squadron and the Detached Squadron.

It is not clear to what extent *Iris* and *Mercury* were intended to meet Milne's needs. Certainly he did not get the large cruiser program he wanted. The British cruiser program continued to consist mainly of relatively slow corvettes through the early 1880s.

In the aftermath of the 1878 crisis with Russia the Carnarvon Committee met to examine the ability of the Empire to maintain the food supply of the United Kingdom in the face of foreign attacks on British trade. It spent relatively little of its effort examining naval efforts to deal with enemy commerce raiders, concentrating instead on the defence of British colonies and coaling stations. Most of the world's steaming coal was in exactly these places. Without coal, an enemy raider would soon be rendered immobile.[8] The Carnarvon Committee did collect statements from some prominent shipowners attacking the earlier trade protection tactic of convoy, which had apparently already been abandoned.

In 1885 the Foreign Intelligence Committee (now in effect a naval staff) issued a comparison of trade protection by focal area patrol and convoy.[9] The unpleasant reality was that the Royal Navy had no cruisers capable of working with really fast merchant ships. Very few had the combination of speed and high-speed endurance needed to convoy even 10kt freighters, which were quite common by that time. Even sailing merchant ships would be difficult to convoy, because they might easily be becalmed. Their owners considered them so vulnerable that they would be laid up in wartime. The alternative of directly protecting the trade routes by flanking them with cruisers along their whole length had been already rejected as impossible. That left only the focal area concept Milne had laid out a decade earlier. The 1885 paper advocated employment of 83 cruisers and 75 merchant auxiliaries; it also offered a reduced version requiring 38 cruisers and 37 merchant auxiliaries. The main later development was to analyse trade routes to decide exactly what areas demanded cruisers. A formal Admiralty Memorandum on protection of British trade in wartime was drafted in November 1898 and printed in February 1900 so that it could be issued to merchant ships in an emergency. It restated the focal area policy: protecting squadrons would be stationed 'where the convergence of the important ordinary trade routes offers to the enemy great opportunities for making captures'. This pamphlet explicitly stated that convoys would not be formed except under special circumstances (i.e., of ships, such as troopships, whose loss could not be tolerated – but that was not said).

Milne's focal area strategy was not for public consumption: any offensive trade protection strategy implied that the British merchant fleet would face heavy losses early in a war. After a few months the enemy raiding force would have been destroyed, and losses would cease. That is what happened to the German cruiser force intended to destroy British commerce during the early months of the First World War. Things later went badly wrong because the anti-raider strategy, so little discussed prewar, was ineffective against U-boats, which could not easily be hunted down. The economics driving the strategy – that there were too few ships for effective escort – explains the Admiralty's attempt to revive hunting in 1939, when it thought that the advent of Asdic had made the earlier strategy viable again. In each case the key failure was not to understand that a primary requirement, the ability of a cruiser or other ship on station to detect a raider at a distance and kill it, had been lost. The US Navy revived offensive anti-raider strategy when it sought to deal with Soviet nuclear submarines during the Cold War;



The *Doterel* class sloop *Espiegle* rearmed with ten 5in Mk III breech-loading guns in shields, four of them (in shields) on VC and six (on the broadside) on VB mountings. The *Mariner* class were similar but slightly larger, completed with breech-loading guns (eight 5in). They displaced 970 tons. Two ships of that class (*Mariner* and *Racer*) participated in the 1885 fleet exercise, proving that they were far too slow (rated at 11.5kts on 850 IHP) to work with a battle fleet. The *Mariner*s were laid down as gun-vessels, but reclassified as sloops on 26 November 1884, while under construction.

again, there was little prospect of building enough escorts of sufficient capability. Moreover, a convoy too lightly escorted became a tasty meal for a raider. That had become evident during the Napoleonic Wars, and the unpleasant experiences of such convoys were cited during the 1878 hearings of the Carnarvon Commission on colonial defence and on protecting British seaborne trade.

It did not help that the Royal Navy's rivals did not have to match its numbers. For example, the Royal Navy squadrons deployed in the Far East had to deal with a Russian threat to trade mounted from Vladivostok. A Russian raider might appear anywhere in the area, so any of the deployed squadrons there had, at least in theory, to be able to counter the most powerful of the potential raiders. British numbers were set by the number of places that had to be covered. It did not take large numbers of potential Russian (or, for that matter, French) raiders to force up the size of the ships the Royal Navy had to deploy in the Far East, hence the cost of the Royal Navy.

The number of vulnerable focal areas increased as the French and the Russians gained bases outside the area the Royal Navy could expect to dominate. Just before the turn of the century the French seem to have been particularly keenly aware that building limited numbers of armoured cruisers would place intolerable financial burdens on the Royal Navy. By that time a big armoured cruiser cost about as much as a battleship, so a Royal Navy forced to build a large number of such ships (to cover the focal areas) would be building, in effect, two battle fleets. It was time to find a new way to handle the problem. Admiral Sir John Fisher seems to have seen the way: use intelligence to find the enemy cruisers, and build overwhelmingly powerful large fast cruisers to run them down. That was a key rationale of the battlecruisers which Fisher hoped would replace armoured cruisers.

Conversely, it was argued that by stationing powerful cruisers at focal areas, the Royal Navy would be forcing enemies to limit their attacks on trade to their most powerful cruisers, and in that way much reducing the scale of the attack.[10]

When he became First Sea Lord, Admiral Fisher rethought trade protection.[11] He again rejected convoy, partly because an entire convoy could be lost if its escorts were overwhelmed. It would be impossible to keep formation of a convoy secret, and the mass of smoke it produced by day (and the lights it would have to show at night) would attract attack. Probably the worst problem was that there were just not enough cruisers to escort convoys and to do 'the far more effective work of hunting down the enemy's commerce destroyers'. It seemed that most of the large number of merchant ships, each proceeding unpredictably, would escape a small number of enemy raiders.

Recent analysis had shown that even famous raiders of the past, such as CSS *Alabama*, had not been very productive. A US analysis conducted after the Civil War showed that Confederate raiders had destroyed only about 5 per cent of the Union merchant fleet; another 32 per cent had been lost as shipowners fled to neutral flags. The latter loss proved permanent due to

onerous post-war taxes rather than to anything the Confederates had accomplished directly. *Alabama* herself had accounted for about three ships each month of her raiding lifetime.

The Royal Navy was increasingly arguing that the main defence of trade was control of the sea, to be gained by seeking out and destroying the enemy's fleet. There had to be a fall-back defence of trade to deal with enemy cruisers escaping from the British fleet, but it should be be minimized because the needs of the fleet came first.

For the moment, Fisher retained the focal area strategy. It was affordable, in terms of numbers of cruisers required and in terms of coal and wear and tear on the ships. It made concentration of force (when needed) practicable. Given a squadron operating in a focal area, the officer in command could readily react to information. Merchant ships under threat would know where to run. As pointed out above, Fisher soon became interested in an alternative to focal areas, using fast cruisers to run down raiders based on intelligence – a strategy which became possible with radio. This strategy in turn helped engender the battlecruiser, as a replacement for armoured cruisers.

Naval Presence

With its rise as the centre of world finance, the City of London became an important element of the British economy and hence a factor in policy-making. It did not speak with any single voice, but in effect it demanded that successive British Governments understand that they had a vital interest in keeping the peace abroad so that international trade, and British traders in particular, could flourish. That role was not too different from what is sometimes now called the vital peacetime mission of 'maintaining good order at sea'. In practice the Royal Navy had to maintain cruiser squadrons on foreign stations. Such squadrons were not necessarily a means of protecting trade. Rather, they were a way of maintaining what would now be called presence. For example, when the Peruvian ironclad *Huascar* mutinied and became piratical in 1877, she was hunted down and disarmed by the local British squadron headed by HMS *Shah* – which fired the first self-propelled torpedo to be used in action against the ironclad (it missed).

Shah was not defending British colonies, but rather the British-centred trading system which kept Britain alive. The City was in effect the centre of an informal empire defined by trade. Unlike the formal empire, it was not generally garrisoned by the small British professional army, and it did not figure in formal defence arrangements. In effect the City could and did apply pressure to maintain the naval presence which protected the British traders abroad and which reassured the governments of the informal empire when they favoured policies which helped international trade – which usually meant trade financed by the City. Whether Britain should have a formal empire at all was a matter of intense debate in mid-century, but the informal empire was not, and could not, be debated at all. It was the informal empire which demanded all those cruisers on foreign stations. The formal empire is largely gone, but not the City and therefore not the vital foreign trading interests. That should, but does not, suggest that the presence mission is still vital, quite unaffected by the demise of formal empire.

Ships intended primarily for the presence role did not necessarily have to be very fast, but they needed long endurance, heavy armament, and survivability. Nearly all the masted cruisers built for the Royal Navy before about 1880 shared these characteristics.

It was not obvious to all in British government that global naval presence was worth while. It was certainly expensive; battleships were often maintained in reserve at home, but cruisers on foreign stations had to be manned and maintained and refitted periodically. In times of crisis, the Admiralty also questioned the value of dispersed ships conducting presence operations. In 1858 the French navy approached the size of the Royal Navy, and in at least one category (frigates) they were superior. The naval members of the Board wanted the fleet concentrated in home waters to deter the French from any idea of invasion, some members suggesting in addition spoiling attacks on the French Channel ports (Cherbourg in particular was being fortified as a fleet base).

The Royal Navy was probably the largest single item in the British national budget of the time. William Gladstone, the Liberal prime minister during much of the late nineteenth century, was an ardent anti-imperialist hostile to naval spending. In 1861, well before he became Prime Minister for the first time, he argued since steam made it possible to reach out to the world rapidly and reliably, the bulk of the fleet could be maintained in home waters. Implicit in Gladstone's argument was that the ships (cruisers) on foreign stations were there to protect British colonies. Gladstone could accept a reduced fleet capable of responding to crises, but not naval presence. He would have dramatically reduced the peacetime British cruiser force, which provided presence. Once Gladstone was in office in 1868, he tested the idea. His First Lord, H C E Childers (who famously disregarded professional naval opinion) argued that money saved by eliminating most of the ships on station could be spent instead on more ironclads in home waters and in the Mediterranean. This idea corresponded to Gladstone's preference for home defence over Empire defence (he was a 'little Englander'). The idea was tested by sending a Flying Squadron commanded by Rear Admiral Geoffrey Phipps Hornby abroad in 1869. Among the drawbacks to the idea were the low speed of existing ships and their very limited coal endurance. Phipps Hornby later described the Flying Squadron as a valuable means of training officers and men (largely under sail) and of showing the flag (cruising under sail also minimized dependence on foreign coal). Despite its prestige, the squadron could not be in more than one place at a time: the United Kingdom still needed a large cruiser force continuously on station.

Presence, and the somewhat similar imperial police role, required large numbers of small ships, ranging downwards from cruisers capable of fleet operations to steam sloops, gunvessels, and gunboats. About 1860, for example, large numbers of shallow-draught sloops and gunboats were required for China, even though China was not in any sense a British colony. These small units were never really expected to engage enemy cruisers, but they seemed absolutely essential; during the nineteenth century after 1815 they saw much more action than larger and more capable warships. They were caught up in the financial problems the Royal Navy faced by 1900, as the cost of adequate warships escalated while resources did not. Hence Admiral Fisher's famous call, upon becoming First Sea Lord

in 1904, to scrap all the small ships abroad which could 'neither fight nor run away'.

In effect Fisher was saying that he could no longer include the cost of the Imperial maritime police force in the Royal Navy budget; in order to maintain a navy adequate for war, he could not continue to pay for assets really needed by the Foreign Office and the Colonial Office. He probably hoped that they would realize that they needed the small warships badly enough to be willing to pay for them, but that did not happen (on the other hand, surprisingly few of the sloops were scrapped). The problem has continued to haunt navies, when maritime solutions to national problems other than naval warfare pop up. If that seems abstract, think about strategic submarines. Both in Britain and in the United States, Polaris submarines and their successors did the national job formerly done mainly by land-based bombers. They did not contribute to conventional naval missions. However, in neither country did governments pay for the new strategic weapons out of the budgets formerly allocated to the land-based bombers. Instead, the submarines were paid for by cutting general-purpose naval forces.

The Shape of the Fleet and the Changing Role of the Cruiser

Nineteenth-century cruisers are often regarded as direct descendants of the frigates and sloops of the age of sail. That is not quite true. Sailing frigates and sloops were generally faster than the line-of-battle ships, to the point that they could escape from such ships. As long as steam engines were bulky and inefficient, steam-powered battleships were generally as fast as (if not faster than) most steam frigates and lesser craft. It took a large frigate (often filled with machinery) to outrun a steam-powered battleship when both ships were under steam. Frigates lost their place in fleet engagements, although they certainly retained their roles in trade defence and attack. Only in the mid-1870s did the combination of steel hulls and more efficient machinery restore the cruiser's speed advantage. It took about a decade more for the cruiser to regain a place in the battle fleet, partly because the nature of the fleet itself was changing.

Even the term cruiser (sometimes spelled cruizer) was not widely used as a ship type until the 1880s. Before that ships were classified as frigates, corvettes, sloops, gun-vessels, and gunboats, of which only the first three figure in this book. The categories were left over from the sailing ship era. In 1878 frigates and corvettes were first officially redesignated cruisers, but the earlier designations survived well into the 1880s in official documents. Sloops remained as a separate category, and so did the lesser cruising vessels.

The evolving roles of cruising ships were intertwined with radical changes in the character of the fleet and of naval warfare. There were three distinct naval roles. One was to protect trade, either directly (by convoy) or by denying an enemy the ability to deploy raiders (blockade and attack at source, i.e., raids on ports harbouring raiders), or by destroying the raiders individually at sea. A second was the destruction or neutralization of the enemy's main fleet. It made the first type of operation possible, by limiting the scale of threat that escorts or blockaders or harbour attackers had to face. A third was to capitalize on control of the sea (secured mainly by battlefleet action) to move troops to strategic places and thus to upset an enemy's position ashore. For example, the British fleet victory at Trafalgar (which effectively finished the French and Spanish battle fleets) secured free use of the sea, which the British used first for an unsuccessful descent on the Dutch North Sea coast and then to support Wellington's Peninsular campaign. Without Trafalgar, there could have been no Peninsular campaign. Trafalgar also made the blockade of various French ports effective. Despite Trafalgar, the Royal Navy had to keep hunting down French raiders until the end of the war.

Steam dramatically changed the situation. A steam warship was independent of the vagaries of the wind. It might no longer be necessary to operate ships in the dense line-ahead formations of the past. Until the 1880s or even later, steam plants were extremely inefficient. For example, it was common in the 1840s and 1850s to design steam warships with a coal endurance of about two weeks and a stores endurance of five months, the assumption being that the ship would spend most of her time cruising under sail. The protracted blockades of the age of sail were no longer practical.

Moreover, sailing ships had been governed by prevailing winds, so that in effect the winds created highways in the otherwise trackless sea. That is why we can read about a British fleet well out of sight of land waiting for the Spanish gold convoy to approach, or an attack on some other large convoy. Steamships could manoeuvre much more freely. In a world without radio, the best way to locate – to destroy – an enemy's warships was at or near their port. As in the sailing ship era, the alternatives were to enter the port (a cutting-out expedition) or to blockade it. The effect of the new steam and other (e.g., heavy gun) technology was to limit the number of ports which could support major warships, and thus to limit the number of ports which had to be dealt with. During the sailing ship era, blockade was far preferable to direct attack on a fleet in port because ships generally could not engage the fortifications protecting the port. Fortifications were, moreover, relatively inexpensive; the French fortified not only their fleet bases but also the ports which supported privateers preying on British trade.

The Crimean War changed this perception. French armoured floating batteries successfully engaged Russian forts (the British built similar batteries, but did not bring them into action during the war). Unarmoured British gunboats were also successful against forts. This lesson was repeated during the American Civil War. More powerful guns which appeared after 1865 presented the even more attractive possibility of destroying an enemy fleet by shelling it from just outside the protected port. It now became far more profitable to attack an enemy port than to blockade it. Both the Royal Navy and the French navy built 'coast defence' ships which might more properly be described as coast (or port) attackers.[12] The French wrote about their 'seagoing siege train'. To the extent that harbour attack became the favoured tactic in the Royal Navy and in its French counterpart, the fleet in the Channel was no longer the long-range seagoing entity of the past, with its scouts arrayed ahead of it. Because they had vital interests far from the British Isles, the British also needed seagoing armoured ships which would be deployed at long range. However, once they arrived at their destinations, they, quite as much as the shorter-range coastal ships, would be attacking an enemy fleet in port.

A fleet crashing into an enemy port to destroy everything inside had only a limited need for scouts. For example, the fleet

HMS *Dolphin*. *Dolphin* and her sister *Wanderer* were the first British sloops to be armed with breech-loading guns. Originally classified as gun-vessels, they were reclassified as sloops while under construction. These photographs were taken when the ship was completed, armed with two 6in and two 5in breech-loaders. The stern view shows closed ports (embrasures) on either side of the ship's stern, a feature of many British sail-and-steam warships of this period. Guns on slides could be moved between the embrasures and side ports. Embrasures made it possible to fire dead astern (there were similar ports forward) without fouling the trunk into which the ship's single propeller was hoisted when she was under sail. Sailing qualities were essential to ships which would spend much of their time under sail so as to conserve coal and thus to achieve the long endurance demanded of cruising warships. These ships displaced 925 tons (157ft pp x 32ft x 14ft). *Dolphin* had a 720 IHP compound engine and was rated at 11.3kts; endurance was 1700nm at 10kts. Both ships were built under contract by Raylton Dixon of Middlesbrough; *Dolphin* was launched on 9 December 1882. She became a sailing training ship in 1899, when the larger corvettes of the Training Squadron were discarded. In 1907 she was hulked as an accommodation ship for submarines; in 1912 she became a submarine depot ship.

which ascended the Turkish straits in 1878 included no cruisers (the sole cruiser in the area, HMS *Raleigh*, was among the ships which remained at Besika Bay).

This did not change the need to protect trade and interests abroad. Both the British and the French built second-class battleships (which in the Royal Navy were superseded for a time by armoured cruisers) for individual operations on distant stations. They had both a cruising role and a port defence role; they backed unarmoured cruisers.

The situation began to change as underwater weapons developed. The American Civil War showed that underwater attack, e.g. by mines, could damage or sink large ships in confined waters. It might be difficult or even impossible for the coast defence ships to approach an enemy port to destroy the fleet inside. With all its difficulties, a fleet operating well offshore might be the only viable means of wielding sea power. That in turn demanded creation of a steam equivalent to the earlier sailing battle fleet, capable of fighting in the open sea. The further from a port the fleet had to remain, the more it would need scouts – fleet cruisers.

A fleet forced (by the torpedo and mine threat) to stand well outside the port containing an enemy fleet badly needed scouts. The attacking fleet also wanted to be able to use torpedoes, and cruisers turned out to be better torpedo platforms than battleships: they enabled an admiral to wield his two disparate weapons, gun and torpedo, flexibly. Too, a British fleet waiting for an enemy fleet to come out might well find itself pursuing that fleet. In 1884 the *Mersey*s and their immediate successors were described as adjuncts to the ironclads capable both of scouting and of forcing a faster enemy fleet to action (the French in particular seemed to be building faster capital ships). That justified arming them with heavy guns. As the manoeuvre experience described below shows, the cruiser was soon seen primarily as a scout – and it was wanted in ever-increasing numbers.

The cruiser role changed again beginning in 1896, when DNC Sir William White sold the Admiralty Board the idea that new lightweight armour made it possible to produce a cruiser with battleship protection – in effect, the battlecruiser.

Fleet Operations: The 1884 Analysis

The rising role of cruisers within fleets is evident in an 1884 analysis of the fleet Britain would need in a war against France, at that time the most powerful potentially hostile sea power. It was conducted by Captain W H Hall, head of the Foreign Intelligence Committee.[13] Hall's work seems to have been an attempt to stave off increasingly loud voices arguing that the Royal Navy had fallen behind the French. Hall's analysis offers a contemporary professional picture of the sort of naval war the Royal Navy expected to fight.

There must still have been advocates of convoy operations: Hall took pains to reject both convoy and other proposed means of trade protection as impossibly expensive (and also as unacceptably defensive). A modern reader might be surprised by how little of the French navy was normally active. Most of it, like most of the British fleet, was in various levels of reserve, awaiting activation by called-up reservists (the idea of nucleus crews was far in the future). Thus the offensive concept was to deal with the active enemy fleet at sea while rushing blockading squadrons to seal the rest in before they could be activated to the point of steaming out. Since reservists came from the merchant fleet, and since the British had a far larger merchant fleet than the French, it was reasonable to imagine that the British could mobilize more quickly. For that matter, mobilization would be a war warning.

Hall advocated mounting an immediate offensive against French forces overseas and already active in the Mediterranean (which might otherwise attack British shipping) while blocking the main French ports (containing the bulk of the [unmobilized] French fleet), destroying French shipbuilding facilities, and also destroying overseas coaling stations and bases.

Aside from ships deployed on foreign stations, the active French fleet consisted of an Evolutionary Squadron based on Toulon and an Eastern Squadron based in the Levant, looking after French interests in Syria. The Evolutionary Squadron consisted of two first-class and four second-class armour-clads, one despatch vessel (to link it to the command ashore), a gunvessel, and two torpedo boats (it seems unlikely that the latter could go very far to sea; they were presumably to ensure that the squadron could get to sea in the event a hostile fleet appeared). A fifth second-class armour-clad was in 1st Reserve at Toulon, hence could probably get to sea to join the squadron. To deal with this squadron Hall envisaged a British fleet consisting of two first-class and six second-class armour-clads plus two corvettes and six torpedo vessels. The corvettes were presumably the fleet's scouts, and the expectation probably was that the French would be caught in Toulon. The French Eastern Squadron consisted of a frigate and two corvettes, against which Hall envisaged a British squadron headed by a frigate and three corvettes (first-class rather than second).

Hall did not envisage sending fleets into French harbours. Each of his blockading fleets included both means of defence against the torpedo boats (torpedo vessels, which soon emerged as torpedo gunboats) and scouts (typically a frigate and two corvettes). Hall did not say so, but presumably the frigate would normally watch the port, the corvettes linking her to the armoured squadron further offshore. The exceptions were Cherbourg, for which Hall allocated one first-class and three second-class corvettes; Rochefort, for which he allocated two corvettes. At the time it appeared that the French were building much larger torpedo craft in the form of avisos, capable of operating well offshore on a sustained basis and thus denying all British ships, even corvettes, a clear view of the ships in a harbour or even of the harbour entrance.

Hall's strategy of trade protection required instant destruction of every French force abroad, because every such force could be used against British trade. Thus he listed each British foreign station with the ships normally present and the corresponding French foreign station. There were obvious imbalances, because the two countries valued their overseas possessions rather differently. For example, the British squadron on the Australia station consisted of a second-class ironclad, a corvette, two sloops, and three gunboats. Facing this force at New Caledonia, the French had a fast sloop, a gun-vessel, and two small gunboats, hardly a match. Hall thought a corvette, a sloop, and two gun-vessels would suffice to overwhelm the French. He clearly separated fleets into categories, seeking equal-

ity or superiority in each category. Thus he accepted that any ironclad could overwhelm every unarmoured ship, but he does not seem to have accepted that even several gunboats or gun-vessels would have no chance against a corvette or frigate, hence that the attacking British force did not have to include small unarmoured craft.

French foreign interests were clearly concentrated in China (their force included one second-class ironclad and three third-class, plus five corvettes) and in a second Pacific force based at Tahiti (one second-class ironclad, a corvette, and two sloops). At this time the British counted what would later be called armoured cruisers as second-class ironclads, so the apparent deficit in such ships was a deficit in cruisers.

Hall classified unarmoured ships as frigates (with a covered battery) of first or second class (speed at least 14½ or 10kts, respectively, and of at least 3000 and 2500 tons, respectively), as corvettes of first, second, and third classes (first: at least 3000 tons, speed not less than 14½kts; second, at least 1700 tons, speed not less than 12kts; and third class, at least 1400 tons, speed not less than 11kts), plus sloops, gun-vessels, and gunboats.

Hall's analysis showed the Royal Navy with a deficiency of 14 armour-clads (first and second class), 37 frigates and corvettes, 97 torpedo vessels, and also auxiliaries. The British had too many third-class armour-clads (10), coast defence armour-clads (5), small unarmoured ships (sloops and below: 37), and torpedo boats (20). The coast defence armour-clads could be employed in some of the operations envisaged, but not the old third-class armour-clads, whose belts could be penetrated by even moderate-calibre guns. They were in effect the left-overs of the building race with France twenty years earlier, and the deficit in more modern armour-clads could be blamed on the habit among successive governments to count the entire British armoured fleet as equivalent, hence to downplay obsolescence. The excessive number of small unarmoured ships could be traced to the need to maintain a maritime police force in a large maritime empire. Nine of them might replace second-class corvettes, albeit inefficiently.

The Royal Navy could not execute all of Hall's envisaged operations simultaneously, but it could begin by attacking all French ships in commission. The French ships active on foreign stations were clearly the most dangerous to British trade, as they could be sent on that mission 'by a flash of the telegraph'. With the exception of China, the British already had powerful enough forces on foreign stations to deal with the French; that was the case even in the Mediterranean. China was a worse proposition. Not only were the French more powerful, but some of their cruisers were faster than anything the British had. Thus the French had the options both of attacking Hong Kong and of attacking British commerce in the Far East. Hall's only solution was to commission six of the fastest British merchant steamers using crews taken from the collection of unarmoured ships already in the Far East. The merchant ships might not be as fast as the French cruisers on a short-time basis, but they would be able to sustain full speed for very much longer, and would not have to coal nearly as often. Once the French squadrons abroad had been dealt with, the remaining British forces would deal with French coaling stations and commercial ports, thus dramatically reducing further French ability to attack British trade.

The British armour-clads in home and Mediterranean waters could meanwhile attack the French ports. This was not blockade, but rather something more like the direct attack of the past. For example, Hall suggested that the five armour-clads in commission in the Channel and First Reserve Squadrons plus the coast defence armour-clad in commission at Portsmouth could form a squadron to attack Cherbourg, the strongest of the French Channel ports, by day, and then disperse to attack the rest simultaneously. After those attacks it would reform as an observation (not blockading, in Hall's words) force off Cherbourg, to prevent the ships there from coming out. If the initial bombardment sufficiently damaged the ships in Cherbourg, the squadron might proceed to attack Brest. Hall wrote that he deliberately avoided using the term blockade because he considered it impossible to establish a true blockade by any squadron which did not include torpedo vessels (i.e., torpedo gunboats).

The Mediterranean ships in commission would watch Toulon. Some of these ships might be sent to reinforce the China station. The Mediterranean would be reinforced by armour-clads in reserve at home and at Malta.

All of this suggests that at this time the French did not yet have sufficient ocean-going torpedo boats to prevent a force from bombarding a port from just outside, but that earlier ideas of actually entering the port in force to destroy the ships inside were no longer practicable.

In effect Hall showed that the existing British force could fight a naval war against France as long as it did not try to execute all necessary offensive operations simultaneously. There was one essential caveat. The necessary blockades could not be enforced so long as fleets had to stay well out to sea at night to avoid French torpedo boat attacks. Thus Hall's most important recommendation was the mass purchase of what he called torpedo vessels, anti-torpedo boat ships. He noted in passing that some of the French cruisers were considerably faster than their British counterparts, and the only solution he could offer in the near term was to take up and arm large liners. Hall also pointed out that his war plan required that several British squadrons keep the sea for a sustained period; to do that he advocated large fast auxiliaries carrying stores, ammunition, and, most important, coal. As there was no way of transferring coal in the open sea, Hall proposed doing so either in protected waters or in neutral ports (where the usual restrictions on what neutrals could supply in wartime would not apply).

Hall listed deficiencies in terms of his plan for simultaneous operations. They amounted to 5 first-class and 9 second-class armour-clads; 2 frigates; 8 first-class and 35 second-class corvettes; and lesser craft (these numbers did not take into account the replacement of some corvettes by sloops). Hall's program was not affordable, but it seems to have shaped what was done. For example, the need for nine second-class armour-clads may well have been met by the construction of the seven *Orlando* class belted cruisers plus *Imperieuse* and *Warspite*, which were seen as small battleships. The two frigates were, in effect, the big first-class cruisers *Blake* and *Blenheim*. Eight *Leander* and *Mersey* class cruisers, which Hall might have considered first-class corvettes, were already under construction. Within a few years the Royal Navy would have a substantial

fleet of third-class cruisers which might fill Hall's requirement for second-class corvettes.[14] The deficit in ironclads was considerably reduced (but the cruiser situation complicated) as the French tried a new naval strategy (*jeune école*) based on a combination of base and harbour defence by torpedo boat and commerce warfare (*guerre de course*) abroad.

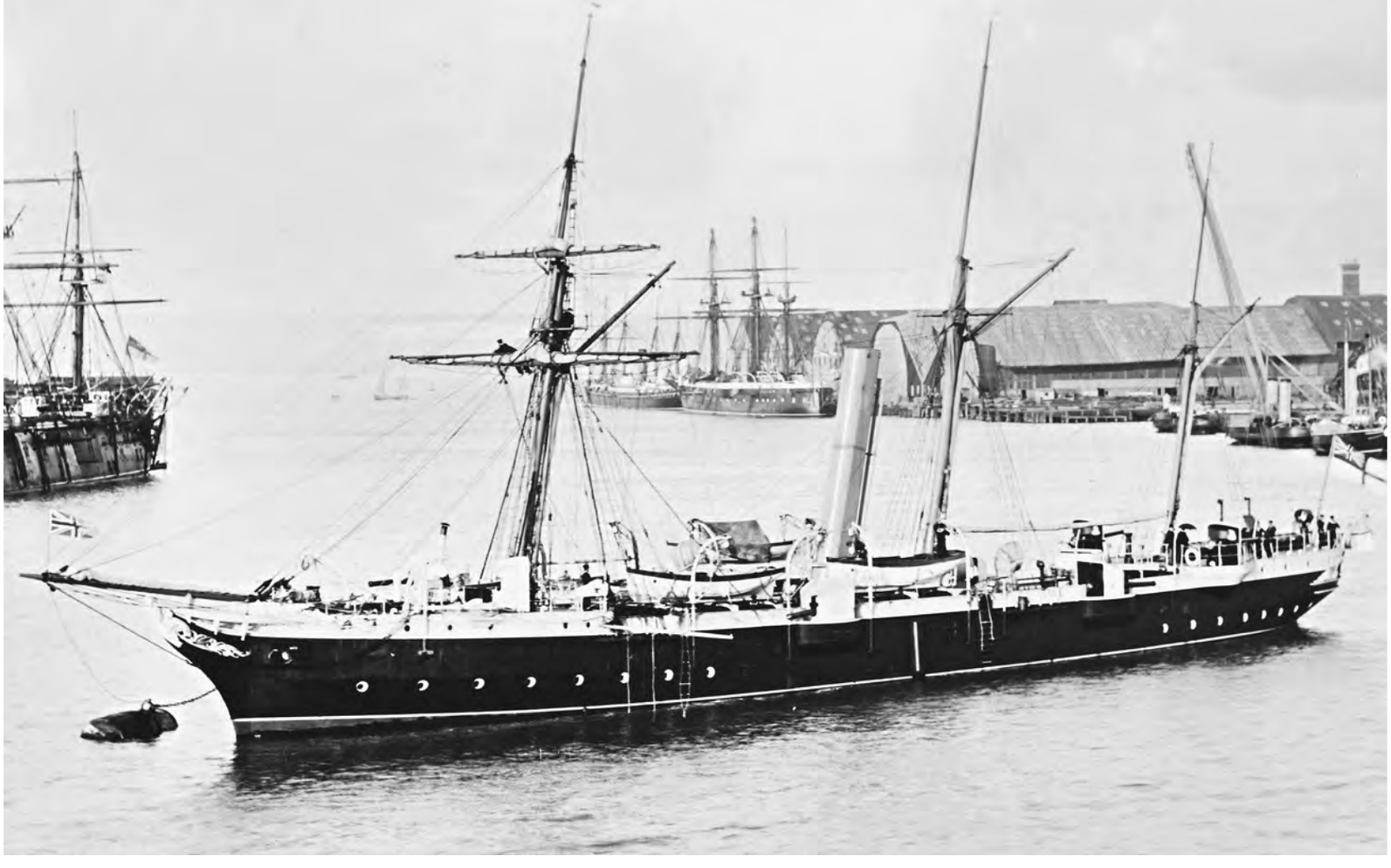
It was accepted that in wartime the Royal Navy would need far more cruisers than it could afford to build in peacetime. The solution often advanced was to take up merchant ships from trade and arm them. DNC Nathaniel Barnaby described what would be needed.[15] For a time the parsimonious Gladstone administration seems to have imagined that armed merchant ships were viable substitutes for all cruisers. The British first tested the armed merchant cruiser idea during the Anglo-Russian crisis in 1877-78, HMS *Hecla* being retained in effect as a test case. Several fast liners were chartered in 1885 during another war scare. The only one commissioned into the Royal Navy, *Oregon*, performed impressively. Within a year or so, possibly due to a change in administration, it seems to have been accepted that, although they would be useful in wartime, fast armed merchant ships were no substitutes for real cruisers.

Fleet Manoeuvres and Their Lessons

The first formal large-scale British naval manoeuvres (June–July 1885) provide an idea of contemporary tactics.[16] The fleet (the Particular Service Squadron) had been assembled for Baltic operations, and it was known that the Russians had large numbers of torpedo boats. The fleet was commanded by Admiral Sir Geoffrey Phipps Hornby, probably the most skilled living British operational commander. He had fourteen ironclads (the term battleship was not yet used). Six unarmoured ships were lookouts when the fleet cruised: *Conquest* (right ahead), *Mercury* (on starboard bow), *Leander* (on port bow), *Racer* (on starboard quarter), *Mariner* (on port quarter), and *Cormorant* (right astern). *Mercury* was the first of the new fast steel cruisers, and *Leander* was a larger and somewhat slower successor. *Conquest* was a considerably slower protected cruiser (corvette). *Mariner* and *Racer* were 970-ton sloops, and *Cormorant* was an 1130-ton sloop. The fleet was accompanied by the torpedo depot ship (converted merchantman) *Hecla* and eight torpedo boats. It was later joined by the torpedo ram *Polyphemus*. The 8kt average fleet speed while manoeuvring was too fast for the sloops *Mariner* and *Racer* to keep station.

Berehaven played the part of a Russian port the fleet might blockade. The fleet anchored outside, protected (it was hoped) by controlled mines it laid, by a boom, and by searchlights. The corvette *Conquest* was sent out with four torpedo boats to watch the port. The corvette squadron (*Conquest*, *Mercury*, *Racer*, *Mariner*) and four torpedo boats represented the inshore

HMS *Swallow* was a composite-built *Nymphe* class sloop. All later sloops had steel hulls. She was not too much smaller than ships classified as corvettes (cruisers) a few years earlier, displacing 1140 tons (195ft pp x 28ft x 12ft 6in), and she had about the same speed as *Calypso* class cruisers (13.5kts on 1570 IHP). She was armed with eight 5in guns and eight machine guns. *Swallow* was built by Sheerness, launched 27 October 1885. She was sold for scrap in 1904.



squadron of a blockading fleet. The ships in port were to sortie while torpedo boats (the other four first-class boats and four second-class from the ironclads) drove off the blockading squadron. The blockaders were to keep in touch with the escaping squadron long enough to be sure of their course. The three escaping ironclads were spotted by a torpedo boat. At daylight they had *Mercury* and *Mariner* on either side, out of gun range. A passage to Blacksod Bay proved that the torpedo boats working with the fleet could hardly be considered seagoing.

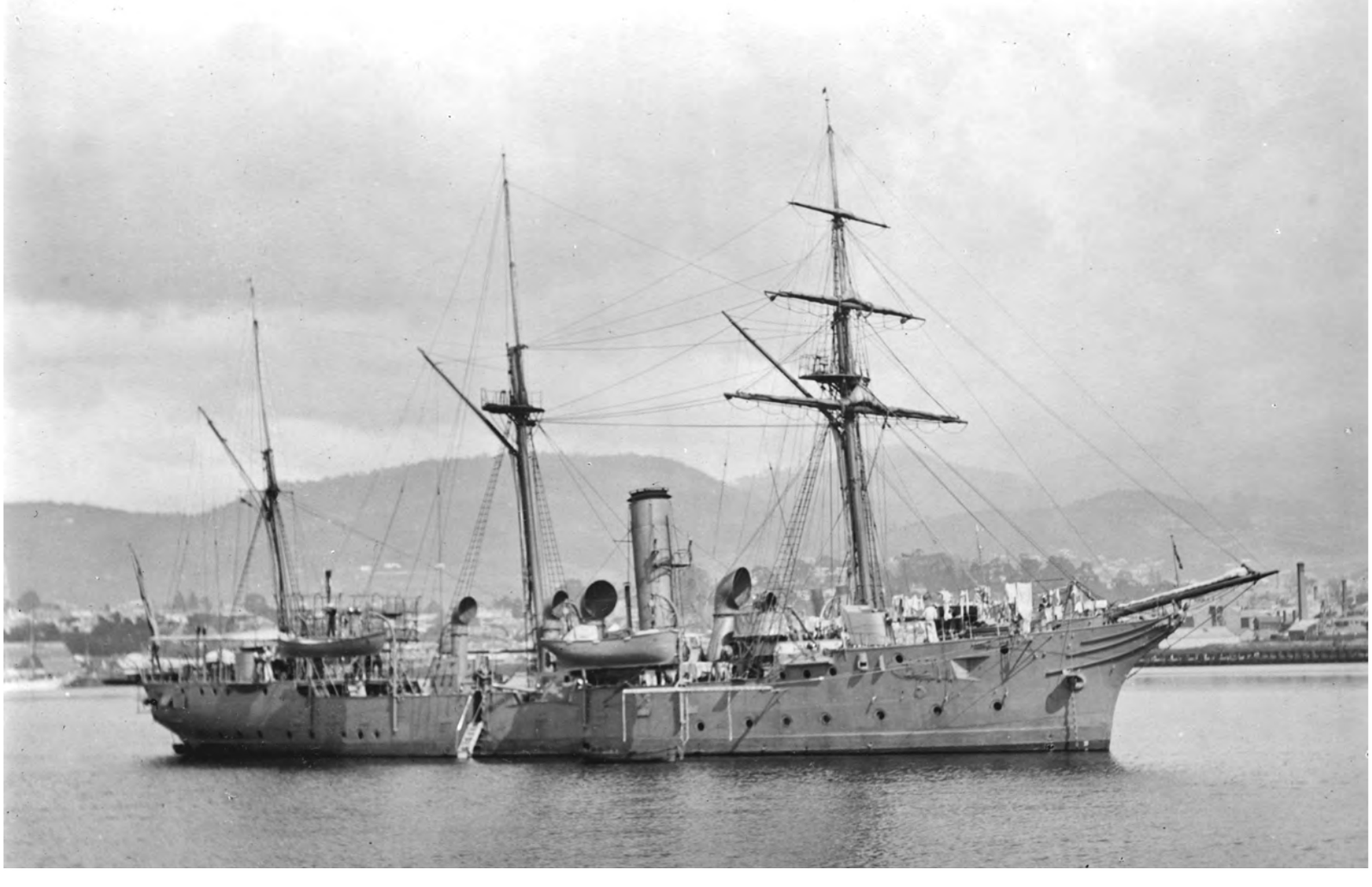
A temporary base would have been created so that an anchored fleet and its service vessels (including colliers and transports) could shelter from Russian torpedo attacks. The fleet tested a combination of booms and mines (both contact and controlled). Admiral Phipps Hornby wrote that 'a boom to [rams] is as a bit of pack-thread' – *Polyphemus* smashed the boom at Berehaven. It would take mines to deal with rams.

Existing torpedo boats (Nos *21* and *22*) were unable to attack *Mercury* when the latter was steaming in open water at 16kts. *Mercury* was deemed to have sunk one of the torpedo boats by the fire of her stern and machine guns.

In a second phase of the exercise, the fleet split into attacking and defending squadrons. The attackers had six ironclads plus the torpedo ram *Polyphemus*. Their six lookouts were the fast cruiser *Mercury*, the sloop *Racer*, the seagoing gunboat *Express*, the coastal gunboats (each with a heavy gun) *Medina* and *Snap*, and the tug *Seahorse*. One object was to see whether small handy ships like the gunboats and the tug could defend a fleet against night torpedo attack. The gunboats proved slow, particularly in a seaway (Admiral Phipps Hornby: 'during the forenoon we had striking evidence of what a clog on the speed of the squadron the heavy-gun gunboats become, invaluable as they are in narrow waters and for many purposes'). For the long passage the gunboats had to be towed by the armoured ships, badly reducing their speed. Finally the fleet included the torpedo depot ship *Hecla* with four first-class torpedo boats. The defenders (seven ironclads) had four lookouts: the fast converted liner *Oregon* (taken up from trade due to the war emergency), the corvette *Conquest*, and the sloops *Mariner* and *Cormorant*. It included two gunboats (*Medway* and *Pike*) and four first-class torpedo boats.

Other exercises had the attacking fleet running at night to elude surveillance by the fast armed merchant cruiser *Oregon*. Phipps Hornby noted: 'the only thought in everyone's mind was "Where is she?" If she caught sight of us our chance was gone, as we had nothing fast enough to prevent her from dogging our steps and acquainting her admiral what place we were steering for.' However, the exercise proved that no one

HMS *Mutine* was one of the last sloops built for the Royal Navy. She built under contract by Laird, launched on 1 March 1900. She was one of six *Condor* class, which were followed by six *Cadmus* class. These ships survived to fight during the First World War. Armament was six 4in QF: two on the forecastle, two in the waist, two on the poop. Twenty years before, her steaming performance would have matched that of a *Comus* class cruiser – 13.5kts (1400 IHP) – but by 1900 cruisers were making 20kts or more. Thus *Mutine* and her like were considered specialist maritime police ships. She was steel-hulled and entirely unprotected.



could prevent a squadron of ironclads from getting to sea in thick weather, even when nights were short. The enemy fleet's object was to get 30 to 35nm offshore before daylight, for which 8kts sufficed. The line of eight ironclads was only 8 cables long (one cable was a tenth of a nautical mile) and the width 2 cables, 'a small space to find in thick weather'. It was pointless to maintain a blockading squadron of ironclads at sea off a port, burning down their coal supply. They would be better off sheltering in a nearby port with bunkers full, waiting for a scout's report.

A few cruisers offshore were not enough. Ideally there should be a line of torpedo vessels (i.e., torpedo cruisers) between port and blockading fleet, at the least to warn the fleet that the enemy was sending torpedo boats against it. The line of patrols should be as far as possible from the fleet. Although sloops like *Mariner* and *Racer* were both handy and well-armed, they were not fast enough. *Mercury* was fast but too large and expensive to risk against a torpedo boat. She would have to move so far from the port mouth at night to avoid attack by a torpedo boat so as to make her a useless picket.

Phipps Hornby concluded that he wanted (i) fast vessels, (ii) seagoing torpedo boats in numbers, and (iii) the means to shelter the fast torpedo boats while coaling, so that they could accompany the fleet overseas. To some extent the first two requirements were combined in torpedo cruisers and also in faster cruisers.

Captain J A Fisher, the future First Sea Lord, accompanied the fleet as Captain of HMS *Excellent*, the gunnery school (and ordnance experimental establishment). He supplied both the detailed narrative in the official report and detailed conclusions. Ironclad squadrons (six ships) should be accompanied by at least four fast unarmoured ships (cruisers) with moderate heavy gun power but with numerous quick-firing guns (to deal with torpedo craft). They would serve both as lookouts and as supports for the torpedo boat destroyers (torpedo boats armed mainly with guns, the first time this term was used) working with the ironclads. 'It is obvious that they cannot perform these duties efficiently or avoid certain destruction by the modern fast ironclads unless their speed is also great and approximate to that of the first-class torpedo boats.'

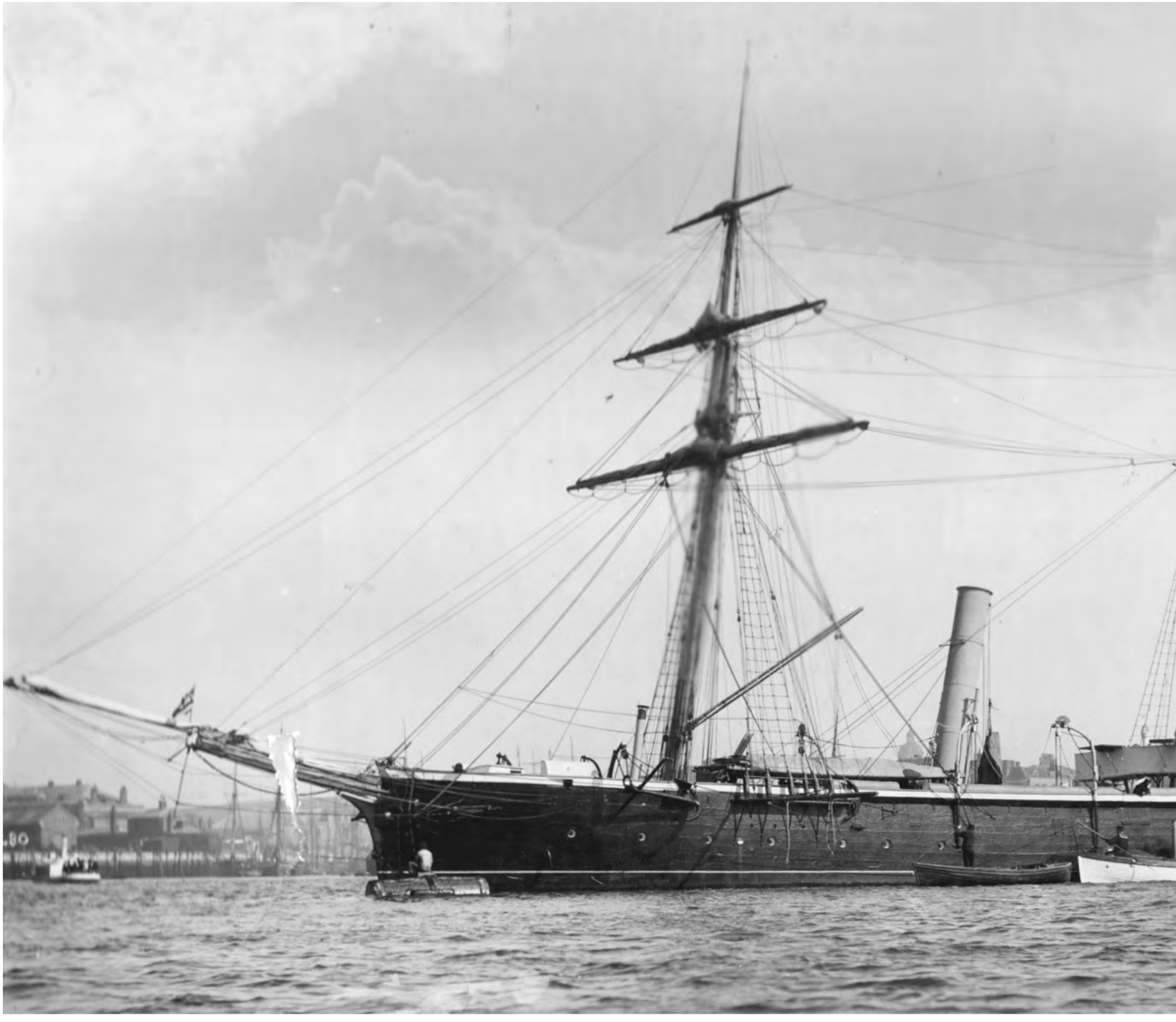
Each ironclad squadron should also be accompanied by at least two seagoing torpedo boats plus a fast torpedo depot ship with commanding speed (such as the *Oregon*) carrying second-class torpedo boats, and also stores (mines and booms) to defend a temporary fleet anchorage. The torpedo boats should have an alternative gun armament to beat off torpedo boat attacks (Fisher used the phrase 'torpedo boat destroyer' for this role). Half the boats, equipped for defence, should be placed ahead of the squadron on going into action, the others (attackers) steaming astern of their ironclads, 'ready to act in the smoke and confusion when the opposing ironclads pass each other'.

Fisher foreshadowed much of the cruiser development which followed soon after. His fast cruisers were the *Medea*s and their successors. His seagoing torpedo boats were the torpedo cruisers and then the torpedo gunboats. Fisher specifically rejected building a special-purpose torpedo depot ship, but his idea for her was embodied in the depot ship/cruiser *Vulcan*.

There were no 1886 manoeuvres, but in 1887 they followed the Queen's Jubilee Review off Spithead.[17] The fleet was organized into three cruising squadrons (A, B, and C) and four coast defence flotillas. Squadron A was ten ironclads (including *Imperieuse*) and four cruisers (including *Curlew*); B was another ten ironclads and four cruisers, and C was six cruisers (including the slow *Calypso*). The coast defence units included both ironclads and first-class torpedo boats plus, in some cases, gunboats. The general idea was that British squadrons had lost touch with an enemy fleet which had put to sea to do maximum damage to English ports in the Channel and in the Thames and Medway while avoiding any engagement. The enemy was represented by the second divisions of A and B squadrons: five ironclads, *Archer* and *Curlew* (A) and five ironclads and the cruisers *Amphion* and *Mohawk* . The first division of A defended against the second division of A, the first division of B against the second division of B. C squadron was to try to pass through the North Channel without being discovered or, if so, attacked by the coast defence units. A second exercise had two cruisers entering the Irish Channel to attack commerce in the face of four British cruisers and the coast defence units. The defending element of B squadron spotted the attackers by their smoke and managed to use its cruisers to hold contact with them for 21 hours, so that it could bring the attackers to action. The A squadron defenders had no such luck (its enemy succeeded in attacking Falmouth, but failed to attack the Thames, where it would have been trapped). Torpedo boats proved effective in attacking the C cruisers during their first operation.[18]

The trade protection exercise must have been sobering. *Calypso* was soon captured by the faster cruiser *Rover*, but *Volage* was never captured (she narrowly avoided HMS *Inconstant*). She claimed 16 vessels off Liverpool, 5 off the entrance to the Clyde, and 36 in Kingstown harbour. Of the 57 in total, there were 14 steamers (but only 6 of any importance), 14 coasters, and 21 yachts. Most of the ships captured at Liverpool were lying off the bar waiting for the tide (capture required that the cruiser remain within a mile of the prize for half an hour, then stop for an hour, the latter representing the time to board a vessel, examine her papers, and put a prize crew aboard or sink the vessel). Umpires pointed out that *Volage* claimed 14 ships at the same time, which was unrealistic. Even simply sinking the ships would have taken longer. The umpires also doubted that *Volage* could have operated freely in the face of the coast defence flotillas envisaged in the other phases of the exercise. She had to get too close to them, and to fixed defences, to find her prey. Cruisers generally proved considerably slower than expected. Against trial (measured mile) speeds of 15.1kts and 16.2kts for *Volage* and *Inconstant*, actual speeds (when the ships were doing their best) were 12 and 11.8kts. However, *Rover* and *Calypso* attained 14¼kts and 13¼kts, respectively, which were much closer to trial speeds.

A, B, and C squadrons were attacked by torpedo boats. Anchored at Spithead, A squadron relied on nets, guns, and rifle fire, plus outlying small craft and torpedo boats. An attack by twenty-two torpedo boats led by the torpedo gunboat *Rattlesnake* failed. B and C were anchored at Portland, with a boom, wire hawsers, and mines laid across the mouth of the anchorage, plus fixed searchlight beams and small craft. Most of the torpedo boats managed to cut through the boom.



HMS *Avon* was a *Beacon* class composite gun-vessel, the category below a sloop. These ships and the larger *Plover*s were conceived as replacements for decayed Crimean War gunboats, particularly for action in China. About thirty of these earlier ships were sent to China to fight in the wars of the 1850s and 1860s. They proved useful, although the ten which attacked the Peiho forts were beaten off with the loss of three of their number. Because the Crimean War gunboats were built of unseasoned timber, they had to be discarded within about a decade. Thus by 1863 work on a replacement was urgent; the *Plover*s were the first new cruising vessels laid down after the mass cancellations of large screw frigates. The engines were still good, and they featured in the *Avon* class replacement ships (four ships did get new engines). The main lesson of the Chinese operations was that the 32pdr armament of the Crimean War gunboats was inadequate. On the one hand something heavier was needed to deal with forts; on the other something firing faster was needed to deal with armed junks and with pirates. Draught had to be limited, so Robinson and Reed selected twin rather than single screws. The *Plover*s were of conventional wooden type, but for the smaller follow-on *Avon*s Reed combined an iron frame with wooden planking – the first British composite hull. The hull was flat-bottomed and square-bilged for about three-quarters of her length; Admiral Ballard described her as almost on the lines of an elongated packing case. The result was a steady gun platform and a buoyant sea boat, and the flat bottom made it easier to deal with frequent grounding. On the other hand, the ships steered erratically in a following sea, and they could not avoid drifting sideways in a strong cross-wind. As the first ships below battleship size with iron frames, they were also the first such ships with watertight bulkheads. Planned armament was two 68pdr smooth-bore muzzle-loaders and two 20pdr breech-loaders at the ends, but ships had one 7in 6½-ton (between funnel and mainmast) and one 64pdr (between funnel and foremast: both muzzle-loading rifles) instead of the two 64pdrs (they retained the 20pdrs). The two different calibres of heavy guns were adopted because two 64pdrs would have been inadequate and

two 6½-ton guns too heavy to carry; later the Admiralty planned to replace both with the new 7in 4½-ton (90cwt) gun, but that was done only for *Rocket*, *Lynx*, *Hornet*, *Flirt*, and *Rifleman*. *Avon*, *Elk*, and *Frolic* each had their 7in gun replaced by the lighter type. Although the ships were designed for river service, they first had to get to China (or other rivers: ships also served in West Africa and in South America) on their own bottoms, which meant sailing.

These ships displaced 603 tons (they had been designed for 584); dimensions were 155ft x 25ft x 11ft. Eighteen were built under the 1867-68 program, and another four under the 1871-72 program. *Avon* was launched at Portsmouth on 2 October 1867, and discarded in 1890. She served in China, in West Africa, and in South America.

However, they were considered put out of action either by the patrolling craft or by the guns of the outer line of ships. It seemed that the problems of torpedo defence raised by the 1885 manoeuvres had been solved.

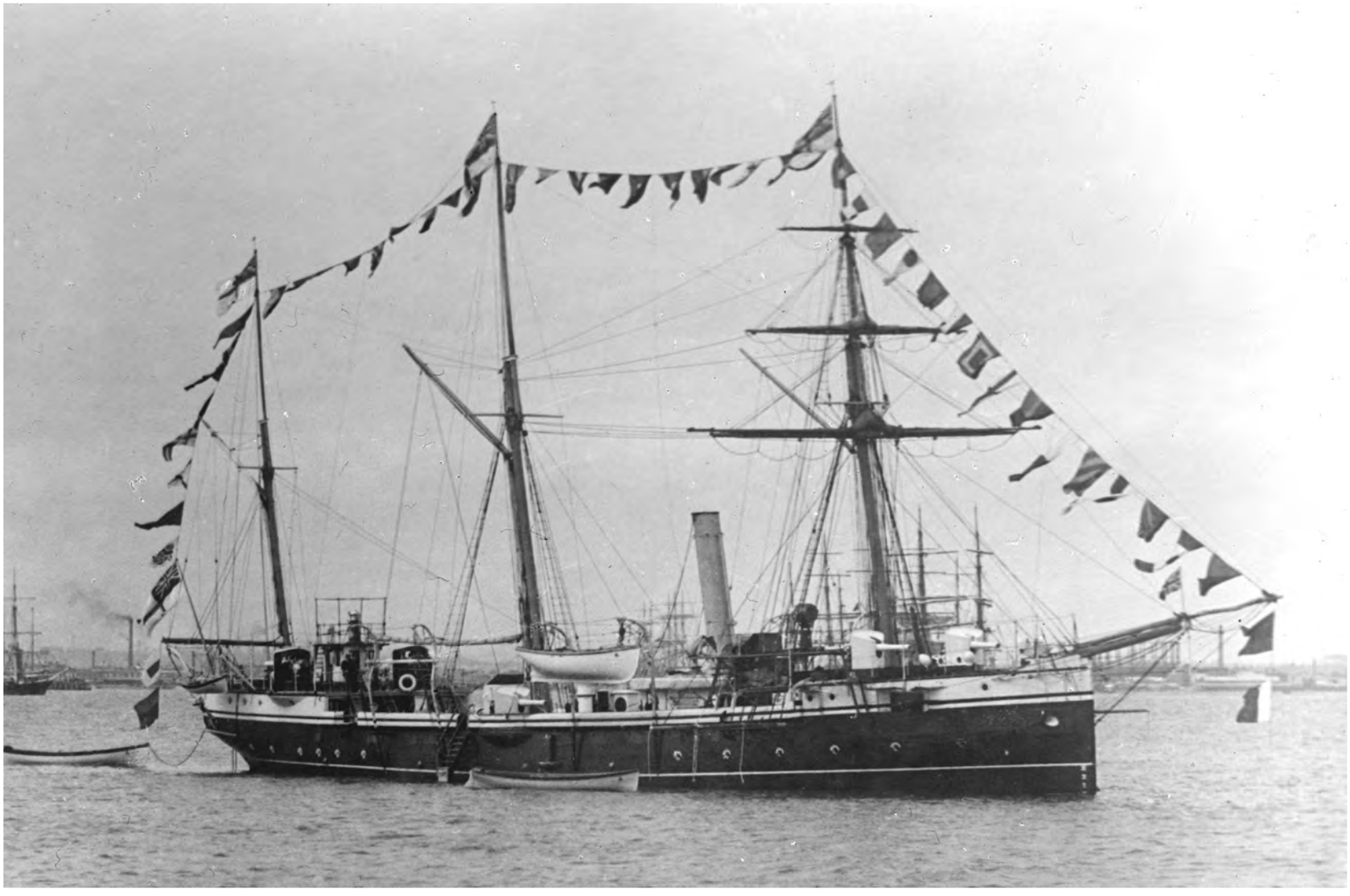
The first conclusion was that a squadron needed more than two scouts, to search a wider area, to allow for breakdowns, and to allow for ships absent while coaling. Ships needed better-trained and more numerous signal staff, with more practice in distant signalling by day and night. Local defensive squadrons would greatly assist in the protection not only of British ports but also of trade, which would inevitably concentrate off the ports. Rapid coaling was essential, and the battleships of a squadron should all have the same speed. Above all, manoeuvres should be conducted on an annual basis.

The 1888 manoeuvres were staged while the Naval Defence Act of 1889 was being framed. They were far more sophisticated than those of 1887. At the sudden outbreak of war, two enemy squadrons (fleet B) in ports some distance apart were preparing for action.[19] The British (fleet A) established blockades of both bases, and the blockaded forces tried to emerge. Each fleet consisted of battleships, fast cruisers, and torpedo boats. The fleet A was numerically stronger than the enemy (B). A1 was based at Pembroke, A2 at Lamlash Bay; B1 was based at Berehaven and B2 at Lough Swilly. England and Scotland were friendly to A, Ireland to B. The object of the B fleet was (1) to attack commerce off the coast of Ireland, in the Irish and entrance to the Bristol Channels and in the English Channel, (2) to attack ports on the west and south coast of England, other than those counted as heavily fortified, and (3) to land troops on any unfortified position.

A1 consisted of seven ironclads and seven cruisers (including the torpedo cruiser *Rattlesnake*). A2 consisted of another five older ironclads, six cruisers (including the torpedo cruisers *Tartar* and *Mohawk* and the torpedo gunboat *Grasshopper*) and twelve first-class torpedo boats. In cruising order the A1 cruisers were dispersed ahead and astern of the two columns of ironclads. Those ahead were to stay 'within signal distance'; the two ships astern were to stay within two miles. A collier trailed the ironclads. When A1 and A2 steamed together, a column of six cruisers steamed alongside the main body, other cruisers being dispersed before and abaft the main body. Against A1, B1 had six ironclads (including the armoured cruiser *Warspite*) and five cruisers (including the torpedo cruiser *Cossack* and the gunboat *Sandfly*). B2 was four ironclads and five cruisers (including the torpedo gunboat *Spider*).

The blockading force off Berehaven consisted of an inner line of lookouts (six torpedo boats and a torpedo gunboat), an inner cruiser squadron, and an outer squadron of ironclads, plus one cruiser and one torpedo boat at each of two telegraphic centres, to which Admiralty intelligence would be sent.[20] If the enemy broke out without being followed, the two A fleet squadrons would rendezvous.

Once the enemy had broken out, in effect A adopted a focal area strategy. A division was assigned to watch Liverpool for two days, after which it would leave a force (two ironclads, a cruiser, and a torpedo boat) to guard that port, falling on Milford Haven in the face of a superior enemy force. The rest of this division was to guard the western part of the English Channel. Cruisers were detached to protect merchant shipping



HMS *Ringdove* was a *Redbreast* class screw gunboat armed with six 4in guns. She displaced 805 tons (165ft pp x 31ft x 11ft) and could make 13kts (1200 IHP). She was launched on 30 April 1889, and was discarded in 1906 as part of Admiral Fisher's program of scrapping ships which could 'neither fight nor run away'.
(Allan C Green, courtesy of State Library of Victoria)

between the North Foreland and Land's End.

Objects were to determine (1) the most efficient distribution of a blockading squadron both day and night; (2) the best means of maintaining communication between scouts and the main body of a fleet; (3) the relative advantages and disadvantages of keeping the main body of a fleet off a blockaded port using an inshore squadron, or of keeping it at a nearby base, maintaining a cruiser and torpedo boat force off the blockaded port, 'with means of rapid communication with the Fleet' (radio did not yet exist); (4) the best means of keeping a blockading fleet supplied with coal; (5) the best means of using torpedo boats, both with and against a blockading fleet; (6) the best means of keeping track of hostile cruisers attempting to attack trade; (7) the best kind of identification signals for a fortified port and minefield; and (8) how to deal with the special dangers to which a blockading squadron would be exposed. These were not too different from the problems laid out in the 1885 manoeuvres.

A Squadron reported that the exercise rules much favoured the blockaded fleet: it was impossible 'to put a torpedo boat out of action except through the stupidity of the officer in charge of her ... and cruisers could with impunity brave the fire of the blockading force'. Fleet A considered its best blockade disposition to be with seagoing torpedo vessels innermost, then fast cruisers, and only then ironclads, the ironclads having cruisers on their flanks. The ships should be end-on to the shore, never exposing their broadsides, with their heads offshore if possible so that they could chase any emerging enemy force. This position would also make ramming much more difficult. To guard against ramming, ships should keep up full steam – which would run down their coal. Ships standing offshore should be able to protect themselves against torpedo attack using nets, but 'in the whole fleet there is not an efficient net defence that could, if down at sea, be raised quickly clear of gun fire; and very few nets that would be safe down, if steaming 4 or 5kts'.

Two torpedo boats and one catcher (torpedo gunboat) should be attached to each ironclad. The blockading fleet should have 50 per cent more ironclads than its enemy, and twice as many cruisers (and those of the highest possible speed). The inner blockade force should include a proportion of torpedo boats and catchers kept with the fleet to carry despatches, to scout, and for other purposes. Torpedo boats should work in pairs, if possible supported by catchers.

Given the fragility of torpedo boats, a refuge should be set up for them on the nearby coast. Torpedo catchers (torpedo

gunboats) were far more serviceable than torpedo boats, and could work in much worse weather. They were not nearly as exhausting for crews. Commanding B Squadron, Admiral Tryon considered catchers 'of very great value. I have a very high opinion of them.'

Cruisers and certain ironclads should be assigned nightly to chase and run down any enemy ships that might escape, special care being taken to assign enough to make capture certain. The chasing ships should be accompanied by catchers, which could report back to the admiral commanding the blockading squadron.

Any enemy ship seen escaping should be followed by torpedo catchers (torpedo gunboats or torpedo cruisers), which would shine their searchlights on them while signalling the fleet, not giving up the chase until relieved by ships of the outer line. If enemy ships escaped in fog, a captive balloon would be a great help, determining which ships were still in harbour . It should be flown by a ship far enough offshore to be safe from enemy fire. In moderate weather, ships should be visible, particularly from aloft, three or four miles away.

A telegraph ship should be attached to the blockading squadron, and a cable laid from the home base to it.

It seemed most efficient to keep in touch with scouts via fast cruisers ('in which we are at present sadly deficient'). Unless there was a nearby anchorage, the ironclads had to be kept constantly under way. To keep them fuelled, the fleet should include 10kt colliers, which would coal ships at their temporary base. Ships should fuel at every opportunity. Seagoing torpedo vessels were vital to the blockading fleet, as they could prevent the enemy from launching harassing torpedo attacks designed to break up the blockade. The enemy would be forced to seek a general action, in which case the torpedo vessels would fall back on the main body of ironclads.

There was no real hope that the blockaders could rest in a nearby port while the enemy was watched by cruisers and torpedo vessels. Enemy ironclads could drive them off and then get away in fog.

The chief dangers facing a blockading fleet were (1) running out of coal, (2) torpedo attacks, and (3) surprise by a second fleet working with the blockaded fleet. Squadron A was weakened daily by ships detached to coal, sometimes in a bay 60 miles away. It had a cruiser at Lamlash waiting for telegrams, a torpedo boat away for repairs, and a ship watering torpedo boats in a sheltered area. This was quite aside from accidents. In good weather the blockading fleet could coal at sea, a ship taking on 20 to 30 tons an hour from a collier. Special fleet colliers might be built.

Ships were not fast enough, and the official fleet handbook (*Steamships of England*) overstated what they could do. The chief defects in the fleet were in boilers, generally due to using forced draught 'which in my [commander of A Squadron] opinion, is the ruin of them. Forced draught is not supposed to be used unless in emergency, but having the power, emergency is certain to arise some time or other. This, and a very inferior class of Stokers, as well as Engineer Officers being strange to machinery, which they have had to work at high speeds without much experience in many of the ships, were the causes of failure in boilers and engines.'

Of the cruisers, only *Mercury* maintained anything like her reputed speed. *Mersey* was reduced to 12kts after running 300nm at 17kts. *Thames* never attained more than 15kts, and stopped continually to deal with defects in steam pipes. *Arethusa* was good for 15kts. The *Archer* class torpedo cruisers were all reduced to 11 to 13kts. These ships were too heavily armed; the weights of their heavy guns fore and aft made them pitch excessively. In many cases (not just in cruisers) coal was very inferior and smoky. Tryon (B Squadron) commented that 'ships are now apt to be too complicated and unnecessarily so. Everything should be as simple as possible. There is often a want of good means of communicating with the engine-room ... Electrical fittings and arrangements have been largely used in substitution of mechanical fittings and appliances, and they failed far too often.' Tryon also complained that ships were too beamy, as a result of which they could steam well in a calm but not in even a moderate sea. He particularly cited the armoured cruiser *Warspite*, which he wrote had been criticized in comparison with foreign ships five years earlier.

In September 1888 the Admiralty appointed a special committee to draw lessons from the manoeuvres, presumably ultimately for Cabinet and parliamentary consumption.[21] The report was submitted on 21 November. The first key conclusion was that steam and torpedoes had made blockade so dangerous that a blockading fleet had to be in the proportion of 5 to 3 to the fleet being blockaded, to allow for casualties which the fleet in harbour would not be risking. An even larger margin would be needed if the area covered by the blockaders were extensive, since in that case the entire blockading fleet might not be concentrated in one place. If the blockading fleet could lie in a nearby port, the proportion might be reduced to 4 to 3. The proportion of cruisers should be at least 2 to 1 in favour of the blockaders, so that any enemy cruisers trying to break out could be run down without weakening the force off the port; at the least, there should be a cruiser to each battleship. Torpedo gunboats would be of 'incalculable value' to the blockading fleet, but first-class torpedo boats would be useful mainly to those being blockaded. They would be worthwhile if they could be carried on board a special ship (superior to *Hecla*; for some reason there was no mention of *Vulcan*, then being built). On occasion the second-class torpedo boats aboard battleships would be useful (but the committee much preferred the new picket boats, which could be armed with torpedoes, as they were better seaboats).

It seemed to the Committee that the A and B squadrons fairly represented the full British and French forces in home waters. These two squadrons together were the entire British naval force available for general purposes in wartime – to reinforce the Mediterranean and distant squadrons, to maintain superiority in the Channel, and to maintain a considerable light squadron off the Irish coast. The manoeuvres implied that the Channel Fleet had to be powerful enough to blockade the French Atlantic ports, leaving a sufficient reserve to hold the Channel and protect the coasts and commerce of the United Kingdom, with sufficient battleships and cruisers to reinforce squadrons abroad and to form detached squadrons.

As of July 1888, the British had in home waters (in commission or in reserve) 22 battleships and 23 cruisers and gunboats. In the Mediterranean were 8 ironclads (including the torpedo ram *Polyphemus*), 4 cruisers, 3 sloops, 4 gunboats, and

a despatch vessel. Including ships in reserve but ready for commissioning in Toulon, the French Mediterranean fleet consisted of 15 ironclads, 2 armoured gunboats, 5 first- and second-class cruisers, 11 third-class cruisers and gunboats, 4 torpedo cruisers and avisos, and 7 seagoing torpedo boats.

Had war broken out, to give the Mediterranean Fleet equal forces, 9 ironclads and 13 cruisers would have had to go there, leaving 13 battleships (including 3 coast defence ships) and 10 cruisers in the Channel and reserve squadrons. They would be watching a French fleet in Cherbourg of 5 seagoing ironclads, 6 coast defence ironclads (including 2 gunboats), 6 cruisers, 8 avisos (including 4 torpedo avisos), and 4 seagoing torpedo boats. In addition, the French had ships at Brest (2 ironclads, 4 first- and second-class cruisers, 1 third-class cruiser), Lorient (7 cruisers, 6 of them third-class), and Rochefort (5 third-class cruisers and avisos).

The total British force was 'manifestly altogether inadequate' against France alone; 'and should the fleets of one other Power – say of that Great Power [Russia] whose Imperial interests may be said to clash most with those of the British Empire – have been joined to those of France against Great Britain at that time, the balance of maritime strength would have been most decidedly against her'. As an emergency measure, the old but still serviceable ironclads should be brought into condition to be activated in an emergency. The system, in force since 1870, of recommissioning ships abroad over and over again 'has, in great measure, brought about a dearth of reserves'.

None of the analysis took into account ships under construction, and the Committee thought the situation would be better in 1890-91; but no ironclads had been laid down since 1886 (i.e., since the Northbrook Program) and 'as there is nothing, in our opinion, to justify the belief that the days of ironclad battleships are over', further new construction was urgent. Since England could not control the question of peace and war, at any time a maritime power might challenge her; so 'we are decidedly of opinion that no time should be lost in placing the Navy of England beyond comparison with any two powers'.

'Putting Russia beside the question, there can be little doubt but that, were England involved in a war with France, and she were to resume her natural rights as a belligerent [i.e., rights of blockade and of seizing neutral ships with enemy cargoes on board], which appear to have been voluntarily laid aside by the Declaration of Paris, troubles with the United States would inevitably ensue, and her whole commercial position, and the immense carrying trade by which it is sustained, would be jeopardized at the outset were war to be forced upon her at a time when her Navy was weak.'

France had both military and naval power, but the British position depended entirely on naval supremacy, 'which has never seriously been challenged since the close of the last Great War [i.e., against Napoleon]. The defeat of her Navy means to her the loss of India and her Colonies and of her place among the nations.'

To the Committee, the arrangements made by A squadron to protect commerce, and those by B squadron to attack it, were much those that would be made in wartime by the admiral commanding the sole British Channel squadron and an enemy force. The B admiral at Berehaven judged that he was justified in breaking out both to attack trade and to attack major coastal cities, causing panic and inflicting great damage. He did so by attracting attention to his main body coming out of harbour while three of his cruisers escaped unobserved. He took a considerable risk, and almost lost two of his ironclads to torpedo attack, but the cruisers got out. B squadron cruisers also managed to break out of Lough Swilly unobserved; they also raided shipping and coastal towns. The British admiral blockading these fleets had decided that if as many as three ships broke out, he was unjustified in continuing the blockade and leaving the approaches to London, the heart of the Empire, uncovered. He also detached ships to cover Liverpool. That freed up the enemy forces, which merged and seized Liverpool. It seemed clear that the British fleet had not had enough cruisers to watch the enemy force, and thus to bring them to battle (as nearly happened off Liverpool, the British force having recently left). The British defending force had never had enough ships.

The blockaded force had an important advantage: continuous access to telegraph lines and thus to current intelligence, so long as it remained in port. Off Bantry the blockading admiral was 200 miles from the nearest telegraphic centre (and for purposes of the manoeuvres he was cut off from the natural source of intelligence, the Admiralty).

Overall, there could be no doubt that any maritime enemy 'would adopt every possible means of weakening her enemy; and we know of no means more efficacious for making an enemy feel the pinch of war than thus destroying his property, and touching his pocket'. The British admiral trying to protect British commerce was badly hampered by the lack of intelligence (under manoeuvre rules) and also by the absence, under his command, of coast defence ships which would otherwise have prevented single enemy cruisers from getting close to defended cities near which shipping would concentrate (i.e., he could not mount a focal area defence). The B fleet won. By definition, B had no floating commerce worth attacking, and the British could not spare any force to attack its capital and its coastal towns.

No cruisers could be spared to protect British commerce. Had Britain been fighting France, all such ships in commission would have been required by the Channel Fleet, watching the French naval ports, preventing their escape, and helping bring them to action if they broke out. Assuming that the enemy did not arm privateers, British commerce would have been relatively safe near British shores. It would be necessary to arrange convoys for the slower steamers (12kts or less); sailing ships would presumably be laid up. The Committee suggested further that groups of merchant steamers with strong bows, steaming together, might give a good account of themselves against unarmoured enemy cruisers, using their bows as a weapon. Without enough unarmoured cruisers to form detached squadrons off the entrances to St George's and the English Channels, and on the fishery grounds, merchant ships would have to be taken up from trade for that purpose.

The Royal Navy needed many more fast cruisers, in addition to the battleships the Committee obviously wanted. This mass of cruisers appeared in the Naval Defence Act of 1889, which might be seen as the outcome of the 1888 manoeuvres (and other efforts). A supplementary report examined the behaviour of various classes of ships; its remarks are given in the discussions of the *Leander*, *Mersey*, and *Archer* classes in later chapters.

The 1889 manoeuvres tested the extent to which a British fleet could mask an enemy fleet from strategic bases, its scouts keeping watch on the enemy's fleet in its own bases. This was very different from the close blockade envisaged earlier. It demanded much more numerous scouting forces plus ships linking the scouts to the main British fleet (there was no radio). In the first phase of the manoeuvres an enemy force trying to pass up the Channel was intercepted. In the second phase the enemy force evaded contact, passing around the north of Scotland into the North Sea, and bombarding East Coast towns before being defeated by a superior British fleet. [22]

The 1890 manoeuvres placed an enemy fleet on an important trade route.[23] The British fleet sought to engage it (the enemy fleet tried to avoid engagement). A secondary object was to find the best way to employ the considerable body of scouting cruisers on both sides. Each side could put cruisers to sea before the outbreak of war in order to watch the other fleet. At the outbreak of war the main British fleet was at Plymouth, a reserve British fleet was at Portland; it was allowed to move from one port to another as necessary. The enemy fleet was at Berehaven in Ireland (later it also used a base at Shannon). Upon declaration of war, the enemy fleet would enter the Channel from the West, the British fleet seeking to engage it. One artificial restriction was that cruisers, which in previous exercises had attacked trade directly, were limited to scouting and despatch (i.e., linking) services. The hostile fleet established a torpedo boat base (boats plus the cruiser [sloop] *Curlew*, other cruisers later joining) at Alderney in the Channel Islands to operate against any British fleet trying to use the Channel. The design of the exercise was somewhat complicated by the need not to interfere with actual shipping in the Channel.

The main British fleet was commanded by Vice Admiral Sir George Tryon, at that time the leading British tactician. He had nine battleships and thirteen cruisers and lesser craft, including the old unarmoured cruiser *Inconstant*, the armoured cruiser *Shannon*, and several torpedo gunboats. A second British fleet was created from the mobilized Reserve Squadron and based at Portland as a kind of coast defence force: six battleships and coast defence ships, the torpedo depot ship *Hecla*, and only three cruisers (the old cruiser *Active* and two torpedo gunboats). The Portland force also included twelve torpedo boats. The enemy had eight battleships, twelve cruisers, and twelve torpedo boats. The enemy fleet managed to get to sea unobserved. In the past, enemy fleets had generally been intercepted by British fleets lying off their bases, waiting for them to emerge. Once an enemy fleet lost itself in the trackless sea, the only hope of catching it was to guess its destination (or to gain intelligence of that destination). In 1798 Nelson found the French at Aboukir only by learning of their movements from ships in the Mediterranean, and it was crucial that they stayed at Aboukir long enough for him to get there. By 1890 the Admiralty was assembling operational intelligence, which could be distributed by telegraph to special signal stations around the British coast. Without radio, which did not yet exist, an admiral afloat had to rely on linking ships (or on ships steaming out from the coast) to provide him with that sort of information – i.e., on fast cruisers.

Tryon did have an important advantage. Like Milne, he knew that the only profitable place for an enemy to attack trade was in a focal area, so he concentrated his cruisers there. He also arranged to be in almost constant communication with the English coast, hence with the Admiralty intelligence centre. His first move was to send three powerful cruiser divisions to await the enemy fleet in the focal area. He soon sent a battle force out to back up the cruisers. Tryon's dispositions blocked a possible enemy run up the Channel. Tryon was thus the first to test the ability of modern materiel to combine an adequate defence of a vital spot of trade, to maintain regular and frequent communication with a base, and to keep the Channel clear of an enemy.

Tryon failed; he never brought the enemy fleet to battle. The two fleets were never closer than 300nm, and at the end of the manoeuvres they were 1700 nm apart. The umpires praised Tryon's use of his cruisers; the hostile fleet clearly did not consider cruiser scouting a primary object. The cruiser force Tryon wielded was not strong enough. An enemy who managed to get out of his port unobserved could still get away altogether. To the extent that there was a solution, it had to be more and faster cruisers, not least to link deployed scouts with the main body of a fleet.

The 1892 manoeuvres had a Red fleet in two separated divisions, trying to join up in the face of enemy (Blue) torpedo attacks – of the sort the French could and would mount from their side of the Channel against a British fleet whose bases were still dispersed (the Irish Channel played the part of the English Channel). The torpedo boats were backed by coast defence ships and cruisers. Opposite the Blue torpedo base was a Red base with torpedo boats, catchers (torpedo gunboats), and coast defence ships. This Red force tried to cover the juncture of the two Red divisions by attacking the Blue base and force.

Again, each fleet and each division included a large cruiser force. The Red first division consisted of eight battleships, two armoured cruisers, seven second-class cruisers, and two torpedo gunboats. Red's second division was seven more battleships, one armoured cruiser, six second-class cruisers, and two torpedo gunboats. The Red covering squadron consisted of four coast defence ships backed by a second-class cruiser, eight torpedo gunboats, and six torpedo boats. Blue had three coast defence ships, the three oldest armoured cruisers, six second-class cruisers, three torpedo gunboats, the depot ship *Hecla*, and twenty-one torpedo boats. Cruiser operations began even before hostilities, each side's cruisers watching the other's fleet in harbour. As long as the observers remained outside the three-mile limit, they could not be driven off before hostilities began. The umpires pointed out that not much could or would be seen, either, unless the observed party sent out ships to challenge the observers. Moreover, the observers always ran the risk that the observed party, having declared war, could jump them. It surprised the Blue commander that the Red Covering Force, which was not far from his own, made no pre-emptive attack using its own torpedo boats, but instead retired from the Irish Channel. Blue never engaged it at all; it might as well not have been present. The day of coast defence/coast attack ships was over: they could not live in the presence of torpedo boats.

Like the French fleet, Blue enjoyed a considerable superiority in torpedo boats. That had surprisingly little impact on Blue's behaviour, because the superiority counted for so little among Blue officers. The official report sympathized that there

was no record of battle experience on which to base confidence or its lack, but he considered it important that Blue showed 'a tendency to consider the torpedo boat as something not to be included in the ordinary naval strength of a country ...' The Red divisional commanders certainly were impressed, the torpedo boat threat delaying their junction by about 43 hours (had it not been thought necessary to have a long period of daylight after the junction [to stave off a night torpedo attack], the delay would have been 37 hours). The delay could be attributed to caution considered necessary when entering waters in which hostile torpedo boats might be operating. Red was clearly impressed with the torpedo boat threat, which was probably exactly what the French hoped. The umpires thought this an important illustration of likely wartime behaviour.

Blue could have chosen either to concentrate its force (as it did) or to distribute its torpedo craft along the coast to harass Red. It concentrated and was destroyed. The exercise report suggested that the special characteristics of torpedo boats made dispersal the wiser course. It also seemed that Blue had been foolish to use its torpedo boats to search for the enemy; they should have been kept in hand for a surprise attack as the enemy approached. Torpedo boats were most successful, it seemed, when they were sent to attack an enemy whose location had already been found – most likely by a cruiser working with the torpedo boats. British and foreign exercises tabulated over five years showed that when the position of the objective was not known at all, the boats succeeded three times; when it was approximately known, six times; and when it was exactly known, sixteen times.

'The number of cruisers to be attached to a Fleet is fixed according to the service on which the Fleet is employed rather than the number of battleships which it contains.' A memo on cruiser organization (for the second division of the Red Fleet) distinguished lookout cruisers (which should be paired) from scouts. Scouts would form a Detached Squadron. There was no allowance for repeaters or links from scouts back to the main body: Scouts could never stray far from visual range.

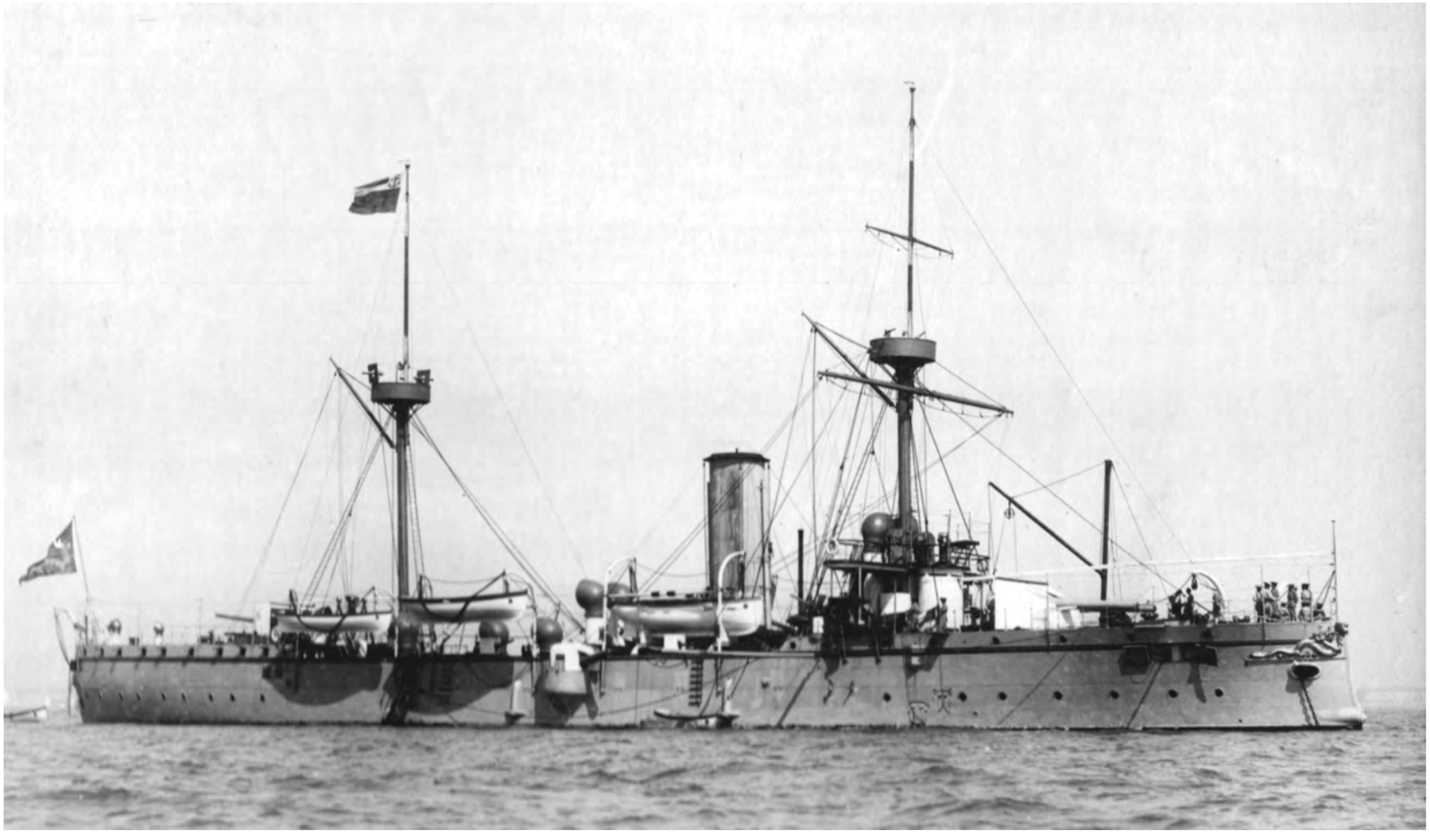
In the 1894 manoeuvres, each fleet (Red and Blue) was split in half, each trying to unite its two squadrons before being destroyed in detail. Red had six and Blue had eighteen torpedo boats. Red had battleships in both its fleets, as well as strong cruiser forces. Each fleet was in three groups, with six ships each in the first two, and torpedo gunboats in the third. The first group consisted of three battleships and three fast cruisers (*Blenheim* was in the first group of the first Red fleet). Each of the second groups consisted of six cruisers. Note the disparity between cruiser and battleship numbers. One of the Blue fleets had seven battleships in its first group, with seven cruisers in the second; the other had only cruisers and torpedo gunboats. The four-fleet situation was something like that between Britain and France in the Mediterranean. In wartime the British would try to unite the Channel and Mediterranean Fleets, and the French their Brest and Toulon Fleets. The Brest fleet was weighted heavily towards cruisers, for raiding in the Atlantic, whereas a classic battle fleet (to contest control of the Mediterranean) was based at Toulon. As in 1892, much attention was paid to the effectiveness of torpedo boats. The commander of *TB 80* wrote that boats trailing a fleet in order to attack had been unable to regain position once lost due to the speed of the fleet. This may have been the first indication that high fleet speed in itself would be an important protection for a fleet passing through a narrow strait at night. It was again clear that torpedo boats had to work with cruisers which would find and report the enemy.

The 1896 manoeuvres again examined the problem of watching a hostile fleet in a nearby port. Red Fleet A watched Blue Fleet C, while Red Fleet B mobilized in another port. As in 1894, there was also a Fleet D, which would try to join Fleet C. This was not too different from the problem of the Mediterranean Fleet (A) watching the French Toulon Fleet (C) while the British Channel Fleet (B) tried to join it, and the Russian fleet (D), newly allied to the French, tried to even the odds. C's object was to destroy A before B could arrive or, failing that, to destroy B before the two Red fleets could join. The commander of A knew the strength of C, but not vice versa. His primary purpose was to defeat C by meeting it at sea. C did not know the strength of B, which was mobilizing, and D was also mobilizing, its strength unknown to A. Overall, A was superior to C and faster; C was superior to B; and B was faster than, and equal to, D. On meeting at sea, C would have to return to its port if it met A. Similarly, A could force D back into its port. However, C plus D were superior to A. If A met C after having defeated D, it would have to return to base. However, if it joined with B before meeting, C would have to withdraw. There would be no decisive result if B met D. 'Meeting' was taken to mean battleship squadrons within 3nm of each other for two hours.

All of this was very much a scouting problem, hence a cruiser problem. Thus Fleet A consisted of five battleships, seven second-class protected cruisers, four torpedo gunboats, and ten destroyers. Fleet B was four battleships (the cruisers *Blenheim*, *Hermione*, and *Charybdis* played battleships), two second-class cruisers, two third-class cruisers, four torpedo gunboats, and ten destroyers. Fleet C consisted of five battleships, two armoured cruisers, five second-class cruisers, and five torpedo gunboats. Fleet D comprised four slow battleships, three second-class cruisers, a third-class cruiser, and four torpedo gunboats. C was inferior to A 'so long as the Battle Squadron, which alone counts, is intact'. At the outset, cruisers and destroyers of Fleet A would be watching Fleet C in its base. An engagement between the cruiser *Thetis* and a torpedo gunboat leading a torpedo flotilla demonstrated once again that it was nearly impossible to execute a torpedo attack in daylight against a fast cruiser armed with quick-firing guns.

C joined D as soon as possible, A being unable to prevent that. Nor were A and B able to prevent the united enemy fleet from reaching the base it sought. The umpires added that 'with regard to the use made of cruisers and destroyers for obtaining and communicating information, nothing has reached [us] which enables us to give an opinion'. That was exactly the problem. The manoeuvres demonstrated a frightening failure of both scouting and communication.

The search problem evidently attracted considerable interest, because the instructions for the 1897 manoeuvres (held between roughly equal forces which had been mobilized for the Diamond Jubilee) include a discussion of the curve of search on the open sea for an enemy whose speed was known, and whose position at some particular time was known. In this case a fleet put to sea before the opening of hostilities, one cruiser



British shipbuilders, particularly Armstrong, constructed many of the world's cruisers between about 1880 and 1910. Armstrong built *Ching Yuen* for China. Completed on 23 July 1887, she was one of two sisters ordered for the Chinese Peiyang Fleet in October 1885. Like other Armstrong cruisers of the time, she was armed with unusually powerful guns, in this case three Krupp 8.2in (two forward, one aft), plus two 6in/36 Armstrong guns (in the waist), eight 6pdr QF, two 3pdr QF, six 1pdr QF, and four 14in torpedo tubes (two training tubes on the broadside and bow and stern tubes (the bow tube is barely visible above water). No other ships had the unusual combination of a twin mounting forward and a single mounting aft, although it featured in an abortive Armstrong design for cruisers for the Australian state of Victoria. Some of the 1pdrs are visible in the fighting tops fore and aft. She displaced only 2310 tons (250ft x 38ft x 15ft) and was designed to make 18kts under forced draught (5500 IHP). On trial she made 18.5kts on 6892 IHP. Under natural draught she made 15.26kts on 3733 IHP (she was designed to make 3300 IHP under natural draught). Here she flies an admiral's flag.

being left behind to bring the news that war had begun. This cruiser was to meet the fleet at a set rendezvous. She was to be intercepted by two opposing cruisers intent on finding the enemy fleet, so that it in turn could be intercepted. Without wireless, the rub was that once they saw the enemy fleet those two cruisers had to turn back to report (the instructions for the exercise assume that the cruiser, once caught, would give up the rendezvous). The cruiser carrying the news would run at 12kts on an unknown track, the intercepting cruisers at 17kts. Hence the search curve. The test failed because the fleet commander chose to send a cruiser force back to escort the cruiser carrying the news of war. This was considered a hostile act before the outbreak of war.

The 1898 manoeuvres were intended to determine the best way of employing a large cruiser force with a fleet, with secondary objectives of helping indicate the relative advantages of speed and fighting strength, and also to obtain more information about the operations of destroyers and torpedo boats.[24] A convoy (C) of slow ships would be escorted by a fast cruiser from Halifax (in Canada) to Milford Haven. A fast hostile squadron (A) lying in Belfast would seek to intercept and capture the convoy. At some point a slower but superior British squadron (B) would be sent to protect C, meeting it at a prearranged rendezvous. The coast of Ireland was considered hostile (A) territory, containing A's torpedo boat bases. The English and Welsh coasts were B territory, including several destroyer bases. Obviously a great deal depended on intelligence available to A, and the manoeuvre instructions included special notes on the distribution of that intelligence, each fleet having its own Naval Centre with outlying despatch stations and signal stations. As yet there was no wireless, so once ships went to sea they could communicate with the land-based intelligence organization only via linking ships. Both fleets had numerous cruisers attached: Fleet A (Red) had three first-class cruisers and sixteen second- and third-class. Fleet B (Blue) had four first-class cruisers and sixteen second- and third-class. Fleet A also had torpedo boats led by torpedo gunboats; B had destroyers.

The result was another failed search exercise. It turned out that A was searching in the wrong place; the convoy was 63nm outside the area A planned to search, and at no time was any A cruiser closer than 120nm to the convoy. B met the convoy as planned, and brought it into port. Nothing was learned of the best way to employ a large cruiser force, but it seems clear that those planning the exercise hoped that by adding cruisers they could make A's search effective.

Further manoeuvres in 1901, in which two fleets fought for control of the Channel, showed that neither fleet had enough cruisers for the necessary scouting and look-out duties, particularly after a cruiser action notionally sank so many on each side.[25] 'This action points decisively to the great advantage either side would have obtained if supported by modern armoured cruisers.' Further, 'the fact of a heavy Cruiser action being fought on the first day of hostilities prevented, in a great