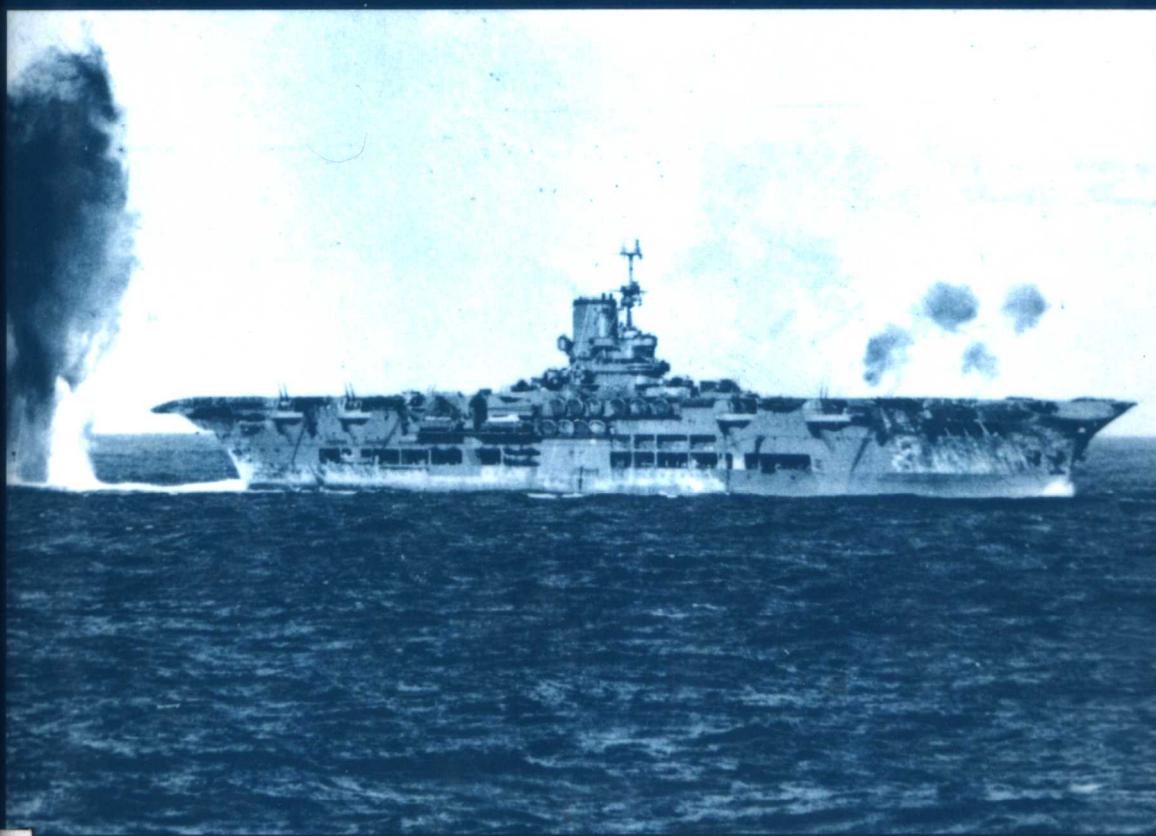


Technology and Naval Combat in the Twentieth Century and Beyond



Edited by
Phillips Payson O'Brien

TECHNOLOGY AND NAVAL COMBAT IN THE TWENTIETH CENTURY AND BEYOND

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Introduction

Phillips Payson O'Brien

The twentieth century was the most technologically dynamic period in naval history, but this will come as no surprise to anyone with even a passing interest in seapower. At the beginning of the century the most technologically advanced fleets in the world were dominated by coal-burning, steel-sided capital ships. The Royal Navy's battleship *Albemarle*, laid down in January 1900, displaced about 14,000 tons, was armed with four 12-inch and 12 6-inch guns, and could reach a maximum speed of around 20 knots per hour. Naval combat between similar vessels would occur at a distance of thousands of metres. At the end of the century the most powerful surface ships of the most technologically advanced fleet, the US *Nimitz*-class carriers, were so powerful that, had a crew member of the *Albemarle* ever come across one, he would have considered it magical. The latest generation of *Nimitz* carriers displace almost 100,000 tons, are nuclear powered and nuclear armed, and carry a complement of more than 80 aircraft capable of engaging an enemy hundreds of miles away.

In many ways, therefore, the history of naval power in the twentieth century was a history of the control and application of naval technology. The various major powers that have striven either to maintain their relative position in world seapower, or to supplant their more established rivals, have usually seen technological superiority as the key to their endeavours. The different chapters in this volume, by some of the most respected and experienced naval historians writing today, tell of this struggle.

This technological race was not, however, a contest of equals. The major naval powers approached their tasks from different perspectives and with very different strengths and weaknesses. Some, such as the Italian Navy described in the chapter by Brian Sullivan and the Japanese Navy, described by David Evans and Mark Peattie, were trying to compensate for their massive, relative economic weakness through technological superiority. In the case of the Italian Navy before the First World War, we see the superb ship designer Benedetto Brin designing some of the most innovative and thought-provoking vessels of the period. In many ways he foretold the

arrival of Admiral John (Jacky) Fisher's battlecruiser concept through his plans for lightly armoured, heavily armed, fast capital ships. Yet, the gap in relative economic strength was simply too large for the Italians to surmount, no matter how sophisticated their warship plans turned out to be. The picture is ultimately one of frustration, with the Italian Navy, even under the control of Mussolini and the Fascists, severely handicapped in its attempts to create a truly balanced naval force.

The picture given of the Japanese Navy by Evans and Peattie is, on the surface, far more successful. Knowing that it would be practically impossible for a country with Japan's economy to compete numerically with the greatest naval powers, such as Britain before the First World War and the United States before the Second, the Japanese Navy opted deliberately for a policy of stressing quality over quantity. It is in many ways the story of significant success. In the 1880s the Japanese Navy was a motley collection of foreign-built vessels. During the ensuing years the Japanese established a home-grown capacity to build technologically up-to-date warships. The Japanese Navy 'came of age' in its steady growth towards its famous '8-8' fleet (eight battleships and eight battlecruisers). The naval arms control process that governed major power strength between the Washington Conference of 1921-22, and the second London Naval Conference of 1935-36, provided a temporary hiccup to Japanese naval growth. The Imperial Japanese Navy's desire to have a fleet 70 per cent as strong as Britain or America was shelved, for capital ships, by the famous 5-5-3 ratio. Still, the Japanese pressed on with their plans to match British and, primarily, US strength by possessing qualitatively superior vessels. When the arms control process ended, this desire reached its apotheosis with the construction of the *Yamato* and *Musashi*, the two largest and most heavily armed battleships ever built.

Yet, while the Japanese experience seems vastly different from the Italian experience, its ultimate result was rather similar. Neither nation was able to compensate for the fact that their economies were not a match for powers of the first rank. Even the excellent and technologically advanced Japanese fleet was brutally crushed by US economic power during the Second World War. Without at least a competitive economic base, it seems, a nation cannot compete in a prolonged war involving naval technology.

The Japanese and Italian experiences, however, were extreme. Their overall economic weakness was quite marked, whereas other powers who attempted to challenge the naval status quo at different times in the twentieth century – France, the USSR and Germany – were relatively stronger. The French case differed the least. In Paul Halpern's chapter we have a significant economic power, though one obviously weaker than its main counterparts, trying to build a competitive fleet while at the same time countering costs. This was one of the main supports behind the *Jeune École*, the famous and seemingly misguided French naval movement that

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stressed large numbers of torpedo boats over more expensive capital ships. It remains a salient lesson to those eager to back any new technological development. Years of experimentation produced a fleet incapable of fulfilling a number of the nation's basic naval needs. It was only after returning to the production of large-scale traditional capital ships, with some excellent design features, that the French Navy began to reassert itself in European terms.

The French, however, remained in an unenviable position. Economically stronger than the Italians, they were still considerably outpaced in industrial terms by the leading European economic powers: Britain and Germany. It was only when Germany challenged Britain that a situation existed whereby a power of equal if not superior industrial and technological resources challenged the dominant seapower of its time. The German challenge to the supremacy of the Royal Navy, particularly before the First World War but also later, under the leadership of Adolf Hitler, is perhaps the best-known example of an arms race at sea.

Michael Epkenhans, examining the years leading up to the First World War, and Werner Rahn, focusing on the interwar years, provide a fascinating picture of a nation with enviable economic strengths providing a somewhat cautious and conservative challenge to the status quo. Before the First World War, Germany had passed Britain in industrial production and had become a world leader in such technologically vital areas as electrification and machine-tool construction. However, under the direction of the famous Admiral Tirpitz, egged on spasmodically by the equally well-known Kaiser Wilhelm II, the Germans opted for a methodical challenge to British supremacy. Tirpitz's obsessive preparations for the one great capital ship battle that he assumed would determine the next major war at sea, led to the creation of the world's second strongest dreadnought battle fleet. At the same time, however, the German Navy seemed inculcated by a certain technological conservatism. Even after some very promising beginnings in naval air and, crucially, submarine development, the German Navy clung, or perhaps was forced to cling, to Tirpitz's notion of a decisive capital ship duel at sea.

The interwar years provide an interesting contrast. Under the strictures of the Versailles Treaty, the German Navy was strictly limited, both in terms of overall numbers and in terms of ship size. In particular, the size limitation of any individual vessel to 10,000 tons forced the German Navy to abandon the doctrines of Tirpitz and adopt more radical trade-warfare thinking which reached a point of technological sophistication with the construction of the famous 'pocket' battleships. These relatively small vessels could never have confronted enemy capital ships in open combat, but they were in many ways considerably superior, especially in cruising radius and striking power, to all other 10,000-ton vessels then built or being built. Yet, when finally freed from the restrictions imposed by

Versailles, the German Navy reverted to its traditional pre-First World War pattern of battleship construction. Even after the experiences of the First World War, when German submarines were by far the most effective naval weapon against Great Britain, the Germans opted for the large capital ship construction programme known as Plan Z. Once again, the Germans had opted for a slow, drawn-out challenge to Britain's supremacy in European waters, a challenge that had no time to develop because of Hitler's decision to invade Poland.

During the Cold War the next great challenger for naval supremacy arrived – the USSR. After the collapse of communism in Europe with the concurrent exposure of the Soviet Union's economic inefficiencies, it has become somewhat difficult to remember just how serious the USSR's naval challenge was viewed at the time. Yet, as Evan Mawdsley shows, in terms of ship construction, the Soviet Navy was remarkably successful in the short period of its prominence. Between 1946 and 1991 almost 400 major surface units and 664 submarines were constructed, while a naval air arm consisting of thousands of units was deployed. In technological terms this fleet was quite advanced, consisting of nuclear-powered vessels, and including such famous weapons programmes as the 'backfire' bomber. Yet, for all these successes the Soviet challenge was to prove about as effective as the Japanese challenge before the Second World War. In many cases the ships built were unnecessary, constructed more to present the image of a USSR able of competing with the United States instead of realistically providing for a Soviet Navy capable of effectively challenging the US fleet.

The collapse of the Soviet Union brings back the earlier point that a naval challenge can only be effective if the challenger's overall economic strength is at least comparable with the power being stalked. It is somewhat ironic that the one thing that all of the naval challengers in the twentieth century had in common was that their efforts failed. Indeed, in the cases of Italy, Japan, France and the USSR the question could rightly be asked whether their efforts were far more counter-productive to their nation's well-being, both in economic and international terms. Only the Germans stood any reasonable chance of supplanting the dominant power of the time, but they opted for such a long-drawn-out process that in two instances their efforts were negated by war before they had any chance of coming to fruition.

This collapse of these naval challenges might seem to imply that the dominant naval powers of the twentieth century, first Great Britain and then the United States, followed more far-sighted and technologically proficient plans than the lesser fleets. The picture of the British fleet during the period of its dominance, given by Nicholas Lambert for the years before 1914 and Jon Sumida for the interwar period, is somewhat uneven. Before the First World War the Royal Navy, led by Admiral Fisher, was fond of technological 'plunging'. Revolutionary designs such as the

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dreadnought class battleships and battlecruisers were first built by the British, who seemed determined to use all technological advances to maintain their naval supremacy. The interwar picture seems, on the surface, considerably less dynamic. The British Admiralty in these years has often been criticised for being too timid in its defence of supremacy. Yet, as Dr Sumida so aptly reminds us, British naval performance in the Second World War was in many ways considerably more impressive than during the First. Even after the devastating German capture of the Norwegian and French coastlines, with the concurrent loss of all of Britain's effective naval allies, the Royal Navy was able to maintain a significant measure of sea control. A German sea invasion was pre-empted and enough shipping was able to get in and out of the British Isles to keep the nation functioning as a major power until the United States entered the war. During the First World War, with France and Italy as naval allies and the German Navy limited to a small number of bases along a short stretch of coastline, the Royal Navy had proved less resilient.

After the Second World War, when Great Britain quite clearly lost its naval position to America, we have an equally complex picture. Eric Grove shows where those who dwell on Britain's supposed catastrophic decline have gone too far. The Royal Navy, in fact, remained somewhat politically astute, especially under the leadership of Lord Mountbatten. While the Soviet Union was building far larger classes of vessel and even the French were opting for such prominent items as attack carriers, the British Navy remained a highly professional, if smaller, force. Yet now, with the collapse of the USSR and the decision of the British government to build two large strike carriers, the Royal Navy is poised to return to its clear position as second naval power in the world.

While in the twentieth century Britain slid from naval dominance to a position in the second rank, the United States rose dramatically. Only a decade or so before 1900 one would have seen a US fleet barely larger than that of Belgium's. Now the US Navy is dominant in an historically unprecedented fashion. The US fleet is not only stronger than the rest of the world's forces combined, it could probably sink all of those other fleets at relatively little cost to itself. This rise, which is now based on a combination of size and technological superiority, was not always smooth. Before the Second World War the US Navy had to contend with political marginalization and it was only the war itself that finally catapulted the Americans into clear superiority over the Royal Navy.

During the Cold War, as George Baer points out, it was technological superiority that kept the US fleet firmly on course. With the advent of nuclear weaponry and long-range air power, questions arose about the survivability of major naval assets. The major American naval leaders who thrived in these years were the ones who were able to marry their favoured platforms to the dominant technologies, from Rickover's famed nuclear

subs to the United States' continuing support for the largest and most powerful carriers afloat. Yet, as Baer points out, technology, combined with a shifting global balance of power, has forced the US Navy to reinvent itself. After the Second World War this process was contentious, whereas, in a somewhat hopeful note, the collapse of Soviet power has been met with a more thoughtful and coordinated response.

What then of the immediate future? For the US Navy, as Norman Friedman points out, success in the future will depend upon a combination of the development of delivery platforms with surveillance technology. Looking back on recent developments, the development of anti-ship missile technology, combined with the ability to track Soviet vessels on the high seas, has significantly changed the threat posed by the US fleet. Non-carrier surface vessels armed with anti-ship missile technology helped diversify a threat that had seemingly been focused in carrier air power, while the ability to track passively Soviet vessels allowed for a better concentration against enemy forces. In the future it is the development of such technologies, presumably including space platforms, that will allow the US Navy to continue in its dominant global role as a power-projection force.

For the Royal Navy, as Geoffrey Till explains, the future is equally complex, but the resources involved are so much smaller that the British might have to rethink some basic assumptions. Should the Royal Navy try to be a smaller, but effective version of the US Navy or should it aim to combine with other European powers in developing a new role? In an extremely interesting shift, however, Till describes how the Royal Navy's view of its role in the outside world has, even after the so-called 'Revolution in Military Affairs', reverted to an almost eighteenth- or nineteenth-century perspective. Instead of preparing for decisive action in home waters, in the manner of an Admiral Fisher, the Royal Navy and leading British politicians are opting for a policy stressing global power projection and 'showing the flag'. The key to this policy shift, needless to say, is the proper allocation of resources. Whether or not the two strike carriers now planned for construction are actually funded will go a long way towards demonstrating whether these plans are serious or not.

This question of funding, as David Andrews points out, will be key beyond the next few decades as well. The New Defence Nexus, brought about by the end of the Cold War, posits that ever-declining defence resources will be combined, over time, with a less clearly defined role for naval forces. The growth of new technologies leaves open the possibility that radical new designs such as trimarans, will take the place of traditional monohulls. Yet, all such changes will be partly dependent on their concurrent role within the domestic economy. For instance, naval vessel configuration might very well march hand-in-hand with merchant vessel technology.

This reliance is obviously crucial. If the different chapters in this book have but one combined lesson, it is that navies are ultimately both an

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excellent indicator and a creation of a nation's overall economic and technological strength. The sheer technological complexity of warships means that they cannot be 'faked'. Nations trying to leap beyond their economic capacities in the twentieth century – Italy, France, Japan and the USSR among them – always failed. Indeed, one of the striking facts of the naval balance in the twentieth century was how little things changed. In 1907 the Royal Navy was dominant, with the US fleet just moving into second position. Now the US navy is dominant, with the British about to move into second position. Any challenge to this balance, be it from the Chinese or some other power, will have to walk hand-in-hand with that nation's overall technological development.

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PART I

PREPARING FOR THE FIRST WORLD WAR

Italian Warship Construction and Maritime Strategy, 1873–1915

Brian R. Sullivan

In the half-century after national unification, Italian warship designs and naval theories reflected great ingenuity but lack of capital and raw materials, geography and technological backwardness constrained the Royal Italian Navy (*Regia Marina*). None the less, in the period c. 1862–89, Italian seapower theorists developed many concepts later attributed to Alfred Thayer Mahan. They argued that national security, prosperity and influence depended on seapower. After the Suez Canal opened, greatly increasing Mediterranean sea traffic, this seemed obvious to educated Italians.

The theorists drew their concepts from Italian experience for application to national maritime strategy. Domenico Bonamico, in particular, argued that enclosed seas like the Mediterranean imposed different conditions on navies operating therein than did oceans. If Italy fought France or Britain, even a victory that gained Italy control of the Mediterranean still would not necessarily grant it access to the oceans beyond. This reality – not French possession of Corsica and British control of Malta, as Mahan argued – meant that the benefits the American insisted would accrue to nations conducting successful naval offensives could not be acquired in Italy's case.¹

The Italian peninsula had a vulnerable 3,000-mile coastline. The country's frontiers joined those of France and Austria-Hungary, both with powerful armies. Unlike Britain, a navy alone could not defend Italy. The Alps did provide significant protection against invasion, but the Italians still needed a large army to defend the Po Valley, as well as a powerful fleet to protect their shores. For the 'least of the great powers', geography challenged its army but imposed a defensive strategy on its navy.² Italian theorists stressed capital-ship primacy. Before *Jeune École* advocates advanced the idea in the 1880s of fleets based on torpedo boats and cruisers, such notions circulated in the *Regia Marina*. But Italian naval leaders rejected arguments that technology was making light craft superior to battleships. Proponents of smaller ships continued to press their case. Still, battleship enthusiasts dominated the navy.³

Among these was Admiral Simone de Saint Bon, navy minister from 1873 to 1876. Study of the American Civil War had convinced Saint Bon that basic naval power lay not in the number of a country's battleships but in the capacity of its shipyards and steel mills. Recognizing the naval architect Benedetto Brin as both a genius and a man of similar views, the admiral appointed him as inspector general of naval engineering, the Regia Marina's chief designer. Both knew their service faced restricted funding for the foreseeable future. The navy had fallen into disrepute following its humiliating defeat by the smaller Austrian fleet off the Dalmatian island of Lissa in July 1866. In 1860–64, the Regia Marina had acquired 14 steam-powered ironclads – 11 being US, British or French-built. All had foreign armor, engines and cannon since the Italians could not produce such equipment. After Lissa, these purchases seemed wasted. The Italian Navy remained larger than the Austrian, however, providing security in the Adriatic. In contrast, the wider Mediterranean had become more threatening for Italy. French resentment over Italian failure to aid its former ally in the Franco-Prussian War required Saint Bon and Brin to plan for war with the French Navy, far superior in size and technology to the Regia Marina.⁴

The two sought solutions in innovation, stressing quality over quantity. Brin designed battleships with little armor or secondary armament but with high speed and heavy guns. The turret-mounted guns of Brin's battleships could outrange and overpower smaller, faster opponents; the Italian ships' speed would allow them to outrun any superior hostile squadrons or close rapidly on single ships. Italian commanders could use speed, or weight and range of fire, as circumstances suggested. Brin had anticipated by three decades Fisher's battlecruiser concept.⁵

Acquiring the infrastructure to transform Brin's designs into operational warships was problematic. Since 1861, the Italians had imported armor plate, mainly from the United States. The Regia Marina purchased low-quality US materials to afford the amount necessary. Even so, Italian warships cost more than foreign-built vessels. Hoping for better, Saint Bon applied his liberal economics, opening the armor contract for *Duilio* and *Dandolo* to international competition. The French firm, Schneider, won, becoming armor supplier to the Regia Marina in 1876. Brin succeeded Saint Bon as minister that March. He would hold the post five times until 1898, over 11 years in total. Brin would realize his mentor's concepts; but with generous budgets from 1883, he chose protectionism over liberalism.

Rivalry with Italy over Tunisia provoked French occupation in 1881. The invasion caused deep resentment in Rome and led directly to Italy's Triple Alliance with Germany and Austria-Hungary in 1882. The treaty offered no protection in the Mediterranean – such guarantees were included in the second treaty of 1887 – but it eased Italian fears of war with the Dual Monarchy. The Italians also obtained a declaration that the treaty was not