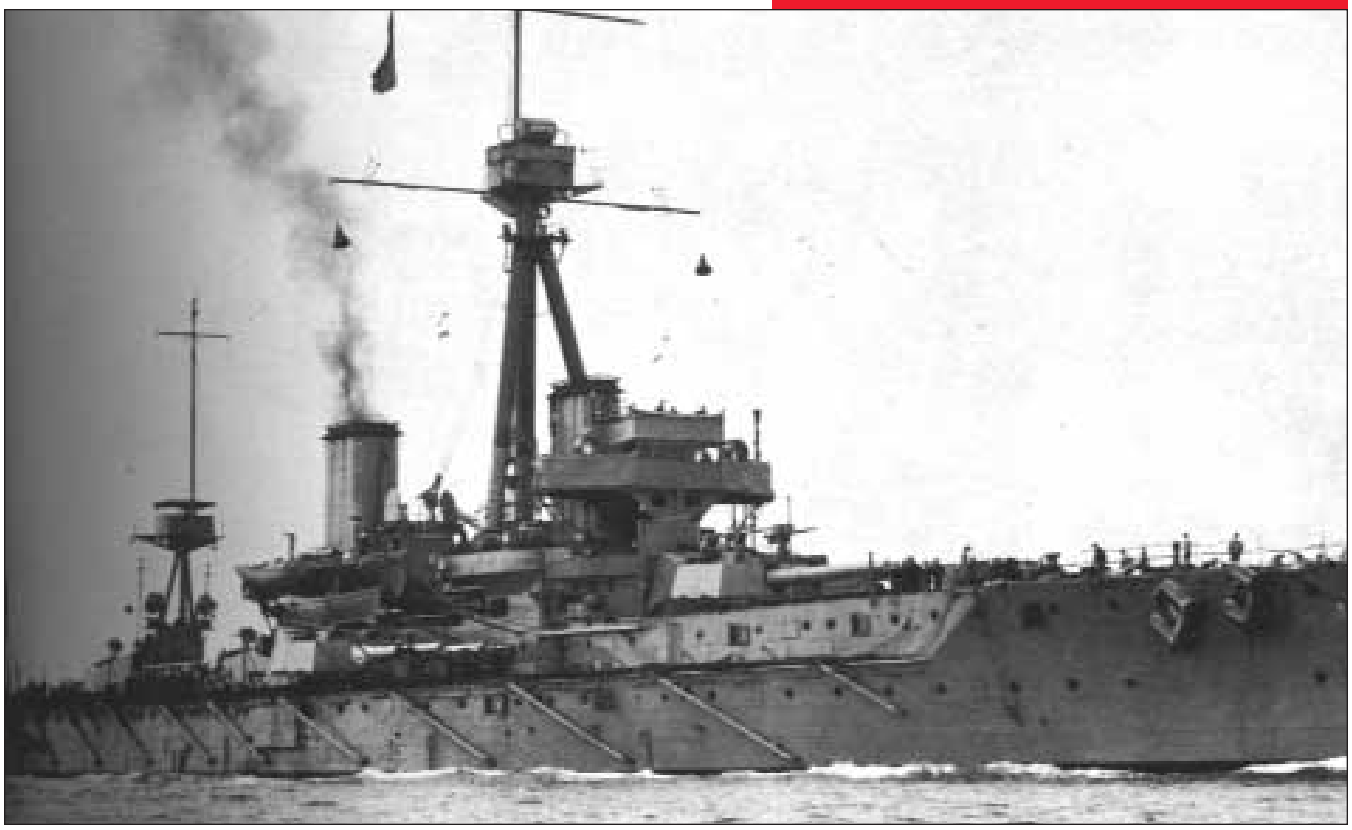
by Commodore Daniel McNeil



Imperial War Museum

HMS *Dreadnought*, the most feared maritime weapon at the time of her launch in 1906.

TECHNOLOGY, HISTORY AND THE REVOLUTION IN MILITARY AFFAIRS

Historical examples clarify everything and also provide the best kind of proof in the empirical sciences. This is particularly true of the art of war.

Karl von Clausewitz

John Keegan wrote a marvellous book for the Barbara Frum Lectureship, *The Battle For History – Re-Fighting World War Two*.[1] He claimed that the real history of the Second World War cannot be written until all of the wounds and passions have fully abated. It may never be written. History is open to interpretation – which is why it is an important tool for fostering strategic thinking. This paper is heavily influenced by the analysis of Barry Hunt, especially his view on war aims and measures of success in the First World War.[2] Nobody really 'won' that war, but others do not share this view. Colin Gray, for example, claims that many historians of British performance in the First World War "get the big business wrong." "It was a conflict conducted innovatively at every level, and it was a conflict that was won."[3] I enter this debate as a warrior – not a historian. My aim is not to prove one side of the case or the other. Rather, my aim is to draw lessons from the past, selecting a strategic moment with parallel possibilities and insights, so as to inform the present debate on the Revolution in Military Affairs (RMA).

To this end, this paper will begin by examining the history of a naval Revolution in Military Affairs that had its genesis one hundred years ago: the rise of many industrial age technologies that found their focus and legend in the production of the Dreadnought battleship.[4] The naval part of this RMA included the development of submarines, aircraft, long-range torpedoes, wireless telegraphy, long-range gunnery, intelligence services and mine warfare. This historical analysis will encompass the relationships and complex interplay

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among technologies, strategic concepts, professional training and education, personalities, government, public expectations and, ultimately, events. This example will then be used to provide some informed speculation about our current Information Age RMA to help understand the present and plan for the future. Finally, the analysis will support current efforts to enhance the Vision for the Canadian Officer Corps of 2020 by highlighting the value of the 'historical' rather than the 'material' school of strategic thought, and thus the importance of a liberal arts education for the nation's military leaders.[5] The analysis will also support mechanisms, such as the *Canadian Military Journal*, to foster intellectualism and educated debate throughout the Canadian Forces.

THE DREADNOUGHT RMA

Maritime strategic and technological developments in Britain from 1900 through to the First World War marked a defining period of the Industrial Age. Ironclad leviathans propelled by steam and armed with long range cannons replaced the age of fighting sail. Accordingly, naval planners were confronted with the daunting task of revising the theory, doctrine and practice of traditional maritime warfare which, while largely 'unwritten', had been thoroughly ingrained through centuries of experience. The vast scale of this challenge gave great scope both for grand success and for grand failure – much the same as our current transition into the Information Age.

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The British Home Fleet, 1914.

This period of naval history gave rise to significant developments in naval strategic thought and in the literature supporting this 'revolution'. Kingston's Royal Military College (RMC) has established itself as a world-renowned authority on maritime strategy. Donald Schurman's *The Education of a Navy: The Development of British Naval Strategic Thought 1867-1914* (1965) and Barry Hunt's *Sailor-Scholar: Admiral Sir Herbert Richmond 1871-1946* (1982) are mandatory readings in all naval colleges. These studies examined the central naval strategists and writers of the period and dared to challenge the stature of the American 'evangelist of sea power', Alfred Thayer Mahan. Mahan's famous 1889 piece, *The Influence of Sea Power Upon History*, provided the layman's explanation for Trafalgar and for the historical success and predominance of the Royal Navy (RN). It was an immutable fact, Mahan argued, that the RN delivered and maintained the British Empire. Mahan provided the 'bible' that described how this feat was accomplished.

Mahan's work emphasized the critical relationship between sea powers (those with big navies), commerce and colonies. Success in naval war was founded, in his view, on employing a concentration of firepower from battleships in decisive battles. He generalized from the Royal Navy's experience in the age of sail, and was dismissive of other approaches to naval warfare. In particular, he gave short shrift to the potential impact of a *guerre de course* doctrine. He became the most widely acclaimed naval writer of his time, and his work generally reinforced social Darwinism and imperial proclivities.

Education of a Navy and *Sailor-Scholar* were radical departures, even though neither Schurman nor Hunt were critical of Mahan, treating him more as a historical actor than as a historian. Schurman and Hunt pointed out that as good as Mahan's ideas were, they were focused on 'timeless lessons' and 'immutable principles' of sea-power that supported "command of the sea" as the only strategy worth pursuing. Drawing his lessons from the Age of Fighting Sail, and seldom appreciating the significance of innovations such as submarines, Mahan's teachings were in reality more useful as a primer on geopolitics than as a guide to future fleet structure. He was, however, an inadvertent 'catalyst' for applying old ideology to new technology, and Mahan's ideas *were* used as guidelines for force structure. They thus contributed significantly to the rise of the 'material school' of strategic thought which placed emphasis on battleships and the decisive battle. Mahanian idealism failed, however, to illustrate how this new force of battleship technology could be proper-

ly used as a modern 'instrument of national policy'.[6] Schurman and Hunt both showed how other historians and naval strategists of the time had better ideas, but considerably less influence.

National Maritime Museum

Artist's depiction of HMS *Royal Oak* at the Battle of Jutland.

A useful starting point in following the thinking that led to the Dreadnought RMA can be found in Karl von Clausewitz's 1832 treatise, *On War,* which pioneered modern strategic analysis. Clausewitz wrote about the nature of war, the interplay of theory and practice, the relationship between war and politics, the object of strategy, the relationship between civilian and military leadership, and the psychological aspects of war, battles and tactics. Clausewitz's ideas, however, came to be interpreted in a variety of ways as societies and technology changed profoundly over the course of the 19th century, but his aphorism that war will "conform to the spirit of the age and its general character," proved to be prophetic. Many early 20th century [admirals and] generals believed that the new technologies were too complex for politicians to understand, that the connection between war and policy was now anachronistic, and that therefore "a general should be left free to conduct it [war] at his own discretion."[7] Clausewitz's stress on the importance of an 'offensive spirit', 'decisive battle' and the 'annihilation of the enemy' were emphasized and highlighted. This highly selective embrace of 'Clausewitzian' principles dovetailed well into Mahan's focus on the concentration of firepower, and the work of these theorists on the use of military force permeated the materialist strategic thought of early 20th century military leaders.

There were, however, theorists willing to question established orthodoxy. A leading British naval historian of the period, Sir Julian Corbett, the Royal Navy's 'Admiralty' historian from 1900 until his death in 1923, took a more scholarly approach to build constructively on the depth and breadth of *On War*.[8] Corbett's *Some Principles of Maritime Strategy* (1911) used *On War* to explain naval warfare and expand on the concept of limited war. His influence was significant in that he was an important mentor to Barry Hunt's 'Sailor-Scholar', Admiral Sir Herbert Richmond.[9]

At the turn of the century, Britain was the predominant naval power, with responsibilities for a worldwide Empire based on sea-power. Despite this, the British contribution to contemporary naval strategy was more through example than theory. In fact, the Royal Navy faced many problems in maintaining *'Pax Britannia'* during a period of shifting international relationships and rapidly evolving maritime technology. Most historians agree that the long 'peace' began to fall apart in 1900.

The RN in this era of transition (1900-1914) was an organization that was not especially responsive to government direction and control, but rather was an institution that for years had thrived on the brilliance and eccentricity of its class-oriented officer corps. Admiral "Jacky" Fisher, an iconoclast who did not fit the usual mould of an RN officer, thus became an instant legend with his appointment as First Sea Lord in 1904. He immediately began instituting his personal plans for increasing the capability of the Royal Navy at a time of diminishing resources and growing commitments. Admiral Fisher had a policy one might today call 'transformational innovation': he was intent on exploiting the new technology in capital construction – heavily focused on the Dreadnought battleship and the submarine – while, much like the Canadian Forces of 2000, he cut force structure that did not provide fighting capability to the nation. The practical contribution of Admiral Sir John Fisher, in terms of technical innovation and strategic and tactical readjustment, far outweighed the contribution of any of the theorists. Nevertheless, he has been criticized for creating a one-dimensional 'Mahanian' navy: one designed strictly to fight the 'decisive battle'.[10]

Fisher was unable to implement fully his Revolution in Military Affairs because of entrenched organizations

and structures, institutional inertia and, not least, the beginning of the First World War. The remainder of this analysis is not intended to indict Fisher's attempts at reformation; he tried his best. The Royal Navy of the period, writ large, was fixated on past glory and on the technical and materiel aspects of warfare that were most easily identified with a line-of-battle surface ship like Nelson's flagship, HMCS *Victory*.

In this climate a 'Sailor-Scholar' emerged. Admiral Sir Herbert Richmond was "a unique phenomenon in the Victorian-Edwardian navy – a professionally competent and successful officer who was also an intellectual . . . with a passionate concern for naval strategy, the art of war, and the most effective training programme for officers."[11] Schurman called him a "Historian in Uniform"[12] – perhaps the greatest compliment a historian can make about a naval officer. As a Captain in 1909, Richmond was given a premier command, HMS *Dreadnought*. This ship, the first of its kind, was one of the most important commands available. Unfortunately, Sir Herbert Richmond's intellectual bent and his penchant for challenging leaders did not fit the Royal Navy culture of the time.[13] Although he clearly admired Admiral Fisher's energy and ruthless transformation of the fleet, he also believed that "a service like ours should not be dependent on the energy of one man."[14] At a critical period, his career languished because he offered too much advice to his superiors, and he went from the premier command of *Dreadnought* to command two second-class cruisers. He began to console himself with a passion for history.[15]

It was during this period that Richmond drew together a group of critics of the accepted practices and prejudices of the Admiralty in an informal organization that became known as the Young Turks. Their ideas were circulated in an unapproved, private journal, the *Naval Review*, which contained essays and articles of historical interest on topics including naval and defence policy. (Some ninety years later, the *Naval Review* continues as a forum for critical discussion within the Royal Navy.) Early on, Richmond recognized the risks inherent in this activity. In 1912 he wrote to one of his accomplices to express thoughts that marked his own career:

> I rather feel that I had done you a somewhat ill turn in that being by nature a mutineer, and impatient of hidebound methods and of restraint, I have encouraged you to express heretical opinions: but do remember that heretics are the exception, and that the fate of the heretic is often an unfortunate one.[16]

For the most part, the British naval leadership prior to the First World War failed to appreciate the vast potential of submarines and aircraft in their RMA, and they then failed to recognize that new technologies demanded new doctrine and new organizational forms. Britain's revolutionary new Battle Fleet failed to become the decisive instrument of national policy that was expected of it in a war with Germany. The Admiralty devised a strategy that had its base in a military mindset which perceived possibilities based on 'materiel', rather than a strategy based on national needs or national aims. Hunt has argued that "the virtual atrophy of the Navy's intellectual apparatus had its roots in the revolution in technology which, since the mid-nineteenth century, had kept naval thinkers' minds almost exclusively occupied with questions of ship design and weapons performance."[17]

Richmond also attributed failures to a lack of appreciation for education and a disregard for intellectualism. He wrote words that could have been just as applicable to the Canadian Forces of a decade ago regarding the propensity to embrace the 'school of experience':

> The proper place for naval officers, they said, was at sea, for the navy needed seamen not bookworms. This was the place to learn about strategy and tactics; after the due numbers of years on the bridge, a mystical appreciation of what sea warfare was all about could be expected to descend on the head of the efficient naval officer, rather in the manner of the Holy Ghost.[18]

The fleets of battleships were conceived and created by naval officers and politicians who were inspired by the potential of the new technology. The Royal Navy was also imbued with the 'Nelsonian' traditions and spirit espoused and made famous by Mahan. The overall ethic was 'materialistic', and it overshadowed naval thinkers and reformers who tried to encourage a broader, more intellectual approach to national policy, strategy and tactics. In the fall of 1914, the Royal Navy's strategy was instinctive; it rested on the 'Mahanian' ideals that demanded a 'decisive action' before other naval missions could be effectively carried out.[19] Admiral Fisher lectured to his officers: "An instant offensive is obligatory. Mahan truly says: 'the assumption of a simple defensive in war is ruin. War once declared, must be fought offensively, aggressively. The enemy must not be fended off, but smitten down....' "[20] The British public eagerly awaited another Trafalgar to bring the war to an early and successful conclusion. They were terribly disappointed.

TECHNOLOGY WITHOUT STRATEGY: STALEMATE IN THE WAR AT SEA

Germany had no intention of offering the Royal Navy the opportunity for a 'Trafalgar-like' victory. Because of its numerical inferiority in battleships, Germany's plan was to delay the decisive battle until attrition of the British Grand Fleet could be achieved by the unconventional means of mines and torpedoes, thus giving them better odds for the 'decisive' battle. The sinking of three older armoured cruisers, nicknamed the 'Live Bait Squadron' on 22 September 1914 by the U-9 created the first big shock of the war for the Royal Navy.[21] It was dramatic evidence of the deadliness of submarine warfare. After the initial torpedo hit the first cruiser, the *Aboukir*, the *Hogue* and the *Cressey* stopped to pick up survivors from the water. Within one hour, one U-boat sank all three cruisers, killing 1,397 of the 2,200 sailors on board. Before 1914 ended, mines and torpedoes claimed additional sinkings, including two battleships, *Audacious* and *Formidable*, and two cruisers, *Hawke* and *Hermes*. The RN found itself in a war the materialist school had failed to predict. As British Admiral Wilson had earlier declared, "this new weapon was 'underhand, unfair and Damned unEnglish!' " (sic)[22]

Strategic thinking remained fundamentally unaltered. These opening events of the naval war were not recognized for the warnings they provided. As the First World War progressed, major naval events exemplified the mindset of the materialist leaders of the Royal Navy: the Battle Fleet stalemate, highlighted at Jutland; the misguided but brilliant campaigns of the Dardanelles and Gallipoli; and, finally, the almost fatal failure to properly address the 1917-18 German U-boat campaign.

Whereas initially the British Grand Fleet strategy was intended to be offensive, fear for the safety of these precious resources forced a different approach. They could not be risked in an immediate offensive against the German High Seas Fleet, holed up in the Heligoland Bight and protected by a defensive screen of submarines, mines, torpedo-boats and reconnaissance dirigibles. In fact, Fisher had constituted the *ad hoc* Ballard War Plans Committee in 1907 to examine just these kinds of issues. Sir Julian Corbett was involved in the wrap-up of the planning; he was asked to write a general introduction involving the principles of naval strategy. However, he was not privy to the whole of the document and he wrote a treatise supporting a strategy of 'open blockade' when the secret portion of the plan actually dealt with 'close blockade'.[23] This planning for a close blockade was an implausible development: reporting on the 1902 French naval manoeuvres, the Admiralty Naval Intelligence Division had advised that close blockade of a port protected by torpedo-boats and submarines was almost impossible. The fact that maritime warfare had become three dimensional – under the sea and in the air – was recognized for its tactical reality, but was not appreciated for its strategic significance.

The Grand Fleet could not win Britain's war. It contributed little to the real war being fought in the trenches on land. It became, in some respects, a liability. In fact, the Grand Fleet could only deploy under optimum circumstances, screened by an enormous auxiliary fleet of cruisers, destroyers, minesweepers and submarines. With the creation of the Grand Fleet, every other weapon system had become secondary to the impending 'Trafalgar of the North Sea'.[24]

The Royal Navy continued to adhere to 'Mahanian' maxims, and worked to produce the engagement their doctrine demanded. The battle of Jutland on 31 May - 1 June 1916 has been called "the culminating surface action of the age of steam."[25] It was a show of naval strength that was unprecedented and truly 'Mahanian'; a warship deployment of this magnitude would not be seen again until the D-Day landings of the Second World War. On 30 May the British Grand Fleet sailed with 28 dreadnoughts, 9 battle cruisers, 26 light cruisers, 8 armoured cruisers, 5 destroyer leaders, 74 destroyers and a seaplane carrier (151 major units). The German High Seas Fleet sailed on 31 May with 16 dreadnoughts, 6 pre-dreadnoughts, 5 battle cruisers, 11 light cruisers and 61 destroyers (99 major units).[26] Jutland generated immediate disappointment as the 'Trafalgar that was not', and created controversy which persists to this day.[27] The battle revealed serious shortcomings in the Grand Fleet and the Royal Navy. The 'mindset' was Trafalgar, and the tactics were 'line-of-battle'. No night or melée tactics were practised by the British. No initiative was shown. Serious deficiencies in British projectiles, deficiencies that should have been revealed and corrected because of the Falklands action, prevented any chance of success.[28] In short, the proper mechanisms (policies, doctrine, organization and tactics) to control this amazingly complex, colossal war machine were not developed sufficiently to make it serve the purposes of the misguided decisive battle strategy.

After the potential disaster of a loss at Jutland was recognized, Churchill stated that, "Jellicoe was the only man on either side who could lose the war in an afternoon."[29] How the mindset had changed! The 'decisive battle' was still pre-eminent, but now it was to be *avoided* if at all possible. Stalemate at sea mirrored the stalemate in the trench warfare on land and, ironically,

became the Royal Navy's most secure strategy. The causes of the Dardanelles and Gallipoli disasters can also be traced to the Battle Fleet mindset of the Royal Navy.

The Dardanelles and Gallipoli failures discredited amphibious operations, and stalled any further planning for peripheral sea-based strategies to relieve the slaughter in the trenches.[30] "The disasters at the Dardanelles and Gallipoli simply reinforced the views of those who insisted that any diversion of troops from the Western Front weakened the Allied war effort."[31] In the First World War, land and sea campaigns were not effectively integrated, nationally or within Alliance strategy. Frederick Maurice reported that it was a "rare event for the First Sea Lord to be present" at Allied conferences,[32] and navies did not have a place in the organization of the Supreme War Council until late in the war; "...the first time a meeting was attended by the First Sea Lord and the senior French Admiral was 1 May 1918."[33]

FAILURE OF STRATEGY: THE U-BOAT CRISIS

Throughout the age of sail, convoys were a well used, but poorly documented aspect of British maritime strategy. Britain's 'centre of gravity' was completely forgotten with the battleship myopia; seaborne trade was in fact Britain's Achilles heel. By the beginning of the First World War, Britain had become totally reliant on her empire and on world trade moving by sea:

> The transformation was dramatic; as late as the 1830s over 90% of the food consumed was also grown in Britain, but by 1913 55% of the grain and 40% of the meat consumed was imported. In raw materials the dependence upon imports was even more marked: seven eighths of these came from abroad by 1913.[34]

The need to provide convoy protection to merchant ships was well recognized in the Carnarvon Commission of 1879. The Admiralty spokesman stated that, "in a major maritime war, convoys would be needed for food ships as well as fleet supplies and troop transports, and this would be a great strain on resources."[35] However, this official evaluation was given before the rise of the 'materiel faction', the gospel of Mahan, and the glorification of Dreadnoughts and the 'offensive' strategy.

Something significant happened to warfare during the course of this particular naval RMA. The efficient use of a new weapon of war – the submarine – resulted in indiscriminate civilian casualties. By early 1915, Britain's handling of the North Sea blockade against Germany was beginning to have side effects. In addition to irritating the United States because it contravened international law, it angered Germany, who declared that it was "uncivilized warfare against women and children."[36] This was one more factor that encouraged Germany to begin using their U-boats more aggressively. After issuing a warning in the *Imperial Gazette* on 4 February 1915, German U-boats commenced indiscriminate attacks, sinking the passenger ships *Lusitania* and the *Arabic*. The U-boat emerged as a commerce destroyer and an indiscriminate weapon that created civilian casualties.[37] However, vehement American protests stopped this form of attack in 1915. The Germans shifted their U-boat commerce-destroying offensive to the Mediterranean where they wreaked havoc while remaining within the provisions of international 'prize law'. Although the German Fleet commanders were very unhappy about this withdrawal of forces from the North Sea, the Mediterranean campaign proved tremendously successful and encouraged Germany to make the decision to begin unrestricted submarine warfare later in 1916.[38]

The British Admiralty had considered the problem of protecting seaborne trade since very early in the war, mainly thinking of German surface raiders. Their solution, however, was influenced by the 'offensive at all costs' mindset. This led first to the arming of merchant ships with deck guns (where the guns could be found and made available), and to deploying hunt-and-kill patrols of destroyers and smaller vessels. Taking the offensive was believed to be always preferable over maintaining a defensive posture. Eventually, disguised U-boat hunters ('Q' ships, an idea from the Young Turks) were developed and deployed. These measures were not very successful, but the problem did not become especially serious until 1917.[39]

The stalemate on land and at sea, the revolution in Russia, and the incredible success of U-boats compelled Germany to begin unrestricted submarine warfare in the Atlantic theatre in February 1917. The British reaction to this 'unthinkable' offensive truly revealed the lack of flexibility in the leadership of Britain's navy. The battleship 'decisive battle' never happened. The 'decisive battle' became the 'battle for commerce protection'. That disdained *guerre de course* almost cost Britain the war. Admiral Jellicoe called Germany's submarine warfare "the gravest peril which ever threatened the population of this country...."[40] Shipping losses in 1917 were so staggering that they were withheld from the public, even as the Admiralty scrambled to find a technological, materiel answer to this new threat.

Admiral Jellicoe was reassigned from Scapa Flow to the Admiralty to solve the U-boat crisis. He undertook measures which allowed progress to be made, including

setting up the 'Anti-Submarine Warfare' division at the Admiralty and merging the offices of First Sea Lord and Chief of Naval Staff.[41] These steps were both logical progressions toward an effective staff system that could provide mechanisms to deal with the complexities of the problem. Despite Jellicoe's best efforts, he too carried a mindset that was difficult to overcome: "No voice condemning the convoy was more authoritative than Jellicoe's, and it was his insistence more than anyone else's in refusing to introduce the [convoy] system that led to his downfall."[42] Convoying as an answer was not just disregarded; it was fought against. It appeared to the political leadership that some British admirals would do or say anything to avoid convoying merchant ships. One reason is that the Navy did not want to see the Grand Fleet denuded of its protective screen by allowing destroyers to be transferred to the protection of trade routes.[43] The erroneous idea that only an offensive strategy could defeat the U-boat continued to dominate: a classic case of an obsession with means over ends. The issue became the single-minded destruction of U-boats rather than the protection of vital shipping.

The decision to convoy was only made *in extremis*, and only after considerable confusion. There is still no definitive answer on how the Admiralty was forced into the correct decision. There is, however, a general consensus that by this time in the war (mid-1917) the influence of the radical group of younger officers, the Young Turks, was being felt. No single figure, and certainly not Lloyd George, can reasonably claim sole credit for the belated introduction of convoys. However, their inception could very well have been fatally delayed but for the heroic work of the Young Turks: officers like the indefatigable Captain Richmond. These young officers risked their careers by advancing the convoy cause and preparing memoranda demolishing the anti-convoy case, then feeding information to the War Cabinet through the back door.[44] Eventually, the Young Turks bypassed the Admiralty and secured the support of the Prime Minister to ensure changes would be made to address the U-boat commerce campaign.[45]

What has been described thus far was the naval equivalent of the events on the continent. For many scholars, the land and sea stalemate of the First World War is the classic example of strategy, in its narrowest sense, usurping policy. A long strategic deadlock was produced. Technology on land and at sea hobbled success on the battlefield. On land, the daily loss of men and treasure constrained diplomatic initiatives. This situation has become the major symbol to students of strategy of the ends-means conundrum, the "remarkable disparity between the end sought, the price paid, and the results obtained."[46]

The military mindset discussed in this paper belonged collectively to the British Navy as an 'organizational structure' – not to specific senior officers or politicians. This paper is not intended to be an indictment of individuals who made up the military and political leadership. They were simply 'actors' "conforming to the rhythm of the tragedy."[47] Arthur Marder examined the 'human dimension' of the Royal Navy's performance in the First World War. Although he spoke often of the 'round peg in a square hole' syndrome, he credited the Royal Navy's overall success on the strength of its leadership. This conclusion was derived despite the many examples of intellectual deficiencies and failures recorded before and during the war.[48]

It is equally important to foster historical analysis, debate and intellectualism in time of 'peace'. This examination of an RMA shows us that nothing prepares for success like failure. A willingness to confront failure will produce prescriptions for success. For example, Williamson Murray argues that German *blitzkrieg* success was created when the victors forced the German Army to reduce its officer corps from 15,000 to 4,000. Postwar discrediting of the traditional front-line leadership caused them to discard these 'traditionalists' and create a new structure built around General Staff, or Headquarters Officers, who fostered "a cultural ethos [that] emphasized intellectual as well as tactical and operational excellence."[49] This reorganization produced a German RMA around 'mechanization' and 'aviation' which eventually resulted in battlefield triumphs early in the Second World War.

This examination also shows us that nothing sets one up for failure better than success improperly analyzed. In 1919, the Young Turks were emasculated by naval censorship. Richmond seriously considered leaving the Navy in total frustration because no real lessons were allowed to surface from failures during the war. He wrote: "No real reform is possible until people know what blunders have been made, and everyone is afraid – or against – showing them up."[50] The greatest single loss of shipping in history occured on 21 June 1919 at Scapa Flow in the Orkney Islands. More than 400,000 tons of the finest capital ships in the world were deliberately scuttled, sunk virtually under the eyes of the British 'protectors'. The ships lost included 15 of Germany's 16 battleships, 4 cruisers and 32 destroyers. The French were particularly angry because this ensured continued British dominance at sea as these capital ships were intended to be divided among the Allies.[51] This preserved the Royal Navy's predominant sea power status and fostered their maintenance of traditional theories and doctrine. They next looked for lessons to show how they had won the war. The irony was that

they had almost lost it by their inflexible doctrine in dealing with the U-boat economic blockade. The irony then grew as the RN declared Britain's success against Germany was primarily because of their sea-based economic blockade.

German propaganda poster extolling the exploits of the U-boats in the North Atlantic, ca 1917.

In 1929, Basil Liddell-Hart argued in *The Real War* that Britain's navy had more to do with the winning of the First World War than any other factor: "For the navy was the instrument of the blockade, and as the fog of war disperses in the clearer light of these postwar years that blockade is seen to assume larger and larger proportions, to be more and more clearly the decisive agency in the struggle."[52] Now, more than seventy years later, there is sufficient accumulated historical evidence to refute the absolute nature of that premise. While some historians[53] support the idea that the 1918 collapse of the German will to continue fighting was largely the result of 'blockade action', others believe that the naval actions were inconclusive and subsidiary to the effects of the land campaign which "sapped the manpower, economy and morale of the Central Powers at a far higher rate than the maritime blockade ever did."[54] In fact, Paul Kennedy provides solid evidence that a strictly maritime blockade could never have been effective against a continental power with protected internal lines of communication, and the option of seizing the vast resources obtainable by campaigning in the Balkans and the Middle East. Furthermore, Germany's control of the Baltic throughout the war assured the import of vital war material and provided an outlet for some world trade.[55] Kennedy drew upon the thought and writings Sir Herbert Richmond:

> It was only owing to the fact that the land frontiers of the enemies were sealed by the armies, and that every nation of importance was either actively assisting with her navies at sea, or passively by withholding trade, that the eventual degree of isolation was procured which contributed to the victory.[56]

For his part, Richmond had a successful but turbulent career. The traditional Royal Navy mindset continued, and he was dismissed from the Navy in 1931 for publishing contrary views on the future of large battleships. Nevertheless, despite frequent official displeasure, he did become an admiral, and history remembers him as the one responsible for the creation of the modern naval staff and the Imperial Defence College. He was one of the principal forces in educating the Royal Navy about the importance of intelligent defence policy formulation. In particular, he can still be identified as the one Royal Navy intellectual who recognized the need for subordination of narrow service strategies to the overarching requirements of joint operations in support of national and Allied security interests.

TODAY'S RMA: THE RELEVANCE OF HISTORY

What does this examination of a narrow RMA of one hundred years ago tell us today? In answering this, I will first provide a broad overview of why we should care. The 21st century began with Canada acknowledged by the United Nations as the best country in the world in which to live. An international accolade, however, comes with obligations to the broader community. Canadians consider their country an important middle power with a deep belief in international stability, human security and the international rule of law. We have lived up to this responsibility throughout the last decade by going to war twice (Iraq and Kosovo), and by participating in more than fifty worldwide military deployments in support of conflict

resolution and 'human security' in places as varied as Cambodia and Bosnia.[57] Canadian governments show every intention of continuing to use the Canadian Forces as an instrument of international diplomacy and, when necessary, force.[58]

The leadership of the Canadian Forces is dedicated to ensuring that Canada retains a military capability that is relevant now and into the future. The Canadian Forces must remain an effective and efficient tool of the Canadian polity. To do this we, like Admiral Fisher, have embraced a policy of 'pro-active innovation' which accepts that there is substance to the concept of a new RMA.[59] We are ready to move forward in new and innovative ways to take advantage of emerging technological possibilities to provide capabilities required by the CF. To facilitate this process, the Department has developed a long-term institutional strategy, *Shaping the Future of Canadian Defence: Strategy 2020*[60], and is refining a coherent strategic capabilities planning process.[61]

Bernard Brodie said, "use history – make adjustments for changes in conditions."[62] Canadians must not forget that we have emerged from a turbulent century of hot and cold wars that profoundly shaped Canada and the current international system. War as an elemental part of the history of human experience was rigorously studied and analyzed as both an art and a science, from Clausewitz and Mahan to the RAND Corporation and Kissinger. As the Cold War ended, it was postulated that this tectonic shift in international relations might mark the completion of humanity's ideological evolution. The transcendence of Western liberal democracy emerging as an end state, it was suggested, would bring peace to the international world order – "the end of history."[63] Unfortunately, a decade later, we are now fully aware that war has not ended, only transmogrified into something more complex, more pervasive and certainly not less deadly. There were more casualties and deaths due to conflict during the 1990s than during the decades of proxy wars which marked the Cold War. Furthermore, most of the casualties were civilians.[64] History has not ended. More than ten years after the end of the Cold War, are we any nearer to understanding war and solving the age-old problem of ends versus means? Is Einstein destined to remain correct in his analysis that with the nuclear age, "technology has surpassed humanity"? Or can we use a historical example to better harness the technology represented in the current Revolution in Military Affairs? Historical examples can teach us not to focus on the 'science of science' at the expense of 'the science of war'.

Military skills are often focused on technology and the narrow application of military force. Military technical competence without some strategic wisdom can result in excessive reliance on military solutions that emphasize the means without appreciating the need to concentrate on the political ends required. Military planners and decision makers must not forget that other conflict resolution tools exist, diplomacy among them. The historical record demonstrates that an educated military leadership can help to avoid this tendency to focus on means to the exclusion of political ends. Historical analysis shows the value of understanding more clearly the complex interplay of government, the 'tool' that is the military (in a western democracy), and the nature of the profession of arms. Today, the range of technical means of applying military force is increasing exponentially. More important, the social and cultural considerations associated with the use of force have to be factored into plans and practice. The debate on the RMA[65] highlights the significant changes occurring in the Information Age[66] today, with the concomitant necessity for Canada's military professionals to adapt in order to remain relevant. Our professional status demands that we define and use mechanisms to help answer the question: "Why is military strategy difficult in Canada?"[67] The study of history provides one method of answering this question and assisting in the development of a coherent and distinctively Canadian military strategy for this century.

Warfare is a unity, and Richmond's ideas on joint warfare apply even more to today's RMA than they did ninety years ago. Cold War assumptions and traditions can, however, be severe impediments to progress. Admiral Bill Owens provides an American example in speaking to the inability of US forces to field the new RMA technology because of the Second World War-through-Vietnam bureaucratic legacy associated with their way of warfare.[68] The concepts of distinct sea, air and land warfare that can provide independent strategic effect are anachronistic. They no longer exist. Modern warfare is more than three dimensional; it is now multidimensional and must take into consideration integration of all of the 'means' available, including all forms of land power, sea power and air power.

This century's RMA must include exploration and analysis of the additional dimensions that come from the Information Age, space and cyberspace. Our first job is to understand how true strategic thinking can be applied to these new dimensions: to look at ways to accomplish a more complex set of 'ends' with significantly different 'means'.[69] While doing so, we must not be mesmerized by the 'Dreadnoughts' of the information age. Therefore, these 'means' must cover the full spectrum of today's warfare, and not fixate only on high-end war. Also, we must 'think' about the possibility that our analysis of the current RMA may be still 'way off base'.

There may be a real peril in making presumptions and/or assumptions based on antediluvian thinking.

The ongoing debate about our current RMA is just as useful as historical debate, because it fosters high-level strategic thought among the military, politicians and security analysts. It is also valuable because it demands that we question everything and challenge the current way of 'doing business'. At its centre, this debate is about change and accepting the possibility that some traditional practices are outmoded and need to be scrapped. The willingness to change is difficult, especially for large organizations that value tradition. One of the reasons that today's RMA is so problematic is that its most vocal proponents come from the material school of strategic thought, and many of its detractors are from the liberal arts and historical school. The material school proposes that 'decisive results' are possible from new technology. They continue to make wild claims for the dominance of air power, the future of warfare in cyberspace and for 'information warfare'.[70] Enthusiasm for technological and tactical possibilities are given free reign without any thought into the strategic deployment of these marvellous warfare methods.

As the Dreadnought Revolution showed, it was foolish to apply 'Nelsonian' 'ship of the line' tradition, doctrine and tactics to revolutionary new capabilities. The Canadian Forces must be a flexible institution that is prepared to learn from experience and from conjecture to make necessary organizational and doctrinal changes. Tactical reality must be carefully examined for potential strategic significance. We cannot remain wedded to our present Cold War-era 'platforms' and 'tribes'. We need to examine critically our first principles. Are we constrained by our current doctrinal and organizational forms? During the First World War, Sir Herbert Richmond found it necessary to forward his good ideas in mutinous ways outside the military hierarchy. This behaviour should not be necessary today as we embrace the Information Age and 'netcentric' command and control. Good ideas can come from anyone: "the brilliance of leadership is measured increasingly by its ability to liberate the genius of the rank and file and to inspire that genius with a vision."[71] We should not remain fixated on ironclad command and reporting structures. We must rigorously examine our current warfare theory and doctrine in consonance with the new technology. Some would argue that the CF does not have its own theory and doctrine. If true, this could be an advantage rather than a constraint. The path to the future begins with dealing with the past.

Our latest CF *Concept of Operations* talks about fielding Canadian 'Tactical Level Self-Sufficient Units' (TSSUs).[72] TSSUs must be modular, adaptable and capable of integrating with other international and national forces that are likely to be involved in a joint and combined operation. This concept is itself tailored for the RMA. "Any military activity is inherently tactical. The consequence of all military activity is in the realm of Strategy."[73] Thus, it is our job to look to leveraging the technology of the RMA to deliver Canadian tactical forces with the right technological capability, organization, doctrine and leadership to yield strategic effect.

The RMA as currently conceived and discussed appears to be directed at high intensity warfare: threats to vital national interests. Nevertheless, the bulk of CF military deployments over the last ten years were peace support operations to check offences against our core values and ethics. Clausewitz tells us the prime consideration is identifying what kind of war you are embarking upon: "The first, the supreme, the most far-reaching act of judgement that the statesman and commander have to make is to establish the kind of war on which they are embarking; neither mistaking it for, nor trying to turn it into, something that is alien to its nature."[74]

Most of today's CF operations in support of international stability are discretionary. In these circumstances, where deployments are not necessarily in the national 'vital' interest, western nations are less likely to want to put their soldiers at risk. The technological solution that purports to fight and win a war at arm's length is very compelling to democracies. 'Sending missiles' instead of 'sending soldiers' is typical of the new type of "Post-Heroic Warfare" which presumes that war can be won with superior technology. Unfortunately, this presumes that only certain 'types' of war will be fought – the types you can win with the RMA. It can deal with neither 'children throwing rocks' nor with zealots willing to give up their lives in suicide attacks on high-tech warships.

The air power debate continues. Is the strike capability of modern precision guided munitions the RMA? Is our faith in this new technology justified? Or, are we blinding ourselves to an, as yet, unimagined use for this new technology? We must guard against the complacency and doctrinal rigidity of the RN during the Great War which left it vulnerable to the German U-boat. The idea that air power can provide 'strategic effect' could well be the 'Dreadnought mindset' of this RMA. "Perfect strikes with perfect weapons," was the message to the western media during NATO's Kosovo air campaign.[75] This created the most recent flood of debate about air power alone delivering a strategic win against Slobodan Milosevic and Serbia. This debate continues

with important moral implications similar to the advent of submarine commerce warfare.

The Kosovo NATO air campaign ended without a single NATO combat fatality. This appeared to be the first example of the RMA bloodless war. Michael Ignatieff's study, *Virtual War: Kosovo and Beyond* (2000), provides a superb analysis of the RMA with specific insight into its potential moral dimension. He proposes that the lethal precision which was wielded against the Serbs is an example of "violence which moralizes itself as justice and which is unrestrained by consequences."[76] The fact that the air campaign was directed at many civilian targets – Serbia's critical infrastructure – blurs the distinction between civilian and military objectives.[77] Warfare has changed. As noted earlier in this paper, there were many more civilian than military casualties during the wars of the last decade. The blurring of civilian and military targeting first occurred in modern warfare with the use of the U-boat as a commerce destroyer. Thinking that it could never happen, Britons were morally outraged when U-boats began sinking merchant vessels (as was the US). As regards ethics and war, "the world of military necessity is part of the grammar of war, it cannot be dismissed – ... unrestricted submarine warfare showed the tendency for military necessity to have a superordinate ethic all of its own."[78] The 'grammar of war' changes with technological adaptations to the application of force. We must pay attention to an overriding necessity to analyze 'ends' and 'means' pragmatically in this RMA. The professional military officer must think about the future in a way that avoids the mistakes of the past on the one hand, but does not succumb to radical or extreme flights of fancy on the other. This is a difficult balancing act. It asks us to be both forward-looking and conservative.

As time passes, the analysis shows that geography still rules. Troops on the ground in the form of the guerrilla KLA, and the threat of NATO ground forces, provided the balance of strategic effect that actually caused Serbia to capitulate.[79] Perhaps Colin Gray is right in his scepticism of this part of the RMA when he asserts, "air power is a candidate RMA that has been 'coming' at least since 1918".[80] Meanwhile, ground forces will still remain relevant to Kosovo-like operations and other lower intensity missions such as peace implementation. In these circumstances, we must apply the best of the technology to make the job of the Canadian Forces safer and more achievable.

Colin Gray believes that all "strategic behaviour is cultural."[81] The most significant feature identified in the failures discussed here was the virulent anti-intellectualism that existed in the Royal Navy of that period: a near fatal 'strategic culture'. The first and most important lesson we can learn from this historical examination of a century old RMA is the necessity to have an educated officer corps that is intellectually capable of dealing with the changing circumstances. There must be room for innovators and 'heretics'. The CF organizational culture must be identified, monitored and improved. Barry Hunt wrote in 1982: "The ethics of the military professionalism can never fully accommodate the fundamentally subversive tendencies of the academic mind; yet if the profession is to avoid enslavement to unreasoning orthodoxy, there must be room for innovators of Richmond's kind." The year is 2000. I sincerely hope that Professor Hunt's characterization of the military profession was wrong, and there is lots of room in the Canadian Forces for innovators. The Information Age RMA demands that our profession embrace "the subversive character of academe": officership reforms demand it. We must embrace dissent and debate in forums like the *Canadian Military Journal*, which emulates Richmond's naval journal of the Young Turks.

NOTES

1. John Keegan, *The Battle For History - Refighting World War Two* (Toronto: Vintage Books, 1995).
2. Barry Hunt and Adrian Preston, eds. *War Aims and Strategic Policy in the Great War, 1914-1918* (London: Croom Helm, 1977). Introduction.
3. Colin S. Gray, *Modern Strategy* (New York: Oxford University Press, 1999) pp. 243-244.
4. This is one of ten historical RMAs discussed in current historiography. See Clifford J. Rogers "Military Revolutions' and 'Revolutions in Military Affairs': A Historian's Perspective" in *Towards a Revolution in Military Affairs* (Westport, Connecticut: Greenwood Press, 2000) pp. 21-35.
5. DND Publication, Canadian Officership in the 21st Century: Strategic Guidance For The CF Officer Corps And The Officer Professional Development System, September 2000.
6. See also David MacGregor, "The Use, Misuse, and Non-Use of History: The Royal Navy and the Operational Lessons of the First World War". *The Journal of Military History* Volume 56 Number 4 (October 1992) pp. 603-615.
7. Michael Howard, The Influence of Clausewitz", in *On War*, edited and translated by Michael Howard and Peter Paret (Princeton, New Jersey, 1984 edition) p. 33.
8. *ibid*, p. 39.
9. Barry D. Hunt, *SAILOR-SCHOLAR Admiral Sir Herbert Richmond 1871-1946* (Waterloo: Sir Wilfrid Laurier University Press, 1982) pp. 17-20.
10. Nicholas Lambert, *Sir John Fisher's Naval Revolution* (Columbia: University of South Carolina Press, 1999). Lambert's analysis correctly refutes this simplistic view. He builds on the work of his predecessors with new archival material to produce the most 'balanced' view to date that shows submarines were a critical element in Fisher's plans.
11. Hunt, Introduction to *Sailor-Scholar.*
12. Schurman, *The Education of a Navy*, Chapter Six.
13. *ibid*, p. 112.
14. Richmond letters cited in Schurman, *The Education of a Navy*, p. 123.

15. *ibid*, pp. 112-113.
16. Richmond Letters, published in Hunt, *Sailor Scholar*, p. 30.
17. *ibid*, p. 3.
18. Geoffrey Till, *Maritime Strategy and the Nuclear Age* (London: MacMillan, 1990 edition) p. 7. Cited in text as Richmond.
19. Stephen Roskill, "Decisive Battle and the Royal Navy", in *Maritime Strategy and the Nuclear Age* Geoffrey Till ed. (London: The MacMillan Press Ltd., 1982) p. 107.
20. John Fisher, *Records* (London: Hodder and Stoughton, 1919) p. 90.
21. Marder, *From the Dreadnought* Vol II, pp. 55-59.
22. Cited in Kennedy, p. 245.
23. Barry D. Hunt, "The Strategic Thought of Sir Julian Corbett" in *Maritime Strategy and the Balance of Power* (New York: St.Martin's Press, 1989) p. 121.
24. Paul M. Kennedy, "British and American Strategies, 1898-1920", in *Maritime Strategy and the Balance of Power*, John B. Hattendorf and Robert S. Jordan eds. (New York: St. Martin's Press, 1989) p. 168.
25. E. B. Potter, ed. *Sea Power - A Naval History* (Annapolis: Naval Institute Press, 1981) p. 211.
26. Marder, *From the Dreadnought*, Vol III, p. 437.
27. *ibid*, p. viii. Volume three deals almost solely with Jutland and Marder claimed that "Jutland is incontrovertible proof of the Dutch historian Pieter Geyl's dictum concerning historical interpretation: 'History is indeed an argument without end.' "
28. *ibid*, pp. 166-174. The most serious problem was the unreasonable expenditure of 1174 rounds of 12-inch ammunition required to complete this action... "It suggested that all was not well...but many months were to elapse and a heavy price was to be exacted before these deficiencies were confirmed, let alone made good."
29. Winston S. Churchill, *The World Crisis 1916-1918* Part I (London: Thornton Butterworth Limited, 1927) p. 112.
30. Frederick Maurice, *Lessons of Allied Co-operation: Naval Military and Air 1914-1918* (London: Oxford University Press, 1942) 173. Sir Frederick Maurice argued that if the 'Supreme War Council' had existed in 1915 the French would probably have supported Churchill's initial Dardanelles plan (despite Joffre) and it was the one opportunity in the war to "apply the superior naval power of the alliance...."
31. Kennedy, *The Rise and Fall*, p. 257.
32. Maurice, *Lessons*, p. 105.
33. *ibid*, p. 145.
34. Kennedy, *The Rise and Fall*, p. 200.
35. Bryan Ranft, "The Protection of British Seaborne Trade and the Development of Systematic Planning for War, 1860-1906", in *Technical Change and British Naval Policy 1860-1939* Bryan Ranft ed. (London: Hodder and Stoughton, 1977) p. 3.
36. The Declaration of London (1909), although not ratified by Britain, divided goods into absolute contraband (exclusively military i.e., guns & explosives), conditional contraband (goods susceptible for military use i.e., fuel, clothing, food) and free list (articles never to be considered as contraband i.e., raw materials like cotton, oil, and rubber). There were rules on what blockading forces could do with these goods depending on the nationality of the ship. Britain quickly realized that the 'total war' of 1914 rendered these categories meaningless. Marder, *From the Dreadnought*, pp. 373-374.
37. Marder, pp. 342-348.
38. Reynolds, pp. 459-461. In Fall 1916, 6 boats in the Mediterranean sank 92 merchant ships.
39. Richard Hough, *The Great War At Sea 1914-1918* (New York: Oxford University Press, 1983) pp. 305-307.
40. John Jellicoe, *The Crisis of the Naval War* (New York: George H. Doran Company, 1920) p. vii.
41. John Terraine, "The U-Boat Wars, 1916-1945", *Business in Great Waters* (London: Leo Cooper, 1989) p. 67.
42. Hough, p. 307.
43. Kennedy, "British and American Strategies, 1898-1920", p. 176. Even Beatty, who corresponded with Richmond and favoured convoying, found himself fighting to retain a minimum of 100 destroyers with the Grand Fleet.
44. Discussed in Marder *From the Dreadnought* Vol IV, pp. 190-194, and in Terraine, pp. 58-67. Marder favoured Lloyd George's Memoirs and credited him with forcing Jellicoe and the Admiralty to 'convoy' by "forcing a deliberate encounter" over the issue (30 April 1917). Terrain provides a counter argument stating that, "the decision to convoy was already taken three days before Lloyd George's 'descent' [on the Admiralty]." Professor Don Schurman's research into this issue determined that there is currently insufficient evidence to decide in favour of one version or the other. This is another excellent example of "History as an argument without end" (see footnote 27)
45. Barry Hunt, *Sailor-Scholar*, pp. 61-64.
46. John Baylis, et. al., *Contemporary Strategy: Theories and Policies* (London: Croom Helm Ltd., 1975) p. 29.
47. Churchill, *The World Crisis* pp. 1-2. This quotation is also used by Barry Hunt in a similar context in his introduction to *War Aims and Strategic Policy in the Great War.*
48. Marder, Vol V, pp. 321-345.
49. Williamson Murray, "Armored Warfare " in *Military Intervention in the Interwar Period*, Williamson Murray and A.R. Millet eds. (New York: Cambridge University Press, 1996) p. 36.
50. Richmond Diary, cited in Barry Hunt, p. 105.
51. Dan van der Vat, *The Grand Scuttle* (London: Hodder and Stoughton, 1982), pp. 170-183.
52. Liddell-Hart, *A History of the World War 1914-1918* (London: Faber & Faber Ltd., second edition, 1934), p. 587. Original Title, *The Real War*, 1929.
53. Marder, Vol. V, pp. 297-313. Marder begins his discussion of this issue by referring to an election speech given by Asquith where he makes the same claim as Liddel Hart..."With all deference to our soldiers this war has been won by sea power" 9 December 1918.
54. Paul M. Kennedy, *The Rise and Fall of British Naval Mastery* (New York: Charles Scribner's Sons, 1976), pp. 254-255.
55. Tuvia Ben-Moshe, "Churchill's Strategic Conception during the First World War", in *The Journal of Strategic Studies*, Volume 12, No. 1 (March 1989), p. 12.
56. Cited in Kennedy, *The Rise and Fall*, p. 254. Extract from Sir Herbert Richmond, *National Policy and Naval Strength.*
57. DCDS Web Site Canadian Forces International Operations Booklet. (http:www.dnd.ca/dcds/force_e.htm).
58. Government of Canada Website, http://www.pco-bcp.gc.ca/sft-ddt/ The Government restated this responsibility with the last Speech from the Throne indicating a desire to play an active and independent role in the world and to promote human security in its foreign and defence policy.
59. Record of Decision of the NDHQ Joint Capabilities Requirements Board (JCRB) March 2000.
60. DND Web Site, http://www.vcds.dnd.ca/dgsp/dda/strat/ intro_e.asp
61. *ibid*.
62. Bernard Brodie, "The Continuing Relevance of On War" in *On War*, pp. 53-54.
63. Francis Fukuyama, "The End of History", in *A Look at "The End of History* Kenneth M. Jensen, ed. (United States Institute of Peace, Washington DC, 1990).
64. David A. Lenarcic, "Conflict-Related Casualties: Trends and Patterns", DND/D Pol Dev Research Note 1999/01, October 1999.
65. See Thierry Gongora and Harald von Riekoff eds. *Towards a Revolution in Military Affairs?* (Westport, Connecticut: Greenwood Press, 2000).
66. Alvin and Heidi Toffler, *War and Anti-War* (Boston: Little, Brown and Company,1993). The Tofflers describe very well how the Information Age and other 'revolutions' in today's world impact directly on the U.S. modern military.
67. Dr Lorne Bentley, "Policy, Strategy and Canadian Generalship: A Clausewitzian Analysis", in *Contemporary Issues in Officership: A Canadian Perspective* (Toronto: Canadian Institute of Strategic Studies, 2000) pp. 145-147.
68. Bill Owens, *Lifting the Fog of War* (New York: Farrar, Straus and Giroux, 2000). He refers to a reliance on large forces with an offensive strategy of using massive firepower, and not over-whelming technology.
69. Robert R. Leonhard, *The Principles of War For The Information Age* (Novato, California: Presidio Press Inc., 2000). This is a good effort.
70. Johnson and Libicki, eds. Dominant Battlespace Knowledge (Washington DC: 1996).
71. David Gompert and Irving Lachaw, "Transforming U.S. Forces: Lessons from the Wider Revolution", RAND Corporation on-line document, 2000.
72. Strategic Capability Planning for the Canadian Forces, (http:www.vcds.dnd.ca/dgsp/dda/strat/intro_e.asp).
73. Colin Gray, *Modern Strategy*, p. 18.
74. Peter Paret and Michael Howard eds. *On War*, pp. 88-89.
75. Anthony Cordesman, "The Lessons and Non-Lessons of the Air and Missile War in Kosovo", Centre for Strategic and International Studies, Washington DC.
76. Michael Ignatieff, *Virtual War: Kosovo and Beyond* (New York; Henry Holt & Company Inc, 2000), p. 163.
77. *ibid*, p. 170.
78. Gray, *Modern Strategy*, p. 50.
79. Cordesman, *Lessons and Non-Lessons*, p. 30.
80. Gray, *Modern Strategy*, p. 251.
81. *ibid*, p. 31.