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Edited by Williamson Murray and Allan R. Millett

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INTRODUCTION

WILLIAMSON MURRAY AND ALLAN R. MILLETT

When the West began its ascent to world supremacy in the sixteenth century, military institutions played a crucial role in its drive to power. Recent historical work suggests that the Western military framework has undergone cyclical periods of innovation beginning in the early fourteenth century and continuing to the present and that such periods have resulted in systemic and massive changes to the basic nature of warfare and the organizations that fight.¹ The military history of the twentieth century indicates that this pattern has continued unbroken except that the periods between major innovations have been decreasing even as the complexity of innovation has increased.

A number of factors have driven innovation in military affairs: the rapid pace of technological change, the vast sums spent on military research, and the increasing sophistication with which military organizations evaluate their performance and that of their weapons systems. The fusion of technology and potent management skills that mobilize mass organizations makes military change inevitable. If anything, the technologies influencing civilian life in the next century may have even greater impact on military force than has been true in this century.

The history of the years since 1939 has been one, for the most part, in which military organizations have had access to unparalleled levels of funding and resources. World War II was a great contest for world dominion, but the Cold War, which provided ideological fervor and motivation for vast defense budgets on both sides of competing alliance systems, followed almost immediately on the heels of the great conflict. Thus,

¹ Clifford J. Rogers, "The Military Revolutions of the Hundred Years' War," *The Journal of Military History*, vol. 57, No. 2, April 1993, p. 277.

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motivation and financial support have been a basic factor in the military equation over the last half of this century.

But the period we are now entering appears to be one in which there is no clear threat to the United States, nor is one likely to appear for the foreseeable future. In such an environment, it is inevitable, particularly in democratic nations, that one will see continuing and substantial declines in defense spending. In contrast to U.S. defense spending during the Cold War, the decline will most likely not be cyclical in nature but instead represent a steady erosion of support. At the same time, scientific advances and technological innovations in society at large will confront military institutions with another period of great changes, but one in which there will be much lower levels of support.

The emerging strategic environment in which our military institutions will have to operate suggests a number of similarities to the period between the great world wars of the first half of this century. During this timeframe, military institutions had to come to grips with enormous technological and tactical innovation during a period of minimal funding and low resource support. Some succeeded, creating a huge impact on the opening moves in World War II. Others were less successful and some institutional innovation resulted in dismal military failure.

One must stress that in spite of low military budgets and considerable antipathy towards military institutions in the aftermath of the slaughter in the trenches, military institutions *were* able to innovate in the 1920s and 1930s with considerable success. And these innovations *were not on the margin*: The U.S. and Japanese navies changed the equation of war at sea with their creation of naval air power based on carriers that accompanied their fleets into battle. Similarly, the Germans developed an armored force, based on a combined-arms concept, that overthrew the entire balance of power in Europe by its breakthrough on the banks of the Meuse and the exploitation of that success to the English Channel. In air war, Air Marshal Sir Hugh Dowding set the technological specifications for the Hurricane and Spitfire, supported the initial research into the possible use of radio waves to detect aircraft, and then created an air defense network based on these innovations; his system innovation altered the *entire context* within which air war was to take place and enabled the RAF to triumph in the Battle of Britain. These innovations were thus of great moment; they represented fundamental, basic changes in the *context* within which war takes place. The factors that contributed to innovation in the interwar period are not always easy to discern, but they do provide a measure of how one might best think about innovation, particularly in the coming decades.

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Consequently, the editors of this study have asked our authors to examine seven specific areas of innovation during the interwar period: armored warfare, amphibious warfare, strategic bombing, tactical bombing, submarine warfare, carrier aviation, and the development of radar. In each case, the authors were to compare and contrast the different experiences of three or more national military institutions. The disparity in the effectiveness of military organizations during this period demonstrates the wide spectrum constituting failure or success in innovation. At the end of this volume the two principal investigators have attempted to draw together their perspectives on innovation in this period and the possible lessons those interested in innovation might consider.

The authors of this volume, as practicing historians, are reluctant to draw “lessons learned” for the innovators of the future. History, reflecting the nature of the world from which it is drawn, is an inexact discipline. It does not and cannot offer clear answers. This study asks how one might study innovation and what patterns may characterize successful, guided changes. As Clausewitz has suggested:

Whenever an activity deals primarily with the same things again and again – with the same ends and the same means, even though there may be minor variations and in infinite diversity of combinations – these things are susceptible of rational study. It is precisely that inquiry which is the most essential part of any *theory*, and which may quite appropriately claim that title. It is an analytic investigation leading to a close *acquaintance* with the subject; applied to experience – in our case to military history – it leads to thorough *familiarity* with it. The closer it comes to that goal, the more it proceeds from the objective form of a science to the subjective form of a skill, the more effective it will prove in areas where the nature of the case admits no arbiter but talent.²

The purpose of this study is to provide insights into the nature of the processes involved in major innovation and change in military organizations during the interwar period and to highlight those factors that encourage success as well as those that inhibit innovation. Among the crucial issues this study seeks to explore are the problems involved in doctrinal, technological, and weapons innovation in a period of severe budget constraint and revolutionary technological change. In particular the authors have attempted to address in a comparative sense the differences among their military organizations, to bring to the fore why some

² Carl von Clausewitz, *On War*, ed. and trans. by Michael Howard and Peter Paret (Princeton, NJ, 1976), p. 141.

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succeeded and some failed. This is, of course, an historical study, but we are looking at history to suggest possible paths for the future.

To achieve this objective, the co-principal investigators asked the participants to structure their essays around three concepts: the strategic framework of the period, the organizational factors of the institutions under study, and the doctrinal framework of the services. We asked the essayists to pose a series of questions for each concept. The authors were to consider what the general strategic framework was within which military institutions had to function in the 1920s and 1930s, how military and political leaders viewed potential enemies, what the services viewed as their overall strategic mission, and how they conceived the next year. The essayists were also to investigate the domestic political environment of the services, especially the issues of funding, access to technological resources, and congruence between political objections and force capabilities. Finally, the authors were to comment on the impact of World War I on both the strategic environment and preparations for a future conflict.

When looking at organizational factors, the essays were to address the efficacy of the services' internal administration in accepting or discouraging innovations. They were to examine such aspects as differences in the pattern of administration between the services compared, national cultural preferences which influenced the services' preparations for war, and the role of professional military education in the capacity to adapt.

The issues addressed in the area of doctrinal framework were to include an assessment of the services' commitment to the problem of doctrine and of their rigor in drawing and learning the lessons of World War I. Other doctrinal concerns were the services' evaluation of their doctrine in light of their potential opponents, and the seriousness with which they incorporated doctrinal principles into training.

This study will neither attempt to establish any grand theory of innovation nor create a model for explaining innovation. Stephen Rosen has already demonstrated the difficulties of such a task. In his book *Winning the Next War*, he has analyzed the existing literature on innovation and failed to find any patterns, in either the military or the far more common industrial studies, that would support such claims. In fact, he has shown that it is far more common for innovation theorists to advance conflicting ideas than to agree on causal relationships.³

Rather, this work emphasizes the complexities and ambiguities inherent in innovation, which defined its framework during the interwar peri-

³ Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca, 1991), pp. 1-53.

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od. Thus, the essays will address the failures as well as the successes of the 1920s and 1930s. The study assumes that innovation is natural and the result of a dynamic environment in which organizations must accept change if they are to survive. While the period of 1918 to 1939 was technically one of peace, the future combatants engaged, especially as war approached, in intellectual and technological jockeying and sought advantages in material and doctrine. It is important to discover what innovative military organizations look like, what their characteristics are, and what actions can be taken to encourage innovation. This study, then, aims at providing a guide to what the past experiences of military organizations have been and how one might best think about innovation in the future. It does not, however, provide guarantees, only the surety that thinking about the past is indeed the only path to the future.

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ARMORED WARFARE

The British, French, and German experiences¹

WILLIAMSON MURRAY

Tanks had appeared in large numbers only at the end of the Great War. Their first success had come in the Battle of Cambrai in fall 1917. They had also played a major role in the Australian success at Amiens in early August 1918, a battle that Ludendorff characterized as “the darkest day for the German Army in the war.” Whatever their promise, the performance of those ungainly vehicles in World War I was spotty. A slow, difficult-to-maneuver weapon of war, the armored fighting vehicle of 1917 and 1918 offered its crews minimum vision, maximum discomfort, and general mechanical unreliability.

It was a weapon designed for one simple task: crossing the killing zone between trench lines and breaking into enemy defenses.² Neither its developers nor operators had moved beyond that role when the war ended in November 1918. Admittedly, J.F.C. Fuller, at that point working in the War Office, had conceived an ambitious plan, Plan 1919, to use tanks in the next year to attack German headquarters – up to corps level – to paralyze the enemy’s command and control. But peace came before the British Army could attempt such an ambitious conception. Consequently, as Eu-

¹ I am indebted to Barry Watts of the Northrop Corporation for his thorough, intelligent, and *imaginative* critique of earlier versions of this draft.

² For a recent discussion of the problems involved in the British Army’s adaptation of the tank in World War I see: Stephen Peter Rosen’s *Winning the Next War, Innovation and the Modern Military* (Ithaca, 1991). For the most thorough discussion of the role of the tank in the British war effort see Timothy Travers, *How the War Was Won: Command and Technology in the British Army on the Western Front, 1917–1918* (London, 1992). See also Shelford Bidwell and Dominick Graham, *Firepower: British Army Weapons and Theories of War, 1904–1945* (London, 1982); and B.H. Liddell Hart, *The Tanks, 1914–1939* (New York, 1959).

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rope entered into two decades of peace, the tank, like the airplane, represented a weapon of potential and promise rather than performance on the battlefield.

The rush to judgment in the aftermath of World War II has fundamentally distorted our understanding of the process of innovation in armored warfare in the 1920s and 1930s. On one side, military reformers, in particular B.H. Liddell Hart and J.F.C. Fuller, used the disastrous defeats of the French Army in May 1940 and of the British Army during the succeeding two years to promote their own personal agendas.³ On the other side, professional historians have emphasized the economic and strategic aspects of German rearmament to explain operational and tactical factors that occurred for reasons unrelated to and independent of the strategic framework.⁴

In sum, the traditional picture has explained the German success in the following fashion: the Germans, reacting to defeat in World War I, developed a *revolutionary* approach to war, one that emphasized maneuver and armored war as a means to escape the strategic and political consequences of their defeat in 1918. Their opponents, the stodgy, unimaginative officer corps of France and Britain, refused to learn the obvious lessons of the last war and went down to defeat in the great battles that occurred in May 1940 because the conceptions and approaches of the prior war had thoroughly muddled their thought processes.⁵ However, the picture that has evolved over the past fifteen years has substantially altered the traditional view. The real explanation lying behind the catastrophe of May 1940 is more complex and opaque. And the development of armored forces in the interwar period, the demand for innovation that new weapons like the tank required, and the problems in developing historically grounded, yet relevant doctrine provide instructive lessons for the present day.

³ For the best discussion and critique of Liddell Hart see Brian Bond, *Liddell Hart: A Study of his Military Thought* (London, 1972). See also John Mearsheimer, *Liddell Hart and the Weight of History* (Ithaca, 1988) which contains useful discussions. For Fuller see Anthony John Trythall, "Boney" Fuller: *The Intellectual General, 1878–1966* (London, 1977).

⁴ The classic expositions of this line of argument are Burton Klein, *Germany's Economic Preparations for War* (Cambridge, MA, 1957) and Alan Milward, *The German Economy at War* (London, 1965). See also Larry Addington, *The Blitzkrieg Era and the German General Staff, 1865–1941* (New Brunswick, NJ, 1971).

⁵ Even before World War II J.F.C. Fuller had provided a devastating, if unfair, critique of the leadership of the British Army and its capacity to innovate. See J.F.C. Fuller, *Generalship, Its Diseases and their Cure: A Study of the Personal Factor in Command* (London, 1936).

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The processes of innovation that created armored forces in the interwar period are anything but clear. Idiosyncratic issues entered the picture to one degree or another because personalities, intellectual trends, societal influences, and the position of military organizations in society all affected innovation and adaptation to new technologies. Moreover, development of armored capabilities took place within a larger framework of doctrinal change, modernization, and technological innovation that affected all military capabilities. In that light a narrow focus on the peculiarities involved in developing armored or panzer divisions would entirely miss the larger problems involved in innovation and distort the actual factors that are of importance in explaining success or failure.

This case study aims to address the issue of innovation by examining the experiences of the British, French, and German armies in developing conceptions of armored warfare in the 1920s and 1930s. It is a story that suggests the inherent difficulties involved in any successful innovation. In a period of substantially reduced military budgets and great distrust of military institutions – at least in the democracies – military institutions had to develop forces that took into account a whole host of changes. Moreover, few tactical and operational lessons from the last war were clear to anyone, including historians.⁶ But all reacted to the terrible experiences of World War I through which they had recently passed. How military organizations would perform on the battlefield of the next war very much reflected how they adapted the murky and unclear lessons of the preceding conflict to the process of innovation.

THE STRATEGIC AND POLITICAL FRAMEWORK

Military innovation does not occur in a political vacuum. The military organizations under study here existed within different political and strategic environments despite the fact that they were neighbors in Western Eu-

⁶ Perhaps the greatest disservice that Fuller and Liddell Hart rendered their nation was the idea that the single, obvious, explanation for the hideous slaughter of the trenches had lain in the stupidity of the generals. The complexities involved in understanding the World War I battlefield are best suggested by the fact that only in the 1980s with the publication of Timothy Lupfer's *The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War* (Leavenworth, KS, 1981) and Timothy Travers' *The Killing Ground: The British Army, the Western Front, and the Emergence of Modern Warfare, 1900–1918* (London, 1987) and *How the War Was Won* that we have finally begun to understand the World War I battlefield. We still do not have an equivalent work for the French, Italian, or Russian armies. If historians who possess the documents and unlimited time have taken seventy years to unravel the changing face of the battlefield, one should not be surprised that the generals had some difficulty during the war.

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rope. Moreover, their experiences were distinctly different in the decades under consideration. The 1920s were a relatively peaceful period, while the 1930s were a time of increasing tension. But even then, throughout the interwar period the German Army felt that it possessed a clear mandate to prepare for a war on the continent, while the British Army until March of 1939 never received firm direction from the national government to prepare for such a contingency.⁷

The British political and strategic environment

From 1920 until early 1939 the British Army existed in an antimilitary milieu, one in which *all* the democratic parties rejected the experience of World War I. Liddell Hart gave voice to the national feelings with his argument for “limited liability.” Such a strategic approach, he argued, was the traditional British way of war – an approach which had allowed Britain to escape the heavy casualties associated with continental war. By using naval supremacy and a small army for attacks on the periphery (as well as on colonies), the British had influenced the course of continental conflicts, while at the same time capturing a great world empire.⁸

Liddell Hart’s arguments had little basis in historical fact, but they appeared as an attractive alternative to the prospect of another blood bath on the Western Front. Ironically, his arguments only served to undermine whatever rationale might have existed to create armored forces in the British Army of the 1930s. The attitudes among the *literati* reinforced a national mood of isolationism; novels and war reminiscences such as Frederick Manning’s *The Middle Parts of Fortune*, Guy Chapman’s *Passionate Prodigality*, Robert Graves’ *Goodbye to All That*, and the novels of Siegfried Sassoon – among innumerable others – reinforced antiwar and antimilitary attitudes that more and more characterized the conventional wisdom. By the mid-1930s much of the educated population in Britain fervently believed that nothing was worth the price of war.⁹

Not surprisingly this sentiment created a hostile political environment for the army, particularly since it received much of the blame for the war’s casualty bill. Despite an increasingly threatening international environ-

⁷ This was equally true throughout the history of the Weimar Republic as in the period of the Third Reich. The only difference lay perhaps in the level of immediacy with which the officer corps lived with the threat of war.

⁸ See B.H. Liddell Hart, *The British Way in Warfare* (London, 1932).

⁹ The surest indication of the national mood in the early 1930s was the infamous Oxford resolution of 1933, a resolution that declared that Britain’s best and brightest would not fight for either king or country at a time that Hitler was already in power in Germany.

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ment in the 1930s, governmental and national willingness to expend financial and other resources on defense remained minimal.¹⁰ Even more distressing for the army was the fact that its sister services received priority for funding, personnel, equipment, and training. Army leaders, at least from the mid-1930s, recognized that Germany was their most probable enemy and that such a conflict would require the commitment of its troops to the continent. But they made little headway against political and popular perceptions.

In spring 1937 Neville Chamberlain became prime minister, and his government wholeheartedly embraced a strategy of “limited liability.” A series of defense reviews emphasized that Britain would not commit an army to the continent under any circumstances. As the prime minister told his colleagues in spring 1937, he

did not believe that we could, or ought, or in the event, would be allowed by the country to enter a Continental war with the intention of fighting on the same line as in the last war. We ought to make up our minds to do something different. Our contribution by land should be on a limited scale. It was wrong to assume that the next war would be fought largely by ourselves alone against Germany. If we had to fight we should have allies who must . . . maintain large armies. He did not accept that we must also send a large army.¹¹

As a direct result, work to prepare the army for a continental role halted. In March 1938, Lord Gort, chief of the imperial general staff (CIGS), told the Committee of Imperial Defense that “in the circumstances it would be murder to send our soldiers overseas to fight against a first-class power.”¹²

Essentially, the army represented to British politicians no more than a colonial police force, aimed at controlling the colonies. The government underlined Gort’s testimony by assigning the following priorities to the army: 1) to protect the British Isles; 2) to guard the trade routes; 3) to garrison the empire and 4) to cooperate in the defense of Britain’s allies – but only after it had met its other commitments.¹³

Chamberlain imposed a limit on defense spending in 1937 that cut

¹⁰ For a closer examination of these issues see Williamson Murray, *The Change in the European Balance of Power, The Path to Ruin* (Princeton, NJ, 1984), chapter 2.

¹¹ PRO CAB 23/88, Cab 20 (37), Meeting of the Cabinet, 5.5.37., p. 180.

¹² PRO CAB 2/7, CID, Minutes of the 313th Meeting held on March 17, 1938.

¹³ PRO CAB 24/275, CP 72 (38), 19.3.38., CID, “The Organization of the Army for its Role in War.”