

French tanks and cavalry  
in assembly area.



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# Comparative Approaches

# to Interwar Innovation

By WILLIAMSON MURRAY

**M**ilitary organizations encounter conceptual problems during periods of innovation. First, since the future is rarely obvious, the process is dominated by ambiguity and uncertainty. Second, the conditions of war can seldom be replicated in peacetime. Experimentation in peacetime, along with coherent analyses of recent combat experience, drives innovation or retards

it and is crucial in testing concepts and technology, although what Clausewitz refers to as the difference between “war on paper and real war” often obscures their lessons.

Experiments do not occur in a vacuum. They are related to concepts about the nature of war. Moreover, they are vital in transmitting doctrine to combat forces and providing a framework around which training and preparations for war occur. To an extent they can furnish a test—albeit not entirely realistic—of how concepts work in practice. Finally, experiments occur in human organizations. Consequently, political and organi-

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Field radio, German  
2<sup>d</sup> Command Group.

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zational agendas of institutions affect the realism of experimentation—and what is learned.

The role of experiments in the innovation process during the interwar period suggests much about the attributes that enhanced change or detracted from it. This analysis traces experimentation in German, French, and British militaries and concludes with observations about experimentation and innovation during a sustained period of peace. The purpose is not to imply parallels with the past, but rather to determine the limits within which experiments might further innovation in an uncertain future.

### Lessons Learned

During the interwar years military culture in Germany was very receptive to innovation for a number of reasons. Nevertheless, it did not set out to create what pundits early in World War II called *Blitzkrieg* warfare. Instead it aimed to evolve capabilities that addressed current as well as long-range operational and tactical problems.

The crucial point in developing armored mechanized warfare came in the early 1920s, when General Hans von Seeckt assumed command of the army. Responding to the demand under the Treaty of Versailles for massive downsizing, which reduced the officer corps by 80 percent, Seeckt placed the general staff in firm control of the army. Putting the educated elite in charge led to a thorough and realistic assessment of World War I.

Some historians hold that armies focus on the last war, which explains why they do badly in the next. That claim is generally misleading since military organizations rarely study what actually happened, but rather what they believe happened. They thus do not address discomfiting issues, which is the only way to learn from the past. In the case of Germany, however, Seeckt established no fewer than 57 committees on World War I. He remarked that “it is absolutely necessary to put the experience of the war in a broad light and collect this experience while the impressions won on the battlefield are still fresh and a major proportion of the experienced officers are still in leading positions.”<sup>1</sup>

The lessons learned were combined in two doctrinal studies in 1923 and 1924 that provided Germany with the most reliable tactical doctrine available in Europe. In 1932 three senior generals, including the future commander in chief of the army, Werner von Fritsch, and future chief of staff, Ludwig Beck, rewrote the 1923 and 1924 studies. Publication of *Die Truppenführung* formed the framework for the preparation and conduct of ground operations during World War II.

This doctrine did not use a top down approach, but rather stressed friction, uncertainty, and the requirement for junior officers to assume responsibility and exercise judgment. What is more, substantial parts of *Die Truppenführung* dealt with the greater use of tanks at a time when the army did not have a single armored fighting vehicle. In fact, it even suggested that “when closely tied to the infantry, the tanks are deprived of their inherent speed.” This is critical because it meant that by the early 1920s Germany had a coherent combined arms doctrine that emphasized decentralized command and control (mission type orders), speed, surprise, and aggressive exploitation of any weaknesses in enemy defensive systems.

Development of *Wehrmacht* panzer forces took place during the 1930s within the context of combined arms doctrine. Tank pioneers emphasized that panzer units must include integral forces such as motorized infantry, artillery, engineers, and signal troops. Doctrine stressed the ruthless, mobile, and rapid exploitation of breakthroughs by panzer units. Yet such thinking was inherent in the doctrine of other combat branches at the time. Thus new panzer divisions simply extended the principles on which German doctrine rested, which explains why infantrymen like Erwin Rommel and artillerymen like Eric von Manstein found it relatively easy to command armored formations.

**the lessons learned provided Germany with the most reliable tactical doctrine available in Europe**

Hindenburg during maneuvers, 1931.



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### Testing for Effect

The German army conducted experiments within an existing framework. The object was to test doctrine and concepts, not to prove them. Consequently there were few scripted drills, and the goal was to push units to the breaking point—to discover how things went wrong and why. There was little room for events in which all the objectives were met. Although the Germans were still involved in lessons learned processes focused on World War I, Seeckt was already urging officers in new directions. In 1922, with limited resources, the army conducted a major experiment in the Harz Mountains with motorized troops. Seeckt's observations on that event reveal why Germany was successful in mechanized warfare innovation. In circulating the after action report he made the following observation:

*I fully approve of the Harz exercise's conception and leadership, but there is still much that is not clear about the specific tactical use of motor vehicles. I therefore order that the following report be made available by all staffs and independent commands as a topic for lectures and study. Troop commanders must see to it that experience in this area is widened by practical exercises.*

Seeckt sought to engross the whole force in an intellectual transformation.

Although they possessed no tanks, the Germans learned much from the British experiments with mechanized forces between 1926 and 1934.

A report in 1926 on the experimental armored force maneuver stated that tanks could substantially increase the exploitation of breakthroughs in enemy front lines. It also suggested that the *Reichswehr* undertake serious experiments in how to defend against tanks breaking into rear areas—in other words, execute a mobile defense in depth. Almost immediately after British maneuvers in 1934, the chief of the general staff circulated an extensive report on what occurred on the Salisbury Plain and what it meant for the rapidly rearming army, which had yet to establish its first panzer division.

The appointment of Adolph Hitler as Chancellor in January 1933 changed the situation of the *Reichswehr*. At his first meeting with senior officers he authorized a massive buildup and told them to disregard the prohibitions imposed at Versailles. In 1935 an experimental, battalion-level force of tanks impressed Fritsch and Beck enough that they approved the formation of three panzer divisions.<sup>2</sup> Again, the German army did not leap into the future; it organized tank brigades to work with infantry as well as motorized infantry divisions and set about learning how mechanized units could extend the capabilities of combined arms forces.

In fact, there was opposition among senior leaders to the notion of armored exploitation of



German armored car in Bavaria.

breakthroughs until the Polish and French campaigns. Future field marshal Gerd von Rundstedt commented to Guderian during an exercise with armored units, “All nonsense, my dear Guderian, all nonsense.” Yet within his skepticism there was a willingness to adopt what was useful and possible. The occupation of Austria in 1938 saw considerable difficulty with deploying mechanized forces; nevertheless the army built on that experience to improve its fledgling armored forces.

The Germans also used wargames to experiment with mechanized formations. In summer 1935, before the army possessed its first armored division, Beck studied the uses of armored corps in paper exercises. Thus by late 1935, when armored divisions were just beginning to be formed, Beck recommended using panzer divisions against long-range objectives as well as an independent force “in association with other motorized weapons.”<sup>3</sup> And, in 1936, the general staff considered utilizing a panzer army in war.

Yet it was not until the Polish campaign that a substantial number of senior officers became convinced that the rapid exploitation of mechanized forces offered real possibilities. In Poland the highest level at which Germany employed panzers was corps. This was also true in the following year in France. It was only during the invasion of the Soviet Union that panzer armies appeared.

The underlying German approach to experimentation was keeping options open rather than closing them. Experimentation elucidated the possible, and everything was rigorously evaluated to include combat lessons learned analyses.

The aim was not to make the organization look good or even to identify who failed, but to learn.

### From the Top Down

No army was as influenced by World War I as the French. Casualties, which totalled over a million and a quarter dead, exercised a baleful influence over civilian as well as military leaders. But France did not make an extensive study of the conflict. Influenced by its heavy losses in the many failed offensives of the first three years of the war, the army concentrated on the successes of summer and fall 1918, particularly First Army operations conducted by General Eugene Debeney. Because Debeney became the director of the war college, selection of First Army experiences was hardly surprising, but it did not contribute to a full understanding of tactical and operational issues. In August 1918, with careful articulation of firepower, limited infantry advances, and tight exercise of command and control, Debeney scored a significant success against the Germans with relatively light losses. But in no sense were his attacks typical, even in 1918.

Nevertheless, heavy German casualties in spring 1918—nearly a million in a period of four months—did not make exploitation tactics enticing to the French. In fact, the disaster in 1940 was caused by a consistent refusal to believe that the Germans could move with the speed their doctrine called for. As the French historian and reserve officer Mark Bloch observed in 1940:

*Our leaders, or those who acted for them, were incapable of thinking in terms of a new war. . . . The ruling idea of the Germans in the conduct of war was speed. We, on the other hand, did our thinking in terms of yesterday or the day before. Worse still: faced by the undisputed evidence of Germany's new tactics, we ignored, or wholly failed to understand the quickened rhythm of the times. . . . Our own rate of progress was too slow and our minds too inelastic for us ever to admit the possibility that the enemy might move with the speed which he actually achieved.<sup>4</sup>*

France did not adopt the iterative approach of the 57 committees organized by Seeckt nor conduct a wide ranging examination of what went right and wrong during World War I. Leaders who were bent on imposing their views on the army did not create an atmosphere that encouraged debate. The commander in chief throughout the late 1930s, General Maurice Gamelin, established the high command as the sole arbiter of doctrine early in his tenure. From that point, all articles, books, and lectures produced by serving officers required command approval. As one officer later noted, “everyone got the message, and a profound silence reigned until the awakening of 1940.”<sup>5</sup>

Foreign observers in  
French Alps, 1937.



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The pace of German rearmament under the Third Reich admittedly alarmed France, though intelligence exaggerated its speed. Nevertheless, there was little interest in foreign writers, even while Germany paid attention to thinkers such as J.F.C. Fuller and B.H. Liddell Hart either directly or indirectly. Both chauvinism and official dicta stifled interest in such influences.

In the event, French doctrine stressed tight control, with artillery dominating all operations. Manuals emphasized that firepower provides “a remarkable strength of resistance to improvised fortifications.” The army would only go on the offensive under “favorable conditions after the assembling of powerful material means, artillery, tanks, munitions, etc.”—a recipe for disaster.

### Looking Good

Some historians may contend that inordinate emphasis on firepower prevented the French from understanding how improvements in tactical mobility, coupled with techniques

that originated in German infiltration tactics of World War I, could overturn accepted and combat-tested methods. The concept of a tightly controlled and centralized battle belonged to another era, and the sense of chaos and futility that emerged after the performance of the French in 1940 revealed an inability to force its method of fighting on the Germans.

Although some claim that this state of affairs arose because of doctrinal predilections, there is more to the story. The French approached experimentation in the same fashion as their doctrine and concepts of war. The purpose of these undertakings was not to test ideas but to prove the preconceived notions of those who authorized experiments and field trials.

The high command proved slow in establishing even relatively modest experiments such as creating an armored division. Through the late 1930s interminable discussions took place on the higher levels, with Gamelin invariably arguing that such proposals needed further study rather than precipitating action. The result was that while proposals for experiments with mechanized forces appeared regularly on meeting agendas, the

French cavalry on patrol.



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French did not establish their first armored division until December 16, 1939—two and a half months after the Polish catastrophe. There were admittedly problems with tank production, but such issues were no more daunting than those confronting the Germans. It was the will to move in new directions that was lacking.

French exercises and experiments were highly stylized and scripted. Their top-down nature is suggested by the fact that Gamelin forbade maneuvers with medium tank units unless a member of the high command was present.

The September 1930 maneuver in Lorraine typified a system which placed a mechanistic approach at the heart of everything the army did. The German attaché acidly commented that the “infantry did not know how to attack.” Even Gamelin had to admit that the exercise was “not an attack but a funeral procession . . . the infantry following the tanks like hearses.”<sup>6</sup> French interwar attitudes towards experimentation carried over into the conflict. The army spent relatively little time over the winter of 1939–40 training to

**in the interwar period the Royal Air Force conducted experiments that should have been alarming**

meet the coming challenge; equally important was a general unwillingness to learn from the defeat of the Polish army in September 1939.

Exercises on both sides of the Rhine in 1937 underlined differences between the opposing forces. French maneuvers, highly scripted with top-down control, offered little latitude for initiative by subordinate commanders. Moreover there was scant emphasis on unit testing. On the other hand, foreign observers came away from German maneuvers either terrified or impressed. The British sensed the energy and drive of the German army to test the organization to the breaking point under realistic conditions. The exercise force largely consisted of infantry and artillery, but the stress on combined arms tactics was thoroughly modern.

### Tragic Misdirection

In the interwar period the Royal Air Force (RAF) conducted experiments that should have been alarming. Aerial combat during the Spanish Civil War suggested that air superiority would be critical in the next war. But there was admittedly no way of testing the vulnerability of bombers to fighters. Moreover the British displayed little interest in learning from others about either air-to-air combat or bombing accuracy. The most glaring



Courtesy, U.S. Air Force History Office

**Wellington bomber during training exercise.**

problem arose in evaluations of RAF experiments with bombers throughout the 1930s. Target identification and bombing accuracy remained issues until the outbreak of World War II. In May 1938 the assistant chief of air staff admitted:

*It remains true . . . that in the home defense exercise last year, bombing accuracy was very poor indeed. Investigation into this matter indicates that this was probably due very largely to failure to identify targets rather than to fatigue.*

Asked in the early thirties how air crews would locate targets at night or in bad weather, future Air Marshal Arthur Tedder replied derisively, "You tell me!"<sup>7</sup>

Experiments generally tested little. As the official historians of Bomber Command noted:

*Thus, the Bombing Committee [established to consider bombing accuracy] had to rely on the trials at the armament training camps and theoretical reasoning. But the trials provided no test for the identification of a target. They were often made at levels which*

*would be impossible in wartime against defended targets. They took place in daylight and in good weather. There were hardly any tests as to what could be done at night or in cloudy weather. Under these conditions some squadrons were able in practice to produce a high degree of accuracy. But in the large scale exercises which approached more closely to war conditions, their deficiencies were exposed. . . . The Manual of Air Tactics contained minute instructions on the various kinds of bombing, special attention being given to high-level bombing in daylight. Most of this was necessarily based on theoretical reasoning since there had been so little practical experiment.*<sup>8</sup>

Some within Bomber Command recognized the extent of the problem. In May 1939 the commander of 3 Group admitted that, according to experimentation, crews could at best bring their aircraft within fifty miles of targets by dead reckoning. But for the most part the RAF leadership were in denial. The rejection was so strong that it took the devastating analysis of the Butt Report in 1941 (after nearly two years of war) to indicate that barely a third of crews were getting

within five miles of their targets (an area of no less than 75 square miles). Confronted with the possibility that the government might suspend the strategic bombing offensive, Bomber Command got interested in a broader definition of technology than simply having faith that the bomber would get through.

This definition had consequences for areas other than bombing accuracy. In March 1940 Air Marshal Sir Hugh Dowding advised the Air Ministry that Bomber Command would need long range escort fighters to execute a strategic bombing campaign against Germany. He received the following reply:

*It must generally speaking be regarded as axiomatic that the long-range fighter must be inferior in performance to the short-range fighter. . . . The question has therefore been considered many times, and the discussion has always tended to go in circles. . . . The conclusion has been reached that the escort fighter was a myth. A fighter performing escort functions would, in reality, have to be a high performance and heavily armed bomber.*

One year later Prime Minister Winston Churchill asked the same question and received a similar reply from the Chief of Air Staff, Air Marshall Sir Charles Portal. Churchill stated that this response “closed many doors.”

The top-down RAF approach constrained experimentation to such an extent that only some of the possibilities were examined. Experiments were carefully circumscribed to support doctrinal preconceptions that bordered on the ideological. This situation not only resulted in a force largely irrelevant to events in 1939, but one that only adapted after extraordinarily heavy casualties.

A number of points can be drawn from the experimentation in the 1920s and 1930s. First, it appears that top-down leadership usually resulted in flawed experimentation. Though innovation requires support from the top, experiments and exercises must test precepts and conceptions. Top-down leadership breeds institutional biases against ideas emerging from below. Such an approach leads to experiments that confirm revealed doctrine rather than provide objective testing.

Second, effective innovation requires an identifiable enemy. Germany intended to fight both Poland and Czechoslovakia and eventually France. When enemies remain undefined, it is difficult to develop a coherent concept to fit national strategy or even the next war.

Third, both experimentation and innovation must be historically connected to the recent past as well as understanding the unchanging nature of war—that fog, friction, and ambiguity will interfere with the conduct of operations regardless of technological advances. Military institutions that distorted or failed to examine recent battles ran into substantial problems in the interwar period. Their experiments failed to address real issues. Moreover, militaries that entirely rejected history based their doctrines and conceptions on fallacious technological assumptions. Those suppositions drove experiments in irrelevant directions, and lessons that might have been learned were ignored.

Finally, military culture was integral in developing realistic and effective experiments that examined the potential of innovation and exercises that contributed to the process. It had to be receptive to learning from tests and drills. Not surprisingly, a culture that encouraged critical study of even the most closely held beliefs innovated most intelligently. The creation of feedback loops depended on honesty and a sense of the importance of learning. Those who valued looking good rather than demanding rigor may have achieved their goals in the short term but paid in blood for their shortsightedness over the long term once war came.

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## NOTES

<sup>1</sup> James S. Corum, *The Roots of Blitzkrieg: Hans von Seeckt and German Military Reform* (Lawrence, Kan.: University Press of Kansas, 1992), p. 37. Seeckt posed the following questions to the committees: “What new situations arose in the war that had not been considered before the war? How effective were our prewar views in dealing with the above situations? What new guidelines have been developed from the use of new weaponry in the war? Which new problems put forward by the war have not yet found a solution?”

<sup>2</sup> Robert J. O’Neill, “Doctrine and Training in the German Army,” in *The Theory and Practice of War*, edited by Michael Howard (New York: Praeger, 1966), p. 157.

<sup>3</sup> Wilhelm Deist, *The Wehrmacht and German Rearmament* (Toronto: University of Toronto Press, 1981), pp. 42–43.

<sup>4</sup> Marc Bloch, *Strange Defeat* (New York: Norton, 1968), pp. 36–37, 45.

<sup>5</sup> Andre Beaufre, *1940: The Fall of France* (New York: Praeger, 1968), p. 47.

<sup>6</sup> Eugenia C. Kiesling, *Arming Against Hitler: France and the Limiting of Military Planning* (Lawrence, Kan.: University Press of Kansas, 1996), p. 139.

<sup>7</sup> Guy Hartcup, *The Challenge of War* (London: Brassey’s, 1967), p. 126.

<sup>8</sup> Charles Webster and Noble Frankland, *The Strategic Air Offensive Against Germany*, Vol. 1 (London: Her Majesty’s Stationary Office, 1961), pp. 117–18.