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THE HISTORICAL EVOLUTION OF OPERATIONAL ART: FROM FREDERICO THE GREAT TO "GOLDWATER-NICHOLS ACT"

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ABSTRACT

O perational art is widely used to enable analysis and planning at the operational level. Its development took place over the last two centuries, has passed through a brief period of oblivion and is now part of virtually all military doctrines. This article aims at providing a broad overview of the historical evolution of operational art, connecting the main historical events that marked its development, in order to facilitate its current understanding. We used literature review as research method. This paper provides readers with a comprehensive and organized report on the theme.

Keywords: Operational art. Operational level. War. Strategy. Tactics. Planning. History.

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INTRODUCTION

Operational art is currently an essential part of military studies in a large number of countries, as its foundations are effectively used in actual operations planning. Staff courses around the world seek to disclose important concepts such as: operational level; joint operations; center of gravity; time, space, and force factors; lines of operation; and operational design.

One of the challenges in discussing these concepts is showing how the operational level relates to the traditional tactical and strategic levels. Understanding this theme can be facilitated by explaining the historical evolution of operational art and various historical contexts in which certain political, social, economic and military aspects have accumulated and gradually generated new military needs. It is necessary to understand the evolution of operational art considering historical moments, analyzing both the execution of battles and the worldview and mentality of the military planners of each era. It means studying the evolution of theoretical concepts and practical experiences (OLSEN & CREVELD, 2011).

The division of war between strategy and tactics was sufficient only when victory could be achieved at a single point where battle took place. Troops fought concentrated in a restricted geographical area. Until the 19th century, usually only strategic and tactical levels were recognized. However, new definitions became necessary because of the increasing complexity of war, which was expressed by either simultaneous or successive fighting in increasingly dispersed locations, and war being fought over a series of battles,. During the 19th century, theorists referred to the "grand tactics" in an effort to vaguely describe this new reality. A more formal understanding of the operational level as the level connecting strategy and tactics would only consolidate at the turn to the 20th century. The operational level has evolved as a result of the increasing sophistication and scale of modern wars and has gradually emerged as an area requiring a distinct analysis from traditional strategic and tactical levels (HIGHAM, 2002; GLANTZ, 2012; PAPILLA, 2014).

There is neither a consensus about the operational art origin, nor an exact definition for it among historians. The various arguments about the roots of operational art depend on the adopted definition. There are legitimate reasons to seek the birthplace of operational art in various historical events such as the campaigns of Frederick the Great in Prussia, Empress Catherine the Great in Russia, the Napoleonic wars, the American

Secession war, the Prussian campaigns led by Moltke in the 19th century, and the Soviet Union in the 1920s and 1930s. The distribution of operations in space, the connection between political and military goals, technological innovations, the organization of armies, and the degree of mobilization of the nation are some of the criteria in dispute in the debate to establish a definition of operational art (HILBURGH, 2014). In any case, the common understanding is that the formation of operational art concepts has been emerging and consolidating over time.

This paper aims at providing a broad overview of operational art the historical evolution, beginning with 18th-century events, including important milestones, and the legalization of many of its concepts in the U.S. in 1986. The time frame was so defined because most of the researched authors refer, with greater or lesser emphasis, to the conflicts of the 18th century. And the inclusion of operational art in U.S. legislation was selected as the final milestone of our study because since then its dissemination to other countries, particularly Western ones became much more evident and homogeneous. With this study we expect to clarify the origins of operational art, providing readers with a comprehensive and organized report on the theme, thus facilitating the understanding of its fundamental concepts in General Staff courses .

We carried out a bibliographical research in databases of scientific articles and books on the subject as a method for the accomplishment of this work. Despite the relatively small number of references, we believe that the quality of the referenced works is high.

The text is organized chronologically, and we cover the following topics: the pre-Napoleon period, Napoleon, the early post-Napoleon decades, the U.S. Secession War, the 19th century second half, the First World War, Soviet operational art, the U.S. between wars, World War II, the beginning of the nuclear age and the revival of operational art.

2 THE PRIORIES OF OPERATIONAL ART

2.1 PRE-NAPOLEON PERIOD

Only after the Seven Years' War (1756–1763) military theory would adopt the two-tier model of warfare: strategy would be the general's science and deal with campaign plans and use of tactics to achieve goals, while the tactic would deal with formations and maneuvers at battlefields. By this time, French General Jacques Antoine Hippolyte, known as Comte de

Guibert, had already realized that future wars would be the intersection of strategy and tactics, a view that would lead to a three-level analysis of war. Guibert's ideas served as the basis for French military thinking at the time of the French Revolution (TELP, 2005).

According to Telp (2005), operational art emerged in the period between the campaigns of the King of Prussia, Frederick the Great (1712-1786), and the Napoleonic Wars (1803-1815). Operational art is the result of the relationship among military, social, economic and political aspects, as well as the relationship between military theory and practice, particularly in France and Prussia. Like Napoleon (1769–1821) afterwards, Frederick concentrated on his hands political and military power, which gave advantages over his opponents, as political goals, represented mainly by diplomacy, were in line with military plans. During this period, the critical change in conducting war was the increased interrelations between strategic and tactical maneuvers of the great campaigns. In this new dynamic, the different formations of the troops, whether divisions or corps, came to the battlefield from various directions as tactically independent units. This made the separation of strategy and tactics blurred, creating a kind of "strategic continuum".

According to Hilburgh (2014), the beginnings of operational art would be in the campaigns of the Russian Empress, Catherine the Great, and in the two Russian-Turkish wars, one from 1768 to 1774 and the other from 1787 to 1792. In these conflicts, some aspects of the current operational art were already present. Military commander General Rumiantsev, drew up his plans in light of the strategic guidelines issued by a council led by the empress. Rumiantsev's plans envisioned successive tactical confrontations with the enemy. He organized his troop into corps coordinated for mutual support and concentration on decisive points distributed over a vast geographical space. Contrary to the prevailing thinking at that time, there was no claim to victory in just one decisive battle, for it was understood that in order to achieve Catherine's strategic goals, a series of battles was necessary.

Studying Telp and Hilburgh, we found that the conduct of the war before Napoleon already had some preliminary features of what came to be known as operational art. Prussians, Russians, and French found that the political-economic-social context was changing and that it was no longer possible to set tactical goals apart from political ones.

2.2 NAPOLEON

The industrialization of Europe enabled states to use all their resources in the Napoleonic Wars in an innovative way, by forming large armies (MATHENY, 2001). Wars became a business involving not only military forces but the whole nation, spreading across Europe a true armed nationalism. Carl von Clausewitz (1780–1831) perceived France as the forerunner of a military revolution in Europe. The formation of national states and the political, social and economic consequences of the French Revolution period were potentiated both by technological advances (transportation, communications, armaments) and organizational advances (armies formation, universal conscription), which enabled Napoleon to approach war in an innovative way. He mobilized his forces, deployed them in the theater of war and then maneuvered independent formations (corps), concentrating them at the right time and place for combat. The increased size of military formations and war theaters enhanced the complexity of military campaigns, which required greater control. So, the existence of an operational level of war was becoming more evident. Carl von Clausewitz was already addressing the "operative elements" as part of campaign level (OLSEN & CREVELD, 2011; PAPILLA, 2014; KUEHN, 2015).

Although the Germans pioneered the use of many operational art terms and the Soviets first systematized their knowledge, many of their current concepts were already employed in the early periods after the French Revolution (KUEHN, 2015; KRAUSE, 2006). Carl von Clausewitz and Henri Antoine Jomini (1779–1869) used the Napoleonic Wars for their analysis and significantly influenced military thinking in the West. Neither of them used the term operational art, but they dealt with war campaigns and theaters, implying the blurred area between strategy and tactics (MATHENY, 2001; OLSEN & CREVELD, 2011).

Napoleon and his subordinate, Antoine de Jomini, seemed to already understand the new context in which wars were fought (KUEHN, 2015). The current of thought led by Jomini understood that in the Napoleonic wars military strategy was based on the operations of large units and that the essence of Napoleon's genius would be the pursuit of the "single point strategy", limited in time and space. "The strategy described a limited complex of actions, including approaches, marches, counter-marches and maneuvers, which take place within the theater to increase mass at decisive points. The tactic described what happened

within the confines of the battlefield " (SCHNEIDER 1989; MENNING 1997). The maneuver aimed at an indirect approach, with the simultaneous use of armies to secure and engage enemy positions was also highlighted (PAPILLA, 2014). Napoleon was the first to lead in this new context (OLSEN & CREVELD, 2011). The 1806 Jena-Auerstadt campaign is considered an example of success in applying the operational art principles, which would be defined later (KRAUSE, 2006).

2.3 EARLY POST-NAPOLEON DECADES

In the period of the Napoleonic Wars, the characteristics of the technologies employed in combat were still basically the same as the pre-industrial revolution era. Although technological advances are only one of several factors influencing the ways of conducting war, the 19th century, especially its second half, was a period when the traditional understanding of tactics and strategy in war strongly felt the impact of the industrial revolution. Some innovations marked this era: interchangeable parts, mass production methods, steam engines, breech loading, smokeless gunpowder, portable automatic weaponry, telegraphy, mines, battleships, and long-range and recoil artilleries (DAVIS, 1991; MENNING, 1997; KRAUSE, 2006).

Governments, now as national states with professional armies have increased their ability to use large masses of people to build armies and improve their organizations. While it is common for advances in technology to take time be applied directly for military purposes, technological developments have led to improvements in troop transport and communications, as well as weapon lethality. The movements of ground troops, which were previously slow (on foot or on horseback), now had the enhanced capacity of railroads of carrying large troops and material through long distances at unimaginable previously speeds. Increased range and accuracy of weaponry, as well as lethality of rifles and artillery made possible new forms of tactical use. The battlefield had been greatly expanded. The telegraph made possible communication with distant troops. The size of armies also increased in number, and industrialization made it possible to manufacture large-scale armaments (DAVIS, 1991; MENNING, 1997; KRAUSE, 2006).

All this required an evolution of military planning, especially the movement of troops within the theater of war. Particularly the "single point strategy" was affected by the new possibilities offered by the combination

of mass and firepower (MENNING, 1997).

Two military thinkers stand out in the 19th century. One is Clausewitz, who studied the nature of war and sought to relate it to political goals. Until then, he focused on less considered aspects such as the idea of morality and absolute warfare. He developed several key concepts such as center of gravity and culminating point. The other is Jomini, who dealt with the growing complexity of war, bringing the idea of the "grand tactics." He detailed some ideas such as theater of operations, base of operations, lines of operation and decisive points, as well as attaching great importance to logistics. In addition to the two, it is also worth mentioning Baron von der Goltz (1843-1916), a follower of Clausewitz, who wrote "The Conduct of War", which was translated into English in 1896 and had a particular influence on American thought. He identified that the main enemy army was its center of gravity (MATHENY, 2001; GLANTZ, 2012).

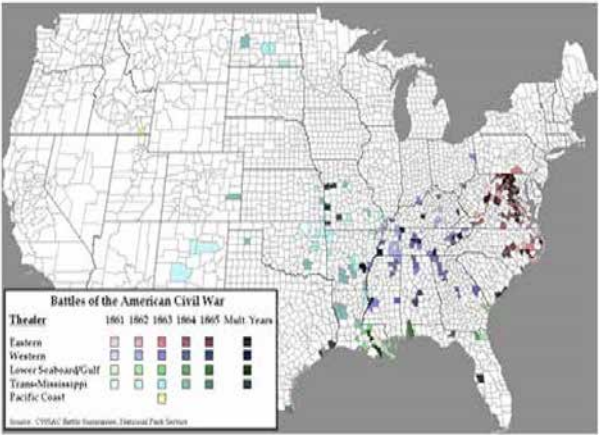
3. TRANSFORMATIONS OF INDUSTRIAL REVOLUTION

3.1 THE U.S. SECESSION WAR

For James Schneider of the School of Advanced Military Studies of Army Command and General Staff College of the United States of America, the emergence of operational art is closely linked to the development

of 19-century technologies. The steam engine, the telegraph, the mass production of rifles and explosives increased the capabilities of movement, communication, and firepower, increasing the pace and complexity of war. However, this development alone would not explain the advances that operational art has brought in thinking about war (KUEHN, 2015). Schneider (1989) attributes Napoleon's strategy of employing army corps to concentrate for a decisive battle as one of the seeds of operational art. However, he argues that the essence of operational art is the spatial and temporal integration of all operations in an orchestrated manner, which demands consideration of simultaneous and successive maneuvers. For this author, these ideas were not yet part of Napoleon's thinking. In his view, operational art had its roots in the American War of Secession (1861–1865) because of characteristics of that war, such as the employing various armies distributed in the theater of operations, (Figure 2), assigning separate command posts to control different armies, integrated planning of various campaigns, conducting operations distributed over time and space, strategic employing cavalry, deep attacks, conducting joint operations, as well as new logistics to support more dispersed troops. Krause (2006) states that operational art, in spite of the non-use of this term, was in fact applied in the American Secession War, the most obvious example being the Gettysburg campaign.

Figure 2: Space and time distribution of the Secession War battles (Source: CWSAC Battle Summaries National Park Service)



The American Civil War was an example of the impact of the Industrial Revolution on the dynamics of war. Automatic weapons and entrenched positions threatened the movement of cavalry, which was employed only far from the trenches. Napoleonic-style frontal attacks were no longer viable. Commanders sought to maneuver and attack the enemy's flank, keeping their troops scattered so that they would not become targets for the high lethality of the new armaments. The distances where troops were deployed increased, resulting in greater difficulty in command and control. Non-military technologies such as air balloons, telegraphs and railways were employed by the military. This conflict also demonstrated the influence of naval war on land (blocking ports and interdiction of lines of communication) and the submarine (although its real importance appeared only in World War I, 1914-1918). Campaigns began to be planned in an interrelated way, with logistics structures ensuring the lines of communication (DAVIS, 1991; MENNING, 1997).

3.2 THE 19th CENTURY SECOND HALF

Field Marshal Helmuth von Moltke, "the Elder," for 30 years chief of staff of the Prussian Army and Clausewitz admirer, was among the first to realize the connection between strategy and tactics in the 1870 Franco-Prussian War. The Prussian victories against Austria in 1866 and against France in 1871 are examples of how Moltke sought to "bring the army to the right place at the right time and in the right combination to avoid battlefield impasse and sustain the synergistic relationship of the commander with political authority". Using railroads to engage large numbers of troops under favorable conditions and the telegraph to coordinate and control their movements and employment, seeking quick and decisive victories, he brought the traditional meaning of tactics and logistics closer to what we now understand as operational art. In 1871, he wrote "Essays on Strategy ," in which he states that strategy has political and military purposes and identifies connections between strategy and tactics. Moltke goes on explaining that operations are the bridge between strategy (political and military) and tactics and used the term "operational conduction " to describe these activities (KRAUSE, 2006; OLSEN & CREVELD, 2011; HILBURGH, 2014).

During the 19th century, under the influence of Clausewitz, the British used the term "operations" to refer to military activities in general. A Jomini influence was also taking place with the use of the principles

of war to guide military thinking in an attempt to connect strategy with tactics. The 1909 Field Service Regulations manual was the first attempt to formalize the principles of war within a closer view of operational art. However, the British were very cautious in adopting such doctrines and the operational art became more tactical (OLSEN & CREVELD, 2011).

But the French, despite Napoleon's heritage, did not considerably evolve their operational art. The development of their doctrine was influenced by the successes and failures of the Franco-Prussian Wars (1870–1871). However the nuances between the tactical level and the operational level seems to be poorly understood, which may have contributed to the high mortality at World War I. as well as the defeats at the beginning of World War II (KRAUSE, 2006)

3.3 FIRST WORLD WAR I

In the early 19th century, strategy could be summed up as the positioning of the main army, which, in contact with the enemy, depended on tactics for conducting combat and pursuing the decisive battle, as in the case of Austerlitz (1805) and Waterloo (1815). Because of the political and economic reality of the time, there was basically only one main army. Consequently the decisive battle was fundamental. It was characterized by being relatively small in duration, geographical dimensions and number of soldiers. Over the decades, the theater of operations expanded and the numbers increased, requiring greater coordination and making it impossible to carry out just a single decisive battle. If a single battle could not be decisive, the tactic was not sufficient to achieve the strategic goals and it became necessary to plan campaigns consisting of several battles (MATHENY, 2001; GLANTZ, 2012). Operational concepts were evolving and the need for joint operations between forces and combined operations among allies arose, all of which enhanced by technological developments and increased industrialization, which increased the scale of forces and the importance of logistics (MATHENY, 2001).

The theory developed after the Napoleonic Wars, in which one of the great lessons were the pursuit of a decisive battle, did not fit the reality of World War I, in which battles became longer. The scale of the fighting had changed: while in Waterloo there were about 140,000 combatants on both sides, in the Battle of the Borders in France the numbers exceeded three million. Post-World War I military theorists would attempt to identify the main lessons of this war, in which the impacts of increased geographical dimensions of conflict, industrialization, and the scale of

military forces became a little better understood. The Germans realized the need to connect tactics and strategy and in the 1920s already used the term operative (MATHENY, 2001).

In World War I the nature of operations depended on high-level planning, and tactical battle victories did not guarantee strategic success. Operations began to be seen as a complex set of military actions, connected by their period, place and intention, in which the most important issue was precisely the connection of these aspects. Nonmilitary considerations became part of the planning, such as alliances and attacks on the enemy's deep rear. Technological innovations such as airplanes and armored vehicles have opened up new tactical possibilities. All of these evolutions required from theorists and planners a more holistic understanding of the phenomenon of war. Such studies generated a common vocabulary and the foundations of operational art concepts. Operational art presented itself as a way to deal with the immense challenges of this new context (MENNING, 1997; MATHENY, 2001).

In World War I, military leaders, such as General Sir Douglas Haig, commander of the British forces in France, resisted making the necessary changes to strategic thinking related to the development of armaments in the late 19th century. The development of tank cars fostered discussions about offensive and defensive strategies. This technology was only effectively employed in World War II (1939-1945), when the Germans created tank divisions. The same delay between development and employment occurred with the submarine (torpedoes, depth charge and sonar). Both tankers and submarines demonstrate the long historical relationship between strategy and technology, with a focus on the offensive-defensive debate (DAVIS, 1991).

4 SOVIET OPERATIONAL ART

4.1 INITIAL CONTEXT

Although the high quality of Soviet operational art is widely recognized, some historians claim that it derives from Germanic thinking, particularly from the ideas of General Heinz Guderian (1888-1954) or even the English Basil H. Liddell Hart (1895-1970) and JFC Fuller (1878-1966). This argument is refuted by the chronology of the work's disclosures, since Soviet studies published in the 1920s precede those of other theorists. In any case, Soviet operational art, developed between 1919 and 1937, cannot

be considered merely an emulation of Western military thinking. There are similarities with the Germans and the English in the use of combat chariot coupled with aviation quickly and over long distances, but it differs in almost all other respects and is better and more sophisticated than the western one, a fact that the Germans felt from the second half of World War II (HIGHAM, 2002; KRAUSE, 2006).

Although Germans contributed a great deal to operational art during the 19th century, its development cannot be placed on the same level as the Soviet, perhaps because the Germans did not have the needs imposed by the Russian geographical extension or the 1917 Civil War (Figure 3). The Prussian model of an efficient military organization that possessed state power significantly influenced Russian ideas. But the German situation did not require preparation for extensive large-scale campaigns, and the comfort trap of staying true to the tradition of strategic/tactical analysis was lived. Regarding the USSR, there were some specifics. The Soviets kept the emphasis on large-scale ground operations, and they were concerned with integrating their thoughts on different aspects of military operations, and their theorists formed a school of thought and systematically studied the history of operations since Napoleon to understand the changes occurred. Wars came to be seen as operations composed of several battles, simultaneous or successive, but integrated in the same general plan. For the Soviets, World War I and the Russian Revolution of 1917 had many aspects in common, particularly the importance of logistics, which increasingly had roads to extend its reach (MENNING, 1997; KRAUSE, 2006).

Figure 3: Space and time distribution of battles of the Russian Civil War

Source: maps-russia.com

According to Higham (2002), the Soviets realized that the Napoleonic style of warfare in search of the decisive battle was no longer appropriate. One explanation is related to the use of armies with thousands of men scattered in a gigantic geographical area, where an attack was no longer enough to defeat the enemy:

> When the Germans destroyed two Russian armies at Tannenberg in 1914, for example, they realized that their victory had been incomplete not because of commanders, but because the major part of the Russian army had not even arrived at the theater of war. Similarly, when the Germans attacked a large concentration of French forces at Verdun in 1916, the French were not only able to maneuver large numbers of reserve troops from other positions, but their British allies were able to launch their own large attack along Somme. In contrast, when Napoleon's forces engaged the Prussian main army at Jena-Auerstädt in 1806, or the Austrian main army at Wagram in 1809, the forces they defeated were the vast majority of forces Prussia and Austria could mobilize to fight at that

time (HIGHAM, 2002).

It can be said that the Russians were not the creators of operational art, but they were the first to systematically study past conflicts in the early 20th century for answers to their problems. As older references, they used the experiences of Napoleon and the teachings of Antoine Jomini and Carl von Clausewitz. As a closer reference, they used the Germanic example, particularly the precepts of Helmut von Moltke, "the Elder," and the experiences of the Austro-Prussian (1866) and Franco-Prussian (18701871) wars to structure their way of organizing, mobilizing, and think of war in the new industrial world. Because of the needs imposed by the specifics of its context during the internal war of the Russian Revolution, where simultaneity and sequencing of campaigns became essential, as well as experience in World War I, the Soviet high-ranking military formulated a doctrine that we now understand as Art. Operational (KRAUSE, 2006; GLANTZ, 2012; KUEHN, 2015).

Soviet theorists, some 100 years after Napoleon, realized the importance of understanding and using the operational level for organizing tactical actions in order to achieve the strategy chosen by the nation. This way of thinking about war gave rise to the term "operational art", which from the 1980s was popularized in the U.S. and the UK (HILBURGH, 2014).

4.2 HOLISTC FORMATION

Soviet operational art cannot be understood without taking social aspects into account with the military (OLSEN & CREVELD, 2011). The study of war in the USSR, particularly of the operational art, was conducted within a broad context, taking into account political, economic and technological aspects. Soviet theorists took a scientific approach to the history of wars within a framework of "military science" to understand the dynamics of war, considering wars as one of several other historical processes of human activities. There was intense debate at all levels of the military. The emphasis on the human and social aspects of Marxist-Leninist dogmas influenced the development of Soviet operational art. Despite realizing the importance of the technological developments of the time, the Soviet military was able to consider in their doctrine the consequences of political circumstances, particularly the willingness of large numbers to form huge armies. In the USSR, all military doctrine

must be endorsed by the Communist Party (HIGHAM, 2002; GLANTZ, 2012). For the Soviets, the evolution of military theory and practice meant that the nation's strategy had to encompass considerations of all kinds of organizations, from the front to broad back support. High-level planning and preparation, resource management, and definition of goals and priorities should have the ultimate purpose of the state's political goals (MENNING, 1997).

4.3 SCHOOLS AND ASSOCIATIONS

Military science was seriously discussed in the USSR after World War I. The military, accompanied by theorists, and all on political oversight, formed associations to debate the issues of war. An example was the Military Science Society of the RKKA (Workers' and Peasants' Red Army') Staff Academy, created in October 1920. Studies of the nature of conflict at this time influenced the military understanding of the coming decades, the definitions of military manuals. , school curricula and the restructuring of the Soviet armed forces. Red Army Commander 1919-1924 SS Kamenev and Soviet Chief of Staff Mikhail N. Tukhachevsky (Figure 4) published articles highlighting planning for successive military operations and contesting the importance of pursuing a decisive battle (GLANTZ, 2012). In the mid-1920s, Tukhachevskiy ordered the teaching of operations to be accompanied by the teaching of logistics at the Soviet Staff Academy, where the Operations Driving Department was set up alongside the traditional Strategy and Tactics departments. The process meant that the Soviet Union institutionalized operational art, placing it between strategic and tactical levels (MENNING, 1997; KRAUSE, 2006).

Figure 4: Marshal Kamenev and Marshal Tukhachevsky

4.4 MOBILITY AND TECHNOLOGY

Soviet operational art emerged to deal with the issue of mobility. Technologies developed during the Industrial Revolution, particularly those that led to increased firepower, reduced troop mobility, making the battlefield deadly static, which was clearly seen in World War I. Even newer technologies such as tanks and aviation have been employed by Germans, British and French to take advantage of tactical successes, such as continuing to attack inside the trenches after an initial success, trying to minimize the loss of life. This way of thinking remained until the 1930s (HIGHAM, 2002). Soviet operational art as early as the 1920s had a different purpose: to restore mobility on the battlefield (HIGHAM, 2002). Soviet theorists recognized the role of technology in the evolution of the way operations are conducted. It was clear to the Soviets that the industrial revolution altered the way war was conducted. Tukhachevsky highlighted the role in technology and the expansion of the battlefield and the need for "deep operations" (MENNING 1997; MATHENY 2001; KRAUSE 2006; HILBURGH 2014). But to the Soviets it seemed clear that solving a tactical

problem did not necessarily solve operational issues. An important conclusion was that for technological innovations to have a significant impact, doctrine must be adapted to new possibilities (HIGHAM, 2002).

Georgiy S. Isserson, head of the operational art Department at the Frunze General Staff Academy in the 1930s, claimed that new weaponry required new ways of fighting. Tanks and airplanes should be employed to achieve success beyond the tactical, ie within a broader view of war (HIGHAM, 2002, ISSERSON, 2013). Isserson argued that it was not enough to properly employ new technologies, but it was necessary to understand the new nature of war, which now had to consider huge armies and defenses at great depths: "a single wave of operational effort employing a linear strategy solves nothing… and will crush helplessly into the depths of contemporary opposition". The doctrine must be completely reformulated because it would no longer be possible to deploy the troops in depth as they had been doing until that time (HIGHAM, 2002).

4.5 MOTIVATIONS AND THOUGHTS

This new perception of the nature of war, especially the increased complexity of military operations, created a vacuum between what was traditionally known as strategy and tactics. Initially the terms "grand tactics", "applied strategy" and operatika (in Russia around 1907) and operativ (in Germany) were used to represent this gap. The experiences of World War I and its civil war, in which operations with thousands of soldiers spread over thousands of kilometers, led the Soviets to consider in their studies as early as the 1920s the operational level between traditional strategic and tactics (MENNING, 1997; GLANTZ, 2012). While many did not realize or value the existence of this level between tactics and strategy, Soviet theorists, as early as 1922, adopted the term operational art, detailing their concepts in subsequent years. In 1926, Aleksandr A. Svechin, reserve general and member of the Frunze General Staff Academy and RKKA Staff Academy, translated the thinking of the day: "Tactics make up the stages from which operational jumps are assembled. Strategy points the way" (MENNING, 1997; MATHENY, 2001; GLANTZ, 2012; HILBURGH, 2014).

Thinkers such as Tukhachevskiy and V. K. Triandafillov, Deputy Chief of the Red Army Staff, emphasized the offensive at the operational level and had great influence on Soviet doctrine in the period between the 1917 Revolution and World War II. His ideas were reflected in the foundations of Soviet operational doctrine and later in the development of

innovative use of armored and mechanized forces (KRAUSE, 2006). In the mid-1920s, under the influence of thinkers such as VK Triandafillov and GS Isserson, Soviet operational art attempted to shape simultaneous and successive engagements and campaigns to enable "deep battle" to attack enemy reserves (GLANTZ , 2012; KUEHN, 2015).

S. Kamenev, analyzing the 1917 Civil War, ponders that

> Despite all battle victories, the fate of the campaign will be decided in the last battle. Intermediate defeats during the campaign, however serious, will be seen a posteriori as individual episodes. In the modern war of great armies, the defeat of the enemy results from the sum of continuous victories on all fronts, successfully completed one after another and temporally interconnected. Uninterrupted conduct of operations is the main condition for victory (GLANTZ, 2012)

Kamenev understood that the railways enabled the enemy, who had suffered an intermediate defeat, to quickly strengthen themselves during an interruption of the fighting. The railway system has especially contributed to increasing defensive effectiveness. While the defender had his fortified positions replenished by railroads in the rear, the attacker had to move slowly and relatively unprotected toward enemy trenches, barbed wires and machine guns. Tukhachevski also emphasized the danger with campaign breaks (HIGHAM, 2002).

Isserson taught that the plans should ensure that the attacker did not reach its climax, that is, not exhaust his strength before the last battle. Following a campaign, the final battles are the most critical. The main obstacle would be a static war, which should be won through operational art. That is, maneuvering through a series of consecutive or simultaneous operations, without interruption, from the initial moment until the complete defeat of the enemy (HIGHAM, 2002).

The realization that the new context in which war was fought required the planning of successive operations, led scholars to focus their attention on what occurred between strategic and tactical levels. Gradually, terminology also considered the operational level of war. In a 1926 study, Tukhachevsky stated:

> The modern tactic is characterized primarily by the organization of battle, presuming the coordination of various branches of troops. Modern strategy encompasses its traditional meaning, that is, the theater tactics of military operations. However, this definition is incomplete because strategy, in addition to preparing for battle, also participates and influences its course. Modern operations involve the concentration of forces necessary to inflict a blow and the continued uninterrupted infliction of blows of these forces against the enemy across an extremely deep area. The modern nature of weaponry and battle is such that it is impossible to destroy enemy forces by one blow in a one-day battle. The battle in modern operations extends into a series of battles not only along the front, but also in depth, until the moment when either the enemy suffers a final annihilation blow, or its offensive forces become exhausted. In this sense, the modern tactics of military operations theater are extremely more complex than those of Napoleon, and they are even more complex because [...] the strategic commander cannot personally organize the fighting (GLANTZ, 2012).

In 1926, Aleksandr A. Svechin published his influential work entitled Strategy (Strategiia), in which he presented his understanding of operational art:

> Combat actions are not enough, but the basic material from which the operations are composed [...]. Normally the path to the final goals is divided into a series of operations, subdivided in time by pauses, comprising different territorial sectors of the theater of war and differing greatly from each other as a result of the different intermediate goals [...]. The operations represent a very diverse set of actions: the compilation of operational plans, the preparation of the material, the concentration of forces for future

> operations, the construction of defensive positions, the execution of marches [...].operational art material is tactics and management: success in developing an operation depends on success in resolving by force different tactical issues and in providing those forces of material and supplies. Operational art, as a result of the goals of the operation, generates a series of tactical missions and establishes a series of tasks for the activities of the rear area agencies (GLANTZ, 2012).

Georgiy S. Isserson pointed out that army units had specialized, with armaments, displacement possibilities and forms of employment having evolved strongly since World War I. As an example, he mentioned that in 1914 the differences between infantry and cavalry were much smaller than in the 1930s, when the introduction of large-scale aircraft, increased armor, and artillery range. For Isserson, operational art should integrate these diverse units throughout an increasingly broad theater of operations (MENNING, 1997). V. K. Triandafillov wrote in 1929 that the evolution of the tank had been a constant attempt to employ this medium more operationally than tactically (HIGHAM, 2002).

One cannot compare the Soviet approach with Napoleon's unique battle strategy. Although Napoleon employed his divisions or scattered corps in the theater of war, his aim was to maneuver to concentrate his forces in a decisive battle. The Soviets, on the other hand, sought to prolong the campaign by ensuring that their forces would not reach exhaustion before the last battle of the campaign (HIGHAM, 2002).

4.6 DEEP OPERATIONS

In the 1930s, the Soviets came up with the concept of deep operations, which represented the application of operational art in practice. Isserson saw, for instance, the continuity of the battles as critical: "Future deep operations will emerge not simply as connections from an unbroken series of engagements, but as an unbreakable current extending the full depth of military activity." For Isserson, operations should now be understood as an interconnected series of various operations, where a new element should be considered: depth. In Isserson's view, "we are at the frontier of a new era of military art and we must make the transition

from a linear to an deep strategy". Deep operations demanded three requirements: identification of operational goals within the theater, three-dimensional theater visualization, and determination of the best sequence of military actions (preparation, organization, support, battles, and command structure). The structuring of tactical actions had as one of its goals to support "deep operations" (MENNING, 1997; HIGHAM, 2002; HILBURGH, 2014).

Conducting deep operations required adequate means, which were provided by the industrialization of the USSR. Technological developments, particularly in motorization, mechanization and aviation and their impact on offensive operations were reflected in the restructuring of Soviet forces and the 1929 Field Regulation (Ustav) manual. through tactical successes against enemy deep defenses, while employing tanks, infantry, artillery and aviation. In 1933, the concept of deep operation was officially introduced in the Red Army's "Provisional Instructions on the Organization of deep Battle". Along with the concept of successive operations, the idea of deep operations has become central to understanding the operational level of warfare. The 1936 Field Regulation (Ustav) established deep operations as a principle of Soviet operational art:

> Simultaneous attacks on enemy defenses by aviation and artillery to the depths of defense, penetration of defense tactical zones by attack with massive use of tanks violent transformation of tactical successes into operational successes, aiming at completely encircling and destroying the enemy. The main effort is carried out by the infantry, and mutual support of all kinds of forces is organized for their interest (GLANTZ, 2012).

The new Soviet doctrine prioritized speed, audacity, and the pursuit of aggressive initiative by commanders at all levels. It was also clear the need for coordination between the various ground commanders, as well as with aviation and logistical support (HIGHAM, 2002).

Kamenev's earlier question of the defender's use of the rail network could now be tackled with the most fast-moving tanks. The new tanks could be deployed scattered and made it difficult for the enemy to locate them. This new possibility provoked surprise and concealment common in Soviet military planning. In addition, the planning of deep operations,

including air strikes, ranged artillery and tank penetration attacks, aimed at destabilizing the enemy's deep defenses. The main targets were bridges and rail nodes to reduce opponent mobility, as well as command and control centers and logistic depots to cause major damage to the enemy's overall structure (HIGHAM, 2002).

4.7 EXPURGES

The Soviets were leading a true Revolution of Military Affairs (RAM) in the 1920s and 1930s by developing a doctrine in tune with the evolution of tank cars and aviation. Understanding the use of armor and successive and deep battle theories was much more advanced than anywhere else. This development was suddenly halted when Stalin began a broad political purge in the USSR in 1937. Stalin executed leading thinkers of Soviet operational art: Tukhachevski, Egorov, Kamenev, Uborovich, Svechin, and many others. The impact on advances in operational art has been immeasurable. The timing for this purge was terrible for the USSR. When the Nazis invaded their territory, the Soviets had to rescue the old doctrine and relearn how to conduct large-scale operations. The basis for the final victory over the Germans in World War II was operational art, developed in the 1920s and 1930s (MATHENY, 2001; HIGHAM, 2002; KRAUSE, 2006; GLANTZ, 2012).

5 THE U.S. BETWEEN WARS

Between the First and Second World Wars, operational art was studied in the U.S. under the heading of strategy (it was not until 1982 that the term operational art was officially used). Still from a 19-century perspective and under the strong influence of Clausewitz's teachings, some World War I lessons were already in the U.S. Army school curriculum. High point ideas, center of gravity, lines of operation, phasing of operations, the importance of logistics, the indirect approach, the influence of technological developments, joint operations, and the connections between strategy and tactics were discussed. In the case of the U.S. Navy, as a result of its experience in World War I and the expectation of a prolonged war on two oceans, its planning took into account multidimensional operations over time and over large geographical areas. These studies had a strong impact on the conduct of military campaigns in World War II. In any case, in the interwar period in the United States, there was still a breakdown between

the various U.S. military units, in which each armed force was concerned only with its own issues (MENNING, 1997; MATHENY, 2001).

6 WORLD WAR II

Airpower initially facilitated offensive tactics. It generated the concept of preemptive attack and deployment of airborne troops. Aviation has increased the fluidity of combat and diluted the boundaries between opposing forces. The emergence of tank cars and aircraft, as well as their joint use, made the strategy highly mobile and coordinated, largely explaining the Soviet offensive "combined weapons" strategy, the West German Bundeswehr's joint tactical operations of the Germans and the AirLand Battle doctrine of the U.S. Army. Airpower made it possible to attack the interior of enemy positions, their civilian population and industrial facilities. This new context encouraged the formation of alliances and coalitions to achieve strategic goals and to defend against these attacks. From the point of view of strategic thinking, these coalitions demand operations on multiple fronts, with consequent restructuring and new forms of use of forces (DAVIS, 1991).

It is interesting to note what the Soviets comment about the beginning of World War II: "Nazi Germany used the methods of deep operations we developed earlier. The Germans borrowed the achievements of Soviet theoretical-military thinking and with great success used them in the war with Poland and the West"(GLANTZ, 2012, our translation).

The revival of Soviet operational art in the early 1940s was the result of chaos caused by the German invasion. The Red Army was forced to resort to its old learning. By 1944 the doctrine had surpassed pre-1937 thinking. Red Army professionalism was evident in the way the lessons of victory and defeat were implemented for their own reinvention (HIGHAM, 2002; GLANTZ, 2012).

The Soviet approach to war is unique and distinct from the Western approach, which implies different ways of conducting war, designing equipment, and organizing forces. The Soviets use a strict definition of terms, which leads to great precision in thoughts. The development of the operational level had a major impact on Soviet military practices. Failure to understand this issue was one of the factors that caused German losses in World War II. Many commanders of German units claimed to consider their troops superior and to have defeated more numerous Soviet troops. But in fact, while tactical victories did occur, the entire German army was

being encircled within broader Soviet operational planning (GLANTZ, 2012).

While all operations to some extent included elements of operational art (maneuvering, deep operations, sieges, surprise, etc.), it is noteworthy that an essential element of Soviet victories was mass in terms of airplanes, tanks, artillery and staff (OLSEN & CREVELD, 2011).

7 THE BEGINNING OF NUCLEAR AGE: OCCASION OF OPERATIONAL ART

The greatest example of the relationship between technology and strategy is the nuclear weapon (deterrense, strategic surprise, preemption, first strike, MAD) (DAVIS, 1991). After World War II, operational art was left in the background due to new atomic weaponry that made it less likely to employ large units (MENNING, 1997; MATHENY, 2001; OLSEN & CREVELD, 2011).

With the development of nuclear weaponry, the operational art was not entirely forgotten by the Soviets, but was in the background. Studies of influential thinkers such as V. A. Semenov, V. D. Sokolovsky and A. A. Strokov demonstrate changes of focus of interest. The priority of strategic thinking has shifted from major conventional confrontations to possible nuclear confrontation. An overview was formed after theoretical debates in the 1950s that the advent of atomic weapons meant a true Revolution of Military Affairs (RAM) and, in the early 1960s, Soviet forces were restructured to the new reality of a possible nuclear conflict (GLANTZ, 2012).

Semenov asserted that operational art should be constantly reevaluated in the light of new disruptive weaponry, such as nuclear weapons. Semenov offered a definition of operational art in accordance with his time: "operational art in the present has been transformed into a large scientific field of military affairs, having its own theory, its own specific rules, its own problems, and its own scientifically grounded methodology"(GLANTZ, 2012).

The Soviet theorists' view of the Revolutionary Military Affairs (RAM) represented by nuclear weaponry was consolidated in 1962. Premier N. S. Khrushchev himself recognized the supremacy of the long-range rocket-based strategy with nuclear warheads. In 1966 Strokov's studies placed great emphasis on a strategy based on nuclear-ballistic ballistic missiles, in which conducting conventional operations would

play a secondary role, particularly in geographically limited wars. In this context, the study of operational art lived a period of eclipse (GLANTZ, 2012).

8 THE REVIVAL OF OPERATIONAL ART

8.1 USSR

In the mid-1960s, through various theoretical studies, interest in operational art gradually resurfaced, while keeping nuclear weapons issues under review. Research on the events of World War II and themes relating to the operational use of tank cars and deep operations was once again studied under the theoretical lens of operational art. Thinkers killed during the period of Stalin's purges were valued again (Figure 5). Already in the 1970s, the Soviet understanding was that nuclear weaponry had altered the nature of war, but conventional combat would continue to take place. What happened was an even greater increase in complexity, with the addition of new electronic means and precision weapons, for example, in addition to the need for joint operations. In this new scenario, the possibilities of combat increased and, consequently, the difficulties of command and control and logistics. In this context, operational art has resurfaced. In 1970, Soviet Chief of Staff General Zakharov wrote: "The theory of deep operations has not lost its importance at present. It can underlie the creative work of commanders when solving today's complicated and complex problems" (GLANTZ, 2012).

Figure 5: Marshal Tukhachevsky (1893-1937) honored on 1963 Soviet stamp

Source: stampworld.com

Because the Cold War environment (1947-1991) was not conducive to information exchange, it is very likely that Soviet operational art was not well understood. Also, as current Russian strategy is strongly related to the consolidated teachings at the end of World War II, many Russian archives have not yet been fully opened (HIGHAM, 2002; GLANTZ, 2012).

8.2 THE U.S.

Because of the size of its territory, the scale of the wars it participated in, and the progressive distribution of forces across the globe, the U.S. would have employed various concepts of operational art throughout its history. However, the theoretical structuring of what was already put into practice only began to occur in the period between the two World Wars. Even in the early years after World War II, because of the focus on nuclear war, operational art was not systematized into a doctrinal body (KRAUSE, 2006).

Interest in operational art arose in the USA after the War

Vietnam was marked by tactical victories in battle, but became a strategic defeat in the end. There were no operational goals that guided battles toward strategic goals (MATHENY, 2001; KRAUSE, 2006; OLSEN & CREVELD, 2011).

At the same time, the threat of a conflict with the USSR without the actual use of nuclear weapons required further study of how to employ large military units in a vast theater of war. Another factor was the influence of technology on conflicts. While the Vietnam War did not offer many opportunities to study this factor, conflicts in the Middle East in 1973 brought new perspectives on air superiority, armor, ammunition, and the conduct of military operations (MENNING, 1997).

Taking Clausewitz's ideas for inspiration (MENNING, 1997), the U.S. revisited its previous experiences, now in the light of Soviet operational art and Vietnamese learning, and began the development of its own doctrine (KRAUSE, 2006). American thinkers began to pay attention to the doctrine of the Soviets and to better understand the three levels of war and the concepts of operational art. The term "operational art" quickly made sense to U.S. theorists in understanding the new complexities of war operations. At the same time, the Soviets themselves, after achieving nuclear parity with the US, also revived the importance of operational art. In Europe, a conventional war with large operations was more plausible than a nuclear war (MENNING, 1997).

In the early 1980s NATO's focus on maneuver warfare and the promises of new technologies demanded from theorists a new way of dealing with issues such as scale, scope, content and duration of conflicts. Operational art was the response that the U.S. military sought to connect, within a large theater of operations, new concepts and technologies with the strategic and tactical levels. As a result, the 1982 U.S. Army Handbook, the 1982 FM 100-5 recognized the operational level as an intermediate level between the strategic and tactical levels. In this handbook, planning has shifted to operational level with campaign planning, understood as operations to defeat the enemy in a theater where simultaneous and successive battles take place. Already the 1986 FM 100-5 manual deepened and extended the understanding of operations from an operational perspective and brought a definition to the operational art: "the use of military forces to achieve strategic goals in a theater of war or theater through the design, organization and conduct of campaigns and major operations." This definition adds to the Soviet vision the learning of the Vietnam War in an attempt to create an intellectual structure in tune with the current context and technologies of war operations. The U.S. military was inspired by Clausewitz and Jomini to create the concepts of operational design, center of gravity, lines of operation, turning points, and culmination that underlie operational art and its application on the battlefield. A general understanding of operational-level functions has emerged: intelligence, fire, maneuver, logistics, protection, and command and control. These functions became part of the planning of military campaigns composed of various operations. Gradually these concepts were incorporated into U.S. Army War College curricula (MENNING, 1997). Already in the 1990s, the entire U.S. Department of Defense began to employ operational art and is now in its doctrinal manuals (MATHENY, 2001).

8.3 IMPACT ON JOINT OPERATIONS

In the US, it was in the Army that operational art first received importance. The Air Force followed the Army's thinking in recognizing the synergy between the two forces in air-ground combat. But what drove the establishment of a joint doctrine in the U.S. was a number of factors. The 1986 Goldwater-Nichols Department of Defense Reorganization Act extended the joint commander's responsibilities and forced the single forces to pursue joint language, giving rise to manuals that emphasize

operational level and operational art, such as JP-3 (Doctrine for Joint Operations and Joint Publications) and JP-5 (Doctrine for Planning Joint Operations). The end of the Cold War has resurfaced the need to deal with diverse war theaters in various parts of the world, requiring an integration of diverse perspectives and resources. Without the nuclear threat of the former USSR, specific conventional campaigns had to be planned for specific regional situations (MENNING, 1997).

The end of the Cold War also led to a restructuring of forces and an increase in the importance of logistics. The Gulf War was an example of the use of operational art concepts, in which planning sought to integrate the effects of the actions of various forces present in the operation, using concepts such as center of gravity and dealing with technological advances (MENNING, 1997; KRAUSE, 2006)

8.4 IRREGULAR WAR

It is interesting to note that throughout its development, the focus of Operational Art was on large-scale operations, but the post-World War II irregular conflicts sparked a debate about what the role of operational art would be in these conflicts. Although operational art was very well used also in the invasions of Afghanistan in 2001 and Iraq in 2003, in the following phases the transition from conventional combat to counterinsurgency was not achieved. Counterinsurgency operations in these conflicts reemerged discussions of the use of operational art in irregular wars (MATHENY, 2001; OLSEN & CREVELD, 2011).

9 CONCLUSIONS

The increasing complexity of the conflicts from the mid-18th century made it imperative to set tactical goals in subordination to political ones. In practice, increasing independent units began to operate in large geographical spaces through a series of simultaneous and successive battles, all within a context of significant developments in transport, communications and weapon lethality. To integrate these various battles in tune with the political goals of states, the strategic and tactical views were no longer sufficient. The operational level proved essential and the operational art brought the concepts that allow equating this integration in an orchestrated way.

The Napoleonic Wars served as a starting point for the studies of

influential thinkers such as Clausewitz, Jomini, and Goltz to develop the early ideas of operational art. However, we highlight the role of Soviet theorists in learning from past conflict experiences as well as in the systematic development of operational art. They recognized that the new reality of conflicts required an adaptation of military planning, realizing the need to improve battlefield mobility and conduct deep operations in an integrated manner. They made operational art official as part of their way of planning.

After a period of relative oblivion, operational art resurfaced to address the issue of the complexity of conflict again. This time it was the United States that, realizing in Vietnam that only tactical victories do not win a war, systematically studied past theorists and Soviet operational art to develop their doctrine. The officialization of the operational level and the operational art by the Americans led to the revival of these concepts in the military planning of several countries.

We hope to have provided a broad overview of the historical evolution of operational art in order to facilitate understanding of its current concepts. It is important to note that we understand as a limitation to work the lack of direct study of Russian literature on the subject. It should be noted that operational art was born and then reborn to deal with the complexities of conflict. Therefore, we envision the study of how operational art could be useful in the face of rapid technological developments and their impacts on the conduct of conflicts as a future research opportunity.

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