MILITARY ART IN THE TWENTIETH CENTURY

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Abstract: *The great discoveries, industrial revolution and science have influenced the military art and revolutionized the military strategic reflection.*

The global character taken on by warfare began in the twentieth century, with World War One. This article presents the military art during World War One and Two,the emergence of the aerial strategy, The Cold War and how far had warfare changed by 2000. Warfare and military art at the beginning of the 21st century were nothing like warfare in 1900 because everything had changed: the tactics, the strategy, etc.

Keywords: *industrial revolution, science, military art, strategy, the twentieth century.*

The agricultural revolution led to the growth of agricultural products and the creation of conditions for feeding more people. Consequently, the population of developed states increased between 1700-1900.

The industrial revolution was based on the mass use of machines and began in England (U.K.) in the late eighteenth and early nineteenth centuries. It then spread to France, the United States, Germany and Japan. This revolution laid the foundation of industrialization and established in those countries the domination of large capitalist production over small commodity production.

The scientific discoveries of the late Middle Ages and the beginning of capitalism (the capitalist order), as well as industrial production influenced the military field, as it moved to the production of military equipment and weapons on an industrial scale.

The French Revolution (1789) practically made an armed nation. This concept (of an armed nation) created strategic, operational and tactical thinking. Then the new concepts of means use (means strategy, generative

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strategy, etc.) were created. Napoleon started a military revolution, and firearms opened a new era in military art.

In the 18th – 19th centuries the line vessels (ships) of ranks 1,2,3,4,5 and 6 appeared, classified by weight and armament. The 4th rank ships were designed to protect the convoys against pirates. The 5th rank had research missions, quick connections and escort. Those of rank 6 were ships intended for coastal (coastal) surveillance, surveillance, patrol and customs. Starting with 1600, the following discoveries were made: sniper rifle, flint rifle, calculation ruler, submarine cannon, mercury thermometer, bubble level, balance, refractory telescope with polished bronze mirror, steam car, steam pump without piston etc.

After 1700 the following were invented: the manometer, Newcomen's steam car, diver's bell, Puckle machine gun, gear milling machine, planning reamer, lightning rod, sextant, calorimeter, stopwatch, anemometer, aerometer, car, ab, the first iron boat, the metal bridge, the steam turbine (Pickard), the industrial rolling mill, the ship, the melting shell with bullets,[1] etc. Therefore, man managed to make - step by step - essential discoveries that allowed the realization of increasingly efficient means of combat (land, naval and air). Without these discoveries, the emergence of mass armies would not have been possible, because the new technical (and military) means not only allowed, but also imposed the creation of armies on an industrial basis. Military art has become a complex issue involving both the armies and the economies of those countries.

The development of military art in the twentieth century was dependent on the inventions that appeared before and during this century.

Thucydides wrote that "*history is the teaching of philosophy by example*"[2], and we say that "Military history is the teaching of military art by example."

Many associations of inventions, technologies and means of combat and communication were the basis of military successes in the twentieth century. Many of these inventions were closely related to military art as we will show in the following pages.

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[1] Mihai Popescu, Valentin Arsenie, Gheorghe Văduva, *Arta militară de-a lungul mileniilor*, volume 1, The Technical-Editorial Center of the Army, Bucharest, 2004, p. 206.

[2] Thucydides (460-396), The Peloponnesian War.

After 1900, machine guns appeared and were used in wars that could fire 8 bullets / second and therefore the number of dead and wounded in the First World War (WWI) was very high. Even the rifles used by the infantry could fire 15 bullets/minute. Still, the biggest losses were the artillery; a cannon could fire a 45 kg explosive projectile at a distance of 8-9 km; a projectile/shrapnel produced the greatest losses. Steel used in the early twentieth century was one of the important factors that led to the development of technology and weapons and military art. The military increasingly used in military actions high-performance equipment and weapons for their strategic, defensive or offensive purposes, through timely information, surprising the opponent and causing great losses. The military used the inventions to keep their troops to a minimum during missions.

The Chinese invented gunpowder in the ninth century, which changed the way war was fought. They produced mines, rockets and bombs. as well as firearms (musket and cannon). As a result of these means, artillery appeared. Samuel Colt, Hiram Stevens Maxim, Kalashnicov, etc. participated in the improvement of firearms.

The steam locomotive and the railways allowed significant progress to be made in military art. Also in the field of electricity there were the discoveries made by Franklin, Ampere, Maxwell, Faraday, Tesla, Edison, Marconi and others. They contributed to the invention of the telegraph, telephone, radio and electric motors. In military art, the use of railroad troops and artillery, Morse code (telegraph), telephone, and radio helped some armies achieve resounding victories.

At the beginning of the twentieth century, military art had the following characteristics:

- Increasing army numbers, which led to the emergence of the war industry and increased production of military equipment, weapons and ammunition;
- Broadening fronts and increasing the duration of wars;
- Increasing the complexity of the command act and command systems (orders were given to divisions and army corps unlike the previous period when they were given to cavalry, infantry and artillery);
- Increasing artillery mobility and diversifying artillery fire from preparing for attack to supporting the fight of divisions and regiments;

- Diminishing the role of the cavalry;
- Developing the operative level (Napoleon perfectly mastered this level);
- Making full use of the railways and the telegraph that facilitated the strategic maneuver. The Chief of Staff of the Prussian Army, Field Marshal Helmuth von Moltke (1800-1891) drew up offensive plans using a map of the railways. He used rail and artillery transport, telegraph communications and Morse code, which he skillfully used, and defeated Denmark, Austria, and France, for he quickly concentrated his troops and artillery in the established district.

World War I (WWI) lasted from 1914 to 1918 and produced millions of dead and wounded people who lived in unsanitary trenches for four years. The large losses for small successes in the field convinced theorists that another type of movement war with units and large mechanized units must be waged.

Until the beginning of World War I a series of notable discoveries were made: the internal combustion engine, the car, the airplane, the torpedo submarine, the toxic gases, the flamethrowers, etc.

In the WWI, the western front was 700 km long and 1400 km long in the east. The number of deaths from injuries in this war was higher than that caused by wound infection or disease.

WWI is a global beneficiary of the development of science and technology, so it benefited from the development of science and technology (technology). It was a static confrontation (positional or positional warfare). From a political point of view, WWI was an "overflow" or a liberation of nations, a return to the fragmentation of the European political space into small states.

War has a subjective and objective character, in any case dramatic.

According to some researchers, "*the transition from one social system to another is made through revolutions, violence, violent denial and violent affirmation, and through qualitative leaps that generate a new type of social relations*."[3]

[3] Mihai Popescu, Valentin Arsenie, Gheorghe Văduva, *Arta militară de-a lungul mileniilor*, volume 2, The Technical-Editorial Center of the Army, Bucharest, 2004, p. 123

Other authors consider that human society has a continuous or undulating character (such as light). War is as complex as society and can only be understood "*if it is analyzed together with all other social processes*[4]."

In the twentieth century, amazing discoveries were made that changed people's view of the world and showed that the world is a complex and continuous construction with a structure that is not noticeable by humans, not even by scientists. Therefore, scientists divided science into fields. Even in a certain field, scientists do not know everything. Thus, for example, Poincarè – the great mathematician – was the last to be able to understand all the mathematical problems of his time.

Numerous discoveries were made after 1900: the amount of energy (Plank); radioactive substances; isotopes; electronic tube; photoelectric cell; theory of relativity; ionosphere; atom structure; industrial chlorine; 4-stroke internal combustion engine; steel furnace; dynamite; two-stroke internal combustion engine; hydraulic brake cannon; the telephone; electric locomotive; smoke-free powder; Maxim machine gun; induction motor; asynchronous motor; carburetor; radio antenna; the first radio links; steam turbine; synchronous motor; the tank (UK and France); direction finding; radar; the helicopter; the airplane; jet aircraft; remote-controlled missiles; nuclear fission; atomic bomb etc.

Due to this level reached by scientific knowledge, they were applied in practice which allowed military art to develop especially in its practical side.

In the twentieth century, the British used the phrase great strategy for global (integral) strategy. The global strategy aims at the final goals, and the small strategy refers to the first objectives of the war. It is necessary that each operation of an army (fleet) be prepared and carried out according to the general plan of the war and the objective pursued. The overall strategy includes the war plan (immediate objectives and the choice of naval and ground forces).

So, the global strategy targets all state resources for war and is a side of politics (a branch of politics) that establishes the Land, Air and Navy Forces as part of an ensemble that will be used as an instrument of war. It

[4] *Ibidem*, p. 23.

must take into account the political and diplomatic situation of the state, its economic and financial situation without which war cannot be waged. In war there is always a friction among them as a deflection of strategy by politics; it appears as a disease in any strategic problem. That is, an important strategic decision cannot be made outside of diplomacy and vice versa. Often an important strategic action cannot be carried out for diplomatic reasons. Of course, the reciprocal is also valid. Consequently, strategy and diplomacy cannot be separated without serious consequences, and their interaction is part of the "friction of war," as Clausewitz called it.

Humanity develops on the basis of the principles of complementarity and the struggle for resources. The first revolution in the field of army mobility was made by Genghis Khan with his cavalry. The second was made on the sea/ocean by the great navigators (Columbus, Magellan, etc.). This led to power projecting on the sea (over the sea). Air mobility followed.

Eurasia is a pivotal continent of world politics. Russia developed through the railway network (Russia replaced the Asian pivot - the Mongol Empire). Russia exerts the same pressure as migrant peoples on Scandinavia, Poland, Turkey, China and India. It occupies in the world today the same position that Germany occupied in Europe.[5]

Napoleon found it difficult to get generals ready for battle. A battle is imposed on the weaker side and must be "*inevitably fought either by lack of space or by the need to defend good material more expensive than the lives of soldiers*[6]." In the WWI, the Arabs had "*nothing material to lose, so they had nothing to defend or anything more expensive than the lives of soldiers. They just wanted to take back their lands, without wasting human lives.*[7]" Their power consisted in the speed of maneuvers and the time available, but not the power of hitting. Therefore, they had a generally strategic force. Through strategic combat actions they conquered Akaba, Talief, Azrak, Deraa and then Damascus. The actions of the Arabs in the desert were similar to those on the sea/ocean in terms of mobility, because they did not consolidate the land and did not stay put. After attacking, they

[5] *Ibidem*, pp. 129-130.
[6] *Ibidem*, p.157.
[7] *Ibidem,* p. 158

retreated and attacked elsewhere. This was the advantage of the cavalry and the fact that they knew the terrain well. In addition, they benefited from the armor of the British who gave them support with sufficiently strong fire, Lawrence considered that, in the spirit of the age of nations, the time had come for freedom and for the formation of national entities, for massive employment with numerous armies or with irregular armies that had atypical (asymmetrical) means. So the time had come for confrontations between states and nations, between strong and violent armies, and the two world wars are one of the consequences of this philosophy (states). WWI was the expression of a new belligerence, namely a new type of belligerence characteristic of the new industrial society and the centrifugal tendencies of the nations (peoples) to get out of the Habsburg yoke. The new discoveries (telephone, telegraph, industrial production, maritime communications and railways) had the effect of accelerating social dynamics. This war had a rapid and irresponsible escalation of mutual blows and the exaggerated ambitions of the world's greatest industrial powers.

The five years of war were apocalyptic and ushered in a century of global violence. WWI resulted in more than 9 million deaths on the battlefields as a result of identity-type nationalism that corresponded to the requirements of the new European construction and the restoration of a new balance of power imposed by a new philosophy of intra-European relations. After the five years of war, no European power came out victorious, but the USA, according to the saying: "when two parties fight, the third one wins". So the two alliances fought and the USA won, which did not engage in war in 1014, but much later - on April 4, 1917. In 1918 the USA had 2 million soldiers in Europe against Germany.

In terms of military art, WWI does not bring much news on the background of the impetuous development of Germany and the expansion of the Austro-Hungarian Empire and Russia. Against this background, the Triple Alliance (Alliance of Central Powers) and the Triple Understanding (Entente) were born. WWI was a mass war because it consisted of employing an enormous amount of forces and means.

France adopted Joffre's Plan XVII (an offensive plan) in cooperation with Russia's offensive actions against Germany. The German campaign plan also provided for the majority of forces to reach Paris via Belgium and

Luxembourg, and in the second stage the grouping of forces from Alsace and Lorraine would also go on the offensive. The Austro-Hungarian plan was called Hypothesis R and consisted of an offensive in Galicia to destroy the Russian grouping of forces between the Vistula and Bug in the first stage, and in the next stage provided for the concentration of forces in Warsaw and the resumption of the offensive against the Russian group in eastern Galicia.

The Central Powers opened three fronts: the Western Front (500 km wide), the Eastern Front with a length of 1000 km and the Balkan Front on the Danube and the Sava River. In this war, 28 states with a population of 1.5 billion people were engaged. WWI brings to the military art mass armies, cars, armored vehicles (mainly tanks), planes, etc. The absolute novelty suffered by the theater of operations is the three-dimensionality (fig. 1) brought by the participation of aviation for the first time in the war (oh dimension).

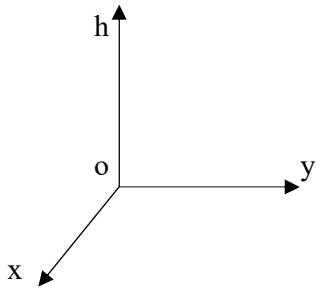

Figure 1. Dimensions of the battle field (operation).

This war raised the issues of aircraft production, the role of bombing aviation, the need to create an air fleet and the conquest of air supremacy, as well as supporting land and sea operations.[8].

A completely new path is needed to prepare for the future war because its nature will be totally different from that of past wars. Consequently, it is wrong to prepare troops for war on the basis of past

[8] *Ibidem*, p. 168.

experience (of the former wars in which those who trained troops participated), but on the basis of the "need to know and understand the future."[9]. WWI took place at the beginning of the aeronautical era. Before it there was the continental era and then that of the great navigators. In addition to the land and sea (naval) forces, the air forces appeared in all armies. They are not dependent on roads, mountains, rivers, seas / oceans. Aircraft compress time and space and suppress borders. They have machine guns and cannons, but also missiles. The planes fly over the states in all directions at any time, day or night, because they have no borders.[10] In addition to the land and sea soldiers, there were also the flying ones. Dozens of planes had appeared at the beginning of the twentieth century, and in the WWI the hundreds of planes turned into thousands by the end of the war.

The purpose of the air strategy was to conquer and maintain air supremacy.[11] The three categories of forces (ground, naval and air) have the same goal: defeating the enemy state, and using the air force for this purpose is just a new method. This strategy does not violate the principles of war; an air offensive to this end does not violate international law or humanitarian principles; the goal pursued can lead to victory and, consequently, the air force will be used to its advantage.

Aviation radically transforms the philosophy of war by expanding the theater of confrontation (area of operations) and by profoundly affecting the security of the entire population that is included in this theater of operations.[12]

In the twentieth century, the real challenge is the appearance of the confrontational airspace and then the cosmic space, in two words, the vertical dimension.

WWI ruined France, which emerged victorious, as did Russia, which suffered just as much.

We can say that the air strategy expanded the content of military art, but it did not get to its end (it did not exhaust it) nor did it change it. But the unpredictable character and fear increased.

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[9] *Ibidem*, p. 168.
[10] *Ibidem*, p. 169.
[11] *Ibidem,* p. 170.
[12] *Ibidem*, p. 172.

After the end of the First World War, Germany still did not understand what it meant to open two fronts. The German leaders thought too quickly of a rematch. Hitler – WWI corporal – was the most suitable "tool" for such a daring mission. In WWI, at Cambrai, the Germans had no information about the British offensive (attack) plan. In France (1916-1917) Hindenburg Line was necessary for German troops regarding a strong defence (barbed-wire fences, machine-gun nests, etc.). British tanks destroyed the Hindenburg defence positions and they were drawn to the center of the German defence position. So 176 British tanks were easily destroyed by German artillery. There is no doubt that World War II (WWII) derives from WWI. The influence of WWII on military art is enormous. After the conclusion of WWI, Germany changed the strategic concept and on this basis it armed and prepared the army, population, economy and information. It is possible that, without Hitler, WWII would have started later, but it would still have started because in Europe the situation was tense, even warlike.

Since the beginning of the twentieth century, warfare was industrialized. Among the factors that determined the victory in the theater of operations were the means of combat used. This truism has already been proven by WWI. Instead, those who focused on the idea of position warfare and the construction of casemate lines were wrong, as the military art of WWII would soon prove[13]. Compared to WWI, the Second World War continued the First and perfected the strategy, tactics and operative art, but first of all the means of combat. It took Hitler's Blitzkrieg and the unexpected Japanese attack on Pearl Harbor for the world to wake up from its numbness and unite against Hitler's Germany.

In September 1939 Hitler started the Polish Campaign and Warsaw had to surrender. On 25 September the Germans dropped 560 tons of explosive bombs and 72 tons of incendiary ones on Warsaw. The Luftwaffe and the German Army learned lessons from the Polish Campaign[14].

On May 10, 1940, German divisions entered the Netherlands and Belgium and broke the French front at Sedan. The French fled from the German army and blocked all roads so that French troops could not move

[13] *Ibidem*, p. 175

[14] Security and Defence Quarterly, Warsaw, 2013, p.176.

for the counter-offensive. On June 14, the Germans conquer Paris. On June 22, the new French government demands an armistice. In August 1940, England began to be bombed by the Germans without being invaded by them. But in early 1941 Hitler invaded Egypt and on June 22, 1941 launched the offensive against the USSR, which was his ally. In two years Hitler started war all over Europe and North Africa. He hoped that lightning would soon lead to the defeat of the world in Eurasia and German domination. Hitler did not understand MacKinder's warning at all that a Russian-German alliance could lead to the UK being excluded from competition for world domination. But such an alliance was then perverse and conjunctural. The two dictators (Stalin and Hitler) were extremists, but one on the left and the other on the right. Such a couple can lead to the end of the world. At Stalingrad (1942) and at Kursk (1943) Stalin was not to allow Hitler to prepare a strong defence. As soon as Stalin found out of the Germans' plan, he began preparing a strong defence and a fine counterattack. At Stalingrad, the German 6th Army was encircled (250.000 men surrendered)[15]. At Kursk, Stalin created six lines of defence behind the front line.

The lightning war broke out in the Kalmyk steppe, at the gates of Moscow and at Stalingrad. Of the 55 million killed in the war, 20 million were Russians. This was the price of the Russian victory.

The Americans go to war against Germany and in June 1944 trigger the Eisenhower-led Normandy landings. In May 1945, Germany capitulated.

The field of strategy is basically the plan of the respective operations: the choice of partial objectives according to the numbers and strategic points of the opponent in order to set the final objective of each operation. The small strategy is divided into 4 main categories: naval, land, air and mixed.

The solution of each strategic problem depends on the nature of the objective (positive or negative). Positive means possession, and negative – lack of possession. If we choose a positive goal, the strategy is offensive and vice versa[16].

[15] Anthony Beevor, Stalingrad, Viking, 1998.
[16] *Ibidem*, p. 134.

The industrialization of the war allowed the Americans to have only 291,557 dead in WWII. The logistical power of the USA (technological and transport power) ensured the success of the Normandy landing.

WWII was not triggered by tensions in the Balkans, but by the expansion of economic, financial, political, social, ideological, moral, informational and cultural borders. Thus, the world economic crisis of 1929-1933 demonstrated this statement. It led to the emergence of totalitarian regimes. The United States was unhappy that its war debt was not being paid. European states ratified the Treaty of Versailles in March 1920, but the United States did not want to ratify the Treaty. The League of Nations was created at the suggestion of US President Woodrow Wilson, but the United States refused to be part of it on the grounds that it is a trivial forum. We wonder if the same opinion is still shared nowadays about the role of the United Nations (UN). Probably, yes.

From a strategic point of view, WWI played a fundamental role in the railways. That is, this war was a war on railways, and WWII was a war on armor, planes and warships.

The armed conflicts of the last decades of the twentieth century and the beginning of the twenty-first had an informational support, air and sea. However, transport acquired a strategic dimension in the war and became a determining factor. Following Hitler's diversion, Stalin beheaded the army, killing 90% of the Red Army's elite and an additional 3 million of the 7 million arrested.

Geopolitically, WWII ended with the annihilation of the old division of Europe and the reconfiguration of spheres of influence, the occupation of Eastern Europe by the USSR, the USA emerged victorious and became an economic, military and political power, and the great colonial empires disappeared (French, Portuguese, Dutch and German) and only three remained: American, Soviet and Chinese.

Twenty years ago together with the increasing developmental tendencies of the social, cultural, economic, technological, scientific and military areas/fields, the changes have been so great that every state (country) as well as the international community has/have to pay ceasless attention at analysing them all in the field of national and international security.

These fundamental changes in the international security and in the military art after 1991 have brought about both positive and negative changes.[17]

BIBLIOGRAPHY

BEEVOR A., *Stalingrad*, Viking, 1998;

POPESCU M., ARSENIE V., VĂDUVA G., *Arta militară de-a lungul mileniilor*, volume 1, The Technical-Editorial Center of the Army, Bucharest, 2004;

POPESCU M., ARSENIE V., VĂDUVA G., *Arta militară de-a lungul mileniilor*, volume 2, The Technical-Editorial Center of the Army, Bucharest, 2004;

THUCIDIDE, *The Peloponnesian War.*

*** Security and Defence, Quarterly, Central European Forum on Military Education, Warsaw, 2013.

[17] Security and Defence, Quarterly, Central European Forum on Military Education, Warsaw, 2013.