THE UNIVERSALITY OF MILITARY SCIENCE

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1. Preliminary Considerations

Motivating the universality of military science involves both describing the progresses made by humanity in the fields of wars and fighting means, and analyzing "products" of certain authors on the subject of war. To demonstrate the universal character of military science we believe that both aspects - military practice and theory - in time and space, since the oldest times and across the globe are required to be recalculated simultaneously. Of course, our approach is directly conditioned by the possibility of acceding to the necessary and sufficient information in order to be able to prove what we intended - the universality of military science.

Unfortunately, the information is quite scarce for certain periods of time and in some areas, while for others there is a lot of information.

Within the evolution of military thinking, there were two critical moments: *the practical-empirical moment*, regarding the commanders of different stages aiming at solving the direct problems of the military actions, moment that is now able to bring innovations, to generate brilliant and original ideas and *the theoretical moment* (*theoretical military thinking*), designed to bring the essence and regularities of armed struggle, to generalize the practical experience of war, to establish fundamental and guiding principles.

Important contributions to the progress of military thinking in a certain historic age bring, of course, scientific, economic, political, psychological, philosophical, historical, technical discoveries, plus the ones which meet the necessity of knowing. Among them, an essential role is that of ***military science*** (***general theory of military science***), which was crystallized only in the modern era. For a long time, the whole scientific knowledge concerning the military science was integrated in the military art, which is only a structural element of the military science.

As a scientific notion it appeared in the military literature of ancient Greece as the ***polenike tekné*** - art of war. Because of the broad definition of the term, ***tekhné*** can be translated both as ***craft*** and as a ***science*** and ***art***.

Gradually **the content of military art** took shape: *war training* (borders reinforcement, city building, equipping the army, assembly and mobilization, etc.); *tactics* (dividing the military in organized units, training the tactical procedures); *planning and execution of military operations* (strategiké tekhne), named *the art of military commander*. With this content the military art dates from the fourth century BC, period from which it remained fragmented in the oldest book about military art, written in Greek[1].

Of course, the military art was inherited from generation to generation, and also the military thinking, is much older than the generalizing writings in this field. In its primary form, ***the military thinking*** (military arts) has the same length as the war and it can be partially reconstructed based on known military actions, thus having as primary source the data and information, surprisingly rich for some periods, from the historical writings. The theoretical principles of the strategy and tactics in subsequent periods are the main source of all concrete actions to fight analysis.

2. The status of military science among the other sciences

Military science is a particular science that belongs to science defined in the broadest sense. It consists of the entire military knowledge - principles, rules and regulations of the war, fighting means, defensive strategies, offensive strategies, theories on armed struggle, the status and role of human force in the armed conflict, etc. - accumulated by humanity over time, due to the development of military thinking and the practice of armed struggle. Basically, it includes a number of scientific areas which allow the implementation of the policy of a strong military defense in a country. Researchers, theorists, strategists, engineers, technicians and personnel testing of prototypes develop in large parts these different areas. On the other hand, the military scientist is trying to adapt, the best way possible, the military tools of a nation to its governmental policy. With a view to doing this, the scientist studies the weapons which could respond best to questions in case or when confronted with a possible war. This science also includes the development of military theories based on past battles to develop strategies for defense or attack. It is about improving the impact or answer

[1] Lt.col.drd. Alexandru Rizescu, *Aspecte ale istoriei gândirii militare până în secolul al XIX-lea,* http://www.actrus.ro/reviste/4_2001/1r2.html

capacities of a country's armed forces causing the best strategies and the best equipment used for war.

In military education, this includes all scientific fields that are mastered (meaning learned, internalized and applied) in case of armed conflict management. It involves the information services, the military material, the conflict simulations, statistics and logistics.

On the other hand, **military science** was and still is understood, generally speaking, as a "whole field of knowledge about war (armed conflict), mainly related to the armed fight, trained and deployed within it"[2]. This definition includes, of course, the training and the use of armed forces in war, and also the procedures and methods of undertaking military actions.

But the war has become an increasingly controversial notion, reflecting the complex reality of the contemporary world. It cannot be approached easily, simply by considering the violent scale of confrontation, since more and more opinions support the idea that the war was a solution or a political option, so a means of policy, namely its core of strength, its violent means. When any other tools used (dialogue, diplomacy, pressure, deterrence, warning, threat, etc.) fail, the last and most risky solution appears: **war**. However, although it is considered as a means or a policy instrument, namely the force policy, war is much more than that. War cannot be reduced to a *summum* of policy or a policy *in extremis*, because this phenomenon has many determinations, some of them spread in time, other features being defined on characteristics of human being, community and human activity, on the relationships between people and human entities.

So, war is a very complex phenomenon which cannot be reduced to a battle, to one or more campaigns and not even during a closed interval, defined by a lot of violent confrontations. War was and still is part of the life of human communities with some objective determinations, some located in well individualized systems, others in chaotic processes in which an essential role is the rule or law of initial conditions variation[3].

A war analysis is usually performed after the fact. The goal of any analysis is primarily to ensure the creation of prerequisites for understanding and preparing the future war, that is the most dynamic and dramatic part of the confrontation, the peak of trajectory (the army confrontation) of the war.

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[2] Col. Dr. Constantin Onişor, *Teoria Strategiei Militare,* Editura Academiei de Înalte Studii Militare, Bucureşti, 1999, p.25.

[3] General dr. Mircea Mureşan, general de brigadă (r) dr. Gheorghe Văduva, *Războiul Viitorului, Viitorul Războiului,* Editura Universității Naționale de Apărare, Bucureşti, 2004, pp.21-70.

3. The evolution of military science in time and space

3.1. Greek-Oriental Antiquity (from last quarter of VI century to the middle of the second century BC)

Basically, during this time, written documents with reference to military aspects of that epoch[4] began to appear. Generally, major battles were described by the thinkers of those times. Thus, we will find the data and information about war in the works of Herodotus, Thucydides, Xenofon. Information provided by them can be completed with the existing ones in some writers' works of that epoch. For example, the story of the battle at Salamina in Aeschylus' tragedy, "Persians". Of course, in taking such information it must be exercised caution, especially when it comes to the number of combatants of the armies which faced each other.

In the field of tactics, namely the art of putting into practice the best means available in a situation at one time, it is noted that: the assault on a point, breaking the defense and catching the demoralized enemy; the attack began with a "rain" of projectiles to facilitate the assault; committing all available forces in succession.

In terms of strategy, it aimed to obtain political results through a combination of military operations.

Some Greek philosophers and not only wrote about war. Thus, we remember the following: **Socrates** (the art of war means applying the rules of tactics), **Plato** (evoking the qualities of a good strategist: perception and control); **Dionysodoros** (one of the Sophists, who gave practical courses on tactics and issued diplomas attesting fitness to exercise the command); **Xenofon** (wrote about the practical experience of fighting).

In turn, historians have described conflicts: causes, operations, battles. But some of them have gone further. For example, **Tucidide** explained and criticized, when necessary, the parties involved in a battle.

Besides the authors mentioned above, there are several important authors in the field of military thinking: ***The art of war*** (Sun Tzi) ***Anthasastra*** (Kautiliya), ***How to protect those encircled*** (Aeneas the Tactician), ***Stratagems*** (Julius Frontinus), ***Army's leader*** (Onasandru), ***Tactics*** (Flavius Arrianus), ***Military Art*** (Flavius Vegitius Renatus) and ***Mauricius's Strategy***, which was later translated and published under the title ***Military Art***.

According to existing sources, **Sun Tzi** lived in the VI-V century BC, being recognized as an authority in the sphere of military thinking. His work "***The***

[4] Alain Bru, *Histoire de la guerre a travers l'armement,* http://www.stratisc.org/act_bru_hisguerre_Ch3.htm

Art of War", also known as "***The thirteen articles on the art of war***" represents the beginning of systematic military thinking, built in concepts, ideas and trying to make a management instrument for targeting troops in battle. His work reflects the historical conditions of the ancient world and it is influenced by the Chinese philosophical schools of that time, especially by Lao Tzi's philosophical system.

3.2. Roman Antiquity (VIII century BC - V century AD)

In terms of military functions in the period analyzed, we mention the three major military reforms from -509 to +476, including the one regarding the standard "great unity", the legion[5]. The characteristics of these three reforms were: **Camille**'s reform: the legion replaced the phalanx and swords replaces spears; **Marius'** reform: plebeian volunteers were allowed in the army, but the legionary was paid and equipped by the state; the Imperial period saw the gradual development into cavalry; **Septime Sever'**s reform: about forbidding the legionary to marry before end of the 20-year long contract.

The tactics was that the Roman Legion, a disciplined, solid and well-trained troop, first had to be able to stop its opponent's upsurge, then due to the skill and technique of fight to discourage him, in order that, in the end, to pass from a defensive position to an offensive one, thus confusing the opponent. Practically, the legion should be able to fight in any terrain.

In terms of strategy, Rome had only three successive political projects in the course of a millennium: to ensure its survival; the conquest of a "colonial empire", to assure total preeminence in the Western world of that time, to defend the empire against the barbarians who came from North and East.

Regarding the theoretical military thinking, excepting Sun Tzi, the quoted source mentions that from ancient times until a very recent period it was based essentially on the information from history: to look in the past to see what succeeded and what the causes for failure were, then, to learn for the future. From the thinkers of this period, we mention Caesar, who in "The Wales War" talked about the personal experience as commandant and about Flavius Vegetus Renatus who, at the end of the fourth century with his "**Treatise of military art**" had a different approach than the authors of that age, using historical facts with an explanatory or demonstrative purpose, reversing the priorities of other authors in this period.

[5] Alain Bru, *Histoire de la guerre a travers l'armement,* http://www.stratisc.org/act_bru_hisguerre_Ch4.htm

This period became famous by creating a network of roads in the entire empire. The existence of these roads facilitated the travel and intervention of the legions in the area where there was a revolt or invaders had entered.

3.3. The Middle Ages (V-XV century)

In the field of military functions in the Middle Ages[6], according to the quoted source, except for some new things at the level of military technique reached by Rome, genuine novelties appeared only from the eleventh century onward.

Generally speaking, the Middle Ages were a period of almost total decline in the headquarters area in relation to what occurred in the Roman epoch. This happened from a number of reasons: often the supreme commander was the political boss, the sovereign or a great feudal, often too young or too old, who simply gave tactical directives to the main subordinates. Then, he had to be an example of fighting in front of the army instead of remaining in a position that would have allowed him to lead the troops according to the situation of the battle field. Also, the coalitions were distinguished by many and endless war councils which led to wasting favorable opportunities and let the quality of speaker to be dominated by the military competence; the military experience of the sovereign was low because the sovereign power was often reached at adolescence; the chivalrous code modeled the behavior of military commanders of all ranks when fighting. Because of this, the troops acted on their own initiative in fighting and not according to the commanders' orders; the concepts of honor and bravery brought the effectiveness of the fight (they didn't collect information about the enemy, the surprises and fraud were not allowed during the fight).

At the end of this period there were some significant issues which appeared in the military: the artillery reached technical maturity; the individual weapons spread in all armies, but without achieving the technical maturity.

For an inexplicable reason, as China seemed to have invented the gunpowder, its armies used very little this discovery. However, it seems possible that the Great Mongolian Khan Cubilai used guns and weapons for conquering the Song kingdom during the years 1268-1269. Therefore, the weapons, equipment and tactics will show a secular immobility.

The Japanese immobility in the field of armaments became clearer. The traditional Japanese armor was preserved and the typical weapons of the soldier often involved a bow and a sword. The fight was reduced, without the slightest

[6] Alain Bru, *Histoire de la guerre a travers l'armement,* http://www.stratisc.org/act_bru_hisguerre_Ch5.htm

tactical idea, to an exchange of arrows in a ferocious duel. It was practiced only in the lower part.

In the operational plan, in the West, the period from the Empire to the Carolingian was limited to the most simple actions: for the successive groups of barbarian invaders, it knew to reunite, when wanted, the hordes of warriors who were going more or less in parallel to produce maximum losses to the fighters by the shock that the scouts reported to be imminent; for the opponents (nations constituted mostly of populations implanted for a long time), that were alerted by the arrival of refugees, called on all men able to bear arms and tried to repel the invaders.

In the Middle Ages, the military strategy, as a level of the general strategy, was complemented by other levels: diplomacy, money, marriage alliances.

In Western Europe, the military-inspired literature remains very poor for a long time. Practically all the authors (Joinville, Guillaume de Tyr, Ambroise, Villehardin etc.) depicted only campaign memories of former commanders without a critical analysis about the deep reasons of the fighting results. The advantage of some narrations is that some stories tell us who, where, when and how people participated in fights.

However, there are some exceptions but none of them before the XIIIth century:

- Jean de Mung, who in 1284 translated "De Re militari" by Vegece adding critical comments made under the title "The Art of Cavalry";

- the monk Plan du Carpin who, sent as ambassador among Mongolians, wrote in return – around 1240 – a material on the tactical characteristics of the fight of these invaders in the Eastern Europe, presenting both considerations on deficiencies of Western armies compared with unknown tactics, and the means to remediate them.

- The only theoretical work was "Le Rosier des Guerres" written by a whole staff at the order of Ludovic the XIth. The paper was concerned, in essence, with the tactical level. But, he wanted to show before Clausewitz that military strategy is only a level of the political project and, reciprocally, war is just the continuation of politics by other means.

Furthermore, this collective work emphasized the careful consideration of the enemy, the terrain, the information, the security when in movement or stationary, keeping the secret. Likewise, the work talked about the role of surprise when choosing a good position, of the superiority of artillery and the reasonable use of infantry, of taking into account weather conditions, of immoral cohesion, of people and horses' good physical condition, of their supplies.

At the other end of Eurasia "Les 36 stratageme" (The 36 strategies) appeared having an undefined origin, but, most likely, pertaining to the Ming period (1368 -1640). Practically, the paper presented a series of "advice", as proverbs, each followed by a short text, a quotation from Yijing (old divine text) and funny stories justifying the proverbs. The level was tactical, but, in point of value, it was beneath the theories in Sun Tzi's "The Art of War".

During this period, Byzantium witnessed the emergence of some general, encyclopedic works. Note the following:

- the writings of Urbicus as well as the ones of Byzantinus Anonymus, during the reign of Justinian (527-565), was characterized by the situation reflected in late Roman age;
- "the Manual" of Heron the Young who, honestly admitted that he wrote the manual starting with the loans made by Apollodor, Biton, Filon, Aeneas, Heron the Old, etc.
- The Encyclopedia elaborated by various authors at Constantine Porfyrongenete's order, also based on ancient works.

3.4. The contribution of the Maya and Aztec civilizations to military science

Due to its existence between 600 B.C. and 1524 A.C., when the Spanish conquest began, the Maya civilization, on the whole, was characterized by a high degree of political and cultural diversity (the archeologists identified about 31 Maya dialects[7] spoken at the moment of Spanish conquests, the basic administrative-political principle being the vassalage of different cities-state in regard to the central city-state).

Politically fragmented, the Maya society was for a long time torn apart by internal wars, some of them only raids with the purpose of capturing prisoners destined to ritual sacrifice, others being true campaigns of destruction of rival states. Mainly, the Mayas started wars to obtain economic advantages (achieved, for example, by paying tribute) or to control commercial routes. Despite the frequent conflicts, there was no deep perspective of the military dimension of the Maya society.

The consulted information sources have given no clues about the existence of some theoretical works in the field of military thinking.

In terms of scientific objectivity, we must note, even from the beginning, that all we know about the Aztecs carrying out the war is due to the conflicts that they had with the Spanish army, the primary information sources being the writings

[7] The Mayas, p.3.

of some Spanish priests or conquistadors. This civilization does not provide either information on theoretical works regarding war or any other aspects concerning military strategy or tactics[8].

3.5. From Renaissance to Enlightenment (1500 -1789)[9]

The evolution of military technique, in the period analyzed, is distinguished by: an improvement of battle means (for instance, the types of cannons are diversified and quality improved in terms of materials they were made from or the projectiles used) and fundamental changes of the battle means. Among the latter, we mention: the development of the hackbut in terms of lightning the powder and attaching the bayonet; the emergence and use of the pistol; the fortifications which stood clear of the castle-fortress, and after two centuries the third Vauban system was obtained; completely new achievements: the case of ships destined exclusively for war that had superposed decks on which batteries were installed; the disappearance of certain battle means: the spear was replaced by the bayonet; the armour was reduced to helmet and ring shirt, used only by trenchers and heavy cavalry; the sword which was only used as a distinctive sign of social status and for parades; the crossbow; the bow.

In the 16th century, among the most important authors who dealt with theoretical aspects of war, we can mention Nicolas Machiavelli (1469 – 1527), with his works "Art de la Guerre" (The art of war), published in 1920 and "Il Principe" (The Prince). It was in the latter where Machiavelli made the following remarks: the state had to grant a privileged role to defense; troops enlistment had to be made in a physically and morally healthy environment; training and practice were the most important things in shaping military courage; discipline was more valuable than impetuosity in a war. Actually, the author approached the general strategy, on one hand, with "The Prince" and, on the other hand, with "The Art of War" on the tactical level.

We should mention here the fact that in the same period when his famous book "Il Principe" was written, the well known work "Invataturile lui Neagoe Basarab catre fiul sau Theodosie" (Neagoe Basarab's teachings to his son, Theodosie) was also written; these two works are compared by many critics, considering their structure and style, through the political, ethical and military

[8] Manuel Aguilar-Moreno, *Handbook to life in the Aztec world,* California State University, Los Angeles, 2006.

[9] Alain Bru, *Histoire de la guerre á travers l'armement,* http:www.stratisc.org/act_bru_hisguerre_Ch6.htm

thinking system. Thus, the Romanian ruler's book set the basis of a number of writings of European value for that time[10].

The 17th century so "fertile" in terms of conflicts, proves that great commanders do not take chances in writing theoretical works. For instance, Turenne, left a voluminous correspondence and, Vauban even more still. But the letters addressed to the king or his ministers were reports, requests, and proposals of operations or works, which did not seek to rely on a general personal doctrine. Yet, Vauban left 12 volumes – "Mes Oysivetes", which covered the most human activities, up to freedom of conscience, colonial expansion, or the threat of waterways. Except for some hints, "Mes Oysivetes" did not address military issues at all.

The 18th century knew a certain number of inquisitive spirits who studied the military issue. Mainly, they were interested in the manner in which the available resources could be used more effectively, as once did Alexander the Great, Hannibal or Cesar.

At the beginning of the century, Maurice de Saxa, in his work called "Reveries" (1732) envisaged for recruitment, organization and military administration very advanced reforms for his time.

A predecessor of great thinkers from the end of the century was knight Folard. Among his works we can mention: "Traité de la guerre des partisans 1717" kept as a manuscript, "Nouvelles decouvertes sur la guerre 1724", "Traite de la colonne et de l'ordre profound 1727" – which will become the long foreword for "Commentaires sur l'histoire de Polybe 1730". These were only a few of this author's works.

At the end of the period analyzed, we could consider the knight Du Teil and the count du Guibert military authors. The former published a brochure in 1778: "De l'usage de l'artillerie nouvelle dans la guerre de campagne" (About the use of new artillery in the campaign war) that preached the offensive spirit, even in defensive situations and dealt with a combination of arms. He showed that the artillery must focus their fire to create a decisive effect on a point of the enemy line. Then, the infantry will exploit this effect. The latter, Charles Benoit, count Guilbert (1743 – 1790), was an officer and military writer. He wrote for 21 years. Among his works we mention the following: "Essai general de Tactique" (1770); "Mèmoire adresse au Public et a l'Armee sur les operations du Conseil de la Guerre: (1787); "Traite de la Force Public, considèrèe dans tous ses rapports" (1790).

[10] Lt.col. drd. Alexandru Rizescu, *Aspects of the military thinking history up to the 19th century,* http://www.actrus.ro/reviste/4_2001/1r2.html, p.4.

In essence, de Guilbert was a tactics analyst and restorer, he rose at the operational level and then at the strategic one, until he could foresee the nature of future conflicts. In this respect, he said that soldiers will be citizens and citizens will be soldiers, and the conflicts between sovereigns will become fights between peoples, and nations in their whole will take part at these conflicts. Moreover, he analyzed the capacities of European nations with a prophetic vision; he especially warned against the threat of gigantic Russia on the small Europe.

3.6. From the French Revolution to the eve of modern wars (1789 – 1861)[11]

During this period, the pace of technical discoveries and their implementation was highly accelerated; we passed from mail coach to railway; from sailboat to steamboat; from the riding courier to the electric telegraph.

The period between 1789 and 1815, scientifically speaking, was hall-marked by technical discoveries and by their implementation: the development of chemical industry, of iron metallurgy, the beginnings of using the electric rasp, hydraulic jack, railway, electric telegraph, the airscrew.

The military thinking of this period was made itself known in:

France – Marshall Gouvion – Saint-Cyr made an analysis of the campaigns undertaken during the Revolution and Empire period; Marshall Bugeaud demanded to go back to the definition of great principles, valid for the modern forms of war. He concluded with the permanent abandonment of the profound order to the profit of gunners' chain, widely spread on the field.

In general, the French military literature from this period consisted of war memoirs which were more interesting for historians than for ideologists.

Austria – Archduke Carol had an interesting input: he stated that strategy prepares the battle and that tactics is the one which must win it.

Prussia – Carl von Clausewitz: "On war" was his basic work read even today. It has the following structure: On the nature of war; On the theory of war; Of strategy in general; The combat; Military forces; Defence; The attack, Plan of war. "War is a continuation of politics by other means" is his most known and cited statement. Among his thesis are the following: the essence of conducting war; executing the conceived plan without allowing to be embezzled by the difficulties which may arise; the battle is an end, not a means, because the purpose of war is to destroy the enemy forces; retreat, even voluntary and unexecuted under the

[11] Alain Bru, *Histoire de la guerre a travers l'armement,* http://www.stratisc.org/act_bru_hisguerre_Ch7.htm

enemy's pressure influences a great deal the troop's morale; is the offensive the final form of war? The answer given by Clausewitz is a nuanced one.

Yet, Clausewitz's thinking exceeded a lot the strictly military issues, in order to stress the relations between war and politics.

Anton Jomini was the most particular case. Colonel when he was only 33 years old, in 1803, he published "Traite de Grande Tactique", republished in 1811, by the name of "Traite des grandes operations militaries". It is worth noting his approach on the operative level and his ability to synthesize.

Here are a few of the idea supported by Jomini: war is not a positive and doctrinal science but an art and more than this, it is a kind of passionate drama where masses' spirit and morale, commanders' skills and characters exert a primordial action; the conviction of immobility and supporting the speed of operations; he supported the advantages of the strategic (operational) offensive and he was reticent about the tactical offensive; the secret of victory lies in the very simple maneuver which consists of carrying the bulk of forces on an enemy's wing.

As for the contribution of the other nations to the development of military thinking is concerned, it seems that there was no ideologist worthy of this name in England, Spain, Russia, USA or Italy.

3.7. The age of modern wars (1861 – 1914)[12]

The first modern wars were from 1861 to 1914, an era when the industrial, technical, and scientific superiority tended more and more to constitute a factor at least as important as numerical superiority and commander's military genius. This period can be qualified as a military "breakage" period as it was, at the respective time, spreading the individual weapon and the cannon.

This breakage was based on three main points: using the mechanical artificial energy, with open possibilities for fast and massive transportation, first on land and, then maritime; the instant transmission of information at great distances in any weather conditions, having the obligation to amend an appropriate infrastructure; the considerable increase of the shooting step, of the target striking distance and of firepower of weapons of all sizes.

Meanwhile, the categories of armed forces know new developments as a result of scientific and technologic progress in almost all fields of human activity.

It can be said that the period between 1861 and 1918 was quite poor in terms of writers who approached military issues. Strategic thinking was rare but tactical or operational ideas met a new phenomenon: the disorder which resulted

[12] Alain Bru, *Histoire de la guerre a travers l'armement,* http://www.stratisc.org/act_bru_hisguerre_Ch8.htm

from the rapid technical progress. Because now, irrespective of the weaponry used at the operational level, in tactics, the connections and transportation means had also to be considered.

The period between 1871 and 1914 knew a development of regulations on categories of armed forces. For instance, in France, in 1875, a new regulation for infantry was issued. Unfortunately, this regulation and the ones that followed it received severe criticism. The doctrine that supported them does not answer the idea of nation. Among its critics we can mention the following: generals Lewal, Fay, Pierrin, Canonge, Cardot.

As a general rule, the German authors from this period were at a higher level than the French authors. Under Clausewitz's influence, military thinking rose at the strategic level, to be more precise at a political-strategic level. Thus, they stressed the fact that preparing a war demands important efforts, especially financial, economical, industrial and human efforts. Its rapid implementation will involve important human sacrifices. Among the German authors we note: Von des Goltz; von Bernardi; von Falkenhausen; von Bieberstein. All of them claimed that modern war does not match the chivalrous conflicts of other times, but it represents a means of acquiring some political or economic advantages.

Regarding other nations, military thinking was stressed through a number of works, published especially in the USA, as memoirs of war. Here there were some views of tactical level, but nothing was written about the operational and strategic levels.

3.8. The modern ideological war (1918 – 1945)[13]

During this period, the prevalent aspect was the ideological aspect of wars. These modern wars became, first of all, wars of material issues – quantitative/numerical and qualitative/performance – which could not make up for the human sacrifices agreed on by the belligerents who had only inefficient industrial means.

In the period analyzed, the military technique witnessed changes regarding the following aspects: generalizing all that already existed in 1918; acquiring new equipment (automatic weapons, machineguns; artillery; aviation; ballistic missiles; acoustic search head torpedo; nuclear weapon, etc); the large production of equipment and complex ensembles (usually, meant for new developments).

Military thinking also knew an interesting development:

- J.F.C. Fuller published: "Tanks in the Great War" (1920), which is a critical review; "The reformation of War" (1923) in which he presented his

[13] Alain Bru, *Histoire de la guerre a travers l'armement.*

concepts on the future armored materials and the one of “On Future Warfare” (1929); Regulation III” (1930).

- Basil Liddell Hart published in 1923 “Tanks Avec Fuller et quelques autres non-conformistes – Hobbart, Martell, etc”
- Lt.col. de Gaulle published: “Le fil de l’èpèè” (1933); “La France et son Armee” (1938); “Vers l’Armee de métier” (1934) in which he suggested: the use of tanks in massive formations; the creation of a maneuver and shock army, mechanical, formed of elite personnel.
- Hans von Seckt published: “Geuselegende Gedanken fűr den Wiederaufban unsere Wehrmacht” (1921).
- Erwin Rommel published: “L’infanterie attaque” (1933);

The second world conflict, more than the first one, was marked by the respective industrial powers of the belligerent nations, but also by the strong involvment of force into battle, connected with the rapid transition from fundamental or applied research to operational use (radar, ballistic missiles, nuclear weapon).

3.9. The Contemporary Period

This period was characterized by a mutual nuclear threat between the two military blocs, which was experienced between 1945 and 1990 for dividing the areas of global influence. This played an important role in preventing the third world war that, had it happened, it would have led to destruction of life on earth. Despite the "nuclear peace" people did not live in peace: conflicts between clients of two blocs, internal civil wars, those between "second degree" nations (e.g., the war between Iran and Iraq), wars related to colonization. The antagonistic blocs have acquired numerous nuclear and classical war means. This period was marked by fantastic progress in science and technology. Meanwhile, the industrial landscape has been radically disrupted. If in 1945 the best indicator of a nation's economic power was the steel production, today, this indicator has lost its value: economic power is measured by the production of military means made with the best technologies (electro-informatics, space, nuclear energy etc.). As a piece of news, if for 45 years "the army peace" has reigned in Europe, since the collapse of communism minor conflicts have multiplied between small neighboring nations, as well as civil wars for creating new states.

Currently, the knowledge in the military field has acquired a great development; some even talk about a *revolution in military affairs* (Revolution in Military Affairs - RMA), an activity that included all the armies in the world, institutions which are in a specific and vigorous process of transformation to keep up with the advancement of human society.

RMA is not a self-status process, but it is part of the much wider revolution in the information technology which, itself, is in the center of the specific processes of globalization. It is obvious that, as globalization has allowed technology to develop quickly, and the human resource, trade and financial investments to transcend the state borders, the revolution in military affairs was affected by this phenomenon. Moreover, RMA has not emerged in a "strategic vacuum"[14], and it is not a coincidence that its development has gained scope in the post-Cold War phase of globalization, the same way as the military consequences of the industrial revolution coincided with the boom of the nationalism.

In this context, for the contemporary military science the following question arises "Does the future of war lie in technology?". Today, the technological progress has revived the idea of the RMA. Because of the emergence and improvement of technology, the military analysts already implement improvements in the speed, capacity, and generally speaking, in the precision of weapons. Also, together with the rapid improvement of computers, the interconnection capacity of the armed forces will improve significantly. The progress of technology has conducted, in Michael O'Hanlon's view, to military robots of unmanned artillery which foretell a future of virtual battlefield and of wars without human casualties[15]. More than that, if technology permits, the war in any part of the world can be taken from the national territory: guided munitions, combat aircraft and artillery could be performed without making a step on foreign soil. It is obvious that RMA technologically promotes the advanced countries, especially USA[16]. Military experts fear that the considerable technological gap will prevent states from participating in multinational operations and the inequality caused by the various technological capabilities of the states can build a source of tension between countries.

Throughout the history of humanity, war has remained an essential aspect of existence. Some entities have committed war attacks, while others did it to defend themselves. Although wars vary with respect to causes, components and magnitude, only one aspect remains the same: war has changed. The technology of war has changed the most, hence the idea that the war will continue to exist as long as times and technology evolves.

RMA has not completely transformed either the art of war or the military science as a whole, but allowed the development of new elements of strategic art,

[14] Francois HEISBOURG, *Special Comment*, in Disarmament Forum, Number 4/2001, pp.3-4.
[15] Michael O'HANLON, *Technological Change and the Future of Warfare: Understanding the Revolution in Military Affairs*, Brookings Institution Press, 2000, p.3
[16] Simon DALBY, *Geopolitics, The Revolution in Military Affairs and the Bush Doctrine*, in International Politics, Volume 46, Numbers 2-3/2009, pp.234-252.

intelligence, and military tactics. The processes, methods and rules of classic military art were reviewed and adapted both to the new stage, new requirements and possibilities of the means of struggle, and especially to the new types of risks, threats and military and non-military threats to security. Thus, in the contemporary period, military science will have to start from the premise that, in the near future, military actions will probably take place in a fluid, multidimensional battle space, characterized by asymmetry, mobility, decentralization, manageability and flexibility. Also, the armies of major developed countries and not only passed to professional training and outsourcing of some functions. All these changes find their reflection in the theoretical field where strategists, military analysts, researchers and theorists elaborate doctrines, concepts, strategies etc. for armies to use in conflict prevention and resolution. On the other hand, the fight against international terrorism required a concerted and extensive research activity regarding the role of army in this fight.

Today, there are tendencies of developing military science in each country or groups of countries. In this latter case, it is about the Member States of some military-political alliances such as NATO. On the other hand, works which, by their contents, belong to military science were issued in all states of the world. Now, more than ever, military research is organized aiming at fundamental issues of war, as a complex and social phenomenon, on the one hand, and develops doctrines for each category of armed forces and not only, various strategies targeting security and national defense, on the other hand. The dissemination of scientific knowledge, including military science, is significantly amplified by the strong progress in information and communication field, on the one hand, and the complex phenomenon of globalization, on the other hand.

4. Arguments in favor of the universality of military science

In its evolution in time and space, military science has seen two key moments: the ***practice-empirical moment***, directed at solving various steps of military actions of the immediate problems by the commanders, moment which was able to innovate, to generate brilliant and original ideas and the ***theoretical moment*** meant to bring forth the essence and regularities of armed struggle, to generalize the practical experience of war, to establish fundamental and guiding principles. These moments take place on two dimensions, temporal and spatial. While initially the practical-applicative aspect is paramount, starting with the shaping of military science as a scientific discipline and structural element of science, the two moments are equally important and interdependent.

Military science is defined by its ***universality*** on two dimensions: ***time*** and ***space***. This defining trait of military science is manifested through the following *variables*:

1. Today, military science is **international**, but the environments that produce them are particular and national. In fact, a comparison with national military history of science shows how universal the results are generated, starting from the individual trajectories and interference. The universal is built step by step through different cultural contexts that do not deny, but express a particular reality. The universality of military science achieves and emphasizes the diversity of scientific knowledge of the military and contemporary phenomena realized nationwide. The results of this knowledge are then disseminated to all interested media also as effect of the globalization of information.

2. Military science exists only as **creative diversity**. The scientific knowledge in military affairs was not, is not and will not be produced exclusively only on one part of humanity, according to its culture and interests, while the other part is content to take advantage of some of its benefits. The research value lies not only in its results which can be taken into account in a globalized society, but especially in raising the cultural level of the countries and regions within which and for which it develops. Multiplication and diversification of research clusters in the military affairs allow the development of a rich, cultural capital which opens a wider access to a larger population. It also allows the development of the needs, concerns, and methods of original work, useful for the entire scientific community, including the military one.

3. Military science is characterized by **continuity**. This means that the level at which it reaches at a certain point is the result of the continuous activity of commanders, thinkers, scientists, analysts, strategists, tacticians from the old days and nowadays, both nationally and internationally. We consider the presentation of the main historical periods of products realization in the military theory and practice, performed in this paper a proof of this temporal and spatial continuity of military science. In fact, this variable acts both on the temporal and spatial dimension of the universality of military science.

4. Military science played, plays, and will play a significant role in **the evolution of technical and technological progress**. Basically, the military activity has contributed and will contribute to the evolution of technical and technological progress. In this respect, we think that two examples are indicative and sufficient. First, *the laser*, discovered by the military researchers came now to be widely used in the civilian world. Then, *the Internet*, which appeared and manifested initially in the military field, went "threshold" and it was and still is beneficial for all people interested in finding and communicating such information. However,

unfortunately, the human being has such a physical structure and social determination that has the instinct to use every scientific and technical progress in order to perfect the warrior "panoply". This is both because he fears that he will be outrun by his opponent, declared or possible, and because he is convinced of the justice of his cause, giving him the feeling of comfort to remove moral scruples. This variable also expresses the temporal and spatial dimensions of the universality of military science.

5. Globalization is another current variable of the spatial and temporal dimensions regarding the universality of military science. The latter, in all ages but especially today, is defined by globality, meaning that its products, over time, have become common good of all people, state and non-state actors. Of course, globality refers to the generalization of scientific knowledge in the military field, both on the usual, common way, and in means specific to intelligence services. On the other hand, the complex and multidimensional phenomenon of current globalization plays a significant role in the development of military science by: the revolution in military affairs; the revolution in information and communication; the active involvement of non-state actors in developing the current armed conflicts; the relatively free flow of knowledge in all fields, including the military one, both nationally and regionally, and internationally; the privatization of some research areas - development, including in the media battle; the outsourcing of some military tasks to private companies offering military and security services.

6. Dynamism is another variable that defines the temporal dimension of universality of military science. In fact, military science, both as part of science, as well as a specific domain of human knowledge has grown dynamically over time. This is because individual and collective needs of defense and security, on the one hand, and the need to ensure the existence of material sources for each person and human community on the other hand, required the hard search in the direction of research-development both for the production of media combat performance, and to generate concepts, doctrines, strategies and tactics related for the use of the former in combat. Thus, the appearance of a new means of struggle, let us call it the "possible enemy", led to the production of an "antidote" to it by the "target enemy". For example, the appearance of the military aviation and its development led to the creation of some effective means of combating them. This way the anti-aircraft artillery appeared. In addition, new concepts, doctrines, strategies and tactics appeared that improved the effectiveness of military actions that are using new means of struggle. Also, the changes in terms of concepts, management and organization of the armed struggle have spurred the dynamic evolution of the military science. The military science, from its appearance, was permanently

established in a concrete support of military practice - from the optimization of the armed forces to providing them with highly effective equipment and weapons.

7. Interaction with other particular sciences is a variable that expresses the temporal and spatial dimensions of the universality of military science. Throughout its evolution and on all populated continents of the world, military science was, is, and will be into a continuous and systematic interaction with other individual sciences. On the one hand, new knowledge gained by the military science, useful for the civilian field pass, in time, from the military field to other sectors of human activity. A lot of knowledge and data generated by other sciences which are somehow useful for the military field, are borrowed, assimilated, internalized and developed by military science. This way, a mutual and beneficial exchange takes place between two areas of human activity – civilian and military – either on ways that are open, common and accepted by all actors involved in such exchanges, or on more or less specific ways. In addition, the military science assimilates and uses knowledge, methods and techniques that were created by other scientific disciplines such as, for example, mathematics, philosophy, sociology, adult pedagogy, cybernetics, and social statistics. Meanwhile, theories, concepts and forms of organization promoted and discovered by military practice and theory are used by other sciences. Today, we often meet concepts like strategy, tactics, general staff etc. or forms of organizing the activity of various state or private institutions according to the military model.

In addition to the variables defining the temporal and spatial dimensions of the universality of military science presented the above, we think that the latter (the universality of military science) is also emphasized by three essential aspects.

First, military science is ***an integrated part of science***, the latter term used in its broadest sense. By its content, methods of knowledge used and its usefulness, military science is included among other social sciences and not only.

Then, this feature is proved by ***combining in time the knowledge of the military area,*** knowledge that resulted from the activity of all military, scientists, military and strategic theorists, regardless of country of origin or age in which they lived and worked. For example, today, some works of military theorists like Clausewitz or Sun Tzi, for example, are still studied, analyzed and used in further development of similar works. Of course, the cumulated knowledge that resisted over time, meaning that has passed successfully the verifications which it had to go through, in the social practice both in the military and the civilian fields.

Finally, military science is linked to the ***evolution, in time, of the means of struggle***. Practically, the development of military science determined the upward evolution of military practice. The technical and technological progress in terms of struggle means and military science influence each other, supporting themselves

continuous and systematic. The discovery of more efficient struggle means, on the one hand, is the result of the development of military science, and, on the other hand, a moment of triggering new research directions in the direction of their effective use in struggle.

Conclusions

Military Science is a component of science and is defined mainly by its universality. Its evolution on the temporal and spatial dimensions was continuous and in close interdependence with the development of human society in general, and especially the evolution of scientific knowledge.

The international characters, continuity, dynamism, significant impact on the technical and technological progress, the interdependence with the other sciences are variables that define the temporal and spatial dimensions of the universality of military science.

The evolution and development of military science will continue in the coming years under the impact of globalization effects and transition of human society into a new stage of development, namely the knowledge society.

The universality of military science is a reality expressed through the products of practice and military theory, in time and space, over the existence and development of human society.

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