

DEFENCE SCIENCES: DO THEY EXIST?

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There is a lot of discussion on the place of defence or military sciences in the larger framework of “science”. In this presentation we will show that defence sciences, as such, do not exist. What we call defence sciences are in fact “normal” sciences used to attain military objectives through military applications. This is the case as well in technical and engineering sciences as in human sciences. This will be illustrated by several examples. As a result, military sciences should not look for a separate place or invent their own for a: they can find their place, and are even necessary, in “civil” frameworks such as the European Commission Framework 7. This will also be illustrated by the participation of the Belgian Royal Military Academy in such international projects.

Key words: *defence sciences, military applications, international projects.*

Definition of Military Sciences

First of all, if one wants to discuss a subject it has to be well-defined. So let us have a look at some definitions. Those to be found in dictionaries and encyclopaedias are rather general and do not help us very much in understanding the nature of military sciences:

- “The discipline dealing with the principles of warfare” (Webster)
- “The academic study of the principles and procedures of warfare” (Encarta) If we turn to internet sources, definitions become a bit more elaborate, even though not always 100% consistent: “Military science concerns itself with the study of the diverse technical, psychological, and practical phenomena that encompass the events that make up warfare, especially armed combat. It strives to be an all-encompassing scientific system that if properly employed, will greatly enhance the practitioner’s ability to prevail in an armed conflict with any adversary. To this end, it is unconcerned whether that adversary is an opposing military force, guerrillas or other irregulars, or even knows of or utilizes military science in return.” (WordIQ)
- “Military science is the process of translating national defence policy to produce military capability by employing military scientists, including: theorists, researchers, experimental scientists, applied scientists, designers, engineers, test technicians, and military personnel responsible for prototyping. In so doing, military science seeks to interpret policy into what military skills are required, which, by employing military concepts and military methods, can use - military technologies, military weapon systems, and other military equipment to produce req-

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uired military capability. Military science involves creation of theories, concepts, methods and systems applicable to the functions and activities of the armed forces, usually undertaken to increase overall military capability by increasing efficiency, effectiveness and simplicity of complex concepts, methods and systems used in military operations in peace during a war. Military science is the means by which military personnel obtain military technology, weapons, equipment and training to satisfactorily provide military capability as required by the national defence policy to achieve specific strategic goals [...]" (Wikipedia)

Finally, let us have a look at the specialists. On the website of the International society of military sciences we find the following text:

- The Austrian National Defense Academy, The Royal Military College of Canada, the Royal Danish Defense College, The Finnish National Defense University, the Netherlands Defense Academy, the Norwegian Education Command, the Swedish National Defense College, and the Baltic Defense College established in October 2008 a society intended to further research and academic education in military arts and sciences in the broadest sense.

The purpose of this organization is to build a network for the creation, development, exchange and diffusion of research and knowledge about war, conflict management and peace support efforts. [...]. Activities include communications and publications to support a research network within topics such as: war studies; military history; military technology; command and control, leadership and basic competence; law & ethics; security, defence policy and strategy; armed forces and society; and defence economics and management [...].

What are the common denominators in all these definitions? First of all, the abundant use of the word "military": military technology, military history, military concepts, ... This is the most strongly represented in the ultimate goal: in all three internet definitions the purpose of military sciences is very clear: it is a means to win wars. Wars, of course, being seen in the broadest, modern sense, i.e. including conflict management, peace support etc. So, basically, military sciences could be defined as:

"Typically military sciences necessary to achieve the required military capabilities to achieve the military goals set by the Government."

This definition presents however one flaw: it still does not explain the nature of these military sciences. Some parts of it are revealed in the various definitions: military history; military technologies, military weapon systems, command and control, psychology, leadership, law & ethics, security, defence policy, strategy, armed forces and society; defence economics, management. As one can see, when we try break down military sciences to its individual building blocks we do find a lot of sciences without the word "military" in their name. If we go even further, as we will see in the next chapters, even the ones that are still named "military" in this enumeration will loose this adjective when, in turn, we break them further down to their basic sciences.

Relation Between Military and Technical Sciences

In the previous chapter we were still "stuck" with military technology and military weapon systems. At first, the difference between military and civilian systems seems obvious: military build weapon systems, civilians do not (for the purpose of clarity we will temporarily forget, for the time being, about police forces and other law enforcement agencies). But just how do you build a weapon system? Let us take the example of a battle tank. What are its main features? I guess we can all more or less agree on: fire power, protective armour, mo-

bility and CISS (communication & information systems and sensors). Let us examine them in detail. First of all fire power, undoubtedly the most “military” requirement. But, what sciences do you need to make a gun? Apart from casting techniques, electronics etc.... it essentially comes down to internal and external ballistics.

Internal ballistics being chemistry meets physics. External ballistics is all about aerodynamics and flight mechanics. Nothing typically military there. Perhaps we have better luck with the protective armour. However, this is a marriage between material science (metal alloys) and basic mechanics (impact angle). Mobility then? No real difference between the motor, gearbox and suspension of a tank and a heavy duty vehicle in e.g. road construction. As for communication & information systems and sensors, no doubt all these are common technologies, painted khaki. Is this perhaps typical for technical and engineering sciences?

Relation Between Military and Human Sciences

Let us have a look at alpha-sciences. Military history is, for most of us, the single best example of a typically military science. Or is it not? Is military history just one aspect of history, an aspect that cannot be understood properly without its bigger historical and sociological context? Just try to understand commanders’ decisions at low and high level, without taking into account the “non-military” environment. We have several examples from the current day history (Afghanistan, Iraq) or from a long time ago. How are you going to wage war in Afghanistan if you do not understand the complex tribal sociological, economical and political situation? And if you go back in time: try to explain the manoeuvres and the strategical and tactical choices made by the Roman generals during civil wars. You will find they have little to do with military arguments but everything with politics, sociology and economics.

Another typical military domain: law of armed conflicts – the *ius ad bellum* and *ius in bello*. I will be very brief on that: I believe that this has become the centre point of military operations in this day and age. The laws of armed conflicts and, by extrapolation, the ethics of warfare dictate our military operations in a very large sense. But if we have a closer look to these laws and rules, we quickly find they are not “military” at all. At best, they are translations of commonly accepted human rights to specific cases. E.g. rights of prisoners translated into the rights of prisoners of war. This is not at all surprising, given the ever blurrier frontier between war, (counter-) insurgency, terrorism and international crime.

Specificity of Military Sciences

So, is the conclusion to forget about military sciences? Is there nothing typical about the science in our profession? Yes, there is: as it was explained earlier, the specificity lies in the ultimate goal – winning wars. So, we are not interested in ballistics, material science or mechanics, we are interested in a combat vehicle.

Military sciences is all about integrating various, non military, scientific disciplines to achieve a military goal. The technical example of the combat vehicle is straightforward. But the finest example is, in my opinion, the notion of leadership.

Even though the military does not hold a monopoly on leadership, it is clear that it is the first and most important factor in an armed conflict. Leadership, or the lack of it, will

determine, more than any other factor, the outcome of a military struggle. It is not so easy to find a straightforward definition of leadership. But its various aspects, e.g. exemplary behaviour or social consciousness, can be easily recognized as being part of classical human sciences: psychology, pedagogy, ethics and sociology.

As the military sciences are the result of a combination of civilian sciences in order to achieve a military goal, this integration can only be achieved by a specialist: the military scientist. This does not necessarily mean this military scientist has to be a specialist in every branch of science. Anyway, this has become impossible: the rapid development of sciences has made the *Uomo universale* or *Renaissance man* a species as extinct as the dinosaurs. He can be, and preferably is, a specialist in one of these sciences. But his most important feature is that he has to be able to translate the military goals into military scientific targets which, in turn, can be transformed into general science objectives.

Military Sciences as Initiator for Civilian Sciences

Previously, it was demonstrated that pure military sciences do not exist. This does not mean that science for military purposes can not have a significant influence on science as a whole. Many specific sciences were invented or developed for military purposes, only to be adapted for and taken over by civilian applications. Some examples:

- Leadership: especially in the Far East, courses on military leadership, strategy, etc.... are followed by captains of industry. The works of Sun Tzu being mandatory reading for everyone who wants to survive in the cut-throat jungle of international business.

- For centuries, developments in cryptography have been made under the impulse of military needs, even though from the earliest times diplomats and merchants have understood its merits. Nowadays we see that many advances in this field are due to the need to secure internet transactions rather than military communications.

- Ergonomics are rarely associated with the military. You are not supposed to feel comfortable in an armoured combat vehicle. But the origins of ergonomic instruments design lie with the British military engineers trying to minimise pilot error in the early days of World War II by adapting the cockpit of their fighter planes.

- Last but not least, the flagship of military sciences: quality assurance. Long before anyone talked about ISO 9000, certification or accreditation, the military (spearheaded by the US) developed the scientific notion of production quality, obliged firms to have quality assurance systems and quality plans, and introduced quality control measures and certification standards. Nowadays, this has been overtaken by industry, to the point where military organizations have to send people to civilian courses to get to know the scientific principles of quality and quality assurance...

Participation in Civil Research Frameworks

Finally, everyone realises that nowadays science and research are not conducted any more by one lonely scientist or even one research group. Research has become international and interdisciplinary. Not in the least in the light of burden sharing and/or participation in tran-

snational research programs. From the previous paragraphs it is clear that the interdisciplinary part does not chock the military scientist. On the contrary, we have seen that military sciences are in the first place interdisciplinary and all about the integration of several different disciplines. The situation is quite different regarding the international aspect. Sharing knowledge with foreign military partners, let alone civilian institutions, is not really something natural for a military scientist. I would even say that it goes completely against his primary goal: equipping his own government with the necessary tools to achieve its military goals. However, there are at least two reasons to overcome this cold water fear for international cooperation.

The first one is straightforward: the times we use military power as a nation, become scarcer and scarcer. We operate under the umbrella of the UN, NATO, EU... and are, not seldom, deployed together with civilian agencies that are confronted with the same technical and operational problems as the military.

The second one lies in the nature of the military sciences: they do not exist! As a result, military scientist can fully participate in international research programs on the fundamental sciences in which the military sciences can be broken down. This can be illustrated by some of the international projects the Belgian Royal Military Academy has been involved in over the last few years:

- FRESP: this EU-FP7-Security project focuses on respiratory protection for first responders under different conditions, including terrorist attacks. From the nine partners, RMA is the only military one. It is clear that the specific knowledge in the niche of CBRN defence by the RMA is of great help to the project. But the integration of the protection against chemical warfare agents and toxic industrial chemicals sought after by the project also has an undeniable value for the CBRN protection knowledge of the Belgian Defence and for future developments or purchases of CBRN protection equipment.

- VIEW-FINDER: this EU-FP6 project aimed at the development of data-gathering robots for use in rescue operations (fire, chemical hazards, etc....). Here the typical military knowledge of integrating systems present in the RMA was put to good use. But such robots could also be very useful in combat circumstances.

- SPIN: this project from the European Space Agency wants to gather information on the impact of extreme circumstances on the physiological and psychological behaviour of man (e.g. astronauts). The RMA contributed in the fields of data exchange and stress psychology. The findings of this project are now translated to certain groups of military personnel, e.g. fighter pilots.

From these examples it is clear that the specific knowledge of military scientists in particular niches is not only welcome, but even sought after in international "civil" research programs. In turn, the outcome of such projects can easily be adapted and put to good use in typically military applications and circumstances.

Conclusions

Military sciences, as such, do not exist. They are just a combination of normal sciences, used in a military context to achieve military goals. This enables military researchers to integrate themselves in an (inter)national scientific cooperation in these general sciences. By combining the findings and the scientific outcome of these groups, and by applying them in a much narrower, military, context, it is possible to achieve the specific military and political goals that are nationally established.