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MILITARY SCIENCE FOR THE PUBLIC BENEFIT:  
THE CASE OF THE HELLENIC NAVY OFFICERS  
DURING THE 19<sup>th</sup> CENTURY

We have already formed a rather clear picture concerning science in the Greek-speaking intellectual area during the 18<sup>th</sup> and early 19<sup>th</sup> century, but this is not the case for the rest of the 19<sup>th</sup> century, after the establishment of an independent Greek state. Nevertheless, the Syros seminar has offered a good opportunity, in the last three years, for discussing the topics related to the interaction of science and society in the new Greek state during the second half of the 19<sup>th</sup> century.

This is reflected on the publication of a thematic volume, which includes the presentations of the previous seminars, and gradually forms a firm background for further research in this field.

When comparing the situation of science during the Neohellenic Revival and that of science in the newly independent state, the general impression is that in the latter case, science was more associated with social factors.

A factor that undoubtedly has always played a very significant role in peripheral countries is the Army. The increasing needs of the Army for developing advanced technology and for its manning with officers of the highest standards, have been proved, according to international sources, a critical factor for the evolution of scientific thought.

We could suggest that in the limited territory of the 19<sup>th</sup> century Greece, where everything took its place through continuous reforms, radical changes and significant reciprocals, one of the few reliable institutions was the military.

One of the most powerful components of this authority, taking into account the geomorphology of Greece and its political situation, was the Hellenic Royal Navy. The officers of the Navy were traditionally considered nobler and better educated than their colleagues of the Army. It is interesting therefore, to see whether this belief was actually

true and if the Navy officers were interested in the scientific achievements of their time.

In this endeavour, the main figures will be a handful of officers, such as Gerasimos Zochios, Andreas Miaoulis (1830-1911), D. Sachtouris and Leonidas Palaskas, who played a very important role in the development of naval education until the first decades of the 20<sup>th</sup> century.

The first three, Zochios, Miaoulis and Sachtouris were co-authors of a pamphlet titled "Memorandum on the Royal Navy," published in Athens, in 1844.

Its introduction outlines their frame of thought concerning the potential of science in a highly competitive world:

*"Everywhere and every time, the most powerful has conquered the less strong, those born braves have defeated the cowards and the weak, and those who have acquired power through technology and science [have defeated] the peoples who ignored science and technology. Consequently, truly free and autonomous nations are only those which are naturally strong or those which became strong through science."*

The authors of this manifest attested the poor situation of the Hellenic Navy and proposed a number of indispensable actions for its improvement. Among others, they claimed that before the foundation of a Naval Academy, at least six officers should be sent to England or France. Once there, each should study a particular subject of the naval science, which after his return to Greece, he would teach it, as professor, in the Naval Academy.

Fortunately, these thoughts did not remain in the realm of good intentions. Indeed, we find the above-mentioned three musketeers becoming active in a constantly expanding circle of activities, such as book writing, teaching in secondary education, conducting scientific research and participating in politics.

An interesting question is why these officers cherished so much scientific knowledge. In our opinion, a significant reason was their stay in Europe for advanced studies. For example, Sachtouris had travelled in 1838 to England and Zochios studied mathematics in Paris.

Besides this group, it would be unfair not to mention Leonidas Palaskas (1819-1880), a real legend of the early days of the Hellenic Navy. Palaskas was born in Ioannina. In 1827, he attended basic education in Paris and in 1833, he became a cadet in the Naval

Academy of Brest. Before returning to Greece, he had a brilliant career in the French Navy, where he served until 1844 reaching the rank of lieutenant commander. As young sublieutenant, he traveled around the world with a French sailing vessel. When he arrived in Tenerife, he climbed on the top of the famous volcano Pico de Teyde and there he was inspired a mathematical solution for the determination of the curve formed by the optical rays of the observer on the surface of Earth. This work was published by the French Navy and was received favorably by the French scientific community. Returning to Greece in December 1847, after the invitation of his patron, prime minister Kolletis, he wrote an extensive "Memorandum on the Naval Academy" trying to persuade the relevant authorities to organize an advanced naval school following French standards. Among other things, he wrote: "The constitution of a strong Navy is not improvised ... A strong Navy consists neither of big and numerous vessels, nor of the number and the bravery of its sailors ... but of appropriate education for its officers and proper exercises for its crew".

The ideas expressed by Palaskas were considered too progressive by the leaders of the Navy and remained unapplied. As commander Michail Goudas wrote, the editor of Palaskas's *French-Greek Dictionary of Naval Terms* published in 1898, in his "Introduction":

*"Leonidas Palaskas coming back to Greece from France brought with him high hopes for the development of our Navy ... in his great heart, which contained only the noblest feelings, there was the hope for the establishment of a respectable Navy in the Mediterranean, aiming at carrying on the feats of the National Revolution, asserting our national rights and realizing the unfulfilled national dreams and desires".*

The Naval Academy was finally established in 1884. Yet, the passage of almost a generation between the original idea and its realization, has proved that in Greece, there is always a lag, which can be quite long sometimes, between the expression of a useful original idea and its realization, due to several social and political reasons.

Palaskas's persistence in his beliefs had driven him to self-exile in Bavaria from 1862 to 1866, where he remained near the deposed King Otto. Returning in Greece in 1866, Palaskas was appointed General Secretary of the Ministry of Naval Affairs and in 1877, for a short time, Minister of Naval Affairs. His long-lasting activity was not without

any disappointments and bitterness. With words still touching our hearts, he wrote in 1875:

*"When I came for the first time in Greece, how many hopes did I have! What a promising future! The Nation was still young, people were more patriotic and less educated ... [Now] I think that our Nation is already as old as myself".*

This disappointment prompted him to burn his manuscripts just before his death, and thus many valuable manuscripts were lost forever.

Among his scientific writings, we would like to mention in particular a significant essay on the history of science, written by Palaskas in French and published in 1856. In this book, he proved that the famous monument by Andronikos of Kyrrhos in Athens, was not a temple, as many believed at that time, but a clock.

In 1866, he participated in a scientific mission to Santorini in order to study the eruption of the island's volcano. Julius Schmidt, the first and most prominent director of the Athens National Observatory, evaluated Palaskas's contribution as following:

*"Most observations, and the best ones, related to topography, height, depth and angles, are owed to Palaskas's tireless activity."*

As an acknowledgement of his scientific contributions, he was elected Vice-President of the Organizing Committee of the Vienna International Fair in 1873. Two years later, in 1875, Palaskas presented in the Geographical Congress of Paris a contribution titled "Recherches sur les chronomètres et les instruments nautiques. Sur les hauteurs méridiennes observées à la mer, par L. Palasca, Capitaine de vaisseau de la Marine royale hellénique".

Among the officers we have already mentioned, Gerasimos Zochios can be considered an exceptional case, as he was not only a high rank officer in the Navy, but also a well known teacher of mathematics in high schools.

In a pamphlet published in 1855, titled *An address on Time and a description of the activities of the Hellenic School* he wrote:

*"Following the infallible history, which is the teacher of savant peoples, in which nothing else is found except for rise and fall of nations and*

*peoples, we see that the nations that have multiplied the aptitude of time have reached to highest point of power, knowledge and glory, their fame travelled through subsequent generations and centuries. The others, the lazy ones, were buried alive".*

Zochios taught in the Rizarios and the Hellenic Schools. In the latter, the headmaster was the French Charles Pottine, who had organized it upon the French school model. Zochios taught mathematical and physical geography, algebra, geometry and stereometry, as well as experimental physics according to Poulliès's book.

In the course of algebra, Zochios used a textbook written by himself and published in 1854 under the title "Elements of Algebra," where some problems proposed by Soutsos and Ragavis, two eminent Greek scholars, were added.

As for geometry, Zochios's course was based on a book written by the famous mathematician Legendre, which Zochios translated and published in 1862, pointing quite brilliantly at the scientific value of the original:

*"Why have we translated Legendre's Elements of Geometry, and not any other book? To those asking such a question the answer is futile, because ignorance is the worst of things".*

Ignorance was certainly an unknown word for Miaoulis, who may be considered to be the founder of modern oceanography in Greece. One of his first works was the *Textbook on Naval Knowledge*, published in 1874. An interesting point in this book is the extensive list of the subscribers, which, following an 18<sup>th</sup> century tradition, is included at the end of the book.

There, one may find not only the names of almost all the Navy officers of the time but also, and this is impressive, a list of 35 learned ladies, something that proves that Miaoulis's activities were, at least to a degree, carried in the higher social strata.

His masterpiece on oceanography was a book titled *On the tides of Euripus*, Athens, 1882. Miaoulis acquired a good deal of knowledge, especially on the methodology of hydrodynamic measurements, from the well-known Rear Admiral and hydrographer of the British Royal Navy Arthur Mansel. Miaoulis had the chance to cooperate with him during the admiral's stay in Greece, having the task to perform a series of observations near Euboea, and to examine the famous Euripus

problem. The Euripus problem is a classical one in the history of physical oceanography. It consists of the alternation of the currents' direction in the narrows of Chalkis. The cooperation of Miaoulis and Mansel took place during the years 1871 and 1872, when they made simultaneous measurements in both harbors in Chalkis. As Miaoulis informs us in his book, Mansel had used regular observations of sea level and current speed and direction since 1866. Miaoulis's work on the Euripus problem is cordially dedicated to Mansel, not only because he was the first to use scientific methods in order to resolve it, but also because it gave reliable results, becoming thus the standard reference to this subject for many decades. Even Defant, in his classical *Physical Oceanography* refers, among others, to Miaoulis's conclusions in order to support his own views. Well known European oceanographers like Endros, Sterneck, and Defant who used Miaoulis's results in their works, became aware of him through the English translation of *On the Tides of Euripus* by N. Contopoulos, published in Athens, in 1884. Since such translations were not a standard practice during the late 19<sup>th</sup> century, we might argue that this was an outcome of the great significance of Miaoulis's work for European oceanographers, who had probably been informed about it either by Mansel personally or the British naval authorities in general.

For the measurements of current speed and direction, Miaoulis did not content himself only with practical observations, but he also used a scientific instrument, the so-called Mussey's currentmeter. He also had read the relevant literature, which seems to represent the basic oceanographic knowledge of the time. For example, he compared his results with a theory proposed by A. Forel, the Swiss limnologist (1841-1921), a translation of which published in the newspaper *Ora* (The Hour) on 7 February 1880.

Miaoulis disagreed with the mathematical formula proposed by Forel and claimed that "if the erudite physiologist Mr. Forel studies the tides of Euripus using my tables, he will be forced to reconsidered his formula".

Miaoulis, rather unexpectedly, gives also a rough description of the sea water circulation in the area of the strait of Gibraltar and supports the idea that the same pattern of circulation exists in the Bosphorus. The proposal about the main current driving the circulation in the northern Aegean is still under consideration by modern oceanographers and has been proved correct in principle.

It is also interesting to note that Miaoulis took meteorological observations because he correctly believed that the winds alter the direction of the currents. Although he did not define how this alteration takes place, this does not diminish his significant contribution to the establishment of systematic oceanographic studies in Greece.

Besides the book *On the Tides of Euripus*, which is the most widely known, Miaoulis wrote another book concerning predictions of the tides in the Corinth canal, which were supposed to appear after the opening of the canal was completed. Although I could not find any information about the authority that entrusted Miaoulis with such oceanographic studies, there are reasons to believe that he was a pioneer in physical oceanography, working on a voluntary basis and not as researcher participating on a national project about the study of the Greek seas. Anyway, we must keep in mind that a general planning policy for the development of science was completely absent at that time in Greece.

Miaoulis writes, giving the impression of a slight disappointment:

*“Six years have been passed since the publication of my book on the tides of Euripus; during all this period, I did not hesitate to examine and study the rise and fall of the sea heights, the current speed and direction near the shores of Greece, whenever my Service allowed it to me”.*

## Conclusions

We have started to uncover the scientific activity of the Hellenic Navy officers during the second half of the 19<sup>th</sup> century. We have begun to shape a picture, still blurred though, for the “noble” character of science in the small aristocratic military circles of that period. Besides the recording of relevant activities, the investigation of the reasons that caused them is an interesting subject to deal with.

Are they just personal researches, had they chosen to follow lonely paths, which today become easily recognizable exactly because they took place in a barren, if not hostile, cultural environment?

Or do these efforts consist in a cohesive force, which, having well-defined ideological and philosophical criteria, aims at making of the Hellenic Navy not only a well-trained navy, compared to that of the nation’s rivals, but also a weighty factor in the internal affairs of Greece?

The latter supposition seems more probable, if we take into account the common course of the above-mentioned officers, in their education, their career and their eventual achievements.

These officers were inspired to the utmost by the picture they have formed about the French and English Navy while staying abroad. It is a picture in which an omnipotent military authority is connected with that one of a powerful country, a picture in which the terms 'nationalism' and 'militarism' become equivalent.

Compared to similar situations in Europe, Hellenic Navy officers did not ask for a higher funding, since they recognized that this would be very difficult, due to the unstable financial and political situation of the Greek state.

On the other hand, they asked that the naval budget be based on a long-term action plan. Nevertheless, they considered that in order to achieve their aims, officers should be experts and, therefore, had to be scientists.

These opinions seemed to have faced the opposition of those officers who were not equal to the task or who were just unwilling to try harder for their personal education and the development of the Navy.

Let us characterize the latter as drones, for being miserable and insecure, they formed a caste that opposed bitterly the pioneers of the scientific development of the Navy. We have to study more extensively those pioneers, as we believe that there is a very interesting material for further research. A research that would better clarify these first suggestions. But we must keep in mind that such a detailed research requires time, and time, according to Zochios, one the heroes of our story, is a "Divine Present".