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Saggi

“There will be no shortage of books... or money to purchase them.” Education and the Reputation of the Library of the College of Artillery in Segovia as a Scientific and Publishing Centre¹

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Abstract. Charles III arrived in Spain from Naples accompanied by a multidisciplinary team of military advisers, including Count Gazzola from Piacenza, who had already drawn up his plans for the urgent military reforms required for the artillery. These included the institutionalisation of that branch of the army and the foundation of the college for artillery officers and industrial engineers to run the military factories being taken over by the State. The most eye-catching element of this undertaking is the formation of its magnificent Enlightenment scientific library. A study of this library reveals an exceptional collection, the origins of the first books brought to the institution, the way it was organised and the military and scientific topics addressed. But its fundamental contribution can be measured in terms of results: indeed, textbooks were created for the cadets, as well as research works on military, artillery and scientific topics written by teachers from the college, and translations of important European scientific books. Finally, as a contribution to demonstrating the cost-effectiveness of the Crown’s investment in education for war, we highlight the work of three captains, showing the versatility they achieved thanks to their education at the college and their reputation outside it, in the service of society, as guiding lights of the Sociedad Económica de Amigos del País (SEAP – Economic Society of Friends of the Country) in Segovia. Without this magnificent library, the research, monographs and translations – ultimately the college’s own published works which brought it great academic credit in Enlightenment Europe – would not have been possible.

Keywords. College of Artillery, library, books, Gazzola, science, military education, publishing, translations.

1. INTRODUCTION AND CONTEXT

In the Bourbon military model, 18th-century systems of social recruitment and military education show an interesting degree of innovation².

¹ This research forms part of the UCM-SANTANDER.PR87/19-22664 project *Entrepreneurs in Military History and their Reputation in the Atlantic Region (1750-1814): Policies, Agents and Archaeological Heritage*. Principal researcher: María Dolores Herrero Fernández-Quesada.

² M.D. Herrero Fernández-Quesada, *Sistemas de captación e innovación en la formación del militar borbónico. Educación para la guerra*, “Cuadernos Dieciochistas, Guerra en el siglo XVIII”, 21 (ed.

Although access rules were discriminatory, the important point is that a single system for training officers was not adopted. Instead, the model developed was based on two procedures that coexisted to educate cadets depending on the branch or corps they were going to enter.

Under the previous dynasty, Spain already had a recognised academic tradition in teaching mathematics applied to military matters³. The most recent of these precedents was crucial in establishing the parameters of the military education system the Bourbons chose, or rather designed in an ad hoc way faced with the territorial, political and military idiosyncrasies of the Hispanic Monarchy⁴. This was the Brussels Military Academy⁵, founded in 1675, by Sebastián Fernández de Medrano, a Spanish soldier whose profile and career we might well classify as innovative. He was supported by the Duke of Villahermosa, as Captain-General of Flanders, in his innovative plans for a military college to produce a constant supply of officers with a high level of specialisation in fortifications. We have already shown that some of Charles II's military advisers also presented themselves as innovators and pioneers of a future age⁶. This can be seen even more clearly in the training of military engineers, as there was an awareness very early on of the need for regulated academic education for them, as well as for officers of other branches of the armed services who lacked the scientific and technical knowledge for operational and tactical service.

An analysis of the scientific and military history of the Brussels academy shows it to be closely linked to innovation in the Spanish Bourbon military education system, quite in keeping with a historical period marked by the scientific revolution of the previous hundred years and the European and European Enlightenment of the 18th century. Once more, the continuity of the previous dynasty's structures⁷, is seen to be a determining factor

in reformulating the Enlightenment military education system, forming part of a State policy focusing on the complete renovation of the Monarchy's military model as part of the general Bourbon reform movement. The process of adapting military structures based on the creation of standing armies began with Philip V⁸ through the publication of successive general and monographic ordinances that succeeded one another throughout the century⁹. The new military establishment and the plan to set up standing armies came in the institutional context of the Monarchy's new political structures – the office of the Secretary of State and the War Office¹⁰ – from where the entire process was run. Finally, as prospective members of the infantry and cavalry branches were established as regimental cadets, the renovation of the officer training system for the expert corps achieved the transition from the empiricism of the military practice of the past to a modern scientific and technical education for war. This was essential in helping them cope with the future forms of warfare and progress in military tactics that could already be foreseen. However, it was no impediment to plans being drawn up for military colleges that failed in their attempt to consolidate a single academic model for military education, even though some of them fleetingly came into existence¹¹, such as the Ávila academy promoted by O'Reilly with the same approaches and teaching methods as those for engineers and artillery.

The reforms did not achieve a standard model. Two military training systems coexisted throughout the 18th century: the Regimental Cadet, heir to the Corps Cadet

by R. Torrens and A. Diaz), 2020, pp. 107-150.

³ Eadem, *La enseñanza militar ilustrada. El Real Colegio de Artillería de Segovia*, BCA, Segovia 1990.

⁴ Eadem, *Catálogo de la Biblioteca del Real Colegio de Artillería de Segovia. II. Fondos artilleros y de fortificación*, BCA, Segovia 1992; *Los ingenieros militares de la monarquía hispánica en los siglos XVII y XVIII*, ed. by A. Cámara Muñoz, Spanish Ministry of Defence, Madrid 2005.

⁵ H. Capel, J. Sánchez and O. Moncada, *De Palas a Minerva: la formación científica y la estructura institucional de los ingenieros militares en el siglo XVIII*, CSIC, Madrid 1988; C. de Clonard, *Memoria histórica de las Escuelas Militares*, Imprenta de Don José M. Gómez Colón y compañía, Madrid 1847; J. Vigón, *Historia de la Artillería Española*, CSIC, Madrid 1947.

⁶ Herrero Fernández-Quesada, *Sistemas de captación*, cit., p. 116.

⁷ A.J. Rodríguez Hernández, *¿Evolución o innovación? Los cambios técnico-tácticos en el armamento del ejército español durante el relevo dinástico: nuevas consideraciones*, in *Entre Marte y Minerva. Los Reales Ejércitos Borbónicos, del reformismo al mito*, ed. by M.D. Herrero Fernández-Quesada, "Cuadernos de Historia Moderna", 41, 2016, 2, pp. 273-294.

⁸ M.D. Herrero Fernández-Quesada, *El nuevo modelo de ejército en el contexto de la Guerra de Sucesión Española* in *En nombre de la paz. La Guerra de Sucesión Española y los Tratados de Madrid, Utrecht, Rastatt y Baden. 1713-1715*, ed. by B. García García, Fundación Carlos de Amberes-SECC, Madrid 2013, pp. 91-106; A.J. Rodríguez Hernández, *El ejército que heredó Felipe V: su número y su composición humana* in *La sucesión de la Monarquía Hispánica, 1665-1725*, ed. by J.M. Bernardo Ares, University of Córdoba, Córdoba 2009, pp. 265-301; and F. Andújar, *El ejército de Felipe V: Estrategias y problemas de una reforma in Felipe V y su tiempo. Congreso Internacional*, ed. by E. Serrano, Institución Fernando el Católico, Zaragoza 2004, pp. 661-682.

⁹ From the publication of the Ordinances of Flanders (1701, 1702) to the publication of the Ordinances of Charles III (1768), which completed the new dynasty's military model. Segovia General Military Archive [hereafter AGMS], sección 2, división 10, legajo 10. Printed copy of the first two: *Ordenanzas de S.M. para el Régimen, disciplina, subordinación y servicios de sus Ejércitos*, Office of Antonio Marín, Madrid 1768.

¹⁰ Philip V's departure for Italy during the War of the Spanish succession made war and budgetary issues independent of the other administrative matters, which until then had been the responsibility of the Secretary of State of the Universal Office. After Utrecht, the number of Secretaries' offices was increased from two to five: State, Justice, War, the Navy and the Indies, and Finance.

¹¹ O. Recio Morales, *Innovación militar en la España del siglo XVIII: la producción científica de la Real Escuela Militar de Ávila (1774)* in *Entre Marte y Minerva*, cit., pp. 425-442.

made official by Charles II in 1692, once again showing R. Hernández's as a continuist¹², who were trained in their units; and the Cavalry Cadets who entered the new boarding-school-style military academies with curriculums that were already in another dimension in terms of education. These academies were opened one after another, forming a network that expanded exponentially across the map allowing us to speak, in the last decades of the century, of the consolidation or institutionalisation of Enlightenment military education. The model was unequal, however, producing officers with different training, the best being graduates of the Academy of Engineers in Barcelona and the academies of artillery in Barcelona, Cadiz and Segovia. So, education for war included short-lived institutions with innovative teaching approaches, some foreshadowing the future as they focused on all officers.

During his reign in Naples, Charles of Bourbon included in his political entourage soldiers with impressive profiles, such as Francesco Sabatini and Felice Gazzola. They were among the retinue who travelled to Spain with the king with the predetermined aim of completing the Bourbon military reforms that had been going on since the reigns of Philip V and Ferdinand VI. Their mission was to complete the new military establishment – new military structures planned ever since the arrival of the first Bourbon – which needed concluding urgently with the establishment of a structured Artillery Corps. This was the finishing touch for the Bourbon military model, set out on paper with the publication of the Ordinances of Charles III in 1768¹³.

Charles of Bourbon's reign in Naples provided him and his military team with a wonderful laboratory for experimentation and learning which would prove crucial when he came to the Spanish throne at the death of Ferdinand VI¹⁴. As Charles III of Spain, his experience of political and military government in Naples would prove invaluable. Encouraged by his minister, Tanucci, the King commissioned Count Gazzola¹⁵ to undertake

the institutionalisation of the artillery as part of the new Bourbon military system. And he carried out these definitive artillery reforms with the constant support of the network of Italians who accompanied him, including Esquilache and Sabatini.

The official documents consulted show that Gazzola enjoyed the unconditional support of the Acting Minister of War, Ricardo Wall, and later the Minister Esquilache, who took over the role of Secretary of the War Office in autumn 1763. The Count always acted with the backing of King and Minister. The latter, in his dual ministerial role (War and Finance), used his influence in the high State politics of the Bourbon court to support the project, which was in line with the monarch's military policy¹⁶. The many and frequent letters between the Italian minister and Gazzola demonstrate the mutual trust between them, as well as the interest and resources Esquilache brought to the process of founding the College of Artillery in his twin role, always granting Gazzola's requests immediately. Two years after the opening of the College of Artillery (1764), the latter had the opportunity to repay him for his support and show him unequivocal gratitude¹⁷. The support of the King, his ministers and his servants from Naples for this State project was critical in making it possible to organise and open the artillery college so quickly; in just a few years it had become established as a model military academy¹⁸. The core of the Italian team – Charles III, Esquilache and Gazzola, now Director-General of Artillery – were, in these early years, decisive in marking the identity of the College of Artillery¹⁹. They made admission to the

dor to London, and Margherita Manli Nombriani, a noblewoman from Parma. See M.D. Herrero Fernández-Quesada, *Félix Gazola (Felice Gazzola)*, <http://dbe.rah.es/biografias/14348/felix-gazola> (16/01/2021). He was Captain-General of the Neapolitan artillery serving Charles, who brought him to Spain as head of his artillery, and he spent his whole life serving the King.

¹⁶ Herrero Fernández-Quesada, *La enseñanza militar ilustrada*, cit.

¹⁷ The Count showed his gratitude in difficult times when mutinies broke out against Esquilache. Gazzola detached troops, guns and officers from Segovia to suppress the revolts. M.D. Herrero Fernández-Quesada, *El Colegio de Artillería y el motín de 1766*, in *Actas del Coloquio Internacional de Carlos III y su siglo*, UCM, Madrid 1988, vol. II, pp. 141-150.

¹⁸ Eadem, *La formación de los militares en el siglo XVIII. El Colegio Artillero de Segovia o la creación de un modelo*, in *Educación, redes y producción de élites en el siglo XVIII*, ed. by J.M. Imízcoz-A. Chaparro, Sílex, Madrid 2013, pp. 317-336.

¹⁹ Simancas General Archive (hereafter AGS), *Guerra Moderna*, legajo 3, file on Count Gazzola., office of the Lieutenant General, signed by Charles III at San Ildefonso on 1 August 1761; and files 556, 557, 560, 564 and 567, a set of documents about artillery training, particularly the procedures concerning the two years before the foundation of the new academy (1762-1764). Also in AGMS, sección 1, legajo G-, work has been done on Gazzola's personal file, and, in sección 9, his will and related documents.

¹² Rodríguez Hernández, *El ejército que heredó Felipe V*, cit., p. 268.

¹³ *Ordenanzas de Carlos III*, cit.

¹⁴ For this article and its historical context, it is important to remember the contributions of Italian historiography and highlight the works of Paola Bianchi, such as *Premessa. Italiani in Spagna nel Settecento*, "Rivista storica italiana", 127, 2015, 1, pp. 124-125, or *Guerre ed eserciti nell'età moderna*, ed. by P. Bianchi e P. del Negro, Bologna, Il Mulino, 2018 (see also the review of this work in *Rivista storica italiana*, 132, 2020, 1, pp. 363-367); and of Anna Maria Rao: among several publications, see *Charles de Bourbon à Naples*, consulted in *Miguel de Cervantes Virtual Library*, the digital edition from *Le Règne de Charles III: le despotisme éclairé en Espagne*, CNRS, Paris 1994, pp. 29-57.

¹⁵ Felice Gazzola, Count of Esparavera, Ceretro-Landi and Macinaso, was born in Piacenza, the son of the soldier and diplomat Filippo Gazzola, Captain-General of Artillery in Parma and Piacenza and Ambassa-

Segovia academy the only possible way of entering the Royal Artillery Corps, a closed system which meant the regulation of promotion by seniority, which was done in this way only for the expert corps. Alongside this, the academic criteria and approaches were laid down for a military training establishment that became a reference for the whole of Europe within just two decades. On 16 May 1764, a modern military academy opened, focused on the objective of providing future officers with the best scientific and military education. As well as instruction on how to handle guns, they needed training in everything relating to artillery, particularly non-military industrial skills. This was because, in the Spain of the second half of the 18th century, the Monarchy reserved the running of military factories to the Royal Artillery Corps as part of the State takeover of this industry carried out by Charles III.

Ultimately, our interest in this study – the Enlightenment library with which the academy was provided – relates to a model of State that was brought to Spain from Naples and carefully designed by Charles and his close entourage of Italian soldiers. Not only were there gaps still to be filled in the Bourbon standing army model – the definitive institutionalisation of the Artillery Corps – but Gazzola also had to develop the full content of a State project of great political, military and industrial importance into various plans of action related to this modern system of warfare²⁰.

In this respect, the most important part of the Count's professional career in Naples was the fact that he had also been Director-General of the Artillery Corps there, with the rank of Lieutenant General won through his involvement in the Italian wars. Setting an almost perfect precedent, as part of his duties in this post he organised the Neapolitan artillery and, in 1745, founded an officers' academy for the scientific and military education of future artillery commanders. This was precisely the route map he followed in Spain²¹. His Neapolitan credentials were decisive for his future destiny, making him the perfect man to drive the organisation and to manage the artillery reform process in Charles III's Spain. The Count's experience in Naples was also his main credential for his appointment by the King to complete the development of the Corps and the College, which became the only means for artillery officers to achieve promotion. Their badge of iden-

tity was having attended the institution²². The positive results achieved by Gazzola in his years of service to the King in Naples not only supported his candidacy for the important task of designing the new establishment for the Spanish Royal Artillery Corps, but also provided him with a scientific and military background that was translated into a reliable plan based on clear, well-developed ideas and a very precise schedule for undertaking and completing the organisation of the artillery in the reign of Charles III.

Ultimately, in the context of this model of State, Charles III and Gazzola, as intellectual authors of the artillery reforms, undertook as a priority the whole process of institutionalising the Spanish artillery. This was developed in three interacting directions, as I have discussed more broadly in a previous study²³. Firstly, there was institutionalisation of the Royal Artillery Corps in the structure of the Royal Armies, with the publication of the New Regulations of 1762²⁴, which confirmed the overall framework. Second came the foundation of the Royal College of Artillery in Segovia in 1764, an essential tool for the success of the project, training artillery officers and soldiers to run the associated industry²⁵. Thirdly, associated with the new Royal Artillery Corps with officers scientifically and technically trained at the Segovia academy, the State assumed entrepreneurial functions²⁶ and took over the military artillery industry. In this way, the Crown controlled production and sought self-supply, while the industry was run by artillery officers trained as industrial engineers at the college. This closed the circle of reorganisation and innovation in the artillery, which was always part of a State policy of great political importance. With this broader perspective always in mind, we can state that, from 1764, the College of Artillery, with its clearly innovative approaches to military education, became the ultimate factory for turning out multi-functional, Enlightenment artillery officers who knew how to use guns, and also engineers trained in everything concerning the process of casting and manufacturing cannons. On graduation, these men were perfectly capable of applying the military industrial engineering they had studied at the Segovia academy. In the institutional context of the Artillery Corps after

²⁰ M.D. Herrero Fernández-Quesada, *La innovación militar en el siglo XVIII. Felice Gazzola y el Real Colegio de Artillería de Segovia*, in *Servicio y grupos de poder en la España del setecientos*, ed. by O. Recio, P. Bianchi and D. Maffi, "Rivista storica italiana", 2015, pp. 211-247.

²¹ *Ibidem*, p. 230 and ff.

²² Eadem, *Ciencia y milicia en el siglo XVIII. Tomás de Morla, artillero ilustrado*, PAS, Segovia 1992.

²³ Eadem, *La innovación militar en el siglo XVIII*, cit.

²⁴ AGMS, sección 2, división 8, Imprenta A. Marín, Madrid 1762.

²⁵ J. Helguera Quijada, *Las industrias artilleras en la época de Proust*, in *La Casa de la Química. Ciencia, Artillería, Ilustración. Catálogo de la Exposición conmemorativa del Bicentenario*, Spanish Ministry of Defence, Madrid 1992, pp. 97-136.

²⁶ A. González Enciso, *Un estado militar. España 1650-1820*, Government of Castile and Leon, Valladolid 2008.

1762, this was an innovative model of military college producing artillery officers who had the skills for industrial engineering thanks to their elite education.

The foundation of the Royal College – a priority State enterprise in the early years of Charles III's reign – was undoubtedly at the heart of a larger project²⁷. The first actions involved State intervention in military factories, whose production until then had been managed by a concession system. A plan was then established to bring them back into the hands of the State. The military entrepreneurial State was intended to control the ordnance industry, incorporate new technologies into the manufacturing process, manage factory production and ensure self-supply. This process began, logically, with the bronze cannon factories in Seville and Barcelona. The historical industrial skills of artillery officers, backed by Charles III and Gazzola, determined the end of the concession system to supply the Monarchy's armies²⁸ and the move during the 18th century towards the consolidation of the process of State control of the factories²⁹. This was vitally important in mobilising resources for war, financing it and achieving self-sufficiency, and it was an economic and military process closely linked to state-building in the 18th century³⁰. In this period, war was a priority for monarchs, which made financing it and providing resources and men a matter of State. Once again, Count Gazzola was allowed to operate autonomously in his area of responsibility. On the new artillery map of the peninsula, he superimposed a map of the factories run by the Artillery Corps, which definitively took over their management, with an artillery colonel appointed to run each one of them³¹. Gazzola focused his efforts on these three areas of action. It was no secret, however, that his passion was the foundation of the college to educate scientific and technical artillery officers to be militarily skilful on campaign but also to be industrial engineers capable of running the military factories. That is why it was so important to institutionalise an appropriate and effective system of artillery education.

As the Italian team worked so quickly, achieving results and objectives, the most likely hypothesis is that the reform plans were drafted between the death of

Ferdinand VI and the new king's arrival in Spain. Gazzola's experience and a study of the information reaching Naples from Spain during Ferdinand VI's last year of life indicate that they were carrying Gazzola's detailed reforms with him when they arrived. The team that had ably taken charge of military affairs in Naples had the necessary experience. They also had plenty of time to do their own research on the new Spanish military establishment, the scope of its development and the matters to be resolved so that they could plan the changes required. Having already studied the Bourbon military model initiated by Philip V, the team already knew all about the nature and pace of the military reforms of the first two Spanish Bourbons. In particular, they were aware of the state of matters in the reign of Ferdinand VI, the progress made under Ensenada and the military issues to be resolved. Most importantly, there was the outstanding question of the reform of military education, which required a model³². The flow of information from the court in Madrid to its Neapolitan counterpart intensified as Ferdinand VI's deterioration became clearly irreversible. That meant the Neapolitan soldiers in Charles's service had time to analyse the state of the now professionalised Spanish standing armies based on the new military model designed by the first Spanish Bourbon and his ministers during his 45-year reign. Taking into account the progress and results already achieved with the new military structures and, above all, the gaps in the model that remained to be filled, they were able to complete a framework text: the Military Ordinances (1768, Charles III).

2. GAZZOLA, THE SEGOVIA COLLEGE AND THE FORMATION OF ITS SCIENTIFIC AND MILITARY LIBRARY

Having set out the historical, military and political context³³ in which Gazzola developed his artillery reforms, to understand the implications of the foundation of the College of Artillery we should now highlight the intellectual background in which this political and military project was developed; steeped in the Enlightenment ideas of the Count, the direct result was the establishment and provision of the library of the Segovia College of Artillery.

²⁷ Herrero Fernández-Quesada, *Ciencia y milicia en el siglo XVIII*, cit.

²⁸ González Enciso, *Un estado militar*, cit., cited in note 25.

²⁹ Helguera Quijada, *Las industrias artilleras*, cit.

³⁰ R. Torres Sánchez, *El precio de la guerra: el Estado fiscal-militar de Carlos III*, Marcial Pons, Madrid 2013.

³¹ The personal documents for Spanish soldiers are kept in the AGMS, sección 1. Artillery officers' service records from the 18th century already show them being posted as factory managers. On this documentation centre, M.D. Herrero Fernández-Quesada, *La investigación en historia militar de la Edad Moderna y sus fuentes. El Archivo General Militar de Segovia, decano de los Archivos Militares Españoles*, "Cuadernos de Historia Moderna", 38, 2013, pp. 165-214.

³² Eadem, *Sistemas de captación*, cit.

³³ The context and success of the military reforms has now been called into question by various authors, such as F. Andújar, *El reformismo militar de Carlos III: mito y realidad*, in *Entre Marte y Minerva*, cit., pp. 337-354; and, from another point of view, J. Cepeda Gómez, *La buena prensa de los ejércitos borbónicos. Una mirada crítica*, in *Entre Marte y Minerva*, cit., pp. 355-371.

Gazzola, and his involvement in a project of State in which the college and its students took an active and necessary part, determined the structure of the academy based on three solid foundations. Firstly, the formation of the best possible teaching staff without regard to their origin, particularly those occupying two professorial chairs through which Gazzola always sought the highest standards of mathematics and artillery/tactics. These became the guidelines for the new scientific and technical profile of an Enlightenment artillery officer³⁴. Secondly, there was the development of an ambitious curriculum based on the scientific and mathematical fundamentals of artillery, bringing to an end any residual empiricism in the use of artillery³⁵. Future officers had to learn theory in classes, by studying and, fundamentally, through books. In the opening lesson on 16 May 1764, the Head of Studies, Father A. Eximeno, extracted Gazzola's innovative approach to teaching at the College of Artillery to use as a subtitle for his own book: "on the need for theory to be developed in the practice of serving His Majesty"³⁶. The third foundation was providing the academy with the best research tools and teaching resources. Among these, priority was given to forming an excellent library, unique in mid-18th-century Spain, as a support for teaching and research at the academy. Without it, the innovative curriculum and approach to education for new officers with a scientific and technical profile would fail³⁷. This profile of Enlightenment artillery officer came into being at the Alcázar, based on innovative educational criteria established by children of the century who underpinned the foundations of the new academy and its curriculum with the collections of books amassed in the library of the Segovia academy.

This is the basis for the title of this article, paraphrasing Count Gazzola who, as he oversaw the process of founding the College of Artillery with the conviction that a good education was the basis for everything he was trying to achieve, pointed out that an essential tool for succeeding in his aim was a library with broad, up-to-date collections. "There will be no shortage of books [...] or money to purchase them"³⁸, he declared

– a maxim maintained as a mantra throughout the history of the artillery academy. For Gazzola, physics, together with mathematics, formed the theoretical basis required for the science of artillery. General opinion in the Royal Artillery Corps was empathetic to the Director's approach, although a small residual group of artillery officers continued to advocate a degree of pre-eminence of practice over theory in training their new colleagues³⁹. Even as the century went on, there was a general feeling of support for the education given by the Segovia academy, strongly based on science and technology. This could span generations, as shown in an interesting and erudite pamphlet with which we conclude our discussion. Published just ten years after the establishment of the Segovia academy, it was written by Captain Gregorio Menéndez Valdés for his grandson, who was then a cadet at the College of Artillery. In the pamphlet, he repeatedly acknowledges scientific and military studies as essential for carrying on the profession in the future. The College, he declared, would be "where the students of Minerva would then march out on campaign for Mars"⁴⁰.

Blending theory and practice in teaching artillery was the conceptual essence and the core of Gazzola's innovative educational philosophy. As an essential tool, he demanded the formation of an Enlightenment scientific and military library and, as the first Director of the College, he procured one in the Alcázar. The teachers at the College accepted that the scientific and technical education of the artillery cadets – the future officers of this *arma sabia* – was necessary. And that is exactly what happened. Our evidence for this comes firstly in the form of the successive curriculums demonstrating the strong mathematical basis for the practice of artillery in the second half of the 18th century⁴¹. In line with the guidelines of the first Director, the intellectual, cultural, military and scientific education of the students was based on the idea of providing theoretical and practical instruction in a balanced way, based on anticipated goals

³⁴ M.D. Herrero Fernández-Quesada, *El Real Colegio de Artillería. De la fundación a la consolidación de un modelo de centro docente militar y científico-técnico*, "Revista de Historia Militar", extra 1, 2014, pp. 73-134.

³⁵ Eadem, *La innovación militar*, cit.

³⁶ A. Eximeno, *Oración que en la abertura de la Real Academia de cabaleros Cadetes del real Cuerpo de Artillería nuevamente establecida por S.M. en el Real Alcázar de Segovia, dixo el Padre Antonio Eximen, de la Compañía de Jesús. Profesor Primario de dicha Academia, en el día 16 de mayo de 1764*, Imp. Eliseo Sánchez, Madrid 1764.

³⁷ A. Carrasco y Sáyz, *Artilleros y artillería bajo su aspecto industrial, o sea, nuestra Ingeniería, in Memorial de Artillería*, series IV, vol. II, 1894; and Helguera Quijada, *Las industrias artilleras*, cit.

³⁸ AGS, *Guerra Moderna*, legajo 560. Gazzola's official correspondence.

³⁹ M.D. Herrero Fernández-Quesada, *Educando a Marte. Rentabilidad de la innovación docente militar y versatilidad profesional*, in *Entre Marte y Minerva*, cit., pp. 255-325.

⁴⁰ G. Menéndez Valdés, *Avisos históricos, y políticos de el Capitán D. Gregorio Menéndez Valdés, Sr. De San Andrés de Cornellana, vecino y regidor perpetuo de la muy noble villa, y concejo de Gijón, en el Principado de Asturias, a D. Miguel Gregorio, su nieto, Caballero Cadete en el Real Colegio de Artillería del Real y Militar Alcázar de Segovia, a quien los dedica*, Oficina de la Viuda de Manuel Fernández, Madrid 1774, p. 4.

⁴¹ M.D. Herrero Fernández-Quesada, *The Education of the Officer Classes in the 18th centuries*, in *Spain and Sweden: Encounters throughout History. The Army and the Navy in Spain and Sweden in a period of change (1750-1870)*, Universidad de Cádiz, Cádiz 2001, and Eadem *Cañones y probetas en el alcázar. Un siglo en la historia del Real Colegio de Artillería (1764-1862)*, PAS, Segovia 1992.

and expectations. The high quality of the education, the unusual profile of the teachers and the impressive provision of resources in the library helped keep teaching standards high over the years. Other evidence is provided by all aspects related to the formation and growth of the library of the College of Artillery, such as the bibliographical support it offered for the teachers' research and teaching activities⁴².

We will cite questions such as the choice of location of the new academy as evidence of the prevalence given by the Monarchy to the founding of the academy in Segovia. This is made clear in the opening lesson by the first Head of Studies, who noted that the King had sited the College in the "best and most worthy fortress in his Kingdom"⁴³. The importance of Gazzola's enterprise is shown in the documentation consulted on the various steps and aspects that had to be coordinated so that the solemn opening of the College of Artillery could take place within just two years. The first question was its location, and the Alcázar at Segovia – close to the court and the Royal residences – was chosen from among various options. The former fortress and palace had to be converted to house the Company of Artillery Cadets, as demonstrated in a drawing by the Engineer-General Francesco Sabatini, a loyal colleague of Gazzola's. The buildings had to be adapted⁴⁴ and, in just two years, the Count managed to resolve issues such as accommodation for the troops, the location of the different departments, the shooting range and flags. In particular, he took charge of all aspects of modernising the infrastructures required so they could house an innovative, modern military academy, set up as a boarding establishment in a historic fortress. It needed classrooms for teaching all aspects of artillery, including military, technical and scientific subjects, as well as languages, fencing, and even dancing, which was also compulsory on the curriculum⁴⁵. There were also various departments and offices, dormitories and communal areas [...] ⁴⁶. And, of course, there was the library established in the Kings' Hall in the fortress. This was the scientific and military heart

of the academy – the centre for academic life, teaching activities with students and research by teachers.

3. *THERE WILL BE NO SHORTAGE OF BOOKS...* AN ENLIGHTENMENT LIBRARY UNDER CONSTRUCTION.

The spirit that oversaw the formation and composition of the college library at all times and the criteria for including scientific and military subjects in its collection flowed from Gazzola's Enlightenment upbringing and the new concept of education and military training, as well as the perceived need at the time for scientific knowledge to be applied to the military arts. The intrinsic value of books as an essential tool for transmitting knowledge and Enlightenment education was clear in the forms of teaching and methods used during the period, and this was also an academic trend internalised by Gazzola. It was a century when concern for education became a badge of identity for enlightened rulers, with a profusion of printed texts on the subject and declarations of intent tending towards the establishment of different kinds of institutions to promote education. As part of his mission to found an innovative military academy, the Count channelled these shared concerns into selecting the right books to form the library, and this can already be seen in the first catalogues drawn up in Segovia. Based on this, an example of the second principal foundation on which the College of Artillery was constructed is offered by the process of forming and stocking its library, which was beginning to develop in the Kings' Hall of the fortress. Gazzola worked with the conviction that the core of the academic and teaching life of the Segovia academy should not be merely a good library, it should be the best scientific and military library of the age. And he made the compiling of it a personal concern, including collections of diverse origins and purchasing and importing many other books. He was well aware that without a well-stocked and properly selected library, it would be impossible to achieve the goals pursued in the academy's curriculum, intended to forge the artillery officers of the Enlightenment Age. This maxim was kept throughout his term at the head of the Royal Artillery Corps and as Director of the College until 1780 – 17 years spent consolidating the academy and its magnificent library. Undoubtedly, this was Gazzola's legacy. The shelves of the largest and most important room in the Segovia fortress were filled with books based on this philosophy and these goals and horizons. Thanks to the handwritten inventories that have survived, there is no doubt that, right from its foundation,

⁴² Eadem, *Sistemas de captación*, cit.

⁴³ Eximeno, *Oración de apertura*, cit.

⁴⁴ In the Museum of the College of Artillery (Alcázar de Segovia) (for which I was responsible for the historical and theoretical approach) there is a copy of a plan drawn by Sabatini of the layout of the fortress, with the adaptations to house the academy. Originally consulted in the General Palace Archive (hereafter AGP), administration section.

⁴⁵ Concerning all the work done to adapt the fortress for the new academy and the infrastructures required for it to open, see Herrero Fernández-Quesada, *La enseñanza militar ilustrada*, cit., chapters III and VII.

⁴⁶ Library of the Segovia Academy of Artillery (hereafter, BAAS), manuscripts. Letter from Gazzola to the Minister of War, Ricardo Wall, dated in Madrid on 2 February 1763, and correspondence between Gazzola and Esquilache over the matters mentioned in the text.

in its collection the library condensed the Enlightenment, at least in scientific, technical and military terms⁴⁷. The Count personally bought books in Europe – as in summer 1769, when he travelled to Italy via Paris and London, purchasing volumes and recent publications as well as well-known scientific treatises, such as those by Leibnitz and Locke – returning to Spain in September 1771 with his suitcase full of new stock for the academy library.

The bibliographical collections Gazzola demanded came from Cadiz and Barcelona, where there had been schools of artillery during the reign of Ferdinand VI, each with its respective library. It is interesting to note the process with which the system of artillery training was adopted during the reign of Ferdinand VI, when these two institutions were set up. They were inspired by the Academy of Artillery founded by his brother Charles in Naples as early as 1746, as well as the concerns of ministers with military responsibilities in Spain. In November 1751 a Royal Ordinance/Instruction was given “concerning what must be observed in the Schools of Mathematics which, under the name of Artillery, His Majesty has ordered to be erected in the cities of Barcelona and Cadiz under the direction of the General Artillery Corps⁴⁸”. These two cities had long histories of having to defend themselves and traditions involving artillery (at the time they were the headquarters of the general staffs of the two battalions). Occasionally, they both had schools or academies of artillery and mathematics. Notable progress was made in the teaching of artillery with the standardisation of criteria at the 1751 opening of the Cadiz and Barcelona schools “for artillery officers, also representing independence from military engineers in terms of training⁴⁹”.

⁴⁷ Undoubtedly, the process of introduction of science in Spain in the 18th century – as in other European states – took place on the basis inherited from the European scientific revolution. It is impossible to understand the progress of science in Europe without the achievements and advances of that revolution whose path was assumed by the scientists of the Enlightenment. Starting from the work of scientists and notable technicians, in the 18th century the trend of research and cultivation of scientific disciplines in line of progress was assumed. The peculiarity in Spain was the indisputable role that the military and marines had as vehicles for the introduction of modern science in Spain, individually and through the innovative Bourbon military schools and academies, such as the one discussed in this article, the Academy of Artillery, and its excellent illustrated library formed by the Count of Gazzola at the request of Charles III, and also responsible for the scientific credit of the Academy.

⁴⁸ AGMS, sección 2, división 8, expediente 85. *Ordenanza e instrucción, que se ha de observar, en las Escuelas de Mathematicas, que con el título de Artillería ha mandado el Rey erigir en las plazas de Barcelona y Cádiz, bajo la dirección el cuerpo general de ella*. Imprenta de A. Marín, 1751. Another copy in AGS, *Guerra Moderna*, legajo 572.

⁴⁹ *Ibidem*, p. I

The fact that under Ferdinand VI there were two centres for artillery training is barely perceptible in the single text of the published version of the Instruction given for both of them. The pattern, the structure of the academy and the subjects taught were shared by the two centres; their organisation was common too, as was the teaching methodology and the curriculums heavily loaded with scientific and technical subjects intended to achieve practical artillery excellence. There were also public examinations (*certámenes públicos*) in which students showed their progress and scientific and military knowledge, and the obligation for the teachers to produce classroom materials⁵⁰. On this basis, we can state that, although it was based in two different places, we are, in fact, looking at one centre and a single model of military academy for artillery. This was decisively important in the short and medium term because these two almost unknown schools were the immediate precedent for the foundation in the following reign of a single centre to produce artillery officers – the Royal College in Segovia – and their libraries provided the seed for the one formed in Segovia.

Documents from Simancas on “the extinction of the Cadiz Academy with its effects sent to the one in Segovia” show that the bibliographical collections – arrived at the Alcázar in 1764 – to be included on the shelves of the Segovia academy’s library came from these two schools of artillery. Those we have consulted include the “Ymbentario de todos los efectos procedentes de la Real Academia Militar de Mathematicas que S.M. ha extinguido en la plaza de Cádiz y estaba a cargo del Cuerpo de Artillería⁵¹”. But although this is the accepted story, the truth revealed by a detailed examination of the composition of the Cadiz and Barcelona libraries is that the bibliographical legacy received by the College of Artillery actually came from a single but conceptually pioneering institution, the Royal Military Mathematical Society of Madrid – the jewel in the crown of the Count of Aranda when he was in charge of the artillery⁵². This proved to be a short-lived illusion in Enlightenment Spain but it foreshadowed future developments as

⁵⁰ Young would-be soldiers were motivated with awards which were usually ‘mathematic cases’, books or even commemorative medals. AGS, *Guerra Moderna*, legajo 11. “Relación actual de la Real Escuela de Artillería de Cádiz, del curso que el Comisario Ordinario D. Gabriel Martínez ha compuesto para su establecimiento con las máximas, que por su dirección se han practicado, y practican con el consentimiento de D. Juan Manuel de Porres, Teniente Provincial e Ynspector de dicha Escuela”.

⁵¹ AGS, *Guerra Moderna*, legajo 560.

⁵² A. Marzal, *Un ejemplo de renovación científica en la Ilustración: La Real Sociedad Militar de Matemáticas de Madrid*, in *Actas del I Congreso de Historia Militar*, Universidad de Zaragoza, Instituto Fernando el Católico, Zaragoza 1982, pp. 62-72.

another step in the process of military innovation and progress. The innovative institution opened in Madrid under Aranda's initiative and did not survive him when he left his post. It was founded as an academy intended to complete the scientific, technical and military training of artillery officers and engineers, but incorporating research applied to the military training⁵³. Its members included all of the expert corps of the army and at its heart was an exceptional library and an archive of drawings and models, some of them to scale. The aim was to create new supports for education for war and a repository of tools for perfecting officer training, from textbooks to translations, models to maps⁵⁴.

3.1. True origin of the bibliographical legacy and synergies between enlightenment figures: Gazzola, Lasso and Datoli

The collection of books transported from Cadiz, which were the first to arrive in Segovia, mostly consisted of half the library of the Royal Military Mathematical Society of Madrid. So, the collection which would soon be considered the best scientific and technical library of the Spanish Enlightenment being formed in the Kings' Hall of the Alcázar at Segovia was based on this core of important books⁵⁵. Teachers even had authorisation from the Inquisition which was the only way in which they could read books that had been banned⁵⁶.

Gazzola entrusted the transport of the books from Cadiz to Captain Lasso de la Vega⁵⁷, who until then had been a "teacher at the Cadiz school⁵⁸". The documents consulted, particularly those in Simancas, make it possible to follow the construction of an Enlightenment library, from the initial moment when the first books from Cadiz arrived in the Kings' Hall. We have already mentioned the Count's prior knowledge of Bourbon policy concerning the institutionalisation of military training and this was demonstrated in the formation of the library when he used his position, with clear inside information, to lay claim to specific collections of great scientific and military value kept in the libraries of other military institutions. In fact, we have repeated refer-

ences to generosity in providing books seen as necessary for the academy, as well as data to substantiate these⁵⁹. Gazzola was quite right when he said "there will be no shortage of books or money to purchase them⁶⁰".

Only men with a high level of scientific knowledge, and who were also skilful in applying it to the military arts and sciences, could lay the bibliographical foundations of the library of the College of Artillery, contributing their experience to working with Gazzola to expand the most important teaching department at the Alcázar in Segovia – its library – in the right and proper way. One of the keys to the success of this enterprise lay in the human factor – people who empathised with the Segovia project achieving synergies with the Count and becoming involved in forming the college library. Looking at this aspect in more detail, it is important to note that Gazzola entrusted the moving of the books from Cadiz to Captain Lasso de la Vega⁶¹ because "he has handled these very books and instruments himself and will be keen to ensure they are not damaged⁶²". So, who was Lasso and what was his professional track record? This officer who supervised the transport of the books from Cadiz to Segovia had been a teacher at the School of Artillery in Cadiz. Moreover, according to his Service Record⁶³, he had been one of the soldiers posted to the Royal Military Mathematical Society, working with the collections of the library in Madrid, half of which were later taken to Cadiz, where he taught. No wonder Gazzola praised him so highly, entrusting him with this responsibility rather than anyone else. His experience also saw him appointed second master, below only the Head of Studies in rank and in the hierarchy at the new College of Artillery in Segovia. There, he also took direct responsibility for the organisation, custody and expansion of the library. Another artillery veteran of Italian origin, Giuseppe or José Datoli, was also posted to this legendary institution in Madrid, which bore Aranda's stamp. Datoli, too, was very familiar with the Math-

⁵³ *Ibidem*, p. 63

⁵⁴ Capel, Sanchez and Moncada, *De Palas a Minerva*, cit., section devoted to this institution.

⁵⁵ AGS, *Guerra Moderna*, legajo 560.

⁵⁶ BAAS, transcribed from the original licence "to have and read prohibited books [...]" given by the Inquisitor General, stamped by the Captain Librarian Serapio de Pedro in 1849, 13 years before the fire at the Alcázar (6 March 1862) which meant the library had to be moved to the convent of San Francisco.

⁵⁷ AGMS, sección 1, Lasso de la Vega's expediente personal, legajo L-400.

⁵⁸ AGS, *Guerra Moderna*, legajo 560.

⁵⁹ Herrero Fernández-Quesada, *Catálogo de la Biblioteca del Real Colegio de Artillería*, cit. Initial study.

⁶⁰ AGS, *Guerra Moderna*, legajo 560.

⁶¹ AGMS, sección 1, Lasso de la Vega's expediente personal, legajo L-400.

⁶² AGS, *Guerra Moderna*, legajo 560, on «la extinción de la Academia de Cádiz y destino de sus efectos para la de Segovia», and "Ymbentario de todos los efectos procedentes de la Real Academia Militar de Matemáticas que S.M. ha extinguido en la plaza de Cádiz y estaba a cargo del Cuerpo de Artillería". The same file also contains the "Relación de los libros que volvieron de la Academia de Ingenieros de los que existen en la Academia de Barcelona, según el Ymbentario hecho el 20 de diciembre de 1762: los cuales libros se han de remitir a Segovia para el uso de los Caballeros Cadetes», on 15 May 1764 (the day before the opening of the college), signed by Gazzola.

⁶³ AGMS, sección 1, legajo L-400

emathical Society's excellent library. It was hardly coincidental that he was later posted to the Cadiz school and was finally recruited by Gazzola for the staff of the Segovia academy⁶⁴. Our work on the documents clearly shows that the Italians involved in military innovation, and particularly in the renewal of Spanish artillery, with Gazzola as intellectual leader of the definitive change in the system of artillery education, were an empathetic group with common interests, supporting one another in the different enterprises and projects. One of these was undoubtedly the formation of the Enlightenment library at the Segovia college⁶⁵. So, going down the scale, we find that, starting with the core led by Charles III's Italians – Esquilache, Gazzola and Sabatini – there were other Italians at different levels associated with the foundation of the College, ranging from the veteran Royal College of Artillery teacher Giuseppe Datoli⁶⁶ to Pietro Giannini, who arrived in Segovia during Gazzola's later years as Director and was chosen by him to be Senior Master and Head of Studies. Here, the man from Piacenza was playing a trump card he knew would not let him down (as had happened between the departure of Eximeno to the arrival of the Italian priest)⁶⁷. There was a notable presence of Italians at the founding stage of the Royal College, from teachers to students, building up synergies around the Count and deeply involved in the project⁶⁸.

With the Italians laying the foundations, and a select group of Enlightenment scientific artillery officers, efforts were made to compile an exceptional library covering scientific and military subjects. Some books were ordered and purchased by Jorge Juan to be added to the legacy of the collections of the library of the defunct Royal Mathematical Society in Madrid⁶⁹. The collections of the Cadiz and Barcelona Academy of Artillery, heirs to the Royal Military Mathematical Society, and a more than generous, wide-ranging acquisition policy, made it possible to form, in the early years of the college's life, one of the best scientific and military libraries

of the Spanish Enlightenment⁷⁰. The key undoubtedly lay in the human factor of the team of officers who, because of their scientific, technical and military training, in the words of Lafuente and Valverde made science their trade, their career, their enterprise and, ultimately, their life and culture⁷¹.

3.2. Rules of the library. Ordinance of 1768

From a hierarchical point of view, the Library was the responsibility of the Head of Studies, the second in command of the college after Director Gazzola. However, in the College Ordinance of 1768 its running is attributed jointly to a teacher together and to the Lieutenant of the Company of Cadets. Their obligation was to make an annual inventory⁷², to ensure that the rules controlling the books and loans with receipts were followed, and to administer the fund the library was endowed with for binding, purchases and similar purposes. The library continued to grow at a notable pace, so much so that by the end of the 18th century it already had more than 2,300 volumes⁷³. Research into its collections shows us a library that is certainly exceptional, as was appropriate for an Enlightenment educational establishment of the standard the College of Artillery had already proved itself to be⁷⁴. Its collection was divided into a range of subjects which were, on the fact of it, astonishingly broad, ranging from military and civil architecture and engineering to treatises on artillery and fortification, accompanied, of course, by all kinds of military subjects⁷⁵. They also included every-

⁶⁴ AGMS, sección 1, legajo D-92

⁶⁵ *Educación, redes y producción de élites en el siglo XVIII*, ed. by J.M. Imízcoz and A. Chaparro, Sílex, Madrid 2013; and J.M. Imízcoz, *Elites administrativas, redes cortesanas y captación de recursos en la construcción social del Estado Moderno*, "Trocadero: Revista de Historia Moderna y Contemporánea", 19, 2007, pp. 11-30.

⁶⁶ AGMS, sección 1, legajo D-92, expediente personal.

⁶⁷ Herrero Fernández-Quesada, *El Real Colegio de Artillería*, cit.

⁶⁸ Eadem, *La enseñanza militar ilustrada*, cit., section "Los Caballeros Cadetes. Primera Promoción", pp. 125-130. One significant piece of data: among the 15 students making up the College's first class of Sub-lieutenants there were two Italians: Leoni (Gazzola's nephew) and Soprani, an Italian nobleman.

⁶⁹ Another copy in AGS, *Guerra Moderna*, legajo 560.

⁷⁰ M.D. Herrero Fernández-Quesada, *Notas sobre los fondos impresos y documentales de la Biblioteca de la Academia de Artillería y el Archivo Histórico Militar, Estudios Segovianos*, extraordinary issue, Diego de Colmenares Institute/CSIC, Segovia 1996, pp. 349-388. For the study of 18th-century military history, see Eadem, *La investigación en Historia Militar de la Edad Moderna y sus fuentes. El Archivo General Militar de Segovia, decano de los archivos militares españoles*, "Cuadernos de Historia Moderna", 38, 2013, pp. 165-214.

⁷¹ A. Lafuente and N. Valverde, *Los mundos de la ciencia en la Ilustración Española*, Fundación Española para la Ciencia y la Tecnología, Madrid 2014.

⁷² BAAS, *Ordenanza de S.M. para el Real Colegio Militar de Caballeros Cadetes de Segovia* Madrid, Imprenta Real, 1768, Title V devoted to the College Library. In the *Actas del Colegio Militar*, cit., frequent references to the library, its inventories and security measures can be found.

⁷³ BAAS. Manuscripts. Until 1862, all the annual inventories were kept in the Alcázar Library. They were lost in the fire and only the four copies mentioned in the text survive.

⁷⁴ J.L. García Hourcade and J.M. Valles Garrido, *Catálogo de la Biblioteca del real Colegio de Artillería de Segovia, I, Fondos científicos*, BCA, Segovia 1989; and Herrero Fernández-Quesada, *Catálogo de la Biblioteca*, cit., p. 15.

⁷⁵ P. Navascués, *Tratados de arquitectura y fortificación en la antigua biblioteca del Alcázar*, PAS, Segovia 1994.

thing from military classics to treatises on ballistics and from castrametation to science in general, mathematics, physics, geometry, chemistry and the new, emerging scientific disciplines like optics and botany⁷⁶. The inventories of the educational resources also included what were described as “instruments”, which always appeared catalogued with the books. This was latest-generation equipment both for teaching subjects related to artillery and those of a scientific nature, and it appears in all the catalogues surviving from the 18th century and also in the 19th century documents corresponding to the transfer of the library to the college on the Balearic Islands.

From the minutes of the College Council, it is known that a considerable sum was invested every year in purchasing books and restocking⁷⁷. With the exceptional contents of this library which was beginning to be formed on the shelves of the Kings’ Hall in the Alcázar, the teachers at the Segovia college were able to fulfil their teaching duties while at the same time researching and producing their own texts. Because Gazzola’s idea of education saw the college as a place where teachers were encouraged to carry out research to be applied to their departments and disciplines, resulting in important publications by the College itself, which created and published innovative works on the Spanish Enlightenment scene. These included textbooks drawn up specially for students, or, as they put it, for the teaching of the Gentlemen Cadets of the Royal College of Artillery in Segovia, which became classic reference works in demand even in other European countries. Not only was the Segovia college founded with a view to research, publishing its own textbooks, the teachers also produced notable translations of European scientific works that were still not available in Spain in the second half of the 18th century.

The library also always had a specific fund for purchases and binding⁷⁸, so it was generously supplied in accordance with the founding criteria established by Gazzola, and it continued to grow exponentially until 1808. A revealing fact that should be emphasised about the importance of the library, both inside and outside

the artillery college, is that, when news came of the French invasion, the first items packed into boxes for possible transfer were the books, although in fact when the French army’s arrival was imminent the cadets and teachers left the Alcázar before they had a chance to move them⁷⁹. As an indicator of the academic reputation of the Segovia college, we should emphasise that Napoleon – himself also an artillery officer – sent a detachment to Segovia in order to go into the library and its warehouses and requisition all copies of Tomás de Morla’s treatise on artillery (*Tratado de Artillería*)⁸⁰.

The formation of the College library and its rules occupy Title V of the Ordinance of 1768 and its articles, governing its preservation, growth, financial budget, control and organisation, or, in the terms of the time, internal regulations. This College Ordinance also entrusted the management of the library to a teacher acting together with the Lieutenant of the Company of Cadets. Their obligations included making an annual inventory⁸¹, overseeing compliance with the rules for controlling books and loans with receipts, and administering the fund assigned to the library every year for binding, purchases and so on. However, despite the obligation to catalogue the collections printed in the Alcázar every year since the foundation of the College, no catalogue had been presented to the College Council, so, at a meeting in autumn 1771, the college’s highest governing body determined that “an inventory should be made of the library by Lieutenant of Cadets Mr Vicente de los Ríos⁸², and the second master Mr Cipriano Vimercati

⁷⁶ BAAS, Manuscripts. A. Carrasco y Sáyz, *Breve noticia histórica del Colegio de Artillería*, 1873, unpublished. The value of the information it contains on the Segovia academy in general, and the college library in particular, lies in the fact that when the fire in the Segovia Alcázar broke out (6 March 1862) the building had to be evacuated and Carrasco, then a teacher of natural sciences at the college, directed the work of salvaging books from the Royal College’s library and archive.

⁷⁷ BAAS, *Actas del Colegio militar de Caballeros Cadetes del Real Colegio de Artillería*. 2 vols. Manuscripts and bound books. They open with the first meetings of the College Council in the summer of 1765. They end in 1787.

⁷⁸ Herrero Fernández-Quesada, *La enseñanza militar ilustrada*, cit., chapter VII.

⁷⁹ The books remained in the Alcázar and, after months of being carried around the peninsula, the College opened again in the Balearic Islands. They were taken there by Captain Loriga, who made an inventory, kept at BAAS. On this subject, M.D. Herrero Fernández-Quesada, *El Real Colegio de Segovia en la Guerra de la Independencia*, in *Actas del Congreso de la Asociación Internacional de Museos de Armas y de Historia Militar (IAMAN)*, published in a monograph in the series *Militaria* no. 7, UCM, Madrid 1995, pp. 287-296, and in Eadem, *Cañones y probetas*, cit., p. 38 and ff.

⁸⁰ T. Morla, *Tratado de Artillería para uso de la Academia de los Caballeros Cadetes del Real Colegio de Artillería Segovia*, Imprenta A. Espinosa, Segovia 1784-1786. The work was completed with the *Libro de láminas del Tratado de Artillería de Tomás de Morla*, Imprenta Real, Madrid 1802. The requisitioning of copies by the French explains why a second edition of this essential artillery textbook by Morla was printed as soon as the College returned to the Alcázar after the Napoleonic Wars, as I have already mentioned in my Introduction to the facsimile (PAS): *Tratado de artillería para uso de los Caballeros Cadetes de Segovia*, Imprenta de Espinosa, Segovia 1816.

⁸¹ *Ordenanza*, cit., Title V.

⁸² AGMS, sección 1, legajo G-4386. Personal file of Vicente Gutiérrez de los Ríos, Marquis of Las Escalonías, a member of the Royal Academy of the Spanish Language. His profile was that of a scholar, as shown in the edition of *Quijote* promoted by the Royal Academy in 1787, in which his name appears on the introductory study *Análisis del Quijote*, pp. 67-242.

[...]83". Two learned men like de los Ríos and Vimercati meant Gazzola could be assured that the inventory would be a rigorous one. The level of responsibility was then raised, as it was agreed that from then on the first master and Head of Studies should take charge of the library and "not give any book without a receipt being left [...]84".

This was the system for controlling loans, emphasising the importance of a rule already appearing in the Ordinance of 1768, which cannot have been entirely followed, stating that "teachers and officers of the Company living within the College can take the books they need out of the Library, leaving a receipt including the book's title, size and the place of printing; and they must return these books when they no longer need them in time for us to make our inventory85". That meeting of the Council in 1771 was decisive in the process of constructing the library and updating the collections, as teachers of the calibre of Ríos and Vimercati, as well as carrying out inventories, had to make a list of "essential works" that did not appear on the shelves so they could be purchased. There would never be a *shortage of money to purchase them*. This is evidence of one of the cornerstones of the library's growth: the fact that it was continually updated to include the latest editions of the scientific and military works of the 18th century. The language they were published in did not matter, because they would be translated at the College by teachers who had received a polyglot education like that in the College curriculum, which, as well as the dead languages, included the study of French and Italian86, the latter due to the decisive influence of the college's founder and Director, Count Gazzola. Once more, the library shows us the Neapolitan influence on artillery reforms, particularly in the founding of the College and its approach, which were clearly imbued with the southern Italian Enlightenment.

Among the rules governing the consultation of books in the library, it is important to look closely at a condition related to potential users. Teachers could take some books out, but not all of them. The College asked the Inquisitor General for a licence for the Director and ten teachers to read banned books, and this was granted

for them only under certain terms. They could "have in their possession and read the banned books that they judge to be precisely necessary for better instruction, teaching and fulfilling their respective duties, ensuring that while they are in their possession other persons cannot read them [...]87". Students clearly did not have access to these collections. In fact, their access to the library was limited and had to be approved by the Head of Studies, the Senior Teacher of the College, who would determine "the gentleman cadets who, for their advancement, must be permitted to study the books of the Library". For this reason, they had to consult books in the Kings' Hall of the Alcázar itself, "subject to the appropriate hours, and under no circumstances may they remove books from it. Anyone who removes or damages any book must provide an exact replacement88".

3.3. *Handwritten manuscripts, research and publishing involving the library*

Four handwritten catalogues corresponding to 1784, 1790, 1794 and 1796-98 survive. They demonstrate the scientific and military standards of the Segovia academy with a library which, by the final decade of the 18th century, possessed more than 2,300 volumes89. These inventories are undoubtedly the best indicator of the excellent academic quality of this library, which was continually developing. Researching these inventories provides important information about the founding of the academy and its teaching objectives. They show a library which was undoubtedly exceptional, as is appropriate for an Enlightenment educational establishment of the standard the Segovia college had already demonstrated90. At first glance, the composition of its collections by subject is clearly broad, including military and civil archi-

83 Cipriano Vimercati, undoubtedly an outstanding officer and scientist of the Spanish Enlightenment, who was posted to the Navy. On his period as Head of Studies and First Master, see Herrero Fernández-Quesada, *El real Colegio de Artillería*, cit.

84 *Actas del Colegio*, vol. I, cit., session of 16 November 1771.

85 *Ordenanza*, cit., Title V, article XIII.

86 For the curriculum of the Alcázar and language teaching Herrero Fernández-Quesada, *La innovación militar en el siglo XVIII*, cit., pp. 211-247; and Eadem, *Cañones y probetas*, cit., in the sections corresponding to the four stages of the College in the Alcázar.

87 The transcription of the original manuscript of this licence, made by the librarian, Serapio de Pedro, in 1849, cit., has been consulted in the current Library of the Academy of Artillery in Segovia.

88 *Ordenanza*, cit., Title V, articles VII and XV.

89 The Alcázar library kept all its annual inventories until 1862, but many were lost in the fire that year, and only the four copies mentioned in the text have survived.

90 In the first two years of the publishing enterprise Biblioteca de Ciencia y Artillería (BCA), two catalogues of the Academy Library were published, accompanied by studies: J.L. García Hourcade and J.M. Valles Garrido, *Catálogo de la Biblioteca del real Colegio de Artillería de Segovia. I. Fondos científicos*, BCA, Segovia 1989; and Herrero Fernández-Quesada, *Catálogo de la Biblioteca*, cit. Others were then published on the subjects and disciplines present on the academy's shelves, including those by G. Marcelo Rodao, *Catálogo de los fondos históricos de los siglos XVI al XIX en la Biblioteca de la Academia de Artillería de Segovia*, BCA, Segovia 2001; and *Catálogo de los fondos geográficos y afines de los siglos XVI al XIX en la Biblioteca de la Academia de Artillería de Segovia*, BCA, Segovia 2001.

ture and engineering, and classical treatises on artillery and fortification, accompanied by all the disciplines involved in the arts of war⁹¹, and innovative treatises on ballistics. However, interspersed with these was a notable presence of scientific books, including a high proportion of volumes on mathematics, physics (general or specific) and geometry, sharing the shelves with general books on science, chemistry⁹² and emerging scientific disciplines like optics and botany⁹³. The search through the foundational catalogues and library book records allows us to state that, at the beginning of the 19th century, the collections were, to a large extent, multidisciplinary. This was a constant feature of the composition and growth of the college library and, by the turn of the century, it included treatises on mineralogy, geodesy and metallurgical chemistry. The same could be said of all the subjects and disciplines in the broad curriculum of the College. These included chemistry, metallurgy, geography, history, cartography and fortification⁹⁴. From the 1784 inventory onwards, all of these appear in this list of works. Newton, Copernicus and Galileo shared the shelves with Chabaneau, Lavoisier and the well-known chemist Proust, while Firrufino, Collado and Lechuga rubbed shoulders with Le Blond, Surirey de Saint Remy, Fernández de Medrano and Morla.

We have also found another different and rather curious kind of continuity in the historical development of the library. From the earliest surviving catalogue (1784), they generally show that the organisation of the library in the Segovia college as it was founded has remained as an unchanging legacy down to the present day. All those attractive Enlightenment scientific and military works were labelled just as books still are today, with their shelf, table and number. In these handwritten inventories that still survive in the current library of the Academy of Artillery in Segovia, we can sense the strong heartbeat of a permanently living library, increasing its collections and broadening the subjects represented.

As an academic benefit deriving from the library of the Alcázar and its consultation by artillery officers, it is appropriate to highlight the publishing activity of the Segovia college, which I have already dealt with else-

where⁹⁵. Medrano was also a pioneer here of what was later acknowledged to be an enlightened achievement and an innovative teaching tool: the military manuals, treatises and texts specifically written for students receiving military training at the academy⁹⁶. The College of Artillery in Segovia began and continued its publishing activity following in the wake of Medrano and the Barcelona Academy of Engineers, whose Director Pedro de Lucuce encouraged the writing of manuals on his return from his posting at the Royal Military Mathematical Society in Madrid and eventually had his own classic work *Principios de fortificación*⁹⁷ printed. The Segovia college's publications focused on textbooks for its students, translations and works written by its teachers in different scientific disciplines. In these activities, with the bibliographical platform of the library, tangible results were soon achieved in terms of the academy's own publications, including the first textbooks for teaching artillery techniques⁹⁸, pioneering research works⁹⁹, and translations that made quite an impact on the Spanish academic scene¹⁰⁰.

⁹⁵ I dealt with this aspect, contributing important information to research on the college, for the first time in *Cañones y probetas*, cit., section *Los frutos. La trayectoria de los artilleros científico e ilustrados*.

⁹⁶ Historically, all the classical treatises on fortification and artillery focused on perfecting techniques of attack and defence, casting materials, and construction techniques to promote officer profiles of the kind described in the titles of works like the one by S. Fernández de Medrano: *El arquitecto perfecto en el arte militar* (The Perfect Architect in the Military Arts), Print shop of Henrico and Cornelio Verdussen, Antwerp 1708; *El práctico artillero que contiene tres tratados. En el primero se declaran las piezas de cada género, y sus diferencias, y se enseña el modo de obrar en las cucharas, y Afustes, y el designio de las baterías. En el segundo se trata del manejo del cañón, con algunas advertencias sobre sus alcances. Y el en tercero se trata en breve del puesto de cada oficial, y otras advertencias*, Print shop of Francisco Foppens, Brussels 1680; *El arquitecto perfecto en el arte militar. Dividido en cinco libros. El 1º contiene la fortificación regular e irregular a la Moderna*, Imprenta Henrico y Cornelio Verdussen, Amberes 1708.

⁹⁷ P. Lucuce, *Principios de fortificación*, T. Piferrer, printer to the King, Barcelona 1772.

⁹⁸ The first two textbooks used for teaching at the College were: T. Morla, *Tratado de Artillería para el uso de la Academia de Caballeros Cadetes de Artillería*, Imp. Espinosa, Segovia 1784-1786, in three volumes, in addition to *Libro de Láminas*, Imp. Real, Madrid 1803 (the second edition of the work published after the Napoleonic Wars included a fourth volume, *Explicación a las láminas*, Imp. Espinosa, Segovia 1816); and P. Giannini, *Curso matemático para la enseñanza de los Caballeros Cadetes del Real Colegio Militar de Artillería*, Imp. Espinosa, Segovia 1782-1795. A fourth volume devoted to geometry was later published. On these works, see J. Navarro Loidi, *Don Pedro Giannini o las matemáticas de los artilleros del siglo XVIII*, BCA, Segovia 2013.

⁹⁹ L. García de la Huerta, *Discurso físico-anatómico sobre las plantas, dirigido a los agricultores y presentado a la Real Sociedad Económica de Amigos del País de Segovia*, Imp. Antonio Espinosa, Segovia 1779. According to the cover of his book, he was already an honorary member and correspondent of the Economic Societies of Leon, Majorca, Vera and Vélez-Málaga.

¹⁰⁰ The Artillery Captain Manuel Munárriz translated Lavoisier's *Traité élémentaire de chimie*, published as *Tratado elemental de Química* by the

⁹¹ P. Navascués, *Tratados de arquitectura y fortificación en la antigua biblioteca del Alcázar*, PAS, Segovia 1994.

⁹² Chemistry had a growing presence on the curriculum, particularly metallurgy, as we have found in previous studies: see Herrero Fernández-Quesada, *Innovación militar*, cit.; and Eadem, *Educando a Marte*, cit. Since then an in-depth study has been made by A. Aguilar Escobar: *La enseñanza de las investigaciones en química y metalurgia desarrolladas en el real colegio de artillería de Segovia en el siglo XVIII*, BCA, Segovia 2011.

⁹³ Carrasco y Sáyz, *Breve noticia histórica del Colegio*, cit.

⁹⁴ Carrasco y Sáyz, *Apuntes sobre los sistemas y medios de instrucción del Cuerpo de Artillería*, in *Memorial de Artillería*, Madrid 1887.

The publishing activity of the artillery college continued to boost its academic reputation. Only with a bibliographical platform exceptional in Enlightenment Spain like the one provided by the college library could such teaching, research and publishing objectives be contemplated. The greatest innovation, which has been clearly demonstrated, was that teaching at the Alcázar was not approached as a passive or repetitive exercise because, thanks to the collection of books amassed, its content was permanently being reviewed and updated by the artillery officers always up to date with the latest modern scientific and technical research being published in Europe. So, undoubtedly, *there was no shortage of books or money to purchase them*.

Here, I would like to include some brief notes demonstrating the scientific profile and professional versatility of artillery officers, who were permanent users of the library, and the cost-effectiveness of the education they had received¹⁰¹. I will select for inclusion in this article the scientific contributions of just three members of the teaching staff, Captains García de la Huerta¹⁰², Munárriz¹⁰³ and Alcalá Galiano¹⁰⁴. They all perfectly illustrate the cost-effectiveness of education in the arts of war in the 18th century with their intellectual concerns and, in particular, with one aspect they shared: the compatibility of their work as academic translators and as authors of some of the studies and unpublished booklets that were so important in Enlightenment Spain¹⁰⁵. The three were teachers at the same time, posted to the Segovia college during the same period, and they were all driving forces behind the Economic Society of Friends of the Country in Segovia¹⁰⁶, with which they were closely associated. They took on management posts and, above all, participated as active members and authors of nota-

ble and outstanding studies appearing in the *Actas de la Sociedad*¹⁰⁷ and in the publications promoted by the institution. All three of them contributed to its fine academic reputation.

During those years, this group published translations and essays that cannot be ignored when setting out the benefits of the Enlightenment education of 18th-century officers in scientific research and publication and the practical application of this knowledge. As an author, the work of Captain Luis García de la Huerta¹⁰⁸ is of particular interest. He combined his teaching obligations at the college with hours and late nights spent researching a priority issue for the Segovia Economic Society of Friends of the Country and a key issue in Spain and Europe of the time, with a strong basis in chemistry. In 1779, he published his *Discurso físico-anatómico sobre las plantas*, a study of his own on a subject of general, scientific and social interest which had nothing to do with military matters. It was, however, a subject of great concern for Enlightenment reformers seeking to achieve a new model of agriculture and progress in the knowledge and cultivation of plants. As translators, all three men contributed very useful works for scientific publication. The most important of all was by Juan Manuel Munárriz, who noted that he was the first translator into Spanish of Lavoisier's *Traité élémentaire de chimie*, which he published as *Tratado elemental de química*. This was printed in Spain just nine years after its first publication in France¹⁰⁹. With publishing successes like these, news of the abilities of the artillery officers and the reputation of the College soon spread across borders and it became a reference for Enlightenment Europe¹¹⁰. This was not all. The chemist Luis Proust, who was hired as Director of the College's Royal Chemistry Laboratory, allowed Munárriz to publish under his own name in his research work *Anales del Real Laboratorio*, a translation from the French of a report by Doctor Fizes "on the purification of tartar crystals"¹¹¹.

The prolific Captain Vicente Alcalá Galiano is outstanding because of his scientific and intellectual concerns shown in works like the translations of three thematically very different texts focusing on Enlightenment priorities which were very much in line with the work of the Economic Societies. They came in 1786, a particu-

Imprenta Real in 1798. Other important translations by College teachers included one by V. Alcalá Galiano of a work by Mauduit, which appeared as *La meteorología aplicada a la agricultura*, Imprenta de Espinosa, Segovia 1786.

¹⁰¹ Herrero Fernández-Quesada, *Educando a Marte*, cit.; and from a broad and interesting perspective, A. Calvo Maturana, *La oficialidad del ejército y la marina borbónicos: reformismo, fidelidad e identidad (1750-1808)* in *Entre Marte y Minerva*, cit., pp. 467-495.

¹⁰² AGMS, sección 1, división 1, legajo G-1477, expediente personal, Luis García de la Huerta.

¹⁰³ AGMS, sección 1, división 1, legajo G-1477, expediente personal, Juan Manuel Munárriz.

¹⁰⁴ AGMS, sección 1, división 1, legajo G-1477, expediente personal, Vicente Alcalá Galiano.

¹⁰⁵ A. Lafuente and J.L. Peset, *Militarización de las actividades científicas en la España ilustrada (1726-1754)*, in *La ciencia moderna y el conocimiento del Nuevo Mundo*, ed. by J.L. Peset, CSIC, Madrid 1985, pp. 127-147; and Herrero Fernández-Quesada, *Educando a Marte*, cit., pp. 443-466.

¹⁰⁶ Herrero Fernández-Quesada, *Innovación militar*, cit.; Eadem, *Educando a Marte*, cit.; and Eadem, *Sistemas de captación*, cit.

¹⁰⁷ *Actas y memorias de la Real Sociedad Económica de Amigos del País de la provincia de Segovia*, Imp. Antonio Espinosa, Segovia 1786.

¹⁰⁸ L. García de la Huerta, *Discurso físico-anatómico sobre las plantas, dirigido a los agricultores y presentado a la Real Sociedad Económica de Amigos del País de Segovia*, Imp. Antonio Espinosa, Segovia 1779.

¹⁰⁹ Herrero Fernández-Quesada, *Cañones y probetas*, cit., section *Frutos*.

¹¹⁰ Eadem, *Educando a Marte*, cit.

¹¹¹ L. Proust, *Anales del Real Laboratorio*, Imprenta de Espinosa, Segovia 1795. Report published in vol. II, pp. 89-103.

larly fruitful year for Alcalá Galiano: two from French and one from Italian. The officer's choice of works to translate reveals something of the officer's profile and education. He produced Spanish versions of three texts then circulating in Europe, which appeared as *Memoria sobre los diferentes modos de administrar la electricidad y observaciones sobre los efectos que estos diversos modos han producido*¹¹² originally by the Frenchman Mauduit; *La meteorología aplicada a la agricultura*, originally by Abbé Josef Toaldo¹¹³ and an interesting report absolutely in line with Campmanism which came out as *Ideas sobre la naturaleza, forma y extensión de los socorros que conviene dar a los enfermos pobres en una ciudad populosa*¹¹⁴. In addition to translations, it is appropriate to mention one of his own essays, which was in keeping with his interests and those of most members of the SEAPS, entitled *Preservativo seguro de la enfermedad del trigo comunmente llamada niebla o tizón*¹¹⁵. This work is an in-depth study of agriculture, one of the great concerns of Enlightenment figures and the economic societies, which was the subject of a great deal of research in late 18th-century Spain¹¹⁶. It was always present in Galiano's work, emphasising its key importance for a State's future economy. This he demonstrated didactically with allegories, such as: "The State is a tree; its roots, agriculture; its trunk, the population; its branches, industry; and commerce itself and the arts are its leaves"¹¹⁷. Captain Alcalá Galiano devoted a good part of his life to the new "political economics", an increasingly important discipline at the time but which was barely developed in Spain¹¹⁸.

¹¹² *Memoria sobre los diferentes modos de administrar la electricidad y observaciones sobre los efectos que estos diversos modos han producido*, Mauduit, translated from the French by Captain Vicente Alcalá Galiano by order of the RSEAP of the province of Segovia, Imp. A. Espinosa, Segovia 1786. However, Galiano was not content to remain a mere translator. Encouraged by the Head of Studies of the College of Artillery, Pietro Giannini, he experimented with a local man from Segovia suffering from mobility difficulties using treatment involving the administration of electricity. See Herrero Fernández-Quesada, *Cañones y probetas*, cit., note 119.

¹¹³ Abate J. Toaldo, *La meteorología aplicada a la agricultura*, translated from the Italian by Captain Vicente Alcalá Galiano, Imp. A. Espinosa, Segovia 1786.

¹¹⁴ Translated from the French by Captain Alcalá Galiano, Imp. A. Espinosa, Segovia 1787.

¹¹⁵ Published in Segovia, Imprenta de Antonio Espinosa, 1788.

¹¹⁶ Herrero Fernández-Quesada, *Sistemas de reclutamiento*, cit.; and Eadem, *Educando a Marte*, cit.

¹¹⁷ V. Alcalá Galiano, *Sobre la industria en general y sobre los medios de promoverla en esta provincia*, in *Actas y Memorias de la Real Sociedad Económica de los Amigos del País de la provincia de Segovia*, Imp. A. Espinosa, Segovia 1785, pp. 55-73. The report is dated 1781.

¹¹⁸ V. Alcalá Galiano, *Sobre la economía política y los impuestos (Segovia 1781-1788)*, publication and initial study by J.M. Vallés, BCA, Segovia 1992.

All these results and achievements based on the profuse publishing activity of the College of Artillery depended on the scientific and military library put together in the Alcázar. Once again, this climate and the activities of this group of Enlightenment figures extended beyond the walls of the Alcázar and the boundaries of military life. In fact, the Segovia academy was a top-class centre for publicising experimental science in Spain, channelling results and studies through the Segovia SEAP, which included a high percentage of teachers from the college¹¹⁹. Military academies, still without a civil alternative, acted as scholars, producers and publishers of the new scientific theories¹²⁰.

4. CONCLUSIONS.

In the context of Bourbon military reform policy, Charles III arrived in Spain in 1759 surrounded by a multidisciplinary group of trusted Italians bent on resolving outstanding military matters and completing a new military model. Count Gazzola was recruited to hold the same powers he had enjoyed in Naples and to successfully establish the artillery, with the founding of the Royal Corps and the Segovia college, together with the State takeover of the military factories. This was to be achieved by having artillery officers scientifically and technically trained as industrial engineers. The mission to found the artillery college was the Count's passion. A man steeped in Enlightenment ideas, particularly when it came to teaching, he took on the challenge of scientifically and militarily training officers who would stand out for their elite education, enabling them to take responsibilities far beyond merely firing a cannon. In this enterprise, because of Gazzola's Enlightenment profile and education, the formation of the main teaching department, the college library, was particularly important. It was installed in an exceptional room, the Kings' Hall in the Alcázar.

This and the inside information he was already collecting in Naples were decisive for the way he started to compile the college library based on collections from three previous institutions in Barcelona, Cadiz and Madrid. However, this study has shown that the true

¹¹⁹ J.M. Sánchez Ron, Foreword to J.L. García Hourcade, *La meteorología en la España ilustrada y la obra de Vicente Alcalá Galiano*, BCA, Segovia 2002.

¹²⁰ This same conclusion was reached by A. Lafuente and A. Mañuecos when they studied the Marine Guard Academy in Cadiz in their now classic book *Los caballeros del punto fijo. Ciencia, política y aventura en la expedición geodésica hispanofrancesa al virreinato del Perú en el siglo XVIII*, Serbal, Madrid 1988; and J.L. Peset in various studies, the last of which was *Melancolia e Ilustración. Diálogos cervantinos en torno a cadalso*, Abada, Madrid 2015.

origin of these collections was the magnificent library provided for the Royal Military Mathematical Society in Madrid by the Count of Aranda. This was a short-lived project to establish a centre for research and the publication of teaching materials for officers of the expert corps: engineers and artillery. Its collections were later divided between the Cadiz and Barcelona schools of artillery which, having been closed due to the establishment of the college in Segovia, passed on their valuable collections of books at Gazzola's request.

Within the college, the priority attention given to the library can be seen in its first ordinance, first handwritten and then printed in 1768. This founding text setting out the route map for the military academy sets aside considerable space for the library's organisation. Specifically, throughout Title V we find all the aspects Gazzola considered to be important for organising the library, as well as provisions relating to the security of the book collections and economic considerations – the library's budget for maintenance and growth. We are informed of this in the handwritten catalogues that survive today in the library of the current Academy of Artillery and which allow in-depth knowledge of this select collection of books: its organisation; the reference system (shelf, table, number) which still exists; and the nature of its military and scientific collections. But its most important contribution has been allowing us to definitively link the existence of this library to the promotion of its own production of textbooks, research works and translations of scientific works by the teachers, to such an extent that the library and the publishing arm of the college were responsible for a notable boost to the academy's reputation.

The profile of the Enlightenment artillery officer, so often discussed, was forged among the shelves of that magnificent scientific and military library. The Crown's investment in founding the Segovia academy, and particularly in forming such an important library, brought benefits beyond all expectations. This bibliographical support available to teachers at the Alcázar, boosted the academic reputation of the College, which was also known in Spain and internationally for its publishing activity, as its books were in demand throughout Enlightenment Europe.

The College's scientific and technical activities, as well as teaching, were based on the library and their results were projected in its own publications. These included research works sent to press by the college's own teachers, which undoubtedly boosted its academic reputation, and translations of European scientific works necessary for teaching and disseminating scientific knowledge among the future artillery officers studying there.