

HISTORICAL AND ARCHITECTURAL STUDY OF A LATE BASTIONED FORT: SAINT JULIAN'S FORT IN CARTAGENA

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ABSTRACT: *Late bastioned fortifications are rarely studied in Spain because, in the majority of cases, they are a part of heritage which have been included in the restricted access infrastructures of the Army.*

The current reality of late bastioned heritage is poorly known and requires rigorous study by applying a methodology that is in keeping with the object of study and one that stimulates those exclusive parameters which this singular legacy possesses: its links with territory, its overall size, the importance of its proportions and geometrical shape or the survival of traditional building techniques which live alongside the latest technology.

In an attempt to establish a methodology for the study of historical architecture, which had been inspired by former work carried out by the Loggia Group on the eighteenth-century bastioned fortresses in Cartagena under the direction of Juan Francisco Noguera, this article focuses on late bastioned fortifications which stand alongside contemporary ones.

A singular specimen, which the Fort San Julian in Cartagena undoubtedly is, has been chosen as the object of this study, thus fulfilling a twofold objective: to test the abovementioned heritage analysis methodology and to highlight this neglected milestone of heritage from Cartagena.

KEYWORDS: bastioned fortresses, tenailed fortresses, perpendicular fortresses, Cartagena, Saint Julian fort, heritage, military history

1.- INTRODUCTION

The work presented in this article includes part of the author's thesis and, to a certain extent, completes the whole of the preceding research undertaken in *Cartagena* in the framework of the research grant awarded by the Ministry of Science and Technology and related to outer bastioned fortresses of Cartagena Bay, under the guidance of Professor *Juan Francisco Noguera Jiménez*.

Among the group of the outer fortresses at Cartagena Bay, the one popularly called "*Saint Julian's Castle*" stands out, a strange fort which rises up on the eastern side of the city, in a similar state of neglect, but turned into a simple plot for a forest of communication antennae which are anchored to its stonework, and whose uncertain future is under debate in ongoing negotiations between its current owners, *Telefónica*, a *Spanish Telephone Company*, and the Public Administration, especially the *Cartagena City Council*, which hopes to restore it for the city.

While these debates go on, this solid construction awaits; visited only by those passers-by ready to enjoy the magnificent panoramic views of the bay which can be enjoyed from its slopes.

Saint Julian's Fort attracts special attention because of its singularity, besides its evident historical value as a building which has survived the most important events taking place in the city in the last two centuries. Its singularity made it tempting to test the research method applied in previous studies, like that of the Fort of Galeras, especially in the relevant compositional section. The presence of bastioned fronts in such a late construction, and the use of certain architectural elements, such as tenailles and caponieres, aroused the author's curiosity to discover whether the geometric compositional method of the major theoreticians of bastioned fortifications had possibly survived to offer such a late architectural work. In the meantime, it was also interesting to discover to what extent building techniques had changed since then.

But this obvious direct practical result, that of verifying a historical and architectural analytical method, and its specific application to the detailed knowledge of *Saint Julian's Fort in Cartagena* in order to evaluate it, derives from another theoretical interest; that which emerges in parallel with the study undertaken by the author, but not included in this article, which is none other than that of in-depth research into fortification theories in the last era of bastioned fortresses in order to settle the debate of their deficiencies and the birth of new means of fortification.



Figure 1: Plan of the location of Saint Julian's Fort on the Cartagena Bay

The case of Cartagena, a key military stronghold in Spain, enabled the repercussions of this international debate, specifically in the case of Spain, to be studied, which resulted in a fortification. Thus this is an attempt to recover the national and international historical sources from this period in which we can still find the last bastioned fortresses in the Iberian Peninsula, which span from the end of the eighteenth century to the middle of the nineteenth, a period which would gradually pave the way for armoured fortifications.

At an intermediate stage, hopes were pinned on offering a new historical and architectural vision of the development of fortresses, particularly in the case of the city of Cartagena, whose history, although recounted in numerous sources, is seen as a developing sequence of decisions and actions which end up leading to and justifying the building effort which, with the Defensive Plan of 1860, led to the said fortress materialising on the heights of Saint Julian. The author considers this approach necessary to avoid appraisal of the Fort to be seen from an exclusive point of view, because a fortress should never be understood merely from its construction particularity given its marked territorial character and its prominence comprising a set of buildings. In other words, the possible individual architectural value that the different military buildings in Cartagena may have, is multiplied by their interrelationships. Although Cartagena does not offer us individual military architectural jewels, it has one of the most complete defensive complexes in the Mediterranean. And now that the time has come to research it in depth, we need to carry out the study with a process that lies between a global study and individual accuracy.

2.-METHODOLOGY

According to the experience gained from the Castle of Galeras pilot scheme, the aim is to not only discover the conceptualisation, design and construction processes and analyse the efficient military theory of the layout and the architecture of its chief elements of this late fortress of Saint Julian by including knowledge of the intervening agents (the military engineers, architects and craftsmen who took part), but to also spell out the overall architectural and theoretical debate which allowed a fortification of this kind to see the light of day.

Thus, this research implied having to consolidate several processes:

-The conceptualisation process entailed learning about the authors of the most important projects of their day, their education and the military treatises which influenced them, and then compare them with military theories and other similar fortresses.

-The design process involved unveiling all the different historical plans, corrections, rejections and adaptations to the terrain, their authors, the typologies and the architectural elements employed, and acknowledged influences.

-The construction process meant researching, learning about and graphically expressing the construction of the fortress by stages, including all the incidents. This was possible thanks to the reports issued by the supervising engineers. This process had to reveal the techniques used for laying out, building foundations, walls, curtain-walls, bastions, vaults, etc.

-Analysis of the layouts and their adaptation to the military theories of the time entailed comparing the layout derived from both the graphical surveys and contemporary military treatises, and studying the fortress in the light of the military maxims in these treatises.

-Analysis of the ornamental architectural elements involved also studying these elements in the light of the treatises which, in many cases, were of a civilian kind.

To go about this, the following steps were taken:

2.1. General and specific bibliographical search

Research work with the bibliographical references related to each section of the research. A preliminary bibliographical research was required which took us to the major national archives. We starting this research work in the nearest library collections, such as the Library of Valencia, Military Intermediate Archive, the Library of the Royal College of the Pious Schools, etc. At the same time, unavoidable references were sought in the National Library, the General Archives of Simancas, the Military History and Culture Institute, the Naval History Institute, the Army's Geographical Service, the Library at the Royal Academy of Fine Arts of San Fernando, the General University Library of Salamanca; the Municipal Archive of Cartagena, the Military Archive of Segovia, etc.

It was also essential to refer to the French National Library to seek French sources given the influence of some of their treatises on Spanish military architecture of the eighteenth and nineteenth centuries.

The material which resulted from this stage may be summarised as the location of bibliographical sources and the drawing up of an exhaustive bibliography.

2.2.-Documentary completion of the data consulted during contextualization¹

Prior to taking on the detailed study of the Saint Julian Fort project, it was necessary to determine the analytical parameters. To do this, we had to specify not only the academic theories on fortification, but also the possible foreign influences, analyse the treatises deemed most important at the time, and investigate the extent to which they had some bearing on the work of those engineers who worked in the peninsula by clearly identifying their work routes and the influences of certain people who occupied key posts (Ministry of War, Head of Fortifications, Director of the Military Academy, etc.) who, in one way or another, would have supervised and had some bearing on the way the works were done. The context in which the engineers were to work had to be established as we are aware that political and war events have a direct effect on priorities when undertaking different defensive constructions

2.2.1.-Political Contextualisation

This stage will consist in taking into account the political events which occurred in the eighteenth century and at the beginning of the nineteenth century marked by international tension which reactivated war policies accompanied by major economic efforts

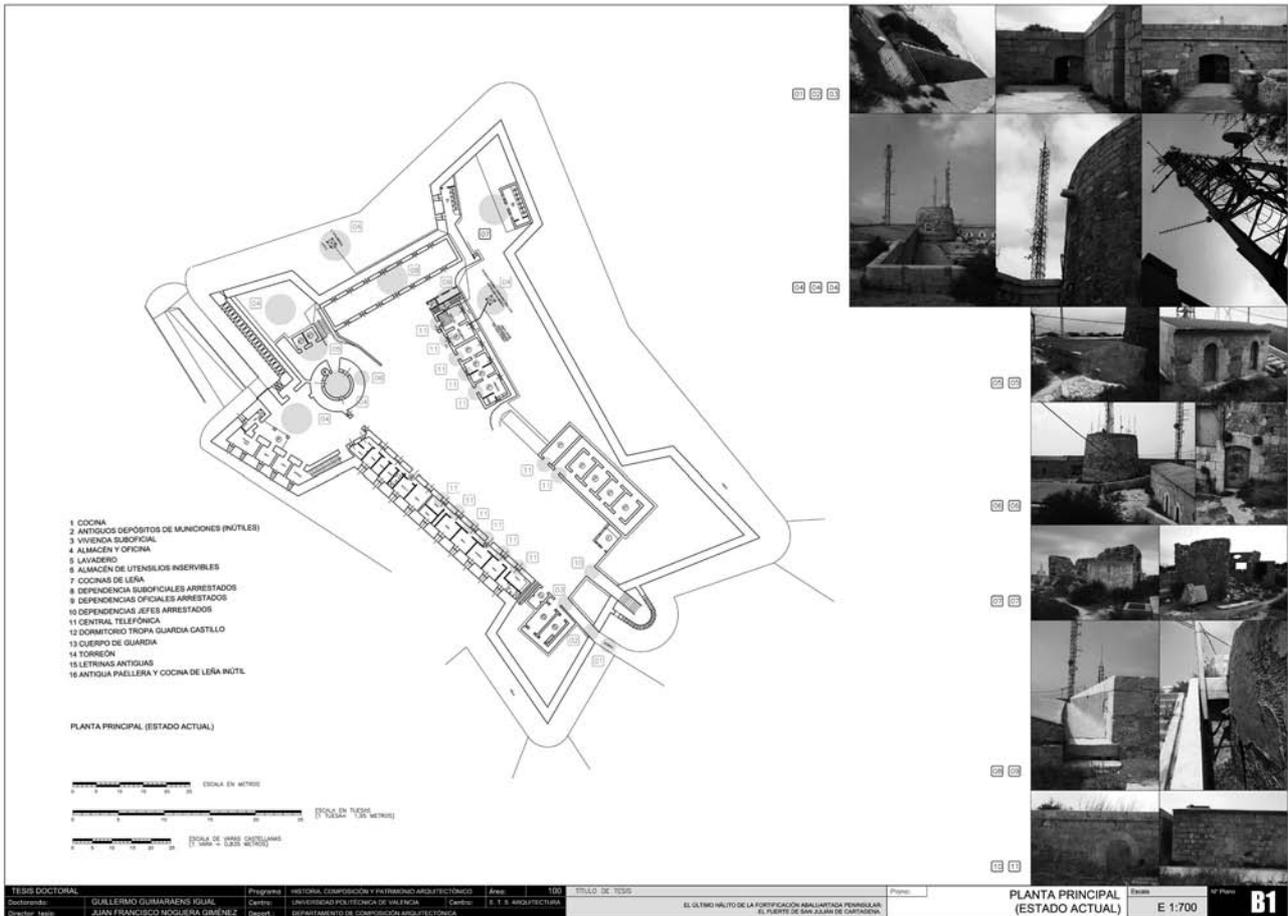


Figure 2. Plan of the current state of Saint Julian's Fort

designed to boost the military machine, particularly to reinforce the country's defensive aspects

2.2.2.-Academic Contextualisation

This stage will consist in establishing the basic characteristics of the academic training of various experts who would subsequently manage the projects devised for the various bastioned fortresses. Here we will examine the aforementioned influences of the treatises of that time and all the peculiarities characterising projects and constructions which gave rise to eighteenth- and nineteenth-century military constructions.

2.2.3.-Terminological Contextualisation

This will involve carrying out an in-depth study of the terminology required to understand this particular architecture. The development of a database program, plays a key role in supporting this contextualisation work, and comprises several of the above-mentioned interactive bibliographical fields (bibliography, terms, interventions, bibliographies, citations, archives, dates, etc.).

2.3. On-site research for the graphical survey of its current state

Among the on-site research activities in accordance with the studies done to understand and raise awareness of the military heritage of Cartagena under Juan Francisco Noguera's guidance and the author's coordination, a field workshop was organised at Saint Julian's Fort in September 2004, in which students from the Valencia University College of Architecture took part, which followed on from previous

years' events that had focused particularly on the Castle of Galeras in 2002 and on Fort Navidad in 2003.

The aim of these workshops was to introduce students to military heritage. A series of theoretical classes were given at the College which covered general aspects of military architecture and an approach to Cartagena's heritage. These theoretical classes were followed by three on-site sessions in which students could experience 'in situ' the theoretical notions covered while being offered the chance to become familiar with surveying techniques by learning how to handle the laser telemeter on the plane table, and how to record different architectural elements using freehand sketching. It must be stressed that this research benefited in part from making small-scale measurements during those sessions. Notwithstanding, it has to be emphasised that all the graphical survey work was carried out exclusively by the author, as were the corresponding photographs, photographic rectifications, and even the three-dimensional measurements taken of the complex, which could only be undertaken reliably with the theodolite². At the same time, the inconsistency of some of the measurements provided meant it was impossible to rely on their accuracy as most of them had to be checked one by one.

2.4. Data interpretation, drawing up final plans and the artist's impressions of the work stages

In this section, together with the unique graphical survey of the fort's current state, as mentioned in the previous section, it was necessary to make the corresponding comparisons by graphically superimposing the various historical projects, detailed studies, and

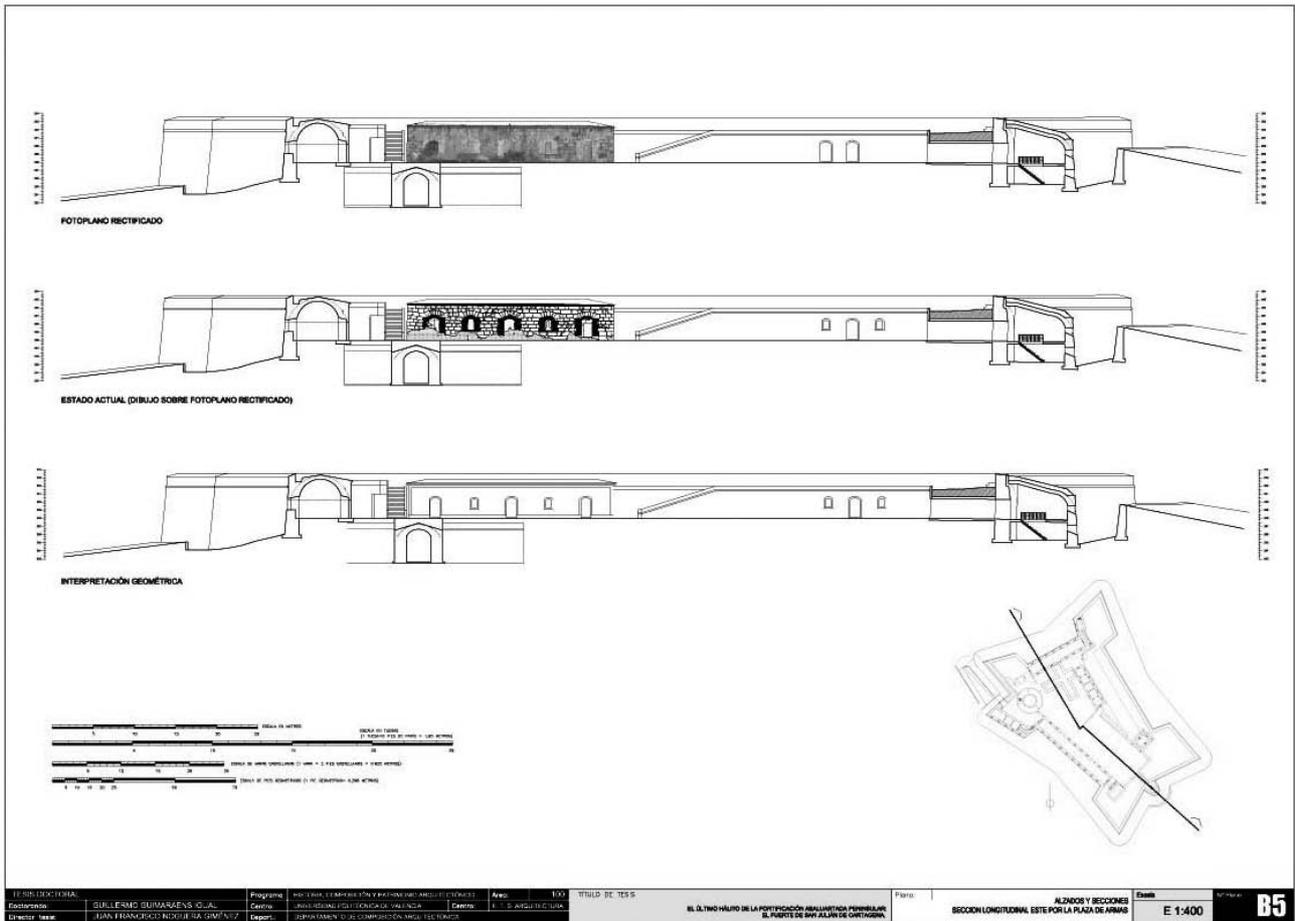


Figure 3: Cross sections of the parade ground and the caponiere, where an elevation with a rectified aerial photograph of its current state and its idealisation are superimposed.

especially the examinations done of the compositional layouts, to discover whether some underlying theoretical metric prescription still remained in the mid-nineteenth century which is only identifiable by graphically studying the layouts given the lack of any revealing statement recorded in the written sources.

2.5. Drafting or carrying out the final work

3.- CONCLUSIONS

Based on the study undertaken, a series of conclusions has been drawn which relate either directly to *Saint Julian's Fort* or indirectly to the studies previously undertaken on other buildings, such as the *Bastioned Fort of Galeras*.

Thanks to former works, we may relate the conclusions drawn at the same time, which may even grow as comprehensive knowledge of the rest of the outer fortresses of Cartagena deepens.

The most outstanding aspects are the following:

-By researching the *project and building process* of this nineteenth-century fort we have managed to bring to light all the projects drawn up for this fort, which include the definitive project, discovering the date of its conception, as well as the start and completion dates of its construction, which have enabled us to learn its progress over the years. For us, a link between the project and the engineer responsible for it has been crucial, and from this link, a series of manuscripts have provided us with an accurate account of the various incidents which took place during the construction stage. The documents

of the various projects proved particularly interesting to discover proposals dating back to 1766, such as that of *Pedro Martín Paredes Zermelo*, until the definitive ones, the work of *Manuel Jácome*, dating back to 1866. With an ideal bastioned proposal to a hybrid one which combines aspects of the bastioned layout with the so-called perpendicular fortification, we discovered a set of projects which reveal a late debate surrounding the bastioned layout which dated back to the close of the eighteenth century, and which provide thought-provoking proposals such as that contained in the *Medina report* of 1860. In the case of *Saint Julian's Fort*, the outcome allows us to understand the links between Spanish and French military engineering in the mid-nineteenth century when a decision was made to resolve the problems of the bastioned system within the system itself. Even though this debate took place later in Spain compared to what happened in Europe, it enabled us to uncover proposals which resembled the German polygonal systems, and used continuous curtain-walls, tenailles, caponieres and counter-scarp walks, like those of the *Medina Project*. Such information therefore reveals how some *Spanish authors were not averse to innovation* and took a neutral stance in the theoretical debate in an attempt to benefit from the different defensive systems which arose at the beginning of the nineteenth century.

Although the reports of engineer *Manuel Jácome* provided us with information about the disadvantages he faced, his decisions, and issues relating to the workmen and the sociological aspects of the construction, compared to reports from previous centuries, they indicate that *the rigorous content of previous engineers* had been lost, which revealed a change in the means of administering works and reporting them in the mid-nineteenth century. Although a certain

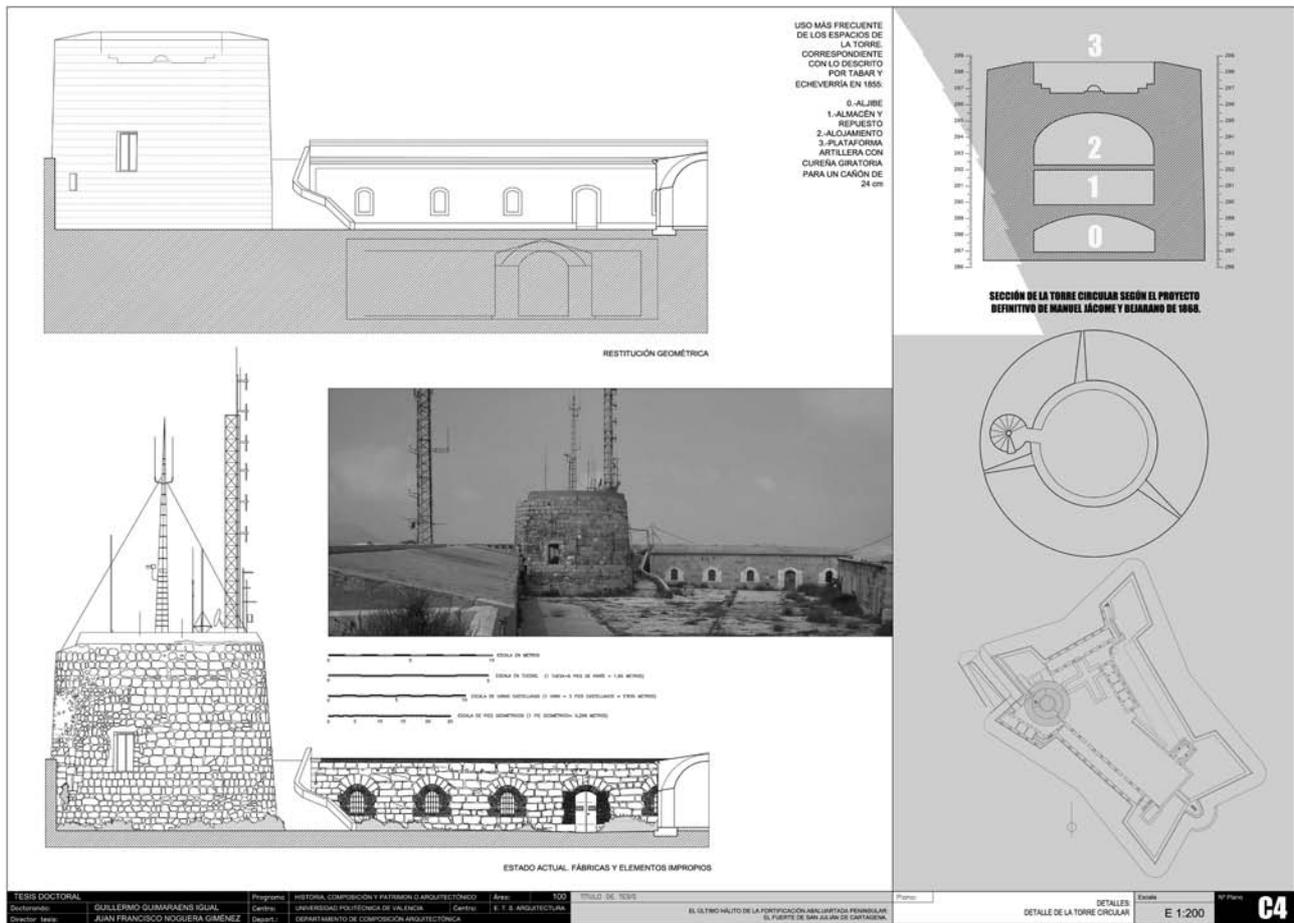


Figure 4: Details of Saint Julian's Fort's circular tower

continuity in addressing the works was detected, which had not been previously recognised since we are aware that, once the project had been defined—a stage at which all kinds of exchanges of opinion and even corrections from the highest authorities took place —, work commenced without any doubt as to who should oversee them. Such doubts arising when defining the works supervision, traditionally taken care of by the site engineer, and being detected at preceding times, should not characterise a different way of understanding their planning, rather a typical situation relating to a specific time while constructing forts in the city of *Cartagena*, from the year 1770 onwards, when a triumvirate shaped with three people in charge: *Francisco Llobet*, who arrived in Cartagena by the King's orders, *Pedro Martín Zermeno*, as brigadier engineer of the *Royal Armies and Strongholds*, and *Mateo Vodopich*, director of the works.

In the case of Saint Julian's Fort, the *definition of a single person* in charge avoided disputes arising from insufficiently delimited powers.

It must be highlighted that should a *loss of textual information* be detected in the comparison made with the reports of Vodopich at the end of the eighteenth century, the same does not apply in the graphical information, which had considerably extended with all sorts of plans which show the different sections and elevations of the construction. Some technical plans were defined with a simple linear layout in the style of contemporary technical drawings, and which lost a complete set of plastic properties that characterised preceding planimetries, thus converting them into veritable works of art with no loss of technical content as they resorted to not only coloured lines to simultaneously provide about pre-existences and

planned work, but also to the planimetry and altimetry by providing shading and by even using coloured tints to identify typical elements; an development in representational techniques as shown in the sequence of plans found with proposals for Saint Julian's Fort.

The prestige of theoretical and practical training that characterised military engineers continued in the mid-nineteenth century when it was discovered that a military engineer was an expert similar to present-day architects, well versed in design techniques and graphical representation, with extensive knowledge of mathematics and calculus, in financial management and site organisation. They also thoroughly understood several building-related trades, and even more so, if this were possible, to earlier techniques in which the authorship and responsibility of the different "masters", who had been identified by name in the 18th century, was acknowledged for certain aspects of the works, such as ornamental masonry details, execution of vaults and staircases, etc., which, on this occasion, diminished with the presence of the Supervising Engineer. A fact that may be attributable to either the reality of an engineer who monitors all the processes, or to a bureaucratic matter which enabled the engineer to not specify certain minor responsibilities which derived from the previously mentioned change in the accountability system. The fact that the engineer was no longer directly accountable to the King or to the Secretary for War— which happened at the end of the eighteenth century— but resorted to an intermediary, such as the Captain General of Valencia, seemed to attenuate the weight of responsibilities handed down through the chain of military command to a certain extent. The absence of proper names that stand out in the masonry work was also directly attributable to the inexistence of artistic work as such, which had gradually been

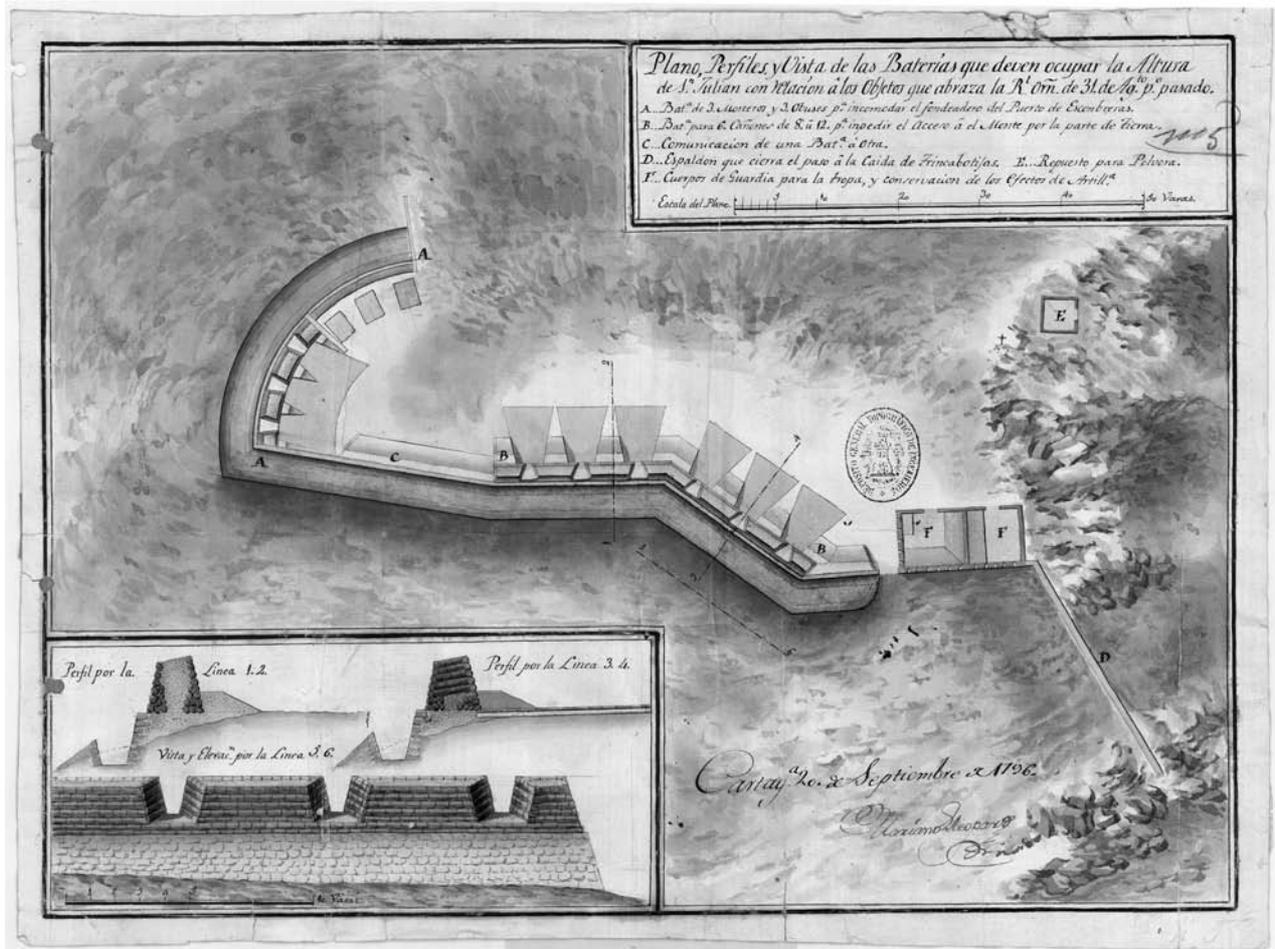


Figure 5: Mariano LLOPART and Juan José Ordovás. Plans, profiles and view of the batteries that must occupy the height of Saint Julian in relation to objects that the R.O. of 31.8. ult. Cartagena, 20 September 1796., Cartagena, San Julián 1796, no scale (n. sc.) SHM (Servicio Histórico Militar) Sign. (Signature) 2657.

displaced from military architecture. The lack of thought-provoking metric studies on the language of gateways or the definition of orders used, albeit diminishing the richness of the compositional study and the influences of treatises, which could be taken from forts such as that of Galeras, built in the 1870s, has enabled us to learn how the state of the issue changed from the mid-nineteenth century when military forts were strictly seen as an exclusively functional object in which ornaments had no place. This attitude was corroborated on examining the content of the military treatises which emerged in the nineteenth century, and with the forging of the pragmatic spirit of engineers who, transformed into civil engineers, were to contribute the main achievements to the history of architecture at the end of the nineteenth century while architects were still engrossed in their dialectical debate immersed in eclecticism.

Consequently, the comprehensive education of nineteenth-century engineers is corroborated, which combines theory and practice and unites geometric composition, and was so influential in preceding centuries with the transcendent parameters of functionality and attention to location. Saint Julian's Fort is very surprising as it shows us how bastioned designs were still valid in the 1860s, albeit impregnated with distinguished elements related to the perpendicular and circular fortifications of Montalembert. Although on the one hand we find a compositional need to adapt the proportions of the bastioned front, on the other hand we come across shapes that were perfectly set in their location with absolutely no qualms about them being distorted for this purpose. The degree of proportionality that the bastioned front preserves, speaks of adaptations to pre-existing structures. Therefore, we can determine how Saint Julian's Fort became a work that not only adapted to the location, but also to

designs.

The type that Saint Julian's Fort portrays could be defined as an irregular oblong, or trapezium, derived from the layout of Saint Julian's plateau, which adopted the pre-existing irregular-shaped battery whose defining feature was a round tower, seen as a timid vestige of the circular Montalembert theories, appealing to the superimposition of fire and the priority of artillery power. The small-sized tower was only justifiable in relation to the forces which it had to confront, that is, those that could barely reach the top of the next hill, Calvary, to face it.

By observing the difficulty of adapting the definitive design of the fort to that of the pre-existing battery— despite being the way that Jácome recorded it with an attached planimetry—several different conclusions may be drawn: either the documentation of the pre-existing structure is inaccurate, or the state of its dereliction, when Jácome speaks of “an adaptation”, leads us to interpret a “relative” respect which takes advantage of piles of earth and fascines and already made excavations from preceding moats, and not a reliable exact superimposition of the geometrical lines. This hypothesis would be extremely interesting to define how Jácome himself chose the bastioned design for the three fronts of the Fort by resorting to rules of proportionality which, as we have seen in the studies carried out, approach some designs put forward by several late eighteenth-century treatise writers, especially of the western front and the design of its moat, whoever they were: Larrando de Mauleón, Sebastián Fernández Medrano or Mateo Calabro himself. This peculiar coincidence in the treatise designs of a bastioned front compared with the “proportional” distancing which occurs in the remaining fronts, derives directly from an “excessive” lengthening

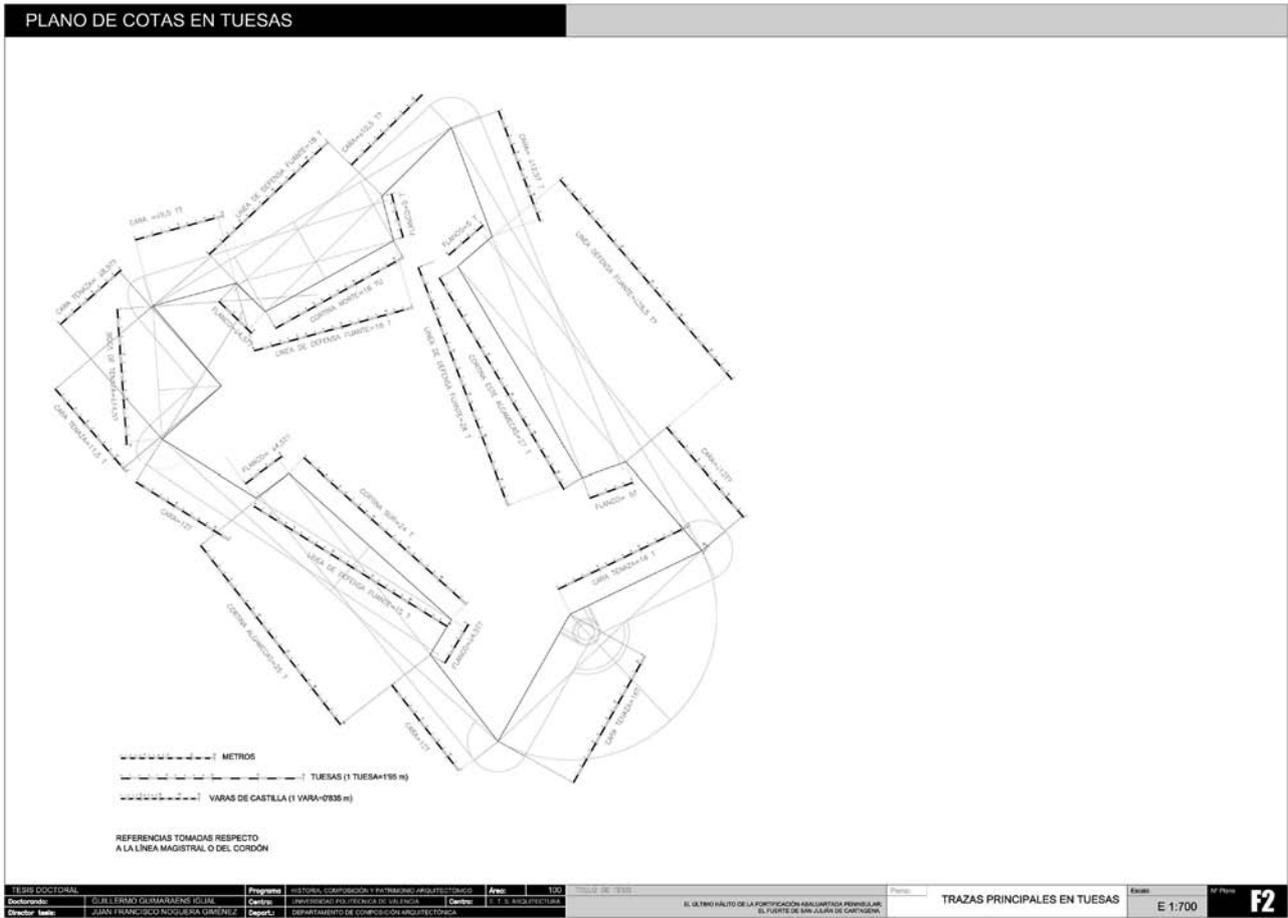


Figure 6: Plan of the layout with dimensions in tuestas

of the curtain-walls. This is the engineer's attitude who treats the bastioned front as though it were geometric interplay, an interplay in which idolised elements such as the bastion itself, survive. As the engineer-author himself showed by using tenailed fronts, the bastioned facade seemed senseless when the ranges exceeded the limits of the fortification. This excess justifies him not having any qualms about lengthening the size of the curtain-walls so that the construction included Saint Julian's plateau, and he brusquely put a swift end to those criteria of proportionality which were respected on the western front. This overcoming of geometric rigour, as opposed to adaptation to location, which had been used in works in Cartagena at the end of the eighteenth century, Galeras for instance, is unusual when posed as a problem in the mid-nineteenth century. However, it is corroborated in documents when the 1865 Inspection Committee saw the need to make the Santa Lucia bastion larger, that is, the Northern or North-western Bastion, and suggested, in turn, rotating the ogee corresponding to the eastern tenaille. In other words, making the parade ground link to the tenaille with a rectangular layout whose directrix would be parallel to the southern curtain-wall and the capital of the tenaille in order to provide access to the ramparts and to increase the capacity of the parade ground.

As we have seen, even the Committee Members had the features of the bastioned tradition as a reference point to explain the requisites of the fortification, which proves how deeply rooted this tradition was. Then there were close links between the Spanish experts and the French academic authorities who always worked according to the bastioned precepts which defined the Modern French Fortification. In this sense, these links become quite clear when, in the research work, Colonel Bernáldez's testimony is provided, which

acknowledges these links at the time and who noted the exchange of information with Paris and the difficulties in obtaining information about German techniques.

It is difficult to establish the direct influence of a treatise, which was the case of the Galeras Fort, where a specific influence of Father Cassani's Fortification Method was found, corroborated by the physical existence of a text among the archives stored at Cartagena from that time which confirmed the inaccuracy of other treatise references. In the case of Saint Julian's Fort, the opposite occurs. It appears that the layout was similar to those of treatise writers, Larrando, Fernández Medrano and Calabro, and left aside Cassani's proposals. This situation may have certain logic when we observe how treatise writers as a whole constituted a clear reference for military academy education management in Spain, specifically the Academy of Mathematics in Barcelona. It could be called inherited information which, without doubt, led to academic education in Guadalajara, where Jácome has been proved to have come from, thus betraying the truth that this Academy perpetuated the works of the Barcelona Academy.

As previously mentioned however, this geometric rigour was relative, and functional, and adaptation to location took pride of place. Now we raise the tactical issues put forward in an attempt to understand why bastioned defences were still being resorted when other types of design were known, such as perpendicular defence, which was used for Saint Julian's eastern front. It would appear that the *raison d'être* for this typological change was owing to exceeding the ranges and the strengthening of distant defences. Regarding the latter, which lay mainly in the hands of the artillery, was supported at short range

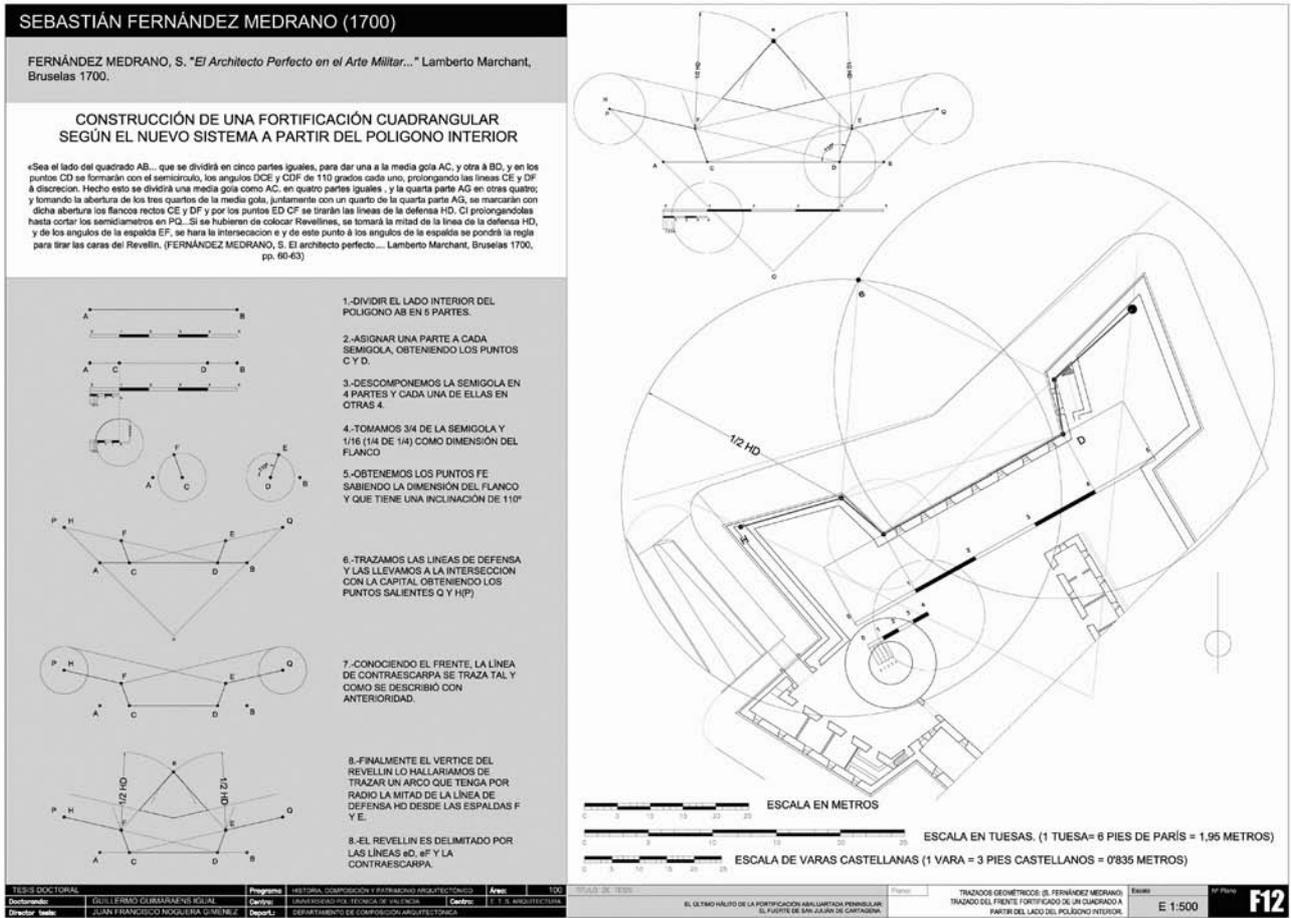
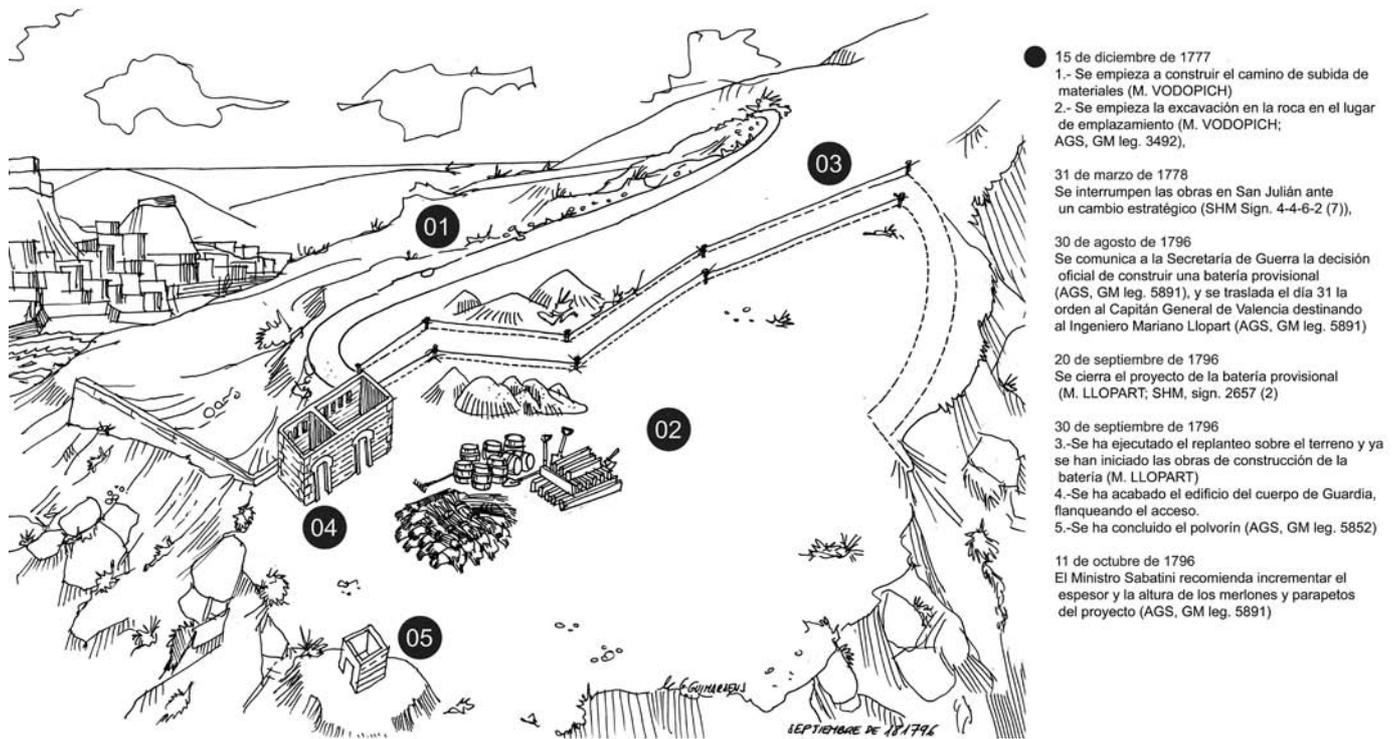


Figure 7: Geometric layout of the bastioned front according to Fernández Medrano's provisions (

by rifle fire, and hopes were pinned on taking advantage of new ranges and accuracy and on avoiding inconsistencies which, in an effort to maintain the advantages of flank fire, ended up crossing the capital line of the bastions, with the material barrier that this would entail. Therefore, bastions disappeared to strengthen tenailles with the intervening caponiere and with flank fire shooting limitlessly. It was senseless establishing a line of defence on a fort like that of Saint Julian as this was considerably lower than the gun range. Something along these lines was suspected when, at the end of the eighteenth century, the small fort was studied, as opposed to the huge Royal fortresses, which could then be extended to all kinds of fortifications. Nonetheless, it is also logical that this limitless shot projection was not necessary when nothing lay beyond the bastion, which occurred, for example, in mountain fortifications next to cliffs, which was precisely the case of Saint Julian's Fort. Bastions were still efficient if they continued to form a tenaille. Even if in this way the choice of the bastioned front can be justified for the western and southern fronts, be it debateable as I explain later, it is not so clear for northern fronts where the north-eastern bastion is indeed a possible visible barrier in the direction of the Calvary headland, this being the only viable access point from land for the summit of San Julian. If to this we add that the Montalembert perpendicular system theories had shown both the shortcomings of the bastioned front and the improved behaviour of the tenailed front, where the tenailles' faces ideally took on flanking roles, with considerable savings in material because it cut down the design of the main line, then the choice of Saint Julian's final design is disconcerting, especially since previous more innovative projects existed, like that put forward by Tabar and Echeverría. This reality, which opted for the bastioned facade, supported by the 1865 Committee's reaction, corroborate

the weight of the bastion tradition in Spain, widely influenced by theories originating in neighbouring France, and which continued to accept a layout whose obsolescence was in question, which reveals that, above all, what was familiar was prioritised, with the added advantage of maintaining nomenclatures and design systems as opposed to the economic and functional advantages that other systems offered but were still frowned at with some scepticism.

This, our case of Saint Julian's Fort, is extremely surprising when metric issues are considered. Such issues are transcendental when dealing with studies involving architectural geometric composition and proportions. When the metric system was launched in Spain by law in 1849— and despite the impacts of its implementation taking place throughout the nineteenth century —, military engineers prepared themselves for the new system with certain ease because, if we consider that this system unified measurements with the French system which they were already using. Thus, these measurements were not unknown to them and, besides, they could read these measurements directly given the references to treatises. The Jácome plans are shown with metric scales, which is quite enlightening as far as the measurements that the project's author used are concerned. However, we are taken aback when taking metric readings from the site survey and by checking, as with Galeras, that some measurements, by chance, match with amazing accuracy, and no longer contained the whole numbers in Castilian yards of the Burgos standard—which would have been the official metric unit which preceded the metre in the decimal metric system —, but in French tuesas. The fact that this fortuitous and unexpected coincidence occurs means that we may assume that the geometrical *raison d'être* in Saint Julian's design was much more far-reaching than initially



- 15 de diciembre de 1777
 - 1.- Se empieza a construir el camino de subida de materiales (M. VODOPICH)
 - 2.- Se empieza la excavación en la roca en el lugar de emplazamiento (M. VODOPICH; AGS, GM leg. 3492).
- 31 de marzo de 1778
Se interrumpen las obras en San Julián ante un cambio estratégico (SHM Sign. 4-4-G-2 (7)),
- 30 de agosto de 1796
Se comunica a la Secretaría de Guerra la decisión oficial de construir una batería provisional (AGS, GM leg. 5891), y se traslada el día 31 la orden al Capitán General de Valencia destinando al Ingeniero Mariano Llopart (AGS, GM leg. 5891)
- 20 de septiembre de 1796
Se cierra el proyecto de la batería provisional (M. LLOPART; SHM, sign. 2657 (2))
- 30 de septiembre de 1796
 - 3.- Se ha ejecutado el replanteo sobre el terreno y ya se han iniciado las obras de construcción de la batería (M. LLOPART)
 - 4.- Se ha acabado el edificio del cuerpo de Guardia, flanqueando el acceso.
 - 5.- Se ha concluido el polvorin (AGS, GM leg. 5852)
- 11 de octubre de 1796
El Ministro Sabatini recomienda incrementar el espesor y la altura de los merlones y parapetos del proyecto (AGS, GM leg. 5891)

Figure 8: The construction stages of the fort between 15 December 1777 and 11 October 1796

thought. Therefore, the generating standard, possibly the firing line defences, are provided according to measurements which date back to the eighteenth-century treatise writers, Vauban's heirs.

The perpendicular fortification theories were not subject to the rigorousness of the design, but verified by applying specific requisites which the tenailed front met, or the tenaille of the south-western or southern bastion fulfilled the requisites of verticality of the caponiere flank compared to the sides of the respective tenaille in the first case, or the perpendicularity between the sides of the tenailles which dominated the access road in the second case.

If anything in the documentary sources comes over clearly, it is the fort's tactical approach, whose intention it was to strengthen the summit of Saint Julian with a self-sufficient defensive feature to prevent it from being seized, but with the consequent danger this entailed for batteries set up on the hillside to defend the estuary.

On the other hand, the intention was also to have artillery power to dominate the proximities of the Santa Lucia Quarter, and the only possible access to the cliff top from the northeast over the Calvary hill. This was a fortification that directed its defences in a northerly-easterly direction, as clearly shown in the first battery proposed by Llopart at the end of the eighteenth century, and which was consolidated with the implementation of a definitive fort with earth-reinforced fronts.

Access came from the coastal batteries and from the least threatened part, protected by extensive rifle fire for which a tenailed bastion equipped with scarp galleries was provided which intensified fire on the access gate.

At the same time, the fort's self-sufficient conditions involved the presence of stable, bomb-proof establishments for the garrison,

together with warehouses for stores and supplies, provisions, an arsenal and, of course, the corresponding cistern with ample storage capacity.

Perhaps the most important aspect was the application of the Campos Volantes Theory in which Saint Julian would become a key point in the Cartagena's defence by intercepting enemy advances from the East. Thus there was undeniable concern about equipping the Fort to billet the troops of these corps, and should permanent accommodation not be provided, campaign quarters would be made available on the parade ground itself. Hence the special interest in the fort having the maximum capacity possible and in its enclosure encompassing the largest possible surface area on top of the hill. However, it would appear that even the project's author himself acknowledged the Fort's insufficient capacity as he proposed Defensive Barracks on the slope of Saint Julian's hill.

Another of the sections defined in this study is the construction process, from its laying out to its completion. However, it was never completed as the official closure was postponed because of successive artillery attempts and due to the final assumption of the artillery defence by the new adjacent battery known as General Ordoñez's.

When studying the construction process, part of the technical, material and human resources were discovered. Similarly, how this construction process was organised, intermittently in the case of the works at Saint Julian, to achieve maximum output has also been revealed. Thus it can be shown how essential materials, such as lime, water, sand or bricks, were supplied by mule trains from Santa Lucia where materials were collected, or how the heterogeneous stone was hewn from the hill itself via a primitive system of wagons on rails for its transport. The unexpected defective quality of the stone from the hillside can also be seen when there were times when masonry was scarce and had to be replaced by employing

faced brickwork. Furthermore, a particular difficulty in obtaining sand was uncovered which had to be replaced by broken stones. Another unveiled fact was the use of formed hydraulic concrete to shape certain vaults, the composition of which was never actually determined, albeit it being deduced from the information provided by a contemporary author, García Herrera, who spoke of a mixture of stone, bricks, ash, water, sand and lime.

It can be seen how the master line, or the cordon projection, was drawn on-site from geometry, which was common in preceding centuries, by considering adaptations to pre-existing structures. It is also known how building work started with the defensive criteria by prioritising the Calvary earth front and how progress was made from there. Then there was a series of disputes in the building stage relating to the lack of continuity of budgetary provisions, worker protest movements, or one-off incidents such as the fire which caused destruction to the work being undertaken.

In order to understand the construction process, this study was accompanied by a series of illustrative drawings of the documented stages which, given the scope of the article, cannot be attached in their entirety here.

Regarding the significant architectural aspects, irrespectively of the singularity of the round tower designed to house a swivel gun platform, or the design of the tenailles, the crenellated parapets suitable for rifles, which were particularly concentrated on the flanks of the bastions and on the sides of the tenailles, where an artillery or cannon embrasure was always available, while uninterrupted parapets of the sides of the bastions only took cannon embrasures, emphasised the priority given to the sides for distant defence purposes, to the flanks for close combat and to the allocation of heavy and light arms to take on such defences. The winding access, always covered by the tenaille, was also singular, as was the layout of the gate and drawbridge which were linked to a system called "Delille", unspecified, but according to the vestiges, consisted of a tilting drawbridge supported on a frame sill, raised by means of a counterweight bar that slid along rails by the force of gravity, thus preventing entry when resting on the ground. The caponiere flanking the eastern moat corresponding to the tenailed front was also outstanding.

This study has also covered the knowledge of the events on which Saint Julian's Fort took part from its construction by comparing the behaviour of an architecture designed for that purpose in times of war. Its efficiency in the cantonal conflict was tested but, at the same time, its rapid obsolescence, which acquired artillery potential as the years went by, meant greater defensive weight. The explosion that took place in 1898 was clearly indicative of the construction situation of the time. It was a national tragedy and changed certain constructional aspects of the project, in particular the tenaille facade. In the same way as alterations came about when converting the fort into a supporting construction for General Ordoñez's adjacent battery, which entailed opening a passage and setting up an access bridge on the tenailed front, counteracting the preceding tactical arrangements revealed the rapid obsolescence of the fort.

This preceding section, which is linked to the unconvered fort's history, closely relates to the changes of use detected and to the consequent renovations, of an anecdotal nature, which took place until the present day. The fort went from being an active element with an offensive capability to become an accommodation block, prison and, finally, an abandoned construction converted into a foundation for a forest of telecommunication antennae.

Despite the inactivity into which the fort has sunk, the original work of the thesis, which gave rise to this article, included a whole series of litigation which arose as a result of defining controversial areas, where the Army clashed with the adjacent landowners over the demarcation of property. Cases of mines, such as that of the Victory Mine, having been detected on the hillside, not only gave rise to

a de facto encroachment on the property, but also simultaneously changed the fort's defensive conditions with the resulting concern about the Army's technical echelons.

It is important to highlight in this work not only the task of tracing and reproducing documents, but also, at the same time, that of preparing unpublished documentation relating to the Fort's current state which may lead to a future architectural intervention on it in interests of its conservation once its great historical importance over the last two centuries of the Cartagena's history has been brought to light. An importance which had repercussions on the whole of the political and military history of Spain, particularly in the nineteenth century. In this sense, we wish to highlight how the intervention of this fort, even though it has some bearing on military history, will always depend on political history. By almost echoing the theories of Clausewitz, Saint Julian's Fort would have been efficient in war by responding to the principle of "Second Action", that is, providing that the wars in which it intervened efficiently had come to a happy ending in its political approach, which, always quoting Clausewitz, was a priority and must be consistent. Saint Julian's would have been decisive in the Republican attempted coup if the Second Action principle had been achieved in 1886. Similarly, its transcendental role in the War of the Cantón, which converted it into an unbeaten element, would have also achieved its objective if the political outcome in Madrid and the defeat of Castelar in Parliament had not been truncated by the Pavia and Martínez Campos Coup.

-In parallel to the conclusions drawn from the direct research work done on Saint Julian's Fort, the original work carried out a series of reflections, which are summarised in the summaries outlined in the presentation of each of the corresponding sections. Specifically:

1.-*Reflection on the sources, studies and interventions which have tackled military architecture arising from the appearance of fire arms.* Observing how, day by day, this architecture—not only bastioned, but also derived fortifications and the so-called contemporary fortification so typical of the twentieth century—is the object of greater attention, not only research, but also interventionist, thus revealing the main problem which this extremely rigid architecture faces, whose functionalist value and diminished ornamental component require an appropriate approach to their use which neither distorts their monumental reality nor alters their clear territorial component, but preserves the value of the monument as a series of closely related monuments.

2.-*Reflection on the development of the fortification* from the appearance of fire arms. Thus, how bastioned military architecture emerged in response to requisites imposed by arms and the new defensive conditions of Modern States was dealt with and how it developed until reaching its zenith with the French fortification in the hands of Vauban and Coehoorn, and how armament and tactical advances drove it into decadence, producing a tense theoretical debate from which arose the Modern French System of Fortification and the German Polygonal approaches as the most outstanding which, without becoming consolidated, were to end up giving way to the armoured fortification at the end of the nineteenth century.

3.-*Reflection on the treatises*, offering an annotated catalogue of the main treatises which are to be considered in the formation of all the techniques which intervene in fortifications at this time of uncertainty which so characterises the nineteenth century.

4.-*Reflection on general theoretical concepts* which permit an introduction to the approaches of bastioned Art, distinguishing types of fortification, maxims employed, compositional and metric aspects, etc.

5.-*Reflection on the professional training and practice of engineers*, essential for understanding the attitude of those mainly responsible for fortification works and their possible influences. It is for this reason that, together with the documentation in the original work,

brief biographical outlines referring to the engineers who took part in the laying out and fortification of San Julian were included; in many cases, those referring to nineteenth century experts, *unpublished biographical outlines taken from localised records in the General Military Archive of Segovia*.

6.-This research also contributes a *development of the history and defences of Cartagena*, which, albeit dealt with by using several sources, in these cases have been carried out from the fortification viewpoint and attempt to understand the increasingly important role which the culmination of Saint Julian took on to defend the city in an attempt to be true to the idea that an individual fortification can only be understood from its overall geostrategic conception. In this way, the approach has always been executed in preparation for the intervention at Saint Julian; in other words, from an *interpretative perspective*.

7.-A result of the research, a *terminological database*, with more than 1,000 terms referring to the field of fortifications, or related to them throughout the ages, was compiled as a complementary element, providing the corresponding definitions, equivalences in other languages, and explanatory illustrations. A database which is complemented by the compilation of chronological data relating to historical military events, the identification of historical *characters, historical abbreviations, archives, literary quotations, fortification works and, of course, bibliographical information referring to monographs, articles and historical documents, with a specific section set aside for cartography*.

By way of conclusion to the explanation undertaken in this article, it must be pointed out that it is impossible to deem this research work finished as it remains open to new documentary findings and, in particular, is prepared to adapt it to new research on fortifications that are contemporary with Saint Julian's Fort, preceding or future ones, and not just in the context of Cartagena, but even in the national or international sphere too.

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NOTES:

¹ Part of this contextualization work, with sections such as the study of the military history of the seventeenth, eighteenth and nineteenth centuries, or that of the development of fire arms and their effect on the development of military architecture of the seventeenth, eighteenth and nineteenth centuries, was started by the author in the Research Project entitled "*La evolución histórica de la arquitectura militar y de las técnicas de ataque a las plazas*". Department of Architectural Composition at the Polytechnic University of Valencia. 9th September 2002

² Measurements were taken by acquisition on the part of the "Loggia" group of a Trimble M3 DR5 total mechanical station, which enabled basic points on the master line to be extracted, and defined the horizontal plane of the cordon, as well as the significant vertices of the fortification in contact with the ground, which, complemented by the detailed manual measurements, and those obtained from the laser telemeter, enabled the measurement disadvantages of these sloping scarp and counter-scarp constructions laid down on uneven ground to be avoided. The theodolite also enabled spatial definition of all those points required for the specific photographic rectifications carried out, which have been used in particular to provide a record of the texturing of the faces and state of the brickwork in specific areas.

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(Abbreviations: AGS: Archivo General de Simancas; AIMV: Archivo Intermedio Militar. Valencia; CGD: Catálogo General de Documentos; CO: Comandancia de Obras; GM: Guerra Moderna; MPD: Maps and Documents; SGE: Servicio Geográfico del Ejército; SHM: Servicio Histórico Militar; Op. cit: Work cited)

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• 1796. Mariano Llopert and Juan José Ordovás. "Planos, perfiles y vista de las baterías que deben ocupar la altura de San Julián con relación a los objetos que abraza la R.O. de 31.8. prócimo pasado», Cartagena./ 20/ 09/ 1796, SHM Sign. Cartagena, 20 September 1796., Cartagena, San Julián 1796, no scale SHM Sign. 2657.

• 1799. Felipe Ramírez. Plano y perfiles del monte de San Julián... Cartagena, 09 April 1799., Cartagena, San Julián 1799, 9 April, no scale SHM Sign. 2631. CGD Sign.

• 1799. Juan José Ordovás. Atlas político y militar del Reyno de Murcia formado por el Capitán de Infantería Ingeniero Ordinario de los Reales Ejercitos Don Juan José Ordovás. Año de 1799, Cartagena 1799, no scale SHM 2604. T-b-1-12 100/486/519. COMMENTS: Gate (100/486); Plan of the city of Cartagena and surrounding areas (100/487); Profile and elevation plans of the fort, project for San Julian heights of the City of Cartagena (100-505-506) Battery on the cliff top of San Julian hill (100- 508) Explanation of the fort projected on San Julian heights. (100-509).

• 1855. F. de Tabar, F. de Echeverría and J. Pajares. Plano de la plaza de Cartagena y sus inmediaciones para significar las nuevas obras que se proponen con el fin de aumentar sus defensas. 26 May 1855. SHM, sign. 2642.

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• 1859. [Draughtsman: D. Miguel González, Brigadier Director: Antonio de la Iglesia] Proyectos de fortificación y de edificios de Cartagena. Año de 1859, Cartagena 1799, no scale SHM 2638. B-3-27 096/343/366. NOTES: Castle of San Julián is to be found under map 41 (096-355. 1859)

• 1860. Salvador Medina. Hoja nº 9. Proyecto definitivo del fuerte de San Julián nº 41, levantado el plano por el delineante D. Miguel González y formado en vista del anteproyecto por el comandante de Ingenieros que suscribe. Cartagena, 18 February 1860. Perteneciente al álbum titulado AA. VV. Cartagena-Proyecto de Reforma y mejora de... Cartagena, San Julián 1860, 18 February, no scale SHM Sign. 2639.

• 1860. S. Medina, E. Puigmoltó, A. Escario, V. Casanovas, J.B. Azpiroz, R. Calvo, J. Linares, J.M. Panisse, S. Ferrin, M. González, J. Romero y M. García. Proyecto de reforma y mejora de sus fortificaciones. Año de 1860. Cartagena 1860, no scale SHM Sign. 2639 (two copies). It comprises 21 sheets or maps.

• 1860. F. de TABAR, F. de and F. de Echeverría. Colección de seis planos correspondientes a las fortificaciones propuestas. Hoja nº 4-Proyectos: Fuerte de San Julián. Torre del Calvario. Cartagena, San Julián s. a., no scale SHM CGD sign. 5-4-11-2.

• 1860. Proyecto definitivo del fuerte de los Molinos. Plantas (plano 096-358) Perfiles (096-359). n. a., Cartagena 1860, February, Scale 1-1000. SHM 2638. B-3-27. 096/358.

• 1860. Proyecto definitivo del fuerte de San Julian núm 41. Levantado el plano por el delineante D. Miguel González y formado en vista del anteproyecto por el Comandante de Ingenieros, n. a., Cartagena 1860, 500 feet (plan) 1 in 200 feet (profiles). SHM 2638. B-3-27. 096/356

• 1860. Proyectos de Reforma y mejora de las fortificaciones de Cartagena, n. a., Cartagena 1860, s. esc. SHM 2639. S-m-1-5. 097/143-163.

• 1863. S. Medina, E. García. Colección de doce planos sobre las fortificaciones de Cartagena. Cartagena, 31 May 1863. Cartagena 1863, 31 August, no scale SHM Sign. 2651 (1/12).

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• 1865. G. Verdú, A. Rodríguez Arroquia, J. B Azpiroz y V. Guzmán. Croquis del último proyecto abaluartado del Fuerte de San Julián con las modificaciones propuestas por la Comisión formada por G. Verdú, A. Rodríguez Arroquia, J. B Azpiroz y V. Guzmán. Cartagena, 30 August 1865. Cartagena 1865, 30 August, s. esc. SHM sign. 5-4-2-1.

• 1866. Manuel Jácome y Bejarano. Conjunto de diez planos del proyecto de fortificación de la cumbre del cerro de San Julián para proceder a la construcción. Cartagena, 30 May and 12 June 1866. There is another copy signed by J. TERRER in Valencia. Cartagena 1866, 30 May and 12 June, no scale SHM sign. 2657 (1-10)

• 1868. Manuel Jácome y Bejarano. Plano de ubicación del Cuartel Defensivo que proyecta Jácome en la falda del Cerro San Julián, en la Memoria presentada por el Comandante capitán de ingenieros Manuel Jácome y Bejarano. Cartagena, 30 August 1868. Se acompaña de una colección de doce planos, 10 referentes al "Fuerte de San Julián" y 2 al "Cuartel defensivo proyectado en la falda del cerro de San Julián" De los correspondientes al fuerte, 1 de la planta, 8 de secciones o "perfiles" (con 34 secciones) y de 1 de alzados o "vistas". Cartagena. 30 August 1868. SHM sign. 4-4-8-1. Sheet No. 11.

• 1868. Proyecto de Cuartel Defensivo en la falda del Cerro San Julián. included in "Memoria presentada por el Comandante capitán de ingenieros Manuel Jácome y Bejarano". Cartagena, 30 August 1868. Se acompaña de una colección de doce planos, 10 referentes al "Fuerte de San Julián" y 2 al "Cuartel defensivo proyectado en la falda del cerro de San Julián" De los correspondientes al fuerte, 1 de la planta, 8 de secciones o "perfiles" (con 34 secciones) y de 1 de alzados o "vistas», Cartagena/ 30/ 08/ 1868, SHM CGD sign. SHM sign. 4-4-8-1. Hoja nº 12.

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• 1871. Plano de variación de la zona Polémica en el entorno del Castillo de San Julián. Cartagena 13 June 1871. SHM 4-4-8-5. Se puede observar el trazado del camino de ascenso al Castillo.

• 1873. SA. Plano del campo de Cartagena con los ataques del sitio. 1873, Cartagena 1873, s. esc. SHM 2642 B-2-85. sign. 013-311

• 1898. *Croquis que acompaña el informe de la voladura de San Julián*. Cartagena, 1898. AIMV E-268.

• 1914. *Plano con el monte y Castillo de San Julián donde se indica la situación de la mina "La Victoria" que solicita explotar don Juan Jorquera Sánchez*, Cartagena, San Julián 1914, 3 de diciembre, 01:10.000. AIMV e-266.

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Versión española

TÍTULO: *Estudio histórico y arquitectónico de la fortificación abaluartada tardía de San Julián en Cartagena*

RESUMEN: *La fortificación abaluartada tardía se presenta en España como un patrimonio raramente estudiado por haber integrado, en la mayoría de los casos, parte de las infraestructuras de acceso restringido del Ejército. Cuando a raíz del plan META de 1994 el Ministerio de Defensa desafecta una porción de este patrimonio, queda abandonado o cae en manos privadas sometido a todo tipo de intervenciones desafortunadas. La realidad actual del patrimonio abaluartado tardío es la de un patrimonio poco conocido que requiere de una puesta en valor rigurosa, aplicando una metodología acorde con el objeto a examinar y activadora de aquellos parámetros exclusivos que atesora este patrimonio singular, como son los vínculos con el territorio y su dimensión global, la trascendencia de la medida y sus trazados geométricos o la pervivencia de las técnicas constructivas tradicionales conviviendo con la última tecnología.*

En un afán de fijar una metodología de estudio histórico arquitectónico— inspirada en trabajos precedentes acometidos por el Grupo Loggia en el caso de los fuertes abaluartados del siglo XVIII Cartageno, bajo la dirección de Juan Francisco Noguera—el autor de este artículo centra su atención en las fortificaciones abaluartadas tardías, que conviven con la fortificación contemporánea. Se verifica de este modo la validez de una metodología centrada en el estudio histórico-documental del monumento, el estudio in situ del mismo y, especialmente, el análisis compositivo.

Se escoge como objeto de estudio una pieza singular como es el Fuerte de San Julián de Cartagena, obteniendo así un doble objetivo: la comprobación de la citada metodología de análisis patrimonial y la puesta en valor de este hito abandonado del patrimonio cartageno.

PALABRAS CLAVES: *fortificación abaluartada, fortificación atenazada, fortificación perpendicular, Cartagena, Fuerte de San Julián, patrimonio, histórico, militar*