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Understanding Bunker Architecture Heritage as a Climate Action Tool: *Plan Barron* in Lisbon as a “Milieu” and as “Common Good” When Dealing with the Rise of the Water Levels

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Abstract: Abandoned on the coast as skeletons, bunkers are the last theatrical gesture in the history of Western military architecture (Virilio, 1975). Technically obsolete, this military territory has fallen into extinction and is now generally forgotten. We present the *Plan Barron of Defense of Lisbon and Setubal* case study, a mid-twentieth-century set of bunkers, recently declassified, as a case study to discuss the future of this heritage facing the climate crisis. Can oblivious historical war heritage be an opportunity to fight climate emergencies? We present four theoretical concepts to fundament this environmental positioning: (i) Heritage Management and Climate Governance, (ii) *Techno-aesthetic* (Simondon, 1992): *panopticon* territorial cluster; (iii) Military: *camouflage* as design, and (iv) Civil: inheritance as future potential. The results allow us to look at military architecture in the form of a bunker, as a set of territorial, architectonic, cultural, and social interests. We demonstrate that the counterpoint of its invisibility is a singular naturalized “milieu”, a place where the memory of war can be transformed as a buffer zone that combines characteristics of climate and coastal resilience with cultural and social interest as a “common good”.

Keywords: bunkerology; climate action; military architecture; climate resilience; Second World War; Portuguese military architecture; military heritage; architecture heritage; sustainable heritage

1. Introduction

By 2019, we have started the first academic study of the *Plan Barron of Defense of Lisbon and Setubal*, a mid-twentieth-century Portuguese military set managed by the Coastal Artillery Regiment (RAC), a unit with the mission of guaranteeing the coastal defense of the ports of Lisbon and Setubal. The set is composed of eight fixed, secret, camouflaged and fortified batteries, installed along the entrance to the Sado and Tejo rivers, mostly in the form of bunkers. RAC was deactivated in 1998 and its files were recently declassified, opening up new research paths completely unowned and improbable in the Portuguese context.

Due to the extended secrecy and the lack of knowledge inscribed in the History of Portugal, *Plan Barron* is at risk of disappearing: one is sealed and makes part of the foundations’ structure of Cascais Hospital, four are in ruins, one has a small temporary museum and two were donated to public entities (Institute for Nature Conservation and Monument to Overseas Combatants). There is no knowledge of its existence in Portuguese history or plan for the future, so our objective with our general research is to inscribe this set in academic and scientific fields and discuss some of its possible historical, theoretical, conservational, and strategic interests so that its future is a sustainable one.

For this paper, and facing some local passivity regarding the future of these batteries, we propose to clarify the idea if we can use forgotten heritage as a climate action strategy

and, more specifically, if we can use an inherited disseminated post-military architecture in coastal territories as a climate action strategy to protect waterfronts, facing the expected rise of the water levels and the instability of the coastline.

1.1. Theoretical Framework

We propose a reading of a pilot case study to identify the theoretical framework inherent in the international and national levels in order to put into practice the classification of the *Plan Barron* following the “win-win” UNESCO suggestion [1] for action regarding heritage in our current climate action scenario. Following the recent declassification of the military sites and archives, real estate has fallen into the hands of the state department that manages state properties. The “ESTAMO—Participações Imobiliárias SA” is now selling parts of *Plan Barron*. These parts are being transacted to private owners like any other public real estate, without heritage classification.

Our framing for the question we pose here is especially linked to the UNESCO guidelines that regulate local national policies with regard to action on the heritage of cultural and architectural interest, in the current scenario of climate crisis and forecast of rising water levels. On the other hand, we need to know the particular case of *Plan Barron* and discuss, especially, how we can look at this type of military heritage of architectural interest, which is dispersed throughout the territory.

Although we understand a global institutional and social (top-down and bottom-up) interest to combat climate change, the question is not yet clearly addressed to specific case studies, like this one. This scenario was noticed particularly in *Plan Barron*, facing a dismantling of a set with such a considerable scale without a plan for reuse or for heritage protection. So, this paper aims to present *Plan Barron*’s case study as a substantiated example in a way to bring some relevant and subject-oriented information for this particular case, but also as an example to other similar cases, either in the theme of climate emergence, or in the type of heritage involved, or in the type of transdisciplinary relationships that this case arouses.

The reading also aims to understand and make explicit the way that international institutions that guide heritage actions around the world, and more specifically, UNESCO, ICOMOS, or ICOMFORT, deal with climate emergency and, on the other hand, aims to put together a theoretical framework that fits the bunker architectonic, landscaping, social and heritage question. The framing we conduct here can have repercussions on the way academy and local stakeholders can see the future of these forgotten places.

Before starting, it is important to briefly contextualize some of the main issues that ground the relevance to address this research paper.

Climate emergence has become a significant topic in urban, landscape, and architectural heritage policies and, it is noticed that many policy efforts at an international level have already been taken to address numerous major problems we are currently facing. UNESCO, as we explained before, is now working on a draft version for the final “Policy Document on Climate Action for World Heritage”, which establishes a “Policy Framework” together with an “Implementation Policy Document” [1]. Although international policies have been centered on protecting heritage from climate crises consequences, this last UNESCO document has a new concern that it is focused on the heritage adaptation to the climate impacts in heritage, but also on “climate mitigation”, as point 59 describes, by creating “value and inspirational power of World Heritage properties to showcase ‘win-win’ mitigation practices that both reduce greenhouse gases and safeguard Outstanding Universal Value” [1] (p. 12).

Despite the optimistic approach on the part of decision-makers, they also deal with some difficulties, linked to the complex positioning of people regarding climate emergency [2] (p. 15), still “scattering in all directions” [3]. Additionally, the idea of the global approach is to address the main lines, and local entities have a role to play, by identifying their own specificity, and this is what we are trying to do through the research of paper.

As military architecture, *Plan Barron* also brings us the responsibility of looking at a type of heritage with a particular cultural interest that is linked to the very recent memory of war and aggression. So, we also bring this theoretical question into our research. Through the analysis of the psychological repercussions of war and aggression in public memory, we found that the act of war is many times linked with resource distribution [4], so then the maintenance of peace can be linked to a more democratic sense of access to natural resources and, in the case of climate change, we could also relate to the sense of common security. In the last decades, there is also a “geography of peace”, well sustained by diplomacy, by the expansion of NATO, and by the geography of post-war reconstruction [4]. Some studies explain the visible “magnitude of climate’s influence on modern conflict is both substantial and highly statistically significant” [5], while other recent studies claim specifically, that climate change can create opportunities for peacebuilding, as well as conflict [6]. We advocate that this is the case with *Plan Barron*.

The recent experience from after the First and Second World War reconstruction example have exposed some ethics and moral statements for a society mostly oriented towards democratic power based on public opinion [7] and more recently, to a more participatory society in political power.

As *Plan Barron* is totally designed around the Lisbon Atlantic basin, we were driven to an understanding of the whole structure as a strategic waterfront, which is now one of the key themes towards climate emergency and Mean Sea Level rise (MSL). Regarding MSL, dynamical and statistical methods on regional scales show that it is very likely that there will be an increase in the occurrence of future sea-level extremes in some regions by 2100, with a likely increase in the early 21st century. The combined effects of MSL rise and changes in storminess will affect future extremes in terms of intensity and periodicity. The situation on the Portuguese coast is above average, especially in the south [8] (p. 1201 and 1202).

1.2. Research Gaps and Contributions

The current scenario with regard to international heritage intervention policies is quite clear in the suggestion of an active stance when it comes to protecting heritage from climate change. However, when it comes to taking advantage of intervening in the historical heritage to combat climate change, the position is no longer so clear.

This research has adopted a prospective perspective to gain a deeper understanding of this particular heritage typology, its scale, aesthetic and memory specificities as an opportunity to rethink how to deal with the present climate emergency scenery as a “win-win” [1] (p. 12) solution: protecting the heritage and provide, through its protection, climate change consequence mitigation.

Can our case study, the *Plan Barron*, a set of eight separated batteries, be understood as a set of architectural interests at a territorial level, so that it can have an impact on combating climate change?

Our addressing to heritage as a climate emergency tool first will present an understanding of heritage, since the mid-twentieth century. We want to perceive the evolution of the interest in the environment on the behalf of the main international institutions that guide the heritage understanding. This knowledge is the key to addressing the question.

We will then present the results of the research on the *techno-aesthetic* [9] concept as an understanding of the *Mode of Existence of (a) Technical Object* [10] and its influence when looking at a military site with this scale and intricate design.

We also propose to understand *camouflage* design [11] to better include the invisible counterpoint of the bunker, as an asset to bunker heritage understanding towards its future.

Finally, we propose to better understand the questions about war, its memories and symbolisms, to capture how can we use a pedagogical approach to better deal with some inconvenient meanings regarding military heritage (Figure 1).



Figure 1. *Viagem ao Invisível Still 1 and 4—Bateria de Albarquel (1958).* Nuno Cera, Source: Maria Rita Pais and Luís Santiago Baptista (Coord.) *Viagem ao Invisível*, Purga, 2019.

2. Materials and Methods

2.1. Site Selection

Following the First World War territorial damages extension, the 1930s were a fruitful time for war strategy developments. The bunker has proved to be an interesting response to artillery and radar developments. Above all, concrete and prefabricated technology improvements enable rapid dispersion of highly durable construction. We can find several bunker sets from this period of peace and several others built during the Second World War in Europe: *Bunkers of Carmel*, *Batarias de Costa de Gorliz*, *Linea P*, *Atlantic Wall*, *UK Artillery and Pillboxes*, *KW-line*, *West Line* (or *Siegfried Line*) and *Ligne Maginot*, among others. Bunkers represent the exception that reveals total war in a mythical dimension [12]. Unlike previous forts and fortresses, bunkers were designed to be invisible and respond to a new geography of control and surveillance, through new technical and spatial devices [13,14].

In 2004 *Plan Barron of Defense of Lisbon and Setubal* was declassified, allowing us, in 2015, to become aware of its existence. After a first official visit in 2016, as part of a curatorial project coordinated by Maria Rita Pais and Luís Santiago Baptista, the *Journey into the Invisible* [15] research was started. We started with in-depth archival work, which enabled the reconstruction of a historic event that began in 1938 when António de Oliveira Salazar placed an order to the English War Office to carry out the project to defend the capital of Portugal.

The investigation took place in *Biblioteca do Exército*, *Arquivo Histórico do Exército*, *Departamento de Armas e Engenharia* and in-site with photographs, measurements, and records of current status. The site research together with an intensive dialog with the municipalities and with the *General Directorate of Architectural Heritage* (DGPC) made clear that no authorities nor local society were aware of the cultural interest and relevance of these military batteries. More, they were even less aware of the importance of *Plan Barron* as a set, more than each battery alone. This is why *Plan Barron* is for sale individually, without any thought or heritage classification (Figure 2).

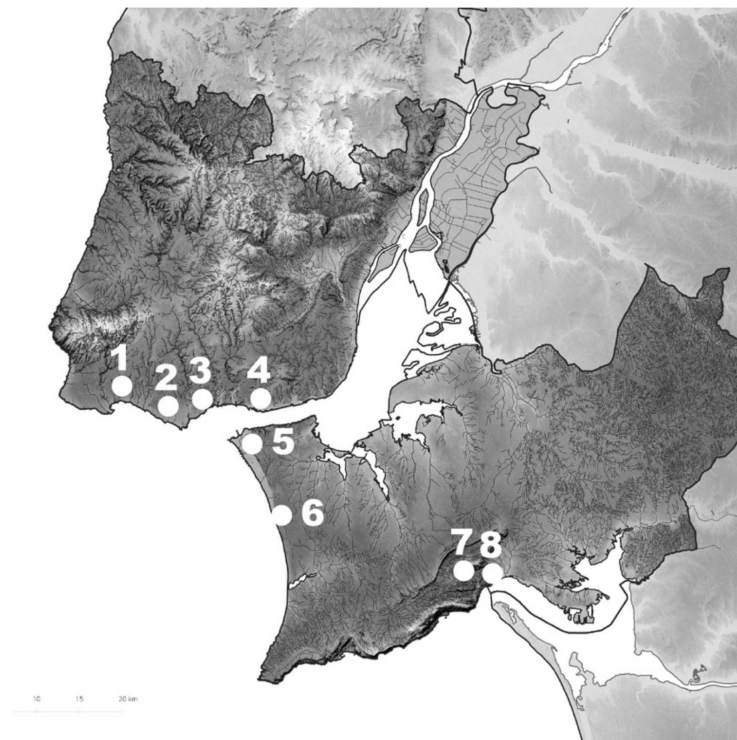


Figure 2. Map of Lisbon Metropolitan Region today with localization of the eight batteries of *Plan Barron*. No scale. Source: Authors.

The H2020 RISE Marie Curie SOS Climate Waterfront project, funded by the European Research Agency, where we have a role in the research and in local managing [16], had a decisive role, giving us tools for a better understanding of Plan Barron through a climate emergency approach. The transdisciplinary and trans-institutional approaches studied and practiced by this European project allowed us to look at this set with a more sustained and broader understanding. Our hypothesis settles in the possibility of understanding if we can or should use forgotten heritage as a climate action strategy and, more specifically, if we can use inherited post-military architecture in coastal territories as a climate action strategy to protect waterfronts and mitigate the expected rise of the water damages?

2.2. Thematic Analyses

So, for this paper, we will clarify the pertinence of the “win-win” UNESCO proposal and discuss if the preservation of the *Plan Barron*’s reading as a whole is possible and positive when we have in mind the mitigation of climate change consequences in Lisbon. In this dual sense, we will investigate the future of heritage, and particularly military heritage from an architectural point of view, but also in terms of the natural environment and social and cultural interest.

The question we are posing here already has a direction: Can we combat the anticipated consequences of climate change, while thinking about protecting heritage? Our answer, through the study of the particular case of *Plan Barron*, is yes, we can have a “win-win” situation, as foreseen in the UNESCO proposal. The possibility to think positively, in this case, seems to have been linked exactly with the dispersion and to the military function. In order to try to answer this question, let us present our reading as shown in the table in Figure 3.

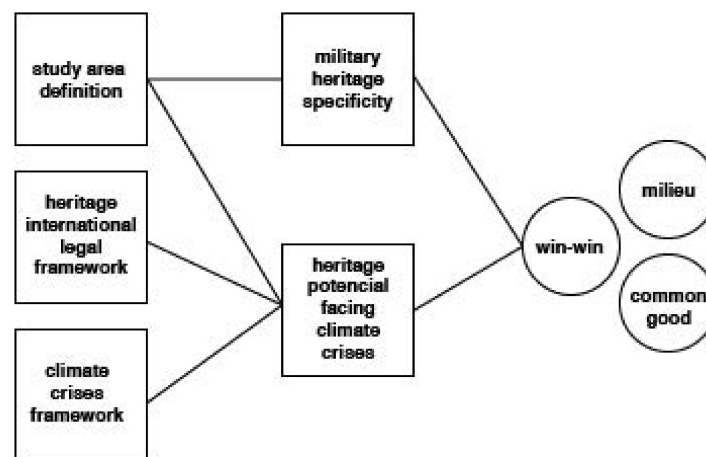


Figure 3. Methodological steps. Source: Authors.

For this, we propose carrying out exploratory research in order to open the search to find answers. Exploratory research, as a more flexible method, without the use of detailed questionnaires or very complex samples, foresees the realization of gathering information and not obtaining statistical conclusions. We want to discover the classification potentials of a dispersed military structure.

We are following an interpretative and argumentative methodology with a series of steps in order to bring some evidence: the study area understanding, the heritage international framework, and the climate crises framework, having in mind that we are dealing with a military heritage specificity and that we are following the possibility of a heritage potential when facing climate crises. We have found four results: (i) Exploring Heritage Management and Climate Governance; (ii) *Techno-aesthetic*: panopticon territorial cluster; (iii) Military: *camouflage* as design, and (iv) Civil: inheritance as future potential. Along with the results, it will be possible to discover and understand the “*milieu*” and the “*common good*” concepts. We believe these two concepts are the base for a climate action positioning when looking to a spread bunker heritage set, as we have.

The argumentation will conduct a dissection of a series of theoretical concepts and will involve its separate critic reading through the literature, in a first phase, and cross reading, after. At the end, through these separated and crossed bibliographic analyses, it will be possible to fundament some hybrid concepts, as the “*milieu*” (crossed reading between *camouflage* and *techno-aesthetic*) and “*common good*” (a cross reading between *military heritage* and *climate action* positioning).

The paper will follow the following investigations and verifications:

First, we need to understand and discuss the international institutional guidelines that link climate emergency to heritage, in a way to interpret *Plan Barron*’s situation now and also its future potential, the here called “*win-win*” opportunity. In relation to this reading, we are also interested here in the specificity of *Barron Plan* and the Lisbon region and its premises for the climate emergency.

Second, we will present *techno-aesthetic*, a concept brought by Georges Simondon [9,10] and discussed here through George Teyssot’s recent interpretation [17], and its possibility to fit into the case of the *Plan Barron*. Then it will be possible to look at this set of eight separate constructions as a single aesthetic object and, with this, sustain the possibility of classifying the set and not just a part of it. Additionally, as Teyssot recently mentioned, we will bring the possibility of a “*milieu*” reading, when dealing with *techno-aesthetic*.

Thirdly, we present the concept of *camouflage* as design in architecture. As it will be presented in the discussion, the evolution of military architecture tends, along the centuries, to transform the highly remarkable walls into stronger topographic thicker structures and, more recently in the twentieth century, into underground invisible bunkers. A bunker’s counterpoint to its invisible and camouflaged architecture is exactly its engaging to nature

and landscape, a “*milieu*”, as Luke Bennett noticed in one of his researches about Cold War bunkers [18] (p. 125). So, we suggest here that bunkers may not be becoming redundant, the place where society is saved. Instead, bunkers may start to become an enlarged “*milieu*” as a *bunker landscape heritage site* with its camouflaged cryptic constructions together with this “*milieu*”. This, here called “*milieu*”, gathers the spread bunkers’ construction, its natural surroundings, and the strategic territorial drawing as a beautiful *techno-aesthetic* example.

Finally, we will discuss a fourth point, the civils’ memory inheritance as future potential. Military heritage always brings an intensive debate about military symbolism and memory about the exercise of power over space, freedom, and well-being. Our argument here presents some ideas that can bring answers when we think about the future of structures with memories of war, aggression, and power. We believe that this debate is mandatory in post-military studies, as we are working on structures of historical relevance, currently unused, but with a pedagogical and cultural interest. In the case of *Plan Barron*, this military landscape refers to a defense system, not a battlefield. This military landscape refers to the idea of control, and we will introduce the “*common good*” idea, which is proposed as a climate action proposal from the first concept.

This planned and crossed reading allows the strengthening of traditional ideas of looking at heritage, such as the issue of conservation, the issue of urban design, or historical relevance. Our proposal is to go beyond the primary readings and, making it possible to go further, bring environmental and social benefits, an expanded reading of architecture by reading the territory and not just a bunker. In this sense, we take the opportunity to understand *Plan Barron* heritage strength, as a large and disseminated territorial set, as a very specific heritage comprehension, that deals with also very particular questions regarding his strait relation with the sea, territory, landscape, urban fabric, natural environment, and civil society.

3. Results

Facing this hypothesis of the *Plan Barron* case study as an opportunity to better understand and explore international heritage strategies, when dealing with climate emergencies and based on the singularity of the presented war object, we have placed four different readings to base our research. According to “Policy Document on Climate Action for World Heritage” [1], *Plan Barron’s* large set with diffused landscaping design along the coast offers a unique opportunity to rethink Lisbon’s ecological strategy together with Lisbon’s waterfront resilience [19].

Following our interpretative and argumentative methodology, we present here four chapters with detailed results for the four points we put here for debate: (i) Exploring Heritage Management and Climate Governance; (ii) *Techno-aesthetic*: panopticon territorial cluster; (iii) Military: *camouflage* as design, and (iv) Civil: inheritance as future potential. The crossed interpretation of these questions also made possible two correlated results: “*milieu*”, which emerges from the crossed reading between camouflage and techno-aesthetic; and “*common good*”, a concept that develops through an interconnected reading between climate action positioning and recovering military heritage qualification. We believe these two concepts are the base for a climate action positioning when looking to a disseminated bunker heritage set such as this one.

3.1. Exploring Heritage Management and Climate Governance

Man’s conscience about heritage is substantially reflected in the series of conventions on cultural heritage starting from the mid-twentieth century, when the modern movement and their ideas of technological and social reform, also began to call attention to the past. The post-Second World War period, heavily influenced by the dramatic destruction of historic buildings, cities, and landscapes, presents a position more interested in the past and its relevance to the well-being of people and societies. The *Geneva Convention*, in 1949, followed by the *Hague Convention*, in 1954, and the *UNESCO Convention*, in 1970, among many others, prove this crescent interest in heritage. The attention, during this period, is

focused on the justification of its memory and material value. Naturally, over the years, the recognition of other historical values of heritage evolves, to landscape value, to immaterial culture value, and to the symbolic interest of the past.

The value of *nature* as a cultural interest of man is demonstrated in the *Paris World Heritage Convention*, in 1972 [20] at its seventeenth session. The importance of this document relies on the recognition that “deterioration or disappearance of any item of the cultural, and (‘for the first time’) the natural heritage constitutes a harmful impoverishment of the heritage of all the nations of the world” [20] (p. 1).

The turn of the millennium brought the interest in sustainability in a broader concept of heritage that includes a new concern in “water” and its influence on the stability of places with the story. The UNESCO publication *Living with water* [19] brings exactly the importance of the water and the systems around water, as both cultural and ecological interest.

This vision of perfection is completely dissected in 2015 in another UNESCO publication edited by Henk van Schaik, Michael van der Valk and Willem Willems, introducing the *disaster* factor, with “flood”, “tsunami”, and “the rising seas” scenery in an age of climate changes [21]. In the same year, in Paris, the *General Assembly of the States Parties to the Convention* at its 20 Session adopted the *Document for the Integration of a Sustainable Development Perspective into the processes of the World Heritage Convention*. The relevance of this document stands in its significant contribution “to sustainable development and the well-being of people. At the same time, strengthening the three dimensions of sustainable development that are environmental sustainability, inclusive social development, and inclusive economic development, as well as the fostering of peace and security” [22] (p. 1). This document also refers to the idea that heritage can contribute to peace and security. It is the first time that a UNESCO heritage report makes an explicit reference to this relation between “heritage” and “peace”.

The alignment of the heritage interests outlined here demonstrates a clear evolution of the concept of heritage, which goes from a classificatory and material preservation necessity to a heritage understanding as something much more than the past event, but a contribution to the future.

Again, in Paris, but four years later, in 2019, as a result of the Meeting from the Climate Change and Cultural Heritage Working Group International Council on Monuments and Sites (ICOMOS), another book was published by the Climate Change and Cultural Heritage Working Group in 2019 called *The Future of Our Pasts: Engaging Cultural Heritage in Climate Action*, in order to summarize the vision developed by the international experts. One of the conclusions, and maybe the most interesting for our analysis, relies on the idea that cultural heritage can play a central role as a “climate action asset” [23]. The idea is that as iconic places of “outstanding universal value”, World Heritage and other iconic heritage sites can stress this urgency of climate action to a global audience. In some cases, “they can also be used to showcase effective adaptation and mitigation responses” [23] (p. 11).

Now, regarding military architecture, we should also point here the role of the ICOMOS International Scientific Committee on Fortifications and Military Heritage (ICOFORT). ICOFORT underlines the understanding of the fortification from the point of view of its operational zone and system. ICOFORT suggests that this understanding is an instrument to teach society the importance of defense policies and peace maintenance [24]. According to *ICOMOS Guidelines on Fortifications*, military heritage also has a role in “promoting reconciliation of the military past with its subsequent reuse” [24]. The relevance of ICOFORT specific guidelines is linked to the architectonic technical value and to territorial implementation systems as “cultural landscapes”. Despite this technological landscape value, ICOFORT Guidelines [24] have a lack regarding the interest of the natural ecosystems generated by these landscapes so well described in the guidelines. *Plan Barron* presents exactly this territorial design, which we will present here as *techno-aesthetics*, and more broadly, as a “*milieu*”, when enhancing this natural environment.

Regarding Lisbon in particular, we found a first strategic proposal for *Lisbon’s Municipal Climate Change Adaptation Strategy*, a document from 2017 that affirms the relevance

of thinking on a metropolitan scale when preparing local action: “It is essential that local action planning in the face of climate change is integrated into metropolitan policies for a better response and management of resources, taking into account the continuity of the territory and the potential cascade effects caused by current and future extreme weather events” [25]. (p. 85). The same document also suggests an integrated approach, which includes “ensure the resilience of the riverfront subsystem” [25] (p. 85), “adapt green infrastructure management” [25] (p. 86), “optimize urban management to ‘enjoy the water’” [25] (p. 87), “promote urban rehabilitation as an instrument of resilience” [25], (p. 87) and finally, although referring only the city of Lisbon, “ways of smooth mobility, in conjunction with the green infrastructure, through clickable lanes associated with green corridors” [25] (p. 87). At the level of promoting citizenship, the same document suggests “involving the community for a participatory citizenship and promoting collective empowerment”, through the “creation of participation networks” that “allow for the integration between local knowledge and academia” and openness to “key actors” [25] (p. 88).

In this sense and taking advantage of the strategic lines of the intervention of the municipality of Lisbon, in a time of climate crises and energy transition, we propose the UNESCO “win-win” 59 point strategy [1] (p. 12) that states to think about heritage as a potential for the future. The case of *Plan Barron*, in Lisbon, connected with a beautiful military landscape, as a *techno-aesthetic* territorial object with a water landscape as a special heritage proposal, a “buffer area” for a climate-changing period, and a military cultural continuous landscape along the coast of the Atlantic. While such heritage may not yet attract the attention from visitors, as castles and historical cities may have, there is now, with *Plan Barron* example, a possibility in the heritage industry, that bunker may bring more than the Virilio’s obsolescence, an added value in terms of joining cultural and natural heritage for sustainable development [26].

Finally, we would like to remember *The extended 44th session of the World Heritage Committee* organized by UNESCO in the People’s Republic of China [1], because there was made clear that the report from 2015 [22] should be updated with the *UN Sustainable Development Goals for 2030* [27], by creating sustainable cities and communities, by acting in climate action, by enhancing life on Earth and in water, among many other challenges. We evidence here the promotion of peace, justice, and the rule of law and human rights as key to this process.

3.2. Techno-Aesthetic: Panopticon Territorial Cluster

According to the description taken from *Raposa Battery* dossier, affected by the *Direção da Arma de Engenharia* archive, *Plan Barron* refers “to the set of batteries and attached buildings that serve them, located in order to defend the ports”. The strategy used to design this project started from the identification of vulnerable areas in the Lisbon region (the city, its anchorage, Banática, Alfeite, Barreiro, Barcarena, among others) and those of Setúbal, (the city and its anchorage), considering that these could be affected by cruisers cannons fires of the *Washington Naval Treaty*, with a maximum range of thirty-two kilometers. From the midpoints of the vulnerable zones, arcs of circles were drawn, with the radius of this maximum range (thirty-two kilometers), fixing a dangerous line in the outline of the set of arcs that delimits the space from which enemy ships can reach the points vulnerable areas. This “line” is called the “bombing arc” and is presented on the map below (Figure 4).



Figure 4. Plan Barron ("B") General Plan (1938). Source: DAE.

Based on the analysis of the enemy attack danger zone, *Plan Barron* outlines in detail a set of surveillance and defense structures, located and arranged in strategic points along the coast, so that they could attack the enemy before they could be able to reach vulnerable territories.

The plan proposed the construction of a set of new fortifications and other constructions (command posts, observation posts, shelters for projectors and other equipment, buried or submarine cables for data transmission, barracks, etc.) and adaptation works in the existing fortifications. From the original plan, some structures were removed according to the adaptation made by a commission of Portuguese and English technicians, with the final set organized as follows:

- A Coast Defense Command, located in Puxa-freixe.
- A Counter Bombardment Zone, divided into two groups (North and South), formed by: *Bateria de Alcabideche* (North) and *Bateria da Raposa* (South), both artillery with

three pieces of 23.4 cm/47, each and two general telemetry and observation networks (North and South).

- Two Close-defense Zones (Lisbon and Setubal) consisting of two groups of close-defense coast artillery each: *Bataria da Parede* (Lisbon) and *Bataria do Outão* (Setubal), both with three pieces of 15.2 cm/47 and two defense groups against small naval units (*Bataria da Laje*, artillery with three pieces of 15 cm CTR and *Bataria do Bom Sucesso*, artillery with two double pieces of 5.6 cm/48, in Lisbon, and *Bataria de Albuquerque* (artillery with three pieces of 15 cm CTR) in Setubal; illuminated areas, areas of discovery projectors, a strip of commanded mines in the Tagus, two BOOMs (obstacle crossed in the river to control or block navigation giving protection to the interior of the port), anchorages and anchorages for inspection.

The system resulting from this project connects and merges Jeremy Bentham's panopticon control concept "see without being seen" [13] in a large optical territorial *panopticon*. As an individual structure, the *panopticon* makes use of architecture as a tool for organizing and arranging space that leads to discipline through visual and physical contingencies [14].

While old towers along the Portuguese coast could work as a series of surveillance and attack posts along the maritime-coastal strip formalizing the incarceration, not of the enemy, but of the territory to be defended, *Plan Barron* follows Bentham's theory only in visual surveillance once the spatial design is invisible in the form of a bunker. In this sense, there is no "auto-discipline", as Bentham conceived. In *Plan Barron*, the dissuasion starts when potential enemies are contacted by radio. At that very moment, they could not attack, because they did not know where to and also, because of the *Washington Naval Treaty*, they could not use more than thirty-two kilometers range to reach Lisbon or Setubal.

The system does not constitute a wall, since it is possible to cross the limits, but it is able, from a series of rules that regulate the entry of boats in the ports, forcing inspections in anchorages strategically positioned on the coast, to deter an invasion preventing access to ports and possible disembarkation of enemy troops.

In this sense, "visibility is a trap" and based on the concept of the *panopticon* as a machine with a deterrent effect on behavior, *Plan Barron* designs a network of watch and attack posts, capable of disciplining and ensuring dominance over the behavior of individuals who enter the space delimited by the plan, integrated into a system, which Gilbert Simondon calls *techno-aesthetics*, "entirely successful and beautiful" [9] (p. 255) since it performs an intercultural fusion between technique and aesthetics, in an intricate set of elements that allow an aesthetic enjoyment from the scale of the portholes to the scale of the territory. In this case, the importance of understanding *Plan Barron* as an intricate set allows us to understand it, not as a set of objects, but as a single, technical, and beautiful machine.

In *Metaphysics* (or literally after physics), Aristotle affirms that "the whole is more than the sum of its parts" [28]. It is a principle that we easily understand when looking at a functional body or at an object, such as the human body or a clock, for example. A clock is a thing and is made up of many parts, which together can be more useful than all the parts themselves apart. For example, if we take all the parts of a disassembled clock and put them on the table, they will not tell the time like an assembled clock. This "object"—the clock—is useful only when assembled, as a whole.

In "*On the Techno-aesthetic*", a letter written in 1982 by Gilbert Simondon to Jacques Derrida and published posthumously in 1992 [9], Gilbert Simondon adds to Aristotle's thought his "*techno-aesthetics*", a concept that proposes the existence of something bigger and meaningful, that elevates this object to more than a technical device. For Simondon, it has aesthetic fruition, because "Art is not only the object of contemplation; for those who practice it, it is a form of action that is a little like practicing sports". It is technical and aesthetic at the same time: aesthetic because it is technical, and technical because it is aesthetic. There is "inter-categorical fusion" [9].

What Simondon means is that a technical object can acquire its aesthetic capabilities against the background of a vast reality. This positioning of Simondon about *techno-aesthetics* from 1982 follows the one that he previously defined in *On the Mode of Existence of*

Technical Objects [10]. In this text, he writes that the technical object acquires its aesthetic capacities against a vaster reality that is used as a territory, and according to a very recent and interesting analysis from Georges Teyssot, he believes “the aesthetic impression is linked to the insertion in the environment; it is like a gesture that fits itself into the natural *milieu*, like the sail of a ship under the force of the wind” [17] (p. 118). In this text *On Gilbert Simondon Techno-aesthetic*, Georges Teyssot explains this *milieu* as “une nouvelle forme de *genius loci*”. According to Teyssot, “pour Simondon, l’objet technique acquiert ses capacités esthétiques à partir d’une réalité plus vaste et ces points clés confèrent un sens esthétique à la topographie. Dans la construction d’un réseau, ces points sont placés au milieu, entre les choses; ils forment un «milieu».” [17] (p. 105).

Teyssot defends that Simondon develops an original philosophy that overcomes most of metaphysics’ historical oppositions (subject/object, form/matter, concrete/abstract, figure/ground, material/immaterial). In opposition to the dominating technophobia implicitly, he introduces an idea of the environment (*milieu*) that questions the genesis of individuals (and pre-individualities, such as cell membranes) and their interaction with the environment.

3.3. Military: Camouflage as Design

On 10 February 2010, after 24 months of construction, the new Cascais Hospital was inaugurated, a 45.863 m² building inserted in a land at the time with military classification in the urban legislation. The military classification was then changed into the public domain, for this purpose, in order to enable the construction on the site of a new health unit. The change in ownership was the first obstacle to be circumvented, being followed by a complicated process of demolition of the bunker structures from the *Battery of Alcabideche* (1954), one of the eight batteries that compose the *Plan Barron*, from 1939. “They were all to be destroyed, but they spent in the first one, the explosives that were foreseen for the construction of the whole hospital”, says Coronel Alpedrinha Pires [29]. The hospital project was changed and the building was then erected above the underground remaining solid structure that was sealed for the building’s protection. Naturally, it would never withstand a traditional demolition for this bunker, since it was calculated to resist the explosion of war bombs.

Throughout the world and throughout the twentieth century, large sums were spent on doing war, avoiding war, and preparing for it. In addition, the greatest material, technological and territorial civil advances come exactly from the needs of war. From an architectural point of view, perhaps the most interesting thought about military architecture is that it is probably the most responsive and adaptable to events, probably much more than civil architecture. On the other hand, due to its secrecy, military architecture is probably the least known from a civil and academic point of view. The rules for the creation of military architecture are linked to technological events and respond to needs on a territorial scale.

After thousands of years of prominent and staring buildings, military architecture lives today from its *camouflage*. This progressive hiding evolves following the needs of military attack and, above all defense, techniques. We review here three moments to better understand the role of *camouflage* today.

First period—from Roman walls to medieval fences.

The Roman wall is used around cities or along strategic defense zones and consists of a linear wall in height and with great thickness, usually built-in stone or brick. It has foundations, but its structure is in height, visually comprehensible for psychological deterrence and physically difficult to pass by people, animals, and the few existing mechanical means (Figure 5).



Figure 5. *Muralhas de Évora*, section of Roman wall in Évora (I e II b. C.), Source: DGPC—Património Cultural de Portugal.

During the first phase of the Middle Ages, the firing armament available was limited to devices that used as propelling elements the force resulting from flexion or torsion: the neuroballistic. Examples are the bow, the crossbow, or the catapult.

Second period—*le bastion*.

The bastion results from the transition from neuroballistic to pyroballistic. The changes in the art of war changed, by consequence, military architecture, including the design of the landscape and the design of buildings. The tower gradually gave way to the bastion and the buildings stopped developing in height to develop horizontally, increasing wall thickness. The cannon, initially ineffective due to its weight and lack of firing precision, was improved throughout the 15th century. The modern stronghold first appeared in Italy at the end of the 15th century, having reached its maximum expression with Marechal Sébastien Le Prestre de Vauban, a French military engineer, who served under Louis XIV, in France, and proposed a rational and scientific method merging engineering and social, common in the Age of Enlightenment [30]. The main modifications were the curtain walls reduction of the height and base thickness increase. The work was completed as an enormous topographic arrangement, as it is the case of the city of Almeida, in Portugal (Figure 6).

Third period—circle of isolated forts.

During the 19th century, military defense architecture changed dramatically. Between 1792 and 1852, there was an increase in the protection of mortars, which together with stronger casemates and weapons gave extra protection to the fort's construction. In 1860, striated artillery appeared, a technology that greatly increased the power and precision of projectiles. Finally, the third technical novelty, between 1885 and 1890, is the use of concrete to replace stone parliaments and the use of metal domes to protect artillery material. The fort starts to organize itself in isolation, forming circular sequences around the cities [31]. These forts were isolated in a vast territory in strategic places in order to defend agglomerations and relevant places, such as bridges, railway lines, or ports. As Major Morritz Ritter von Brunner, a Hungarian military officer said, the type and amount of hostile fire to be expected were the main criteria in fortress design [32]. A good example of this change is the ring of *Brialmont* forts, in Antwerp, 1860. After the destruction of the twenty-two fortresses made under the Duke of Wellington's supervision in 1815–1818, eight detached forts distanced by 3.2 to 4.0 km were built forming the new defense ring in the city.

By this time, cities tore down their useless walls. Paris, Vienna, Brussels, or Rome develop a new urbanism, opening to the surrounding countryside and dissolving the city with nature.

Georges-Eugène Haussmann in Paris, in the first half of the 19th century, Ildelfons Cerdà in Barcelona, in the second half of the 19th century, Franz Joseph I in Vienna, in the second half of the 19th century, and Frederico Ressano Garcia in Lisbon, in the last quarter

of the 19th century, performed plans to update cities responding to this advent of the new military defense strategy.

In Portugal, the equivalent to this technology is the *Campo Entrincheirado de Lisboa*, an idea and project by Marquês Sá da Bandeira, officially created in 1899 (Figure 7).

The First World War started with the use of trenches dug in a direct war area, a battlefield. The soft construction suffered a progressive hardening with reinforced concrete in small strategic points for the protection of communications, observation points, and hospitals, authentic strong cities buried to give better conditions to soldiers. By 1916, German and Prussian high ranks military orders already suggested the use of more extensive concrete, starting in the first battle line.

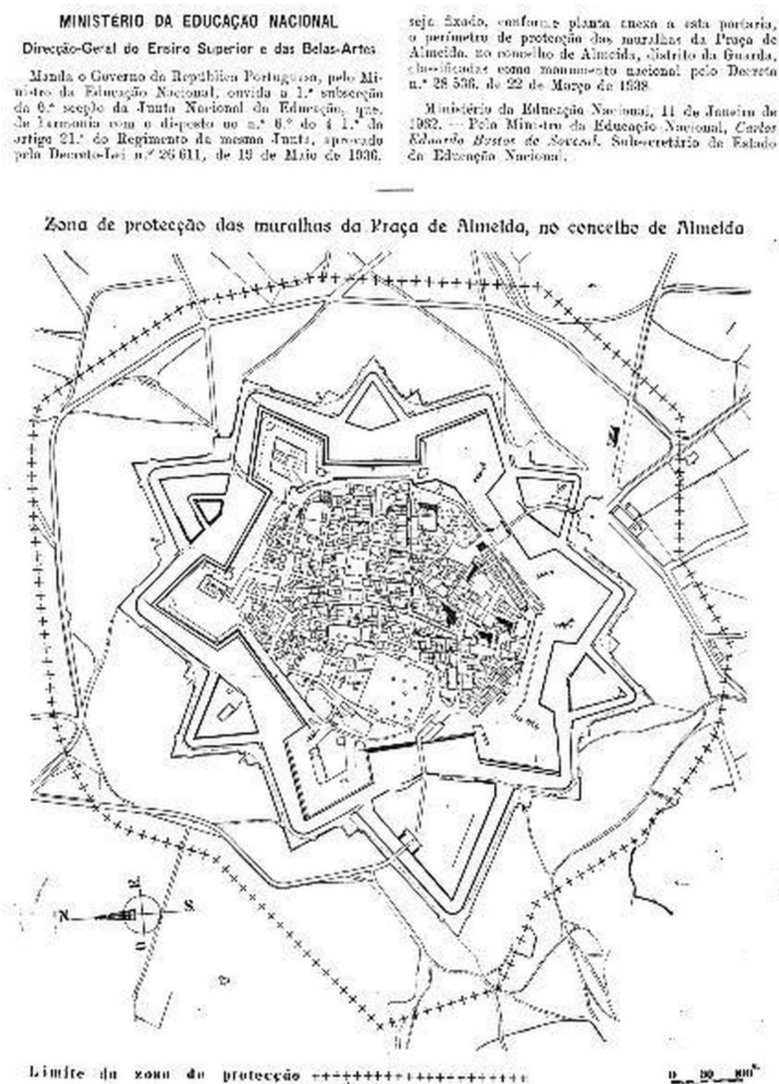


Figure 6. Almeida Castle and Fortress (1641) “Portaria publicada no DG, n.º 97, de 24-04-1962—Texto e planta do diploma in DGPC”, design by Pierre Gilles de Saint-Paul, in a pré-Vauban period and adapted posteriorly to Sebastian Vauban, *Traité sur les fortifications*, Sebastian Vauban [30], 1697. Source: DGPC—Património Cultural de Portugal.



Figure 7. *Campo Entrincheirado de Lisboa* (1899), Joshua Benoliel, n.d., Arquivo Histórico do Exército, PT/AHM/FE/CAVE/JB/GR 1/0343.

The design of these structures aims at *camouflage*: horizontality and low height of the interior space. The use of reinforced concrete by the Germans between 1914–1918 is probably the first step in the use of reinforced concrete on a large scale internationally. Images of the battlefronts devastated after the war scenario often show pillow boxes as the only recognizable element, thus proving the importance of using concrete for its resilience on the ground. Here, the bunker represents resilience in a scenario of total destruction. Often, this resilience surpasses the natural order of the land, as it remains solid, but falls by land movements on more vulnerable soils.

Plan Barron for the Defense of the Ports of Lisbon and Setubal is based on the principles of territorial *camouflage*, as a form of defense and surprise attack on enemy approaches to the entry by sea. We have passed from stage one and two to stage three, following decreasing visibility, although maintaining great impact in urban and territorial structure.

According to the classification of Neil Leach, we consider that the architectural proposal of *Plan Barron* can be understood as “*mimetry*” (or mimicry), a continuous relationship between an organism and its surroundings [11]. Quoting Rogers Caillois [33], Leach develops this idea of “*mimetry*” in a similarity to Darwin’s theory, as an imitation of the surroundings in the form of *camouflage* and more precisely a “*morphological mimicry*” or “*three dimensional teleplasty*”. According to Caillois, it is like a dark space in which the object is stained by the darkness of the surroundings. In the case of the *Plan Barron* bunker design, this is what Leach refers to as “*mimesis*”. “*Mimesis*” means to enter in a kind of crisis, because in many moments, the buried building is not distinguishable from the surroundings and enters a state of “*psychasthenia*”, as Leach also refers. In *Plan Barron* the *camouflage* wanders between “*psychasthenia*” (from the outside) and the “*mask of medusa*” (from the inside), with the body covered by external objects, making a perfect imitation of the surroundings in terms of color and shape. Invisibility through *camouflage* is desired,

“blending into the nature and becoming one with nature” [11] (p. 77), enabling a strategic position in which defense is the best attack.

In the warfield, soldiers “play” supported by a strong expert knowledge [34]. This relationship with their surroundings gives them the necessary control and freedom that enables them to act with precision. So, in this sense, the features of military control shape militarized landscapes, and these militarized landscapes, as physical forms support control in space and political levels.

Military landscapes are political. In *In the Ruins of the Cold War Bunker: Affect, Materiality and Meaning Making* [18], Luke Bennett claims there is an invisible counterpoint of bunkers. Bennett progresses by explaining that it is exactly this specificity that designates a particular landscape. Here, to this discussion, we also remember Georges Teyssot’s definition of “*milieu*”, when referring to Simondon’s *techno-aesthetics* [17]. Crossing these two references studied here, we defend the existence, in fact, of a “*milieu*” in the case of *Plan Barron*, a “*milieu*” that defines itself exactly in the specificity of the *camouflage* that hides the system of attack and dissimulation.

In the case of *Plan Barron*, a territorial *panopticon* has been drowned along almost 90 km of coastline around Lisbon. Resilience here is shaped in this new landscape, not natural, but built-in nature, camouflaged and resistant. The uniqueness of this shape should be studied and preserved to protect the new cultural and natural heritage, as following generations should understand the courage of men regarding the defense of their territory.

Camouflaged bunkers are designed to be forgotten carrying with them a symbolic weight that involves the idea of seeking protection against attack [26]. As much as we understand the relevance of Virilio bunker’s monumentalizing [12], we believe that bunkers in general and *Plan Barron* bunkers, in particular, brings to academic discussion, the possibility to look to this heritage as more than Virilio’s concrete cryptic sculptures and more as a camouflaged military landscape, as a “*milieu*”, and according to Teyssot, a new form of “*genius loci*” [17].

3.4. Civil: Inheritance as a Future Potential

Civil life and architecture depend on the protection and peace feeling provided by military structures. In this sense, civil resilience has its foundations on the presumption of the active role that these structures have in protecting civilians. There is always a sense of separation: civilians and military have parallel existence and hardly meet. Furthermore, civilians and the military live in secrecy regarding each other, the military need secrecy to perform defense and civilians condone military secrecy for their own security. This status quo ensures a sense of mutual respect.

Since immemorial times, men have filled the public sphere with monuments, as souvenirs for virtues, failures, hopes, or uncertainty. These signs inherited from our past generations assure today’s equilibrium but also hope for the future. In the case of *Plan Barron*, the civil community is inheriting an extensive structure of enormous military and strategic relevance. Although a possible cultural interest, *Plan Barron* was secret and is currently abandoned. So, the inheritance of a territory so intricate and maybe interesting has been almost unnoticed by the community. How can these spaces be adopted by the civil community if they are secret?

Military spaces often bring memories of nationalism and national identity, maybe through this, can also unveil individual, community, and public appeals. Post-military landscapes are those with no military function, but where a former military function remains and remembers its military origins. The study of military landscapes offers us the possibility to discuss the moral ideologies expressed in these places and how they might contribute to an ethics of peace and well-being. We should also discuss the tenacity of urban forms and lives of a military inheritance into a civilian present. First, because usually they were protected by legislation, and for that reason, they arrived many times untouched. They deserve to be studied to decide the best form to be absorbed in the existing functional areas, as a memory testimony.

Going back to Vienna, we can see a remarkable heritage case study that transforms post-military heritage into a new strategy for the city. “It is My will” was a decree by Franz Joseph I, in 1857, which began the construction work of the new democratic city, similar to the case of Paris. The architecture in Vienna draws the society of that time, in the sense that the destruction of the walls of a feudal society, enabled the city expansion outwards, into the countryside and opened the city to a better life and housing quality. A new ring road, the *Ringstraße*, took the place of the walls, and a whole new plan was made to fill the wide space left by the old 500 m circular ring of protection. The Emperor’s architects also created large green and leisure spaces accompanied by cultural projects: a new city hall building, a university, an opera house, and a set of large museums, where the imperial art collections were exhibited to the public. This action transformed an enclosed city into an open city. This openness to the surrounding natural space and culture, and to external dynamics, directly contributed to a substantial improvement of the inhabitant’s quality of life.

We found resilience in Vienna’s case, once, the existing void area that surrounded the walls was kept almost entirely, maintaining the memory of the past, but opening space to the new order of those times: light, progress, and a new social order.

Regarding this idea, again Rachel Woodward brings the most pertinent question to this discussion about inheriting military landscapes that these are “invisible to those without the requisite cultural and political knowledge to read them” [35].

Our present reveals a long existence by our confrontation with the “things” left behind by those who came before us [36] (p. 3). Some of them can be used as memory educational devices giving us information about how we got here. A post-military landscape is the one without a military function in the present, but where the imprint of a former military function remains too pervasive to enable the erasure of their military origins [35] (p. 46). We could include interpretative practices of meaning-making through which personnel make sense of the landscapes in which they operate, by imaging experiences of war correspondents, and how these practices resonate in both personal memory and in shared regimental and civilian narratives. “Being in military landscapes is affectual and emotional” [35] (p. 50). However, unlike post-industrial landscapes also with exploitation memories, which are often irretrievably contaminated, post-military landscapes, in turn, often present ecological preservation scenarios, very interesting in the current climate change scenario. In the case of *Plan Barron*, there is a countercurrent with the enormous growth of the rest of Lisbon and its surroundings. Visitors can today experience wildness and abandonment through an accidental preservation of time. Among those who debate the future of these *Plan Barron* structures, there emerges a clear desire to retain something of the dystopian character that resides in the duality between the memory of aggression and the peacefulness of nature that emerges from its oblivion.

Here, a “common good” is recognized from the abandonment and oblivion, as this allowed for a stable natural ecosystem to be born along with the recently densely urbanized Lisbon. So, in this sense and looking to the UNESCO *Convention concerning the protection of the world cultural and natural environment, in 2021* [1], today Lisbon has inherited the memory of the past war, as well as a promise of a better future.

According to Ben Anderson [37] (p. 219) “shock and awe” is a term used to feelings of fear of his own vulnerability and impotence that can also provoke collective feelings of morale effects and terror effects. Other authors such as Ivonne Whelan [38] argue for the significance of the urban landscape such as public monuments, street nomenclature, buildings, city plans, and urban design initiative as ways to transform past memories into public new collective meanings. Additionally, Lisa Benthon-Short, in “Monuments and Memories”, brings the difficult question about nationalism [39] (pp. 94–96) versus the importance to have national references to history, but also the danger of these ideologies and also its surmounter as an “effort to overcome tyranny” [39] (p. 99).

In the continuation of Benthon-Short’s discussion, we also understand the more recent spontaneous monuments and memorials that brought to the public space an active and lived experience and the importance of public expression in these collective sites. In this

sense, the discussion presented here proposes exactly this overcoming of ideas related to violence and nationalism through the activation of common well-being and action against the climate emergency.

4. Discussion and Conclusions

The new culture of peace and the “different fronts” of modern warfare are delivering to the community and civil society architectures and territories which, by their nature, are characterized by an extraordinary geographical and landscape location and take on such dimensions that they can be considered new potential containers of functions capable of polarizing social policies and local strategies [40] (p. 51).

Through the argument of this paper, we understand “that bunker is more than a symbol—a metaphor of superpower” [18] (p. 6) and in the case of *Plan Barron* this is readable by its territorial understanding, a *techno-aesthetic* big artwork to face danger.

We tried here to better understand *Plan Barron* as (i) Exploring Heritage Management and Climate Governance, (ii) *Techno-aesthetic*: panopticon territorial cluster; (iii) Military: *camouflage* as design, and (iv) Civil: inheritance as future potential.

Plan Barron's heritage classification depends, according to our initial investigation, on the discussion around these points to open up more than the traditional heritage concepts. We also saw here that the most influential international institutions are gradually opening their attention to “nature”, “water”, “sustainability”, “water landscapes”, to “maintenance of peace” and to “climate emergency”. So, the relevance of this discussion sits on open new ways to look into heritage along with this challenge that will for climate action.

We present *Plan Barron* as an *ensemble*, based on the Simondon *techno-aesthetic* concept and not as a set of different and isolated buildings. We also present *Plan Barron* as a *camouflage* design, a reason that brings an identification factor as well as a reason for greater forgetfulness and, in this sense, a greater enabler of nature's growth and urban uniqueness. The specificity that we claim here, according to Georges Teyssot can be seen as a “*milieu*”, or a particular form of “*genius loci*”, as he calls it.

So, we launched a concept of natural, but specific inheritance, made possible by decades of state and urban planning laws protection, and ecological resilience that allowed the preservation and development of countless animal and plant species, together with a set of camouflaged and hyper-strong construction. In this sense, *Plan Barron* is a partial *palimpsest*. or more specifically, it is a set consisting of a series of hyper-structures in a context that is now waiting for a big change. We are already exploring this idea in another paper, more linked to space and materiality.

At this point, it is obligatory to bring Caitlin Desilvey's idea of *curated decay* [36], or we would add here, the possibility to carefully control, not decay, but *Plan Barron's* evolution through controlled maintenance of a territory that is now in a kind of suspension in time. This concept could allow us to interpret UNESCO's idea of looking into the past while looking ahead to a future, more sustainable and peaceful. In this sense, Our case study presents the “win-win” 59's article of the UNESCO's *Convention concerning the protection of the world cultural and natural environment* [1].

Plan Barron's recent declassification allows these areas to be reallocated to the community, with its historical and possible nationalist memories. So, it is our role here to draw attention to this sensible issue about the difficult memories of aggression, by opening up a window to the possibility of transforming these memories into the idea of building a “common good”. This scenario, due to the secrecy of the architectural object, needs vast educational work to raise awareness of this new cultural and architectural heritage, which can be realized through the safeguarding of physical and natural heritage, allowing, through this persistence, to evolve the concept of historical, cultural, and social resilience.

Again, as Georges Teissot points “il faut redessiner une carte entre la conception, la technologie et le paysage” [17] (p. 105) and through this new conception of “*milieu*”, make understandable a more continuous and permeable comprehension between figure and

background. This “milieu” is then, our argument, that also redraws the memory of a military landscape through the reallocation of a strategy for a “common good”.

Globally, given the increasing awareness of climate change impacts, building climate resilience has become a major concern. From this point of view, the set of eight bunker structures and the entire surrounding area distributed along the Atlantic coast of Lisbon are already points of climatic resilience (see Figures 2 and 3), since they have been protected in a naturalized state by national interest in municipalities’ law and kept in military secrecy, while Lisbon grew according to current urban laws. We found, therefore, eight unofficial virgin cores aligned and strategically placed along the coast. We believe this resilience should not be despised, on the contrary, could be encouraged and exhibited. The direct benefits of this solution stay in the reduction of vulnerability to climate emergencies and this opens us a potential lode that post-military aggressive memories can be reconverted into a “common” and desired climate resilience.

When looking to military architecture as a climate action tool, these two new perspectives, of “milieu” and “common good” presented here have allowed us to look at military architecture in the form of a bunker, as a new interest, not based as the usual monumental visual mark, but as a more technical welfare zone to the cities of the new climate active millennium. As part of the city, we would think about them as vivid entities, connected entities, cultural entities, and, of course, resilient entities.

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