# THE CULTURAL LANDSCAPE OF THE CAPTAINCY OF PARAHYBA, BRAZIL, IN THE PERSPECTIVE OF THE ICONOGRAPHERS AND CHRONICLERS OF THE COLONIAL PERIOD (1500-1822)

## 1. The Cultural Landscape and the Tourism

In addition to the role of the landforms, resulting from the modelling of rocks and elements embedded in it, like fossils and minerals, as well as of the soil, derived from its fragmentation, and of the water resources, in reconstructing and explaining the evolution of the Earth's crust, a place of interaction for the various organic spheres in an open system of energy and mass exchange, there is an axis of connection inherent to the evolution process of a civilization, whether ancient or modern, that interweaves it to the abiotic environment, conferring a particular degree of importance to geoheritage, specially the geomorphologial one. Geoheritage also supports economic development and the quality of life and it can be inserted into recreation and tourism activities, in its geo-heritage form, providing the connection between geology, landscape and leisure activities.

In this context, it is pertinent to include the concept of 'landscape' as a geographic object, since the tourism, which is a central activity to this book in most of its aspects, has the landscape as a motivating element, whether in an urban context, in the interior of a Historic Center, either in an urban or non-urban coastal context, when diving in a reef, in the rural/natural environment, when it makes a trail in the forest or stays in an ecoresort, for example.

The relationship between geography and landscape studies dates back to the end of the eighteenth century, presenting two points of view: a naturalistic view, where the human being stood outside the description of the physical elements of the landscape and their relations, having in the pioneering works of Humboldt and Saussure their theoretical-methodological basis and; a humanist vision, based on the research of La Blache, which emphasizes the cultural element of the landscape (REYNARD, 2009), from which the concept of 'Cultural Landscape' will descend and will be detailed below.

In the landscape there is the various temporal modifications that can represent a place of belonging and symbology, as something significant in the sense of representation of the being in space. The categories of space and time "are seen as unique elements founders of identity" (GOMES, 2010, p. 62), where time is part of a relationship of the

past with the present, with the existing modifications. The spatial transformation process presents results in a differentiated way, as each moment is unique.

Recently, this concept has been expanded with new landscape approaches related to other senses of the body, such as touch, sound and smell (GASPAR, 2001). Whatever the meaning used, the landscape is changeable, consistent with the history and dynamics of nature and interpreted from the point of view of those who see it, feel it, hear it, for it must be considered that each individual has a different perception on the other, being this perception dependent on a series of factors, such as personal culture, education, age, among others (BRUSCHI, 2007).

In a remote past, the landscape was appreciated according to its possibilities as a supressor source of the needs of the agrarian civilizations, giving value to the fertile plains, to the meadows, while the mountains were considered inhospitable landscapes in this function (PFORR and MEGERLE , 2006). Nowadays, the concept of Landscape can be related to several fields and cultural aspects, giving new values and characteristics to the relationship between the physical environment, history, man and the territory (PANIZZA and PIACENTE, 2009).

In the current world of the Technical-Scientific Revolution, where anecumenes have been gradually occupied, it is almost impossible to find a place considered totally exempt from human action, even indirectly, that is, a 100% natural landscape. Thus, this expansion of the human occupation ends up, therefore, having an influence on the expansion of tourism beyond the traditional destinations. The mountains, the African savannahs, the icy territories of Alaska or Siberia, the Atacama desert, the Amazonian rainforest, and even the overcrowded shantytowns of Rio de Janeiro, among others, have become new places of tourist flow in recent decades. After all, the tourist moves, sometimes thousands of kilometers, to see what is different from their daily life, either from a material or immaterial point of view (PEARCE, 2003), where the practice of tourism provides the opportunity to compare different worlds and to improve man's spirit of observation (AB'SABER, 2002).

"It is through the commercialization of the landscape, the sale of the image, that is based on the consumption of space, involving the displacement of goods and individuals" (ASSIS, 2001, page 43), that is, tourism practices are consolidated in their sense more broadly. This consumption of space is effective through the provision of tourist services by the destination visited, such as accommodation, transport, culture, products, gastronomy, among others, while the consumption of the landscape occurs as the tourist

moves on routes and appreciates the shapes, colors, smells, among others, that are all around them.

It is in the landscape that we find marks left over time, being these marks symbols of lived and constructed by society. In the urban landscape, monumental architecture and historical landscapes are examples of symbolic meanings, these patrimonies being essential for the valorization of space, especially in what refers to valuation through tourism. In addition, these marks were also conditioned by the landscape itself and recognize this role, as geoheritage, in a temporal period that refers to the conquest and occupation of this landscape, in the case of the Parahyba Capitania, it is also possible to add new information to the geotourism activity.

The aim of this book is to do a integrated evaluation of the various geodiversity elements and the municipality of João Pessoa, whose patrimonial value will later be redeemed as a geotouristic resource, since these informations was exuberantly documented during the colonial period in the form of texts, letters and iconographies. However, this relationship has been very little researched and divulged in the context of an interdisciplinary dialogue, where geodiversity is an object of study for the Geosciences and culture. This information can be taken, a posteriori, towards the tourist activities, thinking about the context of geotourism, which would add value to this activity.

## 2. The Cultural Landscape of João Pessoa and the geoheritage in the perspective of chroniclers and iconographers of Colonial Period

### 2.1. Introduction

The letter from Pero Vaz de Caminha, dated from 1st May 1500, Porto Seguro and sent to His Highness King D. Manoel I, began the description of the natural landscape of the newly discovered territory, after an almost three-month exhausting sea voyage. Considering the interests behind the great maritime navigations, launched by Portugal, Spain and other European powers in search of new colonies, could the land known at the time as Vera Cruz possess the same exploration potential that other territories had? In a context of a mercantilist doctrine, in which the accumulation of metals and a positive trade balance were primordial elements for the capitalist phase in force at the time, always under absolutist intervention, these terras novas (new lands) were enveloped in a veil of mystery that the Lusitanian Crown had no reservations in deciphering. While it maintained the possession of the Estado do Brasil (State of Brazil) for more than three

centuries, the management regulation of the colonized territory advocated the exploration of natural resources at all costs, as well as a production system that would increase the public coffers of the Metropolis. It was crucial that the King received, whenever possible, information about the new achamento desta terra (discoveries of this land)[1], resulting from the mapping of its potential.

To this end, some people accompanied the expeditions on the service of the King or the Church, and recorded, through written data (texts and letters), all pertinent information for the Kingdom, from the perspective of "knowing in order to explore".

From "various social classes and of diversified professional and intellectual formation, they described aspects of Brazil through chronicles, travel accounts, correspondence, memoirs, journals, drawing albums. The body of work they left integrates the so-called travel literature and constitutes a literature of testimonies [...] "(CALDEIRA, 1991, p.17, free translation). It is also relevant to mention the importance of the foreign travellers who were here, whether as invaders, like the French and Dutch, or allies of the Portuguese Crown, like the Spanish at the time of the Iberian Union, or the English, after the "opening of the ports", in 1808, who also left a legacy of supreme importance for the historical knowledge about a special period in the formation of our territory. In the historical context of colonization, the objective of most of these travellers was to document information that ensured the best possible coverage of this new territory, including, among others, the cultural habits of indigenous peoples and the characteristics of the fauna and flora present, in other words, its biodiversity.

Considering this, the geoheritage, as abiotic heritage, involving geological (rocks, minerals and fossils), geomorphological (relieves and processes), hydrological (especially freshwater streams) and pedological elements (SERRANO and RUIZ-FLAÑO, 2009), was also the object of analysis of these writers and iconographers, since it was the Crown's foremost interest to explore the rocky substratum of the colony for minerals that would enrich the Kingdom as well as, at a later date, to settle in the recently "discovered" territory. Thus, these writers were valuing, without even knowing it, the geodiversity of the conquered land and spreading it beyond the sea, although these actions went against geo-conservation. That is, their interest was knowledge in order to exploit and not for conservation purposes.

[1] Ministry of the Kingdom, Collection of plants, maps and other iconographic documents, doc 8, Torre do Tombo, refererence PT-TT-GAV-8-2-8 _m0009.

Other travellers during the colonial period had the opportunity to visit the northeast, as well as the Royal Captaincy of Parahyba and its capital, Nossa Senhora das Neves. They produced abundant documentation about the geodiversity of this captaincy, at first restricted to the urban nucleus and the surroundings of the capital, and subsequently, with the increased occupancy inland, towards the 'sertões' (countryside). Analysing from this perspective, the objective of this book is to describe the results of these documents, especially after the conquest of the Captaincy of Parahyba, dissociated from the Captaincy of Itamaracá and posteriorly elevated to the status of Royal Captaincy, as well as during the period in which this captaincy was part of the colony's economic context, when it got rid of the control of the Metropolis, in 1822, prioritizing the information obtained within the capital and its surroundings. These accounts will be prioritized, taking into consideration the four elements of geodiversity: geology, geomorphology, water resources (freshwater streams and estuaries, especially the Parahyba River) and soils.

Iconographies, such as paintings and maps, that depict residents' daily life, the architecture of the buildings and the surrounding natural landscape, at a specific historical moment of the aforementioned captaincy, will also be the object of analysis in this book, emphasizing the elements of geodiversity that had a a fundamental role in the human settlement and urban expansion of the present city of João Pessoa. In both cases, the purpose is to recognize the economic, cultural and functional value of geodiversity, as a provider of regulation, provision, support and cultural services. Analyzed in the present times, these documents and iconographies add a cultural value to the elements of geodiversity, definitively elevating them to a status of geoheritage.

In this way, will be given a new meaning to the landscape, going through the aesthetic-artistic to the functional-economic. It is intentional, at this stage, to present a retrospective and comparative analysis of the natural landscape and the cultural landscape, interweaving the aforementioned geoheritage elements to the cultural practices that forged the city and the identity of the people who settled on it. Even if the legacy left by these chroniclers does not have as main object the mentioned elements, undoubtedly they have influenced their themes and atmospheres.

The sum of these elements, which will be detailed below, associated with the cultural apparatus of that historical period, makes it possible to measure the Cultural Landscape of the region. After all, its constructions, human settlements, land and sea use, cultural traditions, among other cultural apparatuses, which later became part of the

heritage, are consequences of certain ideal natural conditions, particularly geological and geomorphological, and their processes, for the creation of human labour, which resulted in the urban expansion of João Pessoa.

## 2.2. Associating Geoheritage with the history of the Captaincy of Parahyba

### 2.2.1. Introduction

Originally part of the old Captaincy of Itamaracá, the consolidation of the Captaincy of Parahyba coincides with the construction project of the city of Nossa Senhora das Neves, in the year 1585, arising from the need for territorial occupation of the right bank of the lower course of the Para'iba River (native denomination of Tupi-Guarani origin, with pa'ra, meaning "river" and iba, meaning "bad, impracticable"), from the decade of 1530, and also due to the innumerable incursions, ordered by the colonial administration, against the Potiguaras who settled in the region that presently corresponds to the border between Parahyba and Rio Grande do Norte (ALMEIDA, 1978). The region, occupied since 1534, was the scene of great indigenous resistance and French incursions. The unexpected deaths of the first two Captains-Majors, together with difficulties controlling the natives and repelling invaders made its effective occupation difficult. This occupation only took place when João Tavares reached an agreement with the Tabajaras, who accepted the Portuguese settlement and joined them in the fight against other native tribes and the French. We reaffirm that the geographical location of the city was of extreme importance (PEREIRA and AMARAL, 2014).

Additionally, the city became the capital of a royal Captaincy that was directly subordinated to the King of Portugal and resulted from a new distribution of the territory. This measure was linked to the need to preserve the possession of the colony, since its coastline was threatened (ALMEIDA, 1978). A similar decision was taken regarding the Captaincy of São Vicente, which integrated the present location of the city of Rio de Janeiro, also threatened at the time by native resistance and French incursions.

The experience of occupation and exploration of sugarcane in the Captaincy of Pernambuco allowed both the transfer of production methods and the occupation of spaces, notably by settlements that used wood as a raw material (palisades and houses) and constructions made of wattle and daub, clay and plaited wood. The first consideration that concerns the geographical position of the city. Since it is a historical period marked by Portuguese colonization, two aspects must be taken into account on this point: 1) the strategic concern with the defence of the territory; 2) the construction of the city occurs

during the period of the Iberian Union, at which time Portuguese practices were influenced by Spanish culture and forms of administration (PEREIRA and AMARAL, 2014). These two factors allow us to understand the choice of the site where the city was built and the shape of its urban layout. The city's position was determined by factors such as the threat of French invasion and the need to guard against indigenous groups that resisted contact. Portuguese colonial cities mimicked the building patterns existing in Portugal since the thirteenth century, which means that they had a two-part layout comprised of a lower city (downtown) and an upper city (uptown), whose division mirrored the political-economic activities of the period: the lower city was destined for commercial activities while the upper city functioned as the administrative centre (TEIXEIRA and VALLA, 1999). Thus, the geographic positioning was the result of a plan. Located on the plain between the Atlantic Ocean and the Parahyba River, on the banks of the Sanhauá River, was the lower city, where the products destined for the overseas market were shipped; the administrative centre was built on the closest elevation to the river, from where a full view (and therefore control) of the outskirts of the city was possible.

At the top of the hill, full of leafy trees from the Atlantic Forest, 18 km inland in relation to the mouth of the Parahyba River, was the beginning of the urbanization of Nossa Senhora das Neves. Its precursory street was the Ladeira de São Francisco (slope of Saint Francis), which connected the fort, in Varadouro, to the first church built, the Main Church of Nossa Senhora das Neves, which was in fact a chapel. Transversal to the slope, in front of the chapel, houses of stone and lime marked the beginning of the second street, named Rua Nova (New Street), and currently called General Osório. They all overlooked the fluvial terrace of the Parahyba River. Sugarcane plantations spread in this fertile soil, stimulating the economy of this small town, which at the end of the sixteenth century had no more than 1000 inhabitants (MACHADO, 1977).

From the aforementioned reports, it is possible to understand the role of the elements of geodiversity in the consolidation and expansion of the primitive nucleus of Nossa Senhora das Neves. For this research, we consider the definition of geodiversity proposed by Serrano and Ruiz-Flaño (2007, page 144), which consists in the

> variability of abiotic nature, including lithological, tectonic, geomorphological, soil, hydrological, topographical elements and physical processes on the land surface and in the seas and oceans, together with systems generated by natural, endogenous and exogenous and human processes, which cover the diversity of particles, elements and places.

For Serrano and Ruiz Flaño (2009), geodiversity is not a complement to biodiversity, but an individual part of natural diversity, which cannot be separated from it. The fact that it is individualized gives it a geographical character, where scale has a fundamental role (local, district, regional, continental or planetary), forming a hierarchical network that goes from the particle to the gigantic landscapes that shelter natural and cultural elements.

In addition, the authors consider the importance of geological and historical time in the natural (geological, geomorphological and hydrological) and anthropic processes that cause changes and variations in the Earth's dynamics and elements. Thus, the amplitude of elements, systems and processes involved is widened, which also shows the elements correspondingly belonging to biodiversity.

In this way, rocks (with their minerals, ores, fossils and structures, such as fractures, faults and joints), soils, water resources (superficial or subsurface, fresh or salt water) and the relief (forms and deposits) will be considered as elements of geodiversity. This book will attempt to perceive the point of view that the writers of the colonial period held about these elements and their role in the urban expansion of the city.

### 2.2.2. Geological Heritage

The conquest of Parahyba was a result of the Portuguese Crown's increased intentions to expand northwards, with the Captaincy of Parahyba playing a fundamental role. Meanwhile, before their conquest, for about thirty years, expeditions had moored on the colony's eastern and southern coasts, essentially exploring the pau de tinta (ink wood) and creating the first cycle of this pre-colonial era, the Pau Brasil (brazilwood) Cycle (MACHADO, 1977; SALVADOR, 2010).

These expeditions back and forth to the colonial territory and to other Lusitanian colonies scattered around the world, formed hypothetical candidates to become Captains-Major of the lands the King started to donate, from 1531. These lands were called "hereditary captaincies". From this moment, an effective colonization began, with the captaincies of the northeast, especially Pernambuco and Itamaracá, entering the agenda of the discussions regarding the colonial economic structure.

Therefore, the elements of the geodiversity of the coastline of Parahyba, like the relief, as well as its biodiversity, began to be documented by dozens of other travellers.

In this case, the accounts of the elements of biodiversity (fauna and flora), quantitatively exceed those of the abiotic environment.

Shortly after the "handshake" that sealed the peace agreement between the Tabajara Indians and the Portuguese, which symbolized, according to historians, the conquest of the Parahyba Captaincy (MACHADO, 1977) at the foot of the fault plan of the Sanhauá, separating the upper city from the lower city, the local leaders began the reconnaissance of the surrounding landscape, in order to assess the real possibilities of establishing a human settlement and future urban expansion. After all, the reconnaissance of the site that would become the location of the seat of the Royal Captaincy was necessary, considering that the instructions given to Captain João Tavares were part of the Ordinances of the Kingdom. All the cities founded within the colony followed a pattern that took into consideration some conditions pertaining to geodiversity, such as the salubriousness of the site, land, ease of accessibility and communication, proximity to rivers, an upwind sheltered harbour, among others, in addition to the procedures of the land division, the hierarchical organization of administration, and others. Consequently, Martim Leitão, leader of the armadas that attained the conquest, as will be seen below, travelled around the area, from the Jaguaribe Stream to Cabo Branco, returning with the confidence that the place previously chosen was the best place, since it had limestone outcrops that could supply stone for stonework and lime, an upwind sheltered harbour, fresh water, gushing from the rocks, and an elevation that made it possible to overlook much of the fluvial plain located at the base of the site. At a distance of six leagues from the coast, at that moment unguarded by any defensive systems, the only fort built at that time, the Fort of São Filipe e São Tiago, had been abandoned (MACHADO, 1977). Considering that these elements of geodiversity were responsible for the site's successful urban expansion and its role in the local and regional economy, an analysis will be made regarding how these elements were described and recorded in the various specific documents throughout the historical colonial timeline.

Concerning the geological heritage, specially the lithologies in the study area, from the analysis of the historical documents exchanged between the Captaincy and the Crown, it is possible to observe that they practically did not mention this elemento of geoheritage, since they were basically administrative in nature, even if it was an important georesource used in the construction of the flourishing urban nucleus. In an unclear sequence, the historical heritage of the city began to rise. After the Main Church, the Convent of São Francisco (St. Francis), at the top of the hill that had the same name, the

Monastery of São Bento (St. Benedict) and the Convent of Nossa Senhora do Carmo (Our Lady of Carmo, both unfinished during the first decades of the seventeenth century), the Church of Misericórdia (Mercy) and the Chapel of São Gonçalo punctuated the top of the hill, defining the city's outer limits (MACHADO, 1977; ALMEIDA, 1978). The material used in the construction of these first historical landmarks was taken from the local landscape, from which were extracted the various components that corresponded to the different periods and varied intentions that determined the works.

The mapping of this architectural heritage in the Historical Centre, together with the meagre documentation, allow us to infer that during the colonial period only limestone was used as raw material. Key reports on this subject are present in the works entitled 'Summario' and 'Orbe Seráfica', which will be detailed below

The French harassment of the northern coast of the Captaincy of Itamaracá, combined with the Potiguares gentiles, on the outskirts of the Parahyba River "alluvium", who were becoming more and more daring, compelled the general Ombudsman Martim Leitão, authorized by the King D. Sebastian, to organize and even participate in some expeditions to conquer the captaincy's northern strip of land, after the foundation of the Royal Captaincy of Parahyba, whose date remains controversial. Between 1574 and 1585, four expeditions tried to conquer these lands but only the fifth was successful. All these expeditions were narrated in the book 'Summario das armadas que se fizeram, e guerras que se deram na conquista do rio Parayba; escripto e feito por mandado do muito reverendo padre em Christo, o padre Christovam de Gouveia, visitador da Companhia de Jesus, de toda a provincia do Brasil' or, in a simplified form, 'Summary of the Armies', whose authorship and publication date remain the subject of discussion and investigation, although the Parahyba historiography advocates the name(s) of the priests Jerônimo Machado and/or Simão Travassos, of the Society of Jesus, who participated in the expeditions of February and October of 1585, the latter being made after the conquest and both with the participation of Martim Leitão. The work, the first specifically associated with the Royal Captaincy of Parahyba, is divided into 24 chapters and covers a timeline between 1574, the year of the first expedition, and the beginning of 1587, after Parahyba was conquered and at the beginning of the city of Nossa Senhora das Neves.

According to Almeida (1978), the original manuscript remained unknown until mid-1848 or 1849, when it was published, in chapters, by Rio de Janeiro's literary newspaper Íris and, later in 1873, in volume 36, part 1 of the Revista do Instituto Histórico Brasileiro (Magazine of the Brazilian Historical Institute). In 1983, using the prints from

the newspaper Iris, the first version of the book, consulted for the purpose of this work, was published in Parahyba. It is a work of priceless historical value since its author considers himself a "witness of the events", presenting details not only about the conflicts inherent in the Portuguese/Native/French relationship in that historical context but also about the natural landscape that surrounded it. In this perspective, the abiotic environment, especially the water resources, the relief, the soil and the rocks are some of the elements of the landscape that were inserted with thorough detail into the accounts of the 'Summario' and that will be divulged herein from this perspective.

The chapter 15 of this book, entitled "A segunda jornada do Ouvidor- Geral e como se fez o forte" (The second day of the General Ombudsman and how the fort was made), is emblematic, since it refers to the long-awaited conquest of the Royal Captaincy of Parahyba and the preparation of the site for the establishment of its headquarters, Nossa Senhora das Neves. Accordingly, the chronicler's attention turns once again to the elements of geodiversity, especially the geomorphology and the rocks, which comprise the substrate of the future urban site, without forgetting the qualities of the Sanhauá River, nowadays an affluent of the Parahyba. From this perspective, the author is emphatic in describing the physical characteristics of the surroundings and the site itself, stating that

> "sobre o porto onde agora está a cidade, planície de mais de meia legoa, muito chã de todas as partes cercada de água. [...] a natureza ali pos com maravilhosa arte e muita pedra de cal, onde logo mandou fazer hum forno della e tirar pedra um pouco mais asima" SUMMARIO, 1848, pp. 66).

In addition, the fort's construction activities were systematically planned, where the echonomic value of geodiversity, like a supply servisse, contributing, in a useful and functional way, to the urban development and building of monuments, with the use of rocks from this substrate. It is important to point out that the limestone outcrop was located in the highest portion of the terrain, where the upper city was posteriorly formed. This outcrop did not resist the anthropic action. All the historical heritage built in the colonial period basically used limestone as the building material. The author tells us that he "e partia huns na cal outros no mato com os carpinteiros, outros nas pedreiras e com os serradores, barro e taipas, porque os alicerces e cunhais só o heram de pedra e cal …" (SUMMARIO, 1848, pp. 66).

To help clarify the georesources used in the construction of Saint Anthony's Convent and Historic Centre, as well as their origin, the most relevant work is the 'Novo Orbe Seráfico Brasílico' (New Brazilian Seraphic Orb) or Crônica dos Frades Menores

da Província do Brasil (Chronicle of the Minor Friars of the Province of Brazil), written by Friar Antonio de Santa Maria Jaboatam in the eighteenth century and printed in Lisbon in 1761. It is a work of priceless artistic and religious value as it is the record of the Franciscans' participation in the conquest and settlement of the colonial territory. Although much of the information, especially of an historical nature, was specifically about the Franciscan buildings scattered throughout Brazil, the work presents very valuable information, especially considering that there was practically no documentation addressing such matters in that period.

The work was initially published in Brazil by the Instituto Histórico e Geográfico Brasileiro (Historical and Geographical Institute of Brazil), in 1858, and its First Part was divided into two volumes. Subsequently, a second edition, entitled Part Two circulated and it was divided into three volumes, published in 1859, 1861 and 1862 respectively. Each volume was divided into numerous books that in turn were divided into chapters. Both parts overlap and complement each other, referring to the foundation of several convents scattered throughout the country, such as Santa Clara do Desterro, in Bahia; São Francisco, in the town of Serinhaém; Santo Antônio (Saint Anthony), in Recife, Ipojuca and Rio de Janeiro, among others. Meanwhile, the First Part, Volume I, 'Stanza XI' is dedicated to the history of the conquest and settlement of the Captaincy of Parahyba, while chapters IX to XIV, of Volume II, Book III, Second Part refer both to the details of the construction of Saint Anthony's Convent and issues involving geopolitics, the work of religious orders, the economy, the Third Order, among others.

The friar reports the presence of a vast limestone outcrop inside the St. Anthony's Convent and briefly mentions, with the help of an "art master", the textural characteristics of the rock needed for its use, stating that

> [...] Toda servio de grande conveniencia, e menos custo para as obras do Convento, que muito depois se levantou de novo, tirando-se de dentro da sua cerca todo o material de pedra, cal, e taõbem o saibro, que serve em lugar da arêa, e he uha terra algum tanto vermelha [Barreiras], que depois de tirada alguã, se segue esta athe se dar com o primeiro banco da pedreira, e tudo isto se tira dentro do terreno da cerca, sem a moléstia de o pedir, e comprar fora (JABOATÃO, 1861, p. 367)

and

> [...] nesta da cerca do Convento se tirou, e se tira, ainda que já hoje com algum trabalho desmontar a terra pelos seos altos, toda a pedra, assim de cantaria, como a mais, que He necessária a qualquer obra, ou edifício. Consta de vários bancos, como explicão os mestres de arte. Do primeyro, que se cobria ao

> princípio, e pelas bayxas de poucas terras, e em muitas partes descuberto, se tira a perda e tosca, e dura de alvenaria, do segundo, outra menos áspera, mas forte, de que se faz perfeita e forte cal, do terceyro cabeços para fortalecer as paredes, e do quarto a que serve para se lavrarem portaes, e outras semelhantes peças, não tão dura, e áspera, como as primeiras, mas muito mais alva, solida e liza, da qual se fazem perfeitas lavrages.[...] (JABOATÃO, 1861, p. 367).

The property built in the colonial period, according to the aforementioned accounts, had as lithic material limestone from the Gramame Formation, which is a sedimentary sequence belonging to the geological substrate of the municipality. For example, despite the numerous restorations that the Church of the "Santa Casa" (Holy House) underwent, archaeological research indicates the presence of limestone in all phases of the ground plan's evolution[2]. The Gramame Formation corresponds to the first maritime carbonate unit of the Parahyba Basin, of Maastrichtian age (72.1-66 m.a.), when the sea covered the ramp that characterizes the Basin, in a high sea system, representing the peak of maritime transgression in a period of tectonic calmness (BARBOSA, 2007).

These accounts are essential as historical geological documentation, since these outcrops were buried by anthropic action and by the high density of urbanization to which the area was exposed. It is important to note the detailed description of the limestone facies, which are herein called "banks", separated into four, from a sandy limestone on top, considered rough and hard, followed by a less sandy one, in other words, coarse, perfect for making lime, a third used on the walls, culminating, at the base, with a solid, compact and smooth limestone which is perfect for masonry works. This account allows us to deduce that there was a differentiation between what was used in the construction according to the limestone facies present in the outcrop.

Historical records mention the presence of limestone quarries and outcrops at the top of the hill between the Main Church and the Convent of St. Francis, in the middle of the seventeenth century, according to Schmalz (1966). The author presents the figure of the first vicar of the Main Church of Nossa Senhora das Neves, named João Vaz Salem dos Santos, arriving in the city one year after its founding. He was a controversial figure because, among his many activities and possessions, he was the discoverer of a quarry

[2] CANTO, A. C.de L. Arqueologia na Igreja de Santa Casa da Misericórdia da Paraíba. Disponível em <http://www.revistamuseu.com.br/emfoco/emfoco.asp?id=12183>. Acesso em: 28 de abril de 2013.

behind the Main Church, near the site of St. Francis' Convent. This quarry was probably located in the old Caminho das Pedreiras (Path of the Quarries), mentioned in the copies of the sesmarias published by Lira Tavares, in 1712. Through this path it was possible to arrive at the modern Gouveia da Nobrega, in the Baixo Roger, which goes behind St. Francis' Convent (RODRIGUEZ, 1962). Curiously, the aforementioned priest formerly owned the land where the Benedictine Convent and part of its property were located and which was subsequently confiscated by the Crown (PINTO, 1977, page 31).

A report written by the governor of the Captaincy of Parahyba Fernando Delgado de Castillo, on January 9, 1799, addressed to the Queen of Portugal, cites that

> as matas abundam em madeiras para a Marinha Real, para móveis, e embutidos, e para os edifícios dos prédios rústicos e urbanos: a pedra, a sofrível pedra que é precisa, acha-se bem ao pé da cidade com muita abundância e pouco custo. (AGUIAR, 1992, p. 73-74).

This citation is a clear reference to the massive outcrop of limestone on Bishop's Island, on the right bank of the Sanhauá River, farther from the center of the city, which from this time, it is assumed, would supply the raw material for the growing urbanization of João Pessoa, since the outcrops mentioned previously were no longer counted or no longer existed. From 1933 onwards it began to be commercially exploited by the nearby CIMPOR factory (now Intercement). On Tiriri Island, on the Sanhauá River, in the municipality of Santa Rita, belonging to the Metropolitan Region of João Pessoa, 8 km from the center of the capital, there are ruins of the oldest cement factory in Latin America, dated at the end of the 19th century, which was deactivated shortly afterwards, which proves the mineral potential of the rocky substratum which is the site of João Pessoa.

It is known that historically created architectural complexes can take centuries before their edification is complete. This observation leads to the inference that various artistic styles, political interests and cultural shifts influenced their final appearance, just as the human and natural resources employed changed according to the behavioural modifications, the acquisition of new techniques / technologies and new intentions. The historical documentation analysed in this work shows that, at first, the residences of Nossa

Senhora das Neves basically used taipa (lath - local wood mixed with clay)[3], and that, soon after, constructions using limestone began to appear.

Between 1634 and 1654, the captaincy was under Dutch invasion. At the end of Dutch invasion, their main legacy regarded the written and iconographic records of this period, with a precision of detail whose interests ranged from gathering information about the situation of the plantations to the mere description of the characteristics of Frederica[4] and its surroundings.

Maurice of Nassau, as governor of Brazil during the Dutch invasion in the northeast, was responsible for the first scientific and artistic expedition to the north-eastern lands; his entourage included the participation of doctors, astronomers, cartographers, naturalists, and architects. Gaspar Barleus and Johan Nieuhof, while not participating in this entourage, were responsible for the elaboration of two important historical accounts of the north-eastern coast dominated by the Dutch.

Some details of the city, especially those contained in the accounts of Barleus and Nieuhof, allies of Maurice of Nassau, contrast, curiously, with the classic urban descriptions formerly contained in documents. The humanist Gaspar Barleus, at the request of Count Nassau, published, in 1647, the work 'Rerum per octennium in Brasilia et alibi nuper gestarum, sub praefectura illustrissimi comitis. I. Maurtitii Nassoviae, etc... Amstelodami', translated into Portuguese by Claudio Brandão, in 1940, with the title 'História dos feitos praticados no Brasil, durante oito anos, sob o governo do Ilustríssimo Conde João Maurício de Nassau, etc., ex-governador e capitão geral de terra e mar ali e ora tenente- general da cavalaria das províncias- unidas da Holanda, sob o Príncipe de Orange' (History of the deeds practiced in Brazil for eight years, under the government of Count Juan Maurício de Nassau, etc., former governor and captain general of land and sea there and now lieutenant general of the cavalry of the provinces, under the Prince of Orange; MORAES and BERRIEN, 1998). This work is the result of the inventory carried out by Nassau's entourage, especially the works of the physician and naturalist Guilherme Piso and the German naturalist George Marcgrave, illustrated by the painter Frans Post, as a record of the years of Nassau's administration (GALINDO and LODEWIJK, 2001).

Barleus' work was uninterrupted, without subdivisions. In the majority of his work, he praises the achievements of Nassau's government, portraying the geo-political

[3] For example, present in the letter that Diogo de Campos Moreno sent the King, reference PT-TT-MR-1-68_m0020, from Torre do Tombo.

[4] Name given by the Dutch to the city of João Pessoa.

moment experienced by Brazil through information that includes history, economics, anthropology and demography, as well as some geodiversity elements, which were common to the writers of the time, such as the potential of the soils, the water resources, and the geo-resources associated with the monuments, among others. At one point, the author reports on Frederica, presently João Pessoa, stating that "the city itself contains some beautiful buildings, made of stone, whose corners and windows are of white marble, while the rest of the walls are of masonry" (BARLEUS, 1942, p. 93, free translation).

Regarding the georesources used in the city, together with its contemporary Nieuhof, mentioned below, this is the only historical source that refers to the presence of marble in some of the city buildings, which leads to the question as to whether the information that the author received may not have been the result of confusing limestone with white European marble.

Historian Johan Nieuhof lived in the northeast between 1640 and 1649, learned Portuguese and became the historian of the events that succeeded Nassau, preceding the popular revolt that resulted in the expulsion of the Dutch. The result of his research was a work, published in the Netherlands in 1682, entitled Gedenkweerdige Brasiliaense Zeem Lantreize, translated from an English edition into Portuguese, without a specific date[5], by the Biblioteca Histórica Brasileira (Brazilian Historical Library), in 1942, with the title Memorável Viagem Marítima e Terrestre ao Brasil (Memorable Maritime and Terrestrial Travel to Brazil). Very faithful to historical events, Nieuhof also described the physical aspects of the captaincies between the São Francisco River and Maranhão, beginning with an account of the voyage to Brazil and the geographic information about the destination, regarding extension, location and from a morphologic and historic point of view.

At one point in the account, the captaincies under the management of the West India Company are described in historical, economic, demographic and natural terms. Concerning the city of Frederica, the author reports that "it was of recent construction and boasted several imposing buildings with marble columns, with the remainder of the construction made of ordinary stone", as Barleus had described.

[5] In Crítica Bibliográfica (Bibliographic Criticism) contained at the end of the Brazilian edition, José Honório Rodrigues states that the Biblioteca Histórica Brasileira (Brazilian Historical Library) has English copies of 1732, 1746 and 1813, but it does not mention from which of these editions the book has been translated (NIEUHOFF, 1942).

Another important reference on the physical aspects of Brazil and Parahyba, in the early seventeenth century, was the work "Diálogo das Grandezas do Brasil" (Dialogue Concerning the Treasures of Brazil), of unknown authorship and probably written in 1618. Initially discovered by the historian Varnhagen, it was first published, in sparse chapters, in the "Revista do Instituto Arqueológico e Geográfico Pernambucano" (Magazine of the Pernambucano Archaeological and Geographic Institute) between the years of 1883 and 1887. The complete book was first published in 1930, by the Brazilian Academy of Letters, with an introduction by Capistrano de Abreu and interpretative notes by Rodolfo Garcia (ALMEIDA, 1978).

Most of the Parahyba historiography acknowledges Ambrósio Fernandes Brandão as the author of the work, although there is no unanimity about this. In the signed Introduction, in the first Brazilian edition, by Capistrano de Abreu, Parahyba is said to be the place where the texts were composed (BRANDÃO, 1977). In favour of the Portuguese Ambrósio Brandão is the fact that he lived in Brazil for 25 years, mostly in Pernambuco, and, after participating in several armadas to conquer Parahyba, he moved to Nossa Senhora das Neves, where he acquired two mills.

The dialogues alluded to in the text occur between Brandónio, "um português residente no Brasil desde 1583" (a Portuguese that resides in Brazil since 1583), perhaps an autobiographical character of Brandão, and Alviano, "um reinól" newly arrived at the colony. Brandônio presents himself as an educated man, acquainted with details of various sciences, who tries to convince the other of the qualities of this land. The conversation digresses through discussions involving geography, history, archaeology, botany, economics, and anthropology, among other topics. Just like the chroniclers of his time, the author also emphasized geodiversity elements such as water resources, geomorphology, mineral and gemmological resources and edaphology

One of the most lucid discussions made by the author discusses the presence of amber along the Brazilian coast which, according to him, is white and gray in Ceará, and black, from Pernambuco to Bahia (BRANDÃO, 1977, p. 142). This theme had been discussed by other contemporary authors, who described the genesis of amber as being marine. Despite the misunderstanding in the nomenclature, since amber refers to the product of the fossilization of the resin released by different groups of plants, both gymnosperms and angiosperms (CARVALHO and CARVALHO 2004, p. 197), it is pertinent to note that the author deconstructs this mentality of marine environment when it cites the resinous vegetal origin for the refered amber. According to the author

> "Mas o cuidardes que as baleias lançam o ambar na terra, é engano manifesto; [...] e por êste páu vinha pegado ao modo que o faz a resina pelas árvores, [...] se criam também em árvores, da sorte daquele páu, que dão o ambar por resina. [...] enganaram-se os que entenderam até agora que nascia como arrecifes, e deram no alvo os que queriam que fôsse resina; porque o páu achado dá disso bastante prova" (BRANDÃO, 1977, p. 217- 218).

Considering the density of the Atlantic forest at the time of the reports, full of angiospermic vegetation, typical of tropical climates, such as cashew trees, it would not be surprising if these resin-bearing tree branches would stop at beaches and collected by local residents. This resin is an organic compound, and those released by the gymnosperms of the northeastern coast are basically of terpene composition (CARVALHO, 1998; FERNANDES, *et al*., 2011). Thus, these terpenes, such as fenchona, camphor, fenchílico alcohol, among other types, give the resin coloration, texture and special odor, similar to other hydrocarbons, such as petroleum, for example.

The amber of marine origin is called 'amber-gray', which had already been reported by other chroniclers of the time[6].. This type of amber forms in the intestine of the whales and, later liberated, was taken by the currents and deposited in the brazilian beaches. Of dark coloration, with the very strong odor, was thus described by the author of the "Dialogues". According the author

> "Eu era então novo na terra, e não havia ainda visto nela nenhum ambar, pôsto que em Portugal me passára pela mão algum; mas, como era ambar gris, que vem da Índia, dava maravilhoso cheiro com ser branco, e pelo contrário aquilo, que me o mancêbo dizia haver achado, era uma coisa negra viscosa, que tinha o cheiro de azeite de peixe, e por êsse respeito cobrei tanto asco de o ter nas mãos, que lancei a bola pela janela fora entre umas ramas crescidas [...]" (BRANDÃO, 1977, p. 141).

According Priore (2000), several passages of the work denote Ambrosio Brandão's knowledge of the writings of the Greek naturalists Plinio and Eliano, as well as contradict it. Pliny, in his book 'Naturalis Historia', stated that amber 'came from the marine trees from which whales were fed', being extracted from the 'medulla' of the pines'. On the other hand, Eliano, in 'De Natura Animalium', "explained that these were

[6] For example, "em cujo bucho e tripas se acharam 12 arrobas de âmbar gris finíssimo, fora outro que tinha vomitado na praia." (SALVADOR, 2010, p. 384).

perfumed excrements of whales". Thus, we can affirm that Ambrósio Brandão was the first chronicler to inform the vegetal origin for some of the resins found in the Brazilian coast, despite the ambiguity of denominating it amber, in addition to referring to Amber-Gray, another type of resin.

### 2.2.3. Geomorphological Heritage

Another primordial geoheritage element for the success of the consolidation and urban expansion was the chosen relief for the fixation of the colonizer, and many reports and iconographies emphasize this elemento, among them the work titled 'Relação das praças fortes e coisas de importância que Sua Majestade tem na costa do Brasil' ("Relation of the strong places and things of importance that His Majesty has on the coast of Brazil"), which Sergeant Diogo de Campos Moreno had published in 1609 and is referred to as having the first iconographic representation of the city.

This first iconographic representation of the nascent city, in the seventeenth century, was depicted in the plan entitled 'Capitania da Paraiba a 6 graos a sul da Equinothial 1609' ("Captaincy of the Paraiba to 6 degrees south of Equinothial 1609"), with unknown authorship and accompanying the document "Relation of Strong places ...", represented in Figure 1. The city of Filipeia is described by the author as a

> [...] povoação, a que chamam cidade, há três mosteiros, com seus frades, a saber, um de São Francisco, que bastava, mui bem acabado e capaz de muitos religiosos, um do Carmo, que se vai fazendo, e um de São Bento que se fabrica e uma Casa da Misericórdia mui bem lavrada e a Sé mais pobre que todas, porque não é particular[7].

Regarding the iconography, in the figura 1(a), we have an overview of the lower course of the Paraíba River and, in the foreground, on the right, the Fort of Cabedelo, guarding the mouth of the river and, on the left, circulated, the city of Filipeia Nossa Senhora das Neves, detailed in figure 1(b). The original subtitle of Figure 1(a) is represented in Figure 2, with its transcription. It is interesting to note, by the subtitle, the reference, in point F, of two geoheritage elements: the topography, associated with the geomorphological heritage, and the presence of a fresh water source that comes from the rock, associated to the hydrological heritage.

[7] Ministry of the Kingdom, Collection of plants, maps and other iconographic documents, doc. 68, Torre do Tombo (refererence PT-TT-GAV-8-2-8 _m0009).

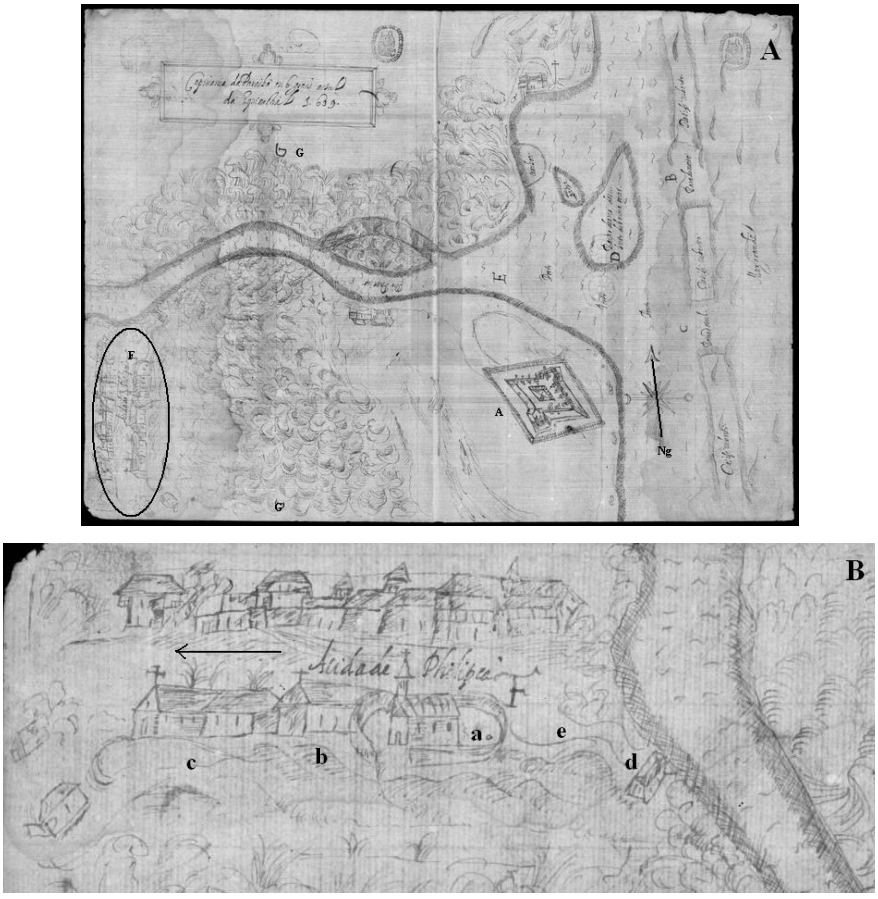
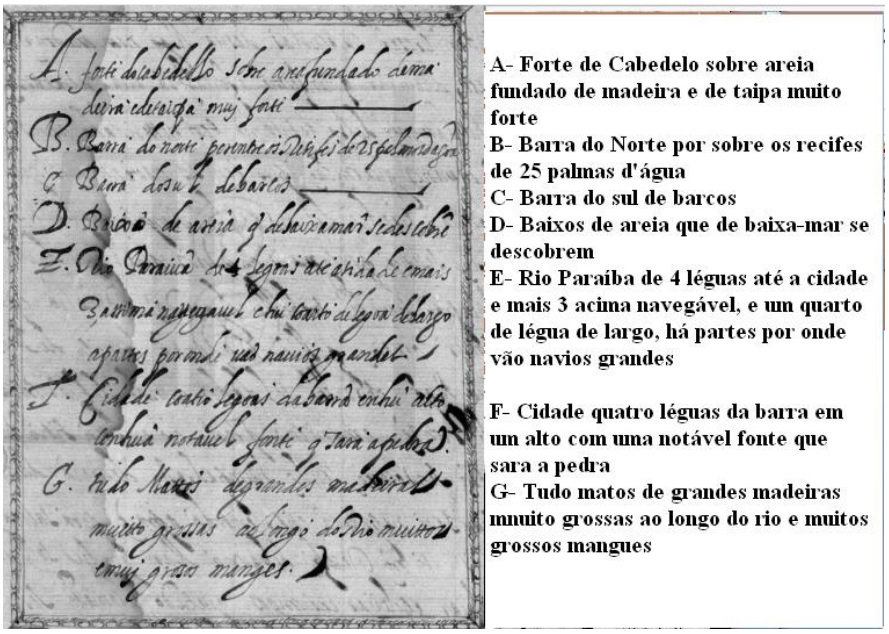



**Figure 1 - Work 'Captaincy of the Paraiba to 6 degrees south of Equinothial 1609'. a) General view, with the mouth of the Paraíba River, on the right, surrounded by a palisade, and on the left, the urban spot of Filipeia N. S. das Neves (point 'f'). b) Detail of the city and its port, being the a-Convent of São Francisco, b-Church of N.S. do Carmo, c-Church and Monastery of São Bento, d-Port of Varadouro, with warehouse and e-São Francisco hill, which connects the upper city to the lower city (Port of Varadouro). The arrow represents Rua Nova. Source: : Relação das praças fortes e coisas de importância que Sua Majestade tem na costa do Brasil, 1609 (extracted and modified from Ministry of the Kingdom, Collection of plants, maps and other iconographic documents, doc. 68, Torre do Tombo, reference PT- TT-MR-1-68_m0016).**



A- Forte de Cabedelo sobre areia fundado de madeira e de taipa muito forte
B- Barra do Norte por sobre os recifes de 25 palmas d'água
C- Barra do sul de barcos
D- Baixos de areia que de baixa-mar se descobrem
E- Rio Paraíba de 4 léguas até a cidade e mais 3 acima navegável, e um quarto de légua de largo, há partes por onde vão navios grandes

F- Cidade quatro léguas da barra em um alto com uma notável fonte que sara a pedra
G- Tudo matos de grandes madeiras muito grossas ao longo do rio e muitos grossos mangues

**Figure 2 - Original subtitle of the map 'Captaincy of the Paraiba to 6 degrees south of Equinothial 1609', on the left, and the transcription of its elements, on the right. Source: Ministry of the Kingdom, Collection of plants, maps and other iconographic documents, doc. 68, Torre do Tombo, reference PT-TT-MR-1-68_m0014).**

At this time, the urban site was already clearly configured in a upper city and a lower city, reproducing the patterns of buildings in Portugal from the 13th century, whose division reflected the political-economic activities of the period. This subdivision, in João Pessoa, was related to the topography, resulting from a geological fault: the lower city, known as Varadouro, the area of the river plain of the Sanhauá River (point 'd' on the map), a tributary of the right bank of the Paraíba River; the upper city encrusted in the low plateaus, or tablelands, the main local geomorphological feature. But it reflected, as well, a clear socioeconomic segregation, which has been perpetuated over time, where in the lower part of the city, in the primitive nucleus, were formed the port, the fort, the warehouse and, later, the commercial activities, where the products of the overseas market were to be shipped. In the upper city, the religious buildings (points 'a' to 'c'), the first residences, where the first streets were traced, and later the administrative buildings (TEIXEIRA and VALLA, 1999; VIANNA *et al*., 2005), having in Rua Nova men of public administration properties and rural owners of high purchasing power, like Duarte Gomes da Silveira[8].

[8] MOURA FILHA (2004) suggests, using as source batch scripts donated or sold to the São Bento Monastery, that in 1612, in Rua Nova, the main existing buildings were the Old Church, Town Hall (on the corner), the jail, the old slaughterhouse, the Church of São Bento (under construction) and some residences, such as Gaspar Gonçalves, Pedro de Lião, João de Heredia and Pedro Álvares.

Considering the geographic position of the city, two aspects should be taken into account in a historical period marked by Portuguese colonization: 1) the strategic concern with the defense of the territory, with the definition of the position of the forts, whether existing or not; 2) the construction of the city takes place in the period of the Iberian Union, at which time the Spanish culture and form of administration influence Portuguese practices. These two factors allow us to understand the choice of the place in which the city was built and the shape of its urban layout. Factors such as the threat of the French invasion and the need to guard against contact-resistant indigenous clusters have marked its position (PEREIRA and AMARAL, 2014). "The natural site, therefore, is intimately linked with urban evolution and with the process of production and appropriation of the city's space, constituting both one of the basic [geo] morphological elements of the city and a participant in its structuring, influencing in the segregation and being able to highlight routes"(SILVEIRA, 2004, p.86).

This urban functionality, resulting, therefore, from state planning, will remain intact for about 400 years. Only with the migration of the population towards the coast in the middle of the 20$^{th}$ century, this structuring will undergo modifications; after all, the city is a cumulative result of all transformations, constructed and rebuilt, through the social work in the course of time (SPÓSITO, 2000), being the center of religious, political and economic power where decisions would be made and would influence the lives of everyone living in their zone of influence.

After a second regiment was sent by King Phillipe II of Portugal, on 31st August 1612, to Gaspar de Sousa, the governor-general of Brazil at that time, the sergeant-general Diogo de Campos Moreno conducted, between 1612 and 1613, an impressive cartographic survey of all Brazilian captaincies under the administration of D. Diogo de Menezes (1608 to 1612), presenting statistical, economic, military and geographic data (MOURA FILHA, 2003)[9], interspersed with details of its geodiversity, contributing to the recognition of the occupation, settlement, defence and economy of the territory, under the context of the Iberian Union. From this survey result the above mentioned work ‘Relação das praças fortes’ and ‘O livro que dá razão do Estado do Brasil’ (“The book that gives reason for the State of Brazil”), published in 1616, whose cartographic representation was the responsibility of the cosmographer João Teixeira Albernaz, the

[9] The authorship of this book was discussed for the first time by the Instituto Arqueológico Histórico e Geográfico Paraibano (Paraibano Archaeological Historical and Geographical Institute) and published in volume XLII, pp. 175- 246, in 1964, by historian José Américo Gonçalves de Mello (see MENEZES, 1985).

Older, who did not participate in the expeditions and inserted the maps afterwards. The maps in this book were written on parchment, painted in watercolour, with dimensions of 0.566 m by 0.400 m (PINTO, 1977). According to Almeida (1978, pp. 163-164, free translation), Varnhagen published scattered extracts from this book, and the full edition was published "by the Public Archive of the State of Pernambuco, with introduction and notes written by Hélio Viana".

On describing the city of Filipéia de Nossa Senhora das Neves, the name given to João Pessoa during the Iberian Union, he refers to the urban site, which "está situado em hua llanura [planície], q se faz em alto desabafada, viltosa e de bons ares, e aguoas com sua fonte particular, q a sua aguoa é remedio notavel contra o mal da pedra [...]"[10] (LIVRO, 1968, p. 72). He covers the demographic composition, with eighty white neighbours, and the architecture of the city, with "tres mosteiros e hum delles de aspecto mui sumptuoso com outros edifícios nobres e pedra e cal, q quada dia se aumentão"[11] (LIVRO, 1968, p. 72). At the end, he highly praised the Captaincy, as it "será este hum dos mais favorecidos povos particulares de toda a costa", even more so if there were a union with Itamaracá, foretelling what would happen 150 years later, with the annexation of Parahyba by Pernambuco. It ends with the concern of fortifying the city, which would bring good profits to the King, resulting from the exploration of brazilwood and taking into account that the city was a Royal Captaincy and not a donation (LIVRO, 1968, p. 72).

The details of the Parahyba River estuary, with its fertile terraces where sugarcane plantations abounded, flowing into an ocean where beach rocks formed a natural obstacle and the presence of sandbanks, all geoheritage elements due to the presence of values, such as economic, functional, aesthetic, ecological and cultural values, ended up inspiring most of the existing accounts of the colonial period, such as those that will be analysed below.

The illustration 'Paraiba or Rio São Domingos', dated from 1626, is represented in figure 3. In (a), we can have a complete view of the place where the city was built, marked with a circle, as well as the lower course of the Paraíba River, the sugar mills, its islands, bar and the fort of Cabedelo. Through the subtitle, shown in Figure 4, the points

[10] "Stone disease" referring to the problem of kidney stones, so common at that time which extended to the present day.

[11] This "sumptuous" building probably is a reference to the St. Anthony's Convent, corroborated a few years later by Ambrósio Fernandes, when he considered it "the best of the order in the whole State of Brazil" (cf. BRANDÃO, 1977, pp. 49).

'a' and 'b' - bars formed by a huge sand bank deposited on the site are coastal elements described that serve to facilitate or hinder the passage of ships, relevant knowledge, to the mercantile policy of that time.

The figure 3 (b) details, even with a naive graphic feature, the city of Filipeia, highlighting some elements of its landscape.

By the characteristics of the area chosen to be inserted in the subtitle, transcribed in figure 4, we can conclude that it was the author's interest to represent the forts and buildings of the nascent city.

From a view of figure 3 (b), on top of the hill, hardwood Atlantic Forest trees were mapped on the outskirts of the city, and the mills at its surroundings. The San Francisco hill, the first path linking the lower city to the upper city, was subtly depicted in the lower right-hand portion of the map, a darker-colored slope, as well as the anchorage and warehouse on the Sanhauá River. The degree of detail of the representation shows a more complex layout of the streets, although irregular, and with some mapping errors. Menezes (1985) suggests that the supposed absence of a more efficient planimetric survey of the city would have contributed to this. The Convent of São Francisco (point M), for example, would have the Rua Nova as axis of connection to Santa Casa (point O), which is wrong. And Rua Direita, in this iconography, was not represented.


**Figure 3-Work 'Paraiba or Rio São Domingos' (1626). a) Photographic copy of the map, with a broad view of the city of Filipeia de Nossa Senhora das Neves, circled, and the lower course of the Paraíba River. The 'D' point was not found on the map. b) Detail of the circulated area, being: G-City of Filipeia of N. S. das Neves, L-Church of N. S. of Carmo, M-Convent of Saint Francis, O-Saint House of Mercy and P-Monastery of São Bento. Source: LIVRO (1968, fl. 75).**

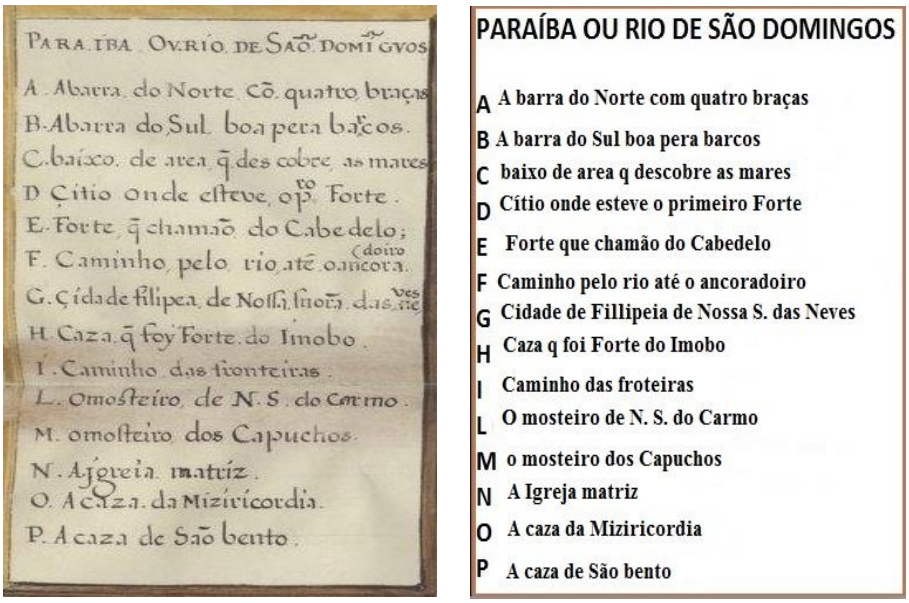



**Figure 4 - Original subtitle, on the left, of the Map 'Rio Paraíba or São Domingos' and the transcription, on the right, of its elements. Source: LIVRO (1968, fl. 75).**

Araújo (2012) warns of the importance of this plant in the understanding of the geometry of the shapes that consolidated the urban site of Filipeia, especially the configuration of the surroundings of the anchorage. The author identifies two promontories, at the right end of figure 3 (b), to the north and south, which would represent the structural terraces that model the western slopes and are responsible, for example, for the outcrops of groundwater in these slopes.

The last important Portuguese iconographic record of the Brazilian coast dates to 1640, being authorship and designer by João Teixeira Albernaz. It represents a paper codex containing 31 letters, the first being the Brazilian coast, and the other detailed points of the coast, including Parahyba (figure 5). As part of the commemorations of the 500th anniversary of Pedro Álvares Cabral's trip and the beginning of pre-colonization, the National Archives Institute of Torre do Tombo, Lisbon (IAN/TT) disclosured the historical source (TEIXEIRA, 2000), that the author had access to the facsimile and color version.

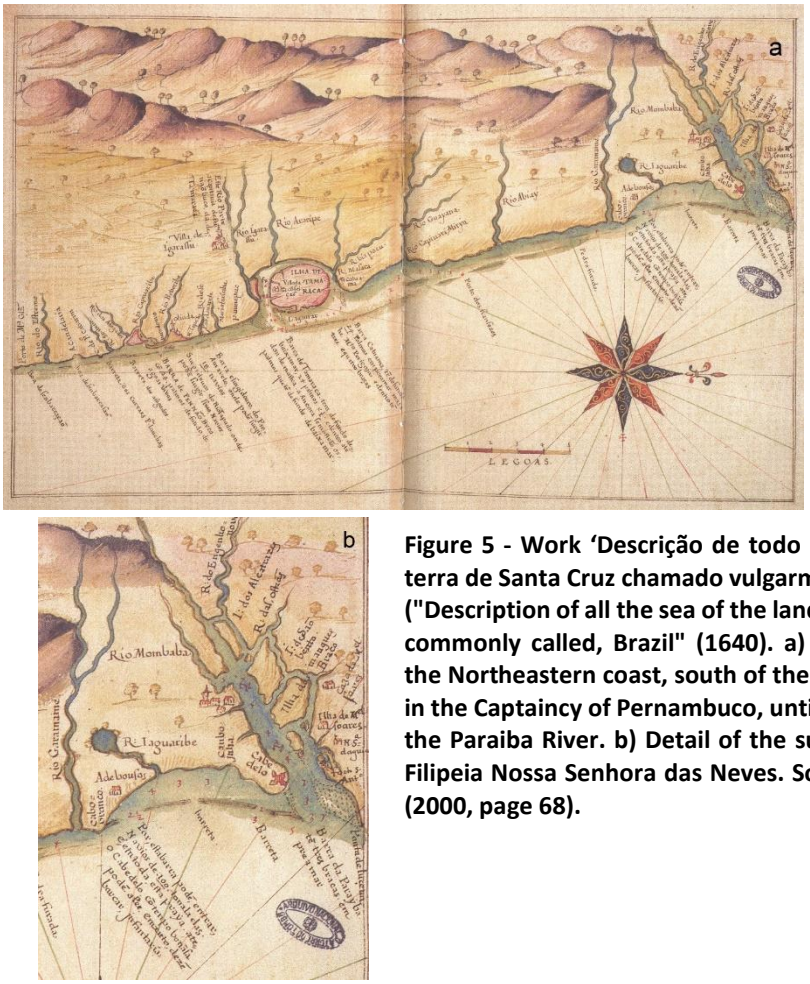



**Figure 5 - Work 'Descrição de todo o maritimo da terra de Santa Cruz chamado vulgarmente, o Brazil' ("Description of all the sea of the land of Santa Cruz commonly called, Brazil" (1640). a) Illustration of the Northeastern coast, south of the city of Olinda, in the Captaincy of Pernambuco, until the mouth of the Paraiba River. b) Detail of the surroundings of Filipeia Nossa Senhora das Neves. Source: Teixeira (2000, page 68).**

Unlike the work of Diogo de Campos Moreno, also mapped by Albernaz, the author gives little emphasis to the city of Filipeia, represented upstream of the Rio Paraiba mouth. The presence of a building on the coast denotes the occupation of that region at this time, a representation that will not be repeated in the iconography of the rest of the seventeenth century. The collection of the elements of the coast proves the author's interest in recognizing the coast, aiming its effective occupation. The points built were minutely described in the text, but poorly represented in the charters. Cables, islands, bars, rivers, among other elements, were mapped with precision, and the human occupation and forts were represented in a simple way through a few buildings.

Interestingly, the Jaguaribe River has its initial portion represented in the form of a circular body of water, something that is standardized in the various representations of this area made by the Dutch but have never been denominated. Coastal details about liming also appear, denoting the importance of the possibility of docking and occupation, as well as the colinous surface as it moves away from the coastline to inland. On the south

coast, the Gramame River Bar, 'Pedra Furada' and the Abiaí River were identified and mapped, as well as the Cabo Branco cliff.

In 1634, for example, the city of Frederica was represented by Claes Jansz Visscher, whose detail can be seen in figure 6, representing part of the drawing called "Afeelding der Stadt in Fortressen Van Parayba", or simply "Parayba" (figure 6).


**Figure 6 - Work 'Parayba' (1634). a) Overview of the work, with the Fort of Varadouro on the banks of the Sanhauá River and the city of Frederica circled. b) Detail of the city of Frederica, with the enumeration of some elements. The original numbers, which are circled in red, were transcribed in the next figure. The others, in red: Nº 1 - Old Church; 2 – Townhall Square (Rathaus) and Pellory; 3 - São Francisco hill e; 4 - Saint House of Mercy. The dashed line represents Rua Nova and the continuous one, Rua Direita. Note the presence of a third street, not referenced in the bibliography, parallel to Rua Direita. The city, to the south, ends abruptly. North up. Source: Overseas Historical Archive, document AHU_CARTi_014, D.1642**

In a broader plan, shown in figure 6 (b), we see the events arising from the arrival of the Dutch in the region, routes and the fortified elements erected by the Portuguese to hinder this advance. The subtitle of the illustration, in figure 7, highlights these elements, such as the landing place of the troops, on the beach, a few kilometers south of the Paraíba River mouth; the advance by the River Paraíba and the taking of the fortress of São Bento, denomination given for the fort on the island of Restinga; the various trenches, or 'aproches' - fosse, found on the way, in the vicinity of the forts, as well as the forts, like Cabedelo and Santo Antônio. Near the fortress of St. Catherine, the Dutch erected a fortified wall, with batteries and barracks, like the one marked "Governor Sigmundus von Schoppen", as well as placing boats guarding the lower course of the river. This same governor had its boat run ashore in a shallow place in the Paraíba River, in the south channel of the Island of Restinga. This morphological feature of the river will again be

portrayed in other engravings, such as the work 'Frederica Civitas', dated 1637-1645 by Jan van Brosterhuisen and Johannes Vingboons' Frederick Stadt (1640).

To detail the author's vision of the city of Frederica, we can see in Figure 6(b) the regularity of street layout, in chess, and some more prominent buildings, as well as the delimitation of lots of land on the outskirts of the urban area. In (a, below), we can see the detail of the urban route of Frederica, with its well-defined layout of lots and blocks, being enumerated some new elements of the city, those translated in the original subtitle, among them the San Francisco hill, main link between the lower city and upper city, with a fortification in the Varadouro. The Townhall Square, with the pillory, can be identified, as well as the churches of the main religious orders. The Old Church, with the inverted frontal position, is overestimated, for according to reports by Herckmans (1982), described later, it was ruined and under construction. The Convent of St. Francis, headquarters of the Company of the West Indies representatives and its soldiers, appears fortified. The original subtitle, in German, with its translation appears in figure 7.

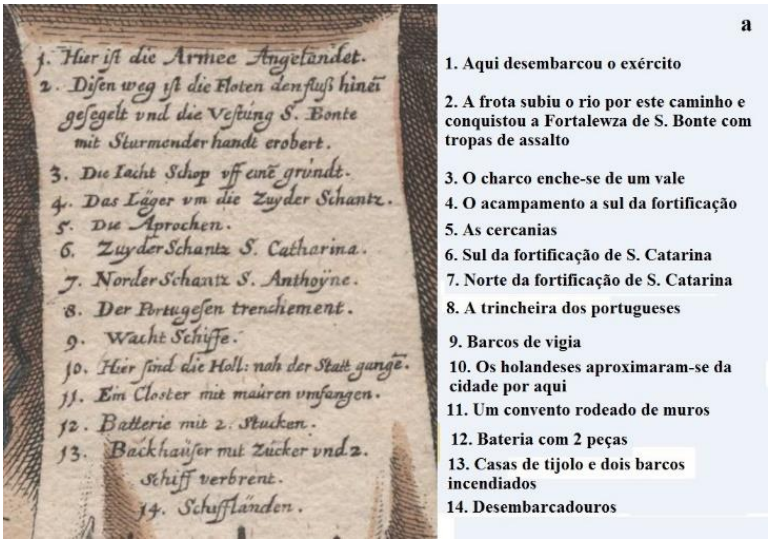



**Figure 7 - Original subtitle of the 'Parayba' map, with transcription, on the right, of its elements. Source: Overseas Historical Archive, document AHU_CARTi_014, D.1642.**

Much less elaborate is the drawing "Afbeeldinghe van Paraiba for Forten" (figure 8), of unknown authorship, but copied by Vingboons and dated from 1634, which depicts Frederica with only two streets, north-south sense and a few blocks, without the detailing of buildings. The little detail allows us to enumerate in six the number of blocks of the city, whose numerous roads take root from the periphery to the fresh water springs, including the Fonte de Tambiá, here called 'fonteyn', behind the wall of the Franciscans.

We can see the fortified Franciscan Convent and, towards the coast, two large lagoons, probably indicating the Jaguaribe River, here without continuity. At the confluence of some roads, to the east of the city, is bounded the lagoon, current Solon de Lucena Park. The Townhall Square, depicted in the previous figure, does not appear, while, in the anchorage, two warehouses were demarcated. The scale also allows the visualization of the landscape between the city and the sea, with the Jaguaribe river, without continuity, east of the city, in the form of two small lakes ('koleks'), perhaps for lack of vision of the cartographer of the all, since the rainforest took over the whole landscape (ARAÚJO, 2012). The military context remains, with the image of soldiers and warships, in a firts plan and a fort in the lower right portion of the image. It is pertinent to point out that most of the roads that leave the city, mainly towards the coast, end up passing through rivers and lagoons, denoting the importance of water for the consumption of the resident population. And, on the right side of the wall of the Convent of San Francisco, the author delimits a relatively steep slope, denoting the colossal position on which the upper city was built, with several rounded hills towards the beach - the tabelands, in relation to the fluvial-marine plain of the Paraíba River, to the northwest and to the own coast, represented here by an extensive network of dunes.


**Figure 8 - Detail of the work "Afbeeldinghe van Paraiba for Forten" (1634). Source: REIS FILHO (2000, CD rom).**

Figure 9(a), named Frederica Civitas, dated from 1637-1645, by Jan Van Brosterhuisen, included as a picture in the Latin version of Barleus' work shows, on an aerial plane, the entire lower course of the Paraíba River and the city of Frederica, to the left, in the upper portion of the rectangle. We can see the fort of Santo Antonio and

Cabedelo, at the mouth of the river, the island of Restinga, as well as the reefs that touch the coast and the sandbars near the mouth, which form the north and south bars, described earlier in other works.

In Figure 9 (b), the dense vegetation of Atlantic forest that spread all over the coast is reduced to spots along the path, indicating a disinterest of representation by the cartographer. The urban site appears well represented, with its lots, blocks, streets and buildings, as well as the water resources in the outskirts of the city, reached by a multitude of ways. Of these fountains, the points '1', '2', '3', and '4 should be highlighted.

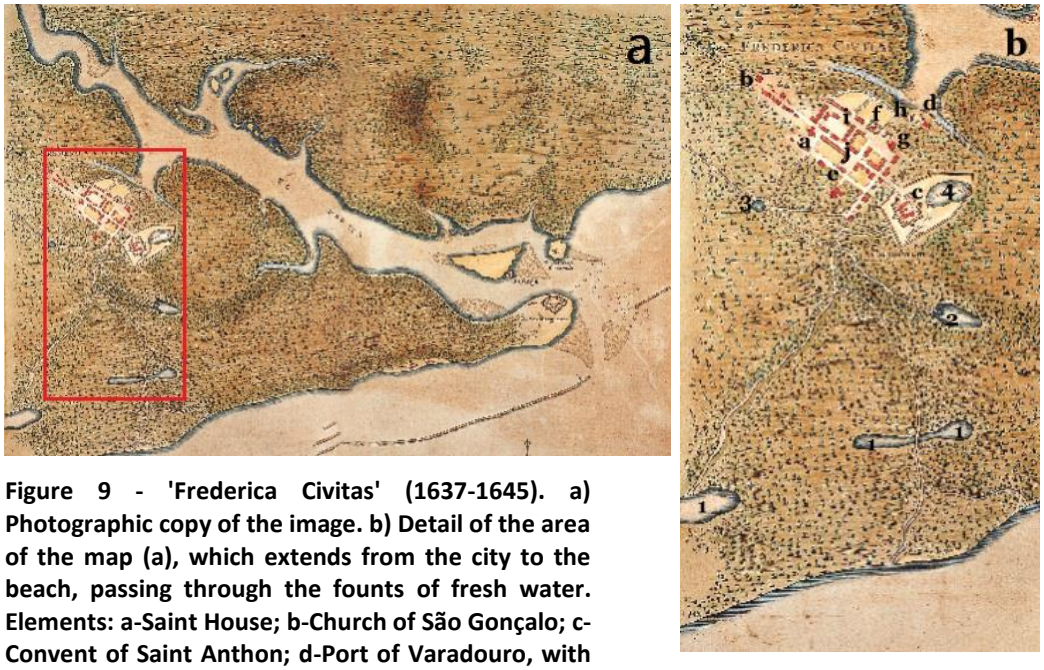



**Figure 9 - 'Frederica Civitas' (1637-1645). a) Photographic copy of the image. b) Detail of the area of the map (a), which extends from the city to the beach, passing through the founts of fresh water. Elements: a-Saint House; b-Church of São Gonçalo; c-Convent of Saint Anthon; d-Port of Varadouro, with the warehouse and palace; e-Carmo Church; f-Church of São Bento; g-Old Church; h-Saint Francis hill; i-Rua Nova; j-Rua Direita; 1-Lagoa dos Irerês, current Solon de Lucena Park; 2- Fountain Tambiá; 3-Small lakes that form the Rio Jaguaribe; 4-Fountain of St. Anthony, in the Convent of St. Anthony. Source: BARLEUS (1942, picture 26).**

In this same figure, which details the outskirts of the city, we can visualize the regularity of the urban layout, identifying only Rua Nova and Rua Direita, which is extended by a road, terminated by the Church of São Gonçalo, on the southern boundary of City. The presence of fresh water in profusion, in the form of streams, fountains and ponds, was fundamental for the position of the urban site in the place where it was built. Inside the convent of St. Anthony was identified a spring of fresh water, which supplied

seraphic friars and part of the population[12], while paths connect Frederica to the dolina, identified with the number 3 on the map. We can also identify that the four religious orders (Carmelites, Jesuits, Benedictines and Franciscans) positioned their buildings, in the urban site, forming a cross. This demonstrated their power as an institution in the urban environment. Like any iconographic representation of the time, the lower city appears underestimated, very little being represented except a small building in the port, probably representing the warehouse. We can note the non-existence of the pillory, the warehouse, the jail and the slaughterhouse in Town Hall Square in the second one, as well as a relatively broad Old Church square.

The landscape of the city of Frederica, seen from the Rio Sanhauá, served as inspiration for several artists. One of these works, represented by figure 10 (a), entitled "Parayba", probably authored by Frans Post (1647), painter of Nassau's entourage, and who illustrates Barleus's book as a picture in the Latin version, can identify the Convent franciscan on the hill, on the left, the warehouse and fortress, in the port, and a large building in the center, which could be the Saint House, all surrounded by a dense green area, which marks the landscape (figure 10b). The coat of arms of Paraíba, at the top left of the engraving, was idealized by Nassau, represented by six sugar loaves, pyramidal in shape, arranged in three rows forming a triangle. This representation confirms the importance of Paraiba sugar for the colonial economy where, even though Pernambuco owned 120 mills against 18 of Paraíba, Paraiba was of better quality (ALMEIDA, 1978).

[12] In iconographic records of the end of the XVII century, in the surroundings of this convent a wall will be built, restricting the passage of the population to this source.

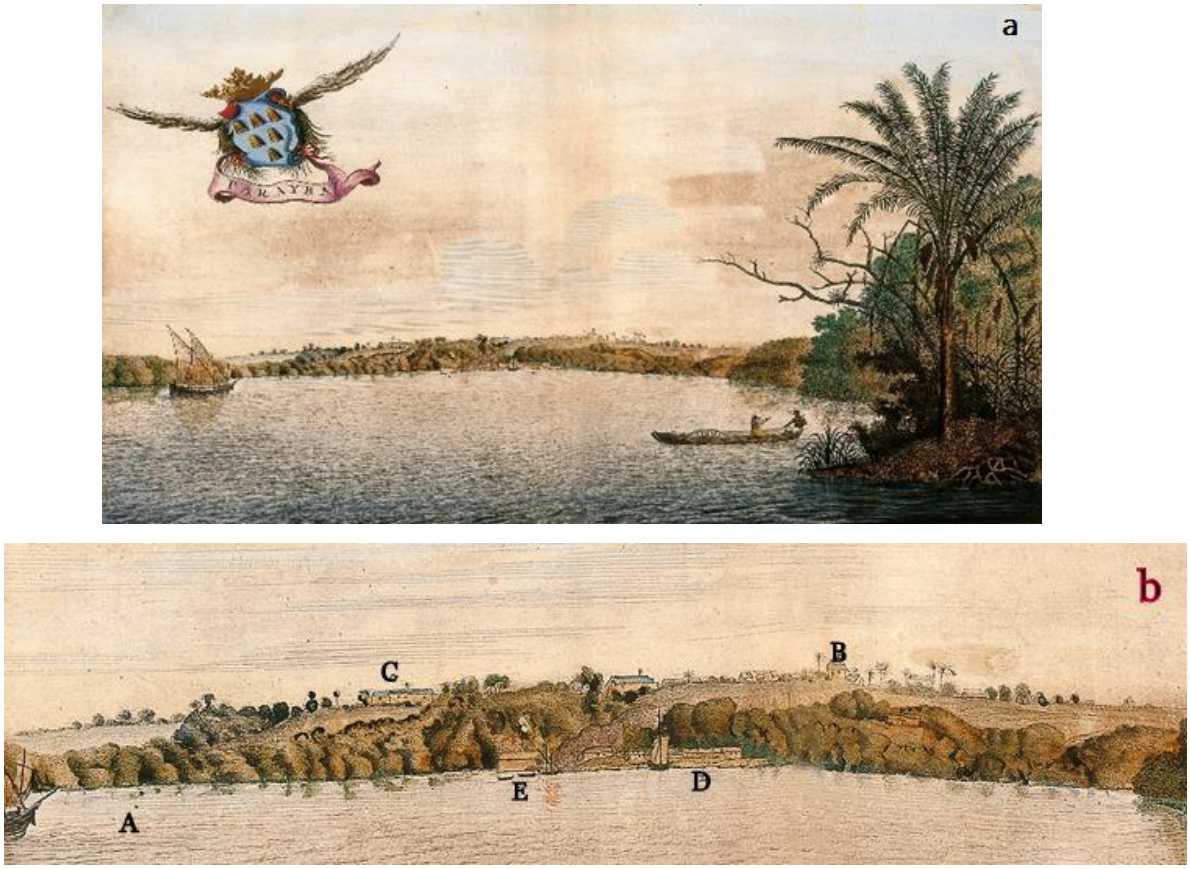



**Figure 10 - Profile of Frederica (1647). a) View in the second plan, at the top of the hill, from the Sanhauá River; b) Detail of the upper and lower city, where A - Paraíba River; B-City of Frederica; C-Convent of Saint Francis; D-Warehouse; E-Fort, and between the Convent of Saint Francis and the fort, the Saint Francis hill. Source: REIS FILHO (2000, CD rom).**

In the end of seventh century, in 1698, the Portuguese João Noronha Freire, a Carmelite convert, became João José de Santa Teresa, and edited in Italy a work about the war between Portugal and Holanda, known as the 'Istoria delle gverre del regno del Brasile accadvte the crown of Portogallo, and the Republica di Olanda' ("History of war of Brazilian Kingdom happened between the Crown of Portugal and Repuplic of Holland"). Inviting several designers to illustrate it, whose work of Post became a reference (MICELI, 2011), the author also portrayed the city of Paraíba (Figure 11) by the same angle as the aforementioned painter. Compared to Post's profile, the city is more populated and the buildings more detailed, including the possibility, for the first time, of being able to visualize, with a certain level of detail, the Varadouro Fort. Until then, its representation was limited to aerial images, rather superficial, and in this work we see a walled construction, with an internal building, next to the so-called 'arsenal'. It is noted that a path connects the fort to the upper city. In previous representations, this path was the Saint Francis hill, extending to the Convent of Saint Francis. In this illustration, the

convent is situated more to the south, and no path connects it to the fort, which shows a lack of care in the representations of the roads and streets belonging to the city of Parahiba.

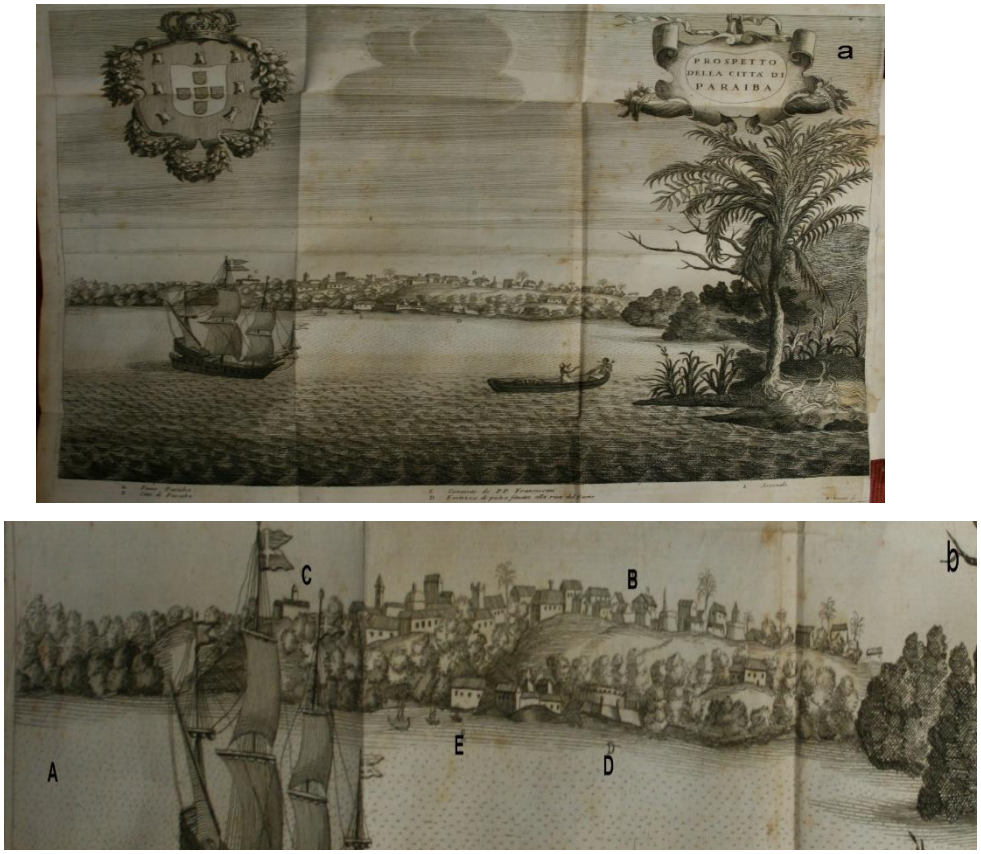



**Figure 11 – Photografic copy of the city of Paraiba (1698). a) Broad view of the city from Paraíba River; b) Detail of previous engraving, where A - Paraíba River, B-city of Parahiba, C – Franciscan Convent, D - Stone fortress located on the shore of the river, E - Arsenal. Source: SANTA TERESA (1698, p.78-79).**

The work 'Summario', in its first chapter called 'Ideia particular destas partes e geral do Brasil' ("Particular and general idea of these parts of Brazil"), can be subdivided into three parts: in a first part, the author describes the geological and geomorphological elements of the Parahyba River estuary where, according to the author, the river runs "athe a ponta de Cabedelo que he já dentro" (SUMMARIO, 1848, p.25), this point being an extensive peninsula that separates the Parahyba River from the Atlantic Ocean, corresponding to a Holocene maritime terrace, formed in the last maritime transgression, which occurred 5,100 years AP (SUGUIO and MARTIN, 1978). It records the width of the river bar, the presence of sandbanks that surface at low tides, Restinga Island, the possibility of good draft for large vessels, always in comparison with the ports of Itamaracá and Pernambuco, and mentions the presence of reefs tangential to the coast. These reefs are of the rocky type, "beach rocks", which extend for up to 8500 meters, and

are characterized for being consolidated deposits resulting from the calcite lithification of sediments in the intertidal zone, typical of tropical, warm and photic coasts (TURNER, 2005), according to Suguio (1998). These reefs are formed by sandstones and conglomerates, cemented with calcite, containing fragmented or whole mollusc shells. Since the top of these reefs may rise above the present average sea level, and considering these rocks were dated between 4830 to 6200 years AP (DOMINGUEZ *et al*., 1990), it is possible to infer that there was a decrease in the sea level in the second half of the Holocene, which made it possible for the author of the Summario to see the top of these reefs, even about 1300 meters from the coastline. This decrease may be related to the beginning of the Little Ice Age, which dates from this time, extending into the mid-nineteenth century.

In the context of the Dutch invasion, apart from the aforementioned Johan Neuhof and Gaspar Barleus, the records left by Elias Herckmans deserve attention.

Elias Herckmans was appointed third director of the Royal Captaincy of Parahyba, between 1636 and 1639. During this time, he elaborated a detailed report on various aspects of the Captaincy of Parahyba, such as the physical characteristics of its main basins, Frederica's urban aspects and the daily habits of the Tapuias Indians, inhabitants of the interior of the Captaincy. This report, written in 1639, was only printed in 1879, in the "Chronicle of the Institute of Utrecht", in the Netherlands, and made known in Brazil by the historian from Pernambuco, Jose Higino, in 1887, when it was published with the title "Descrição Geral da Capitania da Parahyba" (General Description of the Captaincy of Parahyba), in the magazine of the Archaeological Institute of Pernambuco, volume 5, number 31, pages 239 to 288. Meanwhile, in Parahyba, this book was only published in 1911, in the "Almanaque do Estado da Paraíba" (Almanac of the State of Parahyba; (HERCKMANS, 1982), from which this text was extracted. Divided into three parts, in the first and denser, without a title, the author initially made a complete survey of the basin of the Parahyba River, through its mouth and tributaries, advancing further into the city of Frederica and, later, moving upstream, describing the countless mills associated with the river terraces. By stating that "Em águas, ares e fertilidade é esta a Capitania uma das regiões mais saudáveis do Brasil" (HERCKMANS, 1982, p. 9), the author anticipated the praise of the natural aspects of the Captaincy that permeated throughout the account, as well as stating that "fora do Varadouro, subindo o rio durante os Barreiros, que quer dizer sítio onde há muito barro, e aí se costuma cozer muitos vazos e telhas para as cobertas das casas" (HERCKMANS, 1982, p. 17).

The coastal geomorphological heritage, such as coastal profiles and cliffs, whether from the present portion of the urban coast or from the south coast of the State, with its associated elements, were described by both Gabriel Soares de Sousa and Elias Herckmans.

Francisco Barreto's expedition to Africa in 1567, which eventually brought him to Bahia in 1570, had an illustrious passenger on board. He was the Portuguese Gabriel Soares de Sousa, who, once residing in Salvador, became master of planter and ‘sertanista’, always in search of gold and precious stones (SOUSA, 1879). While waiting for royal authorization to explore the valley of the São Francisco River, he began writing for 17 years a report containing geographic, botanical, ethnographic and linguistic data on the entire Brazilian coast, from the Amazon River to the River Plate, called’ Tratado descritivo do Brasil em 1587’ ("Descriptive treaty of Brazil in 1587"). The codices of this 'Treaty' spread throughout the world, having been part of them cataloged by Francisco Varnhagen, resulting in its publication as a book in 1851 in Lisbon, despite the existence of poor quality of these manuscripts in 1825, published by the Royal Academy of Sciences of Lisbon.

This book was divided into two parts: the first, called the General Route of the Brazilian Coast, divided into 74 chapters, was dedicated to a detailed description of the natural landscape, including elements of geodiversity such as soil, relief, rocks and water resources throughout the Brazilian coast, including the Paraiba, as well as historical information on the formation of the captaincies and the anthropological analysis about the various tribes that crossed their path. The second part, entitled Memorial and Declaration of the Greatness of Bahia, was subdivided into 18 titles, making a total of 186 chapters and, as the name refers, represents an ode to the Captaincy of Bahia, who welcomed him and was his home until the death, in 1591, while on an expedition in search of precious metals in the ‘sertão’ (backlands and founding villages along the Paraguassu River. This ordering of divisions, titles and chapters, as mentioned in the comments at the end of the book, was done by Varnhagen himself to benefit readers with a "laconic and clear index" (SOUSA, 1879, p. 332), even dismembering phrase "Descriptive Treaty of Brazil in 1587" existing in the first part of the book and making it the title of the work. The information contained in this text refers to the second edition, dated from 1879, to which we had access.

In chapter XIV of the book, entitled ‘Em que se declara a costa do rio da Parahyba até Tamaracá, e quem foi seu primeiro capitão’ ("In which declares the coast of the river

from Parahyba to Tamaracá, and who was its first captain") and in chapter XV, ‘Que declara a costa de Igaruçu até Pernambuco” ("that declares the coast of Igaruçu until Pernambuco"), respectively, Gabriel Sousa returns to report the presence of reefs and other coastal geographic features, forming a special, detailed landscape, as follows.

> “Deste rio [Ararama] ao da Abionabiajá são duas léguas, cuja terra é alagadiça quase toda, e entre um rio e outro ancoravam nos tempos passados naus francesas, e daqui entravam para dentro. Deste rio ao da Capivarimirim são seis léguas, o qual está em altura de seis graus e meio, cuja terra é toda chã. [...]” (SOUSA, 1879, p. 21).

The nomenclature of rivers described in chapter XIV was not perpetuated in the literature; however, due to the distances between the river courses mentioned in the text and its characteristics, we suggest that the Ararama River be the Gramame River, Abionabiajá be the Abiaí River, while the Rio Capivarimirim be the Rio Capibaribe-Mirim, which, together with Rio Tracunhaém, makes the natural border of the States of Paraíba and Pernambuco. In the case of the first, the citation of a 'marsh' corresponds to the presence of a ‘maceió’, which corresponds to a branch of the river separated from the ocean by a bar of sand, forming, therefore, a swamp area, besides the fact that the region has was a constant area of French contribution, known as 'Port of the French' (LIVRO, 1968, p. 67); on the outskirts of the Tracunhaém River estuary, whether on the Paraiba or Pernambuco side, there is a widening of the Holocene terrace, there being no active cliffs, which makes the place a vast coastal plain, hence the term ‘cuja terra é toda chã’.

The irregular coastal terrain, whether the current portion of the urban coastline or the southern coast of the State, with their associated elements, was described by Herckmans. In his wanderings, that resulted in the book “Descrição geral da Capitania da Parahyba” (Overview of the Captaincy of Parahyba), Herckmans covered the south coast along some of its basins and irregular coastline. Regarding the basin of the Gramame River, which flowed to the south of the city of Frederica, the author described a relevant element of the geomorphology, which he called the “campina”, explaining afterwards that it was a plain or a plateau.

According the author, “do Gramame segue um caminho pelas campinas o qual passa meia légua à mão direita por diante desta aldeia [...] Campina é a terra alta ou tabuleiro do Gramame que do mesmo rio ao Taperubu tem quatro léguas de largo” (HERCKMANS, 1982, p. 24). This area, recognized in later geomorphological studies

by Herckmans, was found to contain the highest terrains of the Parahyba coast, as a consequence of post-Cretaceous tectonic events.

These plains, also called low plateaus, developed on the crystal shields and present, on the side facing the sea, cliffs, such as Cabo Branco. From a geomorphological point of view, they have flat or gently undulating tops that abruptly end on the adjacent plains, in the form of relatively steep slopes. In the coastal plain, these slopes are called cliffs, which are either active or inactive and formed by the Barreiras Formation, interrupted either by cliffs or fluvial carvings, in the form of open or enclosed valleys forming vast amphitheatres. They give sequence to the sedimentary deposits of the coastal lowlands, with their beaches, terraces, river plains, sand dune fields, among others. The plains have a gentle inclination to the east and average heights that reach 40 to 50 m and an extension of up to 40 km of the coastline (FURRIER, 2007; REIS, 2008). In the text, Herckmans (1982) refered to the 'Ponta de Cabo Branco', currently known as Ponta do Seixas, the most eastern point of the Americas, where "quatro ou cinco léguas desta baia [Popoca] para o norte se acha o Cabo Branco; é uma ponta que se faz mui branca a quem vem do mar, e por isso assim se chama. Daí até o Cabedelo ou barra do Paraíba se contam diretamente quatro léguas pelo mar, mas por terra contam-se seguramente seis por causa da grande curva que faz a costa, a modo de meia lua" (HERCKMANS, 1982).

By stating that the distance by land from Cabo Branco to Cabedelo is greater than by sea, the author was referring to Frederica's coastal cliffs and the Cabedelo sandbanks, formed by the coves of Cabo Branco, Tambaú, Manaíra, Bessa, Intermares, Ponta de Campina, Poço, Camboinha, Areia Dourada, Formosa and Miramar.

### 2.2.4 Hydrological Heritage (Freshwater Fountains)

If the choice of the place to be installed the city of Nossa Senhora das Neves had to do with the topography and the presence of rocks, the existence of fresh water fountains that flowed in various parts of the lower plateau played a fundamental role as well. Diogo de Campos Moreno wrote that there was a source of fresh water with medicinal qualities, since it cured the 'mal das pedras ("stone desease"; LIVRO, 1968, sheet 72), as previously described.

There is no unanimity in the evaluation of the water quality that supplied the population in the mid-seventeenth and eighteenth centuries, despite Moreno's accounts, which described the presence of good quality freshwater sources scattered throughout the city. The Tambiá fountain, one of the most important in the city, for example, was

criticized by the Ombudsman of the "Fazenda Real da Paraíba", Jorge Salter de Mendonça, according to a letter addressed to King João V, dated 1736, in which he stated that

> se necessita uma fonte chamada do Tambiá que há nos arrabaldes desta cidade e sem a qual se nam pode passar por se estar bebendo de hum xarco exposto as imundícias de que nem pode deixar de resultar prejuízo aos seus moradores que nam duvido com corram também com os seus escravos pella utilidade que se lhes segue[13].

In addition, on the eve of the conquest of Parahyba, the author of the Summario also emphasizes the difficulties in finding good quality water, specifically on the left bank of the Parahyba River.

The closing sentence of the first chapter of this book is "me paçarei atratar das armadas que para a conquista se fizerão e guerras que nella houve", predicting what would be reported in chapters 2 to 15, regarding all the events related to the expeditions that culminated in the conquest of the Royal Captaincy of Parahyba. Meanwhile, interspersed with the existing outcomes, the author points out data on geodiversity, such as water supply difficulties, considered in various locations as of poor quality, for example in the third chapter, entitled Como Frutuoso Barbosa foi encarregado da Parahiba (How Frutuoso Barbosa was in charge of Parahiba), during the second expedition, dating from 1582, which described the difficulties of settling on the south bank of the Parahyba River, "por ser mao sítio e não ter água" (SUMMARIO, 1848, p. 37). The water that existed was extracted from small cacimbas (water holes) on the beach. Once the Old Fort was founded, during the third expedition, in 1584, on the left bank of the river, in front of Restinga Island, there were more reports of the terrible quality of the freshwater on this bank, belonging to chapter four, denominated Como chegando Diogo Flores a Bahia de ordenou vir ao Parahiba (How Diogo Flores, when arriving at Bahia, was ordered to come to Parahiba; SUMMARIO, 1848, p. 43).

After the Dutch occupation, at the end of the 17th century, very few documents report on the demographic growth of the city of Paraíba or its urban expansion. One of the few imagery documents refers to a plant in part of the city of Parayba, made by pilot captain Manoel Francisco Grangeiro in 1692 (figure 12) and emphasizes the fresh water fountains present in both the upper and lower cities. This map shows, in a firts plan, the

[13] A.H.U.-ACL_CU_014, Cx 10, doc. 791, fl. 3

Old Church and the Church and Monastery of São Bento. The road network showed plus one more street besides the three already mapped until then: ‘Estrada que vai das cacimbas até a porta da Igreja do Rosário dos Pretos’ (“Road that goes from the ‘cacimbas‘ to the door of the Church of the Rosary of the Blacks“), later Ladeira dos Rosários. If the denominations ’Rua do Varadouro para as cacimbas e portinho’ (“street of Varadouro to cacimbas and little port”) and ‘rua do carro para a cidade’ (“street from car to city”), precursor of Rua da Areia, appear for the first time in an iconographic record, its representation had already been made by the Dutch (figure 9b , for example).

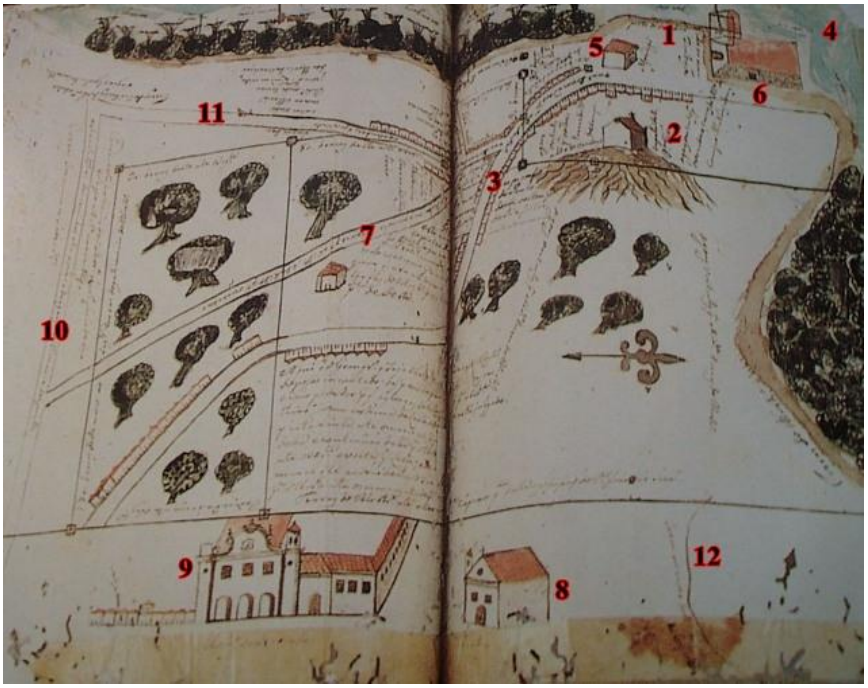



**Figure 12 - Photographic copy of the map of Manoel Francisco Grangeiro (1692). Numbers correspond to notes on the map. Subtitles: 1 - Varadouro; 2 - Chapel of S. Frei Pedro Gonçalves and Alto do Varadouro; 3 - Saint Francis Hill or 'Rua do Varadouro to the city'; 4 - Port of Varadouro, on the Rio Sanhauá; 5 - Customhouse; 6 - Warehouse or Paço; 7 – Street from Car to the City; 8 – Old Church; 9-Church and Monastery of São Bento; 10-Road that goes from the ‘cacimbas’ to the door of the Church of the Rosary of the Blacks; 11-Varadouro and road to the cacimbas and the little port; 12-Fence or wall of the Convent of Saint Francis. Source: modified by Rodriguez (1962, p.11).**

The Grangeiro’s work was the first more detailed representation of the Varadouro region. There, the customhouse, the warehouse and the port were delimited. The absence of the fort could mean that it was in ruins or else, it no longer existed. And, between the upper and lower city, west of Saint Francis hill, one of the rare iconographic representations of the chapel of S. Frei Pedro Gonçalves. The city was surrounded by mangroves in the lower part, and some trees on the slopes, showing a demographic void between the two portions of the city. The citation of the presence of ‘cacimbas‘ shows the

importance, already mentioned, of these streams to supply the growing population of the city of Parayba. Many of these paths led from the main urban points to fountains. We can cite as representations, in this plant, ‘Água vertente do Varadouro (“Waters pouring of the Varadouro“), ‘Estrada que vai das cacimbas até a porta da Igreja do Rosário dos Pretos’ (“Road that goes from the ‘cacimbas‘ to the door of the Church of the Rosary of the Blacks“) and ’Rua do Varadouro para as cacimbas e portinho’ (“street of Varadouro to cacimbas and little port”). In the first centuries of settlement, the population of the lower city bathed in these cacimbas on Sundays (RODRIGUEZ, 1962).

The land where the Saint Anthony’s Convent was built is described highlighting hydrological heritage (presence of fresh water springs) in ‘New Seraphic Orbe’. About the freshwater streams that originated the St. Anthony’s Fountain, friar Jaboatam wrote that

> já pegado pela bayxa, aos Mangaes do rio, corre o muro, e cerca do convento [...]. Tem dentro uha fonte nativa, de boa, e salutifera agoa, a qual brota das entranhas duras de uha pederneyra, e esta com o tempo se tem averiguado ter principio nas bayxas, e beiras deste rio Paraiba (JABOATAM, 1861, p. 357).

### 2.2.5. Pedological Heritage

This kind of heritage is intertwined with the geomorphological heritage, for the economic, functional and ecological values, present as a service of food supply, support and ecological regulation, mainly in the fluviomarines and fluvial terraces of the Paraíba River.

The second and third parts of the Summario are intertwined, they present similarities in content, since they refer to the habits of the Potiguares clan, exalting their warlike personality, at the same time as referring favourably to the functionality of the geodiversity, especially of the soil and geomorphology of the fluvial plain. They emphasize the quality of the floodplains, providing a flooded soil in the proper measure for the abundance of dense mangrove vegetation and brazilwood that the author considers “as matas das arvores são muito maiores e muito mais altas e grapas” (SUMMARIO, 1848, p. 26), and “ter mais pao brazil que Pernambuco he muito milhor porque quanto mais para o norte tanto milhor [...] O pao desta Capitania he o mais e o milhor [...] mais de lei que todas as outras [...]” (SUMMARIO, 1848, p. 26- 31), as well as all types of food, such as manioc “tão grosa como grandes nabos maz com raizes compridas com

muitas pernas e tenras" (SUMMARIO, 1848, p. 27), and its derivate the "beiju, que são redondos como manguaes, [...] pouco mais groços que hóstias he muito bom comer" (SUMMARIO, 1848, p. 27) and the potential for sugarcane cultivation in the portion of the Cabedelo peninsula, whose floodplain is "toda retalhada de esteiros e rios caudaes de água doce que podem dar mais de quarenta engenhos de asucar por toda a terra [...] por ser Rio morto e pelo menos no inverno todo navegável" (SUMMARIO, 1848, p. 26). In this subtext, it is possible to identify the author's perception of the functional value of geodiversity, since the terrain's morphology is favourable to the formation of alluvial soils that represent the last sedimentary package deposited in the area, in the form of fluvial channel alluvial deposits. Clays, gravel, and a lot of decomposed organic matter were deposited in the Quaternary, acting as a habitat for the biomes described in the Summario, such as the Atlantic forest, its brazilwood and the coastal formations, in this case, the mangroves. All this coastal and river environmental system being considered was the result of an interaction between the atmosphere, whose meteorological variations generated a tropical coastal climate with rainfall concentrated in the winter; the biosphere and the biotic environment, in this case, particularly the flora; the lithosphere, represented by alluvial deposits and; the hydrosphere, through the singularity of an estuary richly described by the author, where the fresh water from the river was harmoniously mixed with the sea's salt water during high tides. The natives of the area knew how to take advantage of what this auspicious environment provided, as the author well explains in this first chapter.

Well ahead of his time, the author of the work 'Dialogues', preaviously commented, discusses the the topic of "Sustainable Development" and soil misuse, especially on the river terraces of the Parahyba River, stating that

> [...] por maneira que êste pressupôsto que têm todos em geral de se haverem de ir para o reino, com a cobiça de fazerem mais quatro pães de açúcar, quatro cóvas de mantimento, não há homem em todo êste Estado que procure nem se disponha a plantar árvores frutíferas, nem fazer as benfeitorias acerca das plantas, que se fazem em Portugal, e por conseguinte se não dispõem a fazerem criações de gados e outras; e se algum o faz, é em muito pequena quantidade, e tão pouca que a gasta tôda consigo mesmo e com a sua família. E daqui nasce haver carestia e falta destas coisas, e o não vermos no Brasil quintas, pomares e jardins, tanques de água, grandes edifícios, como na nossa Espanha, não porque a terra deixe de ser disposta pára estas coisas; donde concluo que a falta é de seus moradores, que não querem usar delas (BRANDÃO, 1977, p. 34).

Frei Vicente do Salvador was also responsible for describing the potential of the soil for sugarcane cultivation and the exuberance of brazilwood in his work, dated from 1627, and entitled "History of Brazil", whose dedication, dated from 20th December 1627, revealed that it was written at the request of his Portuguese friend, the priest Manuel Severim de Faria Chantre, a "tratado das coisas do Brasil" (a treatise about the things of Brazil; SALVADOR, 2010). Capistrano de Abreu points out, in the "Preliminary Note" that the manuscript of this work had become public in 1881, in an exhibition held at the National Library in commemoration of King D. Pedro II's anniversary. Subsequently, in 1889, the complete work was published in volume 13 of the Annals of the National Library. This record is in fact a dense history book, as the title itself indicates, beginning with the discovery of Brazil, in 1500, and extending to the Dutch invasion of Bahia, in 1626. Thus, this information, especially in the final part, is supported by the author's own experience at the time of the occurrence. Almeida (1978) suggested, without citing the source, that the friar had lived in St. Anthony's Convent in 1603, when he came to work on the catechism of the Tabajaras. The work is divided into five books, entitled as follows: First Book – About the Discovery of Brazil, divided into 17 chapters; Second Book - At the time of its discovery, divided into 14 chapters; Third Book - About the time when Tomé de Souza governed it, divided in 26 chapters; Fourth Book - About the time when Manuel Teles Barreto governed it up to the arrival of Governor Gaspar de Souza, divided in 47 chapters; and Fifth Book - About the time that Gaspar de Souza governed it up to the arrival of Governor Diogo Luiz de Oliveira, divided in 48 chapters.

In the second book, there were already indirect references to Parahyba, on the eve of its conquest, which would be reported, in detail and uninterruptedly, in chapters 22 to 27 of the Third Book and in the first 16 chapters of the Fifth Book, although much of the information about the expeditions of conquest and foundation of the Parahyba territory was taken from the accounts of the "Summario". In chapter 33 of the Fourth Book, Friar Vicente do Salvador confided that

> "[...] cria-se na terra [Rio Grande do Norte] muito gado vacum, e de todas as sortes, por serem para isto as terras melhores que para os engenhos de açúcar, e assim não se hão feito mais que dois, nem se puderam fazer, porque as canas-de-açúcar requerem terra massapés e de barro, e estas são de areia solta [...]" (SALVADOR, 2010, p. 360).

This fragment indicates the extent of the author's knowledge of edaphology; the dark clayey soil, formed by the decomposition of limestone and gneiss, was conducive to sugarcane cultivation, unlike sandy soil, which is low in mineral salts**.**

In the second part of Herckmans' book entitled "From the fertility of the Captaincy of Paraíba", the author succinctly also praises the potential of the soils, performing an analysis of the main types of subsistence cultivation, such as pepper, indigo, melon, among others, besides other resources that the natural environment offers.

One of the last accounts regarding the geodiversity of the city of Parahyba, named João Pessoa since the expulsion of the Dutch (1654), was the responsibility of the Portuguese Henry Koester, son of English citizens, who in the twilight of the colonial period, more specifically in December of 1809, arrived in Recife aboard the ship Lucy. For about ten years, Koster lived in Recife on the recommendation of his family, due to health issues, and, in the meantime, between 1810 and 1811, in an uninterrupted manner, he explored the north-eastern "sertões", from Recife to Fortaleza, where he "viaja anotando tudo, os homens, as raças, as paisagens, os animais bravos, a natureza dos terrenos atravessados, crianças, tarefas agrícolas, produtos, pecuária, almas de outro mundo, costumes, indumentária, alimentos, ..." (KOSTER, 1942, p. 9- 17).

The result of these explorations was the publication of the work, in 1816, in London, entitled "Travels in Brazil". There were several other editions in England, Germany and France. The Brazilian edition is the eighth, dated from 1898, published from number 51 to 150, by the Pernambuco Archaeological Institute, whose source was the previous French edition of 1846. The translation used in this research corresponds to the one made by Luiz da Câmara Cascudo, published in the 5th Series, volume 221, in 1942, of the Brazilian Pedagogical Library.

Thus, virtually all the geoheritage elements mentioned so far were the subject of reports by the author, including information on the city of Parahyba, in the early nineteenth century, which is of major historical importance. In October 1810, Koster stayed at Colonel Matias da Gama's residence and for a few days he wrote some notes about the city, including information about local geodiversity. For example, about the paving, he mentioned that

> a principal rua [sem citar qual] é pavimentada com grandes pedras, mas devia ser reparada" (KOSTER, 1942, p. 85), enquanto as fontes públicas "foram as únicas obras desse gênero que encontrei em toda a extensão da costa por mim

> visitada. [...] tem várias bicas e é muito bonita. A outra que se está fazendo é bem maior[14] (KOSTER, 1942, p. 85).

while he mentioned that the public fountains "foram as únicas obras desse gênero que encontrei em toda a extensão da costa por mim visitada. [...] tem várias bicas e é muito bonita. A outra que se está fazendo é bem maior"11 (KOSTER, 1942, p. 85).

Probably one of the fountains visited by the author was the Gravatá, with its seven spouts which, according to the reports of the governor of Parahyba Jerônimo de Melo e Castro, dated from 1785, was a reason for the population's satisfaction as it became a public walking place, where

> nobreza e povo estão muito satisfeitos por verem hum chafariz de sete bicas de agoa abundantes, em hum lugar que antes era um paul e charco indecente, onde os escravos brigavao pela pouca agoa de uma casimba, servindo hoje de passeio publico pela situaçao amena, e mais deliciosa pelas arvores silvestres, que na melhor ordem mandei plantar[15].

Through the window of a public building, the author described the natural scenery of the Port of Varadouro and its surroundings, with the canals flowing into a large bay and the fertile soils. The density of the mangroves was mentioned as belonging to a fluvial-marine system, since the author referred to "salty rivers" that were usually covered by mangroves (KOSTER, 1942, pp. 86-87). The following fragment was elaborated in Koster and his companion's return to Goiana, before restarting his journey, where

> [..] pelas três horas percebemos estar numa vasta praia de areia, cercada de rochedos a pique, nos quais víamos a marca das enchentes. A maré ainda estava de vazante. Fizemos o guia montar num cavalo que vinha à nossa frente e apressamos o passo, mandando que nos acompanhasse. A maré estava ainda a pouca distância das rochas. Descobrimos uma mais destacada das outras, interceptando a passagem. Paramos e saltamos dos cavalos, grimpando pelas penedias. O guia, por esse tempo, conduzia as cavalgaduras por dentro d'água. Felizmente essas tomaram a direita, passando longe dos rochedos para descobrir, do outro lado, a terra, para onde se dirigiram. Trepando nas pedras, escorreguei um pé e caí numa fenda, com os dois pés, descendo até os braços, que felizmente me sustentaram o corpo. Reerguendo-me, saltando para outra banda justamente quando vinha uma vaga, esta me fez tomar um banho frio até a cintura. Podíamos esperar que a maré baixasse, mas temíamos ser surpreendidos pelo crepúsculo, o que, malgrado todos os esforços, devia acontecer. A terra, além do rochedo saliente, era baixa, arenosa e inculta (KOSTER, 1942, p. 89).

[14] In the literature, there is no reference of which would be the aforementioned great fountain under construction. In regards to the paved street, there is no more evidence of its location, buried beneath the cobblestone and asphalt.

[15] A.H.U.-ACL_CU_014, Cx 29, doc. 2144, fl 3-4.

In several beaches of the south coast, between the cliffs and the sea, the presence of limestone outcrops from the Maria Farinha Formation are common, creating an obstacle when approaching the cliffs and hindering the passage at high tide. The “rocks” referred to by the author allude to these limestone outcrops, while the ‘protruding rocks’ are the active cliffs of the Barreiras Formation.

**Conclusions**

The natural natural involves a panoply of environments, from mountainous to desert, from plains to mountains, among others. This panoply becomes more complex when includes the landscape that surrounds to the cultural elements that shape it, making the so-called 'Cultural Landscape'.

The natural heritage of the Parahyba Captancy, intertwined with the cultural heritage that used the physical aspects for its consolidation, has resulted in assets of undeniable historical, scientific, pedagogical, tourist, ecological and other values, which gives it a patrimonial character. Thus, nature, associated with cultural heritage, results in the appropriation of this coastal environment, urban or otherwise, in leisure, tourism, educational, sports, among others.

All these examples serve to show to a wider audience the connection between the cultural dimension and the various geodiversity elements through different forms of personal experience at a particular historical time, turning a natural landscape into a cultural landscape, which is reflected in the built cultural heritage. This patrimonial value is justified as this landscape, of diverse aesthetics, impregnated with historical events, ensures the identity and meaning of the local populations.

The creative influence of the geoheritage elements expressed through literature, poetry, arts and iconography demonstrates the strong level of cultural engagement with the landscape and the profound connection between people and the natural world, serving as a link for the current community to know their cultural roots and contributing to a different appreciation of the landscape that surrounds it (GORDON, 2012).

Thus, in this research, the thinking about the Cultural Landscape was focused on the expansion of João Pessoa, as an urban medium, from its beginnings and during the colonial period, when iconographic and historical documentation was elaborated and part of it presented reports that included the physical environment and its importance in the consolidation of said site. The main objective was to make an integrated evaluation between the various elements of geoheritage and the municipality of João Pessoa and

surrounding areas, through the analysis of documentation produced during the colonial period, documentation in iconographies and text forms, since this relation still presents practically without research and dissemination, in an interdisciplinary dialogue between geodiversity and culture. This holistic vision allowed to open a range of new interdisciplinary discussions by allowing cultural experiences different from traditional ones, rediscovering their cultural roots, a sense of place and reverence for the natural world, through the recognition and celebration of the creativity related to the abiotic heritage.

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