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Mestrado em Gestão e Valorização do Património Histórico e Cultural – Master Erasmus Mundus TPTI
Techniques, Patrimoine, Territoires de l'industrie : Histoire, Valorisation, Didactique

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The traditional construction techniques of Ouro Preto (Minas Gerais – Brazil): a proposal for valorisation

Les techniques de construction traditionnelles d'Ouro Preto (Minas Gerais - Brésil) : une proposition de valorisation

Letícia Gonçalves Souza

Orientador(a) / Under the direction of / Sous la direction de:
Antónia Fialho Conde

Évora, setembro de 2023 | Évora, September 2023

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SUMMARY

Title: The traditional construction techniques of Ouro Preto (Minas Gerais – Brazil): a proposal for valorisation

Abstract: This work will propose instruments for the valorisation of the traditional techniques used in the construction of the city of Ouro Preto in the colonial times, which are an important intangible heritage of Brazil. The city of Ouro Preto, known before as Vila Rica, holds probably the greatest Brazilian historical treasure in the domain of colonial architecture, having been elected by UNESCO as a World Heritage Site in 1980. For the construction of the city during the 18th century, several techniques were used, generally according to Iberian traditions, such as stonework, "*pau a pique",* rammed earth, carpentry, and masonry. With the industrialization and the modernization, building techniques have changed and this traditional knowledge has been left behind and almost forgotten by those working in civil construction. In addition to being an important set knowledge that helped to construct the history of Minas Gerais and of Brazil, these techniques are also essential for the safeguard of the material heritage of the area, due to its importance for the works of restoration of colonial buildings. Because of this importance (material and immaterial heritage), it's necessary to create new ways to valorise and safeguard this knowledge.

Speciality: History of Technology
University of defence: Universidade de Évora

Keywords: Ouro Preto; Building Techniques; Heritage; Preservation; Architecture.

RÉSUMÉ

Titre : Les techniques de construction traditionnelles d'Ouro Preto (Minas Gerais - Brésil) : une proposition de valorisation

Résumé : Ce travail propose des instruments pour la valorisation des techniques traditionnelles utilisées dans la construction de la ville d'Ouro Preto à l'époque coloniale, qui constituent un important patrimoine immatériel du Brésil. La ville d'Ouro Preto, connue auparavant sous le nom de Vila Rica, détient probablement le plus grand trésor historique brésilien dans le domaine de l'architecture coloniale, ayant été élue par l'UNESCO comme site du patrimoine mondial en 1980. Pour la construction de la ville au cours du XVIIIe siècle, plusieurs techniques ont été utilisées, généralement selon les traditions ibériques, telles que la maçonnerie, le "*pau a pique*",

la terre battue, la charpenterie et la maçonnerie en pierre. Avec l'industrialisation et la modernisation, les techniques de construction ont changé et ces connaissances traditionnelles ont été délaissées et presque oubliées par ceux qui travaillent dans la construction civile. En plus d'être un ensemble important de connaissances qui ont contribué à construire l'histoire du Minas Gerais et du Brésil, ces techniques sont également essentielles pour la sauvegarde du patrimoine matériel de la région, en raison de leur importance pour les travaux de restauration des bâtiments coloniaux. En raison de cette importance (patrimoine matériel et immatériel), il est nécessaire de créer de nouvelles façons de valoriser et de sauvegarder ces connaissances.

Spécialité : Histoire des technologies

Université de soutenance : Universidade de Évora

Mots-clés : Ouro Preto ; Techniques de construction ; Patrimoine ; Préservation ; Architecture.

RESUMO

Título: As técnicas tradicionais de construção de Ouro Preto (Minas Gerais - Brasil): uma proposta de valorização

Resumo: Este trabalho irá propor instrumentos para a valorização das técnicas tradicionais utilizadas na construção da cidade de Ouro Preto no período colonial, que constituem um importante patrimônio imaterial do Brasil. A cidade de Ouro Preto, antes conhecida como Vila Rica, detém provavelmente o maior tesouro histórico brasileiro no domínio da arquitetura colonial, tendo sido eleita pela UNESCO como Patrimônio da Humanidade em 1980. Para a construção da cidade, durante o século XVIII, foram utilizadas várias técnicas, geralmente de acordo com as tradições ibéricas, como a cantaria, o pau-a-pique, a taipa, a carpintaria e a alvenaria. Com a industrialização e a modernização, as técnicas de construção mudaram e esse conhecimento tradicional foi abandonado e quase esquecido por aqueles que trabalham na construção civil. Além de ser um importante conjunto de conhecimentos que ajudou a construir a história de Minas Gerais e do Brasil, essas técnicas também são essenciais para a salvaguarda do patrimônio material da região, devido à sua importância para os trabalhos de restauração das construções coloniais. Devido a essa importância (patrimônio material e imaterial), é necessário criar formas de valorização e salvaguarda desses saberes.

Especialidade: História da Tecnologia

Universidade de defesa: Universidade de Évora

Palavras-chave: Ouro Preto; Técnicas construtivas; Patrimônio; Preservação; Arquitetura.

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LIST OF ACRONYMS

Ancine – Agência Nacional de Cinema

BID – Banco Interamericano de Desenvolvimento

CIAM – International Congress of Modern Architecture

DPHAN – Diretoria do Patrimônio Histórico e Artístico Nacional

FBN – Fundação Biblioteca Nacional

FCP – Fundação Cultural Palmares

FCRB – Fundação Casa de Rui Barbosa

Funart – Fundação Nacional de Arte

IA - Institute of Contemporary Art of Ouro Preto

Ibram – Instituto Brasileiro de Museus

ICH – Intangible Cultural Heritage

ICHC – Intangible Cultural Heritage Convention

ICOMOS – International Council on Monuments and Sites

IMN – Inspectorate of National Monuments

IPHAN – Instituto do Patrimônio Histórico e Artístico Nacional

MEC – Ministério da Educação

MHN – Museum of National History

PAC – Política Nacional de Arte

PAC-CH – Programa de Aceleração do Crescimento – Cidades Históricas

PCH – Programa de Cidades Históricas

PNPI – Programa Nacional do Patrimônio Imaterial

Pronac – Programa Nacional de Apoio à Cultura

SFC – Sistema Federal de Cultura

SPHAN – Serviço do Patrimônio Histórico e Artístico Nacional

UNESCO – United Nations Educational, Scientific and Cultural Organization

UFOP – Universidade Federal de Ouro Preto

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GENERAL INTRODUCTION

Definition of the subject and scientific interest

The TPTI master addresses various subjects related to the built heritage, allowing its students to delve into areas of great importance, such as traditional techniques. Studying and working as a conservator and restorer in the city of Ouro Preto, in Brazil, enlightened me about the importance of traditional techniques, both as intangible heritage and as an indispensable instrument for the safeguarding of the built heritage. Thus, the choice of researching the construction techniques used in the city of Ouro Preto comes from a personal experience. With the guidance of Professor Antónia Fialho Conde, research director of this dissertation, it was decided to focus on the development of a proposal to value this knowledge, which is in danger due the modernization of the construction systems.

The Western world has always had a great appreciation for the material part of its history. For a long time, heritage referred mostly to buildings and objects. Much was written about the conservation of the materiality of these assets – writings that backed the legislation of many countries and the international conventions of heritage preservation, which also only dealt with the material heritage. Fortunately, at the end of the 20th century, this panorama was changed.

Nowadays, the word Heritage has the most diverse meanings: historical, aesthetic, remembrance, identity, educational, and above all, social. In addition, special attention is now paid to the heritage known as intangible. Thus, the importance of the heritage is no longer linked only to its physicality, but also to the values that the community gives to it. The "practices, representations, expressions, knowledge, skills"[1] are now recognised as part of the cultural heritage of communities and groups.

In Brazil, the first attempts to safeguard its cultural heritage were made in the 1920s, with the creation of some (deficient) laws. In the 1930s, we saw a stronger approach, with better results, such as the declaration of Ouro Preto as a National Heritage Site in 1933[2] and, in 1938, the registration of the city by the National Heritage Institute (IPHAN). Like other countries, Brazil also began to worry about the preservation of intangible cultural heritage at the end of the 20th century. The 1988's Constitution recognized the existence of intangible heritage and the decree nº 3.551, of 04 August 2000, instituted the registration of intangible assets, in addition to the creation of the National Program for Intangible Heritage (PNPI).

[1] UNESCO, *Convention for the Safeguarding of the Intangible Cultural Heritage*, 2003. URL: https://ich.unesco.org/en/what-is-intangible-heritage-00003. Accessed on: 05 February 2023.
[2] Pinheiro, Maria Lucia Bressan. "Origens da noção de preservação do patrimônio cultural no Brasil". *Risco Revista de Pesquisa em Arquitetura e Urbanismo,* (3), 2016, p. 4-14.

Being the first site in the country to receive the title of National Monument, Ouro Preto is the most well-preserved historic urban centre of Brazil. Composed mainly of 18th century houses, as well as a large number of religious and governmental buildings from the same period, the city, located in a region of mountainous relief, has an unmatched beauty, due to its unique Luso-Brazilian architecture and the natural landscape that surrounds it.

The 18th century constructions of Ouro Preto were built predominantly using techniques of Iberian origin, brought mainly by the Portuguese who arrived there to explore the region's mineral deposits. Adapted to the realities of the area, in which one could only count on materials found in the surroundings of the city, such techniques were particular. The constructions were primarily made of stone, clay, and wood, and techniques such as stone masonry, "wattle and daub" and rammed earth, among others, were used.

Having its importance recognized so earlier (compared to other sites in Brazil), was very beneficial for the city, since great efforts were made to conserve its rich heritage. To preserve it and the neighbouring towns, several restoration works are necessary every year. It is important to emphasise that in restoration work it is advisable to use techniques similar to the "original" ones, as the application of modern techniques in traditional constructions can cause great structural and aesthetic problems. In addition, IPHAN imposes requirements on local governments and building owners, which are often difficult to meet due to the lack of specialised workers and the price of restoration works. This leads to the use of inappropriate maintenance techniques, damaging the buildings and leading to the loss of traditional methods.

When we analyse these issues – the gradual loss of knowledge linked to traditional building techniques in Minas Gerais, an important part of the intangible heritage of the region and of the country, and the need for this knowledge to preserve the built heritage of the city – we see the great importance of the conservation of such techniques. This work will focus on the necessity of valorising this *savoir-faire* that, as we see, is important not only as an intangible heritage but also for the preservation of the material heritage of the town.

Chronological and scientific frameworks

Brazil still has several examples of its colonial architecture, which began to be built with the arrival of the Portuguese in 1500 and has been preserved until today. We can cite cities like Ouro Preto, Salvador, Paraty, Tiradentes, Diamantina, São Luís, Recife, Rio de Janeiro, among others, which have remnants of colonial buildings in different states of preservation. In all these places, Iberian construction techniques and typologies, brought by the colonisers, were mixed with others practised by the original peoples and adapted to the reality of the colony, which did

not have the same materials and resources as the metropolis. Thus, a rich and unique heritage was built.

In this work, it was decided to study Ouro Preto, the largest and best-preserved colonial nucleus in Brazil. This historical city is located in the state of Minas Gerais, in the Southeast of Brazil **(Figure 1)**. It is approximately 100 km from the state's capital, Belo Horizonte. According to the Brazilian Institute of Geography and Statistics (IBGE) total area of the municipality is 1,245.865 km², comprising 12 districts and the headquarters, also known as Ouro Preto, where the historic centre is located. Also, according to the IBGE (2020), the estimated population is 74,824 and the average altitudes are around 1100 metres.

Figure 1 Map showing the location of Minas Gerais. Source: Encyclopædia Britannica, 2009.[3]

Formerly known as Vila Rica (Rich Village), the town has its origins in the arrival, in 1698, of expeditions that penetrated the Brazilian colonial territory following the news of the existence of precious minerals in the region.[4] Mining was the main economic activity in the region and financed the development of the town, with the construction of various churches and public and private buildings.[5]

In the mid-18th century, gold production entered a phase of decline, which would lead to economic stagnation, especially during the 19th century. In 1897, the capital of the state of Minas Gerais, which had been Ouro Preto since 1818, was transferred to Belo Horizonte and the city went through a period of relative abandonment.[6] The crisis and abandonment eventually contributed to the preservation of the city's colonial architecture, as they made the modernisation of the city partly unachievable. Thus, these buildings have survived to the

[3] *Minas Gerais. Encyclopedia Britannica,* URL: https://www.britannica.com/place/Minas-Gerais. Accessed on: 06 February 2023.
[4] Bohrer, Alex Fernandes, "Ouro Preto: Um Novo Olhar", São Paulo, Scortecci, 2011.
[5] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010, p. 77-79.
[6] Vieira, Liliane de Castro, "Ouro Preto e o século XIX: o mito da decadência" *Revista CPC*, 22, 2016, p.145-189.

present day, becoming one of the most important of the Brazilian historical heritage sites **(Figure 2)**.

Figure 2 Partial view of Ouro Preto. Source: UNESCO, 2014.[7]

In the 20th century, the city was visited by artists of the Brazilian modernist movement, who recognised the Baroque architecture preserved in the city as an expression of national identity. In 1933, the city was declared a national monument, thus becoming a national symbol and in 1938 was classified by the IPHAN (**figure 3**).[8]

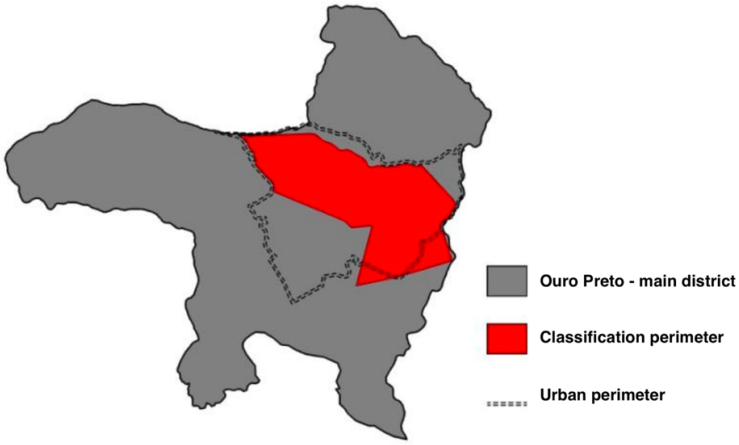

Figure 3 Map of the Ouro Preto's perimeter of classification by IPHAN. Source: Fernandes [2014]. [9]

In 1980, the historical town was recognised as a World Heritage Site by UNESCO, due to its cultural and architectural heritage, The classification happened under two criteria:

> **Criterion (i):** Set in a remote and rugged landscape, the aesthetic quality of the vernacular and erudite architecture and irregular urban pattern of Ouro Preto makes the town a treasure of human genius. The most notable of the city's architectural works are represented by the religious monuments and administrative buildings, including the

[7] UNESCO World Heritage Centre. "Historic Town of Ouro Preto." Gallery URL: whc.unesco.org/en/list/124/gallery/. Accessed 12 Aug. 2023.
[8] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010, p. 103.
[9] Fernandes, Simone Monteiro Silvestre. "Reflexões para ações educativas em conjuntos urbanos tombados: Ouro Preto". Dissertation (Master in Cultural Heritage Preservation), IPHAN, Rio de Janeiro, 2014.

> Palácio dos Governadores (Governors' Palace), today the School of Mines, and the former Casa de Câmara e Cadeia (Administrative and Prison House), home to the Inconfidência Museum. The Baroque churches carry sculptures by Antônio Francisco Lisboa, Aleijadinho, colonial Brazil's greatest artist, and the ceiling paintings of Manuel da Costa Athaide among others. These were the representatives of the initial expressions of an artistic form deemed genuinely national and developed in a region marked by difficult access and a scarcity of materials and labor in the 18th century.
>
> **Criterion (iii):** The built heritage of the Historic City of Ouro Preto bears exceptional testimony to the creative talents of a society built on pioneering mining wealth under Portuguese colonial rule. Although the architecture, paintings, and sculptures are based on underlying models introduced by Portuguese immigrants, the works vary significantly from the contemporary European art, not only with respect to their spatial conception, but in their decorative treatment, in particular the stone sculptures carved on the facades, distinctive for their originality and design and in the combined use of two materials, gneiss and soapstone. The absence of formal convents or monasteries, due to the edict of the Portuguese Crown which prohibited the establishment of religious orders in Minas Gerais, led to the construction of churches and chapels displaying the full splendor, quality, and originality of the syncretized artistic traditions of two cultures.[10]

Nowadays, the main sources of revenue of the city are the metallurgy and mining industries. Tourism comes second. Ouro Preto is known as an important cultural centre for the country. Many festivals and events, linked to art, culinary, cinema, theatre, music, folklore, and religion, happens in the city throughout the year, which together with its history and material heritage, attract many visitors.

Problematic

For the construction of the city in the 18th century, several techniques were used, generally according to Iberian traditions, such as stone masonry, "*pau-a-pique*", rammed earth, carpentry, and masonry, among others, which were taught on the building sites and in the workshops. Unfortunately, with industrialization and modernization, building techniques have changed and these traditional skills have been "largely replaced and relegated to localised uses based on popular events, in places outside the main focus of the formal market"[11].

In addition to being an important set of knowledge that helped to construct the history of Minas Gerais and of Brazil, these techniques are also essential for the safeguard of the

[10] Centre, UNESCO World Heritage. "Historic Town of Ouro Preto." UNESCO World Heritage Centre, whc.unesco.org/en/list/124/. Accessed 12 January. 2023.

[11] "Em larga escala, substituídos e relegados a aproveitamentos localizados a partir de manifestações populares, em locais situados fora dos principais eixos de interesse do mercado formal". [Our translation]. Almeida, Luiz Fernando de. "Apresentação". In Castriota, Leonardo Barci (Ed.), *Mestres artífices, Minas Gerais, Cadernos de Memória*, Brasília, Iphan, 2012, p. 15.

material heritage of the area, due to its importance for the works of restoration of colonial buildings. Because of this importance (material and immaterial heritage), it's necessary to create new ways to valorise and safeguard these skills, as well as invest and expand already existing initiatives, such as the schools for traditional construction techniques.

To further understand this subject, this work aims to answer the following questions:

- Which are the techniques used in the colonial times and how they arrived in Ouro Preto?
- How the modernization of techniques of construction affected this traditional knowledge?
- What is the role of these techniques in the safeguard of the material heritage?
- Which instruments are already used to protect this heritage and what else can be done to valorise and safeguard the traditional techniques (immaterial heritage)?

Hypothesis

Analysing the information above about the town of Ouro Preto and the importance of its tangible and intangible heritage, and the problematic, we can come up with the hypotheses:

- The modernization of the construction techniques puts in the traditional knowledge used in the building of the city in the 18th century.
- The community and the visitors are still unaware of the importance of the traditional techniques as intangible heritage and all the benefits it will bring for the material heritage of the town.
- A project of valorisation, which presents the traditional techniques, highlighting its importance as an intangible heritage and as an instrument of conservation of the tangible heritage, will benefit the city and the public, composed not only of tourists, but also of locals, students, researchers, and others.

Objectives

This dissertation aims to develop a proposal for the valorisation of the traditional techniques used in the construction of the colonial city of Ouro Preto. Its main aspiration is to show the importance of these techniques in a didactical and interesting way. But it also desires to enlarge the discussion about the traditional techniques of construction in Brazil and its importance for the heritage. Especially the importance of this knowledge for the discipline of restoration. Therefore, the objectives of this work are:

- To study the characteristics of Ouro Preto heritage and the historical and patrimonial importance of the city for Brazil and the world as a colonial city.
- To study the traditional techniques used in the construction of the city and how they developed over time.
- To analyse the use and importance of such techniques in restoration works of the material heritage of Ouro Preto.
- To propose a program where these techniques are presented to the community and which the public can discover their importance as intangible heritage and for the conservation of the material heritage of the city, and eventually expand this approach as a model to other cities with Portuguese architectonic influence, namely in Brazil.

State of the question

In this work, we will analyse other texts that were written about heritage, traditional techniques, the city of Ouro Preto, and other relevant topics. When talking about heritage, French author Françoise Choay can be cited as one of the greatest experts in the subject. In her book *L'allégorie du patrimoine*[12], presents the expression Historical Heritage as "a fund destined for the enjoyment of an enlarged community of planetary dimensions and constituted by the continuous accumulation of a diversity of objects brought together by their common belonging to the past"[13]. This book is one of the most important on the subject and deals with the historical and theoretical aspects of heritage. In many of her other works, Choay talk about heritage and its development as a discipline, like in *Le patrimoine en questions*[14], in which she creates an anthology of important texts of different authors about heritage, such as Aloïs Riegl, John Ruskin, Victor Hugo, Eugène Viollet-le-Duc, and others.

Another collection of texts was essential in the writing of this paper. *Understanding heritage and memory*[15], edited by Tim Benton, brings together works by scholars and explains different concepts linked to the discipline, such as intangible heritage. For a long time, the focus of the conservation efforts only targeted the material heritage. But beginning in 1980s, this changed and, as explained by Rodney Harrison and Deborah Rose in their chapter *Intangible*

[12] Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014.
[13] "*Um fundo destinado ao usufruto de uma comunidade alargada a dimensões planetárias e constituído pela acumulação contínua de uma diversidade de abjectos que que congregam a sua pertença comum ao passado".* [Our translation]. Ibid, p. 11.
[14] Choay, Françoise. *As questões do Património: Antologia para um combate*. Lisboa, Edições 70, 2011.
[15] Benton, Tim (Ed.). *Understanding Heritage and Memory*. Manchester University Press, 2010.

heritage[16], also part of the book edited by Benton, it became clear the importance and the necessity to preserve the cultural characteristics, like knowledge, skills, expressions, practices, etc., from different societies.

In Brazil, the valorisation of heritage was late compared to Europe. In the article *Origens da noção de preservação do patrimônio cultural no Brasil* the author Maria Lucia Bressan Pinheiro presents the early days of the discipline in Brazil, and how the government, urged by scholars and artists, as well as by a nationalist spirit that developed in the country in the 30s, developed preservationist initiatives to safeguard the Brazilian heritage.

When talking about heritage, it is also important to explain the more practical part of the preservation. As explained by the well-known theorist Cesare Brandi in his work *Theory of restoration*[17], restoration is a way of maintaining the material part of the heritage so that it can be passed onto future generations. But restoring interventions should only be done as a last resort, analysing each case on its own, but always following principles, such as, minimum intervention and reversibility.

The importance of the traditional techniques and of their teaching, for the heritage of Ouro Preto, was superficially addressed in the article *A formação profissional como instrumento de proteção do patrimônio cultural*[18], by the architect and teacher Maria Cristina Rocha Simão. This article is extremely important for this work, because it was the one that led me to delve deeper into the subject covered in this dissertation. It is a reflection on the importance of professional training to act in cultural collections of a material nature. According to the author, "the lack of knowledge of traditional technologies, caused by industrialisation and the changes that have taken place since the 18th century, persists to this day, generating technical impossibilities for the execution of pre-industrial goods"[19]. It discusses the ethics of restoration and the standards, established by academics and reference documents, that help today's conservators and practitioners. After recalling the practices expected in a restoration, she stresses the importance of involving the population in the preservation of heritage and the importance of professional training. She presents some institutions and projects that work with this insertion, training new professionals who have the capacity to work with the heritage of the city of Ouro Preto and the region.

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[16] Harrison, Rodney; Rose, Deborah. "Intangible heritage". In Benton, Tim (Ed.). *Understanding Heritage and Memory*. Manchester University Press, 2010, p. 238 – 276.
[17] Brandi, Cesare. *Theory of restoration*. Firenze, Nardini Editore, 2005.
[18] Simão, Maria. Cristina Rocha, "A formação profissional como instrumento de proteção do patrimônio cultural", in Fernandes, Edésio; Alfonsin,Betânia (Ed.), *Revisitando o Instituto do Tombamento*, Belo Horizonte, Fórum, 2010, p. 443-461.
[19] "*O desconhecimento das tecnologias tradicionais, causada pela industrialização e pelas mudanças ocorridas a partir do século XVIII, persiste até a atualidade, gerando impossibilidades técnicas para a atuação em bens pré-industriais.* [Our translation]. Ibid, p. 443.

Ouro Preto has a rich history and heritage, and many authors have written about the city. But none delved as deeply as Brazilian architect and architectural historian Sylvio de Vaconcellos. His book *Vila Rica: Formação e Desenvolvimento – Residências*[20], written in 1951, still today one of the biggest sources about Ouro Preto colonial history and life aspect. Once known as Villa Rica, Ouro Preto had a very particular origin and history, full of glory, crises, rebellion and much more. Vasconcellos links this tumultuous history to the architecture erected there. We see how the social, economic, and cultural aspects of that society, in the 18th century, have shaped its architecture and the heritage found there to this day.

Other authors construct narratives that are also very important for the study of Ouro Preto's context in the colonial times. Augusto de Lima Junior, in the book *Vila Rica do Ouro Preto: Síntese Histórica e Descritiva*[21] uses historical texts to create a first-hand narrative of the origins and development of the city, which happened always having the exploration of gold as the main objective. Suzy de Mello's book, *Barroco Mineiro*[22], focuses more on colonial vernacular architecture and covers the entire state of Minas Gerais (which has its origins deeply linked to Ouro Preto, which was its capital for a long period). Like Vasconcellos, Mello uses history to explain the development of architecture and urbanisation in Ouro Preto. With moments of progress, the city witnessed great constructive development, mainly of religious and monumental constructions. But there were also periods of stagnation, which allowed the survival of 18th century buildings.

The history of construction can easily be confused with the history of architecture. But they are distinguished by the fact that the former does not focus on aspects such as style and aesthetics, but rather on the technologies, materials and people who participate in the process of building construction. The literature on the history of building systems is not abundant, but some authors have gone into great depth on the subject. George R. H. Wright, who wrote *Ancient Building Technology*[23]*,* recounts that the first shelters were constructed in the Lower Paleolithic period by the *Homo Erectus.* During ancient times, many developments were done, with the invention of several technologies, some being used to this day. They allowed the construction of monuments, like the pyramids of Egypt and the wonders of the Roman constructions. In mediaeval times, some of these technologies were lost in the European world but remained in force in the east. In the book *The Master Builders: A History of Structural and*

[20] Vasconcellos, Sylvio. de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo, Perspectiva, 2011.
[21] Lima Junior, Augusto de. *Vila Rica do Ouro Preto: Síntese Histórica e Descritiva*. Rio de Janeiro, EGL Editora, 1996.
[22] Mello, Suzy de. *Barroco mineiro*. São Paulo, Braziliense, 1985.
[23] Wright, George.R.H., *Ancient building technology*. Leiden, Brill, 2000.

Environmental Design from Ancient Egypt to the Nineteenth Century[24], by Henry Cowan, it is explained how this changed with the construction of big churches such as the Gothic ones. The author also explains that although many social changes happened during the renaissance, the technologies were not as influenced. Not the same happened during the period of the Industrial Revolution, when new systems were invented profoundly changing the building technologies – the widespread use of metal structures and, later, of the reinforced concrete, in addition to the use of modern equipment and materials, changed the size and the height of constructions as never before, with its skyscrapers and freestanding spaces.

But going back to colonial Ouro Preto, the city preserved buildings constructed using very traditional techniques. The above-mentioned Sylvio de Vaconcellos is also the author of another essential bibliography in this dissertation. *Arquitetura no Brasil: sistemas construtivos*[25] is a treatise on the building systems used during the colonial period in Brazil. It deals with all the stages of civil construction at the time, from structure to painting. It is the main written source on traditional techniques of colonial Brazilian architecture. The text is well illustrated and very didactic, presenting the essential terms and principles for any professional in the field. However, as it is a treatise, it does not cover the history of the techniques, nor their evolution, an important part of this work.

The book *Mestres artífices, Minas Gerais, Cadernos de Memória*[26] by Leonardo Barci Castrota, also deals with traditional techniques. It is a register of master craftsmen in present-day Minas Gerais. It is the result of a survey carried out by IPHAN on the main traditional building techniques of Minas Gerais and on the people who hold this knowledge. It deals with the crafts of stone, colour and ornament, iron, clay, and wood. The interviewees tell the stories of these crafts, which are interwoven with their own stories. This book is essential for my work because, in addition to presenting the techniques and the masters, it addresses other aspects that are important for this work, such as the ways in which this knowledge is passed on and some of its history.

Many other authors were consulted because the subject of heritage is a well-studied subject nowadays. We also can easily find works about Ouro Preto and its built heritage, due to its importance for Brazilian history and architecture. But the state of art about the traditional techniques used in the country during colonial time is still lacking. This supports the importance of this study.

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[24] Cowan, Henry. *The Master Builders: A History of Structural and Environmental Design from Ancient Egypt to the Nineteenth Century*. John Willey & Sons, New York, 1977.
[25] Vasconcellos, Sylvio de. *Arquitetura no Brasil: sistemas construtivos*. Belo Horizonte, UFMG, 1979.
[26] Castriota, Leonardo Barci (Ed.), *Mestres artífices, Minas Gerais, Cadernos de Memória*, Brasília, Iphan, 2012.

Working Method

The methodology of our work is based in the investigation of the subject and in the elaboration of a program of valorisation that shows to the community the importance of the safeguard of the construction techniques and of their beneficial contributions for the town. This program consists in the construction of a teaching space where people can learn more about these techniques through expositions, videos, workshops, and other instruments.

The methodology to be used in this work will follow the following steps:

- The completion of a state of art aiming at presenting the concept of heritage and contextualization of Ouro Preto heritage.
- A bibliographic study concerning the constructive techniques and their evolution throughout history, focusing mainly on the techniques used in Ouro Preto.
- Research in libraries for books and documents and in online archives for paints, prints and photography.
- Visit and research in museums in the domain of architecture and arts and crafts.
- Conception of a space where different museology instruments can be used to teach the importance of the techniques and how they can be used for the benefit of the town and the community.

Thesis structure

This work will be divided into 4 chapters, and the general introduction and conclusion.

- **Chapter 1: Heritage:** This chapter will talk about the concept of heritage focusing on the intangible and vernacular heritage, in addition to talking about heritage in Brazil and its legislation and the importance of conservation and restoration in architecture.
- **Chapter 2: Ouro Preto and its heritage:** In this chapter a contextualization will be made, approaching geographic, historical, and chronological aspects of the city of Ouro Preto, besides the presentation of the architectural profile of the city, from its creation to the contemporary days.
- **Chapter 3: Traditional construction techniques in colonial times:** The chapter will deal with traditional techniques, focusing on those used in Ouro Preto in the colonial period.
- **Chapter 4: Proposal for valorisation of traditional building techniques:** In the last chapter, after the analysis of a case study related to the heritage of

construction techniques and the importance of vocational schools, a proposal for the valorisation of the techniques used in colonial Ouro Preto will be presented.

CHAPTER 1. HERITAGE

Résumé du chapitre

Dans ce chapitre, nous aborderons le concept de patrimoine culturel. Nous commencerons par définir le patrimoine et présenterons l'histoire de la préservation, puis nous expliquerons les classifications du patrimoine immatériel et du patrimoine vernaculaire.

Nous parlerons également du patrimoine au Brésil, de l'histoire des mouvements de préservation dans le pays et de sa législation. Enfin, nous parlerons de la conservation et de la restauration du domaine architectural, et de l'importance de l'étude du patrimoine pour ces disciplines. Ainsi, dans ce chapitre, nous ferons une étude bibliographique approfondie sur le sujet, créant un état de l'art riche qui aidera à l'ensemble de l'étude.

1.1. Introduction

Heritage is a very complex concept that includes not only the old idea of something that must be inherited – an object or piece of property that must be passed on from a generation to another – but also the idea of history and identity. When defining and explaining heritage, many values must be taken in consideration, especially the historical and cultural links a group or society can have with a specific "heritage".

In this chapter, we will define heritage and some of its classifications, like the intangible and the vernacular heritage. We also talk about the Heritage in Brazil and its legislation. Lastly, we will talk about the conservation and restoration of the architectural domain, and how heritage study is important for these disciplines. So, in this chapter we will do a profound bibliography study in the subject, creating a rich state of art that will help in the whole study.

1.2. Definition and the history of cultural heritage

According to the Oxford Dictionary, heritage can be defined as "that which has been or may be inherited; any property, and esp. land, which devolves by right of inheritance"[27]. The word has its origin in the French term *héritage*. Despite that, the French word closer in meaning to the English one would be *patrimoine* defined in the *Dictionnaire de la langue française*, by Émile Littré as: "*bien d'héritage qui descend, suivant les lois, des pères et mères à leurs enfants*"[28].

[27] "Heritage, n.". Oxford University Press. URL: www.oed.com/view/Entry/86230. Accessed on: 6 March 2023.
[28] Littré, Émile. Dictionnaire de la langue française. Paris, L. Hachette, 1873-1874. Electronic version created by François Gannaz. URL: http://www.littre.org/. Accessed on: 6 March 2023.

This word, which was originally associated with family structures and was usually used in economic and legal contexts, undergoes what Marilena Vecco (2010, p. 321) calls a "expansion and semantic transfer". According to Françoise Choay (2014, p. 11) "modified by a variety of adjectives (genetic, natural, historic) that have rendered it a 'nomadic' concept, (the word heritage) is now embarked on a new and much mediatized career"[29]. Regardless of the modifier, we always associate it to a value, "something with uniqueness, of personal, local or universal belonging"[30].

In the 20th century, expressions like "historic heritage" or "cultural heritage", or even of the word "heritage" alone, are used to denominate what was once known as monument, historic monument, or cultural property[31]. Choay (2011, p. 11) defines historic heritage as

> A resource intended for the enjoyment of a community whose scope has been broadened to planetary scale and constituted by the continuous accumulation of a diversity of objects assembled by virtue of their shared belonging to the past: works and masterpieces of the fine and applied arts, fruits, and products of all the knowledge and know-how of humankind.[32]

The definition of Choay is a bit outdated, because nowadays the concept is not restricted to material goods, but it also encompasses intangible elements, like popular traditions, beliefs, rituals, knowledge, and other social traditions that identify and characterise a people or society. It includes the natural heritage as well, that possess ecological, aesthetic, and memorial value[33].

If we turn back in history, we will learn that what today is called cultural heritage was once known as historical monuments. The etymon of the word monument is the Latin *monumentum*. In turn, *monumentum* is derived from the verb *monere*, that means "to warn", "to recall". Monument is an object or set of objects that was created by a community, whichever is its size or nature, to remind its members about events, people, social norms, and other elements that are part of its identity. In this way, we can say that the monument has an identifying function, being "an 'intentional' memorial device".[34] The historical monument is not intentional. It obtains its memorial value after its construction, having been chosen by a society

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[29] "*Requalificada por diversos adjectivos (genético, natural, histórico...), que fizeram dela um conceito 'nómade', prossegue hoje em dia um percurso diferente e notório*". [Our translation]. Choay, Françoise. A Alegoria do Patrimônio. Lisboa, Edições 70, 2014.

[30] "*Algo com singularidade, de pertença pessoal, local ou universal*". [Our translation]. Flores, Joaquim de Moura. Património – do Monumento ao Território. *Urbanidade e Património*, 1998, p. 11.

[31] Vecco, Marilena. A definition of cultural heritage: From the tangible to the intangible. Journal of Cultural Heritage, 11(3), 321-324, 2010, p. 321.

[32] "*Um fundo destinado ao usufruto de uma comunidade alargada a dimensões planetárias e constituído pela acumulação contínua de uma diversidade de abjectos que que congregam a sua pertença comum ao passado: obras e obras-primas das belas-artes aplicadas, trabalhos e produtos de todos os saberes e conhecimentos humanos."[Our translation].* Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014.

[33] Flores, Joaquim de Moura. Património – do Monumento ao Território. *Urbanidade e Património*, 1998, p. 10-17.

[34] Choay, Françoise. *As questões do Património: Antologia para um combate*. Lisboa, Edições 70, 2011, p. 16.

because of its importance to its historical and/or aesthetic value and therefore should be preserved.

According to Flores (1998), in Imperial Rome there were already scholars that collect Greek artefacts as the memory of a superior civilization. But we really see the interest for the creations of the past, in the end of the Middle Age and during the Renaissance. It's in this moment, which Choay (2011) labels as the first European cultural revolution, that we find the foundations of the heritage studies.

Called at the time "antiquities", the buildings, and other objects (from coins to domestic items) transmitted by the Romans, Greeks, and other ancient peoples, were deeply studied by artists, architects, and scholars. The objects were kept in private collections that would, in the 18th century, give place to many public museums. In the second half of the 16th century, they will start to be interested also in the "national antiquities" formed by the historical inheritance from their own countries. These antiquarians (how these men, interested in the antiquities, were called), in the period that extends from the 16th century to the beginning of the 19th century, were responsible for a great deal of work in inventorying and studying these antiquities. For Choay (2011, p. 24), "they prepared and anticipated the work of historians, archaeologists, art historians and the first ethnographers of the 19th century"[35].

Despite all this movement, the actions for an effective conservation of the heritage were very scarce. There was a fascination for these historical monuments, but the main point was to learn more about and gather knowledge. Nothing stopped historical elements from being torn down if they were in the way of a new project. The buildings were seen as a source of knowledge, but its magnitude could be equalled and even surpassed by the architects of the period.

But we can spot some exceptions to this indifference. First, the English antiquarian's society that fought for the preservation of gothic buildings in their country during the 17th and 18th century. Second, it was the action of some members of the revolutionary committees of the French Revolution. According to Vecco (2010), it was during this time that the concept of personal heritage of the word "heritage" shifted to a broader idea of common heritage. With the nationalisation of the goods and properties owned by the king, the church and the emigrants, these items were then considered public goods. The "Monuments Committee" was set up by the revolutionary State to make an inventory of the large number of appropriate properties. This committee was responsible to classify the different categories of elements, to sort it out these

[35] "*(Os antiquários) prepararam e anteciparam o trabalho dos historiadores, dos arqueólogos, dos historiadores de arte e dos primeiros e etnógrafos do século XIX."* [Our translation], Ibid., p. 24.

categories and report the states of the goods. They were then protected until it decided their destiny[36].

A new important moment for the cultural heritage is the "second European cultural revolution" as called by Choay (2011), but better known as the Industrial Revolution. For the author, the latter denomination refers to the technical dimension that occurred with the advent of machinery but excludes transformations in the society, in the landscape, and in other aspects of life that took place during the period, especially in Europe. Choay (2011, p. 136-137) explains:

> In fact, the arrival of the industrial era as a process of transformation but also of degradation of the human environment contributed, together with other less important factors, such as Romanticism, to inverting the hierarchy of values attributed to historic monuments and to favouring for the first time the values of sensitivity, particularly aesthetic ones. The industrial revolution as a break with traditional models of production opened an irreducible fracture between two periods of human creation. (…) As an irremediable process, the industrialisation of the world has contributed, on the one hand, to generalising and accelerating legislation for the protection of historic monuments and, on the other, to making restoration an autonomous discipline, in line with the progress made in the history of art.[37]

In this context, some other factors help to create awareness of the importance of cultural heritage. History establishes itself, in the end of the 18th century, as a discipline, expanding into sub-disciplines such as archaeology and art history. Romanticism brought with it a new sensibility, in which nature, art and the vestiges of the past are worshipped. At this time, there was a reversal: historical objects, previously worshipped for their didactic value, began to be admired for their aesthetic value. Photography allows the diffusion of images of the historical monuments, in addition to becoming an important instrument of analyses used by architects, restorers and art historians. Lastly, there is also the emergence of the art tourism, with even the creation of guides presenting the monuments and museums around Europe[38].

In the 19th century, a new vision was born, one that recognizes the singularity of the monument. Choay (2011) emphases

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[36] Some would be sold to private owners and new uses would be attributed to others. (Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014.)

[37] "*Com efeito, a chegada da era industrial enquanto processo de transformação, mas também de degradação do ambiente humano, contribuiu, juntamente com outros factores menos importantes, como o Romantismo, para inverter a hierarquia de valores atribuídos aos monumentos históricos e para privilegiar pela primeira vez os valores da sensibilidade, nomeadamente estéticos. A revolução industrial enquanto ruptura com os modelos tradicionais de produção abria uma fractura irredutível entre dois períodos da criação humana. (...) Enquanto processo irremediável, a industrialização do mundo contribui, por um lado, para generalizar e acelerar, as legislações de protecção do monumento histórico e, por outro, para fazer do restauro uma disciplina autónoma, solidária com os progressos da história da arte."* [Our translation] Choay, F. (2011) A alegoria do patrimônio. São Paulo: Estação Liberdade. p. 136-137.

[38] Ibid.

> Since the Renaissance, antiquities, sources of knowledge and pleasure, have also appeared as references for the present, works that they could equal or surpass. From the 1820s onwards, the historical monument was inscribed under the sign of the irreplaceable: the damage it suffers is irreparable and its loss irremediable.[39]

Despite this growing awareness observed in the 19th century, there was a chronological lag, says Choay (2011) puts it, in the legislations in European countries, both concerning the role of the State in the conservation process and the procedures to be adopted to safeguard the monuments. The first French law regarding the conservation of French cultural heritage would only have its final form approved in 1913. Italy would have its legislation approved a bit earlier, in 1902. England was a different case. Firstly, a role of the antiquarian and archaeological societies, the management of historic monuments was transferred to a private association, the National Trust, in 1895, which is still responsible for this task today.

At this period, some scholars start to include even the modest heritage among historical monuments. English writer and art-critic John Ruskin (1819 – 1900) is the first to promote the valorisation of domestic and vernacular architecture. It is also Ruskin who coined the notion of "historic urban heritage".[40] The notion arose from the new interest in the fabric of old cities, so contrasting with the new industrial city that was being created. In his book, from 1889, *Der Städtebau nach seinen künstlerischen Grundsätzen*, Camillo Sitte, Viennese urbanist, studied the morphology of ancient cities and compared it with that of modern cities. According to him, "the modern urban planner finds himself dangerously deprived of all the resources of his art"[41]. He believed the qualities of the ancient cities could be used to improve the modern ones. The Italians, after the war of 1914, were the first State to consider the whole of the cities as historical monuments. France would only create a law about this subject in 1964[42].

Known better for the Arts and Crafts movement, William Morris (1834 – 1896) was a very important English preservationist, together with Ruskin. Together with other architects and designers, he created in 1877, the Society for the Protection of Ancient Buildings, that published the *Principles of the Society for the Protection of Ancient Buildings as Set Forth upon its Foundation*, the first charter to defend the conservation of original aspects in buildings[43].

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[39] "*Desde o Renascimento que as antiguidades, fonte de saberes e de prazeres, surgiam igualmente como referência para o presente, obras que se podiam igualar ou ultrapassar. A partir dos anos vinte do século XIX, o monumento histórico é inscrito no signo do insubstituível: os danos que sofre são irreparáveis e a sua perda irremediável.*" Ibid., p. 145.

[40] Flores, Joaquim de Moura. Património – do Monumento ao Território. *Urbanidade e Património*, 1998, p. 10-17.

[41] Sitte, Camillo. *L'Art de Bâtir Les villes: L'urbanisme selon les Fondements Artistiques*. Paris, Ed. du Seuil, 1996.

[42] Choay, Françoise. *As questões do Património: Antologia para um combate*. Lisboa, Edições 70, 2011.

[43] Hagerman, Madeline. "An analysis of key cultural heritage resolutions, documents, charters, and legislation". In Owczarek, Nina. *Prioritizing People in Ethical Decision-Making and Caring for Cultural Heritage Collections*, London, Routledge, 2023.

It was also in the 19th century, thanks to the above-mentioned set of developments, that restoration as a discipline replaced the empirical interventions that were employed on historic monuments. The restoration in the 19th century had two action fronts, the interventionists, and the non-interventionists, i.e., those who advocated major interventions, which came to change the aspects of the monuments and even the incursion of new elements, developed in France by the architect Eugène Viollet-le Duc, and those more conservative, famously leaded by Ruskin, who were against intervention that modified aspects of the buildings.

It would be the Austrian art historian, Aloïs Rielg (1858-1905), that presented a relativistic interpretation of restoration, where each case holds unique values to be considered.[44] The contributions of the Italians Camillo Boito (1836 - 1914) with the notion of "*Voto Conclusivo*" and Gustavo Giovannoni (1876-1946), were also very important for the development of restoration as a discipline.

But back to Riegl, his work *Der moderne Denkmalkults*, from 1903, called a founding work by Choay (2011), makes an essential critical analysis of the notion of historical monument, using a social and philosophical perspective. He is the first to formulate the distinction between monument and the historical monument, explained earlier in this work, and to define the latter according to the values attributed to it throughout history. According to Hagerman (2023), Riegl theorised that the historical monument could have a historical value (when it's associated to a historically significant event or person), or an age value (that depends on how old the monument is), and an artistic value. He also discusses the modern values, like the use and the newness value. One of Riegl's most important remarks was that "works of art do not have inherent value, but values are culturally ascribed"[45].

Portugal also had its own preservationist efforts in the 19th century. In the essay *Monumentos Patrios*, written in 1838, the novelist and historian Portuguese Alexandre Herculano, claims for the preservation of Portuguese heritage, criticising the destruction of the Cristian art from the Middle Age. He states

> We will raise a cry in favour of the monuments of history, of art, of national glory, which every day we see crumbling into ruins. Let those who think it progress to erase or transfigure the venerable vestiges of antiquity smile at our superstitious beliefs; we will smile too, but with regret, and the more enlightened generations to come will decide which of these smiles signified ignorance and barbarity, and if there is no superstition of the present as there is the superstition of the past.[46]

[44] Ibid.
[45] Ibid
46 Herculano, Alexandre. Opúsculos: II, Volume 8. Lisboa, Bertrand, 1873, p. 6 -7.

Despite all the evolution seen in the 19th and early 20th centuries, cultural heritage continued, as stated by Choay (2011), to be part of an elitist European context, both in terms of those responsible for its management and the public who enjoyed it.

> The institutional globalisation of the historic monument, so longed for by Ruskin and Morris, makes almost no progress. Although, notable exception, the concept and practice had been introduced in Japan in the 1870s, in the context of the Meiji overture to the institutions and values of Europe, it only acquired full rights in the United States after the Second World War, with the creation of the National Trust for Historic Preservation. [47]

This became clear at the First International Congress of Architects and Technicians of Historic Monuments, held in Athens in 1931, in which only European countries took part. The Athens Charter for the Restoration of Historic Monuments, also known as *Carta del Restauro*, the first official international document about the conservation of the historical monuments, was a result of this congress.[48]

World War I was of great importance for the development of the politics of safeguarding heritage, influencing the Athens Charter of 1931, but also other charters. Before the war, some documents and conventions already talked about the protection of historical monuments and buildings dedicated to culture, sciences, and art, like the *Lieber Code* of 1863, the *Brussels Declaration* of 1874, and The *Hague Conventions* of 1899 and 1907. The Roerich Pact or *Treaty on the Protection of Artistic and Scientific Institutions and Historic Monuments* from 1935 was the first convention totally dedicated to the protection of cultural property in times of conflict. The Pact, proposed by the Russian painter, archeologist, and preservation theorist Nicholas Roerich (1874 – 1947) had as objective grant a neutral status to sites and institutions linked to culture, science and education.

Unfortunately, these documents didn't stop the attack against several historical monuments and cultural spaces (and civilians) during both wars, once that only the signatory countries followed them. The United Nations Educational, Scientific and Cultural Organization (UNESCO) – that had its constitution adopted in London in 1945 and entered into force in 1946, just after the Second Great War – wrote, in 1954, *the Hague Convention: Convection for the protection of Cultural Property in the Event of Armed Conflict*, which was guided by the Conventions of The Hague of 1899 and of 1907. The Convention states that the "damage to

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[47] "*A mundialização institucional do monumento histórico, tão desejada por Ruskin e Morris, não avança quase nada. Se, excepção notável, o conceito e a prática se introduzem no Japão desde os anos setenta do século XIX, no âmbito da abertura Meiji às instituições e aos valores da Europa, só adquirem plenos direitos nos Estados Unidos após a Segunda Guerra Mundial, com a criação do National Trust for Historical Preservation.*" [Our translation]. Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014, p. 175.

[48] This charter must not be mistaken with the celebrated Athens Charter of 1933, created during the International Congress of Modern Architecture (CIAM), also held in Athens, that mainly deals with modern urban planning.

cultural property belonging to any people whatsoever means damage to the cultural heritage of all mankind, since each people makes its contribution to the culture of the world"[49]. Also, in the after war, many international conservation organisations, which created guidelines and code of ethics for conservators, were created, like the International Institute for the Conservation of Museum Objects (IIC), in 1950, (later named International Institute for Conservation of Historic and Artistic Works) and the European Confederation of Conservation-Restoration Organizations (E.C.C.O).[50]

In the second half of the 20th century, many conventions happened and documents were presented, related to the heritage conservation, such as the Venice Charter (1964), the Records of the Thirteenth Session of the General Conference of the UNESCO (1964), the Norms of Quito (1967), the Paris Convention (1972), the Declaration of Amsterdam (1975), the Nairobi Recommendations (1976), The Charter of Machu Picchu (1977), the Burra Charter (1980), the Florence Charter (1982), The Washington Charter (1987), and the Nara Document on Authenticity (1994).

One of the most relevant documents is the International Charter for the Conservation and Restoration of Monuments and Sites, mostly known as the Venice Charter, created during the Second International Congress of Architects and Technicians of Historical Monuments, that took place in Venice in 1964. In this Charter, important principles of restoration were affirmed, like the reversibility of materials, and, most importantly, the idea that the built heritage should receive the same attention as fine art objects, such as paintings and sculptures.[51] Important principles for the conservation and restoration of the heritage were defined in this charter. Another resolution of the same Congress was the creation of an international non-governmental organisation for monuments and sites, named International Council of Monuments and Sites (ICOMOS).

In 1972, the seventeenth session of the General Conference of the UNESCO happened in Paris and adopted the Convention Concerning the Protection of the World Cultural and Natural Heritage. In it we see the following definition of cultural heritage

> Monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science; groups of buildings: groups of separate or connected buildings

[49] International Humanitarian Law Databases. Convention for the Protection of Cultural Property in the Event of Armed Conflict. The Hague, 14 May 1954. URL: ihl-databases.icrc.org/en/ihl-treaties/hague-conv-1954/preamble. Accessed 13 March 2023.
[50] Hagerman, Madeline. "An analysis of key cultural heritage resolutions, documents, charters, and legislation". In Owczarek, Nina. *Prioritizing People in Ethical Decision-Making and Caring for Cultural Heritage Collections*, London, Routledge, 2023.
[51] Ibid.

> which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science; sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.[52]

According to the World Heritage Convention (1972), each State Party have the duty to safeguard its cultural[53] and natural heritage. In it, we see an importance given to the "exceptional universal value", that it is independent of other attributed values, like aesthetic, scientific, archaeological, or historical. In this context, it was also determined the creation of the "World Heritage List" and the "List of World Heritage in Danger". Today, the "World Heritage List" counts with 1157 properties, 43 transboundary, and 167 States Parties.[54]

The end of the 20th century sees increasing valorisation of the intangible heritage. In 2003, the 32nd session of the General Conference of UNESCO adopted the Convention for the Safeguarding of the Intangible Cultural Heritage which established the List of Intangible Cultural Heritage of Humanity. Brazil would ratify the Convention in 2006.

Today the subject is still being discussed. The continual development of society and globalisation, as well as, environmental topics and conflicts, keep creating new discussions in the context of heritage preservation. As Flores (1998, p. 11) told "the challenge today is to reconcile heritage and development, putting the former at the service of the disadvantaged population of 'historic centres' or the rural world, so that it is not seen as an obstacle to modernization"[55].

1.2. Intangible Heritage

Since the beginning of the focus on cultural heritage, the activities of conservation and valorisation have always been centred on the material aspects of culture. The term "cultural heritage" was used only for architecture, works of art and archaeology.[56]. This is obvious in the 1964's Charter of Venice, the first international charter that gives a definition of heritage. In article 1, it says

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[52]UNESCO, *Convention concerning the protection of the world cultural and natural heritage: Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972*. Paris, UNESCO.

[53] We must highlight that in this convention they use the term "cultural heritage" instead of "historical monument". That is why from now on this work will use the more modern term.

[54] UNESCO World Heritage Centre. *World Heritage List*. URL: https://whc.unesco.org/en/list/. Accessed on: 13 March 2023).

[55] "*Hoje o desafio é conciliar patrimônio e desenvolvimento, pondo o primeiro ao serviço das populações desfavorecidas dos 'centros históricos' ou do mundo rural, de modo a que não seja mais visto como obstáculo à modernização.*"[Our translation] Flores, Joaquim de Moura. Património – do Monumento ao Território. *Urbanidade e Património*, 1998, p. 11,

[56] Harrison, Rodney; Rose, Deborah. "Intangible heritage". In Benton, Tim (Ed.). *Understanding Heritage and Memory*. Manchester University Press, 2010, p. 238 – 276.

> The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development, or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time. [57]

The same is seen in a later convention, the 1972's World Heritage Convention, that defines it as "monuments, groups of buildings and sites, in opposition to natural heritage which it defines as natural features, geological and physiographical formations and natural sites"[58]. It also doesn't make any reference to the social value of the heritage, stating that this should be of "exceptional universal value from the point of view of history, art or science"[59].

The focus of the international institutions dedicated to cultural heritage would change only in 1982, with the acknowledgement of the importance of the intangible cultural heritage, during the Mondiacult World Conference on Cultural Policies, that took place in Mexico.[60] Other important changes are found in the 1982's Burra Charter, that included the importance of a site could come from its social value, and the 1987's Washington Charter, that supported the protection of historic cities based in both tangible and intangible values[61].

In 1989, The General Conference of UNESCO, held in Paris, adopted the *Recommendation on the Safeguarding of Traditional Culture and Folklore*, which defined folklore as "the totality of tradition-based creations of a cultural community, expressed by a group or individuals and recognized as reflecting the expectations of a community in so far as they reflect its cultural and social identity" [62]. It tasked the member states to identify, disseminate and protect these practices, considering not only the traditions but also the transmitters. But according to Harrison and Rose (2010) the 1989's recommendation lacked clear operational guidelines, in addition to the insufficiency of incentives and possible sanctions, what made it remain largely unacknowledged.

To Harrison and Rose (2010), the *Recommendation on the Safeguarding of Traditional Culture and Folklore* it was directed to the safeguarding of the immaterial aspects of non-industrial societies. Until that point, the very Eurocentric composition of the charters and the

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[57] ICOMOS - International Council on Monuments and Sites. *The Venice Charter* URL: https://www.icomos.org/en/participer/179-articles-en-francais/ressources/charters-and-standards/157-the-venice-charter. Accessed on: 24 May 2023.
[58] Harrison, Rodney; Rose, Deborah. "Intangible heritage". In Benton, Tim (Ed.). *Understanding Heritage and Memory*. Manchester University Press, 2010, p. 241.
[59] UNESCO, *Convention concerning the protection of the world cultural and natural heritage: Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972*. Paris, UNESCO, 1972
[60] Harrison, Rodney; Rose, Deborah. "Intangible heritage". In Benton, Tim (Ed.). *Understanding Heritage and Memory*. Manchester University Press, 2010.
[61] Vecco, Marilena. A definition of cultural heritage: From the tangible to the intangible. Journal of Cultural Heritage, 11(3), 2010, p. 321-324.
[62] UNESCO, *Convention concerning the protection of the world cultural and natural heritage: Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972*. Paris, UNESCO, 1972.

World Heritage List, only included grand and aesthetic sites.[63] But it didn't acknowledge that for many cultures the material heritage is not perceived as important as for the Westerns. Japanese culture prioritize the knowledge linked to the creation process of a monument, over its material. The Shinto shrine of Ise, located in Ise, Mie Prefecture, is famous for a tradition existing for twelve centuries, in which its most sacred structures are rebuilt every 20 years. The reconstruction is made using the ancient construction techniques and architectural style, with knowledge preserved throughout time.[64] For Vecco (2010, p. 324)

> This approach depends on the cyclic vision of history, characteristic of oriental civilisations, which allows a sort of reversibility of time. While the western philosophical approach as regards conservation manifests itself in the preservation of the historic monument, the oriental one tries to use the monuments to preserve the very spirit they represent.

UNESCO, together with the Smithsonian Institution, a group of museums, education, and research centres, held, in 1999, the conference titled *A Global Assessment of the 1989 Recommendation on the Safeguarding of Traditional Culture and Folklore: Local Empowerment and International Cooperation*, in Washington DC. This happened after the possible impact of commercial and urban development over the important cultural area of *Jemaa el Fna* Square in Marrakesh raised concern and a public outcry. The square is famous for being a centre for oral storytelling and other street artists.[65] In 2001, the First Proclamation of Masterpieces of Oral and Intangible Cultural Heritage took place, in which nineteen "forms of popular and traditional cultural expressions and cultural spaces" are inscribed. In 2003, twenty-eight Masterpieces were inscribed, followed by forty-three in the last Proclamation, in 2005. The aims of the Proclamation were:

> raising awareness of the importance of the oral and intangible heritage and the need to safeguard it; evaluating and listing the world's oral and intangible heritage; encouraging countries to establish national inventories and to take legal and administrative measures for the protection of their oral and intangible heritage; promoting the participation of traditional artists and local practitioners in identifying and revitalizing their ICH.[66]

In October 2003, at the 32nd session of the General Conference, UNESCO adopted the Convention for the Safeguarding of the Intangible Cultural Heritage (Intangible Cultural Heritage Convention; ICHC), which entered into force in April 2006. According to it

[63] Akagawa, Natsuko. *Intangible Heritage*. London, Routledge, 2009.
[64] Adams, Cassandra 'Japan's Ise Shrine and its thirteen-hundred-year-old reconstruction tradition', *Journal of Architectural Education*, 52(1), 1998, p. 49–60.
[65] Harrison, Rodney; Rose, Deborah. "Intangible heritage". In Benton, Tim (Ed.). *Understanding Heritage and Memory*. Manchester University Press, 2010.
[66] UNESCO. Proclamation of the masterpieces of the oral and intangible heritage of humanity *Intangible Cultural Heritage*. 2001-2005. URL: https://ich.unesco.org/en/proclamation-of-masterpieces-00103. Accessed on: 30 May 2023.

> 1. The "intangible cultural heritage" means the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts, and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity. For the purposes of this Convention, consideration will be given solely to such intangible cultural heritage as is compatible with existing international human rights instruments, as well as with the requirements of mutual respect among communities, groups, and individuals, and of sustainable development. 2. The "intangible cultural heritage", as defined in paragraph 1 above, is manifested inter alia in the following domains: (a) oral traditions and expressions, including language as a vehicle of the intangible cultural heritage; (b) performing arts; (c) social practices, rituals, and festive events; (d) knowledge and practices concerning nature and the universe; (e) traditional craftsmanship.[67]

According to the ICHC text, its purposes are not only safeguarding, but also ensure respect and raise awareness to the intangible cultural heritage (ICH) of the communities, groups and individuals concerned, besides to provide international cooperation and assistance. The convention incentive the States Parties to draw up inventories of their intangible cultural heritage. To bring visibility to the ICH and encourage dialogue about the matter, it established the List of Intangible Cultural Heritage of Humanity. Nowadays, the list has 676 elements corresponding to 5 regions and 140 countries.[68]

1.3. Built vernacular heritage

The word "vernacular" has its origin in the Latin words *vernāculus*, meaning "domestic, native, indigenous", while *verna*, means "a home-born slave, a native", also in Latin. This expression is mostly used in the context of languages and dialectics[69]. We normally use vernacular heritage to define the traditional architecture, the one that is peculiar to a culture or locality and uses local materials and traditional techniques. Brinckerhoff (2005, p. 85) tells that the term vernacular architecture

[67] UNESCO - text of the convention for the safeguarding of the intangible cultural heritage (no date) *Intangible Cultural Heritage*. Available at: https://ich.unesco.org/en/convention (Accessed: 24 May 2023).
[68] UNESCO - Browse the lists of Intangible Cultural Heritage and the register of good safeguarding practices (no date) Intangible Cultural Heritage. Available at: https://ich.unesco.org/en/lists (Accessed: 24 May 2023).
[69] The Oxford Dictionary defines vernacular as "A. adj. 1. That writes, uses, or speaks the native or indigenous language of a country or district. 2. a. Of a language or dialect: That is naturally spoken by the people of a particular country or district; native, indigenous". But another definition, more general, is "native or peculiar to a particular country or locality". "Vernacular, adj. and n.". Oxford University Press, March 2023, URL: www.oed.com/view/Entry/222608. Accessed 31 May 2023.

> indicates the traditional rural and small-town dwelling, the dwelling of the farmer or craftsman or wage earner. Current definitions of the word usually suggest that the vernacular dwelling is designed by a craftsman, not an architect, that it is built with local techniques, local materials, and with local environment in mind: its climate, its traditions, its economy – predominantly agriculture.

According to the author, the definition above was created by architects and architecture historians that didn't consider the strong relationship this construction had with the communities they were part of. These scholars were the first to describe and study this type of building, back in the end of the 19th century. Later studies would focus on other fields – such as the social, economic, psychological, geographical, and archaeological. These further examinations uncovered that "vernacular building, especially in Europe, has had a history of its own, distinct from that of formal architecture, and that far from being timeless and determined by ancient archetypes, it has undergone a long and complicated evolution"[70].

Oliver (2006) explains that in the mid-twentieth century, there is the creation of groups that study vernacular architecture, which were the result of the attempts of creating a more coordinated way to document and describe the subject. Only in the 1960s, studies were published addressing the relationship between vernacular buildings and the cultures that produced them. The 1980s saw the realisation of many forums and conferences regarding the subject.

The Charter on the Built Vernacular Heritage, ratified in 1999, by the International Council on Monuments and Sites (ICOMOS) 12th General Assembly, that happened in Mexico, described vernacular building as "the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints"[71]. Together with the *Encyclopedia of Vernacular Architecture of the World*, created by Paul Oliver in 1997, the Charter "represented a common basis for study and the definitive international agreement for the preservation of traditional building know-how, respectively" [72]. The Charter presents examples of the vernacular in its general issues.

> Examples of the vernacular may be recognised by: a) A manner of building shared by the community; b) A recognisable local or regional character responsive to the environment; c) Coherence of style, form and appearance, or the use of traditionally established building types; d)Traditional expertise in design and construction which is transmitted informally; e) An effective response to functional, social and

[70] Brinckerhoff, Jackson John, *Discovering the Vernacular Landscape*, New Haven, Yale University Press, 1984.
[71] ICOMOS, *Charter on the Built Vernacular Heritage,* 1999. URL: https://www.icomos.org/images/DOCUMENTS/Charters/vernacular_e.pdf. Accessed on: 15 July 2023.
[72] Miguel, María Lidón de et al. "Burkina Faso through Its Traditional Architecture: A Century of Research on Built Vernacular Heritage" *Heritage* 5, no. 3:, 2022, p. 2373.

> environmental constraints; f) The effective application of traditional construction systems and crafts.[73]

Nowadays, there is a great discussion about vernacular architecture and popular architecture. Many studies focus on the aspects of these constructions around the world. Being developed during a long time, always more adapted to the characteristics of different regions and societies, scholars believe that the vernacular architecture, for a long time seeing as primitives and even dangerous[74], can be a more sustainable option to the modern constructions. Olivier (2006, p. 24) tells us that

> Architects and planners engaged in development projects – such as settlement upgrading, sites and services schemes, or low-cost housing – have drawn upon a wide experience of vernacular skills and know-how. So for instance, the Nubian vault system 'discovered' by Hasan Fathy, the Egyptian architect, has been applied by teams of the Development Workshop in Angola and Niger. Such technology transfer has the potential for overcoming the disastrous effects of the depletion of local resources. But there are problems. As structural anthropologists would argue, technological transfer will also mean corresponding changes in society, and there are serious cultural implications when new technologies are introduced. Often the values of a culture are difficult to ascertain.

1.4. Heritage in Brazil

The notion of cultural heritage (as we have nowadays) and preservation in Brazil is relatively new if compared with Europe. In the 18th century, while many countries in Europe were already cultivating their "national narratives"[75], Brazil was still governed by Portugal, following all the rules of the metropole. In the 19th century, while there is already a movement of preservation in Europe, Brazilian society is adopting European cultural values, seen as modern and civilised, the image of the progress, while trying to erase the primitive colonial past[76]. Thus, until the beginning of the 20th century, in cities such as Rio de Janeiro and São Paulo, major urban works were carried out in the name of progress, destroying the old colonial constructions to give space to new buildings, squares and roads, following eclectic styles.

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[73] ICOMOS, *Charter on the Built Vernacular Heritage,* 1999. URL: https://www.icomos.org/images/DOCUMENTS/Charters/vernacular_e.pdf. Accessed on: 27 June 2023.

[74] In Brazil, it was believed that houses constructed with mud, using traditional techniques, like *pau-a-pique*, were responsible for the proliferation of insects and diseases.

[75] Gonçalves (1996) describes "national narratives" as "discursive modalities which fundamental purpose is the construction of a national 'memory' and 'identity'" (*"modalidades discursivas cujo propósito fundamental é a construção de uma 'memória' e de uma 'identidade' nacionais")*. Gonçalves, José Reginaldo Santos. *A Retórica da Perda. Os Discursos do Patrimônio Cultural no Brasil*. Rio de Janeiro, UFRJ/IPHAN, 1996, p. 11.

[76] Pinheiro, Maria Lucia Bressan. "Origens da noção de preservação do patrimônio cultural no Brasil". *Risco Revista de Pesquisa em Arquitetura e Urbanismo,* (3), 2016, p. 5

According to Pinheiro (2006), in 1914, the Portuguese engineer Ricardo Severo was the first to speak up about the necessity of valorising the Brazilian "national roots in architecture", represented, for him, by colonial architecture. The author tells us

> Ricardo Severo transferred to Brazilian soil the nationalist programme of the movement called "*Casa Portuguesa*", which, in turn, had its roots in the English regionalist trend known as Arts & Crafts, which greatly contributed to the emergence of modern architecture in the early twentieth century.[77]

Following his nationalist ideas there is the creation of the so-called neo-colonial style – that was not similar at all to the colonial style. These neo-colonial buildings were "absolutely imaginative manifestations, in which, over a project of restless volumetry in the eclectic taste, colonial-inspired ornaments were applied in varying degrees of faithfulness to the originals"[78]. This shows that the colonial architecture was little-known, probably for being for so long disregarded by the same elite that now celebrated it.

This picture changed when intellectuals, like the above mentioned, Ricardo Severo, started to encourage the study of colonial architecture, through a number of visits to towns where constructions of the colonial period were preserved. Thus, in the 1920s, a line of thought emerged, not only in architecture, which sees in the colonial past the foundations of Brazilian society. According to Magalhães (2017) "the group of intellectuals who took part in the Week of Modern Art in 1922 became one of the main agents in this search for the authentic Brazilian nation through the culture and arts identified in the remote past that would have been preserved in the interior of the country"[79]. This group would be essential for the campaign for the preservation of the heritage of Brazil. That way, the country would see some attempts to the creation of legislation with a preservationist character.

Another important question related to the colonial arts was being discussed in Brazil in the 1920s – the evasion of works of art to other countries[80]. According to Pinheiro (2006) the first projects of law concerning the heritage of the country were created to stop the exportation of these. Unlike the buildings, which were extensively destroyed, such objects, often made of precious materials, were highly valued by the elite and even collected by many. These collections often included parts of demolished buildings.

Pinheiro (2006) tells us that, in the 1930s, the preservationist initiatives started to be more effective. In 1930, a broader federal bill project was presented, including not only the

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[77] Ibid, p. 5.
[78] Ibid, p. 6.
[79] Magalhães, Aline Montenegro. "A inspetoria de monumentos nacionais do Museu Histórico Nacional e a Proteção de Monumentos em Ouro Preto (1934-1937)", *Anais do Museu Paulista: História e Cultura Material*, 25(3), p. 233–290, 2017.
[80] Pinheiro, Maria Lucia Bressan. "Origens da noção de preservação do patrimônio cultural no Brasil". *Risco Revista de Pesquisa em Arquitetura e Urbanismo,* (3), 2016, p. 6.

works of art, but also the buildings and its construction elements, like doors, windows, tiles, etc. – also being against the collection of such elements. Unfortunately, this practice was used even by the "neo-colonialist", that removed the constructive elements of the buildings to study and documentation, without any regard for the "spatial conception of the building"[81].

The 1931 and 1933 conferences which resulted in important documents, like the 1933's Charter of Athens, influenced the creation of new instruments for the safeguard of the cultural heritages in many countries, and Brazil was not an exception. As mentioned before, in 1933, a very important step for the consolidation of the preservation of the heritage of the country was taken, the declaration of Ouro Preto as a national monument. In 1934, the Inspectorate of National Monuments (IMN) was created, by decree nº 24.735, as part of the Museum of National History (MHN).[82] It was up to the IMN to inventory the buildings of artistic and historical value, and that should be elected national monuments by the government.[83] Also in 1934, a new constitution was enacted, stating that the protection of historical and artistic objects was a duty of the State. The Art. 10 of the Constitution of 1934 says "the nation and the states are concurrently responsible for: III - protecting the natural beauties and monuments of historical or artistic value, being able to prevent the evasion of works of art"[84].

In 1937, the federal government, with the support of many Brazilian artists and intellectuals, created the National Historic and Artistic Heritage Service (SPHAN), first national agency dedicated to the heritage preservation[85]. Decree-Law 25/37, which regulated IPHAN, states in Chapter 1, Art. 1º

> The national historic and artistic heritage comprises all movable and immovable property existing in the country whose conservation is of public interest, either because of its connection to memorable facts in Brazilian history or for its exceptional archaeological, ethnographic, bibliographic, or artistic value.[86]

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[81] Ibid. p. 7.

[82] The Museu Histórico Nacional (National History Museum), housed to this day in the old Santiago Fortress (1603), in Rio de Janeiro, was created in 1922 by President Epitácio Pessoa. The project was a response to requests from intellectuals of the time who demanded a museum dedicated to national history. (Guedes, Angela Cardoso. Museu Histórico Nacional. *Comunicação & Educação*, *15*(3), p.131-136, 2010.)

[83] Tomaz, Paulo Cesar. "A preservação do patrimônio cultural e sua trajetória no Brasil". *Fênix-Revista de História e Estudos Culturais*, *7*(2), p. 1-12, 2010.

[84] "*Compete concorrentemente à União e aos Estados: III - proteger as belezas naturais e os monumentos de valor histórico ou artístico, podendo impedir a evasão de obras de art*." Constituição dos Estados Unidos do Brasil, de 16 de julho de 1934. URL: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao34.htm. Accessed on: 27 may 2023.

[85] Tomaz, Paulo Cesar. "A preservação do patrimônio cultural e sua trajetória no Brasil". *Fênix-Revista de História e Estudos Culturais*, *7*(2), p. 1-12, 2010.

[86] "*Constitui o patrimônio histórico e artístico nacional o conjunto dos bens móveis e imóveis existentes no país e cuja conservação seja de interesse público, quer por sua vinculação a fatos memoráveis da história do Brasil, quer por seu excepcional valor arqueológico ou etnográfico, bibliográfico ou artístico."* Decreto-lei n. 25, de 30 de novembro de 1937. Artigo 1º. URL: https://www.planalto.gov.br/ccivil_03/decreto-lei/del0025.htm. Accessed on 28 May 2023.

The decree presented important issues, like the legal implications of heritage protection and the legal effects of the registration. Despite its importance, it must be acknowledged that SPHAN's preservation policies "adopted a predominantly aesthetic perspective to the detriment of the historical aspect, thus failing to incorporate concepts from national and international historiography that are so relevant for a deeper reach with regard to heritage preservation"[87]. Thus, there was a preference for the conservation of certain types of buildings, chosen through a selection based on aesthetic and stylistic characteristics.

The nationalist character of new government, chaired by Getúlio Vargas, put an emphasis in the preservation of baroque buildings of the colonial time – seemed as a genuinely Brazilian and part of the "Brazilian national identity" and the ones linked to the public architecture. That way, mainly "fortresses and forts, town halls, churches, mills, farms, bridges, noble houses, manors and townhouses"[88] were registered. According to Pelegrini (2007) between the 1930s and 1970s, popular houses or less sophisticated buildings were not considered worthy of being protected. Besides it, there was at the time, especially among the modernists, a repulsion for eclectic style, said to be a "French heritage", which led to the demolition and mischaracterization of buildings from the 19th century. And, against the recommendation of the international charters, scenography resources were used in many historical cities, with the construction of many buildings imitating the colonial style.[89]

Even with these problems, we see some improvements in the protection policies for Brazilian heritage. The Constitution of 1946 includes the duty of the nation to protect historical documents in the article that refers to the cultural heritage - "Article 175 - The works, monuments and documents of historical and artistic value, as well as natural monuments, landscapes and places of particular beauty shall be under the protection of the Public Power"[90]. In the 1967 Constitution, archaeological sites are specified – "Paragraph One - The documents, works and sites of historical or artistic value, monuments, and remarkable natural landscapes, as well as archaeological sites, shall be under the special protection of the Public Power"[91].

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[87] Tomaz, Paulo Cesar. "A preservação do patrimônio cultural e sua trajetória no Brasil". *Fênix-Revista de História e Estudos Culturais*, *7*(2), p. 1-12, 2010.
[88] Pelegrini, Sandra de Cássia Araújo. "O patrimônio cultural no discurso e na lei: trajetórias do debate sobre a preservação no Brasil". *Patrimônio e Memória*, *2*(2), 54-77, 2007, p. 65.
[89] Ibid.
[90] "*Art 175 - As obras, monumentos e documentos de valor histórico e artístico, bem como os monumentos naturais, as paisagens e os locais dotados de particular beleza ficam sob a proteção do Poder Público*." Constituição dos Estados Unidos do Brasil, de 18 de setembro de 1946. URL: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao46.htm. Accessed on 28 May 2023.
[91] "*Parágrafo único - Ficam sob a proteção especial do Poder Público os documentos, as obras e os locais de valor histórico ou artístico, os monumentos e as paisagens naturais notáveis, bem como as jazidas arqueológicas*." Constituição dos Estados Unidos do Brasil, de 1967. URL: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao67.htm. Accessed on 28 May 2023.

The SPHAN, in 1946, changed its designation to Directorate of National Historical and Artistic Heritage and Artistic Heritage (DPHAN). The denomination would change again in 1970 to Institute of National Historical and Artistic Heritage (IPHAN) and to Secretariat and Sub-secretariat of the National Historical and Artistic Heritage, best known as SPHAN/*Pró-Memória*. In 1994, it turned back to IPHAN, the denomination maintained to the present day.

It's in the end of the 1960s that a new period of the heritage preservation in Brazil started, very influenced by the ideas of The Venice Charter, from 1964, and of The Norms of Quito, from 1967. According to Pinheiro (2006), it is at this time that there is a broadening of the context of monuments and a valorisation of the "ambience" of the registered buildings and of the historical centres. The author adds that "the architectural and urbanistic monuments are no longer seen as assets of exclusively artistic or historical value, but also as elements inserted in a socio-economic context, therefore carrying a dynamic and changing role in a historical trajectory". Thus, the government creates policies to associate the heritage preservation actions to plans of social and economic development, mainly through the promotion of touristic activities [92].

During the 1970s many institutions linked to culture would be created or restructured, such as the PCH (Integrated Programme for the reconstruction of Historical Cities), the FUNARTE (National Foundation of Art), the PAC (National Politic of Art), and others. Pelegrini (2007) tells us that in 1970, the government writes the Commitment of Brasilia, inspired in The Venice Charter, where it's recommended the joint action between federal, state and municipal authorities

> Aiming at controlling the trade of antique works of art, the leasing of public offices in buildings of historical and artistic value, as well as the joint creation of specialised labour training courses, the encouragement of artistic and literary production related to national and regional values and the inclusion of subjects related to the national heritage in the curricula of primary, secondary, and higher education.[93]

In the constitution of 1988, once more there is a change in what could be seem like cultural heritage, including now intangible elements. The Art. 216 says

> Brazilian cultural heritage is constituted by goods of a tangible and intangible nature, taken individually or together, which refer to the identity, action and memory of the different groups that make up Brazilian society, including: I - the forms of expression; II - ways of creating, doing and living; III - scientific, artistic and technological creations; IV - the works, objects, documents, buildings and other spaces destined to artistic and cultural manifestations; V - urban groups

[92] Pinheiro, Maria Lucia Bressan. "Origens da noção de preservação do patrimônio cultural no Brasil". *Risco Revista de Pesquisa em Arquitetura e Urbanismo,* (3), 2016, p. 12.
[93] Pelegrini, Sandra de Cássia Araújo. "O patrimônio cultural no discurso e na lei: trajetórias do debate sobre a preservação no Brasil". *Patrimônio e Memória*, *2*(2), 2007, p. 67.

> and sites of historical, landscape, artistic, archaeological, paleontological, ecological and scientific value.[94]

From the 1980s, a process started to happen to the historical cities of Brazil – a transformation of them into "consumer goods", that link these sites mainly to their economic value. Against what many heritage charters defended, there was an exclusion of the population and an adaptation of these spaces to new uses that didn't promote the sustainable development of the towns. These actions caused the gentrification of some towns, with the removal of the original population to peripheral areas and a transformation of the historical buildings into commercial establishments, such as restaurants, hotels, and stores, all direct to tourism.[95] An example of this process is Tiradentes, in Minas Gerais. The town, in ruins until the end of the 1970s, became the focus of preservation concerns by individuals from outside the city, which start a process of restoration of its historical centre. With the increased interest by tourists, there were the development of many establishments related to the tourism industry, which ended up driving away the locals. Nowadays, it reassembles a scenic town, with no residents and taken by hotels, restaurants, and souvenir stores.

This process was marked by the superficiality of the restoration and a homogenisation of the historical centres, that according to Pelegrini (2007) "was achieved by restoring the façades of monuments, forging an overall impression by demolishing buildings and creating large empty or green spaces, using standardised urban furniture (defined by period patterns) and employing contrasting plays of colour and light".

Together with that, in the beginning of the 1990s, there was a weakening of the initiatives of protection of the cultural heritage in the country, caused by the politics of privatisation of the federal government, that promoted a dismantlement of the government cultural sector. This context would change only with the restructuring of the IPHAN in 1995 and the investment of the BID (Inter-American Development Bank). In the end of the 1990s, it created the Urban Heritage Preservation Programme, most known as *Programa Monumenta,* by the Ministry of Culture, with support of IPHAN and UNESCO. Through the programme, the government offered tax exemptions to private companies that entered partnerships to invest in the restoration of heritage properties. It created a List of Conservation Priorities that focused not only on the old restricted practices done by architects, but using the vision of historians,

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[94] Planalto. *Constituição da República Federativa do Brasil*, 1988. URL: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Accessed on: 29 May 2023.

[95] Pelegrini, Sandra de Cássia Araújo. "O patrimônio cultural no discurso e na lei: trajetórias do debate sobre a preservação no Brasil". *Patrimônio e Memória*, *2*(2), 54-77, 2007, p. 69.

social scientists, and anthropologists. They shift the focus on the link between the heritage and the tourism industry, to heritage recovery projects aimed at urban rehabilitation.[96]

The National Inventory of Cultural Reference (INRC) was created in 2000 by IPHAN, and, with its more anthropological vision of heritage, it highlighted the social actors. According to Carmo (2019), with the creation of this instrument, IPHAN aimed to "overcome the dichotomous vision that separates traditionally protected architectural assets from other everyday cultural manifestations, working, for example, on the concept of "place", which articulates the tangible and the intangible".

In 2003, after the election of a new Government, led by Luís Inácio Lula da Silva, several preservation agencies and government programmes, such as the *Programa Monumenta*, underwent restructuring. That way, during the 2000s, there was an increase in the participation of the municipalities in the preservation initiatives and more public investments in the sector. To face the international crises that started in 2008, the federal government created economics instruments, that also directed investments to historical cities, like the Growth Acceleration Programme – Historical cities (PAC-CH), which was "the largest investment program in the country, included defending cultural heritage, the ambience and the environment to induce urban rehabilitation and thereby indicated a new idea: to combine the instruments of urban planning to actions of preservation and restoration, and not be limited to physical interventions on historic sites"[97]. During the first half of the 2010s, many investments were made in programs of rehabilitation of touristic cities, including the historical ones, in anticipation for the Brazil's World Cup, in 2014, and the Rio de Janeiro's Olympics, in 2016.[98]

After the impeachment of Lula's successor, Dilma Rousseff, in 2016, Brazil went through a process of dismantling of cultural policies, with cuts in the budget of the Ministry of Culture, responsible for organs such as IPHAN, and corruption allegations inside the agency.[99] After the election of Jair Bolsonaro in 2018, there were even bigger losses for the agencies linked to culture and heritage. The Ministry of Culture was extinct and transformed into one of the Secretariats of the Ministry of Tourism. The Secretariat of Culture was responsible for some of the essential institutions in the management of the Brazilian heritage – not only IPHAN, but

[96] Carmo, Bárbara Helena Almeida "PCH Programa Monumenta e PAC-CH: o patrimônio cultural na perspectiva de política pública" Dissertation (Masters in Architecture), Instituto de Arquitetura e Urbanismo, Universidade de São Paulo, 2019.
[97] Fridman, Fania, et al. Public policies for the preservation of historical heritage in Brazil. Three case studies (1973-2016). *Revista Brasileira de Estudos Urbanos e Regionais*, *21*, 2019, p. 621-638.
[98] Carmo, Bárbara Helena Almeida "PCH Programa Monumenta e PAC-CH: o patrimônio cultural na perspectiva de política pública" Dissertation (Masters in Architecture), Instituto de Arquitetura e Urbanismo, Universidade de São Paulo, 2019.
[99] Cerqueira, Amanda P. Coutinho de. "Política cultural e 'crise' no governo Temer", *Revista Novos Rumos*, 55(1), 2018.

also the Brazilian Institute of Museums (IBRAM), National Arts Foundation (FUNARTE), National Library Foundation (FBN), and others. All these faced many changes in their administration between 2019 and 2022, being led by individuals without any experience with heritage preservation.[100] According to Beiguelman (2020) "The case of IPHAN is emblematic, because it was without a president for many months and has been suffering a process of occupation of its superintendencies by professionals who have no preparation and training to work in this field".

In 2022, Luís Inácio Lula da Silva was reelected, giving hope to many Brazilians of the reestablishment of incentives for the heritage preservation abolished in past years. One of the first actions of the new government after taking office in 2023, was the restoration of the Ministry of Culture. The IPHAN again underwent an administrative restructuring, but now composed of individuals with experience in cultural development and heritage preservation.

In recent years, the Brazilian heritage has not only faced an institutional crisis, with the weakening of the agencies and policies linked to it, but some accidents have caused irreparable losses to the Brazilian memory. In 2015, a major fire hit the Museum of Portuguese Language in São Paulo, destroying a large part of the Luz Station, a historic building opened in 1867 to house one of the most important stations in the country, and which had been restored to house the museum. The Cinemateca Brasileira, also in São Paulo, suffered several fires during the years of its existence. The two most recent ones occurred in 2016 and 2021 and were responsible for the loss of part of the Brazilian film heritage that was stored there.

Probably the greatest tragedy for the memory of Brazil, was the fire that occurred in 2018 and destroyed the National Museum, located in the city of Rio de Janeiro. Installed in the Imperial Palace of São Cristóvão, a building dating back to the early nineteenth century, and which housed the Portuguese royal family and the Brazilian imperial family, the museum was the largest natural history museum in the country. The institution would be 200 years old that same year and had a collection of 20 million items, such as fossils, mummies, indigenous pieces, and rare books, of which very little can be saved. The building also suffered various structural damage. The last blow against Brazilian heritage was the terrorist attacks of January 2023 against the Congress, the Supreme Court, and the presidential palace, when thousands of people

[100] Beiguelman, Giselle. "Pandemia da ignorância cresce com o desmonte do Iphan: instituições ligadas à memória e à preservação do patrimônio estão debilitadas". [Interview to Leila Kiyomura]. *Ouvir Imagens*. São Paulo, Rádio USP (93,7 MHz), 2020. URL: https://jornal.usp.br/radio-usp/pandemia-da-ignorancia-cresce-com-o-desmonte-do-iphan/. Accessed on: 29 May 2023.

invaded and destroyed these government buildings. Many important works of art and historical objects were damaged in the attack.[101]

These tragedies show how the protection of Brazilian heritage is still deficient and, despite the long process described in this work, much remains to be done to improve public policies and initiatives for safeguarding and valuing it. Unfortunately, in Brazil we still deal with a low level of education and cultural training, with a big population that doesn't really value the heritage. Even the intellectual elite tend to not give the same value to the heritage of the country, as they give to the one from other countries. Heritage education and appreciation, as proposed in this work, are extremely important.

1.5. Brazilian Legislation

After learning the different definitions which the cultural heritage received throughout history, we can affirm that it creates a bridge between communities and its identity, regardless of its nature and "for having an unconditional value inherent to public goods, they are worthy of special protection by the State entity"[102]. The idea of cultural heritage rights arises in the end of the 20th century, as part of the third generation (or dimension) of fundamental rights[103].

The Brazilian normative system referring to the cultural heritage started to be outlined, as previously presented, at the beginning of the 20th century. Formed today by different laws, decrees and norms, this normative system is the result of years of demands and changes. The decree 25, from 1937, that created the (today known as) IPHAN and the registration as an instrument of safeguard, and the Article 216 of the Constitution of 1988, that broadened the notion of cultural heritage, are still the most relevant ones. Together with international

[101] Uribe, Gustavo. 'Obra de Di Cavalcanti danificada por criminosos no Planalto é avaliada em R$ 8 milhões', *CNN Brasil*, 1 January 2023. URL: https://www.cnnbrasil.com.br/politica/obra-de-di-cavalcanti-danificada-por-criminosos-no-planalto-e-avaliada-em-r-8-milhoes/. Accessed on: 16 June 2023.

[102] "*por possuírem este valor incondicional inerente a bens públicos são merecedores de tutela especial por parte do ente Estatal*".[Our translation]. Falavigno, Chiavelli Facenda. "A tutela jurídica do patrimônio cultural brasileiro". *Res Severa Verum Gaudium – Revista Científica dos Estudantes de Direito da UFRGS.* Porto Alegre, V. 2, N. 1, 2010, p. 3.

[103] According to Diógenes Junior (2012), the fundamental rights have not emerged simultaneously, leading them to be divided into generations or dimensions. First-generation rights relate to the principle of freedom and comprise civil and political rights. The second generation refers to those that ensure the principle of material equality between human beings. These are the social rights, such as access to food, health, education, housing, etc. Third generation rights are the diffuse or collective rights (fraternity rights, also known as "solidarity rights"), among which we can cite the right to the environment, to cultural heritage, to communication, to self-determination of people, to peace, etc. Diógenes Junior, José Eliaci Nogueira. "Gerações ou dimensões dos direitos fundamentais". *Âmbito Jurídico, Rio Grande, XV*, (100), p. 571-572, 2012.

conventions and the municipal and state legislations, they provide a considerable protection for the heritage of the country[104].

Besides the norms already presented, it is important to mention the following laws and decrees:

- Decree-law nº 2.866, from 1941, that deals with the possibility of cancellation of a registration by the president if there is public interest.
- Law nº 3.925, from 1961, which regulates the elements to the protection of archaeological and prehistoric monuments.
- Law nº 4.845, from 1965, forbids the departure, abroad, of works of art and crafts produced in the country, or brought to it, during the monarchic period.
- Law nº 6292, from 1975, on the registration by the National Institute of Historical and Artistic Heritage (IPHAN), establishing that the registration will depend on approval by the Minister of State for Education and Culture, after opinion by the respective Advisory Council.
- Law nº 7.347, from 1985, that disciplines the public civil action for liability for damages caused to objects of artistic, aesthetic, historical, touristic and landscape value.
- Law nº 8.313, from 1991, that established the National Programme of Support to Culture (Pronac), which has the purpose of raising and channelling resources to the cultural sector, creating mechanisms to protect cultural expressions; safeguarding traditional knowledge; preserving the tangible and intangible heritage; among others aims.
- Decree nº 3.551, from 2000, established the "Registration of Cultural Property of an Intangible Nature", where knowledge, celebrations, forms of expression and places that constitute Brazilian cultural heritage will be registered. It also creates the "National Program of Intangible Heritage", which aims at the implementation of a specific policy of inventorying, referencing, and valuing this heritage.
- Law nº 10.257, from 2001, also known as the City Statute, that deals with the Brazilian urbanistic rights.
- Decree nº 5.520, from 2005, that establishes the Federal System of Culture - SFC, which aims to increase integration between the government and civil

[104] Hüttner, Edison; de Lima, Reginâmio Bonifácio de. "O patrimônio cultural brasileiro e as redes de proteção contra descaminhos vigentes nas primeiras décadas do novo milênio". *Revista Memória em Rede*, *14*(26), p. 421-440, 2022.

society in the implementation of cultural policies and actions, with a view to promoting social and cultural development.

According to the Brazilian Constitution, the Public Prosecutor's Office, the Public Power, and the society is responsible for the protection of the heritage of the country. The Public Prosecutor's Office role is to defend the social interests, having as main function the uphold of justice. As for the Brazilian cultural heritage, both judicial and extrajudicial measures can be adopted.[105]

As seen above, there are many judicial and administrative instruments for the protection of cultural heritage in Brazil. The registration, called in Portuguese *Tombamento*, was introduced in 1937 and didn't suffer any change until today. It can be considered the main instrument for the safeguard of heritage sites of the country's legislation. According to Rodrigues (2005 apud Falavigno, 2010) the *tombamento* "consists of an administrative act by which the Public Authorities declare the cultural value of movable or immovable things, (…) subjecting them to a special regime that imposes limitations on the exercise of ownership in order to preserve them". When a propriety is elected for the instrument of *tombamento*, it can be inscribed in one of more *Tombo* Books, which ate four: the Archaeological, Ethnographic and Landscape *Tombo* Book, the Historical *Tombo* Book, the Fine Arts *Tombo* Book and the Applied Arts *Tombo* Book.[106]

The registration can be definitive or provisory and can generate effects like restrictions on alienability and modification of the property, possibilities of inspections, restriction of use of neighbouring properties, etc. Due to these effects, a conflict between the instrument and the right to property is created, since the registration limits the actions of the owner and gives him some obligations that can bring losses and problems.[107]

Another important instrument is the inventory, which works as a register of culturally valued goods, and when dealing with material heritage, it "consists of seeking them out, both in communities and in private places, and describing them in order to have their existence verified", according to Falavigno (2010). There is not a specific national law that establishes the inventory, so the municipalities and the states are normally responsible for editing laws for this instrument. The inventory doesn't have the same power as the registration, explained above, but it also creates the obligation to the owner to preserve the propriety, avoiding any alteration of destruction.

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[105] Hüttner, Edison; de Lima, Reginâmio Bonifácio de. "O patrimônio cultural brasileiro e as redes de proteção contra descaminhos vigentes nas primeiras décadas do novo milênio". *Revista Memória em Rede*, *14*(26), p. 421-440, 2022.
[106] Falavigno, Chiavelli Facenda. "A tutela jurídica do patrimônio cultural brasileiro". Res Severa Verum Gaudium – Revista Científica dos Estudantes de Direito da UFRGS. Porto Alegre, V. 2, N. 1, 2010.
[107] Ibid.

The Brazilian City Statute also presents important instruments for the protection of cultural heritage. Expropriation can be used in extreme cases, where the property is taken away from the owner to be preserved. Another instrument is the Master Plan, an institute regulated by the City Statute. Municipalities are required to create Master Plans, in which they are allowed to introduce the zoning, that are areas subject to specific rules that limit the right to property and construction according to the cultural value of the assets found there.[108]

The Registration of Cultural Property of an Intangible Nature is also a key instrument of safeguard. The intangible heritage is registered according to its characteristics in one or more of the four books: the Book of Knowledge or Ways of Doing, the Book of Celebrations, the Book of Expressions, and the Book of Places. The registration leaded to the creation of an inventory of the cultural manifestations of the country and helped in the development of politics of valorisation[109].

Despite the number of laws and decrees, we saw earlier in this work that Brazil still faces many problems concerning the protection of the heritage. The instruments, like the *Tombamento* and the registration still raise many discussions, mainly linked to the rights and duties of the owners and of the government. New initiatives are always welcome to improve the effectiveness of the legislation.

1.6. Conservation and Restoration in architectural domain

"Wanting and knowing how to 'classify' monuments is one thing. Knowing how to physically conserve and restore them is another matter, which is based on other knowledge"[110], says Choay (2014, p. 155) when starting to talk about restoration. According to the author

> As an irremediable process, the industrialisation of the world has contributed, on the one hand, to generalising and accelerating legislation for the protection of historic monuments and, on the other, to making restoration an autonomous discipline, in line with the progress made in the history of art.[111]

After the consolidation of the importance of the cultural heritage and the creation of a legislation that protected it, it was time to discover ways to preserve the physicality of the heritage that required repairs, especially the built one.

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[108] Ibid.
[109] Ibid.
[110] "*Querer e saber "classificar" monumentos é uma coisa. Saber depois conservá-los fisicamente e restaurá-los é um outro assunto, que assenta sobre outros conhecimentos*" [Our translation]. Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014, p. 155.
[111] "*Enquanto processo irremediável, a industrialização do mundo constribui p0or um lado, para generalizar e acelerar as legislações de proteção do monumento histórico e, por outro, para fazer de restauro uma disciplina autônoma, solidária com os processos da história da arte.*" [Our translation]. Ibid., p. 137.

Rivera (1997) tells us that "from the Roman Empire until the middle of the 18th century, restoring a work of architecture generally meant acting in an innovative way on it, according to the different valuations of the monument in each period". But already in the 15th century there is the flourishing of some preservationist ideas, in an isolated way. Notions such as respect for the original material, the idea of reversibility and distinguishability of the intervention, the importance of documentation and of a scientific methodology, the minimum intervention, matured between the 15th and 18th centuries. Many events would catalyse the development of the discipline, such as the emergence of Enlightenment ideas, the transformations brought about by the Industrial Revolution, the destruction caused by the French Revolution. So, in the beginning of the 19th century, the nations that already have conservative awareness started to discuss the methodology or effectively restoring their heritage.[112]

In the first moment, during the 19th century, some obstacles were faced by those that worked in the area, like the lack of knowledge from the architects about the techniques used in some periods. Much was known about classical architecture and its techniques, with many manuals written on the subject throughout history. But the mediaeval architecture, like the Gothic and the Romanic, ignored for so long, was not well known by the architects and scholars. Another obstacle was the lack of recognition that restoration works provided to the architects. For those, it wasn't as prestigious as the works that entailed the "creative genius", as well as, not as well remunerated.[113]

So, in the 19th century, the restoration became a discipline that prepared architects to work with the conservation of the past, teaching them art history and art of the construction, and later, throughout the 20th century, new scientific and technical knowledge. But, according to Choay (2014, 158)

> The intervention of specialised technicians in architectural monuments not only required positive, historical, and methodological knowledge. It also implies a doctrine that can articulate this expertise and this practical knowledge in a very different way, by modifying the objectives and the nature of architectural intervention. The new discipline that is the conservation of ancient monuments, and that was constituted from the 1820s onwards, is necessarily linked to the values and new meanings then attributed to the historic monument.[114]

[112] Kühl, Beatriz Mugayar. "História e ética na conservação e na restauração de monumentos históricos". *Revista CPC*, (1), 16-40, 2006.
[113] Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014.
[114] "*A intervenção de técnicos especializados nos monumentos arquitetônicos não exige conhecimentos positivos, históricos, técnicos e metodológicos. Ela implica também uma doutrina que possa articular de forma muito diferente estes saberes e estes conhecimentos práticos, ao modificar os objetivos, e a natureza da intervenção arquitetônica. A nova disciplina que é a conservação dos monumentos antigos, e que se constitui a partir dos anos vinte do século XIX, está necessariamente solidária com os valores e novos sentidos então atribuídos ao monumento histórico*". [Our translation]Ibid., 158.

Two opposing doctrines would dominate the restoration debate in Europe during the 19th century – the interventionist, famously supported by the French architect Eugène Viollet-le Duc (1814 – 1879), and the anti-interventionist, characteristic of England, and strongly defended by Ruskin and Willian Morris.[115]

Ruskin and Morris defended radical anti-interventionism. Backed by his conception of historical monuments, in which he conferred a sacred character on ancient buildings and believed all "marks of time" were essential parts of those. Therefore, no restoration intervention should be done to these relics, being the restoration a crime against the authenticity of objects and monuments. Despite the radical opinion, Ruskin and some other anti-Interventionists supported the need for maintenance and the use of non-apparent consolidations.

The interventionism defended by Viollet-le-Duc can be explained by the definition found in his *Dictionnaire raisonné de l'architecture française du XIe au XVIe siècle* (1897)*:* "Restoring a building is not about maintaining, repairing or redoing it, it is about restoring it to a complete state that may never have existed at a given time"[116]. In other words, he believed that the restoration was supposed to bring the building to an ideal state, even elements that were never part of it must be added. Despite being remembered by his radical interventions in some French monuments – the most famous being the spire he added to the roof of the Notre Dame of Paris –, Choay (2014) tells us not to diminish his legacy to these. He was an avid researcher in the history of building techniques and materials, acquiring knowledge of monuments with his methods of on-site surveys and creating photographic inventories. In addition, he was one of the first scholars to highlight the economic and social dimensions of architecture. His precepts were mostly used in the period, not only in France, but in other European countries as well.

Although Ruskin and Viollet-le-Duc turned out to be major representatives, respectively, of England and France when discussing restoration in the 14th century, both had critics and antagonists in their own countries. Between 1841 and 1870, the architect Gilbert Scott (1811-1879), promoted interventions called "restorative vandalism" by Choay (2014) in important religious buildings in England. In France, Viollet-le-Duc's restorations received strong criticism from important names such as Rodin and Anatole France.

In the end of the 19th century, new reflections about the conservation and restoration of the cultural heritage appeared. Choay (2014, p. 166) explains

> All knowledge in the process of formation invites criticism of its concepts, its methods, and its projects. The twin disciplines of

[115] Ibid.
[116] Viollet-le-Duc, Eugène-Emmanuel. *Dictionnaire raisonné de l'architecture française du XIe au XVIe siècle* (Vol. 8). Paris, A. Morel, 1867.

> conservation and restoration of historic monuments have not escaped it. After the founding work of the first generation, there followed, at the end of the century, a later, critical, and complex reflection.

Already in the last quarter of the 19th century, a more moderate and questioning[117]g method than that presented by Viollet-le Duc would be practised. Advances in archaeology and art history created a more informed methodology, developed slowly and almost by stealth. But the Italian architect Camilo Boito defended it ardently. Being not only an architect, but also an engineer and an art historian, Boito found himself "in the articulation of two worlds made strange: the world of art, past and present, and the world of technical modernity". This allowed him to have a broader look over the situation of the restoration. Having knowledge of the doctrines espoused by both Viollet-le-Duc and Ruskin, Boito formulates a set of guidelines in which he uses the best of each of the visions. Guidelines that would be used in the Italian law of 1909 and referred to by other important names like Gustavo Giovanonni.[118]

From Ruskin, Boito gathered the notion of authenticity – it was necessary to preserve the patina and the additions acquired during time by ancient buildings, as well as reject any reconstitution of missing parts and to respect the singularities of each monument. As Viollet-le-Duc, he preaches the legitimacy of restoration and “the priority of the present over the past”, as Choay (2011) puts it. In his interesting text "*I restauri in architettura*", published in *Questioni pratiche di belle arti, restauri, concorsi, legislazione, professione, insignamento*, of 1893, Boito enunciated seven fundamental principles for restoration, well synthesized by Beatriz Mugayar Kühl (2008, p.22):

> Seven key principles have been set out: emphasis on the documentary value of monuments, which should be preferably consolidated to repaired and repaired to restored; avoid additions and renovations, which, if they were necessary, should have a character different from the original, but could not detract from the whole; the additions of deteriorated or missing parts should, even if they followed the primitive form, be of different material or have incised the date of their restoration or, even, in the case of archaeological restorations, have simplified forms; the consolidation works should be limited to what is strictly necessary, avoiding the loss of characteristic or even picturesque elements; respect the various phases of the monument, being the removal of elements only admitted if they have an artistic quality manifestly inferior to that of the building; record the works, pointing out the usefulness of photography to document the phase before, during and after the intervention, and the material should be accompanied by descriptions and justifications and forwarded to the Ministry of

[117] “*Todo o saber em fase de constituição convida à crítica dos conceitos, dos seus métodos e dos seus procjetos. As disciplinas gêmeas da conservação e do restauro dos monumentos históricos não lhe escaparam. Após o trabalho fundador das primeiras gerações, seguiu-se, no final do século, uma reflexão posterior, crítica e complexa.”* [Our translation]. Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014, p. 166.
[118] Choay, Françoise. *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014.

> Education; place a tombstone with inscriptions to point out the date and the restoration works carried out.[119]

Boito's principles would be articulated and clarified after the destruction caused by armed conflicts in the 20th century and with the evolution of the constructive techniques, but it's continuing to be relevant to this day. The century would show an emphasis in the documental value of the monument. Riegl would contribute not only for the theoretical part of the heritage preservation, but also for the practical one. According to Kühl (2008), he highlighted that there was not a universal solution when dealing with the preservation of historic monuments, but several actions, with different levels of pertinence, and never adopted in an arbitrary way.

After the second war, many meaningful works were written, and there is a shift in the values emphasised in restoration - no longer predominating the documental value of the work, but its formal values, while respecting its historical aspects.

Cesare Brandi (1906 – 1988), founder of the Central Institute of Restoration in Rome, was one of the great theoreticians of restoration. Brandi (2005, p. 48-51.) stated the "restoration constitutes the methodological moment of recognition of the work of art in its physical consistency and in the twofold historical-aesthetic polarity, in view of its transmission to posterity. (…) Only the material form of the work of art is restored."[120]. In Brandi's theory, restoration is a complex process of recognition of the work of art as such, but also as a historical and cultural document, taking into consideration its physical aspects and the figurative image, but also the transformations suffered by the object over time, and using for this reflection tools from various disciplines such as philosophy, art history, criticism, and aesthetics.[121]

In his theory, Brandi explains that restoration is not an empirical and arbitrary process, but a historical-critical one. It's a multidisciplinary operation, even when performed by only one individual, because the procedures must integrate art criticism, aesthetic, and history. In restoration, each case must be analysed individually, but following a sound methodolog that

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[119] "*Foram enunciados sete princípios fundamentais: ênfase no valor documental dos monumentos, que deveriam ser preferencialmente consolidados a reparados e reparados a restaurados; evitar acréscimos e renovações, que, se fossem necessários, deveriam ter caráter diverso do original, mas não poderiam destoar do conjunto; os complementos de partes deterioradas ou faltantes deveriam, mesmo se seguissem a forma primitiva, ser de material diverso ou ter incisa a data de sua restauração ou ainda, no caso das restaurações arqueológicas, ter formas simplificada; as obras de consolidação deveriam limitar-se ao estritamente necessário, evitando-se a perda dos elementos característicos ou, mesmo, pitorescos; respeitar as várias fases do monumento, sendo a remoção de elementos somente admitida se tivessem qualidade artística manifestamente inferior à do edifício; registrar as obras, apontando-se a utilidade da fotografia para documentar a fase antes, durante e depois da intervenção, devendo o material ser acompanhado de descrições e justificativas e encaminhado ao Ministério da educação; colocar uma lápide com inscrições para apontar a data e as obras de restauro realizadas."* Kühl, Beatriz Mugayar. "Os Restauradores e o pensamento de Camilo Boito." In Boito, Camilo. *Os Restauradores.* São Paulo, Artes & Ofícios/Ateliê Editorial, 2008, p. 22.

[120] Brandi, Cesare. *Theory of restoration*. Firenze: Nardini Editore, 2005.

[121] Kühl, Beatriz Mugayar. "Os Restauradores e o pensamento de Camillo Boito." In Boito, Camillo. *Os Restauradores.* São Paulo, Artes & Ofícios/Ateliê Editorial, 2008.

respects the complex structure and historical stratifications of the artwork. This methodology must be rooted in history and philosophy, in a way to avoid attitudes based on individual taste and preferences.

In his book, published in 1963, Brandi arguesthat the restoration must be based on three fundamental principles. The first one establishes that any integrative intervention in a work of art must be easily distinguishable, but without interfering with the "oneness", with the object as a whole. This can be achieved by using integrative techniques that by far are imperceptible, but, on closer examination, are effortlessly identified. The second principle defends the minimal interventions. The materials must not be replaced if they "directly contribute to the figurative appearance of the image and not to the structure"[122]. The third principle states that the restoration must facilitate future interventions and never prevent them. This is reached by using only reversible measures.

About Brandi's theory, Kühl (2006, p. 29) says

> Brandi exposed that the fact of recognizing the work of art as such, imposes on those who recognize it the moral imperative of its conservation. And because of this, it is imperative that the analysis that guides the intervention be very well founded, since we are responsible for our acts before the present and before future generations.[123]

The *Venice Charter*, released in 1964 and also known as the International Charter for the Conservation and Restoration of Monuments and Sites, set many guidelines and concepts for the conservation and restoration. The charter stipulates that the conservation and restoration should be a multidisciplinary process, making use of all the sciences and techniques that could help in the safeguard of the heritage. The conservation must be constant to maintain the monument in its best form, preventing the necessity of restoration, which should be performed only as a last resource. The charter forbids any interference in setting of monuments, like the construction or demolition of buildings, and the moving of parts (sculptures, paintings, etc,), which could be only allowed in cases where there is extreme necessity and to ensure the preservation.

According to the Charter, restoration is a specialised and punctual operation, and must be preceded and followed by studies, both archaeological and historical. Traditional techniques must be always used when dealing with the restoration of built heritage, apart from cases where they prove inadequate. All moments of the object must be respected, and the removal of

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[122] Brandi, Cesare. *Theory of restoration*. Firenze: Nardini Editore, 2005.

[123] "*Brandi expusera que o fato de se reconhecer a obra de arte como tal, impõe a quem reconhece o imperativo moral da sua conservação2. E também por isso, é imperioso que a análise que guia a intervenção seja muito bem fundamentada, pois somos responsáveis pelos nossos atos perante o presente e perante as gerações futuras*." Kühl, Beatriz Mugayar. "História e ética na conservação e na restauração de monumentos históricos". Revista CPC, (1), 16-40, 2006, p. 20.

additions should only be allowed in unique circumstances and when the earlier layers present greater values than the ones above and are in good state. When replacing missing parts, the replacement should harmoniously integrate the rest of the monument but be distinguishable at the same time.

The Charter defends the special care of the historic sites, ensuring their integrity. As well as the conservation and restoration, excavation should follow scientific standards, in addition to the recommendations adopted in 1956 by UNESCO. Ruins must be conserved and protected, and all efforts to ensure the understanding of monuments must be done, but reconstructions are ruled out. Nevertheless, the charter supports anastylosis "that is to say, the reassembling of existing but dismembered parts can be permitted". The integration materials should differ from the original ones and be used in its minimal. And, before, during, and after each process, whether conservation, restoration, or excavation, a very complete documentation should be done and later made available to researchers.

In the decades after the dissemination of Brandi's ideas, other theories were coined, but most of them were coined based in his approach. Vinãs (2010, p. 6-7) tell us

> In the latter part of the twentieth century, these 'aestheticist' views coexisted with another significant contribution to conservation theory: what could be called 'new scientific conservation'. This new scientific conservation was more of an attitude towards conservation techniques rather than a proper conservation theory; in fact, it lacks a solid theoretical body that precedes or justifies it. 'Hard', material sciences (chemistry and physics) play a key role in this kind of scientific conservation. However, nowadays it is a very widely accepted approach to conservation, and, as such, it deserves to be studied.

In 2010, the Spanish paper conservator and restorer, Salvador Muños-Viñas, presented a new look on conservation. Known as "contemporary theory of conservation", his method focuses heavily on the subjective and social nature of conservation. According to Muños-Viñas (2012), this theory, not truth or science, determines the decisions or actions in conservation, "but rather the uses, values and meanings that an object has for people". Thus, the conservation efforts should aim to attend mainly to the expectations of the people for whom the object has meaning. Nevertheless, this doesn't allow the use of empirical processes – the methods presented above, developed throughout the last two centuries, could still be used, as long as it is seen as "valuable and pertinent" for those affected by it.[124]

[124] Muñoz-Viñas, Salvador. *Contemporary theory of conservation*. Oxford, Elsevier Butterworth-Heinemann, 2012.

Conclusion

This chapter develops the depth of the cultural heritage, from its development throughout history to its “practical applications”. The subject, rather complex, is of extremely importance, in its social, historical, and political dimensions. This survey highlights the necessity of further efforts of valorisation within the scope of heritage.

We also plunged into the Brazilian reality in the domain, presenting the struggles and victories of heritage preservation in the country. We closed the chapter by talking about restoration history and presenting some essential concepts to the safeguard of heritage.

CHAPTER 2. OURO PRETO AND ITS HERITAGE

Résumé du chapitre

Ce chapitre présente plusieurs aspects de la ville d'Ouro Preto, sa riche histoire et ses attributs naturels, ainsi que son patrimoine architectural, extrêmement important pour le pays et inscrit sur la liste du patrimoine mondial de l'UNESCO. Nous commencerons par parler des caractéristiques géographiques et socio-économiques, qui sont uniques et qui ont un impact sur son histoire. Ensuite, nous raconterons son histoire, qui commence avant même la découverte de l'or dans la région au XVIIIe siècle, et nous irons jusqu'à nos jours, en présentant les caractéristiques de la ville aujourd'hui. Son profil architectural, construit à partir de la fin du XVIIe siècle et du début du XVIIIe siècle, sera rapporté, afin d'apprendre à connaître son patrimoine matériel.

2.1. Introduction

This chapter is going to present the city of Ouro Preto, a city rich in history and natural attributes, and its architectural heritage, extremely important for the country and part of the UNESCO World Heritage List. For that, we start talking about the geographical and socio-economic characteristics that are unique and impact in its path. Later, we tell its history, which starts even before the gold was found in the region in the 18th century. Its architectural profile constructed starting in the end of the 17th century and beginning of the 18th century will be reported, as a way to learn of what its material heritage consists of.

2.2. Geographic and socio-economic characteristics of Ouro Preto

Ouro Preto is one of the 853 municipalities of the state of Minas Gerais **(Figure 4),** in the southeast of Brazil. With an area of 1.245,865 km², the city is formed by thirteen district **(Figure 5)** – Amarantina, Antônio Pereira, Cachoeira do Campo, Engenheiro Correia, Glaura, Lavras Novas, Miguel Burnier, Rodrigo Silva, Santa Rita de Ouro Preto, Santo Antônio do Leite, São Bartolomeu, Santo Antônio do Salto, and the main district, also called Ouro Preto. It has 70,281 inhabitants, and an urbanised area of 22.69 km²[125].

[125] IBGE. Ouro Preto. No date. URL: https://cidades.ibge.gov.br/brasil/mg/ouro-preto/panorama. Accessed on: 14 June 2023.

Figure 4 Map showing the location of Ouro Preto in the State of Minas Gerais. Source: Salgado [2010]. [126]

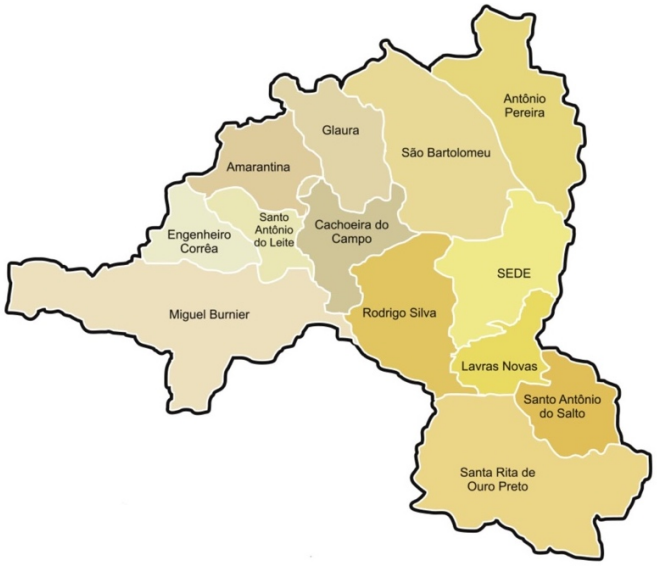

Figure 5 The city of Ouro Preto. Modified by author. Source: Secretaria Municipal de Ouro Preto [n.d.].[127]

The city is located around 100km from the state's capital Belo Horizonte, in the Espinhaço Mountain Range. It's part of a very important geological area of the country, known as Iron Quadrangle. The 7000km^2 of the area has rich reserves of metals, like iron and gold. It was decisive in the deepening of the Portuguese occupation in Brazil during the hunt for precious metals. The Iron Quadrangle have mines of iron, manganese, bauxite, limestone, phosphoric rocks, ornamental rocks (serpentine and quartzite), industrial pegmatites (muscovite and quartz), gems (tourmaline, aquamarine, morgadia, amazonite, topaz, emeralds, and diamonds) and gold, among other minerals. Today, the mining of gold and iron is still the main economic activity of the Iron Quadrangle, with a developed net of exploration, industries, and transportation.[128]

[126]Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[127], Dados Geográficos. No date. URL: https://ouropreto.mg.gov.br/turismo/img/mapa_dg.png. Accessed on: : Accessed in: 10 May 2023.
[128] Roeser, Hubert Mathias Peter; Roeser, Patricia Angelika "O quadrilátero ferrífero - mg, Brasil: Aspectos sobre sua história, seus recursos minerais e Problemas Ambientais relacionados.", *Geonomos,* 18(1), p. 33 – 37, 2010,

The geodiversity of Ouro Preto is abundant **(Figure 6)**. It presents gold and iron mines, besides the rare imperial topaz. The money derived from mining, especially gold, made it possible to build the many houses and churches that today impress visitors. In addition, minerals mined in the area were used in these constructions. The soapstone, widely used in the ornamentation of constructions from the colonial period, is found in the region. Quartzite was also used in the constructions, instead of *lioz*, largely used in Portuguese constructions. This shows the great importance of the geological features of the region for the construction of its heritage.

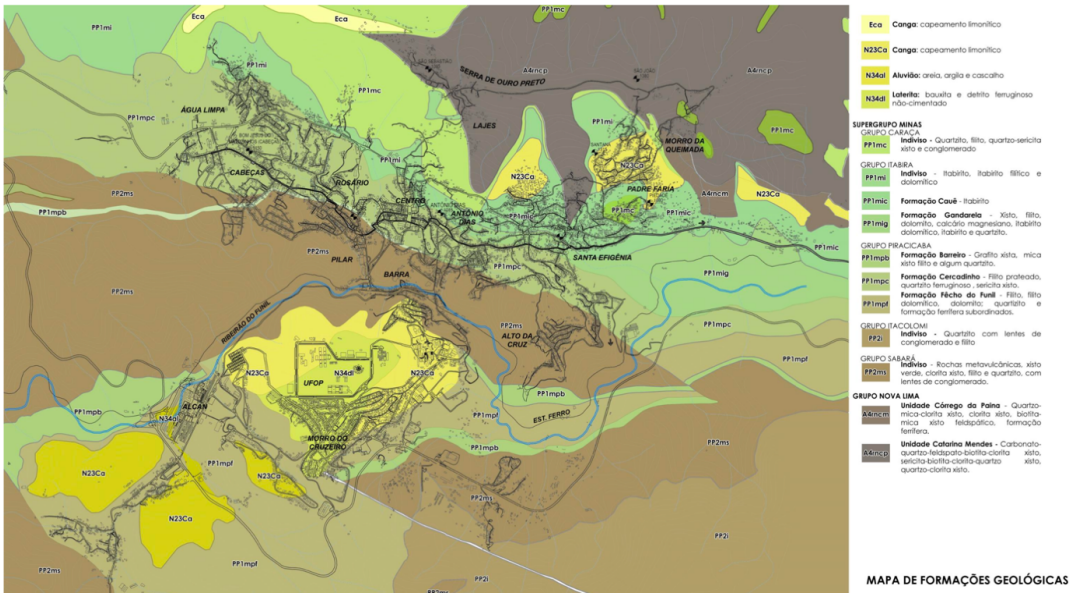

Figure 6 Geological map with overlay of the urban layout of Ouro Preto main district. Source: Gimmler Netto, 2014.[129]

The maximum altitude of the city is 1,891 metres, in the borders with the city of Santa Barbara. The Maracuja River, in the district of Cachoeira do Campo, is in the area of lower altitude, at 989 metres. The city has a predominantly mountainous relief, with 55% of the municipality having this relief, against 40% of undulating land and only 5% of flat land. The Itacolomi Peak **(Figure 7)**, with 1,722 metres of altitude, is a very important landmark of the city. It helped guide many explorers who arrived there at the end of the 17th century and the beginning of the 18th[130].

The climate in the city is defined as tropical mountainous and is characterised by mild summers and winters with low temperatures and high atmospheric humidity. With a rainy period that goes from December to March, temperatures range from 6°C, in July, and 28°C, in December[131].

[129] Gimmler Netto, Maria Manoela. A paisagem de Ouro Preto Thesis (PhD in architecture,). Escola de Arquitetura, Universidade Federal de Minas Gerais, Belo Horizonte, 2014. Accessed in: 10 May 2023.
[130] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[131] Paula, Suzana Fernandes de; Castro, Paulo de Tarso Amorim de. "Geomorfologia antropogênica em função da mineração de ouro no século XVIII: bases científicas e educativas na proposição de uma trilha geoturística urbana na sede no município de Ouro Preto (MG)", *Revista Brasileira de Ecoturismo (RBEcotur)*, 8(4), 2015.

Figure 7 Rupestrian fields in Itacolomi Park. In the picture we see the Itacolomi Peak. Source: https://www.minasgerais.com.br/pt/atracoes/ouro-preto/parques/parque-estadual-do-itacolomi. Accessed in: 10 May 2023.

Inserted in the domains of the Atlantic Forest and *Cerrado*, the vegetation of Ouro Preto has typical vegetation of mountainous environments, with a predominance of rupestrian fields and seasonal forests. The rupestrian fields (as we can observe in the Figure 7 shown before) are formed by herbaceous and shrub formations in areas with rocky outcrops or shallow soils, usually above 900m, and are mainly associated with quartzite, sandstone, and iron ore outcrops[132]. The seasonal forests **(Figure 8)** at Itacolomi State Park vary considerably both in composition and structure in response to the geo-climatic conditions, often resulting in a large heterogeneity of patterns, even in a relatively small area.[133] The region has a total of 1614 species of vascular plants in 122 different families, 9 of which are considered endemic to Minas Gerais[134].

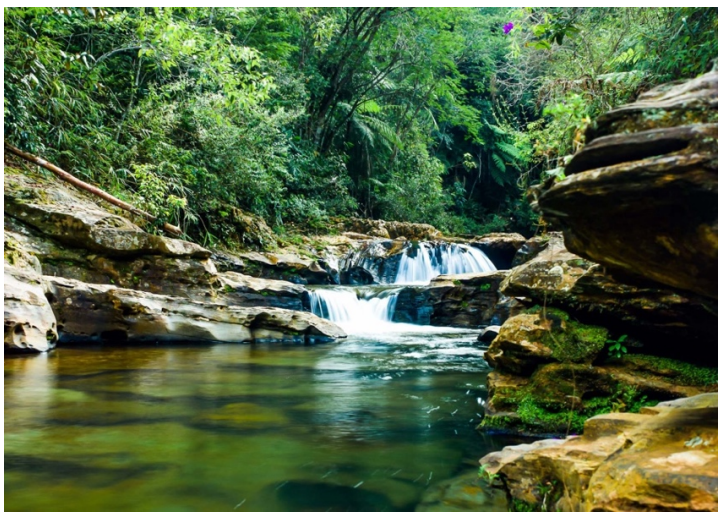

Figure 8 Seasonal Forest in the Andorinhas Park. Source: Andorinhas [n.d.].[135]

[132] Faleiro, Fabio Gelape; de Farias Neto, Austeclinio Lopes de. *Savanas: desafios e estratégias para o equilíbrio entre sociedade, agronegócio e recursos naturais*. Planaltina, Embrapa Cerrados, 2008.
[133] Cardoso, Josiane Teresinha. "A Mata Atlântica e Sua Conservação", *Revista Encontros Teológicos*, 31(3), 2016.
[134] Silva, Rossi Allan et al. "Avaliação da cobertura florestal na paisagem de Mata Atlântica no ano de 2010, na região de Ouro Preto-MG". *Cerne*, 21, 301-309, 2015.
[135] Andorinhas. Inicio. No date. URL: https://andorinhas.eco.br/arquivos/destaque-introducao.jpg. Accessed in: 10 May 2023.

The city is part of the hydrographic basin of the São Francisco and Rio Doce, two important rivers for Minas Gerais. The main rivers of the city are the Rio da Velhas and Ribeirão do Funil. The rivers in the region have their highest levels in the months of January and February due to the summer rains. The region has an average annual pluviometry index of around 1.670,3mm[136].

2.3. History and chronology

Since their arrival in its bigger colony, the Portuguese hoped to find precious metals and stones. In the well-known letter from Pêro Vaz de Caminha to the king Manuel I of Portugal, right after the arrival in the new lands, we read "In it we have not hitherto been able to know that there is any gold, or silver, or anything of metal or iron; nor have we seen it"[137]. Differently from Spain, Portugal didn't quickly find precious metals in its American colonies, resorting, during the early centuries of colonization, to the exploration of other resources of the land, like the *Pau-Brasil*, and to the establishment of the profitable sugar industry in the north-east of the country[138].

Although during these first centuries, the Portuguese mainly established settlements in coastal areas of Brazil, there were countless expeditions to the interior of the country, especially in the south of Bahia and north of Espirito Santo. These quests, full of dangers and obstacles, were encouraged by royal orders, and some came back with metal samples, but never the long-awaited valuable ones[139].

But in the mid-17th century, there was an increase and an improvement in these expeditions, due to different facts. The first would be the crisis that Portugal faced after the Restoration, due to the loss of hegemony of the Indian trade for the Dutch and of the weakening of the Portuguese sugar trade, forcing the metropole to look for new ways to explore the colony. Another decisive situation was the fall in production of gold and silver by the Spanish American colonies, which was affecting the economy of the whole Europe. Thus, the solution found by the Portuguese crown was to increase the incentives for expeditions to the interior of the colony.

The most important figure in the clearing of the territory now known as Minas Gerais is certainly Fernão Dias Pais. The expedition led by him left São Paulo in 1674 and explored a vast area of the centre of Brazil for the next seven years. Despite not finding any mineral

[136]Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[137] "*Nela, até agora, não pudemos saber que haja ouro, nem prata, nem coisa alguma de metal ou ferro; nem lho vimos."* [Our tranlation]. Brasil. Ministério da Cultura. *A carta de Pero Vaz de Caminha*. Brasilia, MEC, [n.d].
[138] Mello, Suzy de. *Barroco mineiro.* São Paulo: Braziliense, 1985.
[139] Ibid.

resources, this excursion opened the way for several other explorers that would end up encountering it. Mello (1985) reminds us that there was not one big discovery of gold in the region of Minas Gerais, but many simultaneous ones happened between the years 1693 and 1695 in distinct areas. According to different testimonials, several individuals found gold around the zone, being very hard to pinpoint the first ones.

About this discovery, Lima Junior (1996) tells us

> This first gold, which made the place so celebrated, giving it the name that History has kept and that was known in the whole world, completed in Minas Gerais do Ouro Preto, due to the fantastic quantity of rich deposits of fabulous income, marks a new era in the World History, because, since then, not only Brazil acquired strength to constitute itself as a Nation, but also, as it was said, it operated a deep economic transformation in the western world.[140]

Names like Manuel Garcia, Antonio Dias de Oliveira and Padre João de Farias Fialho became famous as the founders of the first settlements in the region, named respectively, Ouro Preto, Antônio Dias and Padre Faria. Despite the great difficulty in reaching the mines, at the end of the 17th century a huge number of adventurers headed for the region in search of wealth. These first years of occupation were marked by several problems. Those who arrived did not think of settling in that wilderness, hoping to get rich in a short time and abandon the region. Thus, no one thought of raising herds or growing food. Furthermore, the land and labour were totally dedicated to mining. Supplies were brought in from other regions and traded at exorbitant prices. This caused a great famine at the turn of the century, which led to the exodus of a large group of starving people in search of food, many perishing on the way. Violence was also a big problem, with many cases of looting for gold, land, and food.[141]

The opening of new and more efficient roads facilitated the arrival of goods and even more people. It is estimated that the population of Minas Gerais do Ouro Preto in 1705 was fifty thousand people, among free men and slaves.[142] The "*quinto*"[143] tax was levied on the gold exploited in the area, a tax which meant that one fifth of the metals found in Portuguese territory would go to the crown. But the tax didn't prevented more people from arriving, and there was a lot of contraband and other problems.[144]

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[140] "*Esse primeiro ouro, que celebrizou o local, dando-lhe o nome a História guardou e que foi conhecido no mundo inteiro, completado em Minas gerais de ouro Preto, devido à quantidade fantástica de riquíssimas jazidas de rendimento fabuloso, marca uma nova era na História do Mundo, porque, desde então, não somente o Brasil adquiriu forças para constituir-se em Nação, mas também, comoficou dito, operou-se uma profunda transformação econômica no mundo ocidental*". [Our translation]. Lima Junior, Augusto de. *Vila Rica do Ouro Preto: Síntese Histórica e Descritiva*. Rio de Janeiro, EGL Editora, 1996, p. 56

[141] Ibid.

[142] Salles, Fritz Teixeira de. *Vila Rica do Pilar.* Belo Horizonte: Itatiaia, 1965.

[143] The *quinto* was a tax levied by the Portuguese crown in the amount of one fifth, or 20%, of all gold extracted in the colony.

[144] Mello, Suzy de. *Barroco mineiro*. São Paulo: Braziliense. 1985.

With this large number of people arriving, many conflicts took place in the period, the most famous and violent being the "Guerra dos Emboabas" (War of the Emboabas) (1707 - 1709), in which the *Paulistas* (those that came from São Paulo), who were the first to settle there, fought against the outsiders, called *emboabas*, who came from other parts of the colony, such as Rio de Janeiro and Bahia, and from Europe. The *Paulistas* ended up being forced to retreat to the centre-west and south of the country, in search of new mines.

As a consequence of the conflict, in 1709 the region was transformed into a captaincy, the Captaincy of Minas Gerais, which had administrative autonomy but shared its governor with the Captaincy of São Paulo (known before as São Vicente). The aim was to calm and organise the area in order to create conditions for the political and economic development of Minas Gerais. A royal charter of 15 December 1712 transformed the group of villages **(figure 9)** into a town, Vila Rica de Ouro Preto. This was also a strategy of the crown to increase surveillance in the region, with the installation of government officials, who would enforce order and justice and collect taxes. At the end of 1720, it was decided to separate the captaincies of Minas Gerais and São Paulo, with a new governor elected for the former and Vila Rica raised to capital.[145]

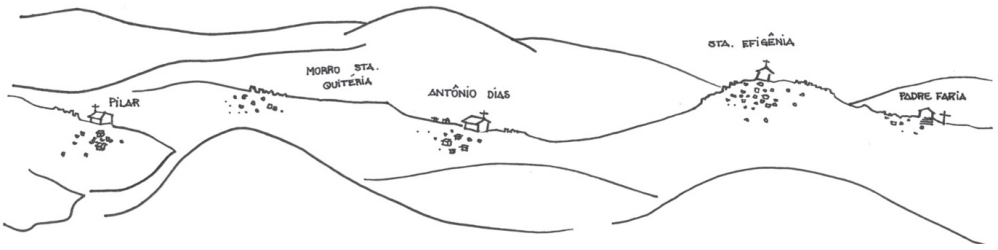

Figure 9 Sketch of the landscape of Vila Rica in the first decades of occupation. Drawing by Fávia Guerra. Source: Salgado, 2010. [146]

About this period, Mello (1985) writes

> Thus, little more than two decades after the arrival of the first explorers to Minas Gerais, its political situation was already defined, the rebellious spirit of its inhabitants was already marked by iron and fire, its extractive economy was consecrated and its fate sealed as the main centre of events in the 18th century, when not only art would reach a great apogee in its most varied forms - from architecture to music and sculpture and painting to literature - but also the late 18th century would reflect here the echoes of the Enlightenment and Liberalism with the *Inconfidência Mineira* (the Inconfidence in Minas Gerais), the most severely repressed attempt of rebellion against the Portuguese power, which would reflect not only the free spirit of the its people but also the

[145] Ibid.
[146] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.

facts linked to the insatiable greed of the colonisers for the riches of the soil, unfortunately already exhausted by continuous exploitation.[147]

According to Salgado (2010), "Vila Rica had more than 80 thousand inhabitants in 1728, with 322 sales and 335 workshops"[148]. But it is in this period that the decline of gold extraction, since the gold found in Vila Rica was superficial, found mainly in watercourses **(figure 10)**, which explains the ease of finds in the area. But the great exploration led to the depletion of this source, which forced the miners to create galleries, that could not be very deep due to ventilation or water problems.

Figure 10 ″Washing of gold ore near the mountain of Itacolomi", Johann Moritz Rugendas, watercolour on paper, 30 x 26 cm, 1835. Source: Joelza [2023][149].

At the same time, a great phase of urbanisation was taking place in the town, with the improvements of the roads and of the water supply system. Vasconcellos (1968 as cited in Salgado, 2010, p. 52) tells us “In Minas Gerais, an eminently urban civilization was established, quite different from the agrarian one, which extended along the Brazilian coast (...) it is an urban people par excellence" [150]. The village, which began with the integration of the initial

[147] “*Assim, pouco mais de duas décadas depois da chegada dos primeiros desbravadores às Minas Gerais, já estava definida sua situação política, marcada a ferro e fogo o espírito rebelde de seus habitantes, consagrada a sua economia extrativa e selado seu destino de principal centro dos acontecimentos no século XVIII, quando não só a arte alcançaria um grande apogeu em suas mais variadas formas – da arquitetura à música, da escultura e da pintura à literatura – como também se refletiriam aqui, já no final do setecentos, os ecos do Iluminismo e Liberalismo com a Inconfidência Mineira, a mais reprimida tentativa de rebelião contra o poder português e que iria refletir não só no espírito livre dos mineiros como também os fatos ligados à insaciável cobiça dos colonizadores pelas riquezas do solo, infelizmente já exauridos pela contínua exploração.”* [Our translation]. Mello, Suzy de. Barroco mineiro. São Paulo: Braziliense, 1985, p. 25-26.

[148] “*Vila Rica chegou a possuir em 1728 mais de 80 mil habitantes, havendo 322 vendas e 335 oficinas”.* [Our translation]. Salgado, Marina. “Ouro Preto: paisagem em transformação”. Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010, p. 51.

[149] Domingues, Joelza Ester, “A mineração sob o olhar de Rugendas - leitura de imagem”. *Ensinar História - Joelza Ester Domingues*. URL: https://ensinarhistoria.com.br/mineracao-sob-olhar-de-rugendas/. Accessed on: 17 June 2023.

[150] “*Nas Minas instala-se uma civilização eminentemente urbana, bastantemente diferenciada daquela agrária, que se estendia pelo litoral brasileiro (...) é um povo urbano por excelência*”. [Our translation]. Vasconcellos, Sylvio de., 1968, in Salgado, Marina. “Ouro Preto: paisagem em transformação”. Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010, p. 52.

settlements, developed first following the valleys of the streams, where the gold was abundant and easy to exploit. In a second moment, when it became necessary to explore the hills of Serra de Ouro Preto and Serra do Itacolomi, the town started to grow in those directions. This way, Vila Rica had a sparse settlement, following the ups and downs of the region's relief, as seen in the **figure 11A**[151]**.**

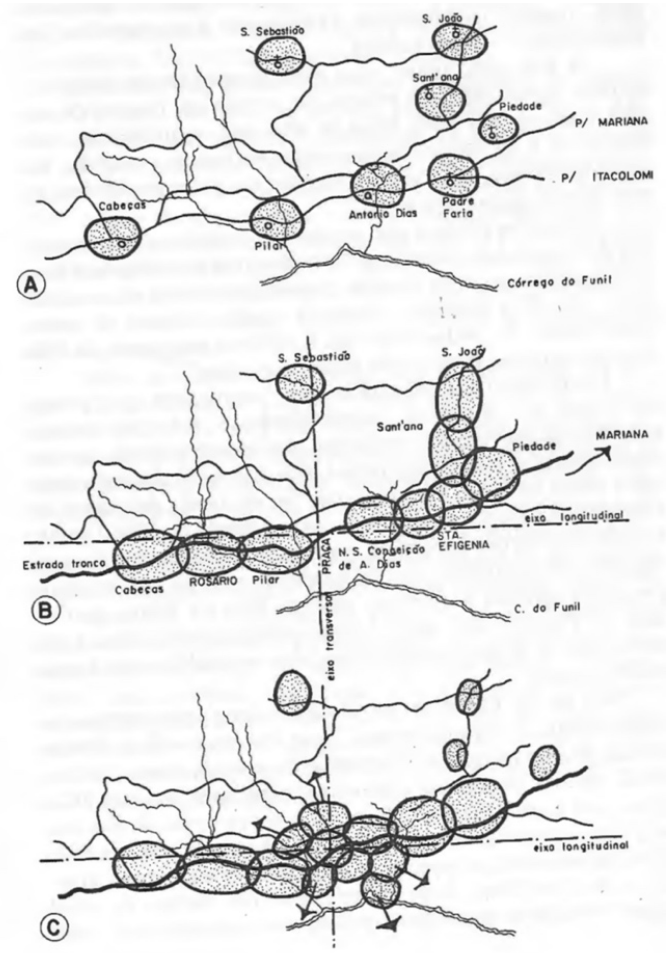

Figure 11 Urban evolution of Vila Rica according to Sylvio de Vasconcellos. Source: Mello [1985][152]

With time, the village starts to have a centripetal formation, with two main nuclei (**figure 11B** above), Pilar and Antônio Dias, where two main churches were built, the *Matriz de Nossa Senhora do Pilar* and *Matriz de Nossa Senhora da Conceição*, respectively. Between these two nuclei was the *Santa Quitéria* hill, where the *Casa de Câmera e Cadeira* and the Governors' palace **(figure 12)** were built around 1740. There it became the administrative centre of the village, connecting the two parishes and becoming its main square and nucleus.[153] The map in the **figure 13** show us the plan of the city in the end of the 18th century.

[151] Vasconcellos, Sylvio de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo (SP): Perspectiva, 2011.
[152] Mello, Suzy de. Barroco mineiro. São Paulo: Braziliense, 1985.
[153] Vasconcellos, Sylvio de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo (SP): Perspectiva, 2011.

Figure 12 Main square, today known as *Tiradentes* Square, with a view of the Governors' Palace, by unknown artist, circa 1766 and 1781. Source: IEB-USP Collection.

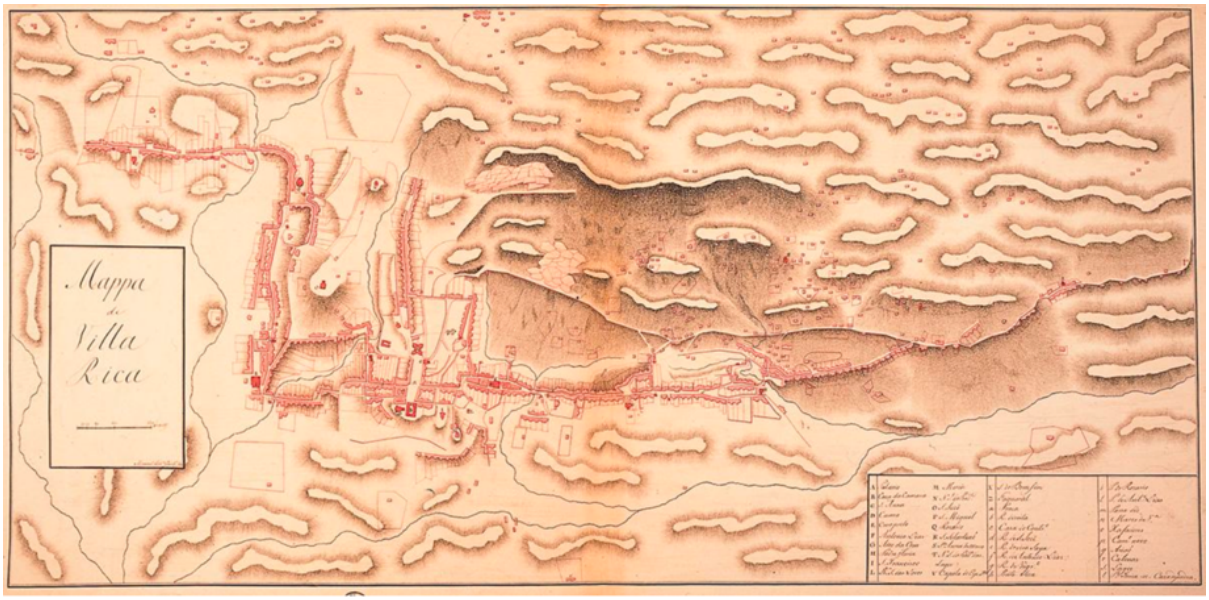

Figure 13 Map de Villa Rica, by Manoel Ribeiro Guimarães, 1775 – 1800. Source: Reis, N. G. 2000.

During the mid-18th century, the auriferous production crisis worsens, but this does not affect the town's economy immediately, due to the great wealth accumulated with mining. Thus, the urbanisation and growth of the town continues, with many improvements and constructions, such as the sumptuous churches built by the religious fraternities. It was during this period that the most famous buildings of the city were erected, and the movement that would become known as Baroque and Rococo *Mineiro* flourished. Artists such as Antônio Francisco Lisboa, known as Aleijadinho, and Manoel da Costa Ataíde, called Master Ataíde, became famous, being known today, respectively, as the best sculptor and the best painter of the Brazilian colonial period. This artistic production followed the Portuguese and European styles, but, like other aspects of life in the interior of the colony, it was adapted to the reality of the town, for example, using regional materials.[154]

[154] Fundação João Pinheiro. Ouro Preto. Prefeitura Municipal; Mariana. Prefeitura Municipal. *Plano de conservação, valorização e desenvolvimento de Ouro Preto e Mariana: relatório síntese.* Belo Horizonte: FJP, 1975.

The auriferous production crisis led to the shrinking of the population in the late 18th century and early 19th century. Fleeing the crisis, the population – mainly those who worked in mining – moved to other areas of Minas Gerais, where agriculture was the basis of the economy. The 1804 census shows an urban population of only 8,990 inhabitants, of whom: 2,893 were slaves and 6,097 were free men.[155] Despite the crisis and the population exodus, the city still maintained its importance as an administrative capital.

In his visit to Vila Rica, in 1816, the French botanist and explorer Augustin Saint-Hilaire

> There are about two thousand houses in Vila Rica. This village flourished as long as the surrounding land provided gold in abundance, but as the metal became scarce or more difficult to extract, the inhabitants gradually sought their fortune elsewhere, and in some streets the houses are almost abandoned. The population of this wealthy village, which once numbered 20,000 souls, is now reduced to 8,000, and this village would be even more deserted if it were not the capital of the province, the seat of administration, and the residence of a regiment.[156]

Another visitor, the English businessman and mineralogist John Mawe (1764-1829), observed during his travels through the interior of Brazil that

> When we spoke to them of the richness of the country, and of the quantity of gold with which it was reputed to abound, they seemed glad of the opportunity of telling us, that they believed the gold was all sent to England, adding that their capital ought now to be termed *Villa Pobre*, instead of *Villa Rica*. Indeed, we were surprised to observe the comparative poverty which prevailed among them. Of above two thousand habitations, which the town contained, a considerable proportion was untenanted; and the rents of the rest were continually lowering. Houses were to be purchased at one half their real value; for instance, a house built a few years ago at one thousand pounds cost, would not now sell for more than five hundred pounds. (...) Villa Rica, at the present day, scarcely retains a shadow of its former splendour.[157]

Despite the testimonies of contemporary travellers and the dwindling of the population, the economist Roberto Borges Martins discusses that one should not believe that the crisis had reached all parts of society. Martins (2016) analysed documents from the time and can prove the exodus of men from the city. But other aspects that can demonstrate the economic reality at

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[155] Ibid.

[156] "*Contam-se em Villa Rica cerca de duas mil casas. Essa villa floresceu enquanto os terrenos que a rodeiam forneciam ouro em abundancia; á medida, porém, que o metal se foi tornando raro ou de extracção mais difficil, os habitantes foram pouco a pouco tentar fortuna outros lugares, e, em algumas ruas, as casas estão quasi abandonadas. A população de Villa Rica que chegou a ser de 20 mil almas, está actualmente reduzida a 8 mil, e essa villa estaria mais deserta ainda si não fosse a capital da província, a sede da administração, e a residência de um regimento*."[Our translation]. Saint-Hilaire. Auguste de. *Viagem pela Província do Rio de Janeiro e Minas Gerais.* São Paulo: Companhia Editora Nacional, 1938, p. 130-131.

[157] Mawe, John. *Travels in the interior of Brazil*. London, Longman, Hurst, Rees, Orme, and Brown, 1822, p. 242-251.

the time, such as the number of slaves, show that those who remained in Vila Rica still had high purchasing power.

Although not all their testimonies are reliable, the travellers who visited the Vila Rica left several images that portray the city at the beginning of the 19th century. Artists like Johann Emanuel Pohl, Thomas Ender, Arnaud Julien Pallière (**figure 14**), Johann Moritz Rugendas (**figure 15**), and many others, represented the city making it possible to future generations to see how the city was in the period.

Figure 14 Vila Rica, 1820, by Arnaud Julien Pallière. Oil on canvas, 36,50 cm x 96,80 cm. Museu da Inconfidência. Source: Estadão [2018].[158]

Figure 15 Villa Rica, 1835, by Johann Moritz Rugendas, Lithograph. Source: Enciclopédia, 2023.[159]

[158] Vila Rica - Aliás - Estadão Aliás. 2018. URL: https://fotos.estadao.com.br/fotos/alias,vila-rica,937062. Accessed on: 17 June 2023.
[159] Enciclopédia Itaú Cultural de Arte e Cultura Brasileira. *Villa Rica*. São Paulo: Itaú Cultural, 2023. URL: http://enciclopedia.itaucultural.org.br/obra61557/villa-rica. Accessed on: 17 June 2023.

Villa Rica was established, in 1818, as the capital of the province of Minas Gerais and in 1824 received the title of Imperial City of Ouro Preto[160]. This administrative role allowed the city to sustain its commerce, services, and cultural activities during the century. It also received some educational establishments: in 1839, the School of Pharmacy and Biochemistry was established, and in 1876, the School of Mines, a reference in mineralogy teaching until today, as part of the Federal University of Ouro Preto (UFOP). And in 1888, a railway branch was inaugurated, showing that the city, contrary to what is often written, did not enter a complete recession in the 19th century.[161]

> Ouro Preto kept its position as capital until the end of the 19th century, assuming new roles in the urban network. Minas Gerais was the most important province in the country and the old Vila Rica circumvented the consequences of the depletion of the gold deposits. The demographic data available in the 19th century indicate a certain vitality to Ouro Preto. Trade and craft activities comprised the elements of economic support to the city, reaffirming Vila Rica's citadel-like character since its foundation. The inauguration of the railroad branch line, in January 1888, brought growth and modernization: it allowed access to new materials and, consequently, a change in the city's appearance.[162]

Analysing the censuses and other documents, it can be observed that after the drastic drop in the number of inhabitants in the early nineteenth century, Ouro Preto began to witness a gradual increase in its population. This panorama would only change in the beginning of the 20th century, after the transfer of the capital of Minas Gerais to Belo Horizonte, in 1897. The city also grew, as can be observed by comparing the map in **figure 13,** above, with the map in **figure 16**. We see the appearance of new buildings, creating an urban densification, mainly in the central area, and the expansion of the road network. besides several other changes in Vila Rica's configuration, like proposals for the construction of boulevards, as seen in the **figure 17**, gardens and "modern houses".[163] Vieira (2016) tells that the inauguration of the railroad branch in 1888 generated an urban growth towards the station.

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[160] Rugendas, Johann Moritz. *Viagem pitoresca através do Brasil.* Belo Horizonte: Itatiaia; São Paulo: Edusp, 1979.

[161] Vieira, Liliane de Castro. "Ouro Preto e o Século XIX: O Mito Da Decadência", *Revista CPC*, (22), p. 145-189, 2016.

[162] "*Ouro Preto manteve sua posição de capital até o final do Oitocentos, assumindo novos papéis na rede urbana. Minas Gerais era a província mais importante do país e a antiga Vila Rica contornou as consequências do esgotamento das jazidas de ouro. Os dados demográficos disponíveis sobre o Oitocentos indicam certa vitalidade para Ouro Preto. O comércio e as atividades artesanais compunham os elementos de sustentação econômica da urbe, reafirmando o caráter citadino de Vila Rica, desde a sua formação. A inauguração do ramal férreo, em janeiro de 1888, trouxe crescimento e modernização: permitiu o acesso a novos materiais e, consequentemente, a mudança da aparência da cidade."* [Our translation]. Ibid, p. 148.

[163] Bibbó Caroline Bertarelli. *Divertimentos em Ouro Preto no final do século XIX.* Master dissertation, School of Physical Education, Physiotherapy and Occupational Therapy, Universidade Federal de Minas Gerais, 2017.

Figure 16 Plan of the city of Ouro Preto, from 1888. Source: Biblioteca [n/d].[164]

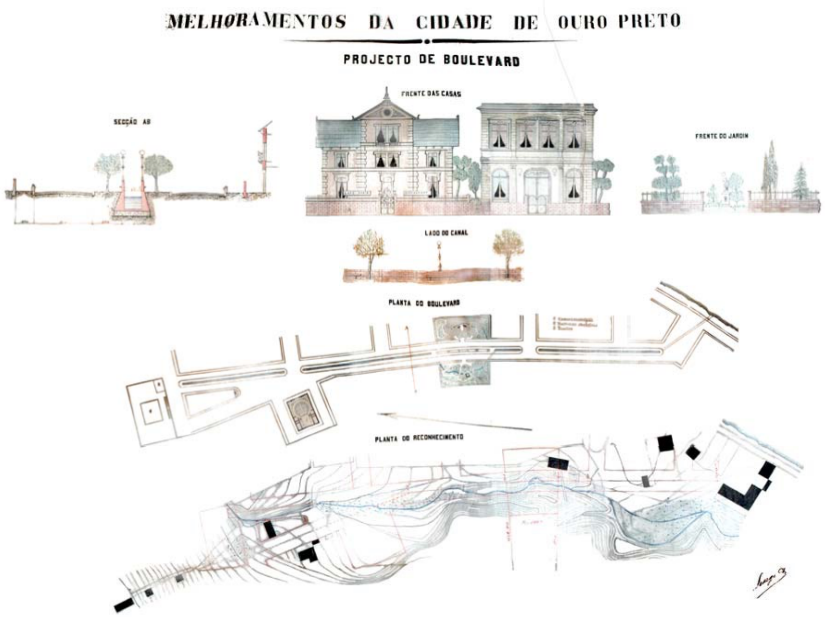

Figure 17 Boulevard project as part of the improvement works of the city of Ouro Preto at the end of the 18th century. 1891, unknown author. Source: Ouro Preto City Hall Public Archive.

During the 19th century was also renovation of some façades, following the prevailing style of the time and using new materials available. The railroad also "allowed access to new materials and, consequently, a change in the appearance of the city. In the central areas, commercial properties were modernised, as were the residential properties of better-off owners"[165] according to Vieira (2016). These "new materials" would be glass, iron elements,

[164] Planta da Cidade de Ouro Preto Organisada por Ordem do exmo. sr.. dr. Luiz Eugenio Horta Barbosa Presidente da Província (1888) Biblioteca Digital Luso-Brasileira. N/d. URL: https://bdlb.bn.gov.br/acervo/handle/20.500.12156.3/20451. Accessed on: 18 June 2023.

[165] "*Permitiu o acesso a novos materiais e, consequentemente, à mudança da aparência da cidade. Nas áreas centrais, os imóveis de uso comercial modernizaram-se, assim como os imóveis residenciais de proprietários mais*

ceramics, and other manufactured ones. In **figure 18**, we see more modern elements that weren't used in the colonial period, like glass in the windows, iron balconies, rainwater collection systems, frames with curved lintels, and others.[166]

Figure 18 Rua do Ouvidor, now Cláudio Manoel, in 1881, where we observe new materials and façades different from the colonial style. Photograph by Guilherme Liebenau. Source: Vasquez [2003].[167]

Some changes in the city, made in the end of the 19th century can be confirmed by photographs. It's the case of the city market that was situated in front of the Church of Saint Francis, today known as *Largo de Coimbra*. In a photograph from 1880 **(figure 19)**, it is possible to see the rather humble structure of the market that took place in that space since 1826. In another photo **(figure 20)**, taken 1938, we see that the old structure was substituted by a neoclassical building, constructed in the end of the 19th century.[168]

Figure 19 *Tropeiros* Market in 1888. Photo by Marc Ferrez. It shows the structure of the first market. Source: França [2020].[169]

favorecidos." [Our translation]. Source: Vieira, Liliane de Castro. "Ouro Preto e o Século XIX: O Mito Da Decadência", *Revista CPC*, (22), 2016, p. 172.

[166] Ibid.

[167] Vasquez, Pedro Karp. *O Brasil na fotografia oitocentista.* São Paulo: Metalivros, 2003.

[168] França, Tayami Fonseca. Do material ao intangível. Estudo e inventário do largo de Coimbra em Ouro Preto Preto MG. *Arquitextos*, São Paulo, ano 21, n. 244.05, Vitruvius, set. 2020. URL: https://vitruvius.com.br/revistas/read/arquitextos/21.244/7880. Accessed in: 03 Jul. 2023.

[169] França, Tayami Fonseca. Do material ao intangível. Estudo e inventário do largo de Coimbra em Ouro Preto Preto MG. *Arquitextos*, São Paulo, ano 21, n. 244.05, Vitruvius, set. 2020. URL: https://vitruvius.com.br/revistas/read/arquitextos/21.244/7880. Accessed on: 03 jul. 2023.

Figure 20 Municipal Market, built in masonry and in neoclassical style in the place of the old Tropeiros Market. Photo by Eric Hess, from 1938. Source: França [2020].[170]

These changes, together with other actions of the municipal government, like the analysis of areas for the expansion of the city, had as a goal avoiding the transfer of the state capital, which had been discussed for decades. But they were not sufficient, and Belo Horizonte was declared the new capital in 1897, leading Ouro Preto to lose its status as an administrative city, which it had maintained throughout the 19th century.[171] But it gained a importance as an academic centre, due to the School of Pharmacy and Biochemistry and the School of Mines, that would later be morphed and expanded in the University of Ouro Preto (UFOP), in 1969, a very important university for Minas Gerais and the country.

The testimony of Moreira Pinto, who visited Ouro Preto in 1902, gives us an insight into how Ouro Preto was in the beginning of the 20th century. He tells us

> The itchiness of the big cities is not noticeable there. It seems that the sacrifice of so many martyrs whom she cuddles in her bosom as a loving mother, produced in her a great boredom of the world, a sadness that did not leave her and the warmth of religion, which is her great consolation. (...) The buildings are very old but well preserved. They have one or two storeys at the front and four or five at the back. I have only noticed two elegant buildings in the city with a modern taste: the *Caixa Economica*, which is a townhouse, and the Arts and Crafts Lyceum, which is on the ground floor. The city is lit by paraffin, but soon it will be lit by electricity, for which the respective poles are already being installed. It is supplied with pure water, which comes from several springs to ten tanks. (...) There are 48 streets and six squares in the city perimeter. (...) The city has 1,553 buildings and a population of 10,000 inhabitants.[172]

[170] Ibid.

[171] Salgado, Marina. "Ouro Preto: paisagem em transformação". Master dissertation in Built Environment and Sustainable Heritage, Universidade Federal de Minas Gerais, 2010.

[172] "*Nella não se nota o prurido das grandes cidades. Parece que o sacrifício de tantos martyres a quem ella affagou em seu seio de mãe carinhosa, produziu-lhe grande tedio do mundo, uma tristeza que não a abandona e o aconchego da religião, que é o seu grande consolo. (...) Os prédios são antiquíssimos, mas bem conservados. São de um ou dous andares na frente e quatro e cinco nos fundos. Apenas notei na cidade dous prédios elegantes e de gosto moderno: o da Caixa Economica, que é de sobrado, e o Lyceo de Artes e Officios, que é térreo. A cidade é iluminada a kerozene, mas se-lo-há brevemente à luz electrica, para o que já estão assentando os respectivos postes. É abastecida de água puríssima, que vem de diversos mananciaes para dez caixas. (...) Há no perímetro*

These improvements observed by Pinto (1906), are still reflections of the modernization plan of the late 19th century. The city ends up, after the moving of the capital, entering a period of decadence and abandonment, which would extend until the middle of the century. According to Vieira (2016), when analysing the map created in 1939 **(figure 21)**, it's possible to see that the city didn't grow much since the last map **(figure 16)**. In annexe I you can find the map of the whole municipality of Ouro Preto, together with other maps of the city.

As already told in the last chapter, the second decade of the 20th century was notable for the development of a preservationist approach in Brazil and Ouro Preto was in the centre of the talks, due to its importance and the number of remaining colonial buildings. Several committees would visit the city during this period, with the aim of studying and cataloguing its architecture. These visits generated works which supported the preservationist discourse.

Figure 21 Map of the main district of Ouro Preto from 1939. Source: Vieira [2016].[173]

The city was also visited by a group of intellectuals, formed by important names, like the poets Mário de Andrade and Oswald de Andrade and the painter Tarsila do Amaral, among many others. A group of modernists undertook trips to historic Brazilian cities in search of genuine Brazilian art, as they wanted to distance themselves from the European aesthetic that was prevalent in the country at the time. "The towns of Minas Gerais represented the dynamics of colonisation, marked by diversity and authenticity - important values for modernist writers and architects alike"[174], tell us Aguiar (2013). He continues

da cidade 48 ruas e seis praças. (...) A cidade tem 1553 prédios e uma população de 10,000 hanitantes." [Our translation]. Pinto, Moreno. Ouro Preto. *Revista do Arquivo Público Mineiro*, Belo Horizonte, ano XI, pp. 691-697, 1906.

[173] Vieira, Liliane de Castro. "Ouro Preto e o Século XIX: O Mito Da Decadência", Revista CPC, (22), p. 145-189, 2016.

[174]"As *cidades mineiras representavam a dinâmica da colonização, marcada pela diversidade e autenticidade – importantes valores para os escritores e também para os arquitetos modernistas."* [Our translation]. Aguiar, Leila

> The trip of the "Paulista caravan" to this ancient city, with great press coverage, and the constant references to Ouro Preto in the work of these artists - paintings, poems and chronicles - decisively contributed to new readings capable of exalting the importance of this city of Minas Gerais for the national culture.[175]

With the discourse of all these influential people in art, architecture, literature and politics, a consensus is reached on the need to preserve this architectural ensemble. As a result, Ouro Preto was the first city in Brazil to be declared a National Monument, in 1933, and to have its architectural and urban ensemble inscribed by SPHAN in the Fine Arts *Tombo* Book, in 1938. The city was then used as a laboratory by the Heritage Institute, where preservation ideas were put into practice by its staff and collaborators.

Aguiar (2016) reminds us that the ensemble could be inscribed in more than one of the four *Tombo* Books – Archaeological, Ethnographic and Landscape *Tombo* Book, the Historical *Tombo* Book, the Fine Arts *Tombo* Book and the Applied Arts *Tombo* Book. But at first, the city was seen as a work of art, a museum-city, which should not, therefore, be altered. Only in 1986, it would be added to the Archaeological, Ethnographic and Landscape *Tombo* Book and the Historical *Tombo* Book.[176] To Motta (1987), the city was thus treated as a work of art, "as an aesthetic expression, understood according to stylistic criteria, of values that did not take into account its documentary characteristic, its trajectory and its various components as a cultural expression and part of a socially constructed whole". She adds that Ouro Preto was "stripped of its social component"[177].

Under the direction of Rodrigo Melo Franco de Andrade (1898 – 1969), first president of the institute, who chaired it from 1937 to 1967, and the collaboration of the modernist architect, Lúcio Costa (1902 – 1998), SPHAN's preservation works seek to maintain a stylistic unity of the city of Ouro Preto, repressing all the additions that the city had received after the 18th century that, for them, were not characterised as part of the colonial architecture which they had elected as the major representative of Brazilian culture. Thus, any construction that had been built or received any addition following the neoclassical or eclectic style, were altered,

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Bianchi. "Cidade morta, cidade monumento, cidade turística: a construção de memórias sobre Ouro Preto". *História do turismo no Brasil,* 2013, p. 185.

[175] "*A viagem da "caravana paulista" para essa antiga cidade, com grande cobertura da imprensa, e as constantes referências a Ouro Preto no trabalho desses artistas — pinturas, poemas e crônicas — contribuíram decisivamente para que novas leituras capazes de exaltar a importância dessa cidade mineira para a cultura nacional fossem realizadas*." [Our translation]. Ibid., p. 186.

[176] Aguiar, L.B. 'Desafios, permanências e transformações na gestão de um sítio urbano patrimonializado: Ouro Preto, 1938-1975', *Estudos Históricos (Rio de Janeiro)*, 29(57), 2016, p. 87 – 106.

[177] "*expressão estética, entendida segundo critérios estilísticos, de valores que não levavam em consideração sua característica documental, sua trajetória e seus diversos componentes comoexpressão cultural e parte de um todo socialmente construído. (...) despida de seu componente social*". [Our translation]. Motta, Lia. A SPHAN em Ouro Preto: uma história de conceitos e critérios, *Revista do Patrimônio Histórico e Artístico Nacional*, n. 22, 1987, p. 108.

being adapted to have colonial characteristics. This is seen in the Cine Vila Rica, formerly the Lyceum of Arts and Crafts, which was constructed in the eclectic style (**figure 22**), but then modified in 1958, with the removal of its triangular frontispiece and roof parapet, and the adoption of the roof with eaves typical of colonial architecture (**figure 23**).[178]

Figure 22 Photo of the Lyceum of Arts and Crafts, today Cine-Teatro Vila Rica, in 1898, still in its original eclectic characteristics. Photo de J. Brandi. Source: Arquivo Público Mineiro.

Figure 23 Photo of the Cine-Teatro Vila Rica, known before Lyceum of Arts and Crafts, in 2019, with the colonial characteristics applied by SPHAN. Foto: Camila Coelho. Source: Branco, Teixeira [2019].[179]

As a way of attracting visibility for the city, the Heritage Institute began to encourage tourism in the region (an alternative that would be widely used in the rest of the country from the 1960s onwards). For that, some measures were taken for the growth of the sector, such as the creation of the *Museu da Inconfidência*, in 1938, installed in the old building of the Town Hall and Jail, and the construction of a new hotel. There were many discussions about the project of the so-called *Grande Hotel de Ouro Preto* **(Figure 24)**, which was built in the historical center, in 1940. Among the proposed projects was that of the architect Carlos Leão

[178] Ibid.
[179] Branco, Camila, Teixeira, Enzo. Cine vila rica: História, cultura e descaso, *Lamparina*, 10 December 2019. URL: https://sites.ufop.br/lamparina/blog/cine-vila-rica-hist%C3%B3ria-cultura-e-descaso. Accessed on: 18 June 2023.

(1906 – 1983), who proposed a building in the neo-colonial style, and that of the most famous Brazilian architect, Oscar Niemeyer (1907 – 2012), whose project followed the modernist style. Niemeyer's design was chosen, but only after it had been adapted to certain suggestions laid down by the Heritage Institute, represented by Lúcio Costa.[180] According to Motta (1987),

> Lucio Costa made a concession with regard to total freedom in the application of modernist dogmas, but maintained its character, seeking only to approximate formal expression, by similarity, to traditional architecture. However, from the point of view of the idealised eighteenth-century city, no concession was made. The architect sought in that period the elements of similarity, establishing in this way, for the continuity of the city, the aesthetic standard of a phase of Ouro Preto. To better adjust the new architecture to the old setting, reducing the contrast between the past and the present without reproducing the old constructions, such as the neo-colonial design by architect Carlos Leão for the same hotel, the inspiration of the colonial pau-a-pique struts was indicated. In this way – although it did not consider the characteristics of volume and implantation – it began to indicate the use of typological elements to "harmonise with the environment of insertion" and "good coexistence between the new and the pre-existing".[181]

Figure 24 Photo of the façade of the *Grande Hotel de Ouro Preto*, showing the mixture of modern architecture with elements of the colonial architecture. Photo by Zonda Bez. Source: Grande Hotel of Ouro Preto [2020].[182]

Other architecture projects, built within the historic centre, started to follow the same suggestions, using elements of traditional architecture, and approximating the main lines and

[180] Motta, Lia. "A SPHAN em Ouro Preto: uma história de conceitos e critérios", *Revista do Patrimônio Histórico e Artístico Nacional*, n. 22, 1987, p. 112.

[181] "*Lúcia Costa fez uma concessão no que diz respeito à liberdade total de aplicação dos dogmas modernistas, mas manteve-lhe o caráter, buscando apenas aproximar a expressão formal, por semelhança, à arquitetura tradicional. No entanto, do ponto de vista da cidade setecentista idealizada, não foi feita concessão. O arquiteto procurou naquele período os elementos de semelhança, estabelecendo desta forma, para continuidade cidade, o padrão estético de uma fase de Ouro Preto. Para ajustar melhor a arquitetura nova ao quadro antigo, diminuindo o contraste entre o passado e o presente sem reproduzir as velhas construções, como o projeto de gosto neocolonial do arquiteto Carlos Leão para o mesmo hotel, foi indicado a inspiração na marcação dos esteios do pau-a-pique colonial. Desta forma iniciava-se – embora não considerasse as características de volume e implantação – a indicação do uso de elementos tipológicos para 'harmonia com o meio de inserção' e 'boa convivência entre o novo e o preexistente'*." [Our translation]. Ibid., p. 111.

[182] Grande Hotel of Ouro Preto. *Wikipedia*. 2020. URL: https://en.wikipedia.org/wiki/Grande_Hotel_of_Ouro_Preto. Accessed on: 20 June 2023.

proportions of the new buildings to those of the colonial architecture. At the beginning, the projects were analysed one by one by the Heritage Institute, which approved only the ones that adapted to their neighbouring buildings. However, as suggested by Motta (1987) these buildings with characteristics that respected the neighbourhood aspects end up imitating the traditional architecture, even while this should be avoided according to the heritage ethics. But with the increase of demands for project approvals, guidelines were created, demanding the use of some elements from the traditional architecture, like the type of eaves and windows that should be employed. With time, these guidelines started to be used not only in the historical centre, but in the whole city.

At the time, it was believed that Ouro Preto would not be further altered, since in the first three decades of the 20th century not much changed in the city. This created the notion that a delimitation of the perimeter of registration was not necessary. But in 1945, new economic growth started, due to the development of the aluminium industry in the region. Adding to these, in the 1960s, there was a bigger increase in the incentives to activities linked to tourism, as well as an expansion of the educational character of the city with the creation of the UFOP. In the 1940s, the population grew 70%, another 19% in the 1950s, and 131%, in the 1960s. The population would jump from 8.751 inhabitants in 1950 to 25.252 in 1970.[183]

The demand for new housing and greater urban infrastructure evolved to irregular constructions and traffic problems. This population expansion will lead to disorderly growth of the city, which will impact the periphery and the historic centre. The two maps below represent the growth of the city, from the beginning of the settlement to 1940 (**figure 25**) and in 1978 (**figure 26**).

In the images below, we see the irregular growth on the slopes, visible from the historic centre. To Motta (1987), "it was characterised, especially in the 60s, the new way of living, which corresponded to a new plot, a new implantation of the houses in the plot, a new disposition of the rooms and a new relation with the street, inducing an architecture quite different from the traditional one"[184]. The parcelling of the land and the dimensions of the new buildings were not questioned by the Heritage Institute, which led to a very different volumetry to that found in 18th century buildings. The institution was only concerned with the façades,

[183] Oliveira, Leandro Duque de, Sobreira, Frederico Garcia. "Crescimento Urbano de Ouro Preto-Mg Entre 1950 e 2004 E Atuais Tendências." *Revista Brasileira de Cartografia*, vol. 67, no. 4, p. 867–876, 2015.

[184] "*Ficou caracterizado, portanto, mais especificamente na década de 60, a nova forma de morar, que correspondia a um novo lote, uma nova implantação das casas no lote, uma nova disposição dos cômodos e uma nova relação com a rua, induzindo a uma arquitetura bastante diferente da tradicional.*" [Our translation]. Motta, Lia. "A SPHAN em Ouro Preto: uma história de conceitos e critérios", *Revista do Patrimônio Histórico e Artístico Nacional*, n. 22, 1987, p. 114.

which were built according to specific, rigid rules, which dictated how the roofs, the eaves, the windows, the painting of the walls and the woodwork, etc. should look.

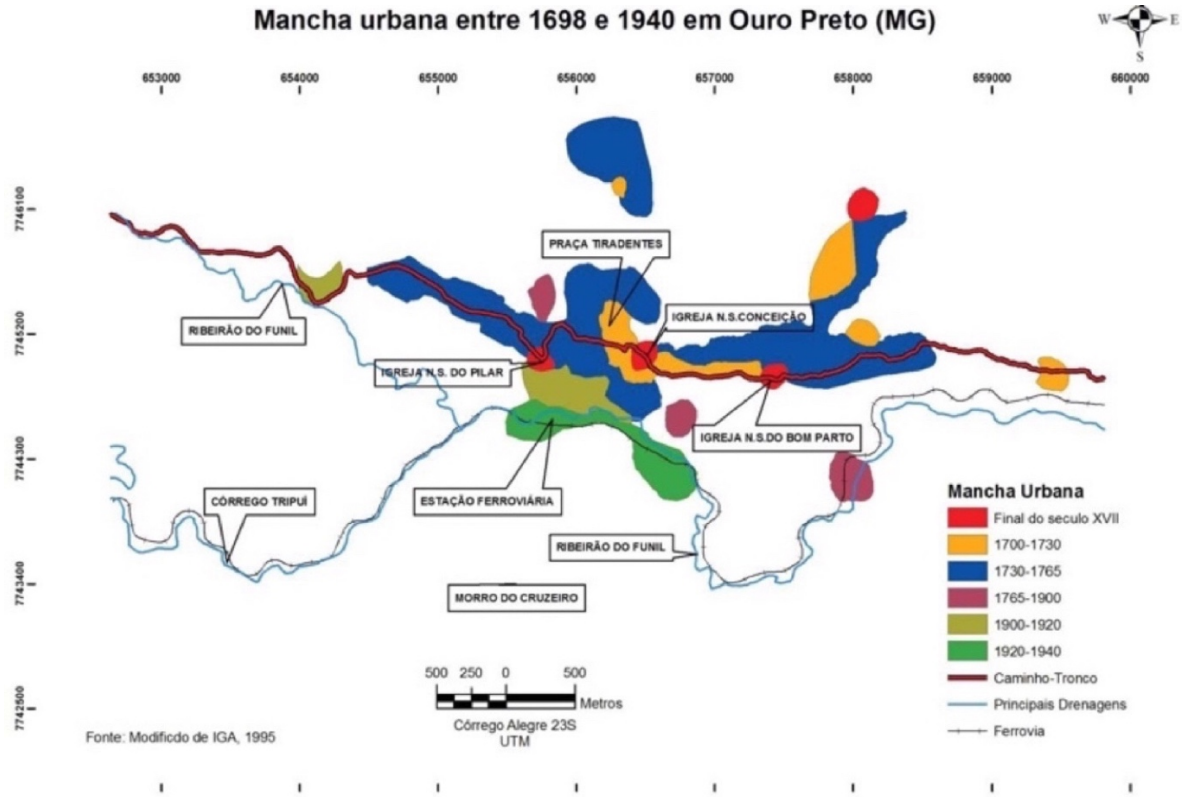

Figure 25 Urban occupation in Ouro Preto between 1698 and 1940. Source: Oliveira [2015].[185]

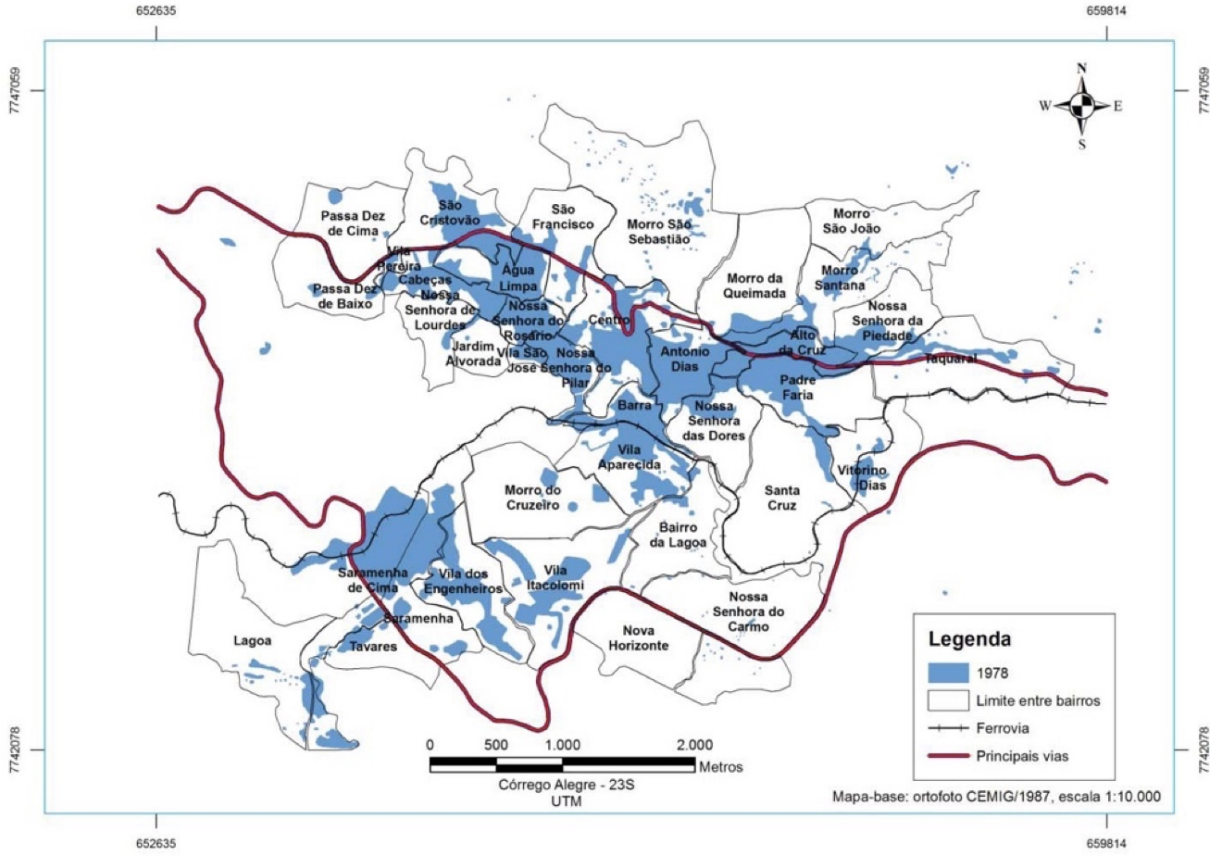

Figure 26 Urban occupation in Ouro Preto in 1978. Source: Oliveira [2015].[186]

[185] Ibid., p. 870.
[186] Ibid., p. 873.

"The consequences of this approach are perceived on three scales: in the urban and landscape disfiguration, in the falsification of the ensemble and in the production of a hybrid architecture"[187], denounces Motta (1987). When comparing the print by Thomas Ender, based on a work of Johann Emanuel Pohl, from 1817 (**figure 27**), with the photograph from 1985 (**figure 28**), showing the same perspective of Ouro Preto, we see how many buildings were constructed in the city.

Figure 27 View from Ouro Preto in the beginning of the 19th century. *Villa Rica*, by Thomas Ender, 1817. Source: Enciclopédia Itaú Cultural [N/d].[188]

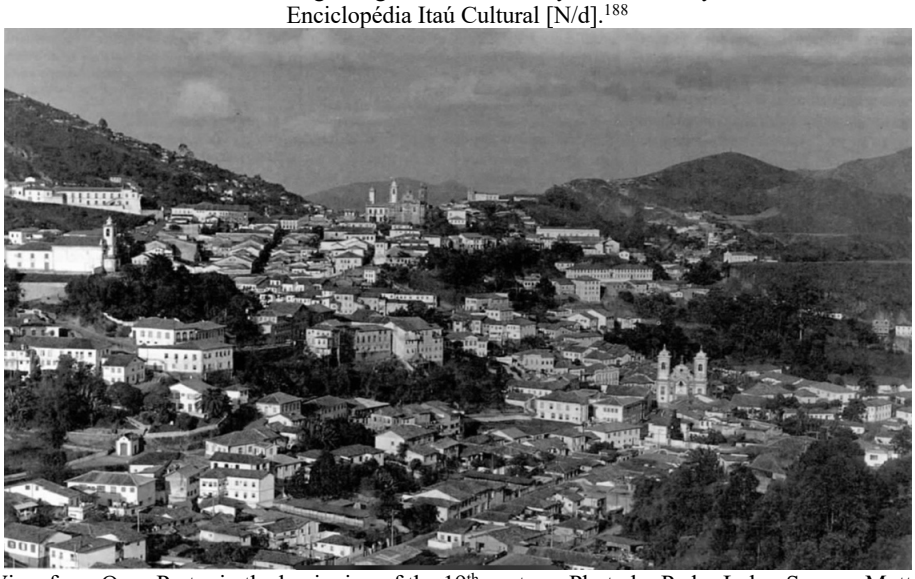

Figure 28 View from Ouro Preto .in the beginning of the 19th century. Photo by Pedro Lobo. Source: Motta [1987].[189]

In addition, there is irregular growth, mainly on the slopes of the hills, which do not follow any rule, either by the Heritage Institute or any other public body. We can observe,

[187] "*As consequências dessa atuação são percebidas em três escalas: na descaracterização urbanística e paisagística, na falsificação do conjunto e na produção de uma arquitetura híbrida."* [Our translation]. Ibid., 115.
[188] Villa Rica, *Enciclopédia Itaú Cultural,* n/d. URL: enciclopedia.itaucultural.org.br/obra60929/villa-rica. Accessed on: 18 June 2023.
[189] Motta, Lia. "A SPHAN em Ouro Preto: uma história de conceitos e critérios", *Revista do Patrimônio Histórico e Artístico Nacional*, n. 22, 1987, p. 114.

comparing photos from 1938 (**figure 29**) and from 2009 (**figure 30**) the growth of the Vila Aparecida neighbourhood.

Figure 29 View of Ouro Preto, showing the hills without constructions. Photo by Luiz Fontana, 1938. Source: Prefeitura de Ouro Preto. [s/d].[190]

Figure 30 View of Ouro Preto, showing the occupation in the hills. Source: Ouro Preto [2009].[191]

The first attempt to control the growth of the city consisted of the visit, organised by UNESCO, of the Portuguese architect Viana de Lima, who proposed a zoning plan for the city. The intent in this plan was the creation of an expansion area outside the Historical Centre, the latter being protected by a greenbelt. Another proposal was "to maintain the population of the old town and its functions by establishing a balance in the distribution of cultural and leisure facilities between the two areas, adapting and restoring existing housing and reviewing urban

[190] "Home." Prefeitura de Ouro Preto – Luiz Fontana, n.d. URL: https://ouropreto.mg.gov.br/luizfontana/?page_id=1624/. Accessed on: 28 June 2023.
[191] Ouro Preto. Wikimedia Commons, 2009. URL: https://pt.wikivoyage.org/wiki/Ouro_Preto#/media/Ficheiro:OuroPretoNord.jpg. Accessed on: 28 June 2023.

facilities and the streetscape[192]", as reported by Motta (1987). This idea still followed the old mentality where the old was separated from the new, keeping the historical core as an idealised object, a work of art that should remain unchanged. Lima even proposed the demolition of houses he judged "lacking quality". In the detailed part of the plain, he created images in which he painted yellow the buildings that were to be demolished.[193]

In 1975, in order to coordinate the urban expansion of Ouro Preto, the "Plan for the Conservation, Valorisation and Development of Ouro Preto and Mariana" was created by the João Pinheiro Foundation (FJP), a research and teaching institution linked to the Minas Gerais State Secretariat for Planning and Management. This plan, which includes the neighbour city of Mariana, which also owns a big architectural heritage, proposed a clear division of the historical nucleus and the area of development, which should not be visible from the first. It also prohibited the construction of new buildings in the historical centre, and even in the expansion areas, some urbanistic and architectural characteristics should be followed. This plan ends up creating the same problems that the city faced, and "reinforced and continued the aesthetic-stylistic and hybridity-inducing routine of Heritage (Institute) approvals"[194] Motta (1987) points out. None of the plans were accepted, and Ouro Preto continued to grow.

From 1979, IPHAN, now led by designer Aloísio Magalhães (1927 - 1982), gained new concepts, among which was the recognition that historic centres still possess a living path. The institution started to support the participation of the people and local authorities in its decisions and set up a technical office in the city, which had professionals from different areas to meet the demands of the region. At state level, Minas Gerais saw the creation of the Technical Committee for Project Evaluation, composed of many agencies – SPHAN, Culture Coordination of the State of Minas Gerais, State Institute of Historical and Artistic Heritage of Minas Gerais (IEPHA), State Planning Secretariat and City Hall of the municipalities.

At the beginning of 1979, the Ouro Preto region experienced heavy and prolonged rains, leading to several problems for the city - collapsing hills and buildings, obstructing streets, and jeopardising the structure of some monuments. As a result, in April 1979, the Seminar Ouro Preto was held in the city, bringing together representatives of the government, cultural entities,

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[192] "*Manter a população da cidade antiga e suas funções mediante o estabelecimento de um equilíbrio na distribuição de equipamentos culturais e de lazer entre as duas áreas, a adaptação e recuperação das habitações existentes a revisão do equipamento urbano e do arruamento." [Our translation].* Motta, Lia. "A SPHAN em Ouro Preto: uma história de conceitos e critérios", *Revista do Patrimônio Histórico e Artístico Nacional,* n. 22, 1987, p. 118.

[193] Ribeiro, Cecília. Viana de Lima em missão da Unesco no Brasil. *URBANA: Revista Eletrônica do Centro Interdisciplinar de Estudos sobre a Cidade*. 5. 52, 2013.

[194] "*Reforçava e dava continuidade à rotina estético-estilística e de indução ao hibridismo nas aprovações do Patrimônio*." [Our translation]. Motta, Lia. "A SPHAN em Ouro Preto: uma história de conceitos e critérios", *Revista do Patrimônio Histórico e Artístico Nacional,* n. 22, 1987, p. 119.

public and private enterprises, and the community. The “Ouro Preto Project” was written during the event, with 22 recommendations for the preservation of the city's cultural and environmental heritage. A Work Group was created and quickly it started to put into practice the recommendations, such as the construction of containments on the slopes, dismantling of hills that threatened residences, reactivation of the Botanical Garden as a way to assist the reforestation of slopes, etc. A Code of Posture of Ouro Preto was created, featuring four chapters dedicated to the aesthetic and landscape defence of the city.[195]

In 1980, Ouro Preto was the first Brazilian site to be inscribed in UNESCO World Heritage List. The city was inscribed as a World Heritage Site due to its role as a testimony of a part of Brazilian history and its unique baroque architecture. The organic layout of the city, together with the squares, public buildings, residences, fountains, bridges, and churches, the lats descendants of the baroque and rococo style shows its “Outstanding Universal Value”. But not only that the city, once the richest of the country, was the stage of the most memorable Brazilian independence movement, the *Inconfidência Mineira*, and the house of Aleijadinho, the great master of Brazilian colonial art[196].

The city was inscribed in two criteria. Criterion (i) means that the site “represents a masterpiece of human creative genius". Ouro Preto mixes the vernacular and erudite architecture in its irregular relief and urban plan, making it a unique masterpiece of human genius. The religious constructions are adorned by sculptures in wood and stone, by Aleijadinho, and paintings by Manuel da Costa Athaide and other important artists of the colonial time. At the time of the nomination, the architecture of Ouro Preto was seen as the “initial expressions of an artistic form deemed genuinely national”. The other is criterion (iii), which refers to “To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living, or which has disappeared”. According to UNESCO, Ouro Preto bears the testimony of the talents of the mining sociaty which flourished in the area in the 18th century. There, the Portuguese architectural and artistic models, brought by the Portuguese, developed differently from contemporary European art, in its spatial conception and decorative treatment. The religious constructions were built mixing different traditions and without the influence of formal convents or monasteries[197], making them unique in many ways[198].

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[195] Teixeira, Ricardo dos Santos. *Uma conjuntura de aparências: a construção de um sistema municipal de planejamento urbano em Ouro Preto.* Doctoral Thesis in Architecture and Urbanism - Universidade Federal de Minas Gerais, Belo Horizonte, 2014.

[196] UNESCO. *Historic Town of Ouro Preto*, *UNESCO World Heritage Centre*. [n.d]. URL: https://whc.unesco.org/en/list/124/. Accessed on: 20 June 2023.

[197] The Portuguese Crown prohibited the entering of religious orders in Minas Gerais after the discovery of gold, due to a belief that these orders could create problems, since they were bound to obedience only to the Church.

[198] UNESCO. *Historic Town of Ouro Preto*, *UNESCO World Heritage Centre*. [n.d]. URL: https://whc.unesco.org/en/list/124/. Accessed on: 20 June 2023.

About the Integrity of the site, UNESCO stated that the city maintained the "its urban nucleus built in the colonial period, including the diversity of civic and religious buildings marked by refined aesthetic and architectural qualities that express Outstanding Universal Value". But the institution also highlighted that some parts of the city were not in a good state of conservation and that the urban growth endangered its heritage. On Authenticity, UNESCO assessed that the buildings in the city preserved the form and design from the 18th century, and the urban landscape was not excessively altered. For the institution "the preservation measures adopted by the Federal Government with the support of the local government, based on urban planning norms and successive conservation and recovery projects have ensured the authenticity of the cultural property"[199]. In spite of the nomination, not much was improved in the city, according to some people in the community[200]. Until today, the title of World Heritage Site is not even known by part of the population of the city. According to the Centre for Applied and Comparative Socio-Political Studies of the Federal University of Ouro Preto (NEASPOC), 41% of the population of the city doesn't know that Ouro Preto has the title[201]. We see that many of the ideas that supported the nomination of Ouro Preto are based on the old ideas of its artistic value. The city is present as a treasure lost in the middle of the country, and where the time stopped due to the abandonment, what, as seen above, was not really what happened. As the modernists, they describe its architecture as being the purest representative of Brazilian art.

With the promulgation of the 1988 Constitution, new guidelines for Urban Policy were created. This led to a new attempt to create a Masterplan. After other unsuccessful attempts, the first Master Plan of Ouro Preto was approved in 1996. It defined the social functions of the city and of property, based on the Constitution and the heritage charters. In addition, the document pointed out guidelines for economic and social development; road system and transport; sanitation; urban cleaning; protection of cultural and environmental heritage; and on social policy - health, education, leisure, housing, culture, etc. The urban perimeter of some districts was delimited, due to the growing urbanisation observed in them. The other districts only had their perimeters delimited, in the revision of the Plan, in 2006[202].

The late 1990s and early 2000s saw a major political shift in the country, which would be reflected in Ouro Preto, such as the approval of the City Statute and the creation of projects

[199] Ibid.
[200] Ribeiro, Isadora Parreira. *Ouro Preto: de Monumento Nacional a Patrimônio Mundial Estudo do impacto das classificações na comunidade local.* Master's thesis in History of Art, Heritage and Visual Culture, Porto, 2021.
[201] Sayegh, Liliane Márcia Lucas. "A dinâmica urbana em Ouro Preto: conflitos decorrentes de sua patrimonialização e de sua consolidação como cidade universitária". Dissertation (Master in architecture) Faculdade de Arquitetura e Urbanismo, Universidade Federal da Bahia, Salvador, 2009.
[202] Teixeira, Ricardo dos Santos. "Uma conjuntura de aparências: a construção de um sistema municipal de planejamento urbano em Ouro Preto". Thesis (PhD in Architecture and Urbanism). Universidade Federal de Minas Gerais, Belo Horizonte, 2014.

that would bring investments and improvement and conservation works, such as *Programa Monumenta* and PAC. There was also a greater concern with intangible heritage. But Ouro Preto still suffered from the same problems. Much attention continued to be paid to the façades, but the rest of the properties were modified according to the owner's wishes. It was normal to modify the back of buildings, which greatly altered the city's landscape. The city also continued to grow, with several irregular constructions. In addition, accidents have occurred during this period, such as when trucks destroyed the same fountain in two separate accidents in 2002 and 2003. In 2003, UNESCO sent a team to survey the historic centre. In a great coincidence, one day after the inspection, the city witnessed one of the greatest tragedies suffered by its heritage. A fire destroyed the Hotel Pilão, located in *Praça Tiradentes*, the main square of the city.

After that the Master Plan of Ouro Preto was revised. According to Teixeira (2014)

> The objectives of the revised Master Plan remained virtually the same as its 1996 predecessor. The change, however, was in the tone of the discourse, which did not emphasise the headquarters district as a hub as much as it did the importance of decentralising activities and placed more emphasis on the other districts. In addition, the preservation and valorisation of the cultural and natural heritage was reinforced as determining factors for the economic and social development of the municipality, for the generation of jobs and for the improvement of the quality of life of the population.[203]

The Plan would be revised some other times, but the main change would be in the zoning. In 2010 it was approved the creation of eight zones: I. Special Protection Zone (SPA); II. Environmental Protection Zone (ZPAM); III. restricted densification zone (ZAR); IV. Densification Zone (ZA); V. Zone of Special Social Interest (ZEIS); VI. Special Intervention Zone (ZIE); VII. Educational Development Zone (ZDE); VIII. Mineral Interest Zone (ZIM). The map below presents the zoning of the Main District (**figure 31**).

[203] "*Os objetivos do Plano Diretor revisado permaneceram praticamente iguais ao seu antecessor, de 1996. A mudança, porém, esteve no tom do discurso, não enfatizando tanto o distrito-sede enquanto polo, destacando ainda mais a importância da descentralização das atividades e dando mais ênfase aos demais distritos. Além disso, foi reforçada a preservação e valorização do patrimônio cultural e natural como fatores determinantes para o desenvolvimento econômico e social do município, para a geração de empregos e para a melhoria da qualidade de vida da população."* [Our translation]. Ibid., p. 162.

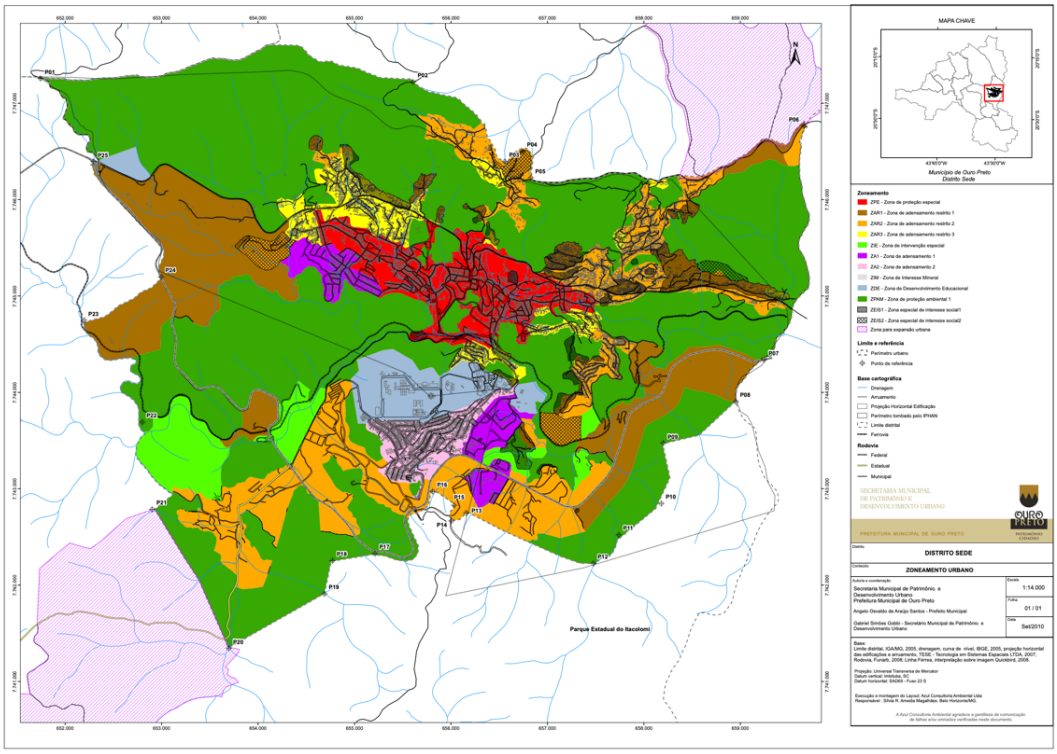

Figure 31 Map presenting the zoning of the Main District. Source: Secretaria Municipal de Desenvolvimento Urbano E Habitação - Ouro Preto. [204]

Nowadays, Ouro Preto still has in the mining industry its main economic revenue. Tourism is also an important part of its economy. The university attracts many students to the city, which are also responsible for boosting the local economy. The city still deals with many problems, from its urban growth to the lack of investment in the preservation of its heritage. One of the most discussed issues in the city is the ongoing battle between the community and the public agencies that demand action from residents, but fail to fulfil their investment functions. Other problems, such as those caused by the rains, which lead to landslides and even the destruction of heritage, still plague the city, without any resolution by the public authorities. But the city continues to maintain its beautiful landscape, attracting visitors and enchanting those who live there.

2.4. Architectural profile: from colonial times to contemporary days

Ouro Preto is the major representative of the colonial architecture of Minas Gerais. As Salgado (2010) explains "the study of the origin of Minas Gerais architecture is intertwined with economic and social factors, in addition to the cultural influences that came not only from the (Portuguese) Kingdom, but also from India, Spain, Africa, China etc". The constructions in Vila Rica (and the rest of Minas Gerais), during the 18th century, are heavily influenced by the

[204] Secretaria Municipal de Desenvolvimento Urbano E Habitação - Ouro Preto. [n.d] URL: https://ouropreto.mg.gov.br/planodiretor/legislacao. Accessed: 22 June 2023.

Portuguese architecture – as explained by the American art historian Robert Chester Smith (1912 - 1975), specialist in Portuguese and Brazilian architecture,

> Of all the former European colonies in the New World it was Brazil that most faithfully and consistently reflected and preserved the architecture of the mother-country. In Brazil were never felt those strange indigenous influences which in Mexico and Peru produced buildings richer and more complicated in design than the very models of the peninsular Baroque. Brazil never knew the exigencies of a new and severe climate necessitating modifications of the old national architectural forms, as in the French and English colonies of North America, where also the early mingling of nationalities produced a greater variety of types of construction. And the proof of this lies in the constant imitation in Brazil of the successive styles of architecture in vogue at Lisbon and throughout Portugal during the colonial period.[205]

The Crown and the City Councils even wielded legislation that regulated architecture and town planning in the colony's villages. But in Vila Rica, such regulations were not always followed, due to, according to Vasconcellos (2011), the fast development and its remoteness. So, during the 18th century, dwellings were built according to the owners' will. But religious and civil buildings used to follow these rules, and military engineers, usually of Portuguese origin, were responsible for drawing up most of the designs for these types of buildings, following rules that were similar to those used in the Metropole.

2.4.1. Residential buildings

The first buildings in Ouro Preto were temporary dwellings, called *ranchos* (**figure 32**) by Vasconcellos (2011). Built by the first miners who arrived there, who had no interest in settling in the region, these shelters were precarious, having just a beaten earth floor, with makeshift beds, called *jiraus,* and a trivet over a brazier in the centre. These shelters were covered with appropriate vegetables available in the region, such as *Brazilian satintail*. The *ranchos* of small proportions had mono-pitch roofs, which the higher side could be supported in the ravine if the terrain was steep, while the bigger ones, had duo pitch roofs. Rolling sticks were used, tied, or braced, to build the structure. “Later, it is supplemented with sticks to the perimeter, covered or not with vegetables, as the roof, or completed with transversal sticks and finished with clay” tells the Vasconcellos (2011). They did not have many openings, apart from the door and sometimes windows.[206]

[205] Smith Jr, Robert C. The colonial architecture of Minas Gerais in Brazil. *The Art Bulletin*, *21*(2), p. 110-159, 1939.
[206] Vasconcellos, Sylvio de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo, Perspectiva, 2011.

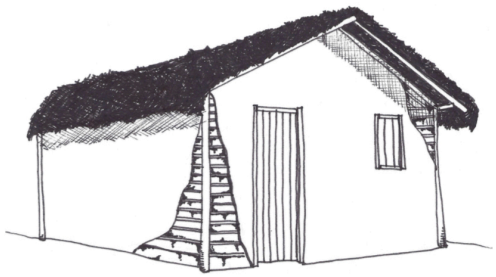

Figure 32 Sketch representing the first buildings in Ouro Preto. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[207]

At the end of the 1710s, more definitive constructions began to be erected (**figure 33**). One of the changes is the use of roof tiles. This became possible with the opening of a pottery in 1713 in the region, allowing the diffusion of tiles in the constructions. The houses had quadrilateral plans, which could receive later additions or secondary appendages (which could be detected due to the presence of walls with exterior characteristics on the inside of the houses). This would many times create plans with different shapes, like an L or O floor plans[208].

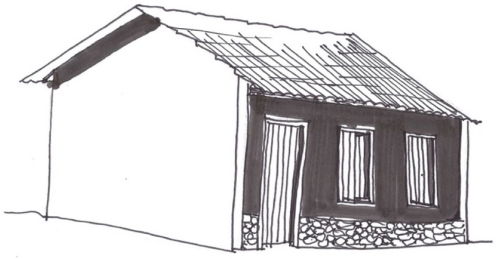

Figure 33 Sketch representing the second type of buildings constructed in Ouro Preto. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010. [209]

As the population of Vila Rica, together with the financial resources of its residents, increases, and the village is consolidated, the need for bigger houses, with division of rooms according to their use, arises. The difference between these new houses and the first typology is in the improved finishing, in the adoption of a rectangular plan and higher ceilings, and in more elongated frames and proportion of the openings (**figure 34**)[210].

Figure 34 Sketch representing the third type of buildings constructed in Ouro Preto. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[211]

[207] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[208] Ibid.
[209] Ibid.
[210] Ibid.
[211] Ibid.

The growing population and urbanisation of Vila Rica led to a shortage of land in the more central areas of the town, led to a reduction of the size of house fronts, to accommodate more houses in the streets, which in turn led to the houses being more elongated towards the back of the plot. This enabled the creation of backyards. In these houses, the corridor is the main element (**figure 35**), which is, according to Vasconcellos (2010),

> The piece that constitutes the dynamic of the plants that, in general, in the settlements, occupy the entire width of the land. It establishes the access, the connection between the various parts of the house and the transit between the public thoroughfare and the backyards. It is the backbone of the dwellings, penetrating from outside to outside and serving them completely.[212]

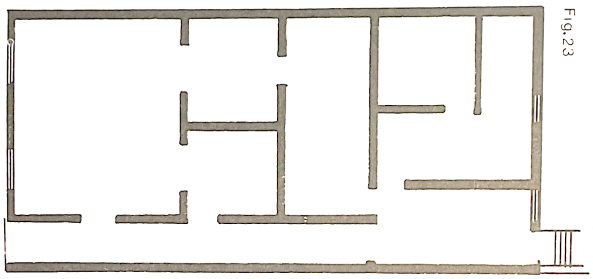

Figure 35 Plan of house in Ouro Preto that shows the corridor connecting the entrance and the back door. Source: Vasconcellos [2010].[213]

This typology was common in all the country. Vasconcelos (2011) says that "the arrangement of the plans, according to this corridor, is common to the whole of Brazil"[214].

The colonial architecture of Ouro Preto adapted as best it could to the rugged relief of the city. Many houses took advantage of the slope of the terrain by creating basements, when downhill, that were used for various purposes - kitchen, storage, stables, workshops, slave quarters, etc. When they are uphill and with a higher ceiling, the basements can house a business (**figure 36**).

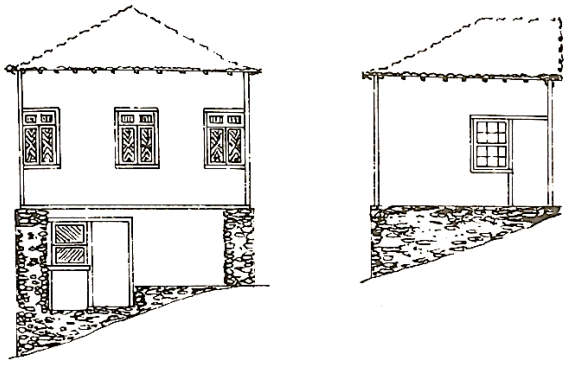

Figure 36 View and plan of a house with basement built following the slope of the land. Source: Vasconcellos [2011].[215]

[212] "*Peça que constitui a dinâmica das plantas que, em geral, nas povoações, ocupam toda a largura dos terrenos. Estabelece ele o acesso, a ligação entre as várias peças da casa e o trânsito entre a via pública e os quintais, é a espinha dorsal das moradias, furando-as de fora a fora e servindo-as por inteiro*." [Our translation]. Vasconcellos, Sylvio de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo (SP), Perspectiva, 2011, p. 133.
[213] Vasconcellos, Sylvio de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo, Perspectiva, 2011.
[214] "*O agenciamento das plantas, em função desse corredor é comum a todo o brasil.*" [Our translation]. Ibid., p.133.
[215] Ibid.

The *sobrados* (townhouses) (**figure 37**) started to be built as a way to make better use of steep terrains and create larger houses, but also to show the social position and wealth of certain individuals. The first floor of these constructions, like the basements of the humbler houses, were normally used as shops, deposits, or slave quarters. They were rarely used as dwellings, explains Vasconcellos (2011). On the second floor, the partitions were usually made of pau-a-pique, due to the lightness of the walls of this technique. Balconies and terraces are an important element of two-storey houses (**figure 38**).

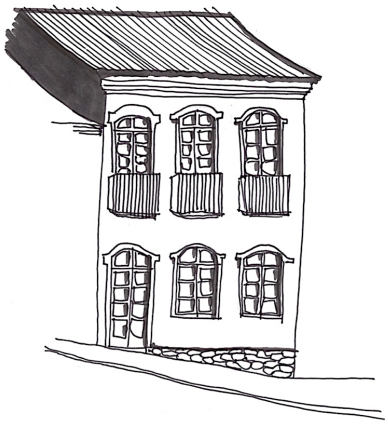

Figure 37 Sketch representing the *sobrados* of Ouro Preto. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[216]

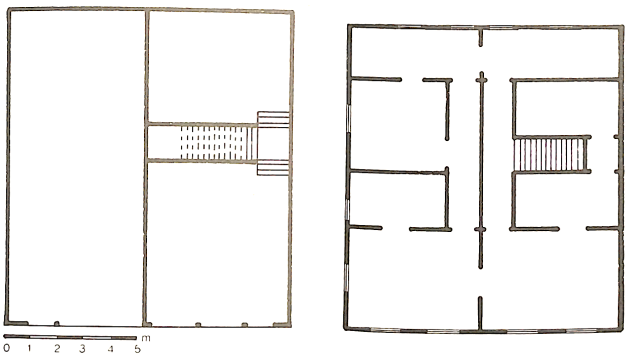

Figure 38 Plan of the two floors of a *sobrado* of Ouro Preto. Source: Vasconcellos, 2010.[217]

In the 19th century, the houses maintained mostly the same typologies of the 18th century, except for the first humble shelters. The only transformation, according to Salgado (2010), is a horizontal lengthening of the houses, which now have more openings. Some façades now have between five and six openings and may have balconies along their entire length (**figure 39**) or individual terraces (**figure 40**).

[216] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[217] Vasconcellos, Sylvio de. *Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo, Perspectiva, 2011.

Figure 39 Sketch representing a bigger *sobrado* with balconies along their entire length Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[218]

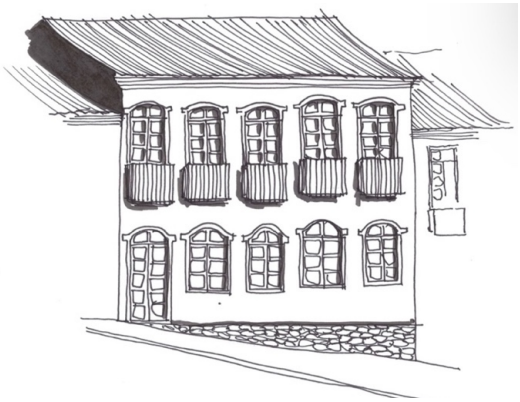

Figure 40 Sketch representing a bigger *sobrado* with individual terraces. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[219]

The **figure 41** shows a photo of the *Largo do Rosário*, where we can find some examples of the typologies presented above. In some of the *sobrados* we see the attic windows or skylights, that Vasconcellos (2011) tells that are normally precarious rooms constructed as extensions of the house taking advantage of roof openings.

Figure 41 Photo of the *Largo do Rosário,* showing the houses of different typologies. Photo by Monique Renne. Source: Melhores destinos [n.d][220].

In the end of the 19th century and beginning of the 20th century, there were many plans for the renovation and modernization of the buildings and the urban space of the city, using the

[218] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[219] Ibid.
[220] *Igreja de Nossa Senhora do Rosário*. *Guia de Destinos*. [n.d] URL: https://guia.melhoresdestinos.com.br/igreja-de-nossa-senhora-do-rosario-206-5826-l.html. Accessed: 01 June 2023.

styles in vogue and new disponible materials. But many of these buildings would be modified by IPHAN in the mid-20th century, to achieve, as explained before, what they believed was the real colonial architecture. In annexe II is possible to see a survey created by Camila Leal and Sulamita Lino of the eclectic buildings still found in the city.

In the 20th century, the growth of the city, together with the presence of the IPHAN and its preservationist spirit, would create a new typology of buildings – new buildings that mix colonial elements with contemporary ones (**figure 42**). This hybrid would be constructed mainly in the historical centre and cause a confusion of what is from the colonial time and what is modern.

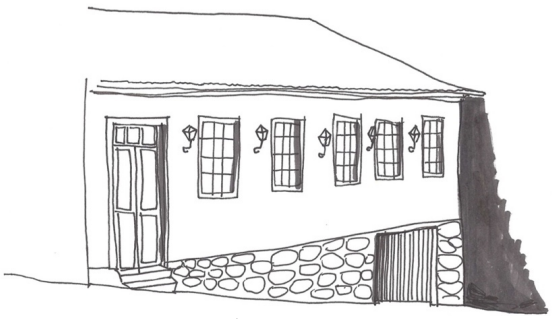

Figure 42 Sketch of the buildings constructed in the 20th century with characteristics from colonial architecture. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[221]

From the 20th century until today, many irregular buildings were erected in Ouro Preto. They don't follow any specific typology but are characterised by the lack of external finishing, presenting the ceramic bricks or brighter colours (**figure 43**). In new neighbourhoods, there is the emergence of vertical buildings with many floors, and some houses in contemporary style, but these are not visible from the historical centre.

Figure 43 The Santa Aparecida neighborhood, with its irregular buildings. Photo: Gilmar Mattos. Source: Mattos, G Gilmar. [2014].[222]

[221] Salgado, Marina. "Ouro Preto: paisagem em transformação". Master dissertation in Built Environment and Sustainable Heritage, Universidade Federal de Minas Gerais, 2010.
[222] Mattos, Gilmar. Ouro Colorido, 2023. Flickr. 2014. URL: https://www.flickr.com/photos/gijlmar/15363081988. Accessed on: 04 June 2023.

2.4.2. Religious buildings

The religious architecture in Minas Gerais developed in a peculiar way in relation to the other regions of the country. We can trace some elements that led it to differ from the rest of the country: the state is far from the coast, so new trends, which developed in the metropolis and arrived almost simultaneously in the Brazilian coastal cities, took longer to reach Minas Gerais - this would change in the mid-18th century, with the arrival of many Portuguese who culturally boosted the region, which started to lead Brazilian architecture. Another difference from the rest of the country was the absence of the monastic orders (such as Jesuits and Franciscans), so important for the development of architecture in the colony, but which were forbidden to settle in the state, because the crown believed that the religious of these orders brought disturbances and damage to the mining areas[223]. This was due to several reasons, among them the large number of religious who moved to the region after the discovery of gold and who refused to pay the taxes related to the golden exploitation, not subordinating themselves to the crown, but only to the hierarchy of the order; in addition, they supposedly incited the population to disobey the royal rules[224]. Thus, lay orders became extremely important to colonial mining society, bringing together men and women from all strata of society and exerting great influence on their spiritual and social lives. These orders became largely responsible for the construction of religious buildings in Minas Gerais.

Thus, the first chapels (**figure 44**), which appeared in the early eighteenth century, were simple constructions of mud and wood, materials that would be replaced by stone and lime around 1740, as told by Bazin (1983). Initially these chapels had a single nave plan (**figure 45**).

Figure 44 Sketch of the Church of Padre Faria. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[225]

[223] Bazin, Germain. *A Arquitetura Religiosa Barroca no Brasil*. Rio de Janeiro, Editora Record, 1983.
[224] BOSCHI, Caio César. (2007). "Irmandades, religiosidade, sociabilidades". In Villalta, Luiz Carlos, Resende, Maria Efigênia Lage de. *História de Minas Gerais; as Minas Setecentistas*. Vol. 2, Belo Horizonte, Autêntica / Companhia do Tempo, p. 59-75, 2007.
[225] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.

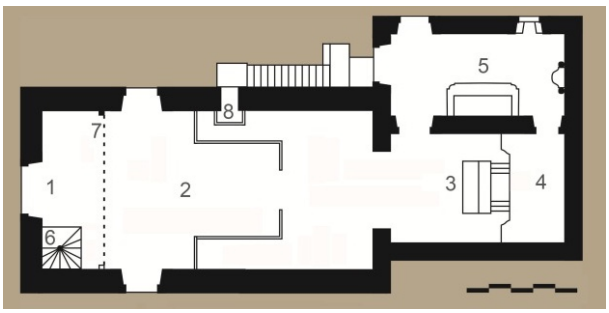

Figure 45 Plan of the Church of Padre Faria. Modified by author. Source: Morfologia das Igrejas barrocas II (2015).[226]

Around 1750, in the facades becomes common the ornamentation in soapstone, with doorways that have the same sculptural vocabulary of the internal decoration of the churches (**figure 46**)[227]. The plans became more elaborated, evolving to a division into a nave, chancel, and side sacristy, with facades with single towers; with the creation of villages, matrons were built, following the traditional Lusitanian plan. They tended to follow a common layout - both in Brazil and Portugal - of monumental unity, which had developed in the 17th century, where all the annexes were brought together in a single rectangular building.[228] The plan typology that best met the Brazilian needs was that of corridors (**figure 47**).


Figure 46 Sketch of the Matriz of Nossa Senhora da Conceição. Sketch: Flávia Guerra Soares, 2009. Source: Salgado, 2010.[229]

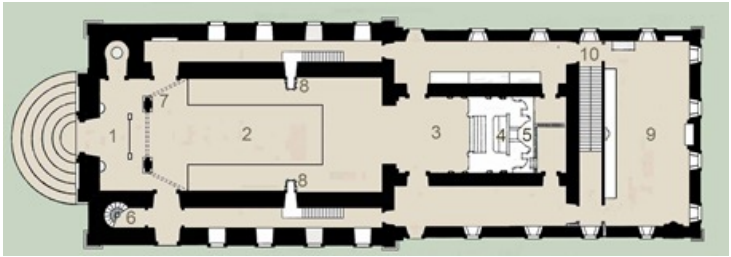

Figure 47 Plan of the Matriz of *Nossa Senhora da Conceição.* Modified by author. Source: Morfologia das Igrejas barrocas II (2015).[230]

[226] Morfologia das Igrejas barrocas II. Coisas da Arquitetura. 2015. URL https://coisasdaarquitetura.wordpress.com/2012/05/09/morfologia-das-igrejas-barrocas-ii/. Accessed: on 12 June 2023.
[227] Oliveira, Myriam Andrade Ribeiro de. *Rococó religioso no Brasil e seus antecedentes europeus*. São Paulo, Editora Cosac Naify, 2003.
[228] Bazin, G; Barata, M. *A Arquitetura Religiosa Barroca no Brasil*. Rio de Janeiro, RJ: Editora Record, 1983.
[229] Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.
[230] Morfologia das Igrejas barrocas II. Coisas da Arquitetura. 2015 URL: https://coisasdaarquitetura. wordpress.com/2012/05/09/morfologia-das-igrejas-barrocas-ii/. Accessed on: 12 June 2023.

There are few examples of churches with circular, oval, curved, and polygonal plans in the colony, just as they were rare in Portugal. One of the most beautiful examples of such a plan in Brazil (and perhaps in all Luso-Brazilian architecture) is the church of *Nossa Senhora do Rosário* of Ouro Preto **(Figure 48).** This church is definitely influenced by the Italian baroque, having the author, Antônio Pereira da Souza Calheiros, designed it "to the taste of the rotunda of Rome" at the request of the brothers of the *Rosário* Brotherhood **(Figure 49)**[231]**.**

Figure 48 Photo of the church of *Nossa Senhora do Rosário* of Ouro Preto. Photo by Rodrigo Argenton. Souce: Wikipedia [2017].[232]

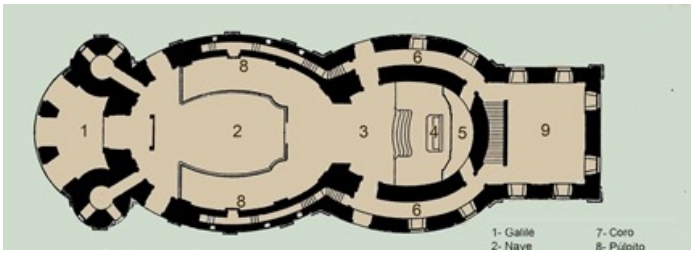

Figure 49 Plan of the Matriz of *Nossa Senhora da Conceição.* Modified by author. Source: Morfologia das Igrejas barrocas II (2015).[233]

The most important church of Ouro Preto is definitely the Church of *São Francisco de Assis* of Ouro Preto, constructed between 1766 and 1810. The church curiously shares many similarities with the Rococo Churches of the south of Germany. The church, supposably designed by Aleijadinho, has many sculptures of stone and wood of the artist, as well as a beautiful ceiling by Master Athaide. The façade uses different types of stone, like the soap stone, and has a different rhythm than the other churches in the city.

[231] Oliveira, M. A. R. de. *Rococó religioso no Brasil e seus antecedentes europeus*. Editora Cosac Naify, 2003.
[232] (No date) *File:Igreja de Nossa Senhora do Rosário (Ouro Preto) por Rodrigo Tetsuo ...* Available at: https://commons.wikimedia.org/wiki/File:Igreja_de_Nossa_Senhora_do_Ros%C3%A1rio_(Ouro_Preto)_por_Rodrigo_Tetsuo_Argenton_(02).jpg (Accessed: 12 June 2023).

[233] Morfologia das Igrejas barrocas II. Coisas da Arquitetura. 2015 URL: https://coisasdaarquitetura.wordpress.com/2012/05/09/morfologia-das-igrejas-barrocas-ii/. Accessed on: 12 June 2023.

Figure 50 Photo of the church of *São Francisco de Assis* of Ouro Preto. Souce: Wikipedia [2007].[234]

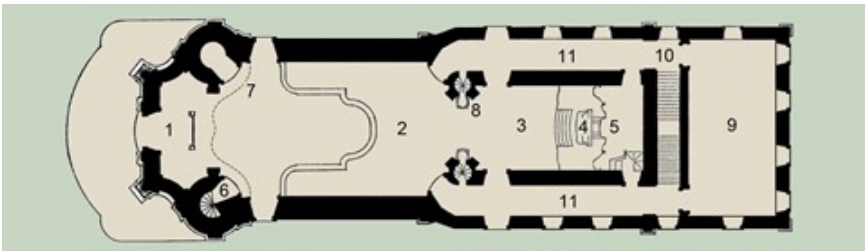

Figure 51 Plan of the Matriz of *Nossa Senhora da Conceição.* Modified by author. Source: Morfologia das Igrejas barrocas II (2015).[235]

2.4.3. Public Buildings

The public buildings, in the colonial time, were very elaborated when compared with the residential ones. Usually, they were projected by military engineers, like one of the first to be constructed, was the Governors' Palace, located in the *Tiradentes'* Square, and that today houses the Science and Technology Museum of the UFOP School of Mines (**figure 52**). It was built by the Portuguese military engineer and engineering teacher José Fernando Pinto Alpoim and shows many characteristics of a military building or a fortress.

Another important building for the city is the City Hall and Jail (**figure 53**), constructed on the other side of the same square, starting from 1784, with a project of the Governor Cunha Menezes. Today it houses the important *Museu da Inconfidência*.

[234] *Igreja de São Francisco de Assis (Ouro Preto)* (2023) *Wikipedia*. Available at: https://pt.wikipedia.org/wiki/Igreja_de_S%C3%A3o_Francisco_de_Assis_%28Ouro_Preto%29 (Accessed: 12 June 2023).

[235] Morfologia das Igrejas barrocas II. Coisas da Arquitetura. 2015 URL: https://coisasdaarquitetura.wordpress.com/2012/05/09/morfologia-das-igrejas-barrocas-ii/. Accessed on: 12 June 2023.

Figure 52 Photo of the Science and Technology Museum of the UFOP School of Mines. Photo: Lívia Ferreira. Source: Novais, A. (2022). [236]

Figure 53 Photo of the *Museu da Inconfidência*. Photo by Ricardo André Frantz. Source: Wikipedia, 2015.[237]

2.5. Conclusion

In this chapter we presented different aspects of the city of Ouro Preto. We first learn about its geographic and socio-economic characteristics. Many of these characteristics, like the geology, were decisive, for the rich history of the city, through which we travelled. We revisit its history from the end of the 17th century until today, learning about the several moments the city lived and how they were important for the country and for the safeguard of its heritage until our days.

Lastly, we talked about the very unique architecture of Ouro Preto. With different typologies of buildings, beautiful churches, and historical monuments, this showed how rich the heritage of the city is, explaining the necessity of preserving the ensemble from the dangers it faces.

[236] Novais, A. (2022) *Museu de Ciência e técnica da Escola de Minas Segue Com Atendimento suspenso ao público*, *UFOP*. Available at: https://ufop.br/noticias/institucional/museu-de-ciencia-e-tecnica-da-escola-de-minas-segue-com-atendimento-suspenso. Accessed: 12 June 2023).

[237] Projects, C. to W. *Files*, *Wikimedia Commons*. 2023 URL: https://commons.wikimedia.org/wiki/Files Accessed on: 22 July 2023.

CHAPTER 3.TRADITIONAL CONSTRUCTION TECHNIQUES IN COLONIAL TIMES

Résumé du chapitre

Ce chapitre se concentre sur une partie importante de la thèse, les techniques de construction traditionnelles utilisées à Ouro Preto aux XVIIIe et XIXe siècles, que nous voulons préserver. Pour ce faire, nous présenterons l'histoire de la construction des bâtiments, un vaste domaine dont l'histoire commence à la préhistoire. Nous aborderons principalement les techniques, les matériaux et les ouvriers, et non les sujets liés à l'architecture, tels que le design et les styles.

Par la suite, nous présenterons rapidement l'évolution des techniques du Portugal et du Brésil, étant donné qu'elles sont la base directe des techniques utilisées à Ouro Preto. Nous terminerons en présentant les techniques et les matériaux utilisés dans la construction d'Ouro Preto, ainsi que le contexte des travailleurs à l'époque coloniale.

3.1. Introduction

An important part of our work is the presentation of the traditional building techniques used in Ouro Preto in the 18th and 19th century that we want to preserve. To do this, we must begin by presenting the history of building construction. This field, which is sometimes mixed up with the history of architecture, is broad and its history begins even in prehistoric times. It covers mainly techniques, materials, and workers, not design, styles and other aspects so closely linked to architecture.

We will start the chapter talking about the history of building construction, talking about its evolution, starting from the prehistoric times. We will then focus on Portugal and Brazil, once that they are the direct base of the techniques used in Ouro Preto. We will finish the chapter presenting the techniques and the material used in the construction of Ouro Preto, and the workers who mastered this knowledge.

3.2. The history of building construction

The history of construction is long, but it is hard to establish its origins. Since the mid-20th century, it is believed that humans start to build dwellings when they transition from a nomad and hunting lifestyle, to a more sedentary one, made possible by agricultural food production. This theory was supported by archaeological discoveries in the Middle East of round buildings presenting a developed design and construction that dated back to circa 10,000

BC to 8,000 BC. But new archaeological discoveries showed that in the Old Stone Age, men already used built dwellings, not only taking shelter in natural dwellings. Archaeology studies in Africa shows that early humans (*Homo Erectus*) were already building "camp sites" in the Lower Palaeolithic period, using field stones for flooring and curbs, wood (branches, brushwood etc.) for the construction of frames and skins or hides covering it. [238]

A lot of evidence was uncovered about the Upper Palaeolithic period – which dates to between 50,000 and 12,000 years ago –, a time when the builders were already the *Homo Sapiens* and different types of shelters were constructed. Buildings found in Western and Eastern Europe, presented different types of formats and materials (**figure 54**). These were mostly natural ones, gathered by the builders and that could receive some processing when necessary. The barrier walls were made of field stones, sometimes paired with mud. The stones could also serve as weights to "brace up and hold down" the superstructures. The structures were usually wooden poles, although in some areas, large animal bones, for example from mammoths, were used (**figure 55**). As roofing, animals' skins sewed together, tied by sinews and stripes of leather. These skins had to pass through some preparation. As seems, these shelters were light framed structures, built in without foundations, but in sunken and/or paved floors.[239]

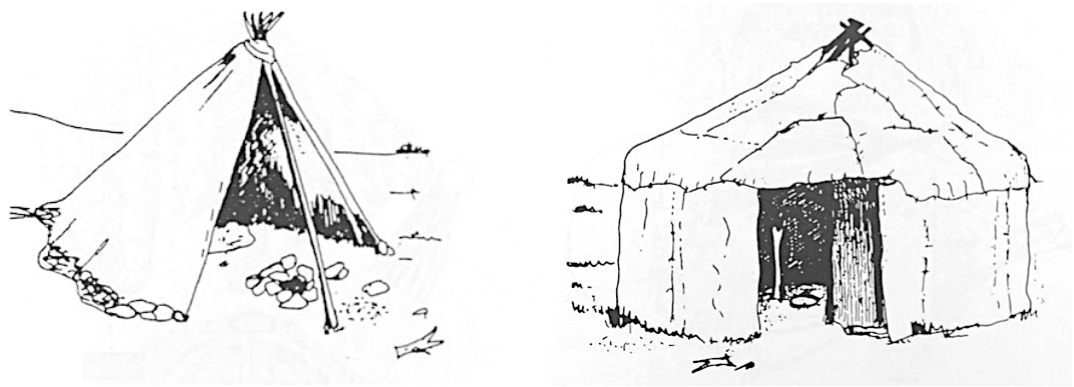

Figure 54 Drawings representing what was the shelters in the Upper Paleolithic period were. Source: Wright, 2000.[240]

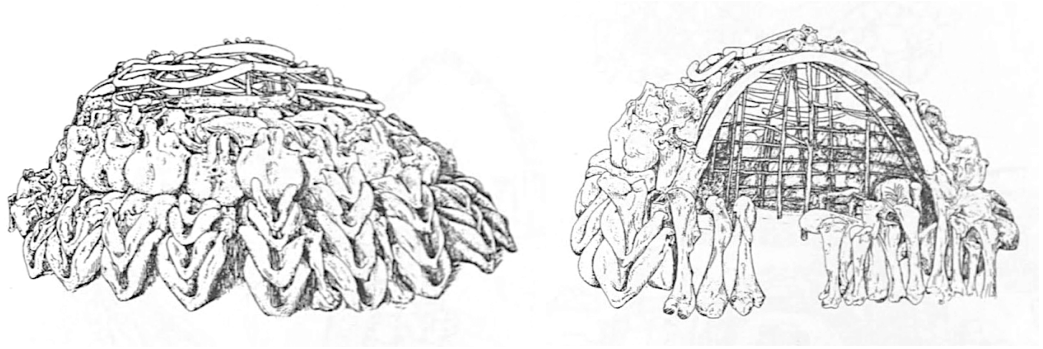

Figure 55 Drawings representing the shelters constructed with mammoths' bones. Source: Wright [2000].[241]

[238] Wright, George. R.H. Ancient building technology. Leiden, Brill, 2000.
[239] Ibid.
[240] Ibid
[241] Ibid

The builders of these shelters probably used tools, like cutters, scrapers, borers, etc, made by flint. It's possible that they also used animal bones as picks, hoes, shovels, etc. Due to the lightness of the materials employed, very few equipment must have been necessary, like hopes and sled to help transport, and maybe levers. The work was done by the building users themselves and should take a few days to erect[242].

During the Neolithic Period (ca. 10,000BC – 2,000BC), humans started to construct "durable masonry structures employing manufactured materials", says Wright (2000, p.18). It is also in the Neolithic that, according to the author, the dichotomy between "domestic building" and "monumental building" appears.[243] Around 8,000 BC, in the Middle East, there was a typology of round houses (**figure 56**), in which the floor was made of prepared earth or plaster, and they used rubble and/or mud masonry to construct walls. We see the revolutionary use of manufactured materials, like mud bricks, lime, and gypsum plaster. These solid walls received "mud terrace roof supported on wooden beams and battens which became standard in the succeeding period and remained standard for traditional buildings in the Middle East ever since"[244]. Around the same period, a big structure in stone masonry was constructed in Neolithic Jericho, in Palestine (**figure 57**). The round tower of around 10 meters in diameter and 8.15 meters high, is an example of monumental building.

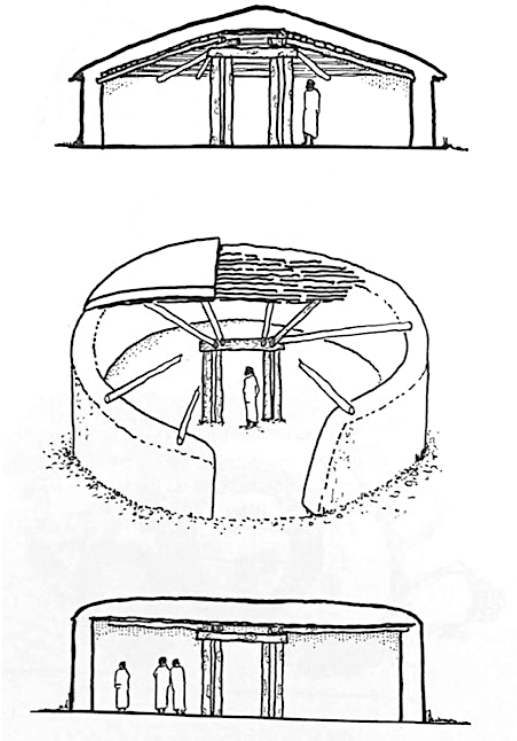

Figure 56: Drawings representing a round house of the Neolithic Period. Source: Wright [2000][245].

[242] Ibid.
[243] Wright (2000) describes the monumental building as those "which incorporates materials and techniques to produce structures with properties manifestly beyond everyday requirements".
[244] Wright, George. R.H. *Ancient building technology*. Leiden: Brill, 2000, p. 19.
[245] Ibid.

Figure 57 Tower of Jericho, Tell es-Sultan archaeological site, ca. 7000 BC. Photo by Reinhard Dietrich. Source: Wikimedia [2010][246],

Although circular buildings have survived in various parts of the globe, such as America and Africa, and were widely used in monumental architecture, around 7,000 BC, they were replaced by rectangular masonry buildings in the Old World. Most of the materials were not used in their natural state. They were processed – "wood, tree trunks and branches, were trimmed on occasion and field stones were dressed into more rectangular forms when required (…). However, the epochal achievement was a true mastery over the possibilities of earth as a building material"[247]. They used mud as mortar and plaster, and fabricated bricks moulded by hand or in forms. Different materials were combined in these constructions, like stone walls reinforced by wooden poles. The roofs were thick, made with spaced poles with a matting to support the mud. These stronger roofs made possible the construction of upper floors, creating multi-storied buildings.

Despite the fact that there were already constructions in stone and mud, in the period, wood buildings with thatch roofs also developed in different regions. For example, in Continental Europe, "very sizable, ridge roofed houses" were erected.[248] In Asia there was also the development of wooden buildings. In the *Jōmon* era (10,000 BC to 300 BC), different wood constructions were common in Japan, including the "*hottatebashira tatemono* (buildings with poles sunk in the ground) (which) were larger buildings with a floor and a roof supported by a post-and-beam structure in which the posts were buried directly in the earth" (**figure 58**)[249].

[246] Tower of Jerico. Wikimedia, 2010. URL: https://commons.wikimedia.org/wiki/File:Tower_of_Jericho.jpg. Accessed on: 05 Jun 2023.
[247] Wright, George R.H. *Ancient building technology*. Leiden: Brill., 2000, p. 20.
[248] Ibid. p. 26.
[249] Young, David; Young, Michiko, *The art of Japanese architecture history, culture, design*. Tokyo: Tuttle Publishing, 2019, p. 22

Figure 58 Reconstruction of *Jōmon* Period raised dwelling, Otsuka-Saikachido Archaeological Park, Yokohama. Source: Japan Experience [n/d].[250]

An intriguing type of construction of the time is the Megalithic. Built with striking sized stones that could get up to 100 tons in weight, these were not used for dwelling, but as worship establishments or communal tombs. The famous example of a Megalithic Monument is Stonehenge, located in Salisbury Plain in Wiltshire, England. Beginning in ca 3,100 BC, and constructed in many stages, the monument is formed by several stones, some positioned upright, and others used as lintels, each with up to 100 tons, designed in two concentric cycles, the outer with 31m of diameter, a two inner rings in form of horseshoe.[251] Another important megalithic site is the Almendres Cromlech (**figure 59**), in Évora, Portugal. Formed by 95 menhirs (name giving to standing stones), this Cromlech is speculated to be erected around 6,000BC. The site was discovered during the 1960s and excavated by M. V. Gomes. Almendres Cromlechs is one of the oldest and best-preserved prehistoric cromlechs in Western Europe.[252]

Around the same period of the megalithic (circa 5,000BC and 4,000BC) were being erected, building developments were also taking place in Mesopotamia. But differently from the monumental stone constructions, that part of the Middle East saw the development of the sun-dried mud brick (figure 60), made of earth, water, and straw, and used for the construction of residential buildings, and later, the monumental structures. The use of mud bricks was one of the biggest developments in the history of construction, being an important construction material until today. Mud was already used as a structural element in other techniques (that also are still in use in contemporary time), like the puddle mud or puddle adobe and the *terre pisée*. But they didn't have the facilities the brick offered – it could be prepared on site or in another

[250] Early Japan history Jomon & Yayoi, Japan Experience, [n.d]. URL: https://www.japan-experience.com/plan-your-trip/to-know/japanese-history/early-japan. Accessed on: 05 Jun 2023.
[251] xf
[252] Cerrillo-Cuenca, Enrique et al. "3DMeshTracings: A protocol for the diital recording of prehistoric art. Its application at Almendres cromlech (Évora, Portugal)", *Journal of Archaeological Science: Reports,* Volume 25, p. 171-183, 2019.

place and transported to the construction site and there was not needed to wait it to dry, because it was already read to use.

Figure 59 Photo of the *Almendres* Cromlechs, in Évora, Portugal. Photo by Luis Ferreira. Source: National Geographic [2017]. [253]

Figure 60 Ancient brick house at Ur, Sumerian city in ancient Mesopotamia. Source: Hafford [2018][254].

The bricks started to appear in the Pre-pottery Neolithic times (around 8000 BC), first shaped by hand and then (around 7000 BC) they were modelled using wooden forms, speeding up production, being already the main material in Mesopotamia around 6000 BC. The same mud used to produce the bricks was used as mortar and plaster in the constructions[255].

Mud bricks are very good in bear loads, but not a lot strength in tension, so to construct some building components, such as window and doors lintels, beams, etc., Mesopotamians had to innovate, creating different types of arches and vaults, as explained by Wright (2000). They also used other materials, like wood, used as roofing beams together with mud bricks or as post and columns (although rarely), and stones, for foundations or as an auxiliary material.

In Mesopotamia, we see the start of urbanisation and of the development of masonry as a profession. According to Hafford (2018)

[253] Rosa, Gonçalo Pereita, et al. Reviver O passado no cromeleque dos almendres, *National Geographic*, 2017. URL: https://www.nationalgeographic.pt/historia/reviver-o-passado-no-cromeleque-dos-almendres_1387. Accessed on: 05 July 2023.
[254] Hafford, Willian B., "Mesopotamian City Life". *Expedition Magazine*. Penn Museum, 2018. URL: http://www.penn.museum/sites/expedition/?p=25945. Accessed on 12 July 2023.
[255] Wright, George R.H. *Ancient building technology*. Leiden: Brill., 2000.

> Farming did not disappear with the rise of cities, but urban dwellers became less involved in raising their own food and more involved on earning it through wages or rations. Without having to spend time growing food, they could concentrate their activity in new fields of industry, commerce, or administration. (…) As cities expanded, builders came into high demand. Canal digging provided huge amounts of mud that brickmakers formed into bricks that builders then used in construction.[256]

They already knew the advantages of the fired mud bricks (durability and strength), but as it didn't really affect the structural purposes, they were used only in special circumstances – for decoration, for water-proof constructions, etc. According to Wright (2000), in the fourth millennium BC, the production process of the fired mud bricks developed. In the middle of the second millennium BC, they were used in foundations and façades, and in the construction of the High Temples or *Ziggurats* (**figure 61**), that could reach 7 storeys. Wright (2000) comments

Figure 61 Elamite Ziggurat of Dur Untash in Choqa Zanbil in Khuzestan, Iran, circa 1300 BC. Source: Encyclopædia Britannica [n.d][257].

> And what was the end of all this? Mud bricks were generalised for village building throughout the Middle East and remained so until the "one world" economic crusade following on the Second World War. Then reinforced concrete and cement block construction come to supplant it entirely. Monumental massive mud brick construction came to an end under foreign (Parthian) rule in Mesopotamia early in the Christian era. However in more remote and outlying parts of the ancient world the use of mud brick on a quite monumental scale survived until recently (cf. especially South Arabia and Morocco); as equally it did in the New World where it was carried by Spanish conquest (adobe = *et tub*, Arabic for brick).[258]

Another great civilization that was important for the history of construction and architecture was the ancient Egyptian. The earliest known buildings from Egypt are probably the round houses from The Badarian period in Upper Egypt (around 6000 BC – 4000 BC) similar to the ones presented before. It used flexible vegetal materials, like reeds, ruches, and

[256] Hafford, Willian B., "Mesopotamian City Life" *Expedition Magazine*. Penn Museum, 2018, p. 53. URL: http://www.penn.museum/sites/expedition/?p=25945. Accessed on 12 July 2023.
[257] Choghā Zanbīl: ziggurat. Encyclopædia Britannica. URL: https://www.britannica.com/place/Chogha-Zanbil#/media/1/113951/200950. Accessed on 13 July 2023.
[258] Wright, George R.H. *Ancient building technology*. Leiden: Brill., 2000, p. 49.

palms, that were used alone, in bundles, latticed, and woven into mats. They plastered the constructions with Nile mud, similar to "wattle daub" (very used in colonial Brazil and called *pau-a-pique*).

The Egyptians started to use mud bricks around the millennium 3000 BC, the beginning of the Dynastic era, probably influenced (indirectly) by Mesopotamia culture. They were large scale buildings, mainly related to funerary use. Called Mastabas (**figure 62**), rectangular, with substantial brick walls and a series of underground chambers connected to the surface by stair or shafts. According to Wright (2000), the Egyptians mastered all the aspects of the mud brick building, such as the construction of vaults and the bonding of individual bricks. They used rectangular (moulded) bricks, similar to the ones used in Europe, which presented "great complexity in possible bonding patterns" explain the author.

Figure 62 Great Mastaba of Beit Khallaf., built during Djoser's reign. Source: Egyptian Monuments, [2009].[259]

Very interesting is that the first representations related to construction were found in Ancient Egypt, in the New Kingdom tomb of Rekhmire at Thebes in Upper Egypt, which dates from about 1450 BC. The painting (**figure 63**) shows all the stages of making unfired bricks, from preparation of the mud, the moulding using a wood form, the drying and the transportation. We also see the different tools, for transporting, to mould, and measure.[260]

Figure 63 Brick making in Egypt. Painted on the walls of the Theban tomb of Rakhmire (mid-15th century BCE). Source: Dospěl, [2023].[261]

[259] Beit Khallaf. *Egyptian Monuments*, 2009. URL: https://egyptsites.wordpress.com/2009/02/12/beit-khallaf/ Accessed on: 05 July 2023.
[260] Tutton, Michael. *Construction as Depicted in Western Art: From Antiquity to the Photograph*. Amsterdam University Press, 2021.
[261] Dospěl, Marek. Pharaoh's brick makers, *Biblical Archaeology Society*, 2023. URL: https://www.biblicalarchaeology.org/daily/ancient-cultures/ancient-egypt/pharaohs-brick-makers/. Accessed: 06 July 2023.

But the Egyptian techniques didn't evolve for the burnt mud brick as in other regions – with a great supply of stones, the use of the stronger material was relatively more convenient, than in other areas. Therefore, around the middle of the third millennium BC, they started to build most of their monumental buildings in stone (but mud bricks continued to be used for domestic and utilitarian purposes, for example, houses, barrier walls, fortifications, royal palaces). In addition to the change of materials, they also rapidly changed the typology of the buildings, which became the canonical style of Egypt, including the great stone pyramid tombs from around 2500 BC.

There are no traces of early developments of stone masonry in Egypt. There was stone works, (vessels and sculptures) and the material was used in some mud brick monuments. But masonry appears as an already developed technique during the third Dynasty (around 2700 BC). The earliest example was the Step Pyramid complex at Saqqara (**figure 64**). There the mastaba was replaced by a six steps pyramid constructed with small stones, similar to bricks, worked finely on the outside were used. Calvert (2021) says that in the massive wall the encloses the complex, "1,680 recessed rectangular panels were carved into the stone after the wall was constructed rather than being shaped as the blocks were laid".

Figure 64 Portion of enclosure wall, Stepped Pyramid complex, Saqqara, Egypt, Old Kingdom, 3rd Dynasty, c. 2675–2625 BC. Photo by Dr. Amy Calvert. Source: Calvert [2021]. [262]

But a new technology rapidly appeared, one that hired huge blocks of stone in the construction of massive walls, pillars, columns, pyramids (**figure 65**). These constructions, which surprises even modern visitors, required technologies which are more straightforward than expected. The Egyptians extracted the stone from big quarries around Egypt (many of these sites were found by archeologists[263]). Salam (2002) explains that

> The gigantic scale which distinguishes Egyptian monuments was made possible not only by the materials, but also by the method of quarrying,

[262] Calvert, Amy, "Step Pyramid complex at Saqqara," *Smarthistory*, October 25, 2021, URL: https://smarthistory.org/step-pyramid-complex-saqqara/. Accessed on July 06, 2023.
[263] Harrell, James A.; Storemyr, Per. "Ancient Egyptian quarries—an illustrated overview". *Geological Survey of Norway Special Publication*, *12*, p. 7-50, 2009.

> transporting, and raising enormous blocks of stone into position. Quarrying was done with copper tools and by use of timber wedges which, when swollen by water, splits the blocks away from the natural rock. Massive blocks of harder stones were often obtained by laboriously pounding trenches around them with balls of delorite, a very tough greenish stone. Delorite was also used for dressing the hard stones. Drilling and sawing of stones were known to the Ancient Egyptians from early times.[264]

To raise the big stones, as in with the megaliths, ramps were used. The masonry was with irregular shaped blocks, which were probably dressed after it was set in place in the structure. Wright (2000) affirms that the procedures and the tools used in their masonry works were the common ones. The tools (many of which were found in excavations or were represented in Egyptian art) were mane of stone or metals, such as copper and bronze. To dress the hard stones, they used (even harder) stones to pound and grind the surface, while with soft stones, metal tools were used. Wright (2000) explains that "it would seem that Egyptian stone dressers in general for normal purposes favoured the struck tools over the striking ones – i.e., they used chisels, droves, punches struck with wooden mallets rather than picks, hammers, axes, adzes". They also dominated the use of measuring tools, like graduated cubit measuring rods, builder's lines, and set squares – tools similar to the ones used today.

New developments in construction would happen just before the first millennium BC, simultaneously, in the Achaemenid Persian building and in the Classical Greek building. The Achaemenid Empire constructed using mixed material (fine stone masonry, mud brick and wood), and created very big complexes **(figure 65)** that could extend for areas of 12 hectares. These complexes were constructed over artificial platforms of finely dressed stone masonry.

Figure 65 Hall of 100 Columns, Persepolis, dated from 465 BC- 424 BC. Photo by Jona Lendering. Source: Livius [2020].[265]

[264] El Salam, Mohamed E.A., Construction of underground works and tunnels in ancient Egypt. Tunnelling and Underground Space Technology, 17(3), p.295-304, 2002.
[265]Persepolis, hall of 100 columns. *Livius*. 2020. URL: https://www.livius.org/pictures/iran/persepolis/persepolis-hall-of-100-columns/persepolis-hall-of-100-columns/ Accessed on: 25 July 2023.

Another big change was the dry set (without the use of mortar) of large, dressed stone, and the use of metal cramps to fixate them. That way, they constructed columnar assembly halls and square *cellas*. They produced columns of great heights, amazingly sometimes employing large monoliths. Using solid vertical elements (stone masonry features ornamented with relief sculptures), they stiffened mud brick or rubble walls, creating long ones. Although they already dominated different types of roofing, they normally used for their monumental constructions, mud terrace roofs on timber beams (probably also ornamented)[266].

Nylander (1965) indicates that the quarrying was similar to in Egypt, and they used the sweeling wood method to cut the blocks, which were cut already in a size close to be used, facilitating the transportation and the handling. The rest of the work was done in the construction site, where the stone was transformed into "fine sculpture, polish thresholds, column bases and capitals, blocks drafted edges and close-fitting Anathyrosis (that) bear witness to an impressive technical knowledge and familiarity with the materials". Studies of unfinished blocks show that the stonework was done in stages and different tools were used. Nylander (1965, p. 49-50) do a great description of the stages, instruments, and methods:

> 1. Aim: primary shaping of the stone in the quarry Instrument: trimming-hammer and rough punch. Method: cleaving and splitting by heavy strokes more or less parallel to the surface. 2. Aim: primary trimming of surface. Instrument: medium sized punches. Method: lighter, more oblique strokes. 3. Aimme: secondary trimming of surface. Instrument: fine punches, (sometimes) flat or curved chisels and (possibly) a drove. Method: lighter, more or less oblique strokes (punch); rather long, shallow strokes (chisels). 4 Aim: smoothing and finishing of surface. Instrument: rasps and files. 5.Aim: polishing of surface. Instrument: abrasive.

But there is still a mystery about the construction of Achaemenid complexes. It is known that at the time there were two methods for lifting elements at the period – the Egyptian way, where things were pushed up ramps, or the other way, using some form of crane, equipment created in the end of the 6th century, but only allowed the lifting of smaller pieces, not those as big as the monoliths present in these complexes. Neither method was possible in Achaemenid complexes, so no indication about the method used was found to this day, explains Wright (2000).

About the workers, records dating from 490 BC to 460 BC, show a big diversity among them, including the presence of artisans' families from other places, such as Egyptian and Ionian masons, working in the construction of Persian's complexes[267].

[266] Wright, George R.H. *Ancient building technology*. Leiden: Brill., 2000, p. 49.
[267] Ibid., p. 49.

As said above, at the same time that there were architectural and technological developments in the Achaemenid Persian building, the Greek were also birthing a style of construction that would be crucial for the development of the Western architecture as we know today. And for the construction of these buildings, some extremely important technological developments occurred. In Greece, a type of monumental building using stone as its main material would also be developed. The well-known Greek temple (**figure 66**), set on a stepped platform and characterised by a long stone building, created in ashlar masonry[268], surrounded by columns constructed in finely finished stone which create a veranda. The ceiling, also in stone, is under the roofing of timber baulks and frames (trabeated), that supports the tiles made of terracotta or stone. Although in the end of the fourth century BC, there was the use of arches and vaults in some secular buildings, the Greek temple never admitted this type of detail.

Figure 66 The Temple of Hephaistos in Athens, erected 449BC and 415 BC. Source: Encyclopædia Britannica [n/d] [269]

Many master-craftsmen worked in the construction of the Ancient Greek temples, each hired to different jobs in the construction site. The great number of people working at the same time at the site required organisation, probably overseem by a coordinator and by the architect, a professional who dominated different skills, especially in science and technology. But this crowd also got in the way of some methods, like the creation of ramps to lift the large stone blocks used[270].

The blocks used in the Greek temples didn't reach the magnitude of Egyptian ones, but they still weighed several tons. To lift them, they probably used some type of machinery. This "hoist" used wheels and could lift and lower the pieces in the desired position. No Greek representation of this machine was found, but holes in the hidden surface indicated its use.

[268] "'Ashlar' designates both a stone element dressed in order to be given one or several flat surface(s), and the masonry made of such components". Kreimerman, Igor; Devolder, Maud. "Leaving No Ashlar Unturned. Definitions, Technical Features and Regional Synopsis of Cut-Stone Masonry in the Eastern Mediterranean Bronze Age". *Ashlar. Exploring the Materiality of Cut-Stone Masonry in the Eastern Mediterranean Bronze Age*. Vol. 17, Presses Universitaires de Louvain, 2020, p. 7.

[269] Athens: temple of Hephaestus. *Encyclopædia Britannica.* S/d. URL: https://www.britannica.com/topic/Theseum#/media/1/591822/142501. Accessed on 25 July 2023.

[270] Wright, George R.H. *Ancient building technology*. Leiden: Brill., 2000.

These blocks were made of good quality stone, generally limestone and marble, so finely dressed, that the surfaces of each piece touch in its entirety, and mortar was not used. Instead, metal ties and dowels fixed the pieces together, which were bound to the stone using molten lead[271].

The Greek masonry used all the disponible tools of the time, and also developed others. These tools, which before were made of bronze, started being produced in iron material. To cut and dress, rhea mainly used the striking tools (picks, hammers, adzes, axes) and the struck ones (punches, points, chisels, etc). Analysis of tool marks shows that they were responsible for the creation of serrated chisels that were used to work in hard stone, such as marble.

Compared to the later cultures presented, lots is known about the construction of Roman buildings. The Empire, which spread far, constructed buildings in several places, and its construction industry was very powerful – results of the prosperity created by the organised society they enjoyed. Wright (2000, p. 111-112) writes

> Widespread law and order created widespread prosperity and this has always promoted the building industry. In this instance a massive building boom such as the Ancient World had not known previously. In areas with a long anterior history of (monumental) building (e.g. Egypt and the Levant) building activities were intensified and expanded; while in areas where monumental building was previously unknown (e.g. sub-Saharan Africa, North-Western Europe) such activities were established. And these building programmes were equally of two classes: private building and public building. The former witnessed a surge of speculative building development (urban housing) together with the widespread establishment of luxury private dwellings in a scenic environment (= the villa). While public building was funded by the mutual interaction of several agencies: the central government of the Empire; local (provincial and municipal) authorities; and the philanthropy of great magnates.

So, many different kinds of constructions were built, including urban works of engineering, such as bridges, roads, aqueducts, etc.

They continued to use the ashlar masonry, similar to the Greek one, for some kind of buildings, like the temples (**figure 67**), buildings that strength of construction was needed (Triumphal Arches and funerary monuments) and those that were extremely high (aqueducts (**figure 68**) and viaducts, which would be constructed like that until the 19th and 20th century). For their roofs they continued to use the ones presented by the Greeks – trabeated (in temples) and arcuated, used in projects such as Aqueducts.

[271] Ibid.

One of the most important technological developments of the Romans, was probably the Roman concrete, that, according to Wright (2000, p.116), consisted in an evolution of the rubble in mortar. The author explains that

> The basic was the replacement of mud mortar by highly cementitious mortar with enduring properties of cohesion and adhesion – one in fact, which set so hard and firmly that cracks and fractures were more likely to develop across the stone etc. In practice volcanic earth and sand (available in the area about Rome) mixed with lime produced such mortar. Best the facing of the wall was specially selected and/or fashioned to give a uniform closely jointed tegument well keyed into the core fill behind it. Finally the core fill itself was a graded one – the main source was broken up builders rubble, i.e. brick bats and the like all angular interlocking shape. With such materials the rudimentary rubble and mud mortar construction was transformed into monumental construction appropriate to any scale and of such durability that much of it can be seen still standing today, two thousand years or so later.

Figure 67 The *Maison carrée*, Roman temple in the city of Nimes, inaugurated between 4–7 AD. Photo by Dennis Jarvis. Source: Flicker [2014].[272]

Figure 68 *Pont du Gard*, Nîmes, France, built in the middle of the 1st century. Source: Encyclopædia Britannica [s/d].[273]

[272] Jarvis, Dennis. France-002364 - Square House. Flicker. 2014. URL: https://flic.kr/p/qbaAPK. Accessed on: 25 July 2023.

[273] Pont du Gard, Nîmes, France. Encyclopædia Britannica. URL: https://www.britannica.com/technology/aqueduct-engineering#/media/1/31132/120352. Accessed on: 25 July 2023.

Talking about mud bricks, they were the go-to material for most of the modest domestic buildings and some monumental structures in the Mediterranean and Middle East. But evidence of the use of load bearing burnt mud bricks by the Romans only appears in constructions made from the start of *Principiate* period (27 BC to AD 284). The material was also used in concrete construction, not only as a facing material, but to create joints, for example to connect a wall to a roof.

Many roofs in Roman buildings used the concrete to create arcuated structures, like vaults and domes. To create them, they used a "skeleton openwork of wooden centering", where they laid a continuous soffit of flat bricks and mortared it up. These structures were strong enough to support the weight until the curing of the concrete, which was expected to behave as a monolith after consolidation.

As exposed above, the Romans, like the Greeks, used lifting devices, like cranes and hoists. The stone pieces used were not as big as Egyptian ones, but still demanded the use of these equipment. Wright (2000) tells that they were installed in building and quarry sites. It's possible to find a representation of one of these devices in a bas-relief in the province of Caserta, Capua, Italy (**Figure 69**). Dating from the second half of the second century, the image shows a wheel crane erecting a column and a sculptor working on a capital.

Figure 69 Wheel crane erecting a column. Relief in limestone of Lucceius Peculiaris. Second half of the 2nd century A.D. Source: Le Gallery degli Uffizi [s/d]. [274]

In the later antiquity (after the third century AD), some changes in building technologies happened, due to historical factors, like social and political adversities, the change of the capital of the Roman Empire to Byzantium, the political decline of Rome in 4th century AD, the increase of the Importance of the Christian Church in the West in the 5th century AD. Wright (2000, p.131-132) lists the factors in public building that allowed this changes

> (1) Changed significance of old buildings; (a) Despoliation of old buildings for reuse of the fabric as building material. (b) Concern for preservation of old buildings in the civic interest. (c) Legislation

[274] Building a Masterpiece: Trajan's Column. Le Galleri degli Uffizi, 2019. URL: https://www.uffizi.it/en/events/building-a-masterpiece-trajan-s-column#&gid=1&pid=12. Accessed on: 25 July 2023.

against the continued functioning of pagan temples. (d) Conversion of old buildings to new functions.

(2) Pronounced Regional Distinction in building construction. (a) Decline in significance of Rome as a centre of building. (b) More sophisticated building construction in East than in West. (c) Marked difference between the East and the West in the building traditions transmitted to later times.

(3) Basic Changes in Building Technology. (a) Increase in occurrence of load bearing burnt brick construction. (b) Disappearance of Roman Concrete after transfer of capital to Constantinople. (c) Prominence of mortared rubble construction. (d) Limited survival of finely dressed stone (ashlar) construction. (e) New techniques of vaulted construction.

The reuse of the material of buildings impacted quarrying and masonry practices, and in the production of elements like columns, in addition to admission of "heterogeneity and irregularity" in the buildings.

With the advance of Christianity, it became necessary to build large churches to receive their new type of worship. The first Christian buildings (**figure 70**), in the West of the Roman Empire, were similar to the civil assembly halls, called *basilicae* in Latin, which gave rise to the name basilica, still used today for certain churches. They consisted of simple construction with long aisled halls and gable roofs supported by timber frames. The construction was economical, with rubble walls and columns, which were re-purposed from old buildings and arcaded to avoid the need for architrave blocks, tells Wright (2000).

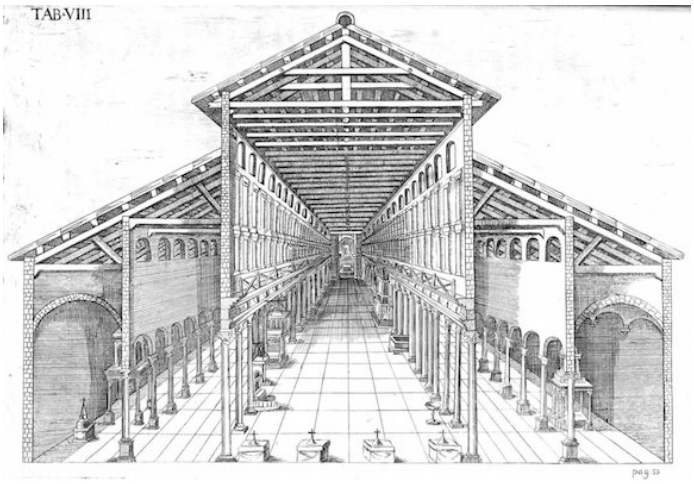

Figure 70 Old St. Peter's Basilica, Rome, engraving by Giovanni Ciampini, *De sacris aedificiis a Constantino Magno constructis: synopsis historica*, 1693. Source: Wikimedia Comon[2014].[275]

At the same time, In the Eastern part of the Empire, a different type of building flourished, one that, contrary to the West, used new material, not reused ones. They used a different technique, not Roman concrete, but, according to small sized mortared rubble work,

[275] Engravings of (old) Saint Peter's Basilica in Rome. Wikimedia. N.d. URL: https://upload.wikimedia.org/wikipedia/commons/8/85/De_sacris_aedificiis_a_Costantino_Magno_constructis_synopsis_historica_pag._33_Tab._VIII.jpg. Accessed on: 25 July 2023.

tells Wright (2000). They also used burnt mud bricks, as a main material or as complementary to stone. They constructed vaulted roofs, which used large flat bricks, inclines in a shallow angle and "held in place by quick setting mortar".

The Hagia Sophia was a large church constructed in the year 537 AD in Constantinople and still standing to this day (**figure 71**). Using a great variety of materials – stone, burnt brick, mortar, iron, wood – the construction could sustain the huge weight of the building, especially its great central dome. In areas of great loads, ashlar masonry of large finely dressed stone blocks are used, but they also use load bearing burnt brick and mortar, to construct walls and in the domes and vaults. Iron, lead, and wood are used to reinforce the structure. Wright (2000) explains, the processes of construction used are not as clear. Some parts are easier to explain, once that they are made simply of brick and mortar, materials that could be easily carried up ramps and ladders. But other materials, like the big marble blocks and monolithic columns, together with those used in the very high heights of the roofing, were probably lifted by cranes and hoists. To create the big domes of the church, probably centring was used. To reach the height of the ceiling, the centring could have being of two ways: a standing centring, built from ground level (what would demand a lot of wood); or the flying centring, constructed high up in the wall "by lodging cantilevered timbers in putlog holes or resting them on corbels and them by skilful carpentry, building around the walls, bridging across spaces and carrying the construction up until the desired form is obtained"[276].

Figure 71 Hagia Sophia, located in Istanbul, Turkey, constructed in the year 537 AD. Photo by Muhammed Enes Yildirim/Anadolu Agency via Getty Images. Source: Fox News [2023][277].

It was a gradual process, the decline of the Roman Empire. They continued to construct elements that would be used for a long time. Like the bridges that would be used for years, after the fall of Rome, being a new one only constructed in the 12th century. Many of their construction, like fortifications, roads, bridges, were destroyed (sometimes by the nomadic

[276] Wright, George R.H. *Ancient building technology*. Leiden: Brill., 2000, p. 142.
[277] Chu, Bonny. The Hagia Sophia: A landmark that was converted from a church to a mosque, to a museum, and then mosque again. *Fox News*, 2023. URL: https://www.foxnews.com/world/hagia-sophia-landmark-converted-church-mosque-museum-mosque-again. Accessed on: 25 July 2023.

tribes that invaded the empire towards the 4th century, sometimes by locals, that destroyed the ways to delay the invaders). According to Cowan (1977, p. 96)

> The effort devoted to defence against raiding tribes left little time and capital for building or repairs. Thus the Roman fire-fighting, water-supply, and sewage disposal systems decayed, and because of a lack of raw materials Roman structures were pillaged for their metal, stone, and brick. New masonry buildings were in modest size and primitive construction.

Early mediaeval Europe saw the loss of knowledge acquired until the Roman times, like the one linked to mining and metalworking. Timber was used a lot in mediaeval times, but they lacked good joints. It was normally used pegs of hardwood, because their iron nails were handmade, being quite expensive, rather soft, and would easily rust. But the material would also be used for wall-framing, method where the spaces between the timber wood be filled or with brick, or with a basket-weaved pattern made of think pieces of wood, later covered by mud, sometimes mixed with animal faeces and fibbers, and finished with blaster of whitewash (very similar to *pau-a-pique*). The roofs also used timber, but in a less advanced way than the Romans.[278]

Here we can add a bit about Eastern construction. The roofs of Japanese and Chinese constructions, done around the same time as the European Middle Age, used to be built also in timber. Their roofs use very intricate joints (**figure 72**), relaying mainly in compression, not requiring any nails, pegs or bindings. In those countries, they still construct with the same technology today – Japanese have a tradition of constructing (and reconstructing) some of its temples using the traditional techniques of construction.

Figure 72 Great Buddha Hall (*Daibutsuden*), in Nara, Japan. It was the world's largest wooden building until 1998. The original structure dates from the 8th century, but it was destroyed twice. Today's temple was built in 1709 using the original techniques. Source: author.

[278] Cowan, Henry. *The Master Builders: A History of Structural and Environmental Design from Ancient Egypt to the Nineteenth Century*. John Willey & Sons: New York, 1977.

In Medieval Europe, brick was not a very used material. It was a manual process and not always cheaper. Cowan (1977, p.119) tells us how it was the very interesting process of production of the material in English mediaeval times

> An English statute of 1477 required that the clay be dug before November 1, and "wrought after March 1. This was apparently intended to utilize the winter frost and rain for breaking down the clay. It was then tended to utilize the winter frost and train for breaking down the clay. It w3as then puddled into a dough with shovels. The bricks were moulded by hand into wooden form without frogs[279] (which were an eighteenth-century invention) and fired with wood or, when available, coal. Because of the amount of labour required, bricks were not necessarily cheaper than natural stone and were used mainly when stone could not be found.

In Italy, that was still quite influenced by Roman tradition, and in the Moorish Iberian Peninsula, bricks continued to be popular. It is only since the twentieth century that the material would start to be more popular around other parts of the continent due to shortage of stones. One example of the use of the material is the Albi Cathedral (**figure 73**) in France, constructed from 1282.

Figure 73 Aldi Cathedral, in France. Constructed beginning in 1282. Photo: Nicolas Janberg. Source: Structurae [2017].[280]

Stone buildings were very common in the Middle Age. Due to the poor quality of the roads at the period, the stones were often extracted from quarries near the construction sites, and the blocks tended to be of a smaller size. Only when there were waterways available, the blocks could be bigger and from distant quarries. But the biggest mediaeval blocks were much smaller than those from Egyptian, Greek, and Roman construction, tells Cowan (1977). Must construction used roughly cut stone blocks and thick mortar joints, being dry construction very rare. But the quality of the stonework would improve and by the 12th century, the Gothic stone masonry was finely finished. Those dressed stones were normally used only on the outside, but the core consisted of rubble in lime mortar, a type of mediaeval concrete.

[279] Frogs are indentations in the center of the brick to accommodate the mortar.
[280] Albi Cathedral, *Structurae*, 2017. URL: https://structurae.net/en/media/283371-albi-cathedral. Accessed on: 26 July 2023.

The mediaeval masons and carpenters used tools similar to the ones used before and those used today. To measure and align the constructions they used compasses, plumb bobs, and knowledge of geometry, that were not completely lost after the fall of the Romans. By the 13th century, practical geometry was probably already dominated by builders. They had hoisting equipment's (**figure 74**), but weaker than those used by ancient Rome and, being this another motive for their stone blocks to be smaller, as said before. To construct tall buildings, like the gothic churches, wood scaffolds were used. Cowan (1977, p. 142) tells us that "Viollet-le-Duc has argued that the walls, piers, and ribs were built with flying scaffolds, that is, scaffolds fixed into holes left in the masonry".

Figure 74 St. Hedwig and the New Convent (detail), unknown artist, Silesia, Poland, 1353. Source: Getty [n.d][281].

The Renaissance changed many aspects of life in Europe – there were cultural, economic, social, scientifical, and artistic changes. In buildings, there was a big shift in the design, which started to be influenced by the classic architecture while rejecting the Gothic. But there was "only a gradual development in the use of materials", informs Cowan (1977, p. 169).

The start point of this change in the society was the learning revival that happened in the 12th and 13th centuries, with contact with Greek books "lost" during earlier mediaeval times. Many texts were translated to Latin, and important Universities were founded in the 13th and 14th centuries. The invention of printing in the 15th century allowed the reproduction of important texts. Europe also became wealthier, with the advent of commerce and manufacturing after the development of cities and the great navigations.

Architecture at the time was already quite advanced, using the expertise acquired during the mediaeval times, but also the Roman knowledge, having the works of Vitruvius as one of the main sources. We can say that the handling of materials improved in the Renaissance when compared with mediaeval times, but it was still not as skilful and prepared as ancient Rome. Lifting equipment, such as the revolving crane, were present in the construction sites, and some

[281] Saint Hedwig and the New Convent (detail). Getty, n.d. URL: https://www.getty.edu/art/exhibitions/building_medieval_world/00437501.html. Accessed on: 27 July 2023.

genius that lived at the time created theories and solutions for the problem of handling materials. Timber still was used in the creation of structures, like roofs, but followed the same concepts of mediaeval times. According to Cowan (1977) "timber joints capable of taking tension certainly existed in fifteenth century"[282].

Although the Renaissance architects had interest in many aspects of Roman construction systems, they did not go back to the use of Roman concrete, using it in very few, specialised occasions. One of the motives for this was the shortage of timber, which was used as formwork for the material. Wood was needed in domestic constructions and in shipbuilding, in addition to as domestic and industrial fuel. The clearing of fields for agriculture also contributed to this shortage. This can also be the reason behind the increase in the use of brick – not very common in mediaeval times, the manufacture of the material advanced in the 15th century. Lastly, the danger of fires worked as an incentive for the abandonment of timber as a main construction material. Stone was also used, still normally quarried near the construction sites.

The Renaissance is famous for its art and many paintings are amazing sources about construction at the time. A great example is Pieter Bruegel the Elder's *The Tower of Babel* (**Figure 75**), dating from about 1525. In it, we see the whole building process, depicted with compelling clarity, as it would have existed in the first quarter of the sixteenth century, and indeed for several centuries before that. Although the building is mythological and impossible, the mode of construction represented in the painting would have been similar for any major building project, such as a cathedral, in mediaeval Europe[283].

Figure 75 1563, Peter Bruegel the Elder, Flemish, 1525-1569, The Tower of Babel, oil on oak panel. Kunsthistorisches Museum, Vienna: kHM-Museumsverband. Source: Web Gallery of Art [n/d].[284]

[282] Cowan, Henry. *The Master Builders: A History of Structural and Environmental Design from Ancient Egypt to the Nineteenth Century*. John Willey & Sons: New York, 1977, p. 2004.
[283] Tutton, Michael. *Construction as Depicted in Western Art: From Antiquity to the Photograph*. Amsterdam University Press, 2021.
[284] The Tower of Babel Web Gallery of Art, n.d. URL: https://www.wga.hu/art/b/bruegel/pieter_e/06/01babel.jpg. Accessed on: 27 July 2023.

Glass was rare in mediaeval times, but the lost Roman technique of glassblowing, that produced clear glass, was rediscovered in Venice in the 15th century and then widespread around Europe.

Although the Renaissance was characterised by a re-valorisation of knowledge, we would see much more advances in science and technology in the eighteenth and nineteenth centuries. Cowan (1977, p. 221) tells that from 1700 to 1815

> The foundations were laid for the mathematical theory of structural design, the first iron structures were built, and concrete was rediscovered. The factory buildings erected at the end of the eighteenth and in the early nineteenth centuries are the prototypes of modern architecture. Entirely new building types, such as hospitals with separate wards and mass-produced houses, appeared during that time. The churches and palaces of the period, however, produced few technical innovations.

Knowledge became well-spread in the 18th century in many parts thanks to many manuals and the encyclopaedias published at the time. Some authors included descriptions of trades, including construction, and of the "mechanical arts". After the French Revolution, the importance of the sciences was evermore emphaticism, starting in France and spreading around Europe. Studies of fields like mathematics, physics, and chemistry become an important part of engineering and architecture, and knowledge was shared among scientists.

A subject fairly studied was the strength of materials. Physicists devised machines that could test the tensile, compressive, and flexural strength of materials such as timber, iron, and glass. The tables with the result data of those tests were published and used by professionals to create, for example, safety reports of buildings. It's also in this period that theories about elasticity of materials and bending appear. These theories, as well as some formulas, like Euler's buckling formula, published in 1757, transformed engineering and architecture, and would be further improved in the 20th century.

A new pratique in construction, consisted in the "systematic use of wrought iron bars embedded in the masonry as *armature*"[285], used by Jacques-Germain Soufflot (1713 – 1780) in the dome of the Church of St. Geneviève (today Panthéon), in Paris. The architect was one of the first to use reinforcement in masonry structures.

More than the French Revolution, the Industrial Revolution – concept which encompasses several social, economic, and technical changes that took place in Europe, starting with England, in the 18th century – greatly affected architecture. The industrialization causes an increase of the population and a growth of the cities, which passed through rapid urbanisation.

[285] Cowan, Henry. *The Master Builders: A History of Structural and Environmental Design from Ancient Egypt to the Nineteenth Century*. John Willey & Sons: New York, 1977, p. 225.

This context demanded new constructions, not only to house the ever-growing number of inhabitants, but of other types of establishments, like factories, railways, hospitals, schools, etc.

The domestic architecture shifts from a "matter of self-help" to a "professional activity", with the mass-production of many working-class houses. According to Cowan (1977, p. 239) "the amenities were deplorably poor by present-day standards but not necessarily by those of the time".

During this period, there was the emergence of the iron frames, which, together with the theory of structural design, modified the appearance and the design of buildings. Three forms of iron were used: wrought iron, that is almost pure iron, which, in ordinary temperatures, it is ductile and when hot, is easy to forge; steel, that contain a small quantity of carbon (0.1% to 1.7%), and is relatively soft when slowly cooled, but very hard when cooled in cold water (quenching); and cast iron, with a bit more of carbon (1.85 to 4.5%), being easily melted and casted, but brittle and with little ductility. Although these materials were already known before, there was the development of new processes that reduced the cost of production as well as improved the quality and supply. The first structures to use iron as main structural material were bridges. In the end of the 18th century, wrought iron was used to construct roofs.

But the big novelty was the use of cast-iron framing for new factories, firstly in England. The main reason for that was creating fireproof buildings to receive the textile mills, which could be a fire hazard due to the method of power transmission and all the cotton there stocked. Later, the material would be used for other types of buildings.

The 20th century would see the "renaissance of concrete", as put by Cowan (1977, p. 255). The material, used tirelessly in the Roman period, was used as foundation material in the Middle Ages, and as core for piers in the Renaissance, was once again used as main material. Since the mid-18th century, some natural cements (those produced by burning a raw material, with no mix of two separate materials) were developed in England (1759), France (1796), and the United States (1818). The first artificial cement (Portland cement) was made in 1811, by mixing two separate materials, limestone and argillaceous earth or clay. "The materials are available in unlimited quantities in almost every country, and Portland cement has now become the cheapest of all manufactured products per unit weight" explains Cowan (1977, p. 260). The name Portland is probably due to the comparasion, made by British civil engineer John Smeaton (1724 – 1792), with the Portland stone, in terms of strength and durability. The modern concrete, which consisted of the mixture of pebbles with modern cement, was first used by Smeaton in 1760. But the use material would be largely spread only in the mid-19th century.

But the use of concrete didn't stop the use of more traditional techniques, like those bricks and even mud, like the *pisé de terre* in France, or rammed earth, that consists in ramming

wet unburned clay or chalk into formworks, which are removed later. Concrete would be used also with the support of formworks, without reinforcement, creating like this monolithic.

Steel started to be a mass production material at the end of the 19th century, first for railroad rails, and later also for buildings. But not only the spread of the use of steel allowed the rise of the construction, but also the development of vertical transportation. Elisha Graves Otis (1811 – 1861) built, in 1852, the first fall-safe hoisting system, called elevator, making possible the hoisting of materials to big heights during the construction of tall buildings. The first steel-framed high-rise building was built by the American architect-engineer William Le Baron Jenney (1832 – 1907) in 1885. The Home Insurance Building (**figure 76**), in Chicago, had 10 floors and steel columns replacing the masonry weight bearing walls, common until the period, allowing big openings[286].

Figure 76 The Home Insurance Building, in Chicago, constructed in 1884. Source: The architecture professor [2020].[287]

The many storeyed building required better foundations, due to the huge weight of these constructions. Builders started to create caisson foundations, where they dug shafts, normally cylindrical, then braced them with board sheathing and filled it with concrete. It created a strong, solid pier, capable of receive the weight of the tall building.

The construction sites now counted with internal-combustion engine, created by Nikolaus Otto, in 1876. This ended the need for human and animal power for tasks that are too heavy, like lifting materials. Another steel technology created at the end of the 19th century

[286] Kayvani, Kourosh. Design of high-rise buildings: past, present and future, 23rd Australasian Conference on the Mechanics of Structures and Materials, vol. I, Byron Bay, NSW, 9-12 December, Southern Cross University, Lismore, 2014.
[287] Larson. Gerald R. The Home Insurance Building, *The architecture professor*, 2020. URL: https://thearchitectureprofessor.com/2020/10/23/8-13-the-home-insurance-building. Accessed on: 27 July 2023.

was the electric arc welding. With these technologies, long spans constructions were possible with the use of welded rigid frames.

Undoubtedly, one of the most important developments in the history of construction and architecture is reinforced concrete. A type of it was used in 1848, by the inventor French Josef Lambot, who constructed a rowboat by pouring concrete over a grid of thin iron wires. After that, many experiences of this idea were made. The first house constructed with reinforced concrete was built between 1871 and 1876 by William E. Ward, in New York. Several tests about the capacities and behaviours of the composite were made in different countries and it was used in different contexts, such as the construction of bridges. The beginning of the 20th century was marked by a very daring construction – in 1903, mixing the techniques developed by different engineers and builders, it was constructed in Cincinnati, USA, the first reinforced concrete high-rise building, known as the Ingal Building, now called the Transit Building[288]. Condit (1968, p. 13) describes the sixteen storey building

> The structural frame of the building is a virtual monolith of solid columns, footings, foundation walls, girders, beams, floor and roof slabs, and spandrel panels, the last of which functioned as part of the load-bearing system above the level of the third floor. Monolithic action was secured as nearly as possible by carefully bonding freshly poured concrete to partly set concrete at the joints left from successive daily operations. The reinforcing throughout all framing members and all foundations consists of Ransome's square-twisted steel bars, so located as to take all tensile and shearing stresses, thus allowing the concrete to develop its full compressive stress. In the case of the columns, however, the compressive action of the concrete is supplemented by groups of heavy round rods, four to a column.

The end of the 19th century and the 20th century still had several technological advances, like the creation of electric-powered equipment and tools, the spread of the production and use of glass, and new development in already used materials, for example, metals and concrete. The last, together with the reinforced concrete, was extensively used by the architects of modernism, who used these materials to create buildings with freestanding spaces and glass curtain walls. In the middle of the 20th century, the first all glass curtain walls buildings were designed, with the pioneer being the United Nations building, construct in New York City in 1949.

Although there were many advances in constructions, many buildings, mainly the domestic ones, still use similar materials to those used in past periods, like bricks, timber, stones, plaster, etc. Nowadays, these materials are manufactured, and easier to obtain. Also, new material, like plastic and other new composites are available.

[288] Condit, Carl W. The First Reinforced-Concrete Skyscraper: The Ingalls Building in Cincinnati and Its Place in Structural History. *Technology and Culture*, Vol. 9, No. 1, p. 1-33, 1968.

It's possible to find countries that still use the traditional techniques, erecting their vernacular architecture to these days and using materials like mud. Being part of their culture, these constructions are very adapted to their regions, making sense to still be relevant to these societies.

Nowadays, a movement tries to achieve more sustainable ways of construction, with the development of materials and techniques that are not hazardous for the environment and for the social-economic progress of modern society. A lot of the research in the area is aimed at use of recycled and "green" materials. In addition, there are also a number of studies that show the efficacy of traditional techniques, mainly the ones using earth, for the construction of highly functional and sustainable buildings.

3.3. Portuguese construction techniques and its influence in colonial Brazil

The architecture in Portugal and, later, in its American colony, was the result of a slow sociocultural process of development by the Portuguese society, resulting from the miscegenation of the peoples of the region with other cultures they had contact, during subsequent invasions – Romans, Visigoths, and Arabs – and as part of the maritime trade.

As told before, the history of construction of Portugal dates back to pprehistoric times. One of the most ancient monolithic sites of Europe is the Almendres Cromlechs, near the city of Évora. The region was conquered by Romans, staying under its rule from the 2nd century BC to the 1st century AD. As explained before, the Romans dominated very advanced techniques of construction. This allowed them to leave a big mark in the architecture of Portugal, construction temples, walls, and aqueducts, and employing their knowledge in these endeavours. Weimer (2005, p.82) says that "It was probably the Romans who introduced the technique of *taipa* (*opus formaceus*) and adobe (*later*) to the Peninsula. From the East, they brought ceramic production techniques (bricks and tiles) and perfected their production"[289].

But the introduction of earth as main construction material in Portugal could be also due to the Arabic influence. The Iberic Peninsula was dominated by them for almost seven centuries and they left marks in many aspects of Portuguese culture, including in architecture and art. The Arabs have a big tradition on earth construction, which they maintain until today. In Portugal, they occupied mainly in the south of the country, an area without a big supply of other construction materials. One of the main techniques they used in Portugal (and that would be

[289] "*Possivelmente foram os romanos que introduziram a técnica da taipa (opus formaceus) e do adobe (later) na Península. Do Oriente, trouxeram as técnicas de produção de cerâmica (tijolos e telhas) e aperfeiçoaram sua produção*". [Our translation]. Weimer, Günter. *Arquitetura popular brasileira*. São Paulo: Martins Fontes, 2005. 333p.

taken to Brazil later and tirelessly used), is the *taipa de pilão* (a type of rammed earth). Toledo (1983, p. 258) explains that "this technique, as we know, was practised in the south of the Iberian Peninsula, in the region of major Arab influence, mainly the ones from north Africa. These rammed earth walls of sixty to eighty centimetres thick, if protected from the rain, resisted indefinitely"[290].

The domination by Islamic people would also influence the position of houses in the street, their plans, the rooms functions, the material, and many other aspects. According to Pinto (1954, p.24)

> If the Berber Arabic peoples left traces of their influence in certain aspects of Portuguese civil architecture, it is clear that many of these aspects passed to Brazil with the blood, ideas, and customs of the colonisers. The *muxarabis*[291] are undoubtedly the most expressive vestiges of this acculturation. The *muxarabi* was a cultural complex to which were attached social customs of Moorish origin, which were soon absorbed in Brazil with greater or lesser intensity - the habit of women not appearing to strangers, going out into the street with their faces covered, living with their legs crossed on the carpet, not frequenting certain taboo places in the house.[292]

The Visigoths stayed in the Iberic Peninsula between circa 400 AD to 700 AD, and possibly brought to Portugal the timber framing technique, in which the walls are treated like independent plans, reinforced by several timber pieces, or at least contributed to the dissemination of an already used technique. But in the country, this technique was modified, due to roman influence. In there, only the framework of the walls and of the openings (windows and doors) was kept visible, while the other timber pieces were covered with mortar. This type of construction would be the main one in residence buildings in Minas Gerais, as we saw in the last chapter.

The use of stones in Portuguese construction was also common. The country had a great supply of good stones for construction, so it favoured the use of the material. In the north of the country, in the region of Minho and Douro, it was very common to use granite, abundant

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[290] "*Essa técnica, como sabemos, era praticada no sul da península Ibérica, na região de maior influência dos árabes, principalmente os do norte da África. Essas paredes de terra socada de sessenta a oitenta centímetros de espessura, se protegidas da chuva, resistem indefinidamente. Grossas paredes e longos beirais são características essenciais da taipa de pilão."* [Our translation]. Toledo, Benedito Lima de. "Do Século XVI ao Início do Século XIX: Maneirismo, Barroco e Rococó". In Zanini, Walter. *História Geral da Arte No Brasil*. Vol. I, São Paulo, Instituto Walther Moreira Salles, p. 89-319, 1983.

[291] The *muxarabi* is a kind of wooden grid typically used in Arabic construction, as a closure for windows and balconies. It allows ventilation and illumination, while hiding the residents from people outside.

[292] "*Se os povos berbero-arábicos deixaram traços de sua influência em certos aspectos da arquitetura civil portuguesa, torna-se evidente que muitos desses aspectos passaram ao Brasil, com o sangue, as ideias e os costumes dos colonizadores. Os muxarabis são, sem dúvida, os mais expressivos vestígios dessa aculturação. O muxarabi era um complexo cultural, a que estavam ligados costumes sociais de formação mourisca, logo absorvidos no Brasil com maior ou menor intensidade, - o hábito de a mulher não aparecer aos estranhos, de sair à rua com o rosto coberto, de viver com as pernas cruzadas no tapete, de não frequentar certos lugares tabus da casa.*"[Our translation]. Pinto, Estevão. *Muxarabis & balcões e outros ensaios*. São Paulo, Brasiliana, 1958, p.24.

material in the area. In there, it was typical for religious, administrative, and military constructions to be erected in stone. The country used the material in different ways – dry masonry or with the use of mortar, faced or natural, for flooring, foundations, walls, and even roofs. In Brazil, the material was not as used as in Portugal, being more common the use in some states, like Minas Gerais, while in other areas it was predominant the use of mud and timber.

As happened in Portugal, these techniques and characteristics were adapted to the reality of the colony. The geology, the climate, the supply and type of the materials, the economy, the workforce, and many other aspects, helped to mould the construction systems that arrive from the metropole, to construct the colonial cities in Brazil. Although, at first, there was an attempt to impose the European customs on the colony, including on the architecture, the population instinctively selected and adapted the characteristics that were most favourable to the different regions of the huge country "always searching empirically for the ideal solution in relation to the hot and extremely humid climates in the North, hot and dry in the Northeast, elsewhere alternating heat and cold, hot days with cool nights and even freezing, as in São Paulo"[293], as told by Lemos (1979, p.16).

The indigenous people from the pre-Portuguese times constructed (or are still constructing), their dwellings using different techniques, depending on the group or of the region they were settled (**figure 77**). They used materials like wood, mud, and vegetal fibbers to construct the houses, also using mud techniques, like the wattle daub (or *pau-a-pique*). Some tribes maintained the same techniques and materials until this day, others were influenced by the technology of the Portuguese colonisers. But they also influenced the architecture in the colony, as with the roofs made with vegetal fibres, even employed in the first buildings erected in Ouro Preto. Or the ones found by Mawe (1822, p. 313), that he described.

> The habitations, which are about one hundred in number, are built detached, and are generally of a circular form, with very high thatched roofs, like African huts, but much larger. The walls are formed of upright stakes, interwoven with small branches, and coated with clay inside and out.

[293]"*Sempre procurando empiricamente a solução ideal em relação aos climas quentes e extremamente úmidos no Norte, quentes e secos no Nordeste, em outros lugares alternando calor e frio, dias quentes com noites frescas e até mesmo gélidas, como em São Paulo*." [Our translation] Lemos, Carlos Alberto Cerqueira. Arquitetura Brasileira. São Paulo: Ed. da Universidade de São Paulo, 1979. 158p.

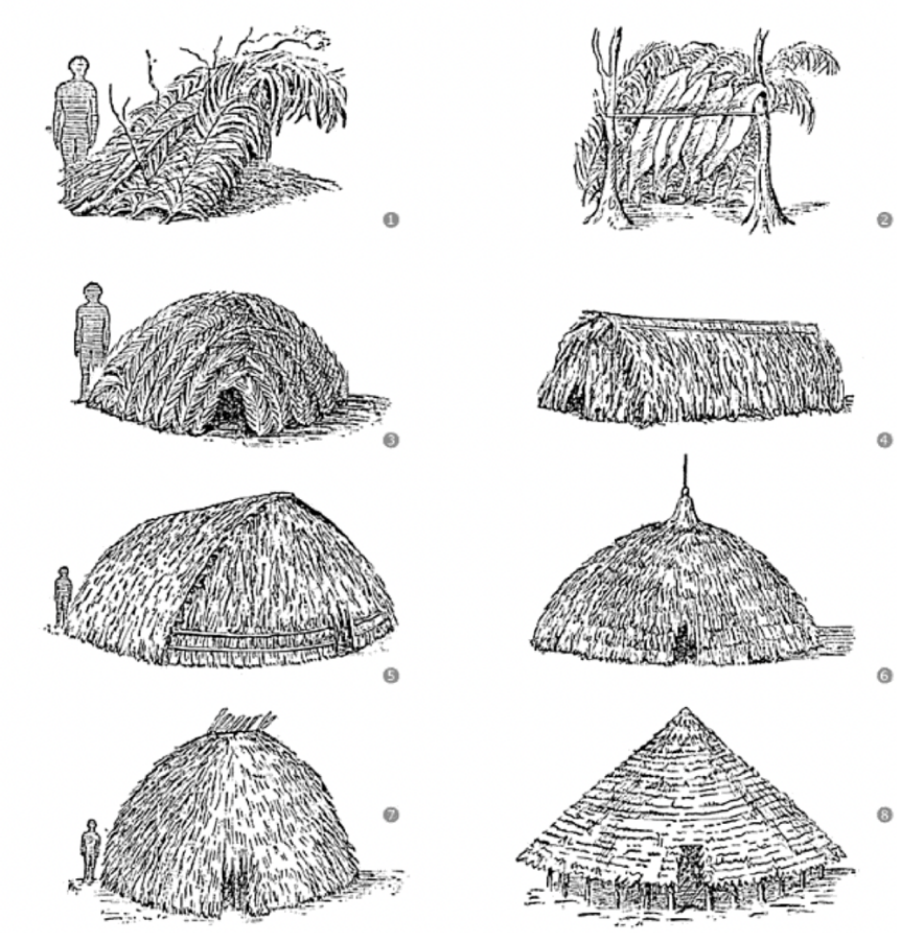

Figure 77 This figure shows different types of dwellings built by different tribes of Brazil. 1 – *Nambiquara* tribal dwellings; 2 – *Puri* tribal dwellings; 3 – *Botocudo* tribal dwellings; 4 – *Carajá* tribal dwellings; 5 – *Pareci* tribal dwellings; 6 – *Pimenta* Bueno tribal dwellings; 7 – *Xingu* tribal dwellings; 8 – *Guiana* tribal dwellings. Source: Faria [1951] apud Portocarrero [2010].[294]

After they were brought and adapted, the building technologies in the colony hardly developed, staying almost the same until after the end of the colonial period – they continue to be "primitive", describes Reis Filhos (2000). The author explains that one of the aspects of the construction in Brazil that supported this primitivism was the use of slave labour, for which no form of training was offered. When there is the use of a paid job, there is an incentive for the "improvement", for the search for better training.

And we can add the lack of any industry to the production of materials. As the metropole established an extractive society in its American lands, all efforts were directed towards exploitation, with no interest in developing other types of industry. Manufactured construction materials were also more expensive. Thus, builders used materials that were readily and easily available, usually those that were close to the building site.

With this context, it is easy to understand the building systems that developed in Minas Gerais, mainly in the city of Ouro Preto.

[294] Portocarrero, José Afonso Botura. Tecnologia indígena em Mato Grosso: Habitação. Cuiabá, Entrelinhas, 2010.

3.4. Construction techniques in Ouro Preto in the 18th century

As already mentioned, when taken to Brazil, Portuguese techniques had to be adapted, according to the reality of each region of the big colony. In addition, each builder brought his own knowledge and techniques.

> Each master, official or apprentice - mason, tinsmith, carpenter, bricklayer - brought with him the memory of his province and the experience of his trade, hence the simultaneous adoption, right from the start, of the different architectural features proper to each way of building: rammed earth, hedge, or hand masonry - pau-a-pique -, adobe, brick masonry, stone, and lime.[295]

That way, the vernacular construction of Ouro Preto, had its techniques defined by the materials available and the worker's background.

3.4.1. The techniques

Several techniques were used in the constructions of Ouro Preto. Because the area is geologically rich and has many different types of stone, this material was widely used in Ouro Preto, different from other areas of Minas Gerais and of the country, which didn't have such a good lithic reserve. One the first techniques used (according to ruins of the first settlements of the city) was the *pedra seca* (dry-stone masonry) (**figure 78**) According to Vasconcelos (1979), this technique used stones of different sizes, in their "natural state" (not worked) and created thick walls in relation to their height (from 0.60 to 1.00 metres). They were not common in residences, being normally used in dividing walls of terrains.

Figure 78 Wall made of *pedra seca* (dry-stone masonry) in Ouro Preto. Photo: author, 2018.

Another type of stone masonry is the *pedra e barro* (stone and mud) (**figure 79**), in which is employed mud as mortar and the stones can be natural or worked to have a better finish.

[295] "*Cada mestre, oficial ou aprendiz – pedreiro, taipeiro, carpinteiro, alvanéu – trazia consigo a lembrança da sua província e a experiência do seu ofício, daí a simultânea adoção, logo de início, das diferenciadas feições arquitetônicas próprias de casa modo de construir: a taipa de pilão, a taipa de sebe, ou de mão – pau-a-pique –, o adobe, a alvenaria de tijolo, a pedra e cal*." Costa, Lucio. *Arquitetura*. Rio de Janeiro, Bloch-FENAME, 1980, p. 36.

These were also very thick, with between 0.50 and 1.00 metres, being used for structural walls, as well as pillars and arcades. They would usually receive a covering, made of lime and sand, to protect them against the weather, since the mud mortar can be easily damaged.

Figure 79 Wall made of *pedra e barro* and without the wall plaster in a house of Ouro Preto. Photo by Elio Moroni Filho. Source: Moroni Filho [2020].[296]

The *pedra e cal* (stone and lime) masonry was very important in Ouro Preto too, being the main technique used in the construction of public buildings, like the one that today houses the *Museu da Inconfidência*, where we see a mixture of the technique with finely stonework (*cantaria*) (**figure 80**). It's very similar to the *pedra e barro*, also being employed in structural walls, pillars, and arcades, but it takes lime and sand in the mortar mixture instead of earth. At first, due to the difficulty of produce lime, the *pedra e barro* was more used, but as it become easier to have access to the material, the *pedra e cal* became the preferred option.

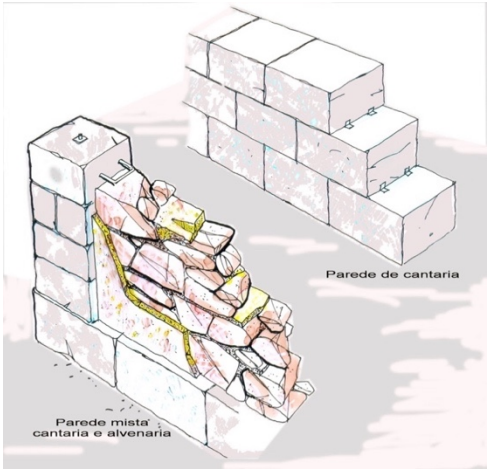

Figure 80 Example of the use of the *pedra e cal* masonry and the *cantaria.* Source: Colin [2010]. [297]

The stones were also employed as finely worked blocks, as structural parts, like the lintels and sills, or as finishing elements, such as, stairs, cornerstones, foundations, and cymatium, like observed in the *Museu da Inconfidência* building (**figure 81**). The stonework in

[296] Moroni Filho, Elio. "Minas Gerais em pedra e barro. Construções em adobe, pau a pique e taipa de pilão|". *Arquiteturismo*, São Paulo, 13, n. 154-155.02, 2020. Published online: January 2020. URL: https://vitruvius.com.br/revistas/read/arquiteturismo/13.154/7613. Accessed on: 30 July 2023.

[297] Colin, Sílvio. "Técnicas construtivas do período colonial – I". Coisas da Arquitetura, 2010. URL: https://coisasdaarquitetura.wordpress.com/2010/09/06/tecnicas-construtivas-do-periodo-colonial-i/. Accessed on: 30 July 2023.

Ouro Preto was admirable, with epitome in the sculptural work of Aleijadinho, as seen in the doorway of the Saint Francis Church (**figure 82**).

Figure 81 *Pedra e cal* masonry, used in the *Museu da Inconfidência.* We can as well see stones used in other elements, like the stairs, columns, lintels, sills, etc. Source: Gagliardi, 2019.[298]

Figure 82 Doorway of the Saint Francis Church of Ouro Preto. Photo by Rogério P. D. Luz. Source: Luz [2012].[299]

"Post-and-beam" or "timber framing" was a structural system used in Ouro Preto that employed hardwood to create a frame, later sealed with a non-structural wall. According to Vasconcellos (1979), the posts, with square sections of around a hand span, were embedded in the floor or as was more common in Vila Rica, supported over stone masonry foundations. In the posts, the beans are joined to support the non-structural walls and the flooring, while the beans that will support the ceiling and roofs are seated over the posts. Other timber pieces can

[298] Gagliardi, Ignacio. "Museu da Inconfidência em Ouro Preto, Minas Gerais – Parte I". Ilumine o Projeto. 2019. URL: http://ilumineoprojeto.com/museu-da-inconfidencia-em-ouro-preto-minas-gerais-parte-i/. Accessed on: 30 July 2023.

[299] Luz, P. D. Rogério. "Ouro Preto: Igreja de São Francisco de Assis". Crônicas Macaenses, 2019. URL: https://cronicasmacaenses.com/2012/08/18/ouro-preto-igreja-de-sao-francisco-de-assis/. Accessed on: 30 July 2023.

be introduced to help support the loads of the construction. In the city, where it was common to build these structures on top of stone masonry, it was common to use diagonal pieces for reinforcement, which was called *cruz de Santo André* or *aspas francesas* (**figure 83**). This created a structure very similar to the *gaiola pombalina,* widely used in the rebuilding of Lisbon after the 1755 earthquake. Vasconcellos (1979) concludes that "when masonry pillars are used, these structures don't differ much from wooden ones, except for the replacement of the posts with the aforementioned masonry pillars and sometimes the purlins with arches.".

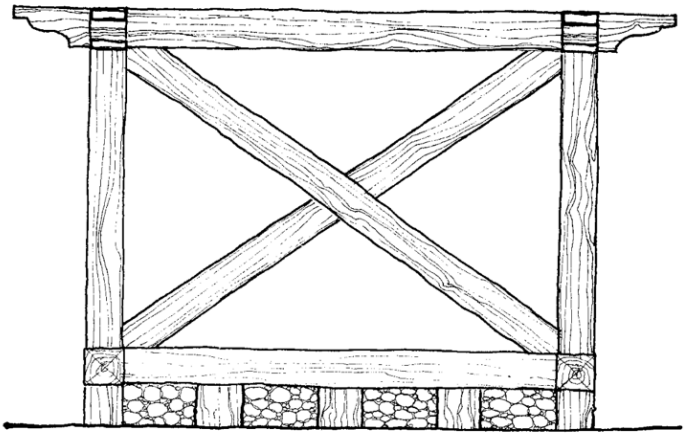

Figure 83 *Cruz de Santo André* or *aspas francesas*, structures used in the construction of Ouro Preto buildings. Source: Vasconcellos [1979].[300]

As said before, the structures could have arcades, like the ones found in the *Casa dos Contos* (**figure 84**), an important building in Ouro Preto. The building is the only residential construction with monumental features of the city, and today houses an archive and a museum.

Figure 84 One of the arcades of Casa dos Contos, in Ouro Preto. Photo by Antonio Correa. Source: Soares [2020][301].

Different types of non-structural walls were used to seal the above-mentioned structures. The *pau-a-pique* (**figure 85**) was the most common type of non-structural wall in Vila Rica. In it, a weft of wood is made with vertical round and thicker wooden poles, fixed in

[300] "Quando são usados pilares de alvenaria, estas estruturas não diferem muito das de madeira a não ser pela substituição dos esteios pelos citados pilares de alvenaria, às vezes, das madres por arcadas." Vasconcellos, Sylvio de. Arquitetura no Brasil: sistemas construtivos. Belo Horizonte, UFMG, 1979.
[301] Soares, Wendell. "Casa dos Contos: a história brasileira através do dinheiro". Abrace o mundo, 2020. URL: https://www.abraceomundo.com/casa-dos-contos-ouro-preto/. Accessed on: 01 August 2023.

the beans and horizontal and thinner poles, normally tied with fibres or leather strips, to the vertical ones. These interlocking voids are covered with thrown wet mud. Vasconcellos (1979, p.51) says that "*pau-a-pique* walls are used both externally and internally, but they are preferred inside buildings or on raised floors. It is the system of choice for fences due to its lightness, thinness, economy, and speed of construction.[302]

Figure 85 Pau-a-pique used to seal the wood structure of a house in Ouro Preto. Source: Machado [2009][303].

The structural walls could be sealed using bricks and adobes was sometimes used in Ouro Preto, mainly when the *cruz de Santo André* or *aspas francesas* is employed. In the interior of the constructions, other non-structural walls were used. The *tabique* was a type of very simple wood boards wall and the *estuque* was similar to the *pau-a-pique*, but used only a weft made of wooden sticks, not using thicker poles, or fibrous species. O *tabique* was used in Ouro Preto, sometimes to close the gaps left by the side of the roofs, and sometimes as wall panelling, as we'll see below. The *estuque* walls were not very common in the city, but the technique was commonly used in decorated ceilings and cymatium (**figure 86**).

A type of structural wall that was used in Ouro Preto was the *taipa de pilão* (rammed earth), employed even in big constructions, like in the Our Lady of Pilar Parish Church. This system creates solid, monolithic walls. The technique consists in the creation of *taipais* – wooden moulds, where well-mixed mud is placed and rammed by feet or by a pestle (*pilão* in Portuguese). But, according to Salgado (2010), this was not very functional for the city, because of the geology of the area, very rocky, making the use of big quantities of adequate clay difficult as well as the fixing of the *taipais*. Besides that, the climate is susceptible to major storms that eroded the rammed earth.

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[302] "*Empregam-se as paredes de pau-a-pique, tanto externa como internamente, preferindo-se, porém, o seu uso no interior das edificações ou nos pavimentos elevados. É, por excelência, o sistema indicado para as vedações por sua leveza, pouca espessura, economia e rapidez de construção*." Vasconcellos, Sylvio de. *Arquitetura no Brasil: sistemas construtivos.* Belo Horizonte, UFMG, 1979, p. 51.

[303] Machado, Rogerio. "Ouro Preto - Pau-a-pique 2009". Flicker, 2009. URL: https://www.flickr.com/photos/machadobrazil/3980941431/in/photostream/. Accessed on: 01 August 2023.

Figure 86 Use of the estoque in a cymatium in Ouro Preto. Source: Martins [2010][304].

"The walls are finished in a variety of ways, not only the wall cladding but also the corbelling and treatment of the cornerstones"[305], explains Vasconcellos (1979). Normally in the colony, including Ouro Preto, the plaster was made of mud, mixed with sand and lime or not. Another very common ingredient was the cattle dung, known for a long time in many cultures for its agglutinating qualities. Wooden boards, the above mentioned *tabiques,* were also used as wall covering, like seen in an old photo of Ouro Preto, taken by Luis Fontana in the first half of the 20th century (**figure 87**).

Figure 87 House in Ouro Preto, that used to be covered by *tabiques*. Photo by Luis Fontana, taken between 1923 and 1948. Source: Martins [2010][306].

Several types of flooring were used: earthen floor is a type of floorings in which the natural floor is rammed to create a uniform superficies; stone slabs with one dressed face were also used to create the flooring, laid using mud mortar; rolled pebbles, use round stones set in the earth, usually employed in external floors (we can see it in the figure 84 in the floor of the

[304] Martins, Régis Eduardo. "A Habitação Vernacular no Séc. XVIII: Residências Mineiras do Período Colonial" Bachelor conclusion monograph (Bachelor in Conservation and Restoration). Instituto Federal Minas Gerais – Campus Ouro Preto, 2010.

[305] "*As vedações recebem acabamentos diversos, não só pelos revestimentos de paredes como pelos coroamentos e tratamento dos cunhais."* Vasconcellos, Sylvio de. *Arquitetura no Brasil: sistemas construtivos.* Belo Horizonte, UFMG, 1979, p. 62.

[306] Martins, Régis Eduardo. "A Habitação Vernacular no Séc. XVIII: Residências Mineiras do Período Colonial" Bachelor conclusion monograph (Bachelor in Conservation and Restoration). Instituto Federal Minas Gerais – Campus Ouro Preto, 2010.

Casa dos Contos; wooden boards were very common in flooring, especially for second and third floors, being set over wood timbers fixed in the beans.

Also, the ceilings were presented in several types in Ouro Preto: *taquara* ceilings, the most simple ones, are made of long bamboo sticks woven mats; the most common was the one that used wooden planks, that could be assembled in different ways, creating different decorating patterns or even painted, like in many churches; the *gamela*, made of five wood panels, with four set inclined in the sides and one horizontal in the middle, also decorated with paintings sometimes; framed panels, were a mix of techniques, with the creation wood panels, framed and very decorated (**figure 88**).

Figure 88 Framed panel ceiling found in Casa dos Contos. Source: Viajento [2018][307].

The openings (doors and windows) were composed of beams, sills, and jambs. The jambs could prolong until the beans of the structure, creating an extra stability. The beans and sills could also be prolonged in a way to create two or more openings, using only one timber, which was more economical (**figure 89**). These elements could be of timber or worked stone. When in timber, they are normally painted, giving the aesthetic so famous of Ouro Preto's architecture.

Figure 89 Example of the openings of a house, with their painted beams, sills, and jambs. It is possible to observe the elongated beans and jambs, and the use of the same bean for different openings. Source: Martins [2010][308].

[307] Viajento, *Ouro Preto – Casa dos Contos*. 2018. URL: https://viajento.com/2018/02/09/ouro-preto-casa-dos-contos/. Accessed on: 02 August 2023.
[308] Martins, Régis Eduardo. "A Habitação Vernacular no Séc. XVIII: Residências Mineiras do Período Colonial" Bachelor conclusion monography (Bachelor in Conservation and Restoration). Instituto Federal Minas Gerais – Campus Ouro Preto, 2010.

The roofs in Ouro Preto (**figure 90**) were done with timber structures or round wooden poles, depending on the function. The joinery in the wooden roof structures in Brazil were good, due to the quality of the Portuguese carpentry (probably highly evolved due to the highly specialised shipbuilding in the country). The cover was done with ceramic roof tiles. They were normally gable roofs, since the position of the construction and the fact that many of them were constructed without any space from the neighbouring houses. This gable roof allowed the rainwater to be directed to the street and to the back of the house. They also had protrusions to give more protection to the walls, with sizes defined by the height of the wall to be protected. According to Vasconcellos (1979), these eaves can be: "made of wood with an apparent structure - *cachorrada* - when they are called eaves; profiled, when they are called cymatium, and made of the following materials: wood; masonry and plaster; stonework; stucco"[309]. The *cachorro*, a timber that supports the coverture, is a remarkable characteristic of the buildings in Ouro Preto, even being installed in buildings of other periods, to imitateRestoration the colonial style. But this characteristic could also be covered by the cymatium.

Figure 90 Roofs in Ouro Preto. Source: author.

3.4.2. Builders and master craftsmen

In Portugal, in end of the 16th century, the "craftsmen" (carpenters, bricklayers, stonemasons, shoemakers, blacksmiths, tailors, carpenters, barbers, potters and other manual trades), were still organised in trade guilts, similar to the ones in the Middle Age. defined the rules, the hierarchy, and the teaching of these professions, controlling the labour supply and the quality and the prices of the services. In Vila Rica, there was not such a severe and organised context, only being necessary a licence for a worker to practise the profession. Nevertheless, many of them didn't own these authorisations.

[309] "*De madeira com estrutura aparente - cachorrada - quando são chamados beirais; perfiladas, quando são chamadas cimalhas, sendo dos seguintes materiais: madeiras; alvenaria e massa; cantaria ou ensilaria; estuque*." Vasconcellos, Sylvio de. *Arquitetura no Brasil: sistemas construtivos.* Belo Horizonte, UFMG, 1979, p. 62.

Many of the craftsmen moved to Vila Rica looking for a better life in the thriving city. They went there, taking their regional knowledge, and sometimes had to start from more humble jobs until they had the opportunity to buy slaves and tools, to work on their own workshops or *fábrica*. Silva (2007, p. 91) explains

> The term *fábricas* was part of the labour universe transposed to the colony by these Portuguese builders. Used to refer to the idea of a house or workshop, related to mechanical work, the term is used to designate the group of workers, equipment, materials, and infrastructure that involved the official masons and carpenters in their constructions. It better expresses the nature of the builders' work, because in each project, the spheres of both the workshop and the shop converged, i.e., all the training, production and commercialisation was carried out within the factory, which could be moved or divided according to the owner's needs.[310]

These workshops normally had slaves as the main workers. Unlike other areas of the country, in Vila Rica there wasn't a limit for the number of slaves a workshop could have. Silva (2007) tells that most of the workshops had less than ten slaves, but some had around thirty. These slavered workers could learn the craft and receive the titles, such as mason, carpenter, blacksmith, etc. Sadly, these workers were treated as tools, being sold at the will of their owners. However, contrary to other slave owners, who built in Vila Rica, they also carried out their manual labour, working side by side with their "employees". According to Silva (2007, p. 97) "owning slaves did not a priori mean that builders were averse to manual labour, as many masons, carpenters and stonemasons acquired captives to complement and reinforce the workforce in the factories, which sometimes also included the participation of the owners"[311].

When it came to public works projects, factories were contracted through a kind of bidding process, and the *fábrica* that charged the least was chosen. If the deadlines and requirements were not met, the *fábrica* owner would be fined and could even be imprisoned. Guarantors were needed for these contracts, so the builders maintained good relations with individuals who could fulfil this role. They also tried to maintain positive relations with the politicians in the town hall, which favoured them greatly. Builders who carried out a lot of public works became very wealthy.

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[310] "*O termo fábrica fazia parte do universo laboral transposto para a Colônia por esses construtores portugueses. Usado para aferir a idéia de casa ou de oficina, relacionada ao fazer mecânico, o termo nos serve para designar o conjunto de trabalhadores, equipamentos, materiais e infra-estrutura que envolvia os oficiais pedreiros e carpinteiros em suas construções. Ele expressa melhor a natureza do trabalho dos construtores, pois, em cada obra, convergiam as esferas tanto da oficina quanto da loja, isto é, toda a parte de treinamento, produção e comercialização era realizada dentro da fábrica, que podia ser deslocada ou dividida de acordo com as necessidades do proprietário*." Silva, Fabiano Gomes da. "Pedra e cal: os construtores de Vila Rica noo século XVIII (1730-1800)". Dissertation (Masters in history). FAFICH, Universidade Federal de Minas Gerais, 2007, p. 91.

[311] "*A posse de escravos não significava, a priori, uma aversão ao trabalho manual pelos construtores, pois muitos pedreiros, carpinteiros e canteiros adquiriram cativos para complementar e reforçar a força de trabalho das fábricas, o que, às vezes, também incluía a participação dos proprietários."* Ibid., p. 97.

Silva (2007, p.115) concludes that

> In short, access to the labour market in the construction sector in Vila Rica was restricted, especially when it came to bidding for monumental works, which involved higher earnings. Few builders managed to set up safety nets and form factories with specialised slaves, equipment, and materials, leaving the majority to work as licensed or unlicensed journeymen. This limited group of monopolist builders took flights beyond the mechanical condition they enjoyed in the Kingdom, especially at a time of expanded opportunities in the slave mining economy.[312]

Although the builders received the wealth, documents show that the slaves that worked in some *fábricas*, were very prepared, being the ones that were in charge of the construction work. The expert slaves were of extreme importance for the construction sites, not only because of their manual labour, but because they worked as teachers and translators to other slaves. For those reasons, they were more valorised, then an "average" slave. They were treated well, compared to the ones that worked in other trades and other parts of the country. According to Silva (2007), the register shows that the owner of the workshops expended money for the food and health of its captives. Also, in Minas Gerais, slaves were not normally violently punished as in other states of the colony. Another "privilege" of expert slaves was the opportunity to acquire their freedom. They could buy it (normally paying the debt with work for its older owner) or receive it for free (normally after the death of the owner).

There were also the freemen that worked as builders and in other trades. These men were white men that didn't have the condition to constitute workshops, slaves that were freed and also, those people of colour, normally children of white men with their slaves, that were already born free (what was very common in the colonial society of Brazil). These workers offered their skills and received for that. It must be highlighted that these individuals sometimes also owned slaves of their own, regardless of their origin or colour.

3.4.3. Materials

About the materials used in the constructions of Ouro Preto, we must remember that due to some facts, such as the difficulty of arrival in the region of Minas in the XVIII century and the non-existence of factories dedicated to the production of construction materials, since most

[312] "*Em síntese, o acesso ao mercado de trabalho no setor construtivo em Vila Rica era restrito, especialmente nas arrematações das obras monumentais, que envolviam maiores ganhos. Poucos construtores conseguiram constituir redes de proteção e formar fábrica com escravos especializados, equipamentos e materiais, restando à maioria o trabalho como jornaleiro licenciado/examinado ou não. Esse limitado grupo de construtores monopolistas alçou vôos para além da condição mecânica que usufruíam no Reino, principalmente numa conjuntura de oportunidades dilatadas na economia escravista mineradora*". Ibid, p. 115.

of the labour force of the region was destined to mining, most of the materials were usually acquired in the surroundings of the city and even at the construction site.

As for the stones, the most used in the constructions was the quartzite, also called *Itacolomi* stone. Used in blocks or in extracted formations, it can have bluish, pink, yellow, and green colours, depending on the elements present in their composition. Soapstone was used for decoration and in detail. Like quartzite, its colouration varies according to its composition, and can be, for example, grey, blue, or green. According to Vasconcellos (2011) "they are talcous stones, compact, more or less homogeneous, offering good resistance to the efforts to which they are submitted (pillars, lintels, wedges etc.) soft to work, not subject, as the quartzites, to the decomposition, favoured by the humidity of its faces exposed to the time".

Due to the rocky constitution of the area, vegetation was not so abundant and propitious to be used in the constructions. Thus, the first buildings of Ouro Preto were built of timber, but soon the high-quality wood was exhausted in the region, so the use of stones began, especially in main walls and pillars, and there were even laws prohibiting cutting of nearby forests. According to Vasconcellos (2011), in constructions, there was always a preference for hardwood, but, with the exception of a few species (*Ocotea catharinensis*, *Melanoxylon brauna*, *Plathymenia*, etc.), the trees found around the city were small and not very valuable. Thus, the very good quality timber was extracted from distant areas and transported there, being sold at high prices. They were also only cut in certain times of the month and when it was dry. It took some time to be able to use the timber, due to the time it took to dry. This forced the use of these woods only in some props and purlins, what was not a problem, since the constructive system of independent structure does not demand a great use of wood of great quality, allowing the use of wood of any species. When used in walls, the timber was reserved to interior partitions and raised floors due to its weight.

Fibrous plant species, such as *Vellozia squamata*, palm trees, *Guadua weberbaueri* (taquara), and ferns, were employed in the hedges to make up the armour of the walls and stucco. Other fibres, such as vines, were used to tie the poles to the prop sticks. The *taquara* is also used to construct linings that can have simple or elaborate designs. In more humble dwellings some other plants are used, like the palm trees that were employed as roofs.

Earth was also used a lot, as in *taipa de pilão*, *pau-a-pique*, in revetments, as mortar in masonry. When used as mortar, it could be acquired at the construction site itself. But if used in more specialised works, which needed good resistance and durability, the clay had to have a specific composition, with a certain amount of sand and binder. The appropriate consistency could be achieved with the addition of straw or cattle dung, and it should be homogeneously mixed. The most suitable soils are those with a pinkish-orange colour, which were obtained in

particular regions. The sand used was obtained from natural deposits formed by the degradation of quartzite, which was normally found in the area of the building site itself.

Lime was an essential material in the constructions of the period, both for painting and as an ingredient in the preparation of mortars and plasters. In the vicinity of Vila Rica there were no limestone deposits favourable for the manufacture of the white lime, especially used in painting. The black lime, effective for the use in mortars, but not adequate for painting, was produced in closer areas. The white lime, used in painting, came from other distant parts, often being used only as a final plaster, or substituted by *tabatinga*, a kind of white clay. Tiles, so important for Portuguese architecture and even in some Brazilian colonial cities of the coast, were hardly used in Ouro Preto, due to the difficulty of transport of this material to the city.

Another important material was iron, which, during the 18th century, was usually obtained by importation or by primary processes. According to Vasconcellos (2011), the manufacturing of the material "was hampered throughout the colony, by the profits brought by import duties, the lack of capable techniques and the fear of razing the forests". Thus, the iron used to meet the architectural needs of Vila Rica was imported from Europe until the country was able to meet its own demand. The iron elements, such as "locks, (...) hinges, bolts, working tools, nails" were often produced in a rudimentary way, but with great quality.

Vasconcellos (2011) made a kind of inventory of some elements that were imported to Vila Rica when he states that

> Moreover, not few materials were imported to the constructions, from the “English locks”, which appear frequently in the auctions of the time, to the ceramic tiles, the crystals and porcelain for the pines, the lead, the old leaf, the Scots pine, the paints, the kid leather for glue, the glass, to which would join later the sanitary ware, the tiles, etc. It is clear that in the early days they had to be reduced to the essential minimum, increasing as needs grew and the roads improved.

3.5. Conclusion

This chapter presented the long history of construction, from the dawn of humanity to the present day, showing how rich and diverse this history is. It also delves into the construction techniques of Ouro Preto, discussing, as well, the materials and the labourers.

With this chapter, we could conclude that construction techniques have been created all over the world, each place moulding them in the way that best suits its reality. But also, different people have influenced the construction of other groups, being influenced as well. The evolution is not linear, occurring more quickly in some places, and sometimes even going backwards.

In Vila Rica, architecture very much followed Portuguese techniques, as in the rest of the colony, but adapted to the materials, climate, and geology of the region. Construction was also heavily influenced by the social and economic reality of the region. As a slave-owning region, slave labour was very important in the construction of Ouro Preto.

CHAPTER 4.PROPOSAL FOR VALORISATION OF TRADITIONAL BUILDING TECHNIQUES

Résumé du chapitre

Dans ce chapitre, nous présenterons un cas d'étude, le Musée des Outils de Menuiserie Takenaka, qui, bien qu'étant un musée sur les outils, traite des techniques traditionnelles utilisées dans l'architecture japonaise tout au long de l'histoire et constitue un excellent exemple pour notre proposition.

Dans la deuxième partie, nous présenterons une proposition qui pourrait être utilisée comme instrument de valorisation des techniques traditionnelles à Ouro Preto. Cette proposition vise à présenter les techniques à la communauté en montrant leur importance en tant que patrimoine immatériel et pour la conservation du patrimoine matériel de la ville. Par la suite, cette approche pourra être étendue comme modèle à d'autres villes avec une influence architecturale portugaise, notamment au Brésil.

4.1. Introduction

After all we discussed in the latter chapters, we developed the idea and the importance of the traditional techniques for the preservation of Ouro Preto's heritage. In this chapter, we are going to talk about an engaging example of a museum in Japan, dedicated to carpentry tools used in the construction of buildings in the country. The museum presents traditional techniques used in Japanese architecture throughout history and is a great example for our proposal.

In the second part of the chapter, we will present a proposal, which could be used as an instrument for the valorisation of the traditional techniques in Ouro Preto. This proposal aims to present the techniques to the community showing their importance as intangible heritage and for the conservation of the material heritage of the city. Eventually, this approach can be expanded as a model to other cities with Portuguese architectural influence, namely in Brazil.

4.2. Case study

As a case study, we will present the Takenaka Carpentry Tools Museum (**figure 91**), located in Kobe, Japan, and which I had the privilege to visit in April 2023, during my mobility in the University of Kagoshima, part of the TPTI program. The museum, established in 1984 by the Takenaka Corporation, has as its goal the preservation of an important part of the heritage of Japan that can be in danger due new technologies – the carpenter's tools. The museum, which

will celebrate its 40 years in 2024, allows visitors to interact with the exposition using their five senses.

Figure 91 Takenaka Carpentry Tools Museum, Kobe, Japan. Photo: author.

Japanese architecture used wood as its main material throughout history, using it exclusively until the Meiji era (1868 – 1912), when the country, until the moment an isolated feudal society, opened up to modernization and the Western influence. Therefore, carpentry and wooden architecture in the country developed into advanced technologies and particular beauty – much thanks to the tools. Due to technological development in construction and carpentry, lots of carpenters are substituting hand tools with electrical ones. These instruments, normally used until damaged and often seen as trivial and not worthy of preservation, but which play an important part in the heritage of the country, are in danger of disappearing.

The Takenaka Carpentry Tools Museum was established in 1984, in Nakayamate, Chuo-ku, Kobe, but moved to a new space, near Shin-Kobe Station, in 2014. It is a project of the Takenaka Corporation, a construction company in operation since 1610. The company, founded in Nagoya, moved to Kobe in 1899, and its owner, Toemon Takenaka, started collecting tools. By the time the museum was open, it already had 10,000 items, including tools, picture scrolls and documents. Despite being a small museum, with only 10,000 visitors a year, it is a well-recognised museum of architectural culture. Created as a company museum, it became a foundation in 1989, and in 2012 was elected a foundation of public interest.[313]

Today the main collection has more than 35,000 items, being (as of January 2020): 18,270 carpentry tools; 9,357 historical and reference documents; 481 felling and lumbering; 857 tools audio and visual material; 777 blacksmith tools; 1,280 replicas and specimens; 4,422 other tools; and 245 folklore materials. Of those, around 1,000 items are part of the permanent exhibition. It also hosts several events, like temporary exhibitions (**figure 92**), workshops, lectures, seminars, etc.[314]

[313] Sakamoto, Tadasuke. Gokan ni hibiku tenji de jōhō o tsutaeru takenaka daiku dōgukan no torikumi [Efforts of the Takenaka Carpentry Tools Museum to convey information through exhibits that resonate with the five senses]. *Jōhō no Kagaku to Gijutsu*, 69(2), 2019, p. 78-83.

[314] About us. *Takenaka Carpentry Tools Museum*, n.d. URL: https://www.dougukan.jp/about_us?lang=en Accessedon : 01 July 2023.

Figure 92 Temporary exposition in the Takenaka Carpentry Tools Museum, in April 2023. Photo: author.

The building occupied by the museum since 2014 was constructed specially to receive the collection (**figure 93**). One of the concepts of its design is to connect the visitors with the nature that surrounds the museum that is located at the foot of Mount Rokko. The building has one floor above ground, and the two others are below ground, avoiding the hiding of the green scenario around. That way, the construction building blends well with the beautiful area. A second concept was to link tradition and innovation, by creating a steel-framed reinforced concrete structure (as it is located in a fire protection zone), but with the interior and also the roof made in traditional techniques and materials, exhibiting the craftsmanship of carpenters, plasterers, and roof tile makers. This allows visitors to enjoy the mixture of newer and traditional techniques, and also materials, like steel, glass, and wood, that create a large space that plays with natural light and shadows (**figure 94**). All of these characteristics, together with the green seen through the large windows, creates a perfect place of contemplation for visitors.[315]


Figure 93 Building of the Takenaka Carpentry Tools Museum. Source Takenaka [n.d][316]. Accessed on: 09 Jun 2023.

[315]. Sakamoto, Tadasuke. Gokan ni hibiku tenji de jōhō o tsutaeru takenaka daiku dōgukan no torikumi [Efforts of the Takenaka Carpentry Tools Museum to convey information through exhibits that resonate with the five senses]. *Jōhō no Kagaku to Gijutsu*, 69(2), 2019, p. 78-83.

[316] Museum Architecture. Takenaka Carpentry Tools Museum, n.d. URL: https://www.dougukan.jp/about_architecture?lang=en. Accessed on: 09 Jun 2023

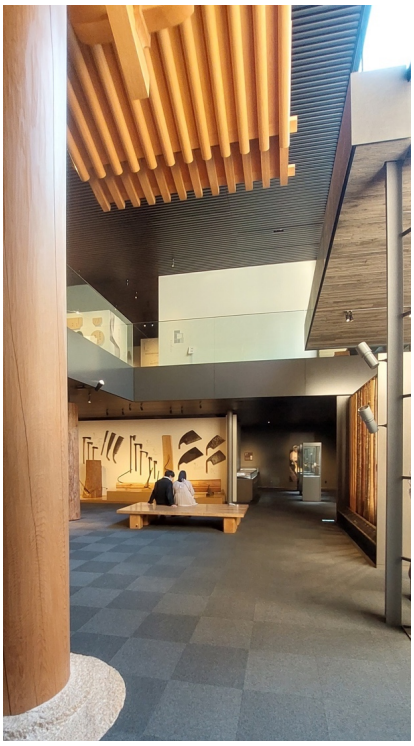


Figure 94 Interior of the Takenaka Carpentry Tools Museum showing different materials, Kobe, Japan. Photo: author.

According to Sakamoto (2019, p.79), the concept of the permanent exhibition of Takenaka Carpentry Tools Museum "deeper, easier-to-understand exhibits that resonate with the senses".[317] With this idea, the museum designed an exhibition that allows visitors to interact in different and intuitive ways with the collection, learning a lot. This makes the museum interesting not only to people interested in architecture, construction, and woodworking, but to everyone, including children.

The museum is paid, but very affordable – 700 yen (around 5 euros) for adults, with discounts for seniors, college and high school students and groups, and free for elementary and junior high school students, preschool children, and people with physical disability and one accompanying adult. The museum is also fully accessible, providing ramps, lifts, and accessible toilets. They offer free audio guides in Japanese, English, Chinese, and Korean which can be accessed by the visitor's own mobile phone using the Wi-Fi provided by the museum. The first floor of the museum houses temporary exhibitions, while the permanent one occupies the two other floors. On the last floor, we find the workshop room and the library.

The permanent exposition is divided by subjects: "A Journey through History," "Tools and Handwork," "Tools Around the World", "Exquisite Works of Master Craftsmen", "The Traditional Beauty of Japanese *Wa*", and "Learning from a Master Carpenter". The exhibition is created in a way that allows the visitor to use the senses – you can not only, look at the objects, images, and texts, but watch videos, listen to audios, feel the texture, and smell the

[317] "「より深く，よりわかりやすく 五感に響く展示」" [Our Translation]. Ibid., p. 79.

aromas. Besides that, you can have first-hand experience with the techniques behind the craft of woodworking.

As other museums, many objects – mainly carpentry tools, of course – are presented in the Takenaka Carpentry Tools Museum. They are exhibited in glass cases (**figure 95**) of different sizes or in exposed displays, allowing a closer look at the pieces. As these objects can be dangerous (some tools have sharp blades), they can be partially covered in acrylic cases (**figure 96**). The mode of use of the instruments is presented not only by images and videos, but also by the way they are displayed, as if they were being used (**figure 97**). The use of different resources makes the understanding and learning more dynamic, deep, and interesting.

Figure 95 Glass case displays different carpentry tools. Photo: author.

Figure 96 Tools displayed in different forms, exposed, with blades secured, and in glass cases. Drawings in the display explain the use and characteristics. of the tools.

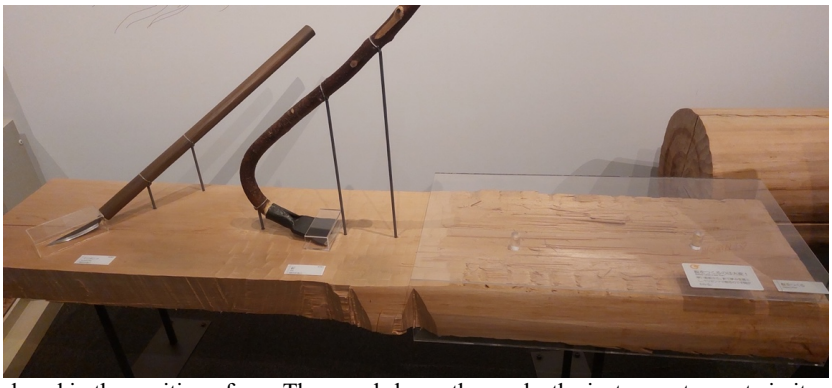


Figure 97 Tools displayed in the position of use. The wood shows the marks the instruments create in its superficies. As these are instruments with sharp blades, the cutting edges were protected with acrylic cases. Photo: author.

Images and videos are used profusely in the exposition. Unlike many museums, the texts are kept to a minimum, while images and videos are used to explain what it's displayed. The images – drawings and photos – explain the history of the carpentry and the use of the

tools. The images are presented in the walls behind the displays (**figure 98**), but also in some displays (**figure 96**, above). Some of them are reproductions of art works, which had a big importance in the exposition, as we will see next. The videos are presented in touch-screen terminals (**figure 99**), very intuitive and easy to use. These terminals present several short videos, which can be chosen by the visitor according to what they want to learn more. These videos, which are very interesting, are also disponible in the library of the museum and on the website, together with complementary material.

Figure 98 Photo and drawings used as pictorial explanation for the exposition. Photo: author.

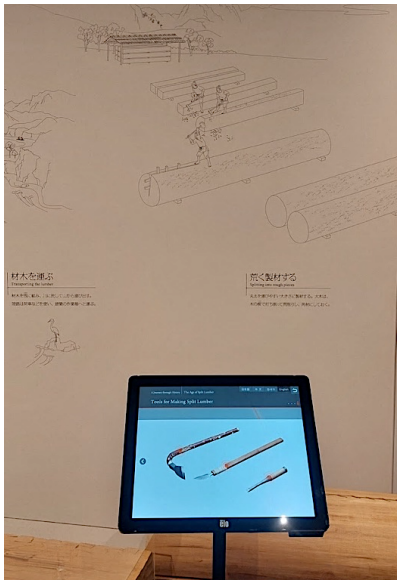


Figure 99 Touch-screen terminal used to present explanatory videos and further material. Photo: author.

The touch-screen terminals are used in more very creative ways. As said before, the use of work arts, like picture scrolls, were extremely important for the construction of this exposition. As explained in the audio guide, much of the information about the techniques and the tools used were learned from art works. One of the best fonts of information about construction in Japan, is the "*Matsuzaki tenjin Engi Emaki*" (**figure 100**) a picture scroll from

1311 which represents a construction site from the Kamamura period (1185 – 1333).[318] In the scroll, it is possible to identify the tools, the techniques, the materials, the transportation, the typology of architecture and even the social interactions in a construction site of the period. A very entertaining way found by the museum to present the information found in this document was to create an animated presentation of the scroll. It can be navigated by a touch-screen panel (**figure 101**), where you can choose one of the craftsmen and, in the bigger screen (**figure 102**), the characters will move, showing how they work and explain it in his "own voice".

Figure 100 Matsuzaki tenjin Engi Emaki, Vol. 4, 3rd section, 1311, Okusho, Hofu Tenmangu Shrine, Yamagushi Prefecture. Source: Akao, Kenzo et al., 2021.

Figure 101 Touch screen terminal to navigate the picture scroll Matsuzaki tenjin Engi Emaki. Photo: author.

Figure 102 Animated presentation of the picture scroll "Matsuzaki tenjin Engi Emaki". Photo: author.

[318] Akao, Kenzo et al. (2021) "*Takenaka Carpentry Tools Museum. Permanent Exhibitions Catalog*". 4th ed. Takenaka Carpentry Tools Foundation, Kobe.

Another interactive way they found was to use the touch-screen terminals. Visitors can learn more about *kiku-jutsu*, a technique used by carpenters to work the wood, particularly for projecting eaves, that has been developed since the twelfth century (**figure 103**). While the terminal teaches you how to calculate this very geometric technique, you can try it in glass top, using a carpenter square and a marker.

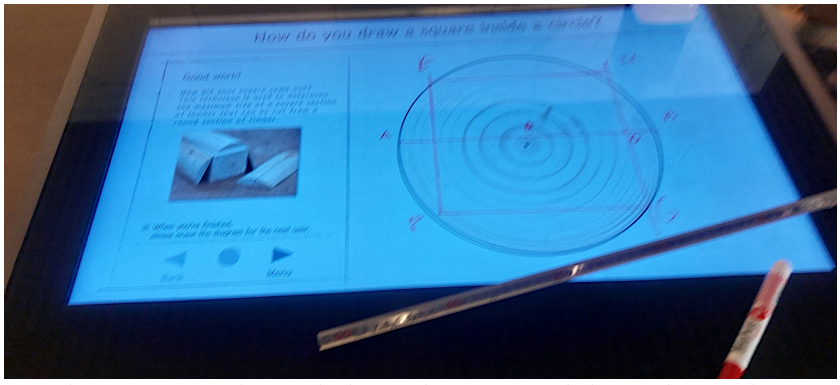


Figure 103 Interactive terminal to teach carpentry techniques. Photo: author.

The museum uses a feature known as hands-on exhibits, which allows visitors to touch and interact with objects from the exposition. Facsimile of books (**figure 104**) that talk about the techniques and designs of carpenters are presented. Made of a tear-resistant paper, visitors can leaf through to learn more. Other exhibits can be hold, to see how they are used, their weight, their texture, etc. The section that talks about wood joinery, a very important and interesting part of Japanese architecture, allowed people to test the different types of joins (**figure 105**).

Figure 104 Facsimile of books that can be touched by visitors, together with the pieces represented in them. Photo: author.

The museum does not focus on the tools and techniques, but also in the materials and the carpenters. We find many explanations about wood and other materials used in Japanese architecture. A special part of the exhibit is one that allows visitors to discover the scents of each tree used in Japan architecture through smelling their wood shavings (**figure 106**). Other is the presentation of the tools created by Japanese blacksmiths, showing how they created instruments that are not only utilitarian but also works of art, full of beauty (**figure 107**).

Figure 105 Kid interacts with the pieces of wood joinery. Photo: author.

Figure 106 Space where visitors can experience the difference in the types of wood, including the smell. Photo: author.

Figure 107 Presentation of the tools created by the master blacksmith Chiyozuru Korehide (1874~1957). Photo: author.

To showcase the beauty and mastery of Japanese carpentry, many full-scale architectural models are displayed. In the middle of the building, standing in a size of two floors, is a wood

model of one of the columns (**figure 108**) of the *Toshodaiji* Golden Hall, a Buddhist temple constructed in the city of Nara, that is a National Treasure and part of the UNESCO World Heritage List. From the second floor is possible to observe the work of the carpenters of the past, that constructed the temple more than 1200 years ago. The magnitude of traditional Japanese architecture is also presented in the life-size model of a teahouse (**figure 109**), a typical Japanese building. While the first model shows the grandiosity of their techniques, in this one is possible to see the how delicate they could also be. It's possible to enter the model (after taking off your shoes), and observe the different materials and techniques used in this type of construction.

Figure 108 model of one of the columns of the *Toshodaiji* Golden Hall, one of the oldest temples in Japan. Photo: author.

Figure 109 Model of a Japanese teahouse, where visitors can enter and see the materials and techniques used. Photo: author.

As said before, the museum has a workshop room (**figure 110**) where classes are offered to the community. They have different courses, on different subjects of carpentry and open to people of all ages. The room is very well equipped, and the teachers are volunteers. On the site, most of the workshops offered seem to charge only the price of the materials.

Figure 110 Workshop room where people in the community can learn techniques of carpentry. Photo: author.

The museum offers so much, in a way that is both informative and entertaining, making a subject that seems interesting only to carpentry and architecture enthusiasts, appealing to all types of visitors. It is a good example of niche museums which expand the idea of heritage, including different types of objects, but also highlighting the value of the intangible elements, like the traditional *savoir-faire*. Japan is famous for its respect for the traditional knowledge and intangible heritage, and it has a lot to teach to other countries, including Brazil.

4.3. Proposal

After all we presented in this work, and the example analysed in the case study, we concluded that a good way to present the value of the traditional techniques to the community and visitors, would be the creation of an exhibition, an educational or museal space, about the traditional techniques of construction used in Ouro Preto in the 18th century.[319]

[319] We believe that the best way to call this proposed space is "exhibition" because other terms, such as "educational space" or "museal space", can mean different things in the English word. Oftem, ehxibitions can be understood as temporary events, but its meaning can be much broader. So, we use the term exhibition, following de definition given by André Desvallées and François Mairesse, in their book Key Concepts of Museology The exhibition, which defines it as "understood as the container or the place where the contents are on display (just as the museum appears both as a function and as a building) is characterised not by the architecture of this space but by the place itself. Even though the exhibition appears to be one of the characteristics of museums, exhibition thus has a far broader reach because it can also be set up by a profit-making organisation (market, store, art gallery). It can be organised in an enclosed space, but also in the open air (in a park or a street) or in situ, that is to say without moving the objects from their original sites natural, historical or archaeological sites. Seen from this perspective exhibition areas are defined not only by the container and the contents but also by the users – visitors and museum professionals – that is to say the people who enter this specific area and share in the general experience of the other visitors at the exhibition. The place of the exhibition is thus a specific place of social interaction, the effects of which can be assessed." Desvallées, A. and Mairesse, F. Key concepts of Museology. París: Armand Colin, 2010, p. 34.

For the creation of this exhibition, we will follow the guidelines dictated by the Statute of Museums, a document established by Law No 11904 of 14 January 2009. In this document, we find concepts and principles that must be followed by Brazilian museums. Our project does not have the ambition (at the moment) to create a museum, a project that should be much larger and costly at the moment for the subject addressed. But following the guidelines of the Statute of Museums, can facilitate the transformation of this project into a museum. Also, the first paragraph of Article 1º of the Statute of Museums, states that "this Law shall apply to museological institutions and processes focused on working with cultural heritage and the territory with a view to cultural and socio-economic development and community participation"[320].

This exhibition will have as a mission the preservation of the immaterial heritage of Ouro Preto, represented by the traditional techniques used in the construction of its architectural ensemble. It will also be a space of dissemination of knowledge, related to traditional techniques, materials, and workers, with the intention of teaching about the importance and the value of these know-how for the history and the preservation of the material heritage of the city. With the exhibition, we hope to contribute not only to the valorisation of the techniques, but also to the sociocultural development of the city and the country. For the future, we hope the project could be a reference, in Brazil and in other Lusophony countries, about traditional techniques. But to achieve all these goals, the exhibition will respect a set of concepts, such as, the respect to the diversity to its public, the constant interaction and talk with the community and the respect to the cultural and natural heritage.

In the construction and the implementation of an exhibition, collaboration is essential. To produce this exhibition will be essential the creation of an interdisciplinary team, with architects, museologists, conservators, restorers, builders, historians, anthropologists, and other professionals who can take a differentiated view of heritage and traditional construction techniques, especially those of Ouro Preto. These professionals would work in different areas of the exhibition, as experts, consultants, designers, educators, interpreters, staff, etc. Ouro Preto offers diverse associations, schools and institutes that could have personnel suitable to be part of this project.

Many institutions could supply workforce to support this project. First of all, the governmental agencies connected to the safeguard of heritage in the city – IPHAN, IEPHA, the

[320] "*Enquadrar-se-ão nesta Lei as instituições e os processos museológicos voltados para o trabalho com o patrimônio cultural e o território visando ao desenvolvimento cultural e socioeconômico e à participação das comunidades."* Legislação sobre museus: Lei no. 11,904, de 14 de janeiro de 2009, que institui O estatuto de museus, Lei no 11,906, de 20 de janeiro de 2009, Que Cria o Instituto brasileiro de museus (ibram), E legislação correlata (2012).

city hall, etc. They all count with interdisciplinary teams, full of x skilled professionals. But a very stimulating idea would be the use of students and new graduates from IFMG and UFOP. Both are well respected institutions that offer courses in architecture, civil construction, heritage preservation, museology, and tourism. That way, the project could could provide an opportunity of work to new professionals. Another establishment that prepares professionals who could be part of our personnel is the School of Traditional Crafts of Mariana (EOTM). There, masters of trades such as carpentry, masonry, stonemasonry, etc. are prepared to meet the demand for these professionals in the city. These would be essential for the execution of the exhibition.

Like any other endeavour, this project will have costs, but as it is only a proposal, we will not go into the costs and budgets. But it is important that we point out certain funding possibilities. The government and some institutions offer various ways of funding through the tax incentive laws, funds, public calls, etc. for which the project can be presented. Some of them are:

- The *Rouanet* Law (n. 8.313/199) – also known as the Federal Law of Incentive to Culture, the *Rouanet* law (named after Sérgio Paulo Rouanet, who created the law during the government of President Fernando Collor in the 1990s) is a mechanism to incentivise cultural projects through the conversion of the income tax of individuals and companies to projects supported by the government.[321]
- State Law for Cultural Incentives (LEIC) (Resolução SEC nº 136/2018) – It is a state mechanism to support the production of artistic and cultural projects in which every taxpayer who financially supports a cultural project may deduct the amount from the Tax on Operations Related to the Circulation of Goods and on the Provision of Interstate and Intermunicipal Transport and Communication Services (ICMS).[322]
- National Culture Fund (FNC) - cultural promotion fund, of direct investment of resources from the Union budget, in projects selected through public notices approved by the Ministry of Tourism.[323]

[321] Nohara, I.P. and Fireman, A.L.A. Desenvolvimento pelo incentivo à cultura: papel da arte e vicissitudes da utilização da Lei Rouanet. *Revista de Direito Econômico e Socioambiental*, 7(2), 2016, p.198-220.
[322] Silva, L.A.D.S. *Lei Estadual de incentivo à Cultura - LEIC*, *SECULT*. [n.d] URL: https://www.secult.mg.gov.br/documentos/lei-estadual-de-incentivo-a-cultura-leic. Accessed: 01 July 2023.
[323] *Comissão do Fundo Nacional de Cultura*, *Instituto Brasileiro de Museus – Ibram*. [n.d.] URL: https://www.gov.br/museus/pt-br/acesso-a-informacao/participacao-social/conselhos-e-orgaos-colegiados/comissao-do-fundo-nacional-de-cultura Accessed: 01 July 2023.

- National Development Bank (BNDES) public calls – a federal public company whose role is to finance projects from all economic spheres in Brazil in order to promote the country's socio-cultural development.
- Brazilian Institute of Museums (Ibram) public calls - authority responsible for the supervision and administration of national museums.

These are some of the public initiatives. We can, as well, seek partnerships with private companies, especially those linked to construction and restoration. The project can also be part of other cultural projects already in place, such as the *Museu da Inconfidência*, the EOTM, the *Fundação de Artes de Ouro Preto* (FAOP), etc.

An important aspect to discuss is the space where the exhibition will be presented. This space should be preferably in the historical centre, in one of the already existing buildings. Preferably an ample space that could house the different spaces of the exhibition. Ouro Preto has several exhibition spaces, such as the Manoel da Costa Athaide Room, in the Anexo I of the Museu da Inconfidência, The Arts and Conventions Center of the UFOP, the Nello Nuno Art Gallery of FAOP, the Cláudio Manoel da Costa Room, in the Museu dos Contos, end many others. These spaces have different sizes and characteristics, but only receive temporary exhibitions. It's preferable to look for public buildings that are being misused. As last resorts, rent a private property or the construction of a space to receive the exhibition. This last option would probably be very costly.

One of the intentions of the exhibition will be to attract a distinctive group, welcoming people from the community and tourists. To learn more about museum visitors in Ouro Preto, we will use data on visitors of the Museu dos Inconfidentes, the city's main museological institution. According to the last Museological Plan (2019-2022), published in 2018, the museum received 178,185 visitors that year, the biggest number since 1945, when they started to count it. It was the second most visited museum managed by Ibram in 2018. From those that visit the museum in 2017, impressive 82% are students and only 5% are from the community[324]. Unfortunately, this shows an exclusion of the community from this cultural space, a problem faced in the whole country. We believe that to change this context it is necessary to create an exhibition that would also attract the residents, and to that we should invest in new ways of designing it. The Museu da Inconfidência received a new museography project in 2006, but it still uses the old system, counting only with objects in display. They even have a small room dedicated to the evolution of the civil construction in Ouro Preto (**figure 111**), composed of a few pieces, such as roof tiles, tools, and some drawings.

[324] Museu da Inconfidência, *Plano Museológico do Museu da Inconfidência 2019-2022,* Ministério da Cidadania e Ação Social Secretaria Especial da Cultura; Instituto Brasileiro de Museus – Ibram. 2018.

Figure 111 Exhibition on civil construction in Ouro Preto at the Museu da Inconfidência. Source: Alves [2014].[325]

As the case study, the exhibition should be very engaging and interactive. The idea of "engaging the senses" should also be followed, to construct an experience attractive to all kinds of public, not only those interested in the subject or students (like what is happening in the *Museu da Incofindência*). The exhibition should be formed by graphic communication (photos, drawings, small texts, etc.), audio-visual (videos, audios, touch screens, etc.), objects on display, interactive exhibits, exhibition models mobile technology (audio and video guide, augmented reality).

Thinking about the main goals of the exhibition, which is the creation of awareness about the importance of the traditional techniques in the community, we believe that some aspects of the topic should be addressed – the history, the nature of the techniques, the materials, the tools, and the masters. So, we will divide the exposition in three parts: the history, the techniques, and the people. The first one will introduce the subject and the history of the city, its architecture, and its construction in a very succinct way. In the second, the practical part will be presented, with the explanation of the techniques, the used material, and the tools. The last part will present aspects of the life of the builders in the 18th century, but also some masters that still possess this knowledge nowadays. These three parts together should tell a story and guide the spectator through the exhibition.

The first part of the exhibition will present the history of the city in parallel with the history of its architecture, showing the typology of the houses constructed during the 18th century. It would be interesting to present also what happened during the 19th and 20th century,

[325] Alves, R. da S, "Lendo o museu: relações entre a expografia e a historiografia no Museu da Inconfidência-Ouro Preto/MG". 2014. Dissertation (Master in History), Universidade Federal de Minas Gerais, 2014.

to create a complete context of the city Ouro Preto, to present the history of the "patrimonisation" of the city. But an exposition has to convey its message in a concise way that holds the attention of the visitor. To do it, we should use images and audio.

The visitor can use its own cell phone to access the audio guide of the museum (if possible, free wi-fi should be offered). Different technologies can be used to access the audio guide, like QR codes or the numeration of the spaces/exhibits, which the correspondent audio can be accessed in a site. The images used to illustrate the history can be a mix of drawings, photos, artworks, cartography (this work showed that there are plenty of available images). Some text should accompany the images for those who don't desire to use the audio guide. To make this first part more interactive, models of the different examples of architecture can be exposed, so the visitor can see then in three-dimensional form. These models could be created in a resistant material that allowed the visitor to touch them.

The second part should be the biggest one of the exhibitions. In it, the techniques will be presented in the detail. Here the visitor will learn about the techniques to construct the structures, like the different types of masonry (stone, bricks), the construction with mud, the wood and stonework, another technique. The techniques will be present by models, constructed by real master. The model should show the different stages of the technique. They will be accompanied by touch screen terminals, where the visitor can watch videos of how each of these stages are done.

The materials will be presented in acrylic containers, or in its final form. For example, when talking about mud masonry, to explain the fabrication of a brick, the earth, the water, and the turf, we are presented in containers, and a brick will be shown as the result of the mixture of these materials. Videos will also follow these exhibits. When possible, the visitors will be allowed to touch the materials, feel their texture, weight, etc.

Original tools will be present in glass cases. These tools can be obtained as loans from other museums, like the *Museu da Inconfidência* and the *Museu de Artes e Ofícios de Belo Horizonte*, both with sizable collections. They could also be acquired by private collectors and from workers. The owners of the tools can give comments that will accompany the exhibits, creating a bigger connection with these objects. Models of the tools will be created, and the visitors will be allowed to touch these models to observe their physical characteristics. At the end of this part, there will be a small house where the visitors will be allowed to enter and see up close how they were in the 18th century, observing the result of the different techniques.

The last part will present the masters. First of all, the life of the crafters in the 18th century, through images and also videos of recreation of the life of these professionals. Lastly,

there will be a hall where some masters that still keep this knowledge will receive a homage. In the touch screen terminals will show testimonials about their craft and its future.

The exhibition can count with a space for workshops, where member of the community and visitors could participate in events, to learn more. These workshops would be provided by volunteers and teachers of the partners institutions, like the UFOP, IFMG, and the school of crafts. To create a big contact with the community, these workshops could be held outside of the museum.

The IA (Institute of Contemporary Art of Ouro Preto), created in 2023 a project called *BomSerá: Oficinas de Restauro*, where they restored three colonial houses in Ouro Preto, owned by humble families. Together with the restorations, workshops were organised, where people from the community could learn more about the traditional constructive technologies, the maintenance of these houses, restoration, and patrimonial education[326]. A partnership of the museum with the AI, could create the opportunity for more restoration works and workshops, besides the opportunity of free restorations for families unable to repair their homes. Besides that, visits to the museum can be organised to amplify the learning. With projects like that, where the museum is inserted in the community, the contact with the population is more effective, encouraging people to visit this cultural centre and others in the city.

It's essential to highlight again that in this work is presenting a proposition, and the exhibition here described is an ideal. The realisation of it all depends on several factors, like budget, space, and workforce. But in case this proposal is put into practice, it will be extremely beneficial for the community and the visitors, besides all the attention to the subject of the traditional technique!

4.4. Conclusion

In this chapter we presented a study case of the Takenaka Carpentry Tools Museum, a very interesting space dedicated to the carpentry tools and traditional architecture in Japan. The Museum, that is very interactive and well structured, influenced the proposition delivered in the second part of the chapter. The proposition of an educational or museal space, dedicated to traditional techniques of construction used in Ouro Preto in the 18th century has as objective to show the population and tourists the importance of this technologies used in the construction of the architecture so admired by them, and how they should contribute to its safeguard.

[326] Bomserá: Oficinas de Restauro. Instituto de Arte Conteporânea de Ouro Preto, n.d. URL: https://ia.art.br/ia-programa-bomsera-sobre/. Accessed on: 01 August 2023.

CONCLUSION

Finishing this dissertation, we summarise the conclusions and results of our study.

In this work, we developed the traditional techniques of construction of Ouro Preto in the 18th century, with the goal to construct a proposal of valorisation to these techniques, trying to present to the population and other visitors of the city the importance of this savoir-faire for the preservation of the material heritage, but also as intangible heritage.

We started this work talking about cultural heritage. We develop the depth of the concept of cultural heritage, from its development throughout history to its "practical applications" with the discipline of conservation and restoration. It is a subject complex and very important, in its social, historical, and political dimensions. This dissertation highlights the necessity of further efforts of valorisation within the scope of heritage. We also look in detail at key concepts for this work: intangible heritage and vernacular heritage.

In this first chapter we were also immersed in the Brazilian reality in the domain of heritage, showing the struggles and achievement of the path followed by the cultural heritage preservation in Brazil, also including the legislation in force in the country today. We closed the chapter talking about restoration history and presenting some essential concepts to the safeguard of heritage.

Our second chapter presents the city of Ouro Preto, going through its rich history, its natural attributes, and its architectural heritage, extremely important for the country and part of the UNESCO World Heritage List. For that, we started talking about its unique geographical and socio-economic characteristics that helped mould the city's paths, due to the richness of its soil. Later, we told its history, that starts even before the gold was found in the region in the 18th century, but with the arrive of the Portuguese and their quest to find gold in their American colony going to today, and discussing what events transformed Ouro Preto in such a relevant component of Brazilian history and heritage. Its architectural profile, that gave the city status of one of the most meaningful historical sites of the country, will be delineated as a way to learn of what its material heritage consists of.

Chapter three addresses the traditional building techniques used in Ouro Preto in the 18th century that we want to preserve. But before that, it was necessary to lay out the history of building construction. Constantly mixed up with the history of architecture, this field is broad and its history begins even in prehistoric times and influenced many aspects of human life. We covered mainly techniques, materials, and workers, not design, styles and other aspects linked to architecture.

The chapter starts talking about the history of building construction, talking about its evolution, starting from the prehistoric times, and going to nowadays, with the most developed technologies. We then focused on Portugal influences in Brazil, showing how it is the direct base of the techniques used in Ouro Preto. Then we close this third part presenting the techniques and the material used in the construction of Ouro Preto, and the workers who mastered this knowledge.

The last chapter was constructed based on the information collected in the other three chapters of the work, where we developed the idea and the importance of the traditional techniques for the preservation of Ouro Preto's heritage. So, this third chapter begins showing an example of a museum in Japan, dedicated to carpentry tools used in the construction of buildings in the country, but that ends up revisiting the construction techniques and architecture of Japan. The museum approaches the subject throughout history and is a great example for our proposal.

The second part of the chapter is dedicated to the proposal, which could be used as an instrument for the valorisation of the traditional techniques in Ouro Preto. Its aim is to present the techniques to the visitors and the community showing their importance as intangible heritage and for the conservation of the material heritage of the city.

We therefore believe that we have achieved our objectives with this work. We studied the characteristics of the historical city Ouro Preto heritage, understanding its historical and patrimonial importance. We investigated the origins and its development over time of traditional techniques used in the construction of the city and how they developed over time.

Through this dissertation we aimed to raise awareness to the more technical aspects of the cultural heritage in Ouro Preto, that could be lost due to the modernisation of technologies, that advances over the traditions, superseding them, with an idea that the modern is always better. But in this case, besides the fact that this knowledge is part of the intangible heritage, mainly Brazilian and Portuguese, these techniques also still have a practical importance. In the restoration, as stated in important documents, like the Charter of Venice, traditional techniques and materials should be favoured.

But new theories and questions arouse with this dissertation. It was observed that the population of Ouro Preto is still put aside by the cultural context of the city. They don't go to the city's museums or cultural events, which are many compared to other Brazilian cities. They are also unaware of the city's important features, such as its UNESCO World Heritage status. In reality, we observe a lack of valorisation of this title even by the government and other cultural institutions in the city. This shows that there are other aspects of the city that must also be included in the effort of valorisation.

With the work we also observed new aspects of the traditional techniques. They can be not only used in restoration but in new sustainable buildings that bring benefits for nature and offer positive characteristics to human living. The presentation of this new importance given the vernacular architecture should also be investigated, helping even more in the preservation of the traditional knowledge, that evolved through millennia to get to the highly sustainable aspects that it presents today.

We expect to put the proposal of this work in practice and to spread the ideas and information presented here to continue preserving the material and the intangible heritage not only in Ouro Preto and Brazil, but other places where it is still necessary.

BIBLIOGRAPHIC REFERENCES

Adams, Cassandra 'Japan's Ise Shrine and its thirteen-hundred-year-old reconstruction tradition', *Journal of Architectural Education*, 52(1), 1998, p. 49–60.

Aguiar, Leila Bianchi. "Cidade morta, cidade monumento, cidade turística: a construção de memórias sobre Ouro Preto". *História do turismo no Brasil*, p. 180-193, 2013.

_____'Desafios, permanências e transformações na gestão de um sítio urbano patrimonializado: Ouro Preto, 1938-1975', *Estudos Históricos (Rio de Janeiro)*, 29(57), p. 87–106, 2016.

Akagawa, Natsuko. *Intangible Heritage*. London, Routledge, 2009.

Bazin, Germain. *A Arquitetura Religiosa Barroca no Brasil*. Rio de Janeiro, RJ: Editora Record, 1983.

Beiguelman, Giselle. "Pandemia da ignorância cresce com o desmonte do Iphan: instituições ligadas à memória e à preservação do patrimônio estão debilitadas". [Interview to Leila Kiyomura]. *Ouvir Imagens*. São Paulo, Rádio USP (93,7 MHz), 2020. URL: https://jornal.usp.br/radio-usp/pandemia-da-ignorancia-cresce-com-o-desmonte-do-iphan/. Accessed on: 29 May 2023.

Khallaf, Beit. *Egyptian Monuments*, 2009. URL: https://egyptsites.wordpress.com/2009/02/12/beit-khallaf/ Accessed on: 05 July 2023.

Benton, Tim. *Understanding Heritage and Memory*. Manchester University Press, 2010.

Bibbó Caroline Bertarelli. *Divertimentos em Ouro Preto no final do século XIX.* Master dissertation, School of Physical Education, Physiotherapy and Occupational Therapy, Universidade Federal de Minas Gerais, 2017.

Boschi, Caio César. (2007). "Irmandades, religiosidade, sociabilidades". In Villalta, Luiz Carlos, Resende, Maria Efigênia Lage de. *História de Minas Gerais; as Minas Setecentistas*. Vol. 2, Belo Horizonte, Autêntica / Companhia do Tempo, p. 59-75, 2007.

Bohrer, Alex Fernandes, "Ouro Preto: Um Novo Olhar", São Paulo, Scortecci, 2011.

Branco, Camila, Teixeira, Enzo. Cine vila rica: História, cultura e descaso, *Lamparina*, 10 December 2019. URL: https://sites.ufop.br/lamparina/blog/cine-vila-rica-hist%C3%B3ria-cultura-e-descaso. Accessed on: 18 June 2023.

Brandi, Cesare. *Theory of restoration*. Firenze: Nardini Editore, 2005.

Brasil. Ministério da Cultura. *A carta de Pero Vaz de Caminha*. Brasilia: MEC, [s.d].

Brinckerhoff, Jackson John, *Discovering the Vernacular Landscape*, New Haven, Yale University Press, 1984.

Calvert, Amy, "Step Pyramid complex at Saqqara," *Smarthistory*, October 25, 2021, URL: https://smarthistory.org/step-pyramid-complex-saqqara/. Accessed on July 06, 2023.

Cardoso, Josiane Teresinha. "A Mata Atlântica e Sua Conservação", *Revista Encontros Teológicos*, 31(3), 2016.

Carmo, Bárbara Helena Almeida "PCH Programa Monumenta e PAC-CH: o patrimônio cultural na perspectiva de política pública" Dissertation (Masters in Architecture), Instituto de Arquitetura e Urbanismo, Universidade de São Paulo, 2019.

Cerqueira, Amanda P. Coutinho de. "Política cultural e 'crise' no governo Temer", *Revista Novos Rumos*, 55(1), 2018.

Cerrillo-Cuenca, Enrique et al. "3DMeshTracings: A protocol for the diital recording of prehistoric art. Its application at Almendres cromlech (Évora, Portugal)", *Journal of Archaeological Science: Reports,* Volume 25, p. 171-183, 2019.

Castriota, Leonardo Barci (dir.), *Mestres artífices, Minas Gerais, Cadernos de Memória*, Brasília, Iphan, 2012.

Choay, Françoise. *The invention of the Historic Monument.* Cambridge, Cambridge University Press, 2001.

_____ *As questões do Património: Antologia para um combate*. Lisboa, Edições 70, 2011.

_____ *A Alegoria do Patrimônio*. Lisboa, Edições 70, 2014.

Chu, Bonny. "The Hagia Sophia: A landmark that was converted from a church to a mosque, to a museum, and then mosque again". *Fox News*, 2023. URL: https://www.foxnews.com/world/hagia-sophia-landmark-converted-church-mosque-museum-mosque-again. Accessed on: 25 July 2023.

Condit, Carl W. The First Reinforced-Concrete Skyscraper: The Ingalls Building in Cincinnati and Its Place in Structural History. *Technology and Culture*, Vol. 9, No. 1, p. 1-33, 1968.

Convention concerning the protection of the world cultural and natural heritage: Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972 (no date). Paris: Unesco.

Costa, Lúcio. *Arquitetura*. Rio de Janeiro, Bloch-FENAME, 1980.

Cowan, Henry. *The Master Builders: A History of Structural and Environmental Design from Ancient Egypt to the Nineteenth Century*. John Willey & Sons, New York, 1977.

Diógenes Junior, José Eliaci Nogueira. "Gerações ou dimensões dos direitos fundamentais". *Âmbito Jurídico, Rio Grande, XV*, (100), p. 571-572, 2012.

Domingues, Joelza Ester, "A mineração sob o olhar de Rugendas - leitura de imagem". *Ensinar História - Joelza Ester Domingues*. URL:

https://ensinarhistoria.com.br/mineracao-sob-olhar-de-rugendas/. Accessed on: 17 June 2023.

Dospěl, Marek. Pharaoh's brick makers, *Biblical Archaeology Society*, 2023. URL: https://www.biblicalarchaeology.org/daily/ancient-cultures/ancient-egypt/pharaohs-brick-makers/. Accessed: 06 July 2023.

Falavigno, Chiavelli Facenda. "A tutela jurídica do patrimônio cultural brasileiro". *Res Severa Verum Gaudium – Revista Científica dos Estudantes de Direito da UFRGS.* Porto Alegre, V. 2, N. 1, 2010.

Faleiro, Fabio Gelape; de Farias Neto, Austeclinio Lopes de. *Savanas: desafios e estratégias para o equilíbrio entre sociedade, agronegócio e recursos naturais*. Planaltina, Embrapa Cerrados, 2008.

Fernandes, Simone Monteiro Silvestre. "Reflexões para ações educativas em conjuntos urbanos tombados: Ouro Preto". Dissertation (Master in Cultural Heritage Preservation), IPHAN, Rio de Janeiro, 2014.

França, Tayami Fonseca. Do material ao intangível. Estudo e inventário do largo de Coimbra em Ouro Preto Preto MG. *Arquitextos*, São Paulo, ano 21, n. 244.05, Vitruvius. 2020. URL: https://vitruvius.com.br/revistas/read/arquitextos/21.244/7880. Accessed in: 03 Jul. 2023.

Fridman, Fania, et al. Public policies for the preservation of historical heritage in Brazil. Three case studies (1973-2016). *Revista Brasileira de Estudos Urbanos e Regionais*, *21*, p. 621-638, 2019.

Salles, Fritz Teixeira de. *Vila Rica do Pilar.* Belo Horizonte: Itatiaia, 1965.

El Salam, Mohamed E.A., Construction of underground works and tunnels in ancient Egypt. Tunnelling and Underground Space Technology, 17(3), p.295-304, 2002.

Flores, Joaquim de Moura. Património – do Monumento ao Território. *Urbanidade e Património*, p. 11-17, 1998.

França, Tayami Fonseca. Do material ao intangível. Estudo e inventário do largo de Coimbra em Ouro Preto Preto MG. *Arquitextos*, São Paulo, ano 21, n. 244.05, Vitruvius, set. 2020. URL: https://vitruvius.com.br/revistas/ read/arquitextos/21.244/7880. Accessed on: 03 jul. 2023.

Gagliardi, Ignacio. "Museu da Inconfidência em Ouro Preto, Minas Gerais – Parte I". Ilumine o Projeto. 2019. URL: http://ilumineoprojeto.com/museu-da-inconfidencia-em-ouro-preto-minas-gerais-parte-i/. Accessed on: 30 July 2023.

Gimmler Netto, Maria Manoela. A paisagem de Ouro Preto Thesis (PhD in architecture,). Escola de Arquitetura, Universidade Federal de Minas Gerais, Belo Horizonte, 2014. Accessed in: 10 May 2023.

Gonçalves, José Reginaldo Santos. *A Retórica da Perda*. *Os Discursos do Patrimônio Cultural no Brasil*. Rio de Janeiro, UFRJ/IPHAN, 1996.

Guedes, Angela Cardoso. Museu Histórico Nacional. *Comunicação & Educação*, *15*(3), p.131-136, 2010.

Hafford, Willian B., "Mesopotamian City Life". *Expedition Magazine*. Penn Museum, p. 51-59, 2018. URL: http://www.penn.museum/sites/expedition/?p=25945. Accessed on 12 July 2023.

Hagerman, Madeline. "An analysis of key cultural heritage resolutions, documents, charters, and legislation". In Owczarek, Nina. *Prioritizing People in Ethical Decision-Making and Caring for Cultural Heritage Collections*, London, Routledge, 2023, p. 3-14.

Harrell, James A.; Storemyr, Per. "Ancient Egyptian quarries—an illustrated overview". *Geological Survey of Norway Special Publication*, *12*, p. 7-50, 2009.

Herculano, Alexandre. *Opúsculos: II, Volume 8.* Lisboa, Bertrand, 1873, *p.* 6 -7.

Hüttner, Edison; de Lima, Reginâmio Bonifácio de. "O patrimônio cultural brasileiro e as redes de proteção contra descaminhos vigentes nas primeiras décadas do novo milênio". *Revista Memória em Rede*, *14*(26), p. 421-440, 2022.

IBGE. Ouro Preto. *Cidades.ibge.gov.br*. N/d. URL: https://cidades.ibge.gov.br/brasil/mg/ouro-preto/panorama Accessed on: 14 June 2023.

Kayvani, Kourosh. Design of high-rise buildings: past, present and future, 23rd Australasian Conference on the

Mechanics of Structures and Materials, vol. I, Byron Bay, NSW, 9-12 December, Southern Cross University, Lismore, 2014.

Khallaf, Beit. *Egyptian Monuments*, 2009. URL: https://egyptsites.wordpress.com/2009/02/12/beit-khallaf/ Accessed on: 05 July 2023.

Kreimerman, Igor; Devolder, Maud. "Leaving No Ashlar Unturned. Definitions, Technical Features and Regional Synopsis of Cut-Stone Masonry in the Eastern Mediterranean Bronze Age". *Ashlar. Exploring the Materiality of Cut-Stone Masonry in the Eastern Mediterranean Bronze Age*. Vol. 17, Presses Universitaires de Louvain, p. 7-88, 2020.

Kühl, Beatriz Mugayar. "História e ética na conservação e na restauração de monumentos históricos". *Revista CPC*, (1), 16-40, 2006.

_____"Os Restauradores e o pensamento de Camilo Boito." In Boito, Camilo. *Os Restauradores.* São Paulo, Artes & Ofícios/Ateliê Editorial, 2008.

Larson. Gerald R. The Home Insurance Building, *The architecture professor*, 2020. URL: https://thearchitectureprofessor.com/2020/10/23/8-13-the-home-insurance-building. Accessed on: 27 July 2023.

Lemos, Carlos Alberto Cerqueira. *História da casa brasileira.* São Paulo: Contexto, 1989.

Lima Junior, Augusto de. *Vila Rica do Ouro Preto: Síntese Histórica e Descritiva*. Rio de Janeiro, EGL Editora, 1996.

Littré, Émile. Dictionnaire de la langue française. Paris, L. Hachette, 1873-1874. Electronic version created by François Gannaz. URL: http://www.littre.org/. Accessed on: 6 March 2023.

Magalhães, Aline Montenegro. "A inspetoria de monumentos nacionais do Museu Histórico Nacional e a Proteção de Monumentos em Ouro Preto (1934-1937)", *Anais do Museu Paulista: História e Cultura Material*, 25(3), p. 233–290, 2017.

Mello, Suzy de. *Barroco mineiro.* São Paulo: Braziliense, 1985.

Motta, Lia. A SPHAN em Ouro Preto: uma história de conceitos e critérios, *Revista do Patrimônio Histórico e Artístico Nacional*, n. 22, 1987

Moroni Filho, Elio. "Minas Gerais em pedra e barro. Construções em adobe, pau a pique e taipa de pilão|". *Arquiteturismo*, São Paulo, 13, n. 154-155.02, 2020. Published online: January 2020. URL: https://vitruvius.com.br/revistas/read/arquiteturismo/13.154/7613. Accessed on: 30 July 2023.

Nylander, Carl. "Old Persian and Greek Stonecutting and the Chronology of Achaemenian Monuments: Achaemenian Problems I." *American Journal of Archaeology*, vol. 69, no. 1, pp. 49–55, 1965.

Oliveira, Leandro Duque de, Sobreira, Frederico Garcia. "Crescimento Urbano de Ouro Preto-Mg Entre 1950 e 2004 E Atuais Tendências." *Revista Brasileira de Cartografia*, vol. 67, no. 4, p. 867–876, 2015.

Oliveira, Myriam Andrade Ribeiro de. *Rococó religioso no Brasil e seus antecedentes europeus*. São Paulo, Editora Cosac Naify, 2003.

Oliver, Paul. *Built to meet needs: Cultural issues in vernacular architecture*. Oxford: Elsevier/Architectural Press, 2006.

Paula, Suzana Fernandes de; Castro, Paulo de Tarso Amorim de. "Geomorfologia antropogênica em função da mineração de ouro no século XVIII: bases científicas e educativas na proposição de uma trilha geoturística urbana na sede no município de Ouro Preto (MG)", *Revista Brasileira de Ecoturismo (RBEcotur)*, 8(4), 2015.

Pelegrini, Sandra de Cássia Araújo. "O patrimônio cultural no discurso e na lei: trajetórias do debate sobre a preservação no Brasil". *Patrimônio e Memória*, *2*(2), 54-77, 2007.

Pinheiro, Maria Lucia Bressan. "Origens da noção de preservação do patrimônio cultural no Brasil". *Risco Revista de Pesquisa em Arquitetura e Urbanismo,* (3), 2016, p. 4-14.

Pinto, Estevão. *Muxarabis & balcões e outros ensaios*. São Paulo, Brasiliana, 1958.

Pinto, Moreno. Ouro Preto. *Revista do Arquivo Público Mineiro*, Belo Horizonte, ano XI, pp. 691-697, 1906.

Portocarrero, José Afonso Botura. *Tecnologia indígena em Mato Grosso: Habitação*. Cuiabá, Entrelinhas, 2010.

Reis, Nestor Goulart. *Imagens de Vilas e Cidades do Brasil Colonial* [Colaboradores: Paulo Bruna e Beatriz P. Siqueira Bueno]. São Paulo, EDUSP|FAPESP, 2000.

Ribeiro, Cecilia. Viana de Lima em missão da Unesco no brasil. *URBANA: Revista Eletrônica do Centro Interdisciplinar de Estudos sobre a Cidade*. 5. 52, 2013.

Ribeiro, Isadora Parreira. *Ouro Preto: de Monumento Nacional a Patrimônio Mundial Estudo do impacto das classificações na comunidade local.* Dissertation (History of Art, Heritage and Visual Culture), Porto, 2021.

Roeser, Hubert Mathias Peter; Roeser, Patricia Angelika. 'O quadrilátero ferrífero - mg, Brasil: Aspectos sobre sua história, seus recursos minerais e Problemas Ambientais RELACIONADOS.', *Geonomos*, 2013.

Rugendas, Johann Moritz. *Viagem pitoresca através do Brasil.* Belo Horizonte: Itatiaia; São Paulo: Edusp, 1979.

Saint-Hilaire. Auguste de. *Viagem pela Província do Rio de Janeiro e Minas Gerais.* São Paulo: Companhia Editora Nacional, 1938.

Sakamoto, Tadasuke. Gokan ni hibiku tenji de jōhō o tsutaeru takenaka daiku dōgukan no torikumi [Efforts of the Takenaka Carpentry Tools Museum to convey information through exhibits that resonate with the five senses]. *Jōhō no Kagaku to Gijutsu*, 69(2), 2019, p. 78-83.

Salgado, Marina, "Ouro Preto: paisagem em transformação". Dissertation (Built Environment and Sustainable Heritage), Universidade Federal de Minas Gerais, 2010.

Sayegh, Liliane Márcia Lucas. "A dinâmica urbana em Ouro Preto: conflitos decorrentes de sua patrimonialização e de sua consolidação como cidade universitária". Dissertation (Master in architecture) Faculdade de Arquitetura e Urbanismo, Universidade Federal da Bahia, Salvador, 2009.

Simão, Maria. Cristina Rocha, "A formação profissional como instrumento de proteção do patrimônio cultural", in Fernandes, Edésio; Alfonsin,Betânia (Ed.), Revisitando o Instituto do Tombamento, Belo Horizonte, Fórum, 2010, p. 443-461.

Silva, Rossi Allan et al. "Avaliação da cobertura florestal na paisagem de Mata Atlântica no ano de 2010, na região de Ouro Preto-MG". *Cerne*, 21, 301-309, 2015.

Smith Jr, Robert C. The colonial architecture of Minas Gerais in Brazil. *The Art Bulletin*, *21*(2), p. 110-159, 1939.

Teixeira, Ricardo dos Santos. "Uma conjuntura de aparências: a construção de um sistema municipal de planejamento urbano em Ouro Preto". Thesis (PhD in Architecture and Urbanism). Universidade Federal de Minas Gerais, Belo Horizonte, 2014.

Thomas, Carter; Cromley, Elizabeth Collins. *Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes*, Tennessee, University of Tennessee Press, 2005.

Tomaz, Paulo Cesar. “A preservação do patrimônio cultural e sua trajetória no Brasil”. *Fênix-Revista de História e Estudos Culturais*, *7*(2), p. 1-12, 2010.

Tutton, Michael. *Construction as Depicted in Western Art: From Antiquity to the Photograph*. Amsterdam University Press, 2021.

UNESCO. Proclamation of the masterpieces of the oral and intangible heritage of humanity *Intangible Cultural Heritage*. 2001-2005. URL: https://ich.unesco.org/en/proclamation-of-masterpieces-00103. Accessed on: 30 May 2023.

UNESCO, *Convention for the Safeguarding of the Intangible Cultural Heritage*, 2003. URL: https://ich.unesco.org/en/what-is-intangible-heritage-00003. Accessed on: 05 February 2023.

UNESCO, *Convention concerning the protection of the world cultural and natural heritage: Adopted by the General Conference at its seventeenth session, Paris, 16 November 1972*. Paris, UNESCO, 1972.

Uribe, Gustavo. ‘Obra de Di Cavalcanti danificada por criminosos no Planalto é avaliada em R$ 8 milhões’, *CNN Brasil*, 1 January 2023. URL: https://www.cnnbrasil.com.br/politica/obra-de-di-cavalcanti-danificada-por-criminosos-no-planalto-e-avaliada-em-r-8-milhoes/. Accessed on: 16 June 2023.

Vasconcellos, Sylvio de. *Arquitetura no Brasil: sistemas construtivos*. Belo Horizonte, UFMG, 1979.

_____*Vila Rica: Formação e Desenvolvimento - Residencias*. São Paulo, Perspectiva, 2011.

Vasquez, Pedro Karp. *O Brasil na fotografia oitocentista.* São Paulo: Metalivros, 2003.

Vecco, Marilena. A definition of cultural heritage: From the tangible to the intangible. *Journal of Cultural Heritage*, 11(3), 321-324, 2010.

Vieira, Liliane de Castro. “Ouro Preto e o Século XIX: O Mito Da Decadência”, *Revista CPC*, (22), p. 145-189, 2016.

Viollet-le-Duc, Eugène-Emmanuel. *Dictionnaire raisonné de l'architecture française du XIe au XVIe siècle* (Vol. 8). Paris, A. Morel, 1867.

Wright, George R.H. *Ancient building technology*. Leiden, Brill, 2000.

Young, David; Young, Michiko, *The art of Japanese architecture history, culture, design*. Tokyo, Tuttle Publishing, 2019.

Zanini, Walter. *História Geral da Arte No Brasil*. Vol. I, São Paulo, Instituto Walther Moreira Salles, 1983.

SITOGRAPHY

Arquivo Publico Mineiro – URL: http://www.siaapm.cultura.mg.gov.br/

Encyclopedia Britannica - URL: https://www.britannica.com/

IBGE - URL: https://cidades.ibge.gov.br/

ICOMOS - URL: https://www.icomos.org/

International Humanitarian Law Databases - URL: ihl-databases.icrc.org/

Planalto - URL: https://www.planalto.gov.br/ccivil/

Oxford English Dictionary - URL: www.oed.com/

Secretaria Municipal de Desenvolvimento Urbano E Habitação - Ouro Preto - URL: https://ouropreto.mg.gov.br/

UNESCO World Heritage Centre 1992-2023 - URL: www.whc.unesco.org/

SOURCES

Arquivo Público Mineiro

Coleção de Documentos Cartográficos do Arquivo Público Mineiro – APM

APM – 072 Mapa do Município de Ouro Preto

APM – 076 Mapa da Comarca de Vila Rica, 1775

APM – 979 Planta de Vila Rica de Nossa Senhora do Pillar

APM – 080 Carta Geográfica do Termo de Vila Rica(...)

Fundo Secretaria De Governo (Província) – SG

SG– 005 Mapa de Distritos e Capelas de Ouro Preto, Mariana e Queluz

Fundo Secretaria Da Agricultura

SA – 210 Carta Topográfica da Cidade de Ouro Preto - Comissão Geográfica e Geológica de Minas Gerais

Fundo Presidência Da Província - PP

PP – 006 Planta da Cidade de Ouro Preto

Fundo Secretaria de Viação e Obras Públicas - SVOP

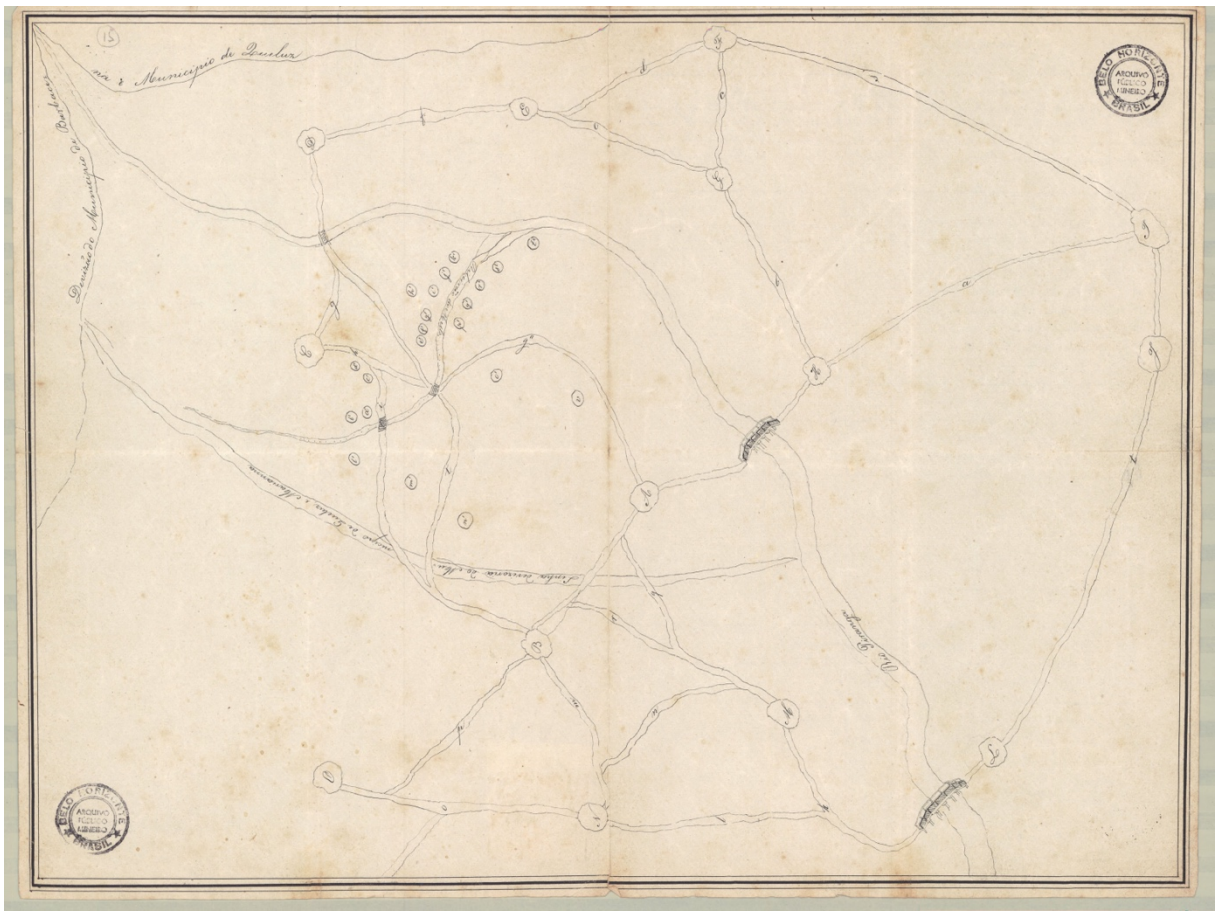
SVOP – 048 Mapa do Estado de Minas Gerais - Município de Ouro Preto

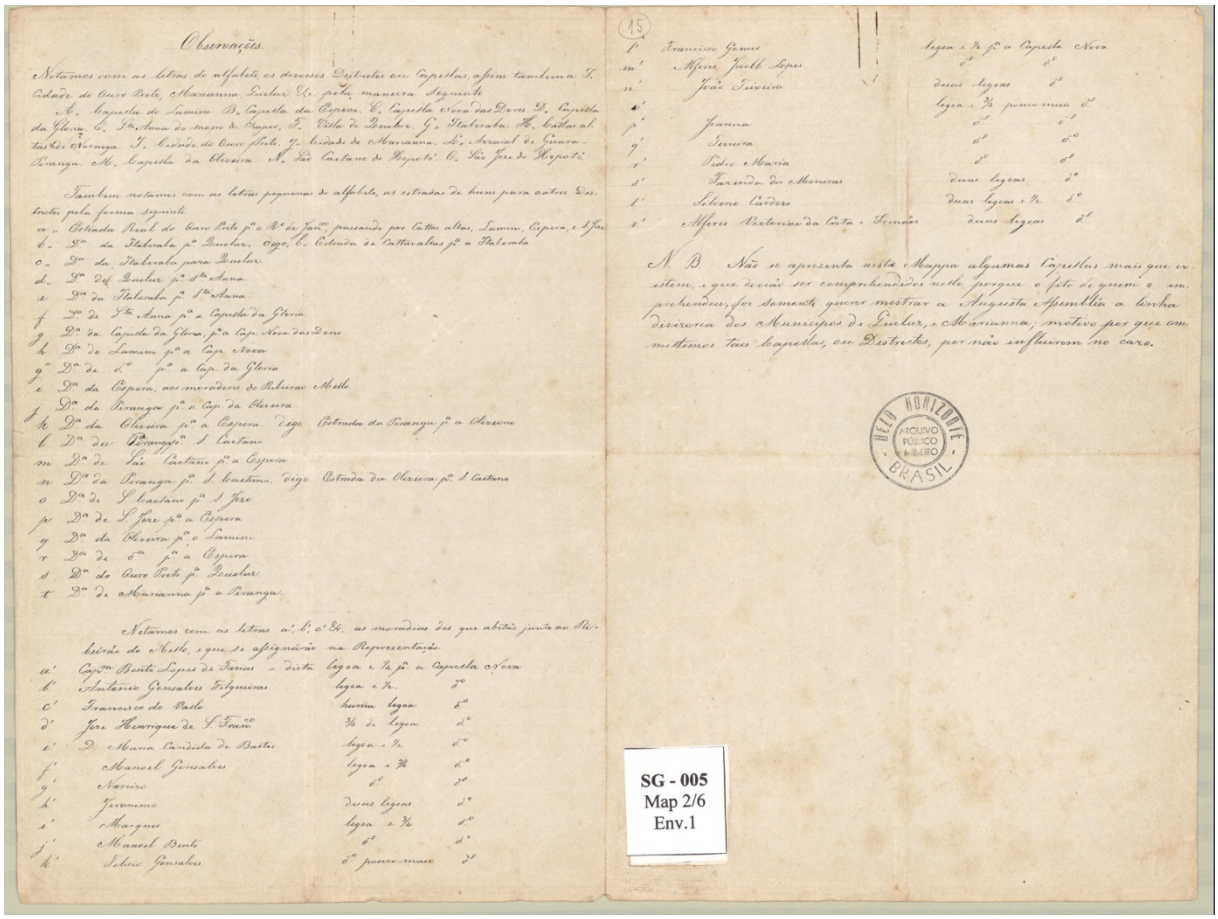
ANNEXES

Annexes I – Maps of Ouro Preto

Map 1 Map of the District of Vila Rica, by José Joaquim da Rocha, 1775. Source: APM.

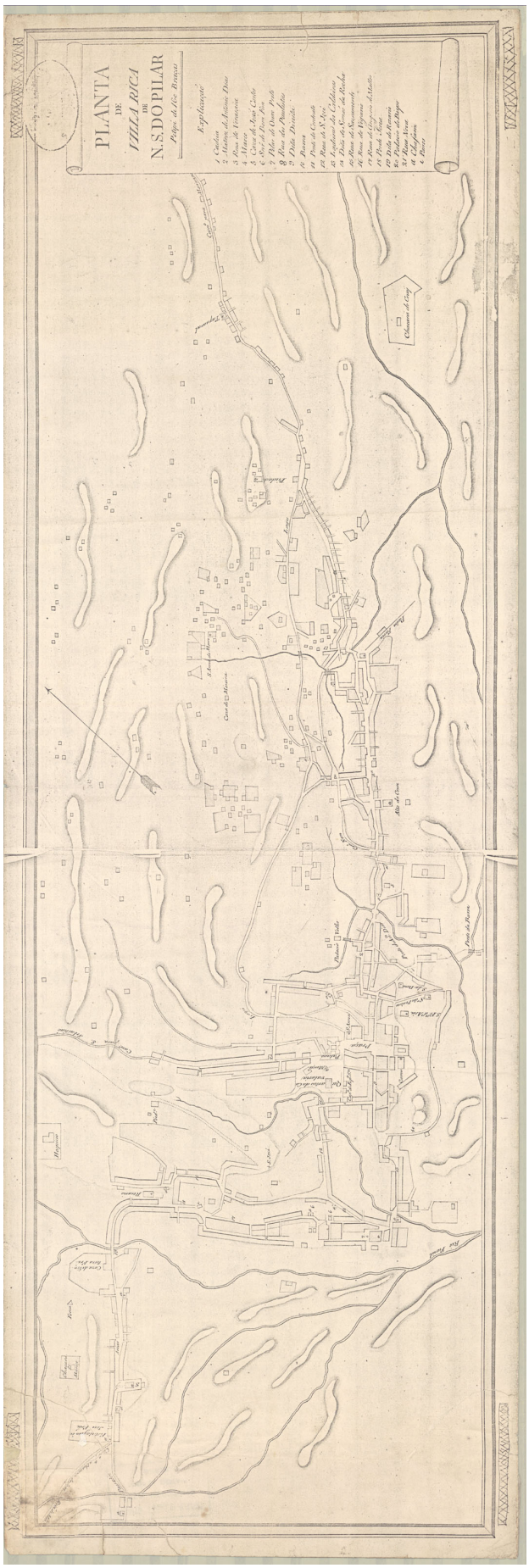
Map 2 Map of the District of Vila Rica, around 1801 – 1900. Source: APM.





Map 3 Front and back Map of Districts and Chapels of Ouro Preto, Mariana and Queluz, from around 1801 – 1900. 1900. Source: APM.

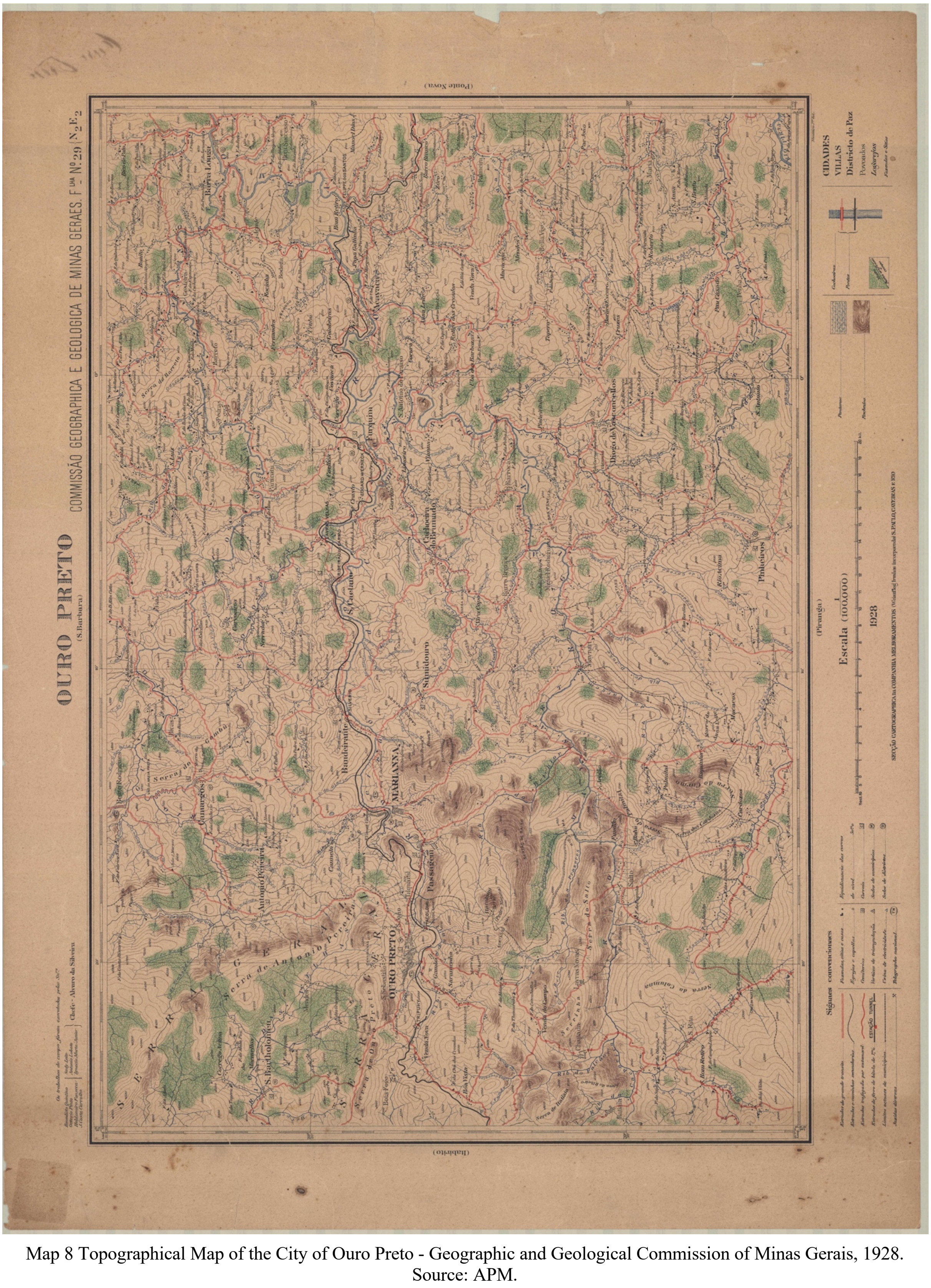
Map 4 Map of the Municipality of Ouro Preto, probably from 1800. Source: APM.



Map 5 Plan of Vila Rica de Nossa Senhora do Pillar, probably from 1800. Source: APM.

Map 6 Ouro Preto City Plan, 1888 Source: APM.

Map 7 Plan of the Sesmaria and the City of Ouro Preto, 1904. Source: APM.



Map 8 Topographical Map of the City of Ouro Preto - Geographic and Geological Commission of Minas Gerais, 1928.
Source: APM.

Map 9 Map of the State of Minas Gerais - Municipality of Ouro Preto, 1938. Source: APM.

Annexes II – Eclectic architecture in Ouro Preto

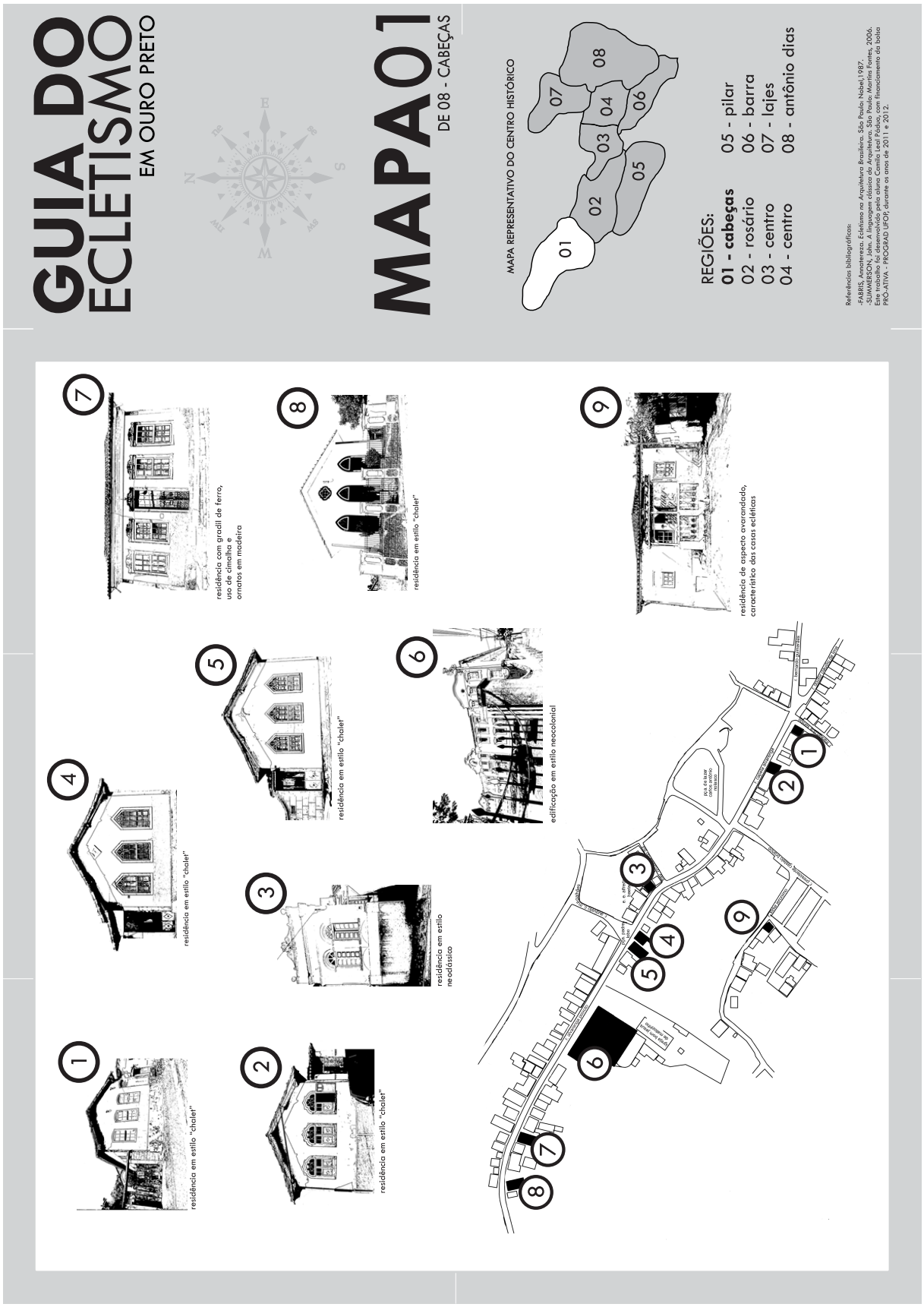


Figure 112 Guide to Eclecticism in Ouro Preto, map 1. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

Figure 113 Guide to Eclecticism in Ouro Preto, map 2. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

Figure 114 Guide to Eclecticism in Ouro Preto, map 3. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

Figure 115 Guide to Eclecticism in Ouro Preto, map 4. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

Figure 116 Guide to Eclecticism in Ouro Preto, map 5. Authors: Camila Leal and Sulamita Lino. Source: Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

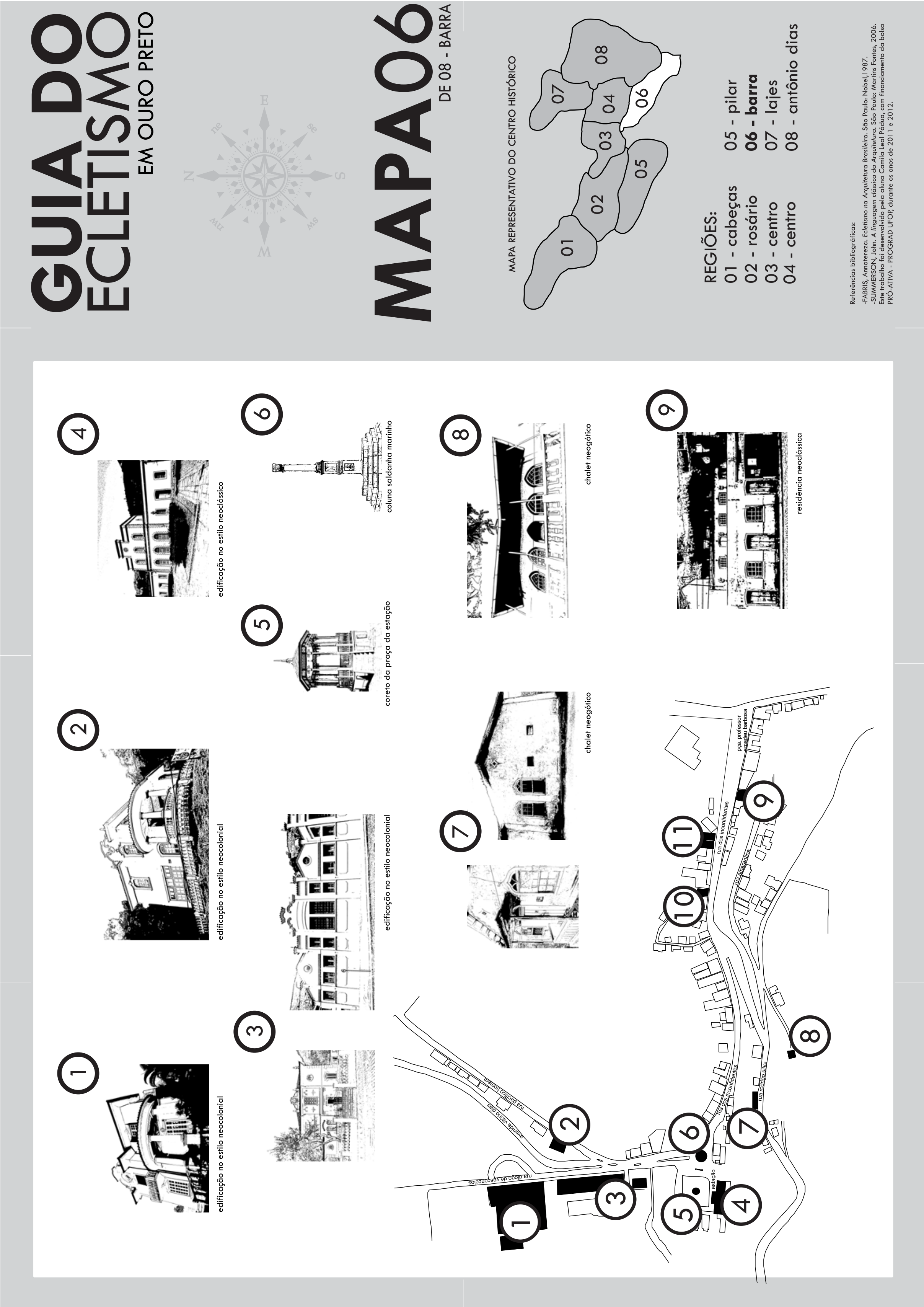


Figure 117 Guide to Eclecticism in Ouro Preto, map 6. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

Figure 118 Guide to Eclecticism in Ouro Preto, map 7. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.

Figure 119 Guide to Eclecticism in Ouro Preto, map 8. Authors: Camila Leal and Sulamita Lino. Source: Guia do Ecletismo em Ouro Preto URL: https://guiadoecletismo.wixsite.com/ouropreto/downloads. Accessed on: Accessed: 01 June 2023.