



Storia e patrimonio del caso studio dei marmi dell'Alentejo (Vila Viçosa, Borba e Estremoz – Portogallo)

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La riserva più importante di marmo di alta qualità in Portogallo si trova nella regione dell'Alentejo, nei comuni di Vila Viçosa, Borba e Estremoz. Lo sfruttamento, la trasformazione e l'utilizzo di questa risorsa naturale risalgono al periodo romano. Il marmo proveniente da queste cave è stato utilizzato in edifici civili e religiosi e in opere pubbliche, oggi considerate patrimonio storico. Esiste un particolare know-how associato all'estrazione, alla trasformazione e all'utilizzo del marmo che costituisce un patrimonio immateriale essenziale.

Il Projecto História e Património da Indústria do Mármore – PHIM (Progetto Storia e Patrimonio dell'Industria del Marmo) è stato avviato nel 2012 per comprendere meglio questo patrimonio. Si tratta di un'indagine multidisciplinare a lungo termine volta a comprendere l'evoluzione economica di questa attività, i suoi attori, i cambiamenti del paesaggio, l'importanza per la comunità e il suo ruolo come fattore distintivo a livello culturale e turistico. Questo testo ha lo scopo di presentare l'evoluzione del progetto PHIM, in particolare la sua indagine sul periodo contemporaneo, e di integrarlo in un contesto globale.

History and Heritage of Alentejo Marbles (Vila Viçosa, Borba and Estremoz – Portugal) case study

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A story under construction in a particular geo-economic context

Portugal's most important marble reserves are in the region of Alentejo, located in the South of the country. The largest of these reserves, and the only one still operating over the last thirty years, is in the municipalities of Vila Viçosa, Borba, and Estremoz, an area geologically known as the Estremoz Anticline.

The richness of this geological formation, with approximately 27km², has enabled the extraction of large quantities of crystalline marbles over the last two millennia (fig. 1). Their great aesthetic beauty and colour diversity (white, pink, cream, grey) make them very appreciated for the interior decoration of buildings, namely paving, stairways, columns, and walls, as well as funerary art and sculpture.¹

Marble exploration has an important economic presence in Alentejo as regards employment and industrial development. In 2020, 41 extraction companies employed 672 workers, and 53

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1. CASAL MOURA 2007, pp. 20-30.

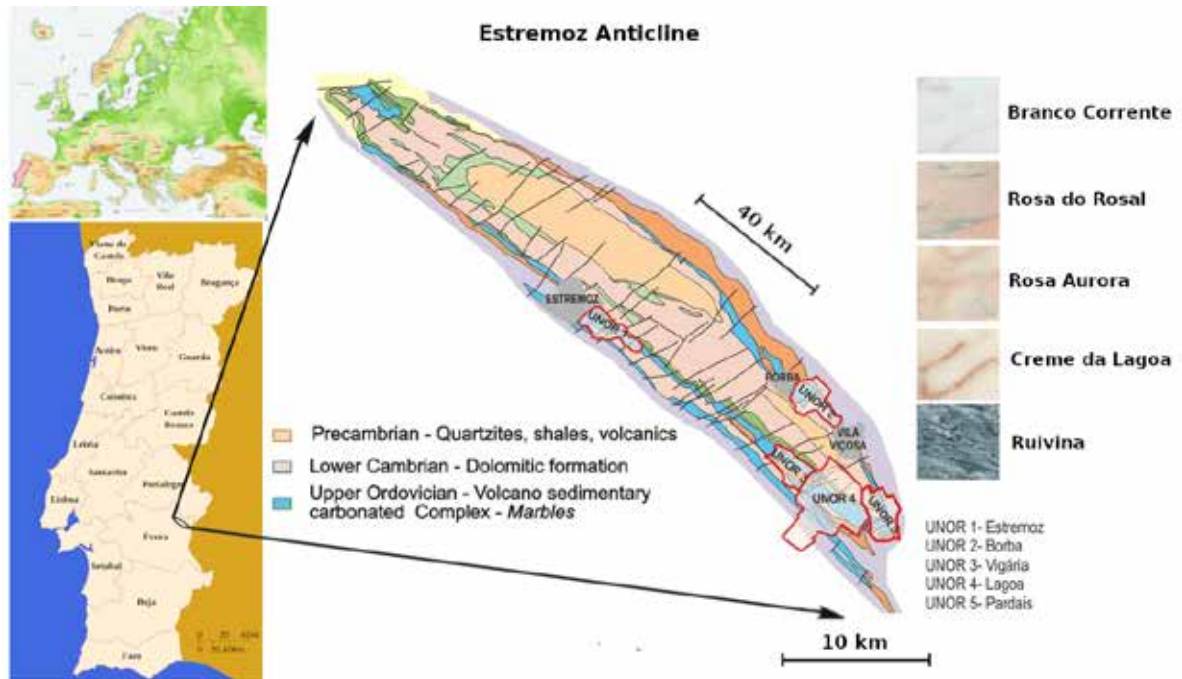


Figure 1. The anticline of Alentejo Marble (Adapted from Ineti, Cartografia temática do anticlinal de Estremoz, Lisboa 2009).

transformation companies had 317 workers; their business volume ascended to €52,152,988 and €43,684,478, respectively.²

Marble is a product mainly destined for foreign trade. In the last few years, its exports reached 335,831 metric tons (2019-2020) and a value of 106 million euros (2021); France, Saudi Arabia and China were its main destinations.³

In terms of reserves, the latest estimate (2012) points to 51 million cubic metres available for commercial use, corresponding to approximately 137 million metric tons, according to a medium density of 2,700 kg/m³. This estimate, however, only accounts for commercial use, around 20% of the extracted material; the rest is not used due to its massive fractures.⁴

For this reason and because extraction was significantly reduced in the last four decades, it is likely that these reserves, and the use of its countless waste, will allow exploration for a few more centuries.

Historical studies on this industry are recent and have highlighted its great evolution cycles.⁵

The first cycle extends from the Roman era, in the 1st century, to the early 19th century. It is a long period with moments of prosperity interspersed with moments of decay, from which we stress the Roman Empire, Renaissance, and Baroque (fig. 2) in the first (wealth), and the Middle Ages and the transition from the 18th to the 19th century in the latter (decay).

This cycle is characterised by a low technological intensity and a long permanence of methods, techniques, and tools, which remained virtually unchanged until the 19th century and, in some cases, until the early 20th century: tools and manual processes, using large hammers, wood and iron wedges, and human and animal muscle power.

Several clues on its trade suggest that marble was used in several locations in the current territories of Portugal and Spain, Northern Africa, particularly Morocco and Algeria, and possibly the Italic Peninsula during the Roman era. In the following centuries, exports reached central Europe and the American continent, especially Brazil, which was still a Portuguese colony.

A second cycle began in the 19th century and lasted until the end of the First World War. In the mid-19th century, with the establishment of the liberal regime in Portugal, an industrial development policy was enforced, creating a favourable context to explore these underground minerals. The

2. See I.N.E. 2023a.

3. See: D.G.E.G. 2021; I.N.E. 2023a; I.N.E. 2023b; I.N.E. 2023c.

4. See CARVALHO 2012.

5. For a more depth analysis, see QUINTAS 2020.



Figure 2. Palace of the Dukes of Braganza, Vila Viçosa (16th.c. - 18th.c) (photo *Centro de Estudos CECHAP*, 2019).

development of geology, the appearance of the first geological cartography of Portugal in 1876 and 1899, the promulgation of laws regulating mines (1852) and quarries (1884), the arrival of the railway to Alentejo (as of 1850), and the participation in many universal exhibitions gave new visibility to marble and the mining sector. New quarries were opened, and marble was sent to Lisbon and its port. Sales to the American continent also increased significantly, mainly to Brazil and the USA, and to Europe, mainly to England, France, Belgium, and Germany. However, the modernisation of labour in the quarries would wait for the next cycle.

The period between the end of the First World War and the adhesion of Portugal to the European Economic Community (1918-1986) composes the third development cycle of the marble industry of Alentejo. At that time, many companies invested heavily in mechanisation and new labour techniques, which translated into increased extractions and a significant growth of exports. Around 300 quarries were opened for permanent exploration by 200 companies, which used modern machinery and techniques, such as helical wire and compressed air, followed by the use of diesel and electricity and the appearance of trucks and large derrick cranes. Due to its high quality, the region's marble was a product that attracted companies from the sector of ornamental stones, which explains the interest in investing in technical modernisation. Many of these companies expanded their businesses from their exploration sites in other regions, such as the limestone quarries of Sintra, Lisbon, and the centre, near Batalha, Leiria. During this period, the transfer of technology and the role played by foreign investors were also fundamental. Modernisation allowed by these investments placed Alentejo at the same level as other European deposits, like Carrara in Italy or Wallonia in Belgium.

The quarry space changed radically thanks to the introduction of more modern techniques, and quarries became wider and deeper, creating a lunar landscape with large craters (fig. 3). As of the 1960s, boosted by the Planos de Fomento (development plans), this industry reached a considerable level of mechanisation, and the quantity of stone extracted and the number of workers in the quarries were extremely high. Regarding extraction, between 1968 and 1986, these quarries increased from 111,000 metric tons to 407,7400 metric tons, corresponding to a 54% share of all the stone extracted nationally at first and later ascending to 70%. In terms of values for the same period, they were worth 70% of the entire national production: 87.000 contos, and then 80% of the whole value generated in the country, 6.285.000 contos.⁶

Regarding commerce, until the end of the First World War, exports were based on sales to Brazil, USA, and Europe, namely Belgium, Luxemburg, and Germany; exports for the latter ended

6. 1 conto = 1000 escudos / 1000 escudos = 5 euros.



Figure 3. Marble quarry at Vila Viçosa (photo Centro de Estudos CECHAP, 2023).

when the war began. In the next 40 years, the marble trade expanded even more. USA and Brazil maintained their positions, and exports to Europe recovered, namely to countries like Benelux, the Federal Republic of Germany, France, Spain, Sweden, and Italy. Sales also increased dramatically in the African continent, especially South Africa, Angola, and Mozambique, these two until 1975 when they became independent from Portugal. Exports to the Middle East began, destined for countries like Saudi Arabia, Kuwait and United Arab Emirates.⁷

The fourth and latest development cycle started in 1986, with the adhesion of Portugal to the European Union. New foreign trade opportunities appeared with the European Community, accompanied by structural support funds for modernisation, which were invested in the sector. The new industrial policy included the creation of technological centres. Centro Cevalor, in Borba, was created for ornamental stones and operated from 1990 to 2016. However, as of 2004, the sector suffered significant financial difficulties due to environmental issues, lack of entrepreneurial dynamism, and the complicated international economic context. In addition, the high mechanisation significantly reduced the number of workers, creating a difficult social situation due to the rise of unemployment. Finally, this period cemented the former trend of foreign trade supported by countries of the Middle East, China, and Europe.

The cultural dimension of marbles as an added value to the mining territory

The marble activity goes beyond its economic dimension since it has cultural and patrimonial value. In fact, quarries are an essential testimony of this activity, which has marked the life and people of the region. It is an industrial heritage that reflects the impacts, traces, and memory of the industry as a productive sector, and its functional structures and remains are a symbol of one of several periods, reflecting upon the land and the life of its communities.⁸

On the other hand, creations made with marble from these quarries were used in civilian and religious buildings and public construction works and are now considered cultural heritage. A specific know-how is associated with the extraction, transformation, and use of marble, constituting a critical element of intangible cultural heritage.⁹

7. See QUINTAS, CARDOSO DE MATOS 2022.

8. See QUINTAS 2022a.

9. See QUINTAS 2022b.

The exploitation of marble quarries profoundly transformed the landscape. Over time, the area lost its original agricultural character, becoming dominated by marble and the excavations from which it was extracted (fig. 4). The landscape is in a constant state of transformation, as extractive activities continue to deepen the quarries to extract more blocks from within.¹⁰

Its cultural dimension is reflected in social and symbolic practices based on common elements, namely the memory and construction/reinforcement of a territory's identity. These two inseparable concepts can only be fully comprehended by understanding the evolution of both historical and territorial dynamics.

In terms of territorial enhancement, the policies of cultural production, tourism, and scientific research may contribute to new forms of regional planning through the symbolic appropriation of the industrial dimension, especially the industrial past, projecting the territory on a national and international level and combining efforts to solve its problems.

Studying the Marble Industry is undoubtedly an important tool for understanding the territory. From a historical and cultural heritage perspective, the study of this large marble reserve only began in 2012. However, the area had already been the focus of geological and economic analyses for over half a century. This historiographical void started being filled with the work conducted by *Centro de Estudos CECHAP*, a non-profit organisation based in Vila Viçosa, in the heart of the marble territory, when it decided to promote PHIM – *Património e História da Indústria dos Mármore*s (fig. 5).

This project benefits from the collaboration of several research centers from Portuguese universities, such as CIDEHUS - *Centro Interdisciplinar de História, Culturas e Sociedades* - Universidade de Évora; IHC - *Instituto de História Contemporânea* - Universidade Nova de Lisboa, CIES - *Centro de Investigação e Estudos de Sociologia* - ISCTE - *Instituto Universitário de Lisboa*, and ARTIS - *Centro de História da Arte - Faculdade de Letras*, Universidade de Lisboa.

Its purpose is to know the extraction processes, the technology, the players and social aspects of the industry, the economy, and the relationship with the territory over the last two millennia. It also aims at defining the relationship between marble as a natural resource and its uses in art, architecture, and urbanism. PHIM's lines of research include Roman and industrial archaeology, art history, construction, law, techniques and technology, cartography, natural resources, circular economy, digital humanities, oral history, and environmental and heritage education.¹¹

10. See CARDOSO DE MATOS, QUINTAS 2015.

11. See <https://www.marmore-cechap.pt/en> (last access 15th march 2026).



Figure 4. The Marble Landscape at Pardais, Vila Viçosa (photo *Centro de Estudos CECHAP*, 2023).



Figure 5. Marble Quarry at Pardais, Vila Viçosa (photo *Centro de Estudos CECHAP*, 2022).

The funding for this study relies on CECHAP own resources, support from the partners, but mostly on *European Regional Development Fund* (FEDER), which throughout the Alentejo programs, has already supported this project three times (2015, 2019 and 2022).¹²

In the last ten years, the results of this study led to a series of events on the subject, both national and international, oral presentations at over 50 scientific congresses, 30 scientific papers and seven monographs, five of which on the history of marble and two on heritage education directed to students (fig. 6). In addition to that, it contributed to three master's theses and two doctoral theses, supporting other master's and doctoral theses based on archive resources recovered by CECHAP.¹³

The project's website is now a thematic site and an important information repository on these marbles, which even allows one to search the records created by the project's researchers and offers historical sources that, even though already studied, may be important to other scientific areas, like economy or architecture.

Since its beginning as an academic study for the historical knowledge of this activity in the long term, it has allowed a practical use of research and materialised in the development of industrial tourism in the Anticline. The Marble Route 14, a touristic product promoted by CECHAP Association, has valued the territory through visits to extraction and transformation units and urban patrimony, interacting with school audiences and promoting creative tourism. The results of the marble research were critical to the continuous innovation and dynamisation of this industrial tourism. In turn, research also provided a unique knowledge of the territory's evolution. In this domain, and specifically in the contemporary period, it became possible to know the sector's evolution over the last two decades and its problems, most of which persist today.

The study of cultural practices related to marble, from the traditional labour organisation to the transmission of knowledge by the artisans, has contributed to raising heritage awareness towards them. On the other hand, the identification of the uses of marble, i.e., its many uses in art in architecture, and the knowledge of where it was used in architecture, sculpture, and other artistic elements, are crucial for a more global vision of this industry and its impact on urban spaces and artistic manifestations.

12. European Regional Development Fund (FEDER), by Alentejo programs corresponds respectively to: ALENT-08-0347-FEDER-002329; ALT20-08-2114-FEDER-000077; ALT20-08-2114-FEDER-000213.

13. In 2017 Cechap rescued the archives of the Cevalor Technology Center dedicated to natural stone, which had closed the previous year. Also see QUINTAS 2021.

14. Portugal Marble Route, <https://rotadomarmoreae.com/en> (last access 29th april 2026).

Using this knowledge, we may also identify and encourage cultural promotion strategies for this economic sector, combined with the already mentioned industrial tourism, like Museology and interacting and supporting artisans, stonemasons, and artists.

Regarding the sector’s challenges—such as territorial and spatial disorder, marketing difficulties, and significant raw material waste—studies have enabled comparisons with other regions and countries, fostering the development of strategies in collaboration with industrial and scientific entities. As an example, we refer to the reutilization of rubble to create art pieces, products like stone aggregate and stone paper, among others, the use of carbonate muds obtained from the water used to cut the stone, heritage education directed to students and the incentive of new ideas for using and trading marble with added value.

The study developed under the scope of the PHIM project has come a long way and became a massive contribution to approaching the issues of the territory (waste, abandoned quarries, water, etc.) and see them as possible solutions thanks to the joint efforts of a team with members from several institutions. Its latest initiative is called Stone Cast, a consortium composed of several public and private entities from the business, academic, and associative world (including CIDEHUS and CECHAP) that aims to aggregate efforts to improve the role played by the marble industry of Alentejo. In general terms, these are its objectives:

- R&D processes to reduce waste, circular economy, and create products like Stone Paper;
- HR qualification projects;
- Economy internationalisation and digitalization;
- Industrial tourism, valorisation of the marble heritage, recovering handicrafts, heritage, and the environment, and environmental education.



Figure 6. Publications between 2015-2022 (*Centro de Estudos CECHAP, 2019 2022*).

Finally, we are preparing two historical studies with a specific lines of research as a subsidiary projects. One is dedicated to knowing the position of the Portuguese marble trade in the international context in the present time and identifying the types of non-religious buildings and public infrastructures in which they were used. During the first phase, we shall privilege the Iberian-American countries to try and discover the players in the respective ornamental processes. Other is dedicated to study the enterprises of ornamental stones that arrived for marble business between 1946-1986 in this region. We want to know its shareholders, its commercial strategy, the investments, and its position in the context of the national and international economy (fig. 7).

Final remarks

The study of the marble industry of Alentejo, in addition to providing important information on its evolution, has brought to light a series of recent and pertinent questions about the territory. The research team's concerns have evolved substantially, and now we're more focused on environmental issues and the organisation of the territory, which have conditioned the future of this industry. With a marble deposit that may last many centuries, it is necessary to convey a series of pertinent questions to the community to adapt the sector to our times so that it can maintain, or even increase, its economic relevance, minimise the industry's environmental impact, and contribute more actively to the region's social and economic development.

Heritage features are critical to making the community feel like the activity belongs to them and is an expression of their ancestors' labour, thus increasing the harmony among the people who live here and encouraging their participation in public debates concerning the territory.



Figure 7. The 150 meters deep quarry, Vila Viçosa (photo *Centro de Estudos CECHAP*, 2023).

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