

Lemnian Earth: Ancient Medicine and Present-Day Heritage

Project Report for the ARCHMAT Summer School

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Introduction

Lemnian Earth was a medicinal clay sourced from the island of Lemnos. It was used from antiquity on until the post-medieval period, primarily for the treatment of poisonings and open wounds and was even believed to protect against the plague (Hall & Photos-Jones, 2008). Lemnian Earth was sold in small, stamped tablets known as sphragides, examples of which are still preserved in museums across Europe (Photos-Jones et al., 2017). The local significance of Lemnian Earth is particularly evident through travel accounts from the 15th to 19th century, where it is described as an essential part of the island, similar to its flora, fauna and traditions (Photos-Jones et al., 2017). In my project for the ARCHMAT summer school I explored the historical significance of Lemnian Earth, which connects natural and cultural heritage, and I investigated how it can be reconnected with contemporary life on Lemnos.

Literature Review

Lemnian Earth was first documented in the 3rd century BCE for its use as a pigment (Jaronowski, 2008). The earliest mention of its application as a medicine appeared in Dioscorides' *Materia Medica*, dated to approximately 50–70 (Jaronowski, 2008). In antiquity, writers recommended Lemnian Earth as a treatment for open wounds, bites from venomous animals and suggested ingestion as an antidote to poisoning. References to Lemnian Earth in natural history texts were common until the 2nd century, after which they become increasingly rare, which potentially indicates a decline in its use (Jaronowski, 2008). Lemnian Earth experienced a revival during the 14th century within the Ottoman Empire, when it became a widely traded medicine across Europe (Jaronowski, 2008).

The raw material for Lemnian Earth was traditionally extracted from a site near Kotsinas, close to a spring known as Phthelidia (Hall & Photos-Jones, 2008). In antiquity, extraction of the raw clay was done by a priestess of Artemis, after which the material was transported to the nearby city of Hephaestia for further treatment (Hall & Photos-Jones, 2008). This included extensive washing of the clay and the ritual sacrifice of grains to the Earth. In the medieval

period, contemporary sources describe the extraction as taking place annually on August 6th, from a designated pit near a stream (Hall & Photos-Jones, 2008). Hall and Photos-Jones, 2008 argue that the water, which is used in both the ancient and medieval process, may have altered the composition of the natural clay. The spring water near Kotsinas is naturally enriched with alum, which could have concentrated in the clay during washing and may have contributed to its medicinal properties. Additionally, the technique of levigation, where clay is mixed with water, heavier particles are allowed to settle, and lighter impurities are separated, may have helped to purify the clay and produce a finer, more uniform material. Therefore, the final medicinal product was produced from the raw clay through ritual processing, which might have significantly altered its composition and properties (Hall & Photos-Jones, 2008; Photos-Jones & Hall, 2014; Photos-Jones et al., 2017).

The question of if and how Lemnian Earth medicine works has long been investigated, with first chemical analyses dating back to the 19th century and research continuing to the present day (Christidis et al., 2020; Milling et al., 2024; Photos-Jones & Hall, 2014; Photos-Jones et al., 2017). Modern studies have shown that Lemnian Earth is primarily composed of montmorillonite, kaolin, alum and hematite (Hall & Photos-Jones, 2008; Photos-Jones & Hall, 2014). Some Lemnian Earth sphragides have been found to exhibit antibacterial properties (Christidis et al., 2020; Photos-Jones et al., 2017) and additionally, ingestion may have positive effects on the gut microbiome, which could explain its historic therapeutic use (Milling et al., 2024).

Current Relevance

The history of Lemnian Earth intersects with many topics that hold relevance today. Medicinal clays continue to be employed in various cultures and contexts and are used to treat infections, indigestion and diarrhea (Gomes et al., 2021), conditions similar to those Lemnian Earth was historically used for (Jaronowski, 2008). Medicinal clays also have a long history of being used to bind toxins in the body, although they have largely been replaced by modern pharmaceuticals (Gomes et al., 2021). Two of the most commonly used medicinal clays today, kaolin and montmorillonite (Gomes et al., 2021), have been identified as the main components of Lemnian Earth sphragides, showing a continuity between ancient and modern medicinal clays (Hall & Photos-Jones, 2008; Photos-Jones & Hall, 2014).

Lemnian Earth also offers a compelling example of how traditional manufacturing practices can combine both scientific principles and religious or cultural beliefs (Hall & Photos-Jones, 2008). Other examples can be found in traditional pottery production, metallurgy and medicine. It highlights the importance of considering the final artifact in the context of its production in archaeological analyses. In this regard, Lemnian Earth also ties into current movements to recognize traditional ecological knowledge and to decolonize archaeology by integrating indigenous and local worldviews.

Lemnian Earth also represents an important part of the heritage of Lemnos and shows how



Figure 1: Extraction site of Lemnian Earth near Kotsinas.

connected the island's natural and cultural history is. In recent years, there has been growing recognition of heritage sites that span both natural and cultural dimensions. One key example is the establishment of mixed world heritage sites by UNESCO, but also on smaller scales, efforts to protect landscapes with both natural and cultural importance are receiving increased attention (UNESCO, 2025).

On-Site Learning

During the week on Lemnos, I visited historical sites related to Lemnian Earth, including the clay extraction site near Kotsinas (Figure 1) and the archaeological site of Hephaestia (Figure 2), where the clay was processed and shipped. I also had the opportunity to speak with local expert Christos Kakarnias which offered valuable insights into the local perspective on Lemnian Earth. Beyond the sites directly connected to Lemnian Earth, I saw many other natural and cultural heritage sites on the island which allowed me to better understand how a new initiative focused on Lemnian Earth could complement and build upon the already existing heritage infrastructure.

Project Results

During the literature research and on-site learning on Lemnos I found that there are still many open questions regarding the composition, processing and medical effectiveness of Lemnian Earth and further research is needed to address them. The published scientific analyses sometimes present inconclusive results and some studies appear to contradict one another. Additionally, the proposed connection between scientific principles and traditional beliefs in the historic extraction and production methods requires more in-depth investigation.

I also learned that there are significant gaps between local knowledge on Lemnos and external academic research as well as between research conducted inside Greece and outside of it by universities and research institutes with historic sphragides in their collections. One key reason



Figure 2: Unprocessed extracted clay (left) and ancient theater in Hephaestia (right).

is a language barrier: research published in Greece is generally only available in Greek, while research from outside Greece is published in English. For future research projects it is therefore essential to prioritize collaboration between all associated parties.

Another important result is that Lemnian Earth currently has low visibility, both on and off the island, in physical and online formats. As Lemnian Earth is an important part of the heritage of Lemnos that still holds relevance today, it would be meaningful to change this. In this context it is important that future research collaborations, educational materials and online presence ensure multilingual accessibility so that all interested groups can engage with the topic. As a first step to increase the visibility of Lemnian Earth online, I created a Wikipedia page, which did not exist before. This is a way to share the knowledge I have gathered as a possible foundation for future research and projects but also as an accessible resource and collaborative tool for anyone interested. On the island itself, creating an outreach project that brings the history of Lemnian Earth into a visible physical space would be a great way to raise awareness both with locals and tourists. This could include an exhibition, interpretive signs near the extraction site or a specific tour or hiking route focused on the history of Lemnian Earth.

Finally, Lemnian Earth represents an important part of heritage that links both natural and cultural aspects of the island. This connection is not unique to Lemnian Earth and the week on Lemnos allowed me to observe many examples where the land, the people and their culture are closely intertwined. For example, the Mandras system for local agriculture combines traditional beliefs with farming practices and the fisheries system reflects a similar relationship. This strong connection between landscape and culture deserves greater recognition, especially considering the growing emphasis on understanding these links in international cultural heritage management. One practical way to highlight this connection would be to expand the existing thematic tourist routes on Lemnos. Currently, these routes separate natural and cultural sites, but adding a route focused specifically on the interaction between nature and culture could provide a more integrated perspective.

Conclusion

In conclusion, the ARCHMAT summer school on Lemnos was an inspiring experience that provided me with many interesting insights into the island's unique cultural and natural heritage, especially through the example of Lemnian Earth. Lemnian Earth is a fascinating part of the island's history that intersects with many current relevant topics, yet it is relatively under-researched and lacks broad visibility. Further research on the topic, along with collaborations that connect the local community with universities in Greece and abroad, would be highly valuable. Additionally, highlighting the history of Lemnian Earth through both an online presence as well as physical representation on the island would be an important step in future heritage initiatives. At the end of this project it was very meaningful to me to have the opportunity to share my findings directly with local stakeholders on the island. Finally, I would like to thank the local experts for sharing their knowledge and experience, as well as my professors for organizing the summer school and making this incredible week possible.

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