

## **Doctoral position to be held in Paris 8 University / ArScAn CNRS UMR 7041**

### **Lead in monumental constructions: uses, practices, supply (12<sup>th</sup>-19<sup>th</sup> centuries)**

#### **General information**

Reference: Université Paris 8 Vincennes-Saint-Denis – ArScAn UMR7041

Working place: Paris

Publication date: xxxx

Name of the scientific supervisors: Catherine Verna, Maxime L'Héritier, Sandrine Baron (co-direction TRACES)

Type of contract: CDD Doctorant/Contrat doctoral

Contract duration : 36 mois

Funding source : MITI du CNRS – chantier scientifique « Notre-Dame »

Start date of the position: 1<sup>er</sup> novembre 2020

#### **Description of the PhD subject**

##### *General Research Context*

Lead is a poorly documented material, especially in the ancient construction field, even for major buildings where hundreds of tons of lead are used, to seal stone and iron, for roofing or decoration. The production of lead and its supply to major construction sites are linked to political and economic issues that are still little explored today in history and archaeology.

This project aims to look at the history of lead from its use in construction between the 12th and 19th centuries while highlighting the role of this material in our heritage landscape: its origins and supply, its recycling, its shaping techniques and the resulting transfer of skills and knowledge. This diachronic investigation will radiate from cathedral Notre-Dame de Paris, whose artefacts collected after the disaster open up new research perspectives. It will be undertaken according to a comparative approach with other buildings, aiming at a global understanding of material culture related phenomena. It will lead, among other things, and for the first time, to the constitution of a diachronic database of construction leads in France between the 12th and 19th centuries.

##### *Summary of the PhD Work*

The research that will be conducted during this doctoral contract is fully interdisciplinary, as shown by the PhD co-direction between the universities and laboratories of Paris 8 Vincennes-Saint-Denis/ArScAn (holding the PhD) and Toulouse/TRACES and the framework provided by the CNRS/Ministry of Culture Notre-Dame scientific project in which this work will take place. The role of the PhD student will be to build a reference system for construction leads collected at Notre-Dame de Paris and other buildings. The proposed approach is initially archaeological, however the study will be extended to written sources (mainly accounting) in order to build a historical reflection on the uses and circulation of lead in medieval and modern times based on an interdisciplinary approach.

The first objective of the thesis will be to carry out an archaeological inventory of lead elements used in construction from the 12th to the 19th century. It will be based on a large-scale investigation on a group of medieval and modern monuments, already partially selected, but whose perimeter will have to be refined and completed with the PhD student. The expertise of LRMH's (Laboratoire de Recherche sur les Monuments Historiques) metal department, a partner in the project, will be sought at this stage. The second objective of the thesis will be to gather a corpus of texts (manuscripts or edited) dealing with the supply, use and processing of lead in the studied monuments. This documentation will concern both the construction and the restoration of the buildings. Using this material, the PhD student will be able to approach the major fields of the history of techniques and economic history

(over the long term) with particular attention paid to the actors and the evolution of their practices over the centuries. The acquired data will complete the database.

The third objective of the thesis will focus on the archaeometric part of the project consisting in elemental and isotopic analyses on construction leads in order to characterize the different sources of lead used in construction and their evolution over time. These analyses will be carried out in the partner laboratories: at IRAMAT-CEB, in Orléans (trace element analyses by LA-ICP-MS) and in Toulouse (isotopic analyses by MC-ICP-MS). Thanks to the historical and archaeological expertise acquired, the PhD student will contribute to the selection of relevant artefacts within the repository. He or she will coordinate on-site lead sampling and analysis campaigns (LIBS, XRF) in collaboration with the researchers of the metal workgroup of the Notre-Dame CNRS project, who are specialized in materials analysis. Finally, he or she will participate in the laboratory analyses conducted by the researchers.

While being aware of the scope and limitations of the results of elemental and isotopic analysis, the PhD student will have to focus the interpretation effort on the intersection of data from archaeology, written sources and geochemical analyses, to identify the implications and historical issues of lead use and supply on construction sites.

#### *Applicant Profile*

The doctoral student must hold a Research Master's degree in Archaeology, History, History of Medieval Art or in a field related to Archaeomaterials and Heritage. Solid knowledge in medieval archaeology is expected, in particular in building archaeology, as well as research experience on ancient materials (prospecting, inventories, typological studies and even chemical analyses). Prior knowledge in the field of heritage and ancient construction would also be an asset. Similarly, knowledge or experience in the field of reading (palaeography) or in the study of ancient archives will be necessary. Managing the field missions in order to constitute the repository will require a great deal of autonomy on the part of the doctoral student, who will have to demonstrate a capacity to adapt to different working contexts (archives, field, laboratory). Open-mindedness, curiosity and strong motivation will be essential to integrate and associate the practices and reasoning of the various disciplines which the doctoral student will be confronted with in the course of his or her research.

#### *Working Context*

As the thesis project is situated at the intersection between archaeology/history of metals and archaeometry, the PhD student will be attached to two teams which already have experience of collective and interdisciplinary work: the ARSCAN (UMR 7041) and TRACES (UMR 5608) laboratories. The PhD student will also be part of the Metal workgroup of the CNRS/MC Notre-Dame scientific project and will be involved in its work.

The archaeological and historical approach being the core of the project, the PhD student will be enrolled in a PhD in History at the University Paris 8 Vincennes – Saint-Denis (ED 31 Pratiques et théories du sens) within the ArScAn laboratory (UMR 7041), whose GAMA and THEMAM teams include several specialists in the history and archaeology of metals, as well as in the historical and archaeological study of medieval monuments. Based in the Paris region, the candidate will be located in the centre of his or her study area, in the heart of Gothic construction, thus facilitating the trips that he or she will have to make in the course of his or her research: in the field, in archive repositories and in libraries (National Archives, Departmental Archives, Médiathèque de l'Architecture et du Patrimoine in Charenton, etc.).

The TRACES laboratory, which ensures the co-direction of the thesis, houses in particular the 'METAL' team (Metals: Economics and Techniques through Archaeology and the Laboratory), which is dedicated to the history and archaeology of metals in diachrony. This team has recognised skills in

mining and metallurgical archaeology through archaeological and archaeometric research carried out in particular on large mining and metallurgical districts. It is also a privileged environment for the characterization and analysis of objects and samples, thanks to partnership agreements signed with other laboratories in the natural and physico-chemical sciences.

The doctoral student will thus be in an eminently interdisciplinary environment favourable to the acquisition of knowledge in archaeology and the history of metals, as well as in medieval built heritage. The doctoral student will be involved in the activities of the CNRS/MC Metal WG and will benefit from its scientific and logistical support. The parallel progress of another thesis in environmental chemistry on the evaluation of lead pollution in Historic Monuments (MINHAPLOM project, dir. Sophie Ayrault and Sandrine Baron), also integrated in the workgroup, will be a source of exchange, collaboration and stimulation between the two doctoral students working on a common subject of study.

The thesis will be supervised by Catherine Verna and Maxime L'Héritier (Paris 8 - ARSCAN) and Sandrine Baron (CNRS TRACES).

Candidates may apply on the CNRS website:

<https://emploi.cnrs.fr/Offres/Doctorant/UMR7041-MAXLHE-002/Default.aspx?lang=EN>

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