

THE USE OF METALS AND METAL PRODUCTS ON URBAN AND RURAL ARCHAEOLOGICAL SITES: Reconstructing Technologies Employed by Native American and European Artisans in New France using the 17th and 18th Centuries

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1- TOPIC

This research focuses on the study of the chaînes opératoires and the metallurgical techniques employed by Native American and European artisans, as well as the technological choices made throughout the process of metal production during a period of technological adaptation to the environment of New France. The artefacts are studied using tomography (CT scan) and by principles of materials engineering with the goals of identifying the source of the metal, the technical signature of the artisans, and the technological problems related to a lack of raw material, as well as to climate and fuel.

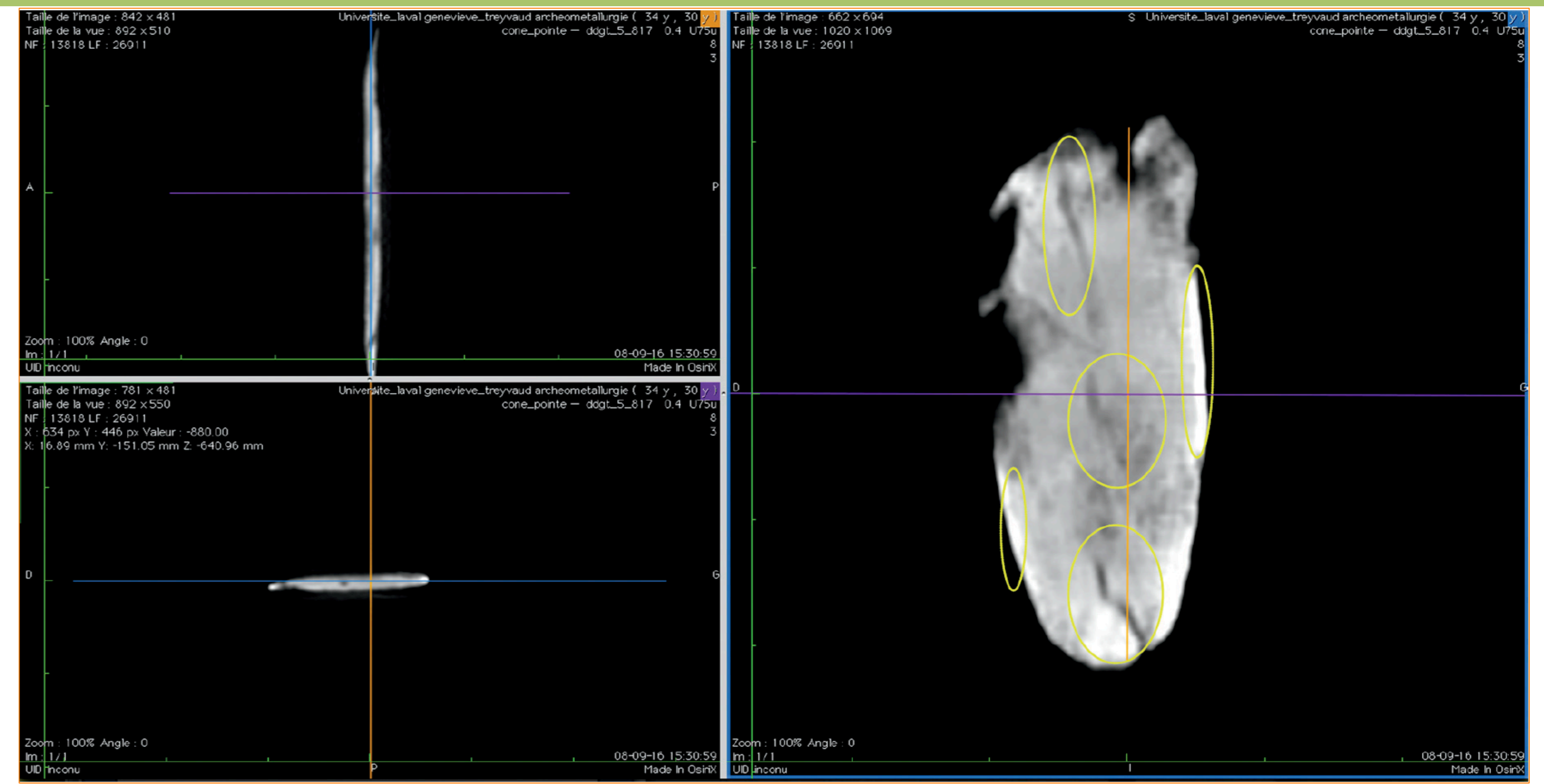
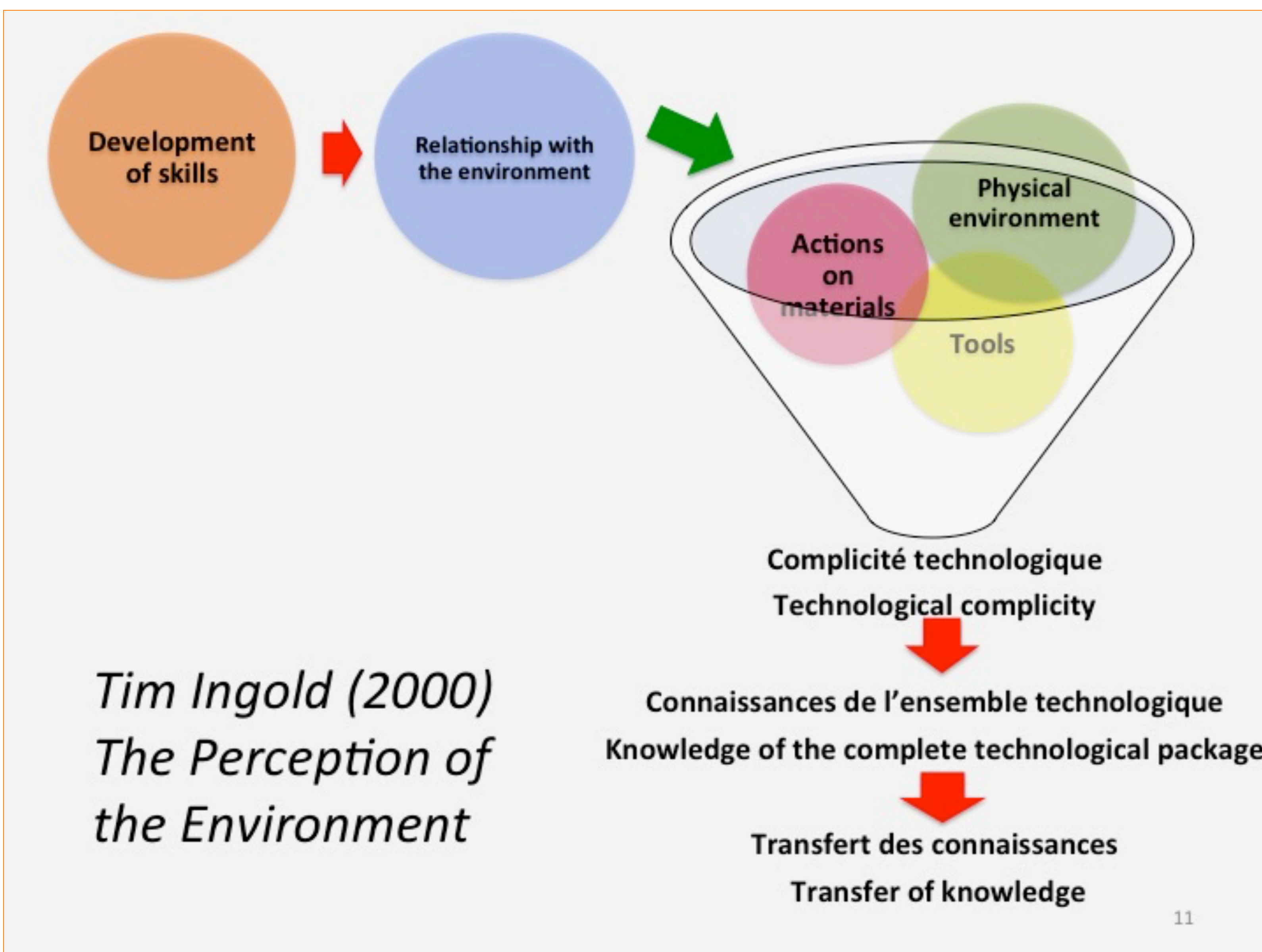


Fig. 1. Reconstruction and specifications from Tomography to sample CT n° 817.

2- APPROACH

Regarding the archaeometallurgical studies, the choice of the characterization method should be dictated by the archaeological inquiry and based on four main groups. The first brings together the problems of corrosion and conservation of metal objects. The second is the study of the alloy proportion. The third is the study of the development of metals working technology and elaboration of object. These help to rebuild the « chaînes opératoires » and, by extension, to highlight the social and environmental impact of metallurgical production. The fourth and final issue is the origin of minerals used for producing metals and objects. The origin of materials allows archaeologists and historians to approach the raw material circulation and to answer questions about the technological, economic, social and political operations. This approach to understanding the « chaînes opératoires » of American Indians and European artisans of the period of contact and the French regime in New France involves the contribution of archeology, materials engineering, anthropology and history.

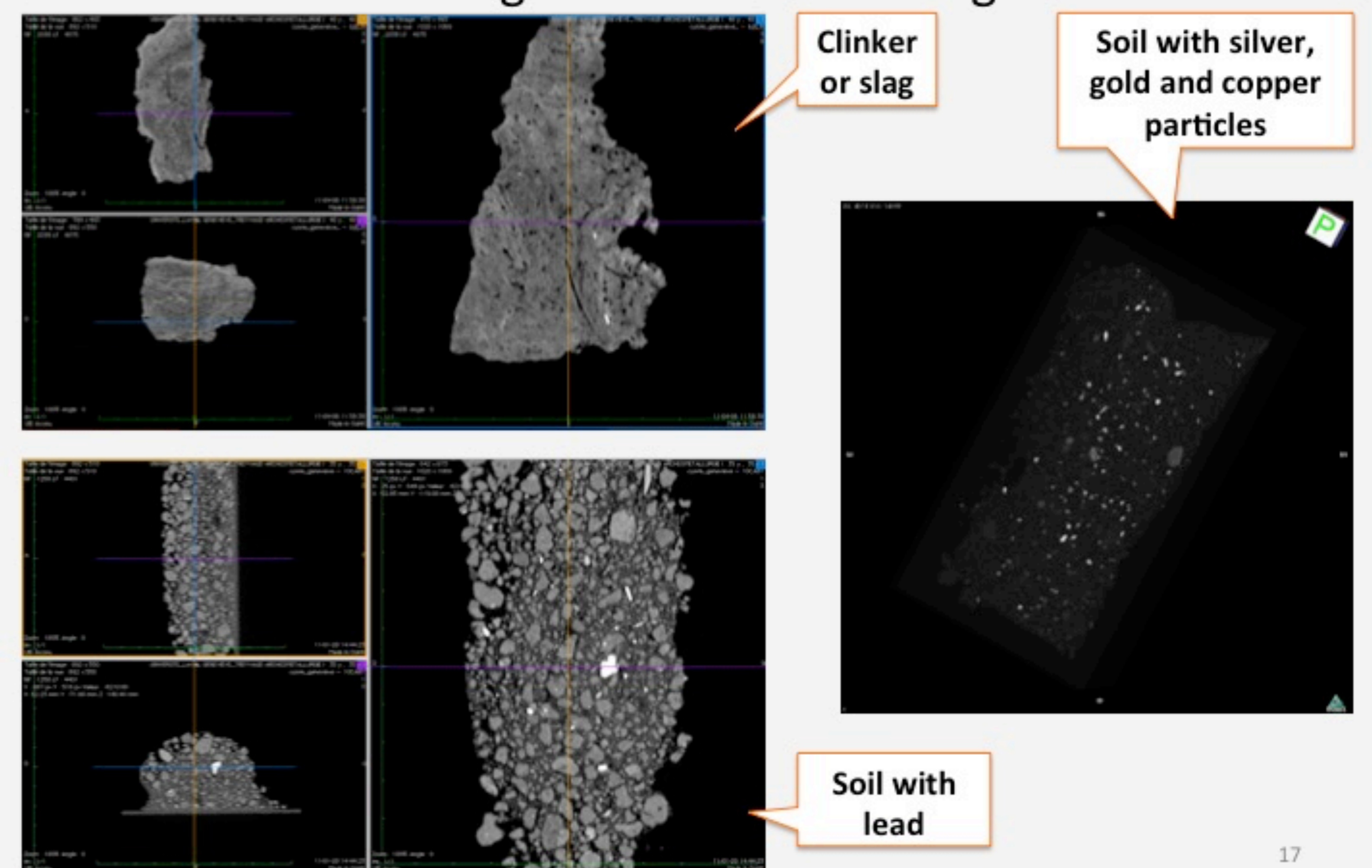
3- METHODS

The Tomography can identify the material with which the artifact was designed and also to characterize its manufacturing process. Visual and density data into identify such materials present in the object under study, or the type of alloy of an artifact, and characterize the inclusions or the other material intake at recycling. Visual analysis during the X-ray passing through the object and 3D reconstruction show the physical transformations that the object during its manufacture. The marks left by tools, repairs and ornamentation are also visible. The data acquired by the scanner is received in DICOM format, then processed and analyzed on OsiriX. The results are recorded on analysis card index for each subject studied. They are presented for all studied artifacts of a summary table. Each artifact has been taking a morphological data, to complete the engineering analyzes of materials and technological analysis.

4- RESULTS

For this research we have remains to incomplete for « chaînes opératoires » : the finished objects, tools and some metal scrap, artifacts during manufacture and soil samples for metallurgical work. The identification of manufacturing processes started by collecting all the clues related to metal production and artisans. Each evidence have been studied individually compared and placed in an « chaîne opératoires » in which the missing process of an archaeological point of view are reconstructed. Our contribution to knowledge is twofold: the first is the production of a archaeometallurgy technological study allowing for a Native American craft production. The second results from the use of Tomography as a method of analysis of metal objects. These results allowed the reconstruction of metallurgical « chaînes opératoires » of colonial power sites and peripheral sites. This documentation allowed us to demonstrate that on sites of colonial power, Quebec and Montreal, metallurgical work consisted of metallurgical testing, exercise of the metallurgy of iron and copper, repair and manufacture according to the needs of Colony (hardware, edge-tool, etc.). Metallurgical production at the peripheral site of the colonial power, the Fort Témiscamingue, trading posts Pano, Chicoutimi, Métabetchouane and the Bérubé site DDGT-9 reveals shaping processes based on metal recycling of European origin.

Example : Characterization of archaeological soils from metal working areas on archaeological sites



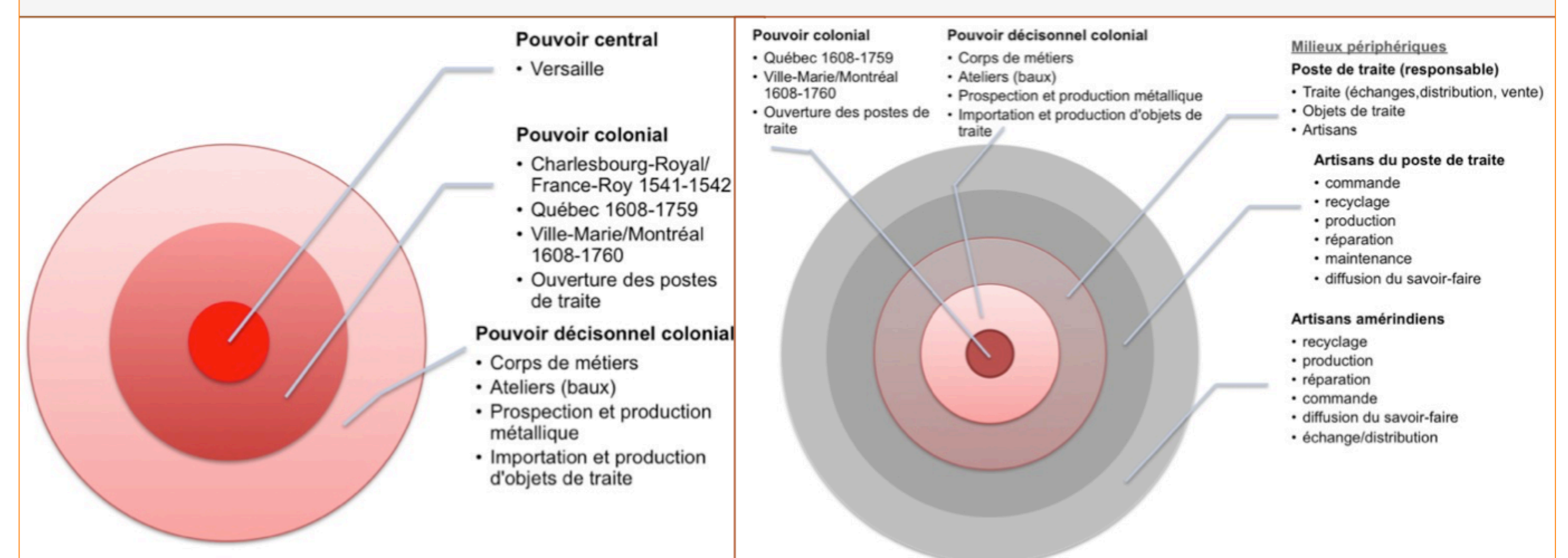
4- L'HUMAIN DERRIÈRE LE GESTE, L' ESPACE TECHNOLOGIQUE : comparaison et relation The human behind the gesture, the technological sphere, comparisons and relationships

• L'espace technologique des centres du pouvoir colonial / The technological sphere of colonial power centers

- Colonial administration and control
- Metalworking specialists
- Workshops are organized and hierarchical
- Metal ore prospecting and assays
- Iron and copper metallurgy
- Craftsmanship

• L'espace technologique des sites périphériques / The technological sphere of peripheral sites

- Freedom in organization and management of production
- Presence of an « official » craftsman/metalsmith
- Presence of First Nations craftsman/metalsmith
- Primacy of links with aboriginal groups
- technical knowledge of an armurier
- Craft, recycling, repairing, new creations
- Workshops and tools that are restricted and personal



THANKS !

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