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Carpenter Hoards in Minoan Crete, tools for woodworking ? Technological and functional study of copper alloy tools from Malia.

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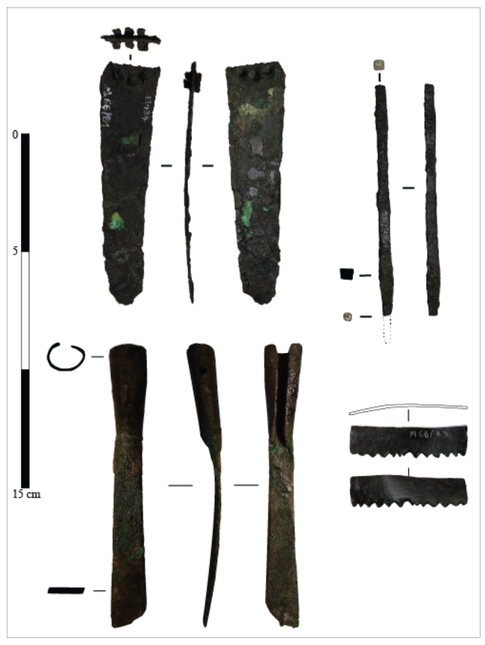
MAIN RESULTS

- Two carpenters hoards in Malia (Quartier Mu) appear to be well attested woodworking toolkits both typologically and by tool association. Lithic tools are a complementary association (Karimali 2008) to metal toolkits for woodworking (Loescher 2021).
- Tool hoards alone are not a significant proof for a workshop (Evely 1988) they should rather be considered as toolkits (Procopiou 2013) storaged pendind future use. They can create a workspace “wherever [they are] laid” (Gorgues 2017)
- A first referential of archaeological and experimental traces.
- No woodworking related traces could be identified, but manufacture traces such as polishing marks and indirect percussion (teeth setting) were recognized.

AN ONGOING RESEARCH PROJECT

A PhD Thesis started in 2021 on "*Woodworking in Minoan Crete (3200-1100 B.C.) : tool hoards, contexts and technology*" with the aim to expand the investigation method to all 26 Cretan hoards previously identified as potentially related to woodworking.



CARPENTER HOARDS IN MINOAN CRETE, TOOLS FOR WOODWORKING ?

TECHNOLOGICAL AND FUNCTIONAL STUDY OF COPPER ALLOY TOOLS FROM MALIA

INTRODUCTION

How may we study woodworking when the material is not preserved in the archaeological record ?
During the Bronze Age in Crete (3200-1100 B.C.) there are hoarding practices of metal tools within the settlements (Blackwell 2018). 13 of them have been referred to as "carpenter's hoards" (Branigan 1969 ; Deshayes 1960 ; Evely 1993 ; Poursat 1985). From a first synthetic study (Loescher 2020) we identified a larger panel of 26 "tool kits" (Procopiou 2013) potentially related to woodworking. These attributions, which are based on typology and associations within the assemblages, remain however uncertain. The difficulties are due to the versatility of the tools and the use of the same techniques (sawing, cutting) in wood, stone and bone working.
This research therefore questions the functional attribution of metal tool deposits in Minoan Crete through a use-wear and an experimental approach.

METHODS

Use-wear analysis
Application to metal artifacts is a recent field in archaeological research (Dolfini, Crellin 2016 ; Kienlin, Ottaway 1998)
Referential of traces used (Gutiérrez, Munoz Moro 2020 : table 1).
Material : Optical Microscope Dino-Lite (x20 and x50).
Experimentation
6 saws whose versatility is known from their archaeological context (Poursat 1996).
Recent developments of archaeological experiments around tools in the aegean world (Maragoudaki, Kavouras 2012 ; Maragoudaki 2019 ; Löwe Fri 2011)
Collaborations with :

- *François Allier (Fonderie de l'Oppidum) for the reproduction*
- *LTDS (Tribology and Systems Dynamics Laboratory UMR 5513) for analysis*

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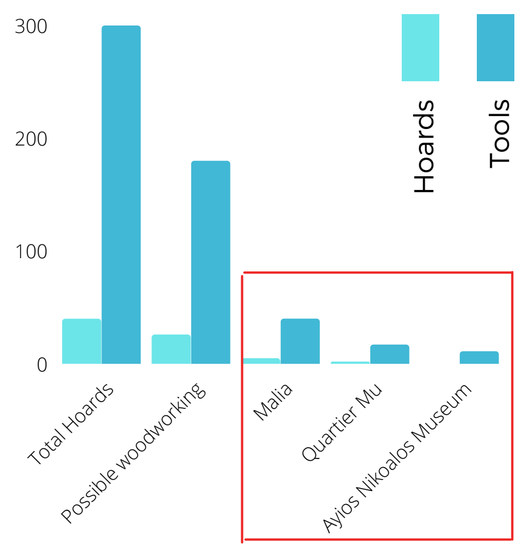
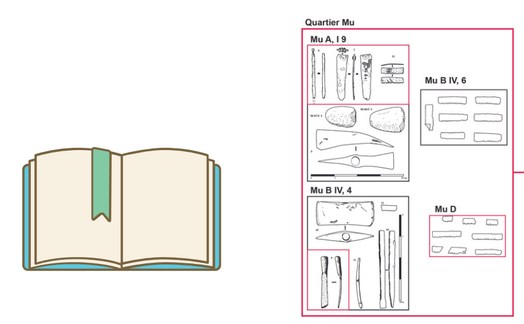
SAMPLE STUDIED

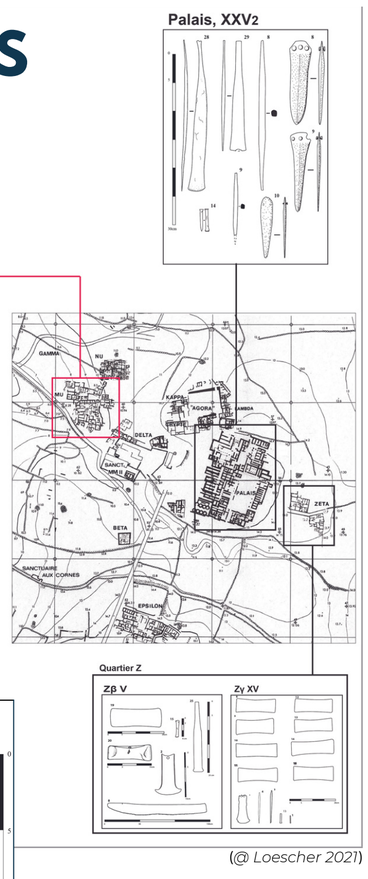


Malia, Quartier Mu (Hoards A I9 et B IV4) :

- *2 "administrative" buildings*
- *MM II (~1700 B.C.), destruction layer*
- *fallen from upstairs*
- *only tools ; typologically related to woodworking (modern parallels)*
- *association of lithic and metal tools*

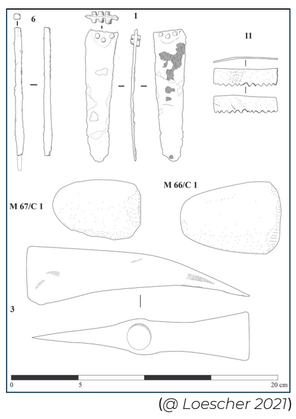
CONTEXTS





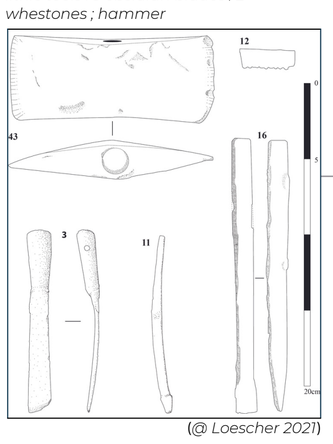
(@ Loescher 2021)

Hoard A
Building A, corridor I 9
metal tools : drill ; knife-razor ; saw ; axe-adze
lithic tools : 2 axes



(@ Loescher 2021)

Hoard B
Building B, room IV 4
metal tools : double axe ; saw ; adze ; punch (or drill) ; chisel
lithic tools : 3 obsidian blades ; 2 whestones ; hammer



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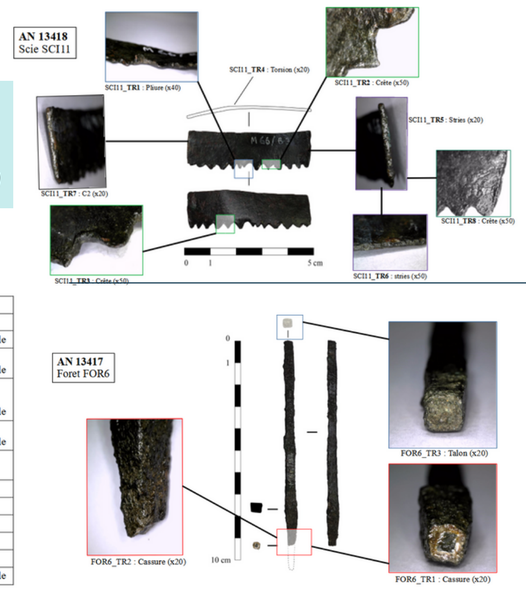
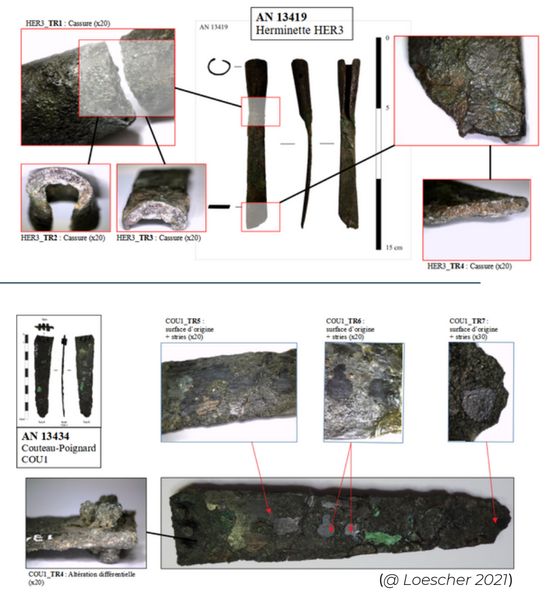
USE-WEAR ANALYSIS ARCHAEOLOGICAL TOOLS

11 archaeological tools analyzed
[Ayios Nikolaos Museum of Archaeology]
8 from Hoards A et B + 7 little saws
(Optical Microscope Dino-Lite : x20 and x50)

Résumé des types de traces observées sur les outils		
Type de trace	**Outil et ID_Trace**	**Interprétation**
Cassure	FOR6_TR1-2	Altération post-dépositionnelle
	HER3_TR1-2-3-4	Fabrication Altération post-dépositionnelle
Torsion	SCIE11_TR4 13439_TR5	Utilisation/maniement Fabrication Altération post-dépositionnelle
Pliure latérale	SCIE11_TR1	Utilisation/maniement Altération post-dépositionnelle
Crête	SCIE11_TR2-3-8 13439_TR4	Fabrication
Stries	SCIE 11_TR 4-5	Fabrication
	COU1_TR5-6-7	Polissage
Altération différentielle	COU1_TR2-3	Emmanchement
	COU1_TR3-4	Sens des rivets
Bord défectueux	13439_TR3	Utilisation
Résidus	13439_TR1-2	Altération post-dépositionnelle





(@ Loescher 2021)

EXPERIMENTATION

6 versatile small saws reproduced and tested
Saw model from Quartier Mu, Hoard A et B (Evely 1993 : type 1)
3 different materials :

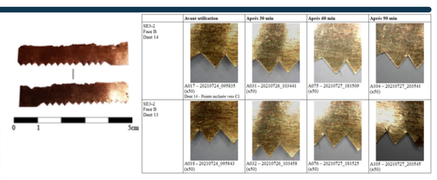
- *wood (olive tree)*
- *bone (bovid)*
- *soft stone (steatite)*

2 variables :

- *bronze alloy (tin 3% and 8 %)*
- *worked material*

3 sessions of 30 min work, observations carried after each session

Reproduction of saws being used on the 3 different materials (Loescher 2021)



Résumé des types de traces observées sur les scies expérimentales		
Type de trace	**Outil et ID_Trace**	**Interprétation**
Résidus	SE3-1_TR1	**Utilisation** Dépôt lié au travail du bois
	SE8-2_TR1; SE3-2_TR4	**Utilisation** Dépôt de moelle et de chaire
	SE3-3_TR1; SE8-3_TR2	**Utilisation** Dépôt de poudre de stéatite
Émoussé	SE3-2_TR3; SE8-3_TR1; SE8-3_TR2	**Utilisation** usure des dents par frottement
Entaille et pliure latérale	SE3-2_TR2; SE8-2_TR2	**Fabrication** Mise en forme des dents à la cisaille
Stries	SE3-2_TR1	**Fabrication** Martelage
	SE3-3_TR2	**Utilisation** raison exacte inconnue

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