

# THE RECONSTRUCTION OF A 7th c. AD SMITHY IN CENTRAL ITALY

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Lombardic belt buckles found on excavation



## Introduction

The excavations carried out since 2005 at Aiano-Torraccia di Chiusi, near San Gimignano (Siena) in Tuscany by the team of the Université catholique de Louvain, directed by Prof. Marco Cavalieri, have un-

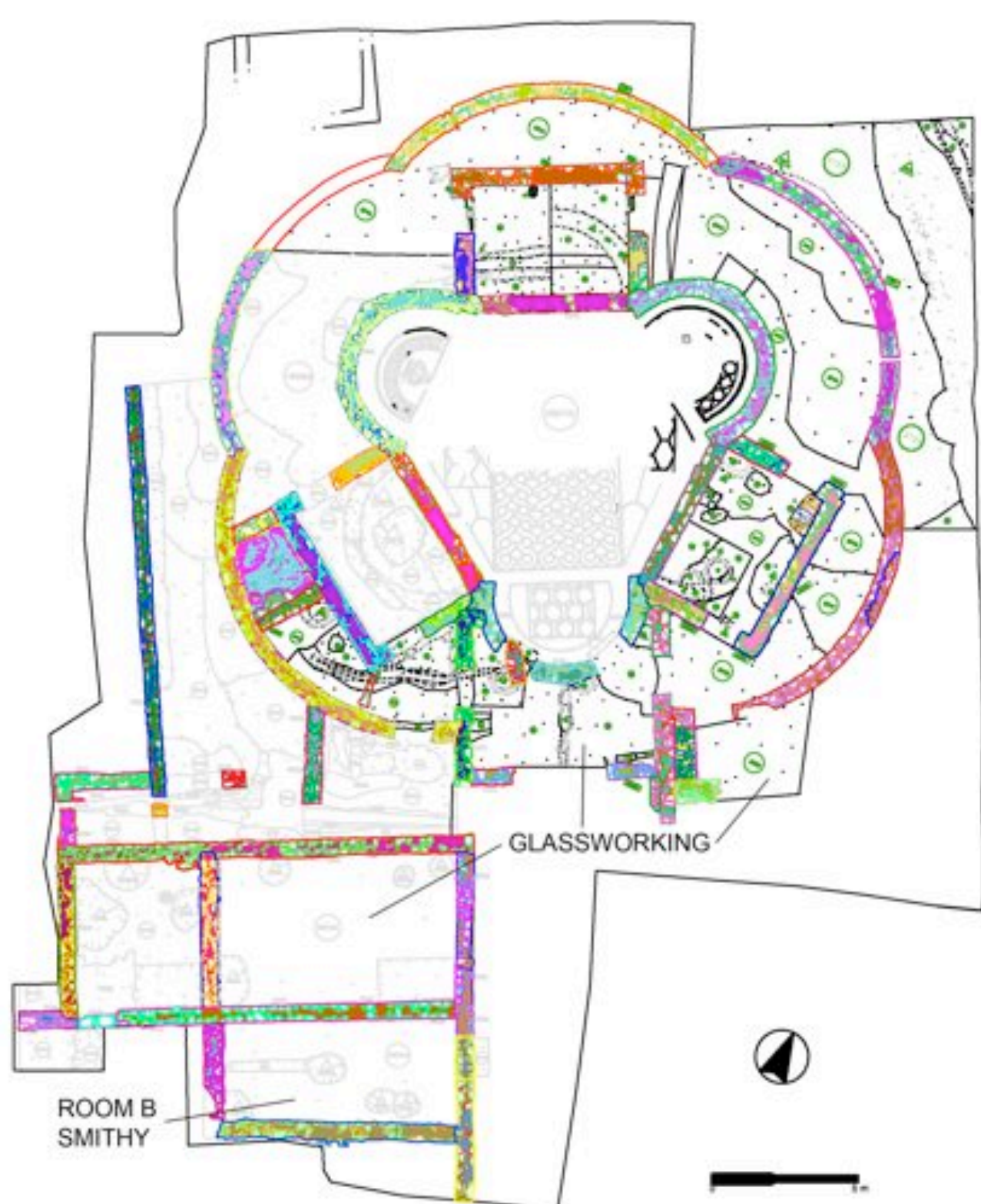


Fig. 1: Plan of the excavation at Aiano-Torraccia di Chiusi

earthed a large Roman villa, shown by geodagnostic surveys to extend over 1 hectare. Only a small part has been excavated (2005-2009) as part of the international project "VII Regio. Elsa Valley during the Roman Age and late Antiquity".

## The Lombardic workshops

The workshops were connected one to another and provided with water from a channels system fed by a higher reservoir. They include a ceramic workshop, three rooms in which glass mosaic tesserae were recycled, and a smithy. From the indications gathered from the working remains behind the North/North-East wall, there was also the production of copper-based items and of gold.



Fig. 5: Room B after excavation

## The smithy

The workshop excavated in room B can be reconstructed in detail. In the rendering the smithy is covered by a wooden roof open at the sides to allow the escape of smoke and gases from the forges. There are two large pits for water. The central pit is connected to the water system. On the side there is a double tempering pit. At the bottom of the deeper pit iron objects, such as a sickle and a knife, and a jug

is mounted on a log placed as close as possible to the forge. In the second rendering, the anvils are placed on the floor, close to the forge.

No examples of bellows are known from this period and area, therefore no reconstruction was attempted here.



Fig. 6: The sandbed with iron wires still in situ

Near the entrance there was a sand bed (3-4 cm thick) on which thin iron rods have been recovered. The very clean sand had been brought from elsewhere and was an important working material. It was used as support for the hot objects and spread on the red-hot iron. The sand melted and formed a silicate layer which protected the metal from oxidation. In a hole in a corner of the room there was also a large clay vessel, most probably used for storage or for drinking water.



Fig. 2: Graphic reconstruction of the smithy, view from SW/S



Fig. 3: Graphic reconstruction of the smithy, view from NE/E

The villa is dated to the 3rd -5th c. or beginning of 6th c. AD. The most striking architectural structure is a representative room with 6 exedrae and a mosaic floor, surrounded by a circular passage (*ambulatio*) with 6 lobes.



Fig. 4: Detail of one of the water pits used for tempering, showing the red Fe oxide layer

(represented here in the corner of the room) have been found. The shallower pit probably contained a vessel filled with oil or brine, used in some cases instead of water, to obtain a less hard and close-grained metal. With oil or salt water the quench is less severe and slower and the characteristic structure of troostite, i.e. a softer steel is obtained. To our knowledge this is the first time that a Lombardic double tempering pit is documented. On the walls of the pits there is a thick bright red layer. The analyses showed that the colour is due to Fe oxides, as expected when the water is employed for the tempering of steel.

## The smithy debris

A vast amount iron working debris, slag and hammerscale, forge residues and fragments, but also iron objects and fragments have been recovered from the excavated areas. Slag and hammerscale have been sampled and are now under study. The analyses carried out up to now, evidenced different compositions and several types of slag. The smithing activity in the workshop concerned mainly the working on steel, as 70% of the slag analysed is of glassy, silica-rich type, however some of the iron-rich slags show that recycling of iron was also practiced.

## The Langobards

The building was abandoned in the 6th c. AD. Between the 6th and the 7th c. AD Lombardic (Langobard) artisans from Eastern Europe, settled down in the villa remains and installed various workshops.

The Roman villa was abandoned in the 6th c., but shortly after, between the 6th and the 7th c. AD the complex was occupied by a group of people who installed workshops of different kinds in the *ambulatio* and adjoining rooms. Finds such as belt-buckles and -fittings suggest that the artisans were the Langobards who invaded Italy in this period.

A Roman threshold stone used as working support and the traces of two forges of simple loose stones, have been found. The wall at the back of the forge is altered by the heat. Around the forges hammerscale and slag have been found and the clay floor is visibly reddened. The remains show that the forges were often reconstructed.

No tools have been found, as they were too precious to be left back. For this reconstruction simple tongs, hammers and a common type of small anvil, with a roughly square shape, were chosen. In the first picture, with two smiths working on a large object (plenty of elbowroom was required), the anvil

## Conclusions

Lombardic workshops dated to this period, have never been thoroughly studied before in Italy. The excavation is still ongoing and it looks as if larger amounts of working debris will be unearthed. Apparently the workshop has been in continuous use for a long time. During the last excavation campaign in 2009 a massive stone forge of a totally different type has also been excavated outside of room B in one of the adjacent spaces. Interestingly it does not seem to have been ever used. The data collected at Aiano-Torraccia give a unique insight in the working of iron of the early Middle Ages.