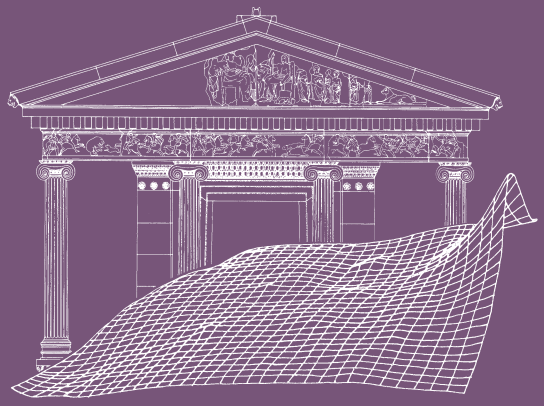

KNOWLEDGE, ANALYSIS AND INNOVATIVE METHODS FOR THE STUDY AND THE DISSEMINATION OF ANCIENT URBAN AREAS

KAINUA 2017

Proceedings of the KAINUA 2017 International Conference in Honour of Professor Giuseppe Sassatelli's 70th Birthday (Bologna, 18-21 April 2017)

edited by
Simone Garagnani, Andrea Gaucci

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All'Insegna del Giglio

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THE ARCHAELOGICAL SETTLEMENT OF MONTE BIBELE (BOLOGNA)

Between 375 and 350 BC, a Celtic presence became established alongside an Etrusco-Italic group in the village of Pianella di Monte Savino, on Monte Bibele massive. It is not so widely documented by finds relevant to that culture found in the settlement, extremely few, but by the grave goods from the nearby peack of the same mountain, the burial site of Monte Tamburino, where typical Celtic objects, especially ornaments and weaponry, came to light alongside typical Etruscan elements. A similar permeation of Italic and Celtic traits may be found in the finds from the nearby necropolis of Monterenzio Vecchio, in graves showing affinities to Bologna and its territory, as well as in urban contexts in the Po Valley and in other Apennine highlands sites. All of these indicate a more or less continuous line of military outposts along the ridges from the Adriatic to the Tyrrhenian sea, from the Marche (Montefortino di Arcevia) to Liguria (Cafaggio).

Sometime between the end of the 3rd and the beginning of the 2nd century BC, around the time of the routing of the Carthaginian armies, the subsequent and final defeat of the Boii, the foundation of roman Bononia, and the construction of the *via Aemilia* and the *via Flaminia Minor*, the village ceased to exist. The destruction of the hamlet of Pianella, and the contextual and definitive abandonment of the whole Monte Bibele massif, are substantiated by a burnt layer, whose origins are still subject to investigation (Penzo 2016, with bibliography).

The inhabited site, occupying maybe 7,000 m², parts of which have yet to be investigated, was founded where cliffs and inaccessible slopes provided a natural defensive barrier, at first clearing the area of trees, then digging out about ten consecutive terraces, aligned NE to SW, for the erection of buildings (Fig. 1).

A.P.

The builders of the Pianella hamlet followed an exact and coherent plan, implementing it according to the various characteristics of the terrain morphology (Fig. 2). The terraces, earthen platforms supported by stone walls, were similar to miniature city blocks of regular size; on these, about 25 living units were built, plus other buildings for common use – storehouses and a cistern/icehouse. The recurrent module for each dwelling was approximately 4×8 m. These features gave the settlement a well-defined surface-to-volume ratio, allowed a functional distribution of dwelling vs. street surface, and performed the task of remodelling the slope alignment in order to consolidate

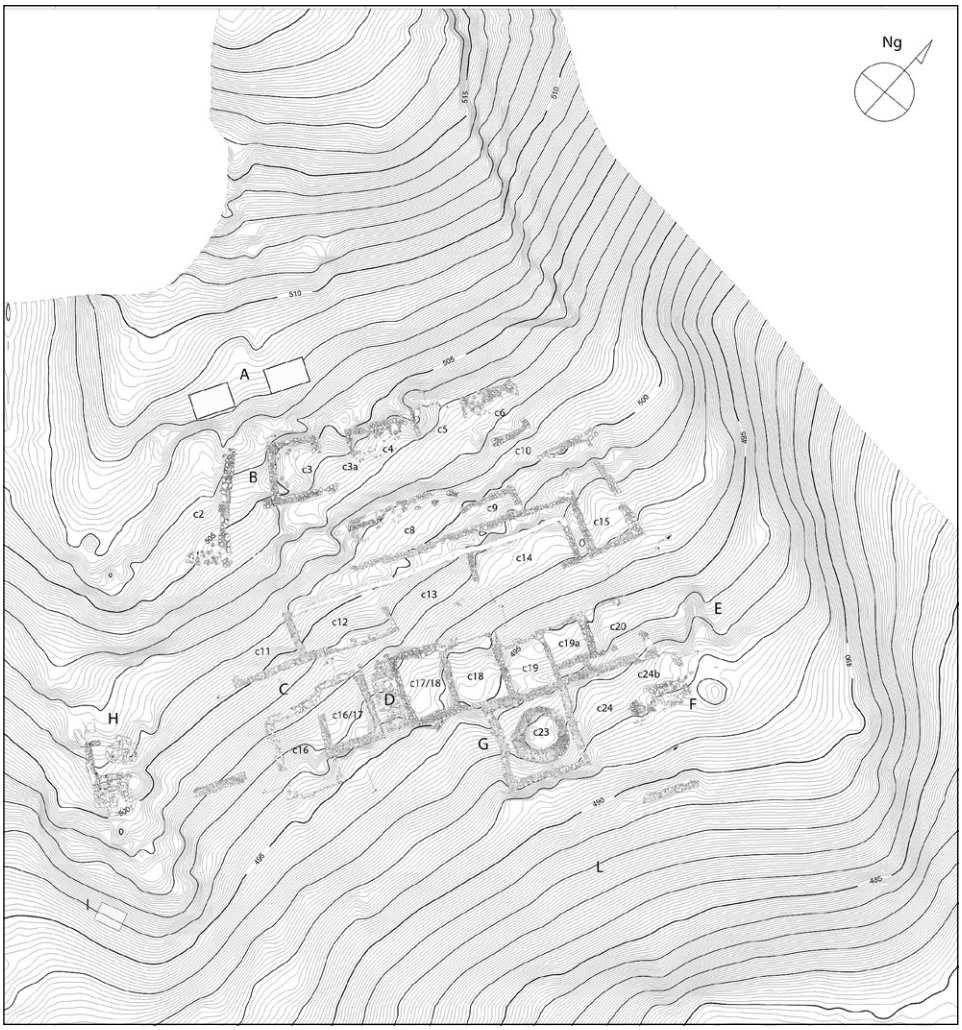

Fig. 1 – Pianella di Monte Savino village's plan. Designers: I. Devoti and A. Gottarelli.

the terrain. The wall structure consisted in large chunks of locally quarried sandstone flakes, its main function being that of consolidating the terracing of the mountainside (Gottarelli 1987) (Fig. 3).

About us, the archaeologists of Te.M.P.L.A. – Research Centre for Multimedia Technologies Applied to Archaeology – of Bologna University's Department of History and Cultures, we have made, over the last decade, different models of Pianella's dwelling. The first one was virtual, followed

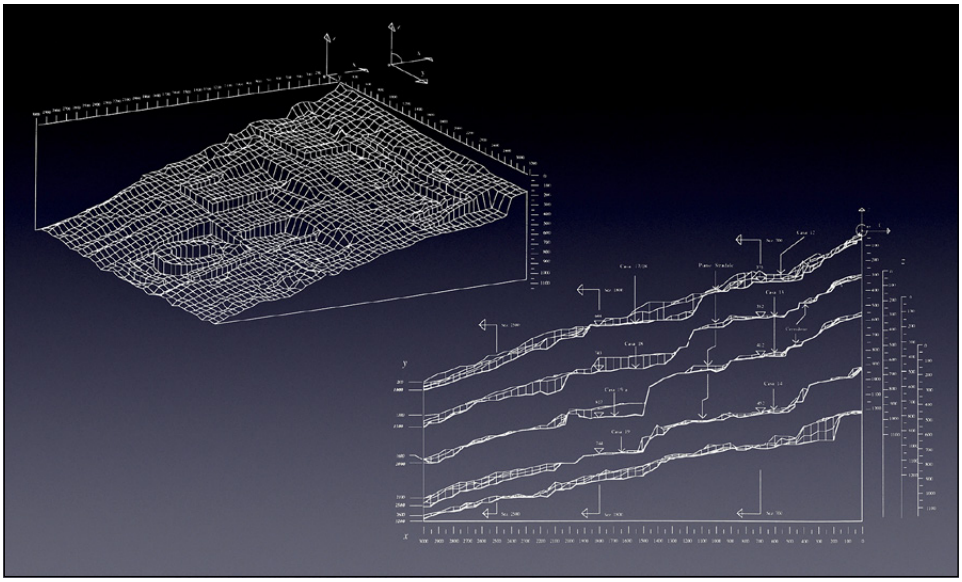

Fig. 2 – The volumes of the Pianella hamlet.

Fig. 3 – The walls consolidate the terracing of mountainside.

by a second one – a real model made nearby the Museum of Monterenzio – lastly by the two new buildings realized *in situ*, due to EU founds for Emilia Romagna's development, in renovating the archeological and naturalistic area of Monte Bibele (Por Fesr 2007/2013). An uncommon example in which the first virtual 3D models have been replaced by real reconstructions, based on archaeological evidence and experimental methods. This experience showed the gaps in 3D data-system compared to those problems that can be evaluated only throughout the effective construction of a real model.

The data in our possession for reconstructing the Pianella dwellings are in part based on direct, objective evidence, derived from archaeological excavation, and in part on indirect elements from historical sources (rare iconographic representations of Iron Age dwellings, and Roman literary sources as Vitruvius), traditional architecture having similar characteristics, and, finally, common-sense considerations on the functional and structural characteristics of the model (as in Marzatico, Stelzer 1999).

The first step was elaborating a general hypothesis on the volume of the woodwork in order to arrive to a reasonable structural solution. The lack of roofing material such as tiles indicated that the dwellings had been modelled on traditional solutions which called for building strategies based on roofing materials available *in situ*. For this reason, the unique possible solutions would have been wood, brushwood mesh covered with earth, straw or aquatic reed thatch. Comparison with traditional models suggested that in order to insulate the structure from rainwater, the slope of the roof had to be extremely steep, much more than what is achieved with tile roofing: around 60° when straw or reeds are resorted to.

By comparing this information with the fact that the buildings had been erected on terraces, with the uphill side dug more than 2 m into the hillside, we came to the conclusion that the woodwork had been set up on two levels and was markedly vertical, over 7 m from the ground to the roof ridge.

F.P.

Starting with the floor plan, we took Pianella Dwelling 14 – rectangular, 4×8 m – as a model. Excavation here had clearly shown the position of postholes laid out on three lines, delimiting the surface and pinpointing the location of the vertical woodwork (Fig. 4). We then proceeded to erect posts in a manner consistent with this pattern: four posts in the side rows and three in the central one corresponding to the ridge, with a distance of 2 m in the case of the former, 4 m for the latter (Fig. 5). We selected chestnut wood, as it is easily available on Monte Bibele, quite strong, and exceptionally durable.

After setting the posts, the horizontal structure was erected: the upper woodwork, with double beams to support the tall central posts, and the lower beams meant to hold the floor planking. Wooden joining features, such as

Fig. 4 – The vertical woodwork of the house.

Fig. 5 – The distance of the posts.

Fig. 6 – The floor planking.

Fig. 7 – The roof's purlins.

wedges and plugs, were used, but also iron nails, as proved by the archaeological excavations. The floor planking was not preserved under the collapse levels of the dwellings, but traces of it have remained as impressions underneath the clay firedogs (Fig. 6). The fact that the planking level was elevated above the ground is a reasonable hypothesis, as it would have allowed ventilation and proper insulation from ground humidity. The verticality of the structure

Fig. 8 – Wattle made of freshly-cut hazelnut branches.

suggests the dwelling's elevations of two floors, with a second pavement of planks laid out over beams.

Then we added the rafters and ridge beams. These were generally designed to allow the woodwork to provide a safe support to the roofers during construction. In order to provide an accessible framework, notches were cut into the beams at 50 cm intervals in order to house the purlins (Fig. 7). The rafters were hoisted two by two so that they would deflect the load in opposite directions converging towards the central line of posts. The lower hinged joints of the twin horizontal beams were fastened with wooden pass-through plugs. The ridgepoles were placed last, and fastened in the joints formed by the ends of the rafters and the tip of the central posts. The horizontal woodwork of the roofing consisted of small, round-section purlins, wedged into the notches cut into the rafters. The distance between purlins ensure easy access for the roofers and facilitate the subsequent assembly of the roofing material.

That wattle was used for the vertical structures is documented by the excavation. Specifically, numerous fragments of fired packed clay were found, impressed on one side by the wattle braiding, making it likely that this technique, widespread and well-documented in traditional architecture, had been used to infill the planking. We therefore pegged staves onto the horizontal beams at an interval of approximately 40 cm, and then proceeded to add horizontal withies of freshly-cut hazelnut branches, suitable for their mechanical characteristics of resilience and strength (Fig. 8).

The lack of roof tiling material in the collapse layers of the dwelling indicated that the roofing on the buildings followed traditional solutions making

Fig. 9 – Roof material: water reeds.

Fig. 10 – A Pianella's house full reconstruction.

use of materials readily available on-site: wood, leafy branches, earth, straw, or water reeds (as in Ortalli 1995). There was no way of choosing anyone else of these alternatives from an objective basis, so we opted for the last, in consideration of the fact that this material had been widely used in ancient Italy and was readily available also in hilly territory. Before being fitting them to the roof frame, the reeds were selected according to length and packed into

rectangular sheaves 140 cm long and about 25-30 cm thick, tied and held rigid lengthwise by means of laths (Figs. 9-10).

In order to complete the roof, the sheaves had to tied to the purlins. The truss was used much in the same way as a ladder for the roofers to work from, as well as a support for the roofing material. Reed sheaves were assembled along vertical lines, bottom to top, upper sheaf overlaying the lower one. The perishable, leafy part of the sheaf was alway set on the uphill side of the roof, so that it would be always covered by the reeds of the sheaf immediately above it. This conferred protection from weathering, although the foliage would remain visible from the inside of the building. The traditional wooden implements (large needles, leggetts, combs) used to fasten the sheaves to the purlins were manufactured on site.

The Monte Bibele dwellings had peripheral walls ranging from 150 to 200 cm in height, their main purpose being that of containing earth thrust from the banks of the terracing dug out of the hill-slope. Walls were laid in rows of local sandstone flakes alternating with mud mixed with manure and straw to fill in the cracks and also act as a binder. Generally, the postholes found in the course of the excavation show that the relevant posts supporting the woodwork were leaning against the walls on the uphill slope, but had been incorporated into the walls on the other sides. According to our reconstruction, this detail proves that the walls meant to contain the terracing on the uphill side of the slope were erected first, and that the wooden planking came later. Only subsequently were the side walls put in, incorporating and strengthening the lines of lateral posts.

Daubing the wattle came last. The traditional mixture – clay, manure and straw – was altered by adding cement mortar. This improves durability and reduces the need for periodical maintenance, extremely frequent in ancient times. Daubing was effected by hand, which proved to be a very suitable way to make the mixture penetrate within the wattle and smooth out the outside surfaces. The inner part of the walls was left unmortared to allow visitors to see the underlying structure of the wattle (Gottarelli 2015).

A.G.

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ABSTRACT

Monte Bibele is an archaeological settlement of the 4th and 3rd century BC with a village, a necropolis and a votive deposit. Earlier, during the 14th and 13th century BC, in the same area there was a small village of sub-Apennine facies attributable to the late Bronze Age. The Second Iron Age settlement is just a part of a larger demographic reorganization of the Apennines, as is also proved by the recent discovery of the Monterenzio Vecchio necropolis and votive deposit, on the opposite side of Idice Valley. These are small settlements located close to the main routes of both sides of the Apennines and populated by Italic (Etruscans, Umbrians, Ligurians, etc.) and transalpine peoples (Celts) allied to control the surroundings. Of the architectural structures of Monte Bibele, the best known are those of the village, in the part of the massive called "Pianella di Monte Savino". It has an Etruscan foundation, over an area of about 7,000 m², in part still to be explored, and documented in its final phase in the late 3rd century BC, when the village was sealed by a sudden fire. Archaeologists of Te.M.P.L.A. (Research Center for Multimedia Technologies Applied to Archaeology of Bologna University's Department of History and Cultures) over the last decade, have made many models of houses at Pianella. Reconstructions are based on direct feedbacks (archaeological data) and indirect comparisons (historical sources, traditional architecture). The first model was virtual, followed by a real one made near the Museum of Monterenzio, and by the two new houses made directly *in situ*, thanks to EU funds for the development of Emilia Romagna used for renovating the archaeological and naturalistic area of Monte Bibele (Por Fesr 2007/2013).

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