A virtual journey through a Roman settlement. Aloria

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Abstract: This article presents the virtual reconstruction of a portion of a Roman Settlement found in Aloria (Alava – Spain). Such reconstruction was carried out using the 3DMAX program. The purpose of the reconstruction is to serve as a graphic base to the ultimate publishing of the memories of the excavation, the monographic exhibition about such settlement that will be soon held at the Archaeological Museum of Alava, as well as the making of a video for the exhibition and its later visualization on the net. It is this latest part, the visualization of the reconstruction on the net under WRML format at http://tempus3d.com, that the article is about.

Key words: virtual reality, virtual archaeology. WRML/VRML. Reconstruction. Education. Roman villa. 3D Modelling.

The virtual reconstruction of archaeological settlements is lately becoming the easiest and most attractive method of transmitting the results of the archaeological interventions to the general public because they are easily understood by everybody. On the other hand, the process of virtual reconstruction of any settlement arises new questions about the openings, roofing, etc, that archaeologists were not used to answer so far, making the analysis of the structures found deeper.

The reconstruction of the Roman settlement of Aloria has an special relevance given the fact that it has been covered, thus being impossible to be visited anymore.

The Roman settlement of Aloria is located in the Orduña valley (Fig.1), where the Nervion river is born and whose riverbed has always been used as a communication route between the Alavan plains and the Cantabric Sea. As a proof of its importance as a crossroad Orduña held the customs house for centuries just because most of the merchandises coming from Castilla had to pass through that strategic spot.

We clearly find three phases of occupancy, all of them dated from the Roman period (Fig.2). In the beginning, in the early 1st century AD, five enclosures were built. During the second phase of the settlement, around mid 2nd century AD, two of the enclosures were enlarged with tiled roofs, one of which led to a cesspool built with a restrain wall, creating a sort of *impluvium*. A sewer was also built to carry the water from the *impluvium*. Besides, four new enclosures were built, three of them were attached to the previous five, and the streets were paved. The last phase took place during the early 4th century AD. The enclosures built so far were falling into disuse and in ruin so a new one was built apparently performing the same functions as the previous ones.

The remains found in Aloria seem to be the stables, warehouses and workshops of a small *villa*. Such *villa* must have been placed a few metres uphill. However the extraction of soil from the place where the *villa* supposedly was, only left a big amount of debris all over the area. Out of the enclosures found in Aloria, none of them is a dwelling in itself. There are two stables, two warehouses, one forge, some attached tiled roofs and a barn in late Empire period. The remains of cow are numerous, as well as those of horses buried in one piece. There are also many slags as a result of a second treatment of metal in the forge. So far no remains have been found to make us think of a first transformation of iron in Aloria, basically because the ovens found were designed to work the metal, probably imported, and were not foundry ovens by themselves. Besides there are no veins nearby and there are not any foundry slags either.

The virtual journey in WRML is just a part of the graphic documentation and virtual reconstruction carried out in this settlement. The virtual reconstruction and the drawing of the plans (Fig.3) were possible thanks to the help and financing received from the Basque Society of Studies. Such reconstruction has several goals, being one of them the recreation of this virtual journey and its consequent release through the web. The reconstruction will as well be used as illustrations in the memories of the excavation and also in the monographic exhibition about the Aloria settlement that will be inaugurated in a coming future at the Archaeological Museum of Alava (Fig.4, 5 & 6). This exhibition will show a brief video focused on the 3D reconstruction of the hypothetical appearance of the buildings. The three phases previously mentioned, 1st, 2nd and 4th century AD, are explained thoroughly in the video.

The planimetric drawing of the settlement was recreated by recording the surface on video and then it was digitized. Afterwards, with the help of a topographic plan and applying the Airphoto program a photo mosaic was created in order to faithfully represent the structures and trace them.

The recreation of the 3D reconstruction was fully made with the 3D Max program (Fig.7). Then it was exported as WRML to be visualized in the web. The 3D program is also being used

in the videos and illustrations of the exhibition at the Archaeological Museum of Alava and in the Memories of the Excavation (Fig.8).

The WRML virtual journey can be found in the web at: http://www.tempus3D.com, this journey is the 2nd phase of the settlement, 2nd century AD, the largest of the three.

First the geographical environment of the settlement was created (Fig.9). To do so, the Orduña valley was 3 dimensionally modelled using the level lines taken from the army topographic service map, scale 1:25,000, with a 20 metres equidistant between curves.

Once the topographic environment was finished the structures were lifted up (Fig 10). This is what you will find in the Internet address cited above. The virtual journey allows visitors to hang around by themselves or through an already determined path, following previously fixed points of view. Visitors can walk out of the predefined path anytime to look around by themselves having the choice of coming back to the journey anywhere.

The use of this kind of constructions is nowadays unquestionable, for it enables the general audience to be attracted to and understand the archeological findings which, otherwise, are only accessible to a few experts in this field. It becomes even more necessary when the referred findings are currently inaccessible or have disappeared, as it is the case of Aloria. The fact that the audience is able to understand and enjoy the archeological exhibition of a settlement with no flamboyant materials is greatly facilitated by 3D technologies. These design technologies allow for photographic-quality illustrations and videos to be made, as well as free visits to the settlement, which stimulate the curiosity of the visitors.

The WRML format allows us to publish the reconstruction on the web, being thus potentially accessible to a large audience at a low cost. Due to the reduced size of the files, WRML format is widely used on the web. The reduced size of the files comes as a result of the 3D environment reduction, in WRML there are no shadows nor light effects and the textures must be flat (2 dimensional) photographs. To sum up, WRML format provides us with a wide and cheap broadcast but it carries with it a great loss in quality. The connections to the net and the zipping programs are getting better and better day by day so it will soon be possible to load photorealistic 3D environments on the web and they will be easily accessible to everyone.

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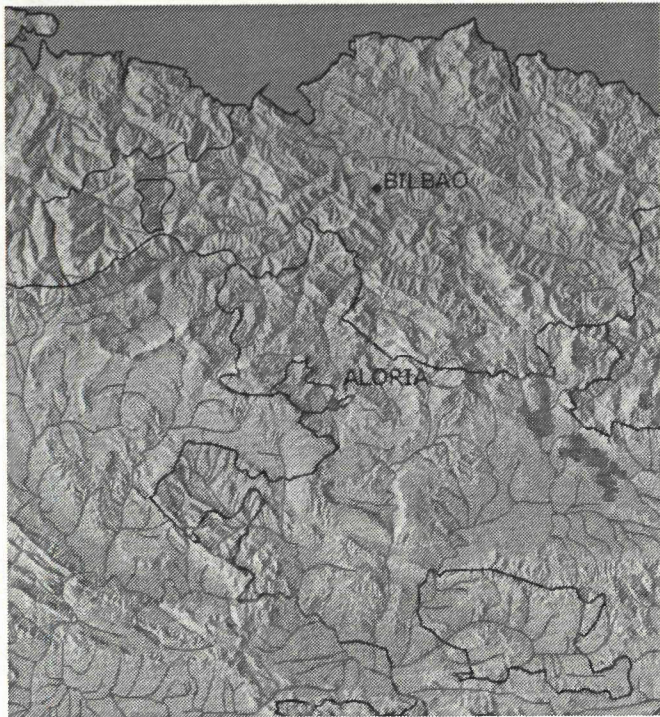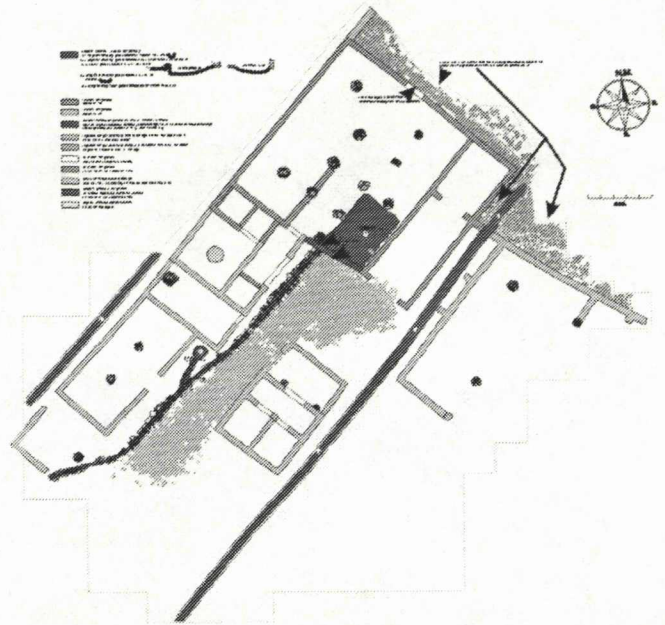
Figures

Figure 1. Aloria's location.

1st phase
2nd phase
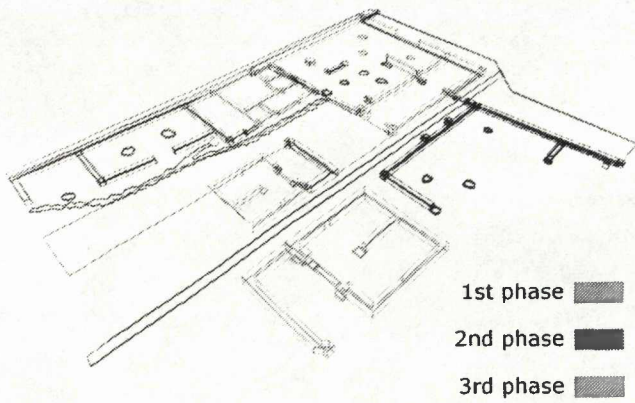3rd phase

Figure 2. Phases of occupancy.

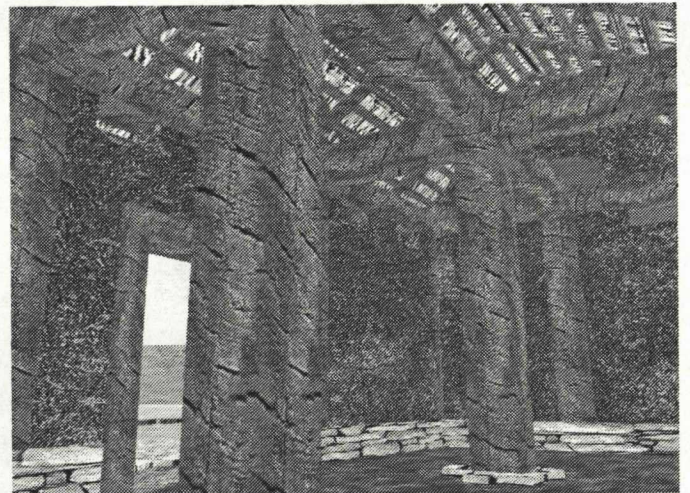*Figure 3. General plan of Aloria.*

Figure 4. Inside the warehouse.
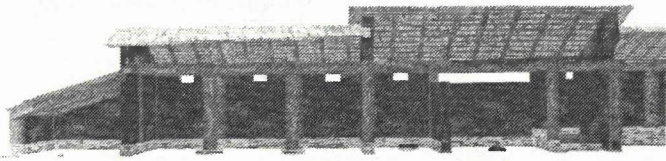

Figure 5. General view.
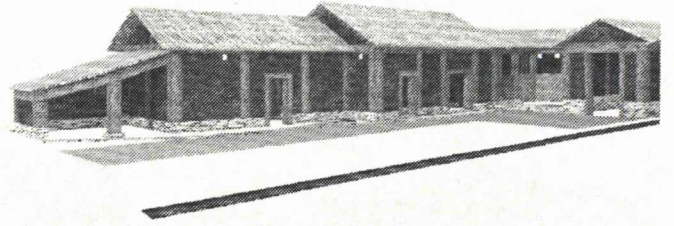
Figure 6. Enclosures M, W, Y.

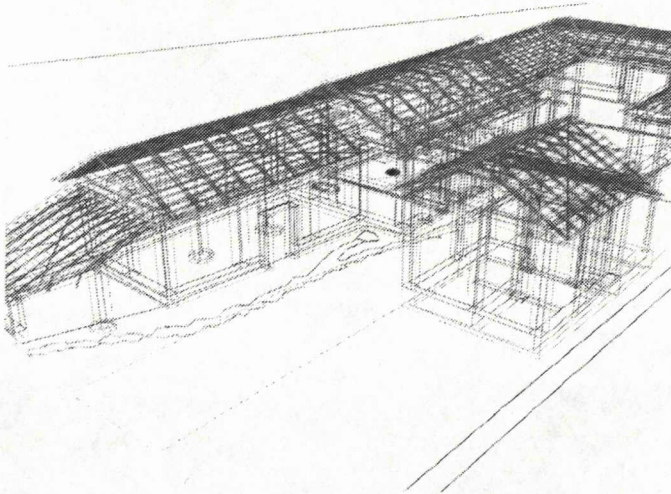Figure 8. Enclosures M, W, Y, at the memories of the excavation

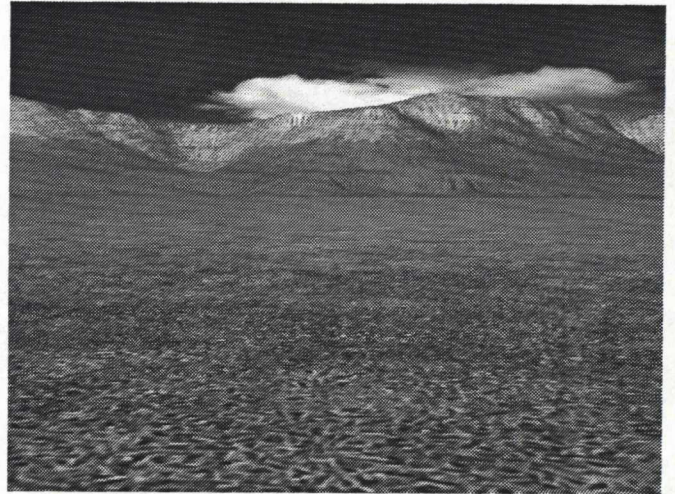Figure 7. Modelling the reconstruction.

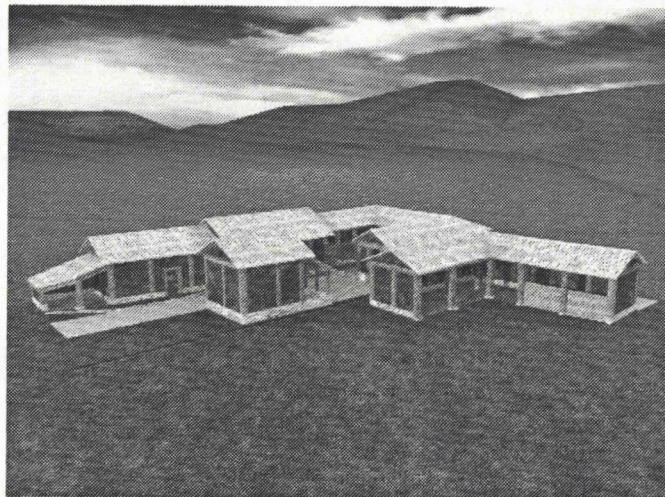

Figure 9. Geographical envorioment three dimensionally modelled.

Figure 10. Final aspect of the virtual reconstruction.