

On the trail of Caesar and Vercingetorix: survey in the Bibracte oppidum, Mont Beuvray (France)

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HISTORY OF THE SITE

Bibracte, a Gaulish oppidum in Burgundy, was the capital center of the Haedui, one of the most important tribes in Late Iron Age Gaul. The oppidum is well known from historical written sources. In 58 BC, Julius Caesar defeated the Helvetii, just few kilometres from Bibracte. In 52 BC Vercingetorix was proclaimed head of the Gaulish coalition here and Caesar, the victor at the battle of Alesia, spent the winter of 52–51 BC here, completing his work entitled *Commentarii de Bello Gallico*.

Bibracte is protected by a fortification of the *murus gallicus* type, enclosing an internal area of 135 ha and an external area of 200 ha respectively. Archaeological excavations at the site have a very long history. The first excavations (1867–1895) were initiated by Jacques Gabriel Bulliot, followed by his nephew Joseph Déchelette (1897–1907). Further research activities were not conducted until 1985 when Bibracte was proclaimed a site of French national interest. Bibracte is currently being excavated by multiple research teams from European universities. The main coordinator and guarantee of archaeological research on the site is the European Archaeological Centre of Mont Beuvray. Excavations on this site yielded evidence of prehistoric settlement, but above all a huge number of features associated with Gallic settlement. The period after the Roman conquest of Gaul is also well represented.

GEOPHYSICAL SURVEY

Preparation and realisation of several independent archaeological excavations at the same site each year demands detailed planning. In 2011, the Masaryk University Brno in cooperation with the European Archaeological Centre of Mont Beuvray initiated a geophysical survey to obtain data on areas where excavations are planned in the near future. Relevant new information on the nature of particular areas of the oppidum greatly benefits planning and archaeological research itself.

The oppidum is located in a mountainous landscape. Most of the site is forested and only a small part consists of meadows. Tourist-related structures (roads, a car park and reconstructed historical buildings) stand in places. A geophysical survey is extremely time-consuming under these conditions. Time is needed to prepare the areas for the survey and continuous prospection is not possible due to the enormous extent of the fortified complex with many steep slopes and densely forested terrain. Therefore, accessibility of the area and the practicality of running a prospection there were important selection criteria.

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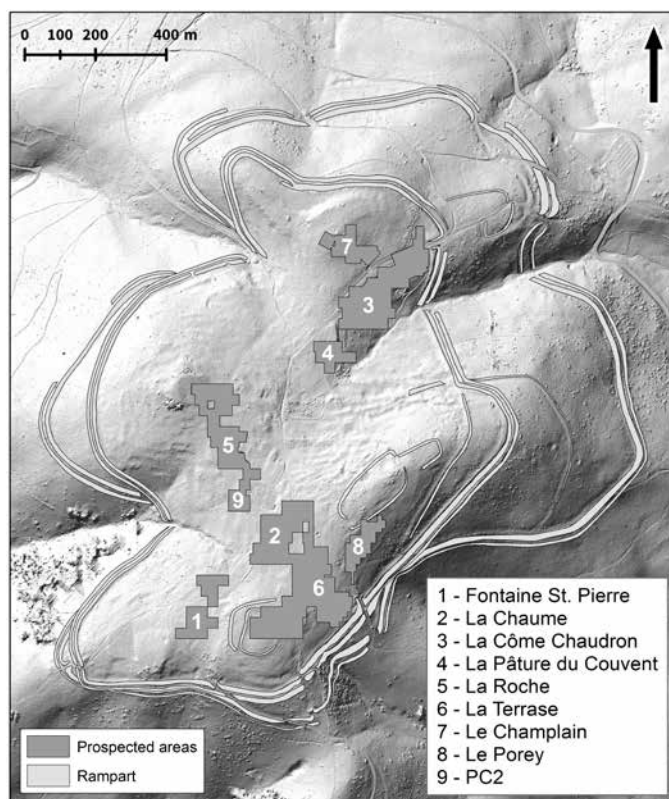


Fig. 1. General plan of oppidum Bibracte with areas covered by geophysical prospection in 2011–2014

Four seasons of prospection have been carried out by a team of geophysicists from Masaryk University between 2011 and 2014. Two different geophysical methods were employed: magnetic survey (fluxgate magnetometer Foerster Ferex) and GPR survey (ground-penetrating radar RAMAC X3M from Malá Geoscience). Almost 20 ha were surveyed, of which about 80% was a magnetic survey. Hitherto, measurements, which were made in seven individual areas (Fig. 1), have verified knowledge from earlier archaeological excavations and provided new information on settlement at the site.

The most extensive survey was carried out in the area of Côte Chaudron in the northern part of the oppidum (Fig. 2). The 19th and early 20th century excavations revealed numerous houses originally built of wood, including some specific buildings associated with metalworking. However, the general plan of the excavations, is more than 100 years old and therefore not very accurate. The results of the magnetic survey made it possible to verify the position of individual features shown on the archaeological plan and to locate other, still unknown, structures. From the data we now have at our disposal we can draw conclusions on the extent, density and character of settlement in the area. A comparison of the results of geophysical measurements with information from archaeological excavations has given the opportunity to improve the reconstruction of the building sequence in this part of the oppidum.

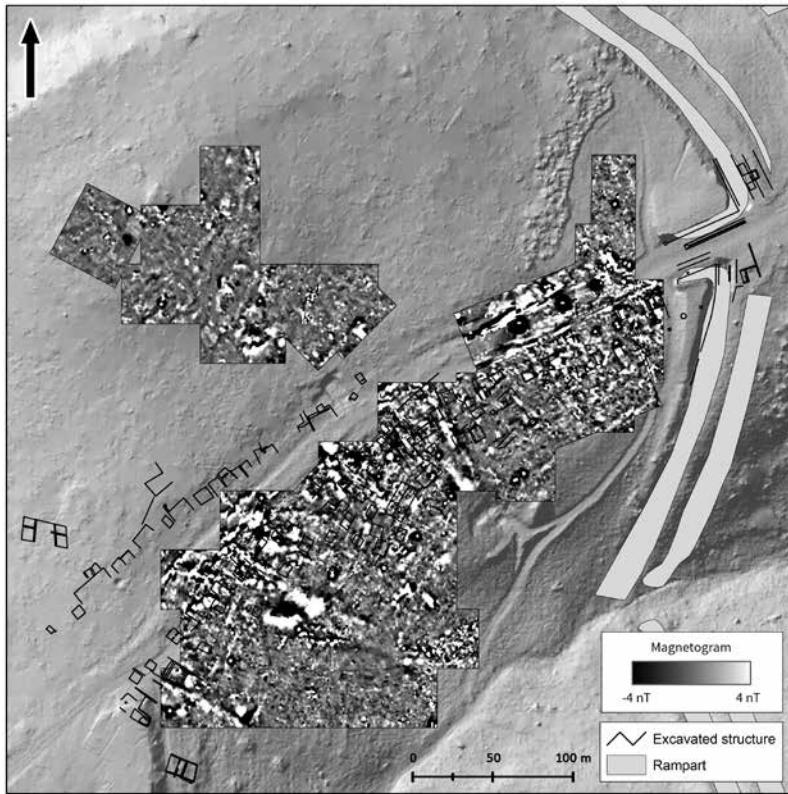


Fig. 2. Bibracte, Côte Chaudron. Magnetic map (raster 0.25 m/0.50 m, dynamics of measured values $-4/+4$ nT in 256 shades of grey: black/white) overlaid by the plan of earlier archaeological excavation

Sunken features of various nature, similar to those from the Côte Chaudron, were also found elsewhere, but there were less of them and at other locations they only filled in areas between extensive stone building complexes. Several structures of this type, which are already dated to the time after the integration of Gaul into the Roman Empire, were discovered at the location of Le Parc aux Chevaux. Most of the masonry features were detected with the help of GPR. However, some of these structures, were already revealed by magnetic survey. An ideal example for research into Roman architecture is villa PC₂ (Fig. 3). The building was already partly explored and surveyed during excavations by J. G. Bulliot. For the purpose of the geophysical survey, we had at our disposal the original plan of the archaeological excavations, including the measured spatial dimensions of the building. In the data from magnetic survey, individual walls of the villa show slightly negative values (approx. -1 to -3 nT). Particularly well visible are the external and internal perimeter walls. The partition walls inside the villa, on the other hand, are only partly visible. Especially important is the perimeter wall of the internal courtyard of the building, which exhibits distinct deviations towards positive and negative magnetic values (approx. -10 to $+15$ nT). It can be assumed that this part of

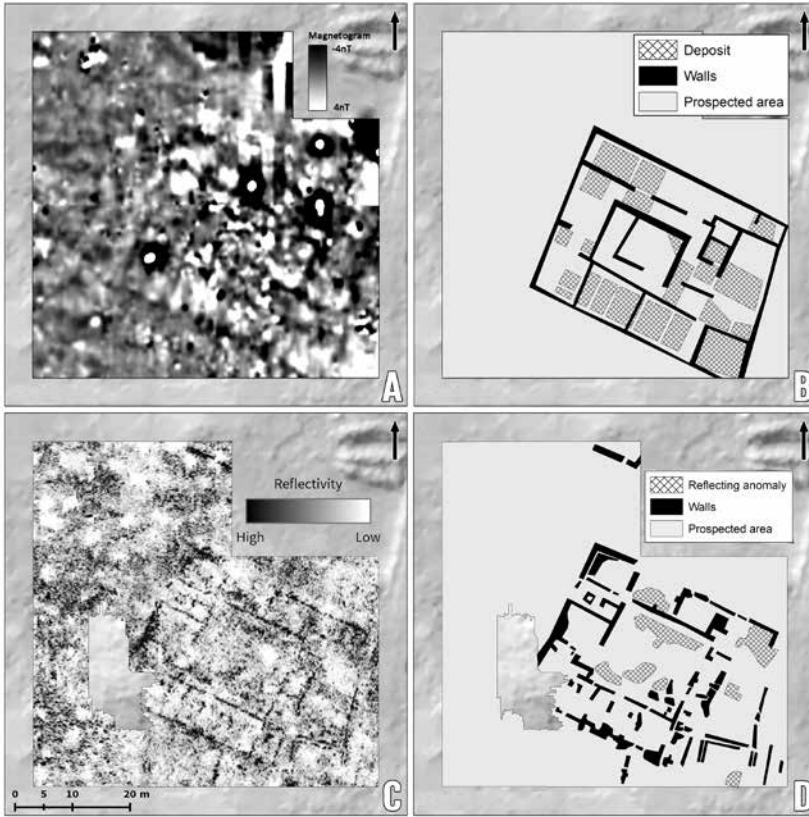


Fig. 3. Bibracte, PC2. Comparison between the results of magnetic (A, B) and GPR (C, D) surveys

the villa was built of magnetic material, most probably bricks. The remaining part of the building, however, was built of local stone. Relatively large differences in the intensity of the magnetic signal can also be observed with regard to individual rooms of the building, whereupon we can suppose differences in the backfill. For the time being, it is not yet clear whether it is a phenomenon associated with earlier excavations or a display of some preserved archaeological context. Answers to these questions will come from planned archaeological excavation. Even so, we already have a much more detailed picture of the condition of the villa based on GPR measurements. These confirm that the archaeologically documented layout of the building corresponds to reality and that spatial deviations in the geodetic survey of individual walls do not exceed 0.5 m. In addition, walls were detected that had not been identified by archaeological excavations.

Among interesting discoveries we also can count evidence of ore extraction right in the area of the oppidum, represented as spatially extensive and magnetically distinct anomalies. Also interesting are enclosed compounds, which appear to exhibit only minimal, if any, evidence of settlement. Among the most important to be detected is an interconnection between fortifications at La Terrasse and

Le Porrey. Still unsolved is the interpretation of linear structures at La Chaume. The magnetic map shows numerous anomalies of various nature, but most notably, a system of lines from 1.5 m to 3 m wide, oriented east–west (four structures) and north–south (one structure). Their length cannot be determined since they continue beyond the prospected area. These structures are interpreted primarily as possible deserted roads. Their dating, however, is unknown. They may have been built in medieval up to early modern times, but their contemporaneousness with the oppidum cannot be excluded.

CONCLUSIONS

Further surveys are planned despite the difficult conditions of prospection, because of the need for long-term research. The evidence from this study has already answered some questions concerning the extent of the settlement area, building density, nature of features in individual parts of the oppidum, and building development structure in individual periods. More detailed information on previous results of the geophysical survey at Bibracte can be found in relevant literature (e.g., Milo 2013; Milo and Goláňová 2012).

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