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Colline Metallifere (Tuscany, Italy): Research and landscape enhancement of a mining district¹

Colline Metallifere (Toscane, Italie) : recherche et mise en valeur du paysage d'un district minier

Riccardo FRANCOVICH †*, Luisa DALLAI *

Abstract: Since the 1980s, in Italy, and Tuscany in particular, considerable experience has been developed in research on the mining landscape in relation to the geography of population, with particular attention to the Medieval period. Numerous research projects carried out in the *Colline Metallifere* areas of Livourne and Grosseto by the Archaeology Department of the University of Siena (Prof. Riccardo Francovich) have revealed the huge potential offered by this territory for the study of the population, extraction and production dynamics of the pre-industrial period as well as the necessity for rigorous surveillance of the remains of these activities which have been progressively eroded by recent and massive extraction activities and by the current development of housing and infrastructure. In the Livourne *Colline Metallifere* area, we have already advanced from the research phase to the creation of a fully operational Archaeo-mining Park which has made it possible to protect an extensive territory containing a wealth of pre-industrial and industrial archaeological evidence, including the mining village of Rocca San Silvestro. In the Grosseto province, the *Colline Metallifere* grossetane Technological and Archaeological Park was recently created. The aim of this institution is to preserve and enhance historical and archaeological heritage of prime importance which twenty years of research have contributed to uncover across a vast territory.

Résumé : Depuis les années 80, en Italie, et en particulier en Toscane, une expérience considérable d'étude du paysage minier en relation avec la géographie du peuplement s'est développée, avec une attention particulière pour la période médiévale. Les nombreuses recherches menées dans la zone des Collines Metallifere de Livourne et de Grosseto par le Département d'Archéologie de l'Université de Siena (prof. Riccardo Francovich) ont mis en évidence le potentiel énorme de ce territoire pour l'étude des dynamiques de peuplement, d'extraction et de production d'époque préindustrielle, ainsi que la nécessité d'une surveillance rigoureuse des vestiges de ces activités progressivement érodés par les activités d'extraction récentes et massives et par le développement de l'habitat et des infrastructures actuellement en cours. Dans la zone des collines métallifères de Livourne, nous sommes déjà passés de la phase de recherche à l'institution d'un Parc Archéominier pleinement opérationnel qui a permis de protéger un vaste territoire riche en témoignages archéologiques préindustriels et industriels comprenant le village minier de Rocca San Silvestro. Dans la province de Grosseto a été récemment créé le Parc Technologique et Archéologique des Collines Metallifere de Grosseto. Cette institution a pour objectif de préserver et mettre en valeur un patrimoine historique et archéologique de grande importance que vingt ans de recherches ont contribué à mettre au jour sur un vaste territoire.

Key words: Mines, landscape, research, enhancement.

Mots clé : Mines, paysage, recherche, valorisation.

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1. Cet article a été préparé pour la conférence de Florac du mois de septembre 2006. À la fin du mois de mars 2007 Riccardo Francovich nous a quitté à la suite d'une tragique fatalité. Son absence laisse un vide immense parmi nous tous, ses élèves, et représente une perte terrible pour l'archéologie médiévale italienne et européenne. Les intuitions de Francovich ont été fulgurantes et déterminantes dans de nombreux domaines. Une des plus significatives est celle de l'archéologie minière, de la tutelle et de la mise en valeur des restes de la production. De l'intelligence de Francovich sont nés les parcs miniers, comme celui de Rocca San Silvestro, qui constituent aujourd'hui une référence y compris au-delà des frontières italiennes. Nous tous pleurons un grand maître; notre engagement doit être de ne pas oublier sa précieuse leçon et de poursuivre avec détermination la tutelle et la sauvegarde des territoires miniers en sensibilisant et en impliquant les associations et les administrations locales.

This article was prepared for the Florac conference in September 2006. At the end of March 2007, Riccardo Francovich tragically left us. His absence leaves an immense void among all of us, his students, and represents a terrible loss for Italian and European medieval archaeology. Francovich's intuitions were powerful and decisive in many domains. One of the most significant is in the field of mining archaeology, regarding the supervision and enhancement of production remains. Francovich's intelligence gave birth to mining parks, such as the Rocca San Silvestro park, which serve as a reference today, in Italy and beyond the Italian borders. We all mourn a great master, and our commitment must be not to forget his valuable lesson and to pursue with determination the supervision and safeguarding of mining territories by raising awareness and getting associations and local governments involved.

1. FROM THE RESEARCH PROJECT TO THE ROCCA SAN SILVESTRO ARCHAEOLOGICAL AND MINING PARK (CAMPIGLIA MARITTIMA)

Generally speaking, in the vast field of Italian archaeological resources, from prehistory to the industrial revolution, oftentimes nothing is done to transform material remains of the past into a real resource largely because of a misled love for science. It is testimony not only of the meagre number of archaeological parks in Italy, if by archaeological park we mean not the 'visitable' portion of an area but a site with a complex system of interrelations with 'its' territory, but also the scarce or total absence of attention towards problems regarding the diffusion of archaeological information for didactic use and publications (Francovich, 1994; Francovich-Buchanan, 1995).

An incisive archaeological investigation doesn't involve only the researchers, but also the local political policies of the territory. With this in mind, one cannot imagine executing an archaeological excavation that is not a mere act of preservation without having organized a formal project. Without defining the culture of the project, any planned archaeological intervention is nonsensical. This means that any true conservation effort by entities external to those that govern the territory is impossible.

The goal of the brief notes that follow is to illustrate the process that brought about the definition of the Archaeological Mining Park project of San Silvestro, one of the very few archaeological parks in Tuscany, actually defined as such and opened to the public, where even the lengthy archaeological research has had a steady tradition.

2. ROCCA SAN SILVESTRO, FROM RESEARCH TO PARK

The proposal to foster appreciation for the territory between the Monte Calvi Hills and the Monte Valerio Hills, near Campiglia Marittima, by creating an archaeological park was conceived after a long period of research, from 1984 to 1995, conducted on the medieval castle of Rocca San Silvestro and its surroundings (fig. 1). The archaeological investigation was conducted by the Department of Archaeology of the Università degli Studi di Siena in collaboration with the City of Campiglia and numerous departments from other European universities.

Rocca San Silvestro is a fortified village dating back to around the beginning of the 11th century, in the historical period that Gorge Duby defines as the "awakening, the infancy" of Europe. The Della Gherardesca family is res-

ponsible for the foundation of the castle. Its demise came about in the 14th century, when the village was under control of the Della Rocca family, who were tied to the hegemonic peerage of the Della Gherardesca family. The archaeological excavations revealed that the collocation of the village in this area, its entire economy, and its destiny were inextricably linked to the mineral resources of this area. Today the village, of which about three fourths have been excavated, its copper and silver mines documented and researched, constitutes an important reference point on the international level for the archaeological study of the historic trades of a village with mining and metallurgical vocations (fig. 2).

The urban structures of the village are largely preserved, and the houses have rendered handiwork and artefacts of great importance (fig. 3). The structures for copper, lead and silver production are the first to be identified with a specific historical period; the smelting furnaces and the forge are an essential starting point for the history of pre-industrial technologies of the Italian peninsula (fig. 4). The marble and limestone quarries, the oil press, the bread oven and the kiln for pottery allow for a reconstruction of everyday medieval life beyond comparison.

There is no doubt, however, that the peculiar mineral trade of this area, that makes the castle play a fundamental role in the collection of essential resources for the coin minting of the most important city of the western Mediterranean at the time, Pisa, constitutes the focus in a revised history of medieval technologies (Insolera, 1990).

The archaeological research on San Silvestro was developed following an expansive and long range strategy.

Along with the intensive excavation of the village, surveys were initiated throughout the entire Campigliese territory and particularly on the mountains nearby, reach in minerals. Settlements dating back to different historical periods were discovered around the area as well as several metalworking sites and mine shafts and tunnels. Up to now about 200 pre-industrial mines dating back to the late Etruscan, Medieval and Renaissance periods have been discovered and documented on a scale of 1:50. This research was done in collaboration with the speleologists from the Museum of Natural Sciences in Livorno. In addition to this, an investigation was made to retrieve clues useful to reconstruct an idea of the environmental past of the area.

This research became not only the focus of a greater European archaeological research, but also one of the most important areas for the study of mining history (fig. 5).

The occasion of the archaeological work done by the Università di Siena constituted therefore an essential moment to accelerate, again in the area of Campiglia Marittima, the interests of administrators and city officials,

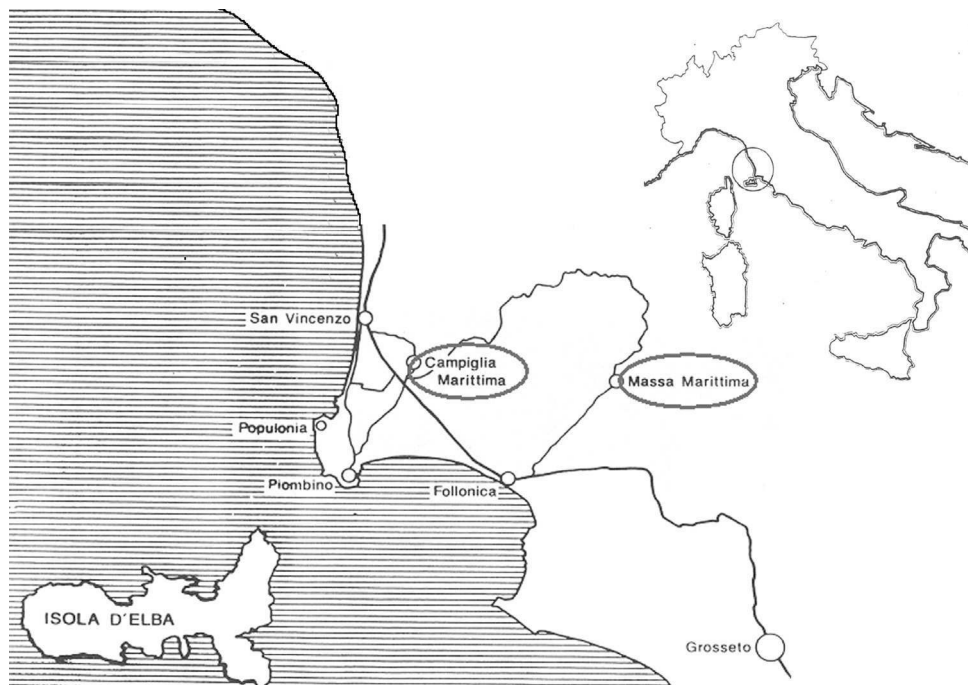


Figure 1: Tuscany, Colline Metallifere: research project area.

Figure 1 : Toscana, Colline Metallifere: localisation de la zone d'étude.

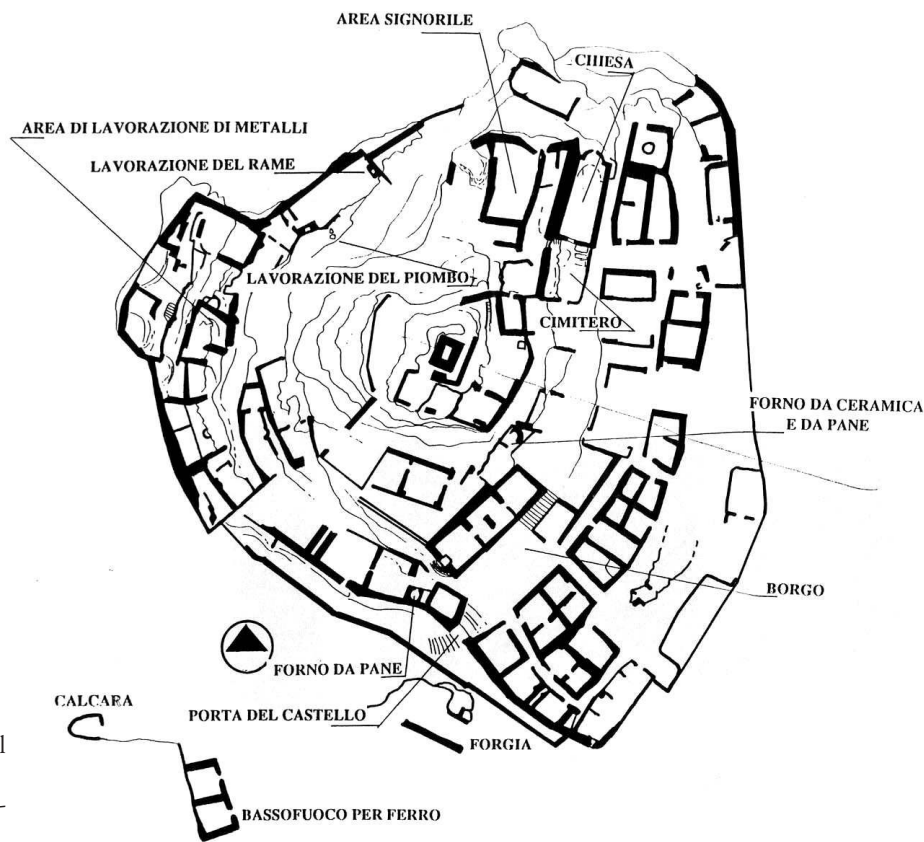


Figure 2 : Rocca San Silvestro : general plan of the site.

Figure 2 : Rocca San Silvestro: plan général du site.

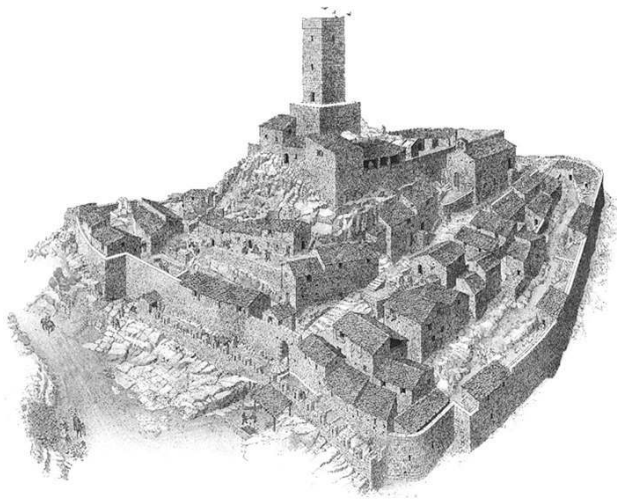


Figure 3: Mining park at Rocca San Silvestro : the communication of research results. An example: reconstruction of the castle and its lead and copper furnaces.

Figure 3 : Parco archeominerario di San Silvestro: la diffusion des résultats. Exemple : la reconstruction graphique du château.



Figure 4: Rocca San Silvestro: The productive structures for the copper and the lead.

Figure 4 : Rocca San Silvestro : les structures productives pour le cuivre et le plomb.

naturalists, historians, archaeologists, territorial planners, as well as the offices in charge of the cultural assets.

For these reasons the effort to create an archaeological mining park had gained ground: from 1989, a work group appointed by the local administration began to concretely define the general lines of the project of the archaeological mining park of Campiglia Marittima. Jemie Buchanan, landscape architect, participated in the work group by deve-



Figure 5: Earle shaft, 2nd level, traces of a manual starter on a gallery of mid-19th century.

Figure 5 : Valle del Temperino : Pozzo Earle, niveau 2, traces de fleuret manuel dans une galerie du milieu du XIX^e siècle.

loping a master plan of the project. The architect Lorenzo Greppi carefully evaluated the possibility of re-use of some of the buildings present in the park, he and who writes determine the areas of archaeological interest.

The first consideration that we made in planning the park, was to affirm the necessity to surpass the spatial and chronological limits of the research that had been carried out on the castle of Rocca San Silvestro, and to keep in mind, vice-versa, the vast potential present throughout the entire Campigliese territory, appreciating it as a whole, and underlining in particular those long term aspects characterized in mining and metallurgic activities. We decided, therefore, to pass from the point scale of the excavation, to the dimension of a comprehensive park. This was possible through urbanistic interventions that the administration of Campiglia had afforded us.

The second consideration that guided us was that of the opportunity to “import” the experience of the archaeological-mining park to Italy, which in the second half of the 80’s was still without any such park. Many European countries had established these parks, successfully joining the utilization of natural resources and the safeguard of environmental, historic and naturalistic values. Within this type of structure, in fact, the subjects of interest don’t respond any longer to the mere classificatory principles of landscape forms, of objects or of techniques, but instead tend to integrate, through various forms of expository organization, the complexity of scientific and technological practices, including their social and natural structures (Preite, 1990). The comparative experience, practiced in the European framework over a period of four years, served to acquire the

general guidelines of potential developments of the park, to collect ideas on how to utilize abandoned tunnels and create possible relations among

them, the surrounding areas and the museum and didactic structures. We are continuously reminded of the extraordinary and peculiar occasion that presents itself before us.

In fact, the Campiglese territory contains abundance of environmental, geo-mineral, archaeological and historic resources, enough to permit us to surpass limits established by many other parks, where the prevalent technical aspect had set up an underestimation of the historic dimension or often had retraced only until the industrial revolution.

In planning the project we defined the areas of pertinence of the park through the establishment of parameters linked by the central theme of the history of mining and metallurgy. We had to create a connective structure between the results acquired from the archaeological research, conducted over the last decade, with those conducted in the years between the two wars. The archaeological research, conducted on site by experts of various training under the Etruscan expert Antonio Minto, led to the discovery at Madonna di Fucinaia, a few hundred meters in a direct line from the castle of Rocca San Silvestro, of what are still today considered to be the most important metallurgical structures of that period.

An organic relationship was created with the findings of traditional historic research, that had focused mostly on the structures of iron working dating to Renaissance, and followed what we knew around the mining and metalworking activities of the 1800's and 1900's.

Overall we had to develop an instrument that, along with promoting awareness of the vast and complex historic and naturalistic patrimony, allowed us to conserve and study the material traces of the productive activities and continue to research what the Campigliese hills still hides underneath and how much has been covered in time.

We know for certain, both from the archives from the 16th century onward, as well as explicit archaeological indicators, of the existence of a large amount of precious information and materials regarding the productive cycles of the pre-industrial era located throughout the territory that would eventually become the park. This information and these materials have yet

to be rediscovered and studied in detail, while the systems of the industrial revolution, imported from beyond the Alps from the second half of the 1800s until the first decade of the 1900s, remain as great 'fossils', eroded in their documentary potential because of the degradation of the materials and the lack of careful analysis. (R.F.)

3. THE RESEARCH PROJECTS IN THE SOUTHERN COLLINE METALLIFERE

For all the reasons mentioned above, the researches conducted by the Università of Siena in the district of the so called "Colline Metallifere" have aimed at coupling their results with the equally important task of cultural conservation. The objective achieved in the area of the Colline Metallifere near Livorno is extremely relevant because the research developed into a fully operational archaeological mining park that has allowed for the diffusion of information of a vast territory, including the mining village of Rocca San Silvestro (Francovich, 1994; Casini, Zucconi, 2003).

Recently, in the province of Grosseto, the Technological and Archaeological Park of the Colline Metallifere Grossetane was created with the adhesion of seven municipalities that allowed for a vast area of reference. Within this area, strategies of conservation and promotion were focused directly on the territory, with its complex cultural stratification in which the aspects of pre-industrial and industrial mining comprise a role of great importance.

Here, the history of copper, lead and silver mining activities, originating in the Eneolithic era and largely developed in the Medieval time, entwines with that more strictly related to metalworking which ties it to the coastal areas and to the Island of Elba, first in the Etruscan-Roman era, then once again in the Renaissance and 18th century, when the initiative of the Medici and Lorena families led to the metalworking structures of Valpiana and Accesa.

The presence of unique geologic conditions has generated aluminiferous deposits known from Antiquity and again exploited in the Medieval and Granducal periods, another theme in the research and conservation efforts to be added to those regarding metallic minerals (Francovich-Preite, 2009).

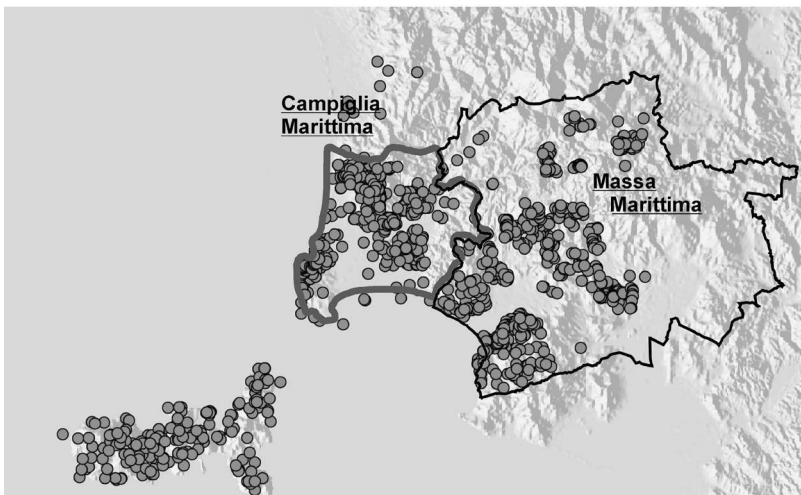
4. RESEARCH STRATEGIES

The knowledge of the local mining and metallurgical patrimony was for the most part acquired through the research conducted over the years by the Department of Archeology of Siena. The archaeological surveys conducted on territorial samples through the years have covered today a total area of 145 square kilometers. On this sampled area more than 2,600 sites of different time periods and natures have been documented and described, a total of 347 shafts, caves and mining tunnels have been noted, as well as 765 metalworking sites and slag heaps (fig. 6). The number of archaeological mining and metallurgical indications makes up 44% of the total number of the topographical findings.



Figure 6: Rocca San Silvestro: reconstruction of a medieval mine.
 Figure 6 : Rocca San Silvestro: restitution d'une mine médiévale.

A careful selection of the files present in the data bank of the research project has generated the pre-industrial section of the database of the Technological Park of the Colline Metallifere Grossetane, that consists of 22 main sites on which we are presently investigating. The archive, conceived for the management of scientific data, became a monitoring and planning instrument for the entire territory of the Park (fig. 7).



5. THE KEY THEMES OF THE PARK: MINES AND MINING CASTLES

From the analysis of the data base, 'strong themes' emerge that uniquely connote the area of the Colline Metallifere. One of these themes, rendered evident thanks to the excavations, is that linked to the presence of strongly fortified settlements geared towards protecting and managing the mineral deposits, mainly of copper, lead and silver sulphates, that historic and archaeological literature have defined as "mining castles".

The phenomenon greatly developed since the 10th century; in some cases these castles originated from the fortification of previous villages; in other cases they emerged as new foundations for specific economic or political possibilities which specifically aimed their economies towards the production of metal. This type of genesis constitutes a very important segment of local history (Francovich-Wickham, 1994; Farinelli-Francovich, 1994), and has to do also with the nearby Campigliese territory where the most noteworthy and most studied example of "mining castle" is the site of Rocca San Silvestro that we have already discussed.

Also in the territory of Grosseto the mining castles covered a key role in the dynamics of territory and resource control for the the local nobility, until the progressive and winning expansion of the cities, and Massa Marittima in particular, since the middle of the 13th century.

In 1992 the department of Medieval Archaeology undertook the excavation of the castle of Rocchette Pannocchieschi (near the town of Massa Marittima) (fig. 8), in 1997 Castel di Pietra (near the town of Gavorrano) was put under investigation and from 2003 the Castle of Cugnano (near Monterotondo Marittimo) has been excavated (fig. 9). These

Figure 7: "Colline Metallifere". Le Parc de "Val di Cornia" et de "Colline Metallifere grossetane".
 Figure 7 : « Colline Metallifere ». The parks of « Val di Cornia » and « Colline Metallifere grossetane ».

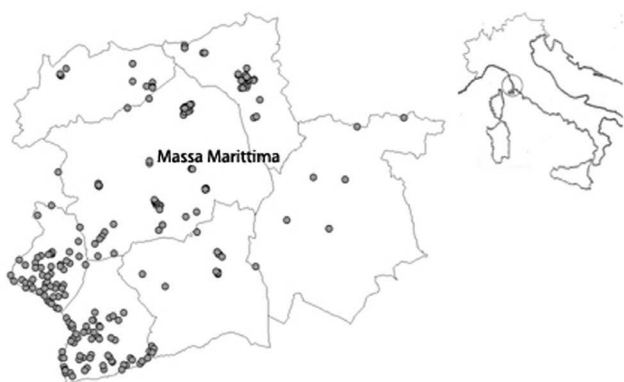


Figure 8: The “Colline Metallifere grossetane” park: masterplan and summary of pre-industrial archaeological resources.

Figure 8 : Le Parc des « Colline Metallifere grossetane » : projet Masterplan et synthèse du patrimoine archéologique pré-industriel.



Figure 9: Rocchette Pannocchieschi: castle reconstruction.

Figure 9 : Rocchette Pannocchieschi : reconstruction graphique du château.

sites, positioned in key areas for the control of copper, lead and silver mines and noted by written sources beginning in the 11th century, have revealed phases of hilltop occupation that are much older (Belli-De Luca-Grassi, 2003, p. 286-291; Citter, 2009; Bruttini-Fichera-Grassi, 2009, p. 306-313). For Rocchette Pannocchieschi the first archaeological evidences are dating back to the 9th century; for Cugnana the researches still going on are indicating a phase of occupation certainly older than the 10th century.

In all these cases, the link between castles and mining areas has been proved by the topographic research conducted simultaneously with the excavations. It is a research that has documented the existence of ancient mines, always located within a short distance from fortified centers (Dallai-Francovich, 2005).

6. THE AREAS OF EXTRACTION AND THE METALWORKING SITES FOR COPPER, LEAD AND SILVER PRODUCTION

The archaeological surveys of the Colline Metallifere near the mining areas has produced a precise archive of cultivations dating to pre-industrial time.

In some specific territorial contexts (for example in the Campigliese area), underground research has been carried out; in some cases ancient mine shafts have been documented as far as 100m below the surface (Cascone-Casini, 1997).

In the Grosseto area at the moment only in a few cases the research has been able to proceed on the subterranean level, but a project with the objective of investigating the underground development of ancient mines by samples is presently going on. Up to now the mines that have been explored on a subterranean level are generally partially obstructed by debris from the surface, and have a depth that in the majority of the cases is around 15 meters; with a diameter of about 2-2,5 meters, but in few examples the depth can touch 34/35 meters and more (fig. 10); recently, an oversight in the mining areas north of Massa Marittima revealed extremely deep access shafts, certainly deeper than 80meters. At the bottom of the vertical shafts only in very few cases we have recognized traces of possible tunnels, partly closed by debris, that are now under investigation (Aranguren-Bagnoli-Dallai-Farinelli-Negri, 2007, p. 79-113.).

Though a thorough underground examination has not yet been conducted, some criteria to date the mines were established by observing the surface around these ancient shafts and the diameter of the openings, analyzing individual morphologic and technical elements of the excavation, for example the diameter of the shaft opening, its position and the quality of the mine waste (Dallai-Francovich, 2005) (fig. 11).

Besides the remains of ancient mining activity, the Massetano territory presents evident traces of important metallurgic activity for the production of copper and argentiferous lead, that were for a long time consequential to the extractions. Such remains appear particularly significant for the documentation of the organization of metal production in the Medieval period,

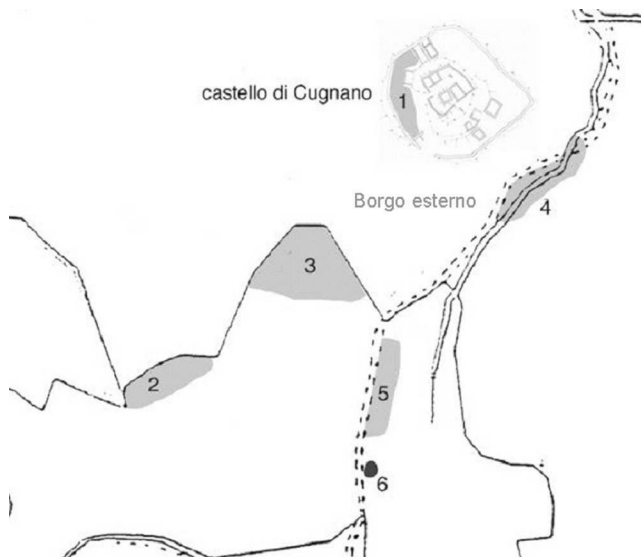


Figure 10: Cugnano: general plan of the castle.
 Figure 10 : Cugnano : plan général du château.

both in the manorial phase, when the productive cycle was controlled by the “mining castles”, as well as the phase in which the city of Massa (1225-1335) extended its control to include the mining and metallurgical areas.

Impressive masses of slag are present in the area to the southwest of the city, at Pian delle Gore. Here, archaeological research revealed three smelting structures for the processing of copper sulphites, and a water system associated with the metallurgical activities (fig. 12).

The structure, conceived to harness the water from the nearby Pecora river, is composed of a longitudinal canal about 2 meters deep, about 10 meters long and 80 centimeters wide with three openings toward the exterior. Upon conclusion of the archaeological research conducted at the site, three distinguished uses of the structure were determined. The first and most ancient, which was concluded at the beginning of the 15th century, is properly related to the metallurgical activities present in the area. We suppose that the canal was supplied by two water wheels, perhaps of different dimensions, filled from above by way of an supplying canal dug into the limestone. The water wheels powered

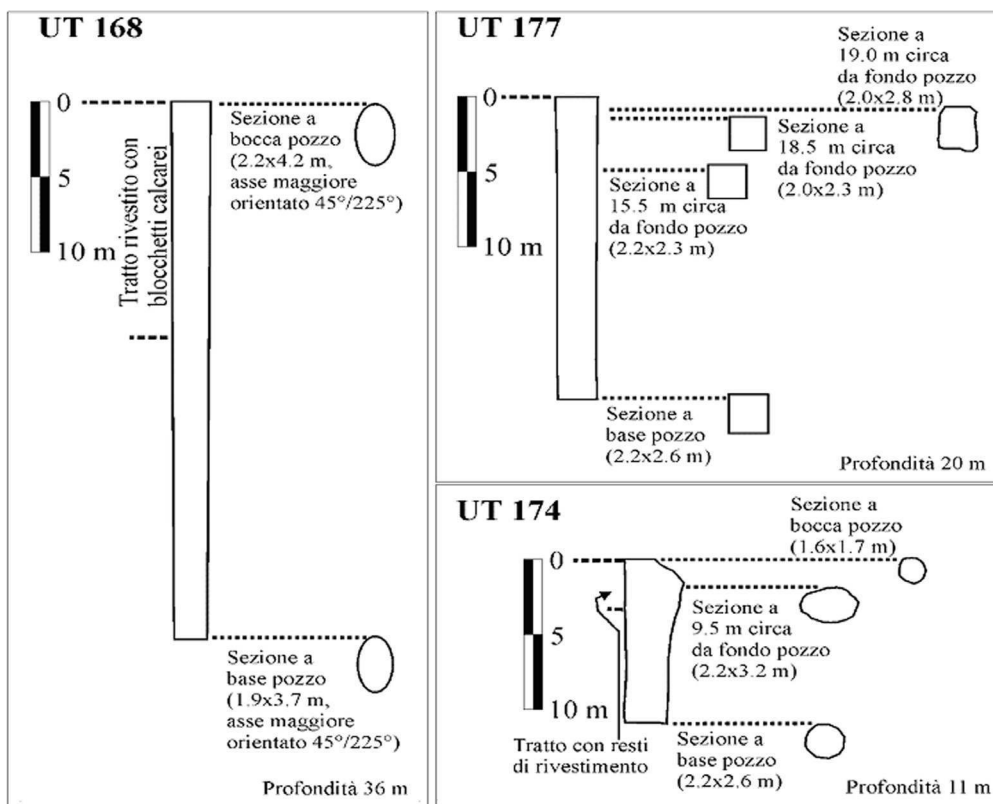


Figure 11: Massa Marittima: underground development of ancient mining shafts.
 Figure 11 : Massa Marittima: développement souterrain d'anciens puits de mines.



Figure 12: Massa Marittima : remains of an ancient mining shaft.
 Figure 12 : Massa Marittima: vestiges d'un ancien puits de mine.

the bellows and/or the mallets of the metallurgic workshop that must have been located behind the wheels, where the excavation had revealed the ruins of a covered structure. The discovery of the complex represents a testimony of great value for understanding the techniques of copper production. (Guideri, 1996).

7. THE CASE STUDY OF MONTEROTONDO MARITTIMO

The case study of the territory of Monterotondo Marittimo is particularly interesting for the presence of skarn deposits, hydrothermal phenomena and alum rock caves (Dallai, 2005).

Most of the mining evidence of this territory is located in the area around Poggio Trifonti, not far from the Castle of Cugnano and from the copper and lead sulphites deposits that, in the Medieval period were used for the production of copper and silver. In this particular zone, scattered along the north side of the settlement and to the east of Podere del Castello, about 50 depressions were discovered, found in clusters of a median dimension of 2.5 meters with a depth of 1.5 meters. We can assume that each of these cavities corresponds to an obstructed mine shaft or to areas of superficial mineral extraction. In the same zone a partially collapsed structure of mineral transformation was found. It is of a circular form, covered by a dome, and is made up of blocks of limestone. Around the structure some slags and fragments of ore were discovered (fig. 13). These findings are associated with some specific caves of variable dimensions, located near the shafts as well as along the slopes of the hillock of the Castle di Cugnano. We can hypothesize a link to the Castle of Cugnano, in that it is probable that the stones extracted were used to construct some of the castle's structures. (L.D.)

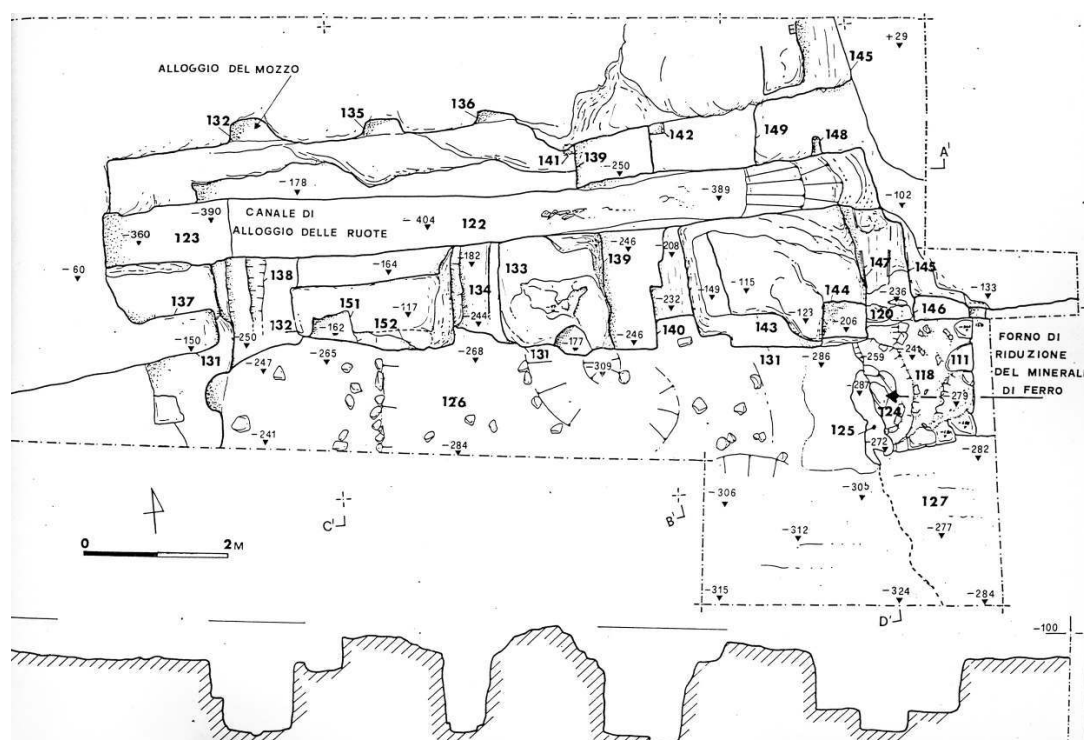


Figure 13:
 Marsiliana (Massa marittima); plan of the hydraulic structure.

Figure 13 :
 Marsiliana (Massa Marittima); plan de la structure hydraulique.



Figure 14: Cugnano: vestiges d'une structure métallurgique.
 Figure 14 : Cugnano : remains of a metallurgical structure.

CONCLUSION

The tendency to cancel the trades of mining and metallurgy, which were essentially concluded at Campiglia around the end of the 1970s, and in Massa Marittima area at the beginning of the 1990s, from the collective memory and the dramatic mining interventions, beginning from around World War II, of white marble extraction from the quarries, which traumatically disturbed the vegetation and geomorphology of the coastal territory, have rendered even more complex the already difficult equilibrium that the park projects had to establish. This equilibrium had to be found between the historic recovery of traces of the ancient, modern and contemporary settlements and trades of the area and the complex natural environment, whose underground have been profoundly modified and impoverished by man's activity over the past millennium, while the surface continues to be, as we've previously mentioned, subject to radical transformation due to the presence of large quarries.

The project of parks such as the one of Campiglia, or the one of the Colline Metallifere grossetane, with all its peculiarities, in order to be successful, must be developed into a framework of a difficult but indispensable balance between conservation interventions, of both artefact and environment, and the construction of a cultural dimension in the management of the park. This balance must be found in order to avoid a destructive 'consumption' of the territory, but also to appreciate its specificity and to safeguard those very reasons that have gained, over the last century, the attention of naturalists, from the peninsula and from beyond

the Alps, and those interested in international archaeological research. In addition, if we want this complex operation to be successful we must seriously evaluate the costs and benefits of each single intervention, achieving an appreciation and conservation of the territory, on one hand through increasing and optimizing the research conducted and, on the other hand, the rendering, in terms of employment, that the initiative can offer to the local communities.

The challenge is therefore to conserve a unique patrimony through new and original possibilities developed with a thematic and diachronic character, in order to fully understand the complexity of the mining history that has been present in this territory throughout the centuries, from the Etruscan-roman era through the Medieval era and to the modern day. (R.F., L.D.)

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