

THE MINES AT CAMPIGLIA MARITTIMA, LIVORNO, ITALY.

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Abstract: Campiglia has remains of mining and smelting from the Etruscan period through medieval times to this century. Recent excavations have revealed 11th and 12th century remains at Rocca San Sylvestro of a small township with lead, iron and copper smelting, with a nearby mine. Attempts are being made to make the area into an archaeological and mining park. There is much of related interest in adjacent areas too.

INTRODUCTION

Campiglia Marittima is a few kilometres north-west of Piombino in the Province of Livorno, just off the major road SS1, on the north-west coast of Italy. It is thus readily accessible to tourists. The area has a very long history of metal mining, for lead, copper, iron, and tin, including a german influence in the 16th century and an english involvement in the late 19th, and early this century (The Etruscan Mining Company). Although metal mining has now ceased, there is still much quarrying for marble aggregate, and for bentonitic clay. Not far away is Massa Marittima, mentioned briefly by Weisgerber in a recent Bulletin (1988 p227), where copper mining continues, and where there is an underground gallery to demonstrate 20th century mining methods. Nearby too is a geothermal district, where drilling for steam has now replaced boracic acid production: an exhibition at Larderello shows both extractive and power production methods. Piombino (the name indicates its involvement with lead) has visible remains in slags of Etruscan (6th-4th century BC) iron smelting, and a small museum. Thus the area is of general interest to tourists, but especially to those with a thirst for mining or geology. Most recent research has been done by archaeologists from Sienna University (Francovich and Altri 1985; Francovich 1988), who currently are providing the essential interpretation for a Museum Park to be run by the Campiglia Comune.

GEOLOGY

The area around Campiglia is part of a tectonic province, with limestones and mudstones deposited in Liassic times, which have subsequently been intruded by granitic magma, and have been metamorphosed. These in the area being considered are found today as marble and slate, with veins of intruded porphyry, with mineralisation related especially to the porphyry. The mineralisation at and near surface is notably gossanised, with a thick band of pyroxene which has been partially altered, and much limonitic material within which are quantities of pyrite, chalcopryrite, galena, and blende, with calcite and quartz: there are only modest quantities of oxidised copper minerals such as malachite though the galena seen had a thin grey crust. Other oxidised minerals such as smithsonite (calamine) are also found. Depth of oxidation is unknown to the writer, but was much less apparent at 100 metres depth, though there was still plenty of limonite.

Cassiterite has also been mined in the area, at Monte Valerio, with a production of 2500 tonnes during the 1930s: this area is now being intensively quarried and is

inaccessible for investigation.

ANCIENT MINING AND SMELTING

Remains of copper slags with Etruscan pottery sherds have been found near the small church of Madonna di Fucinaia, in the valley below the main town of Campiglia. These are of a run-type, indicating liquification of the slag in the furnace, probably produced from sulphide ore. Earlier slags may well exist, based on malachite smelting, but their small size and quantity will be difficult to detect because of the lush vegetation. The activities of the Etruscan Mining Company included resmelting of old slags, so current remains are misleading.

MEDIEVAL MINING AND SMELTING

This forms the basis of recent work by the Sienna Department of Archaeology, at and near the 11th to 14th century village of Rocca San Sylvestro. This village, a reconstruction of which was pictured in *Archeologia Viva* (Francovich 1988), has a picturesque position on a small hill, and still has much of the medieval wall and buildings extant. Within the walled area, both lead and copper were smelted - in a position where strong winds would have dispersed

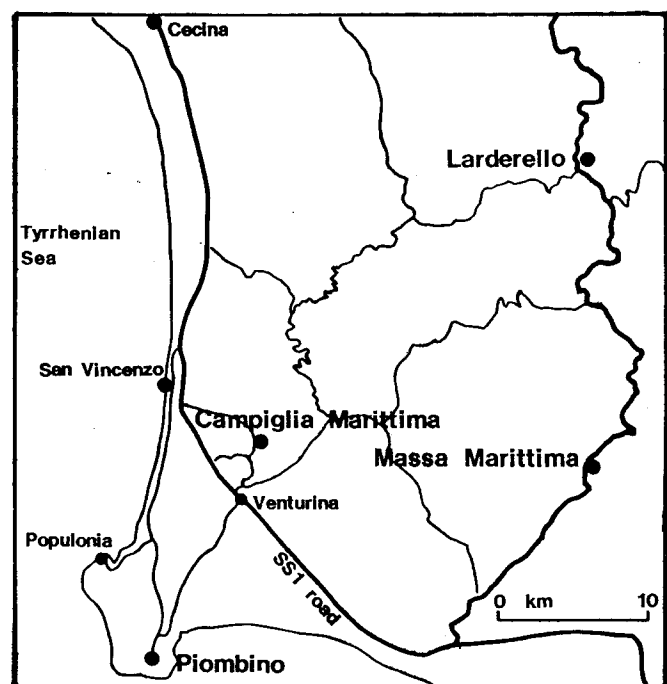




Plate 1. Ruins of Rocca San Silvestro, Campiglia Marittima.

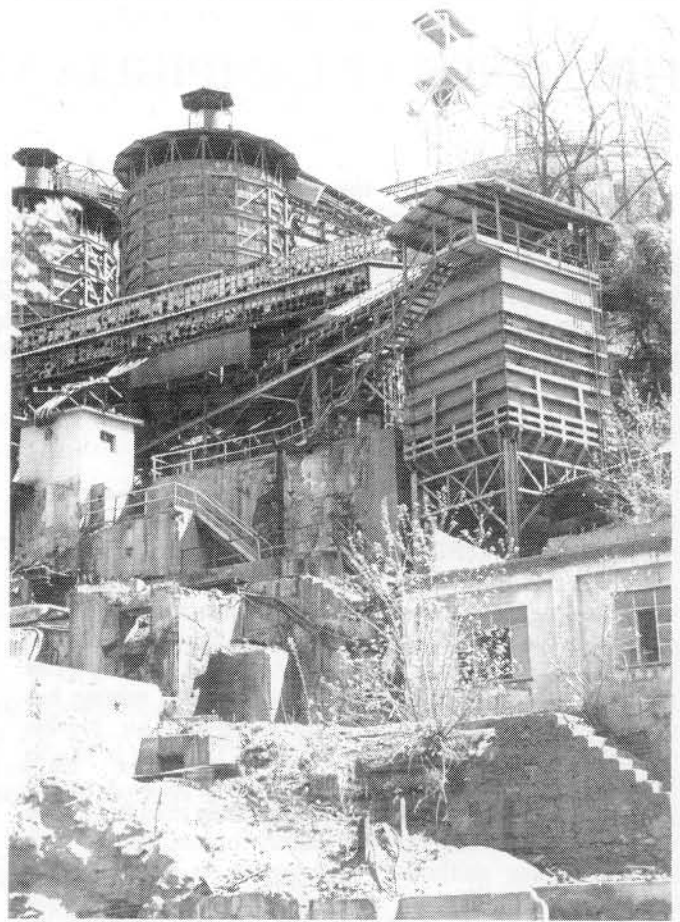


Plate 2. Solmine's Copper mine at Massa Marittima.



Plate 3. Ruins of the 1904 Etruscan Mining Company copper smelter.

fumes. Iron was smelted on the opposite side of the settlement, just outside the walls, whilst nearby was a substantial limekiln.

The two lead hearths found, (the reason for the writer being there) were both small, next to each other, and placed on a shelf of marble rock on the steep sloping cliff. Their bottoms were some 35cm across, delineated by a low wall formed by stones of granitic porphyry. The hearth-site was sealed with a layer of clayey soil with marble clasts, apparently derived from the slope above. Beneath this, in an area which covered the hearths, was a darker "soily" layer, but without the clayey smell when moist. This included fragments of gossan, charcoal (or burnt wood), pieces of lead slag, and partially altered galena: encrusted with whitish-grey and yellow oxidised material. Small lumps of oxidised galena were found also in the hearth bottoms, with pieces of marble. These remains seem consistent with a roasting operation, with the fire covering the whole of the two hearths. Possibly the actual smelting was carried out as a separate operation, using hand or foot operated bellows.

Search was also made for a possible silver refining operation: this would have yielded litharge, of pinkish or yellowish hue, but none was found.

Copper slags indicate a copper smelting operation was carried out a few metres away, but these and lead slags were in all only small in quantity. Unless substantial quantities are found buried downslope (and remembering slags have been carted away in the wider area), it seems both operations were carried out on a very small scale: the objectionable character of the fumes produced would in any case encourage migration to a position further from the settlement.

Medieval mines have been located on the valley side opposite the Rocca. One of these was partially exposed by an exploratory working early this century, and has recently been partially investigated, and at surface excavated, by Sandra Casini, a post-graduate student at Sienna University. The mine is small, some 8-10 metres deep: it has two shafts close together, and was also reached by an incline and small climbing shaft, and may have a further inclined entrance. Below it bells-out, and it also has minor workings off. At surface, the waste-rock hillock has had a small wall built, below which is a floor, apparently used for beneficiation, since it has a layer with much galena in 3 cm down pieces: very suitable for smelting. A number of other small mines are located nearby, and an adjacent valley, in the time of the 16th century german influence, had very many small mines.

Rocca San Sylvestro was evidently almost wholly a mining settlement, begun under the influence of the city of Pisa, first ecclesiastically, then under the comune: its existence began with mining, and ended when more attractive ventures were found elsewhere.

MINING FROM THE 16th CENTURY ONWARDS

A number of shafts seen in the area date from this period when german miners came to the area: in Massa Marittima this was by invitation, and of course it was a period of widespread german mining activity, as in Britain also. The remains of their work includes a chimney base and site near the Church of Madonna di Fucinaia, where springs would

have provided water power for bellows. Their mining activities included sinking of fairly large shafts, usually (as seen) inclined with the vein, and the driving of short levels. Workings seen in the gossan suggest firesetting may have been used to assist extraction, as at a subsequently much enlarged working known as Gran Cava.

From the 16th century to the late 19th, very little mining seems to have been carried out. In the late 19th, and especially early this century, modern mining practices were adopted very quickly, and Campiglia Marittima became dominated by mining, a phase which lasted until about 1976. First to be involved seems to have been the english company "The Copper Lead & Hematite Mining Company, who set up at Monte Valerio in 1872. The "Etruscan Mines", set up in London, were particularly active from around 1902 to about 1908, when they ceased mining on their own behalf, and evolved into a new company, Campiglia Copper Estates Ltd. (Information based on Benedettini 1983).

Under James Hart Fawcett, the engineer for the Etruscan Company, a series of levels were driven in from the hillside, and shafts sunk to deeper horizons. At surface tramways, inclines and locomotives (built at Stoke-on-Trent) conveyed copper and lead ores to a large gravity dressing mill and new smelter. An imposing "Palazzo Govett" was built for the first english director, who also gave his name to "Govett Shaft". Much of their work, and that of their successors, can be seen still, both surface and underground. A portion of the underground workings may be made accessible to the public, especially large open stopes between the adit at Level Two, and the Level Three which is 50 m lower and reached via a shaft.

The remains of the gravity mill and smelter complex are especially impressive: though much overgrown, the ruined buildings are easily seen from the road to Campiglia from San Vincenzo. The huge mill descends from what is now a quarry yard, and is cut well back into the hill. Though roofs are gone, the arches and walls of buildings, and a fairly complex flue system can easily be examined. A steep incline took wagons up to the top of the mill. The chimney has been demolished, but has fallen as large lumps so its detail and size can be appreciated. Large iron staples seem to have formed a ladderway up the inside of the chimney. There are two large slag heaps, which were clearly served by short railways: they appear to be mainly if not wholly of copper slag.

OTHER SITES IN THE AREA

Monte Valerio, where the 1872 english company worked, was developed especially in the mid-1930s, but is now largely inaccessible due to quarrying. Some of the buildings of its mill have been incorporated in more recent quarry operations. At Venturina, part of Campiglia, but two kilometres from the town, what is now a large thermal swimming area was in the sixteenth century an iron works, dependent on the springs for power, deriving its ore, haematite from Elba (a few kilometres offshore), and limonite from the locality. At Piombino (near the small village of Populonia) Etruscan iron slags can be found in the low cliff adjacent to the church, associated with sherds of pottery. The small museum there has a number of lead funerary artefacts, recovered from one or more of the many tombs, and there are several lead anchors on display

recovered from the wreck of a Roman ship.

MASSA MARITTIMA

Here a wartime shelter in limestone has been adapted as a mining museum, with some 700 metres of gallery. This has been used to display mining machinery, mainly of post war vintage, and to show methods of mining, notably top- and bottom-slicing methods. There is much of interest for the specialist, and the Italian audience seemed to enjoy the guide's commentary, though on the whole the displays were rather static. About two kilometres away, Nuovo Solmine, have a working copper mine, with a very modern headgear complementing a rather older dressing mill arranged, though not necessarily still operating, on gravity principles.

GEOHERMAL MUSEUM AT LARDERELLO

The area around Larderello is characterised by shining pipelines criss-crossing the countryside, carried on low pylons. Each delivers steam from a borehole to a power-generating station. Thermal waters, containing boracic acid have been known and used here since at least Etruscan times. In the 16th century salts derived from the springs - sulphur, vitriol and alum were sold widely and in the late 18th century it was discovered that boric acid could be recovered also. A century later saw this being done on a large scale, an activity which continued until the 1960s, when it became uncompetitive.

The first electricity was produced experimentally in 1904, but large scale production did not take place until after the second World War.

The Museum illustrates the two industries admirably, and especially it has a fine display of 19th and 20th century drilling machinery. The 19th century industry was carried out under a very liberal paternalism, with advanced provisions for the social wellbeing of workers. An interesting feature was the "Black Band" - the instruments were irretrievably blackened by sulphureted hydrogen in the air. For mineral specialists there is a wide range of boron minerals, derived from all over the world, on display.

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