
GEOMINING HERITAGE IN THE NATURTEJO AREA: INVENTORY AND TOURIST PROMOTION

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ABSTRACT

Naturtejo is an intermunicipal company for tourism promotion that comprises the municipalities of *Castelo Branco, Idanha-a-Nova, Nisa, Oleiros, Proença-a-Nova* and *Vila Velha de Ródão*. In this area of 4600km² traces of the mining explorations abound which, from the Proto-History to the middle of the XX century led to the extraction of alluvium gold, wolfram, cassiterite, argentiferous galena, baryte, chalcopyrite and secondary copper carbonates, antimony, oxides and iron hydroxides. From the inventory destined to the conservation and promotion of the geologic heritage of this region, the preliminary survey of mining exploration appears, which makes reference to its state of conservation and proposes measures to its use, aiming at the implementation of transmunicipal mining routes, centralised in the thematic of mining or exploration historical period, small route thematic pedestrian itineraries and the Geomining Museum of *Segura (Idanha-a-Nova)*.

INTRODUCTION

Abandoned mines are spaces of high historic interest once they contextualize remaining aspects from the current way of living in relation to the socio-economical needs and the political strategies that vigour in the labouring period. On the other hand, the space of the mine – so many times remote – is frequently surrounded by a majestic natural/rural landscape, causing sometimes a positive scenic impact between industrial landscape and the surrounding one. This impact is given by the enormous proportion of dismounts, of the net of profound galleries that perforate the mountain, by the ruined installations, by machinery remains, ghosts of a lost micro cosmos that conditioned the life hundreds or thousands of people. This way each ruined corner, each piece of twisted and rusty iron are the memory of a technique, of a time and culture that are being rapidly lost, as fast as the closure of last mines in Portugal. The culture of the mine and of mining people may still remain in the memory of old miners, in the municipal registration books of concessions, in the magazines of the old Geological Survey of Portugal, as legends or singsongs that lose with the oral tradition extinction.

Naturtejo, one intermunicipal company of tourism promotion that comprises a zone including the municipalities of *Castelo Branco*, *Idanha-a-Nova*, *Nisa*, *Oleiros*, *Proença-a-Nova* and *Vila Velha de Ródão*, strongly bets in its natural and historic-ethnographic resources for the development of new strategies of sustainable tourism. For this reason, a multidisciplinary team formed by investigators in the areas of Geology, History, Archaeology and Anthropology recently started a project of inventorying the mining assets of the region with three main goals:

- a) Recognize the diversity of the geomining heritage in order to better structure measures to its tourism exploitation;
- b) Determine the cultural impact of the mines space and safeguard the experiences that are still recognizable;
- c) Potentiate the mine as a key-element to the knowledge of regional geological evolution.

This project – which is still in a very preliminary phase and is limited to the remains of the extraction of metallic minerals – already allowed the recognition of a set of mines from the Proto-History to the middle of the XX century (Fig. 1). We must point out that the current extraction industry in this region resumes to clay (*Sarzedas – Castelo Branco*; *Toulões – Idanha-a-Nova*) and to granite quarries (*Alpalhão – Nisa*; *Alcains – Castelo Branco*). The results already obtained consubstantiate the implementation of the Mines Route in *Segura (Idanha-a-Nova)*, a small pedestrian route

where the central theme is the exploration of natural resources, also allowing the creation of the Geomining Museum of *Idanha-a-Nova* in the same place, aiming at the interpretation of mining spaces from the surrounding mining camps, to make basic geology experiments and promote the interactivity with the local community.

Afterwards the results obtained regarding mines and mining camps studied are shown, by chronological order of exploration, as well as preservation strategies and tourist promotion already in course.

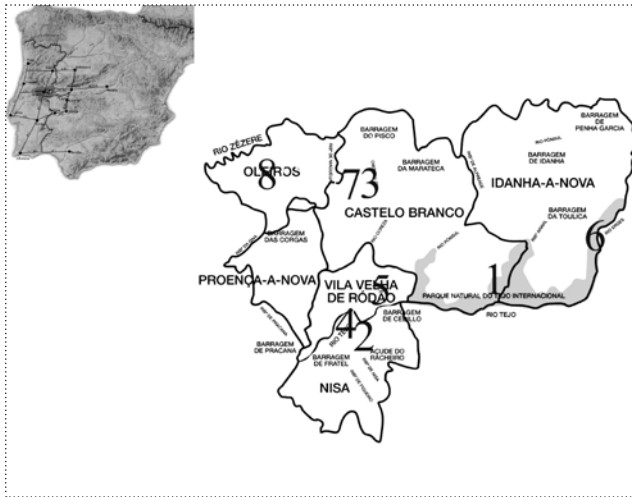


Figura 1 - Mines and mining camps from Naturtejo region, already analysed aiming at tourist gain. 1 – Mines of *Monforte da Beira*; 2 – *Buraca da Faiopa*; 3 – *Buraca da Moura de Barbaído*; 4 – *Conhal of Arneiro*; 5 – *Ingadanais mines*; 6 – Mining camp of *Segura*; 7 – Mining camp of *Sarzedas*; 8 – *Cavalo* mines.

MINES FROM THE IRON AGE – ROMAN ERA

Almost all quartzitic ridges of this region show cavities or galleries of mining source, the “*buracas da moura*” – Moorish girl Caves of popular tradition. Included in this item are all cavities studied in the quartzites and situated close to villages from the Iron Age having scoria points or with the identification of findings in the place, which allow a chronologic attribution.

MONFORTE DA BEIRA

Between *Monforte da Beira* and *Castelo* – in a quartzitic relief – there are three mines in geographic and metallurgic intimacy with the settlement of *Monforte da Beira*, from the Late Bronze-II Iron Age (Canas, 1999), considering the numerous iron scoria that abound in the top. Henriques *et al.* (1995) identified and described the *Mina do Pó*, the *Mina da Tinta* and the *Poço das Vacas Priadas*, all of them pretty close

to each other. The *Mina do Pó* shows two entries, having the superior been formed by a landslip. The inner part shows ruptures filled with iron hydroxides. The *Mina da Tinta* - 60m North from the former one – shows an access through a staircase excavated in the rock. The inner part is formed by a wide “room”, with coverings of iron hydroxides, without tunnels or visible pits. The *Poço das Vacas Priadas* is a big dimensioned hole, almost totally filled up with rubbish, showing on the West side a deep vertical crack. In popular tradition this pit is from “the moors period” and it was used to through sick animals thereto Henriques *et al.* (1995). The archaeological richness of the *Monforte da Beira* hills, allied to a wide and extremely interesting landscape, from the geomorphologic point of view, justifies the creation of a small pedestrian route under the thematic of Iron History.

BURACA DA FAIOPA

A mysterious place located in the mountain ridges of the S. Miguel hill with a view over the *Arneiro* graben (Fig. 2). The access is made by track, from the main road to *Portas do Ródão*, near the quoted point of 289m. Entrance is made through a cavity in the rock, located on the bed of a water line, on its top. The cavity seems to develop on a fracture zone, falling in deepness. In its interior there are fractures filled by coloured iron hydroxides on the walls of the galleries. These ones multiply but they are all pretty much filled up with rubbish. According to information obtained, the field galleries extend throughout more than 200m and in deepness. It should once had been an old iron mine. In the surroundings roman traces and goethite blocks were found. Immediately over the mining exploration there are some accumulations of quartzitic blocks.

There is one curious legend associated with the *Faiopa*. One says that a certain D. Urraca was crazy in love with a moor. He – to meet his beloved woman – crossed the river underneath its bed through an immense tunnel that linked the *Faiopa* to the Castle. D. Urraca’s husband, after finding about her wife’s treason, tied a millstone to her neck and threw her into a well or into the Tagus river. Among the community of Arneiro, the mine of *Faiopa* had - until very recently – an important function in the initiation process to become men. Entering the *Buraca da Faiopa*, with all its legendary and wonderful charge it contains revealed courage and daring that men should denote in the beginning of its process of social affirmation (Henriques, pers. commun.).

We must still underline the identification – in the *Buraca da Faiopa* – of a specimen of the greater-horseshoe-bat (*Rhinolophus ferrumequinum*). These are the elements that are indicative of the geoarchaeological, anthropological and natural potential of the *Buraca da Faiopa*, which will be explored in a pedestrian circuit that shall contex-

tualize it within the big Roman mining exploration of *Conbal do Arneiro*.

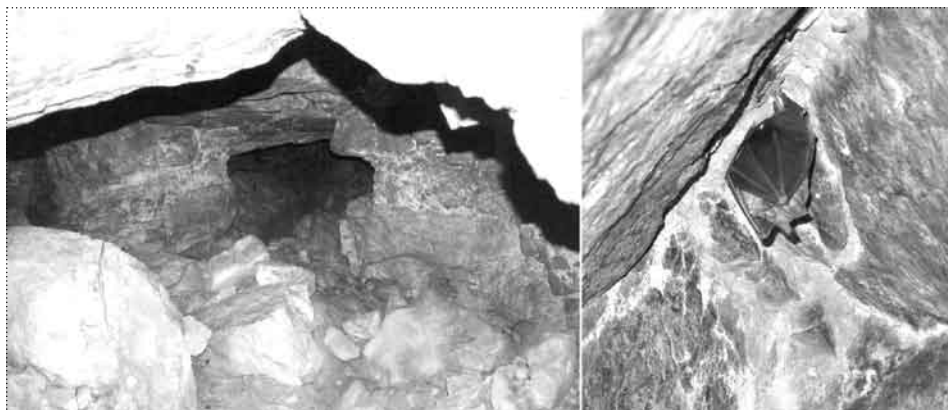


Fig. 2 - Inside the *Buraca da Faiopa* and its new inhabitants, the greater-horseshoe-bat.

THE BURACA DA MOURA DE BARBAÍDO

In the Valley of the River *Tripeiro* the *Buraca da Moura* appears disguised amongst exuberating autochthonous vegetation. It is formed by a main gallery in triangular form – from where several galleries went out, being filled with rubbish nowadays. On the ceiling and walls iron hydroxides are found. One of these galleries shows its rounded ending by chiseling. Its real age is unknown and local people keep no memory about any sort of extractive activity in the place. This natural idyllic place may be covered by the weir of a dam to be created down the stream.

ROMAN ARRUGIAE OF THE ARNEIRO (NISA)

Downstream of the Portas do Ródão landscape opens to the North over a wide extension of quartzitic blocks agglomerates, disposed in conic piles or alignments. These deposits are identical to those found in the Roman *arrugia*. In fact the Roman *Plinio, the Elder* (*Procurator* from *Hispania Citerior*) referred in Chapter XXII from the 4th book of his *Naturalis Historia* that the sands from this river are rich in gold (“*Tagus ab arenis aureis*”). Still *Frei Manuel Dias Canbestro*, in 1758 referred to this region of *Arneiro* in the parish memories of Espírito Santo (*Nisa*), as being “...a place the natives call *conbal*, (...). It was a constant tradition to have gold mineral in this place, by the time the Carthaginians and Romans lived in this country...” (*Canbestro*, 1758). *Carvalho* (1975) – one of the investigators that prospected gold in the sediments of the Tagus Basin, supports the local tradition under which it is believed that the *conbais* result from residues of gold washing in the margins of the Tagus river.

From the Serrinha we perspective more than 400000m² of Roman mining

cutting area, the *Conbal do Arneiro*, possibly contemporaneous (centuries I-III b.C.) from the Roman mining place *Las Medulas de El Bierzo* (Peninsular Northwest), considering the traces of the techniques used and the volume of sediments dismantled (according to Sánchez-Palencia *et al.* 1999). Through aerial picture and old pictures taken from this belvedere it is possible to identify structures connected to mining exploration, such as the incipient channels for the evacuation of useless material, of “U” section, large and of plane ground, some of these tack by alignments of block piles. One of these channels present in its terminal part a stagnant pond, possibly a zone for ore concentration, such as the *Lago Somido*, in *Las Medulas* (Sánchez-Palencia *et al.* 1999). All channels would evacuate to the Tagus (Fig. 3). The *Conbal do Arneiro* may have resulted from the gravity dismount of the Cenozoic detrital deposits (namely from part of the *Cabeço do Infante Formation*), as well as from the whole Fluvial Terrace T₃ and from colluvium) by increment of the erosive competence of pre-existing water lines or artificial *emissaria*, with draining direction E-W and S-N, taking advantage of regional pendants (such as the gutter-channels of El Couso and La Furnia, in Las Médulas). Water would have been transported since Nisa riverside until this place, through *corrugi* excavated for such purpose (the “*Vala dos Mouros*”). The bigger stones that resulted from the terrace dismount and from colluvium were removed from the sediments evacuation channels by manual sorting and piled along the borders of the channel, reaching more than 5m high, in conic or rectilinear piles, depending on the space available in the moment and to such purpose. The piles of big angular quartzitic blocks – a characteristic from the deposits resulting from colluvium, prevail in the septentrional limit of the *conbal*, the majority of the piles being formed by sub-rolled to rolled quartzites blocks of fluvial source (Terrace T₃) which practically does not emerge in the place (it was almost totally dismount).

Some estimates allow determining – in a first approach – the volume of sediments dismantled and the quantity of gold extracted. So, knowing that the total area of the dismantled zone, terrace T₃ shows a 6m thickness in this region downstream the Portas, the *Cabeço do Infante Formation* has its top at a 121m quota (Castelejo) and that its average quota of exploration is 106m, the volume of sediments worked would have been higher than $10,5 \times 10^6 \text{m}^3$ (considering that the volume of removed colluvium is unknown). This way the volume of works was 10 times lower than the one of *Las Médulas* in a 12 times smaller area (data compared to Sánchez-Palencia *et al.* 1999). Regarding the amount of gold extracted we know - under the work of *Carvalho* (1975) - that the proportion of gold in the detrital formations is extremely irregular,

existing enrichment per density in the base of the alluvium. From data obtained by this author for sediments of Terrace T₃ and of fields immediately overlapped to the Cabeço do Infante Formation, it is deducible that the gold extracted in the area of *Conhal do Arneiro* during the Roman exploration period would had been lower to 6 tons (to an average value of 0,521g/m³), possibly 3-3,5 tons (for average proportions of 0,291g/m³-0,347g/m³). This value represents around half of the whole gold production made in *Las Médulas* (Sánchez-Palencia *et al.* 1999).

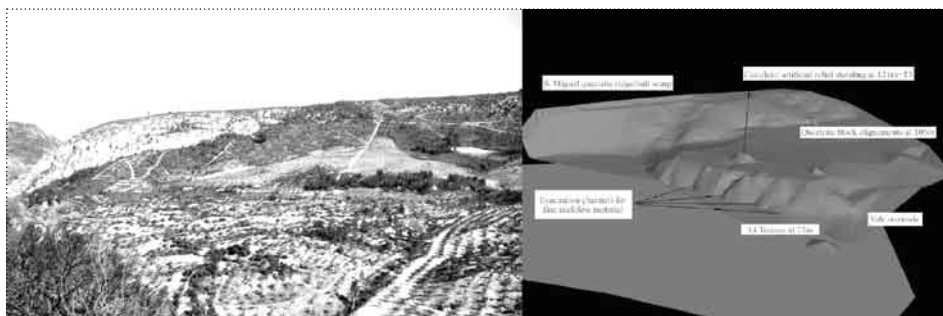


Fig. 3 - Natural and 3D-model description of mining landscape over the ancient Roman *Arrugiae* of Arneiro. The plane surface at the average quota of 106m marks the limit - in depth - reached by mining exploration.

Castelejo is a 15m high relief located on the northern border of the *Conhal do Arneiro*, rising in a central position and detached over the alignment of gross useless material. Its geometry, its constitution, low-cemented sediments of the Cabeço do Infante Formation equal to many others that emerge in the area, its plane top, without traces from the terrace remains T₃ and its strategic positioning in the centre of the mining exploration – between the channels destined to the evacuation of useless material and with a view over the Tagus River – are evidences of its artificial origin, connected with the mining dismount. This “*corona*” (Calado & Calado, 2002) might have been a place of vigilance over mining exploration and the fluvial traffic in the *Aurifer Tagus*.

This magnificent space for environmental education is included in the candidature of *Portas do Ródão* to Natural Monument. The Portuguese Institute of Archaeology considered the *Conhal* as an “area of archaeological interest”, being in a phase for classification as “Municipal Interest”. In the margins of the main rivers of this region – downstream quartzitic crists - the *conbais* or *conbeiras* abound, from a penecontemporaneous era to the one of the *Arneiro*, especially in Ocreza river downstream Sobral Fernando and in the Erges river (near Thermal Waters of Monfortinho).

INGADANAIS MINES (VILA VELHA DE RÓDÃO)

The copper mines of Vila Velha de Ródão were explored in seven concession periods in the beginning of the XX century, by the French companies *Société Anonyme des Mines de Cuivre de Ródão* and *Société Minière Iberique*, although there are some traces – pretty older ones – in the *Sítio do Cobre* (Guimarães dos Santos, 1945). The vertical pits distribute aligned 3,5km until the *Açafal* riverside, of big ecological interest due to the presence of the otter. Beyond explorations, sterile concentrations and ruins from buildings and pool, is one of the most pedagogical places where we may observe the Cenozoic reactivation of the most important Ponsul fault, associating the secondary mineralization from copper to the circulation of hydrothermal fluids in the zone of the fault (Fig. 4).



Fig. 4 - Decantation pool and the copper secondary mineralization associated to the tectonic accident from the *Ponsul Fault*.

MINING-CAMP OF SEGURA (IDANHA-A-NOVA)

The Route of Mines aims at helping to give knowledge from the natural patrimony from the small village of *Segura* with the interpretation of geological landscapes and the genesis from mineral resources which – for more than one century – have impregnated the experiences and customs of this region. We wish that this short route – on an intimate relation with the Geomining Museum of Idanha (Fig. 5), may include a set of mining routes that allow to get to know the main historical mining areas of Idanha: *Segura* (tin, wolfram, lead and barite), *Salvaterra do Extremo* (lead),

Thermal waters of *Monfortinho* and *Rosmaninhal* (gold) and *São Miguel de Acha* (lead and wolfram), this last one having deserved one of the first works of geological cartography developed in Portugal (Ribeiro, 1857). The itinerary PR4 - *Rota das Minas* (Route of Mines) shows a geographic bi-cephalic, in which the east sector allows to recognize the geological evolution of the region and the west sector leads the visitor to the mining heart of *Idanha* where he/she can find – among ruins and tunnels – the way geological resources of the region have been explored. The itinerary variations will proportionate a pleasant complement to the geological and mining knowledge of the area, considering that some itineraries go through very rich zones in landscape and ecological aspects (*Tejo Internacional Natural Park*), whit no urban pressure.



Fig. 5 - Geomining Museum of Idanha - museological space that will reproduce mining landscape and culture. On the right – quartz vein containing tin on the inside of the *Tapada da Barreira Alta* Mine (*Segura*).

MINING CAMP OF SARZEDAS (CASTELO BRANCO)

Along this mining camp of 10ha it can be visited 7 mines (*Gatas*, *Bartelinho*, *Ficalbo*, *Pomar*, *Gualdins*, *Santa* and *Pesquisa*) in the surroundings of *Sarzedas*, having been explored until the 40ies by the Mining Society of *Sarzedas*, allowing revealing the wolfram fever that crossed all Beiras during the Second World War. The galleries filled with rubbish and the ruins of mining buildings, involved by dense autochthonous vegetation and surrounded by an upsetting landscape are all that is left from a history full of happenings, of the intense hurry of hundreds of people and numerable villages around the exploration of wolfram, antimony and gold, only in the memory of old miners who still live in the small villages – now asleep – from the region. To create a mining route in *Castelo Branco* we cannot forget the mines of *Palvarinho* and *Forninho do Bispo* (Thadeu, 1951).

CAVALO MINES (OLEIROS)

The *Cavalo* mines occupy the slope of the small riverside, W of the Coval Seixoso (Fig. 6). They are arranged in degrees, as sulks, along an interval – in altitude – of 200m. The horizontal galleries are numerable, accompanying the mineralized quart veins that cross the slate-greywacke formations of the Beiras Group. Few are known about this wolfram mine. The dimension of the area of extraction and of administrative buildings and washing area appoint however to a mining exploration that might have had some importance during the end of the first half of the XX century. The *Cavalo* mines gather conditions to make thematic visits within the scope of industrial Archaeology and Geology.



Fig. 6 - The *Cavalo* mines. This entire rough region, covered with vast pine-groves, and the mine buildings themselves suffered with summer fires during the last years. On the right: detail from the inner side of one of the galleries.

EPILOGUE

Naturtejo, a company promoting tourism development in the Centre-South municipalities that integrate it and the Associação de Estudos do Alto Alentejo intensely bet in the knowledge of its geomining heritage, aiming at developing new tourist products to the region. The relevant cultural assets shown herein – although in a preliminary stage – already allowed the development of projects in operation: for a small route pedestrian itinerary and for a locality museum in Segura (Idanha-Nova). Another pedestrian itinerary will rise in Arneiro (*Nisa*), connecting the

Buraca da Faiopa to the *Conbal do Arneiro*, two important monuments for the building of the Natural Monument of *Portas do Ródão*. The policy followed by Naturtejo for the sustainable tourist development in the region will keep on being the one of getting to know its cultural patrimony, based on fun, emotion and sense use. After all, the simplest way to learn is by playing with knowledge.

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