

# Enhancement of the historical “Royal Quicksilver Way”

E. Sanz-Rubio, S. Cuezva, A. Sanchez-Malo & A. Fernandez-Cortés  
*Geomnia Natural Resources SLNE, Madrid, Spain*

A. Hernandez Sobrino  
*Fundación Almadén-Francisco Javier de Villegas, Almadén, Spain*

R. Parra Indiano, E. Soria Hernanz & M. Padilla  
*Artchemist, Pavimentos y Restauración SL, Collado Villalba, Spain*

S. Mellado  
*Parque Natural de la Sierra Norte de Sevilla, Spain*

T. Herrero  
*Ayuntamiento de Cazalla de la Sierra, Sevilla, Spain*

**ABSTRACT:** The “Royal Quicksilver Way” (XVI-XIX centuries) started in Almadén (Ciudad Real), the largest cinnabar mines in the world until the final closure of this historical mine in 2002 by environmental problems. Almadén, together the Slovenian Idrija mercury mine were declared Human Heritage by Unesco in 2012. Nowadays, the Mining and Cultural Heritage of Almadén is available for visitors in the Almadén Mining Park & Museum.

Although the Almadén Mine was famous during the roman epoch because the use of cinnabar as valuable pigment, its more flourishing period is related to the introduction of amalgamation process in the Spanish Central America silver mines since the mid XVI century. After distillation of cinnabar, the obtained quicksilver was used to extract the metals from silver ore. Consequently, the demand for quicksilver drastically increased, and Almadén became an important mining and industrial center. Silver was essential to fund the conquest campaigns of the Spanish Royal Crown.

The “Royal Quicksilver Way” ended a first terrestrial section in Seville, where the quicksilver was sent to Cadiz via the Guadalquivir River, to be loaded in galleons and transported to Central America. Bullock carts and mules were used in the transport of quicksilver across three variants, two roads, and a carrier, which were used between XVI centuries until the final introduction of railway in mid XIX. Today, the “Royal Quicksilver Way” crosses Ciudad Real, Córdoba, Badajoz and Seville provinces and allows the discovering of distinct construction and maintenance elements (bridges, fountains, etc.). The way crosses natural parks, valuable environmental areas and towns with important Cultural Heritage figures that provide an additional value. Social support, volunteers and involvement of those local or regional organizations that are interested in the recovery of this historical way for public use, appears as the unique way to enhance a long distance historical way in such crisis period with absence of public funding for these initiatives.

## 1 INTRODUCTION

The Almadén Mines (Ciudad Real) (Fig.1) have been the largest cinnabar mines in the world, that produced about 250,000 MT of mercury from the roman period to the final closure of the mines in 2002 due to the environmental problems of the exploited metal. During the roman epoch, Almadén is already famous because the use of cinnabar as valuable pigment (Hernández-Sobrino, 2000), but the most important period of the mines is related to the discovering of silver amalgamation with quicksilver in the Pachuca mine (Viceroyalty of New Spain) in 1555 by Spanish Bartolomé de Medina.

After distillation of cinnabar, the obtained mercury was used to extract the metals from silver ore. The introduction of amalgamation process in the Spanish Central America silver mines since the mid XVI century provokes the drastic increase of quicksilver demand. Consequently, Almadén became an important mining and metallurgical center.



Figure 1. Recent aerial photograph showing Almadén city, the historical mining complex and waste tailings in process of restoration.

Most of the production was transported to Seville, via the Royal Quicksilver Way ("Camino Real del Azogue") In Seville, the quicksilver was embarked in shallow-draft boats coming down the Guadalquivir River to its mouth (close to Cádiz) and later loaded in galleons to cross the Atlantic Ocean and finally transported to the Royal Mines of New Spain and Peru. One of the most important routes landed in Veracruz and later transported in a long journey overland to Mexico City, from where it was distributed to the various mines (Fig. 2). Quicksilver production allowed the operation of a complex economic circuit that supplied silver to the Spanish Crown and made possible the colonization of the Americas and funding conquest campaigns.

Before the sixteenth century, Almadén mines are a minor operation, which corresponds to small mining development work. The mining establishment consisted of underground workings and ore roasting kilns, but it was quite small and did not have a permanent infrastructure. The mines quickly reached significance when the mercury really became an essential element for the

amalgamation of the silver mines discovered in colonial America. Almadén was transformed in a few years from a small mining establishment to a major production center.

The routes were rapidly established after the discovery of the new procedures for obtaining silver by amalgamation. In the second half of the sixteenth century are already established and organized roads and routes between Almadén and Seville, which were maintained until the arrival of the railroad in the second half of the nineteenth century, a fact that roughly coincides in time with the independence of the American colonies.



Figure 2. Atlantic routes of the quicksilver.

## 2. QUICKSILVER PRODUCTION AND TRANSPORTATION

The long road of quicksilver between production centers and America began in the called “Buitrones Fences”, where cinnabar was distilled to get quicksilver, and later stored and packaged for transport. The seasonal increase of temperature from May or June increased losses in furnaces and production was stopped in summer to be newly resumed in the fall. Until the late eighteenth century, when they began to use iron bottles, the liquid metal is transported, not without difficulty, in goat skins (“baldeses”). During the early nineteenth century, iron and goat skins coexisted until the construction of the railway Madrid-Badajoz.

Traditionally, the mercury was placed inside three goat skins and lately coated with a basket. After this preparation, the packages were ready to be placed in bullock carts, which had previously been conditioned with soft branches covering the bottom. The weight of the carts was 460 kg of mercury (Fig.3), while the maximum weight for a mule was 46 kg of mercury (Hernández Sobrino, 2006).



Figure 3. Artistic illustration of the loading of bullock carts (Jaime Sánchez Calleja)

The growing demand for quicksilver involves the adaptation of the route Almadén-Seville. It is especially notable the well preserved infrastructure made in the eighteenth century near Almadén (Hernández-Sobrino et al, 2006) to facilitate transit in the initial segments of the route of mercury (Fig. 4). In Seville quicksilver was packed again in three smaller concentric layers of goat skins. Each of these skins was introduced into a small closed timber barrel and three of these barrels were placed in a wooden box. Once the quicksilver was properly conditioned, it was ready to be shipped for the long transatlantic voyage.



Figure 4. Bridges (XVIII c) in the way close to Almadén (Chillón, Ciudad Real).

The route between Almadén and Seville was already established in the mid-sixteenth century. In May 1558, the manager of Almadén mines authorized to purchase the first 20 bullock carts. Quickly, it was necessary to expand the number of carts for transportation (Fig.5).



Figure 5. Artistic illustration showing the trip with bullock carts (Jaime Sánchez Calleja).

When for whatever reason, it was not possible to send the mercury in bullock carts, mules were used (Fig. 6). The transport of mercury in wagons was cheaper to transport by mule, despite facing long detours. The bullock carts used a month and a half to get to Seville, while the mules took about a week. The survival of transport using mules is because in the summer months could not find suitable pastures for hundreds of bullocks pulling the carts loaded with quicksilver. In addition, many of these animals sickened and perished because of the extreme heat of summer. So, during the summer months was suspended transport by carts and was done by mule. Every year, the first shipments of quicksilver were initiated in mid-April, when the roads were no longer muddy. The bullocks wintered between November and April in the called "Dehesa de Alcudia", while repairing and preparing the carts.

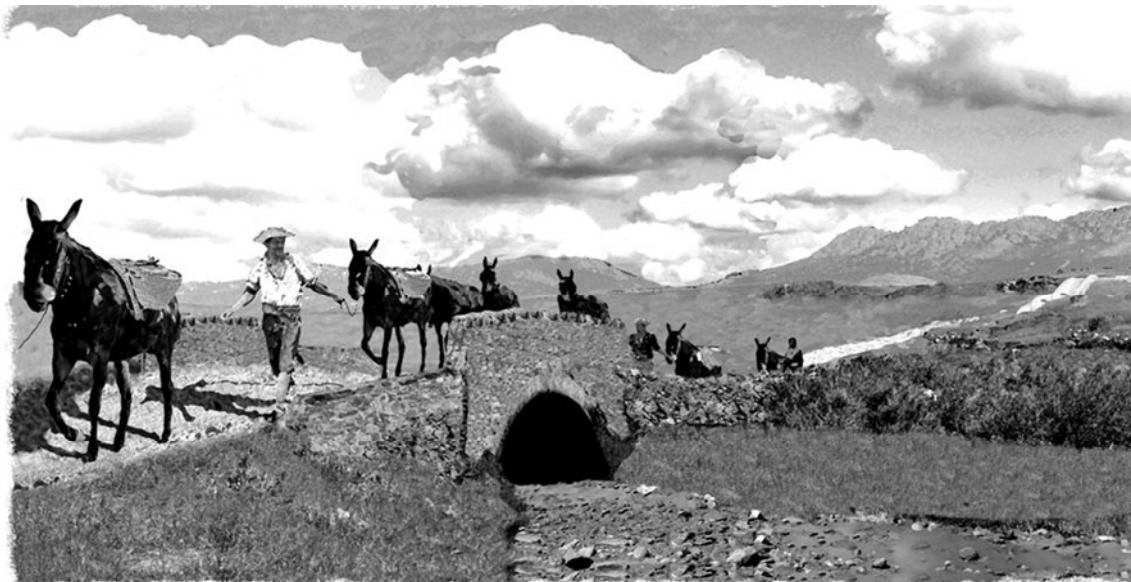


Figure 6. Artistic illustration showing the trip with mules (Jaime Sánchez Calleja)

### 3. QUICKSILVER ROUTES

The way of quicksilver in the peninsular stage had three variants, two roads, and one carrier, which were used from s. XVI until the introduction of the railroad in the second half of the XVIII century. The three paths have a common initial segment, from the warehouse where quicksilver was packed in Almadén to the town of Azuaga (Badajoz); later, there are three routes to save the natural barrier of the Guadalquivir River (Fig. 7).

- a) A first road runs through Azuaga, Llerena, Santa Olalla and El Ronquillo, bordering the Guadalquivir River until after crossing through the bridge of Triana in Seville. This way practically coincides with the Silver Way ("Ruta de la Plata").
- b) A second road runs along Azuaga, Alanis, Constantina, Lora del Rio and save the Guadalquivir River in Alcolea or Tocina using boats.
- c) The third way was only used by mules and ran between the previous two, by Alanis, Cazalla de la Sierra, El Pedroso and crossing the Guadalquivir by boat in Cantillana.



Figure 7. General scheme of the 3 routes of the Royal Quicksilver Way.

#### 4. CULTURAL HERITAGE

The quicksilver route is a leading cultural route, through which it was possible the economic development of colonial America and the maintenance of the Spanish monarchy. Moreover, this route allowed the dissemination of scientific and technical exchange between the two continents.

Firstly, the way starts in the historical cinnabar Almadén Mines. Although it is closed since 2002, nowadays, this exceptional Mining and Cultural Heritage is available for visitors in the Almadén Mining Park & Museum. Moreover, Almadén together the Slovenian Idrija mercury mine were declared Human Heritage by Unesco in 2012 (Fig.8).



Figure 8. Bustamante oven “Hornos Bustamante”, used for cinnabar distillation, are probably one of the symbols of the Almadén Mining Park (Ciudad Real).

Today, the Royal Quicksilver Way crosses Ciudad Real, Córdoba, Badajoz and Seville provinces and allows the discovering of distinct construction and maintenance elements found in the crossed municipalities (bridges, fountains, etc.) (Fig. 4) and other important Cultural Heritage figures, landscape or environmental areas that provide additional value to the historical way.

#### 5. ENHANCEMENT OF THE ROUTE

The cultural diffusion of the Royal Quicksilver Way has been the aim of the project "Enhancement and cultural diffusion of the historic route of the Camino Real Quicksilver", funded by the Ministry of Culture of Spain. The project provided for the relocation of this historic route between Almadén and Seville for use culture and tourism.

A first stage of the enhancement of the way was focused on the historical research, finding evidences in old maps and historical libraries, together with fieldwork reconnaissance, relief analyses and GIS techniques to locate the original pathway. Later, a phase for the cultural diffusion of the knowledge about the way started (talks, conferences, publications, etc). Once the public funds were exhausted, a second stage, still in course, is being developed by social support and involvement of those local or regional organizations that are interested in the recovery of this historical way for public use. This is the case of the Sierra Norte Natural Park, where groups of volunteers are developing a major and more detailed study of the way crossing this environmental area. In addition to the reconnaissance of the routes (Fig. 9), the activities are also focused on the recovery of the traditional and cultural knowledge from the inhabitants of the towns of the park; in fact, several of these towns, as Alanis, Cazalla or Constantina already provided bullock carts during the XVIII century to transport the quicksilver from Almadén. Other towns, like El Pedroso or Guadalcanal are related to historical mining activities for the exploita-

tion of Iron or Silver respectively. Despite of the absence of public funds due to the crisis period, this social support that believes in the recovery of the old traditions and culture appears as the unique way to enhance the value of the “Royal Quicksilver Way”.



Figure 9. Volunteers walking in the neighborhood of Alanis town (Sierra Norte Natural Park, Seville)

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