



Mining heritage of Sobrarbe

Iron and silver in the high Valleys of the Cinca river



Historic Geo-mining Trail

www.geoparquepirineos.com



Sobrarbe-Pyrenees UNESCO Global Geopark

An exceptional geological heritage

Geoparks are territories that promote a strategy of sustainable development based on their natural and cultural values. At the Sobrarbe Pyrenees Geopark we work to nurture our natural heritage, especially geology, and all the cultural aspects of our region with the ultimate aim of providing enjoyment for future generations and allowing them to experience this exceptional heritage that characterizes our local culture.

The Sobrarbe Geopark covers the entire 2,202 km² of the district and includes all of its 19 municipalities.

Due to its exceptional geological heritage, its protection orientated management, education and sustainable development, and over 100 geology sites, it has become part of the UNESCO Global Geoparks Network.

Since September 2006 the Sobrarbe Geopark has been part of the European Geoparks Network and Global Geoparks Network, a voluntary association of territories that share the same work methods to promote and care for their local heritage, especially where geology is concerned.





Sobrarbe is a treasure trove of history, telling us of its past and proudly showing off its stunning geological heritage that extends from the Palaeozoic era up to the present day in a journey through time spanning more than 550 million years. Nothing could be simpler than discovering Sobrarbe's outstanding geological treasures: first visit the Geopark Space in Aínsa and then travel to the 13 places of special interest on the Roadside Geology Route; choose the geology routes for walkers and/or mountain-bikers that you find most appealing and are suited to your abilities, follow the Historic Geo-mining Trail in Parzán, visit the Lamata Palaeontology Museum or climb the via ferrata at the impressive Sorrosal Waterfall. They say that all that's missing in Sobrarbe is the sea, and it's true: there is no sea now, but there certainly used to be!



And during your stay in Sobrarbe look out for **Geopark Partner Enterprises** and enjoy the hospitality and services they offer. They include tourist facilities, accommodation, restaurants, adventure sports, museums, shops and artisan food producers and are identified on signboards helping visitors get in touch with the surrounding geology.



Organización
de las Naciones Unidas
para la Educación,
la Ciencia y la Cultura



Sobrarbe-Pirineos
Geoparque
mundial de
la UNESCO



Mining Heritage In The Sobrarbe Geopark



Throughout different eras, the Sobrarbe area has experienced intense mining activity. There used to be a great deal of mineral mining In the *Pyrenean Axial Zone*:

- **Iron ore mining:** The most productive mines were up on the Mener mountain near Parzán in the Bielsa area.
- **Lead and Zinc mining:** This took place in the municipality of Bielsa, mainly on the Liena mountain, although the minerals were also extracted from the mines of Serveto and Ana. There was also a mine in the Chistau valley near “ Hospital de Gistain”.
- **Cobalt and Nickel mining:** This was concentrated in the Chistau Valley around San Juan de Plan.

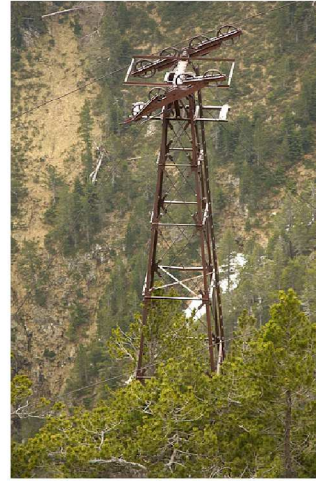
Though there were other important mineral mines in the *Meridian Pyrenean zone*.

- **Salt mining.** These mines were all located in an area rich in Mesozoic outcrops of Keuper Triassic era material. The largest of these was close to the village of Salinas de Trillo. Among other minerals present in this area was Halite (Salt). Likewise, traces of Koalinite, Gypsum and Calcium Sulfate remain from the Keuper age.





- **Aluminium-rich rock mining.** There were several places in the Sobrarbe area where clay heavy materials (oil shale and lime shale) were extracted. This was then used as a primary material in ceramic factories and in the tile ovens which have been given mining heritage status. These were situated in the following municipalities: Ainsa–Sobrarbe (in La Pardina), Bârcabo (in Almazorre, Bârcabo and Lecina), Boltaña and La Fueva (in Morillo de Monclús, Rañin, Solipueyo and Tierrantona).
- **Carbon Rock mining.** In most cases, these limestones were used as the base material in the Lime ovens which were dotted around the Sobrarbe region. They were to be found in Lecina (near Bârcabo) and in Mesón de Puértolas (near Puértolas).



The Scenario Of The History

THE ORIGIN OF THIS MINERAL WEALTH

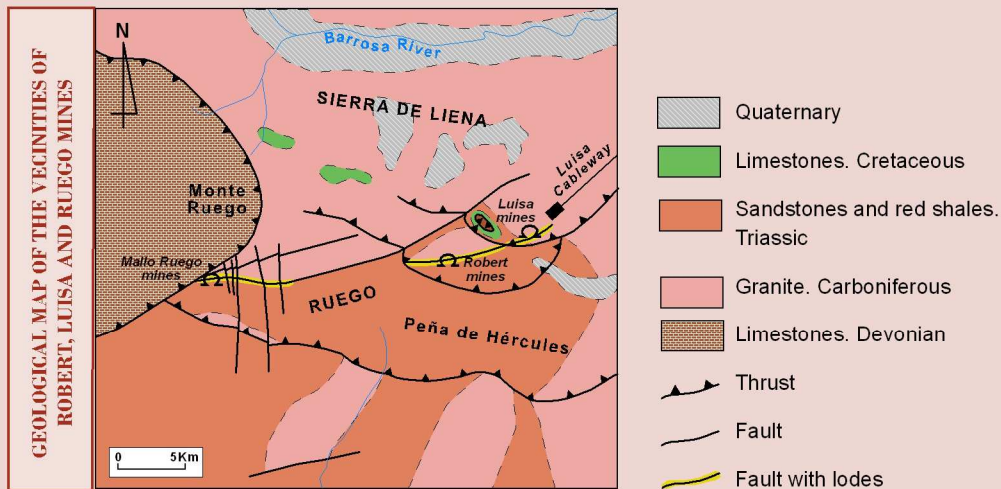
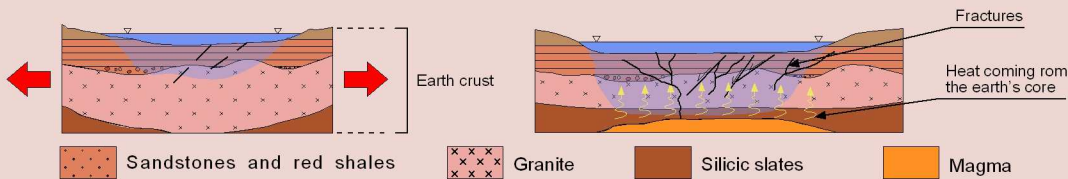
Lucrative minerals are often concentrated in lodes, which is the name given to accumulations of mineral found in fractures in the ground. These deposits were formed due to the flow of hot underground water that transported dissolved metals. This is very much the case with mineral deposits located in Axial Pyrenean Zone.



Luisa cableway arrival station

The geological history of the region tells us the story of its fractures, fissures and the flow of its hot water sources. Millions of years ago during the Paleozoic age (around the time of Hercynic or Variscic folding) and later in the Mesozoic and especially the Cenozoic era (during the folding of the Alps) there was a great stretching of the earth's crust. This caused fractures and an increase in underground temperature, which heated up and set in motion water soaking into the rock strata. The water dragged various chemical elements contained in the rocks along with it (among which were some metals) and deposited them into fractures and cracks where they accumulated as the water cooled. It is interesting to note that the different minerals did not mix, as they appear, perfectly separated into layers, generally depending on their point of fusion.

However, the mineral deposits of the Meridian Pyrenees are generally stratified, sedimentary and influenced by Geologic cycles; this is due to erosion, transport and sediment processes.



Mines are dug over the fractures

Iron, silver and other minerals of an economic interest

Apart from iron and silver other minerals of an economic interest were exploited:

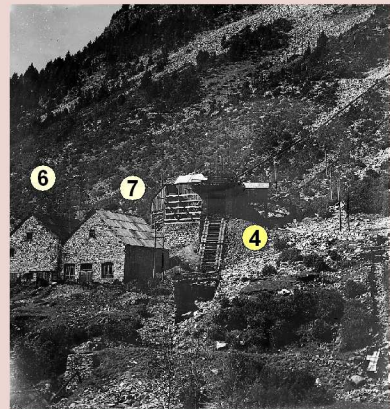
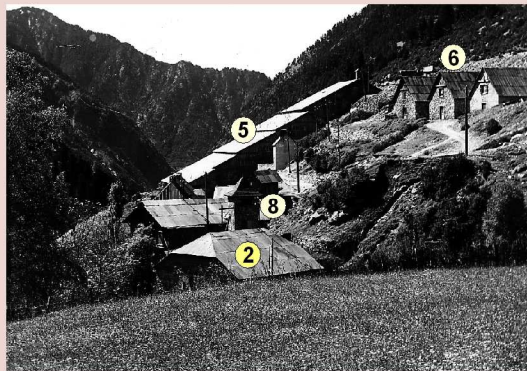
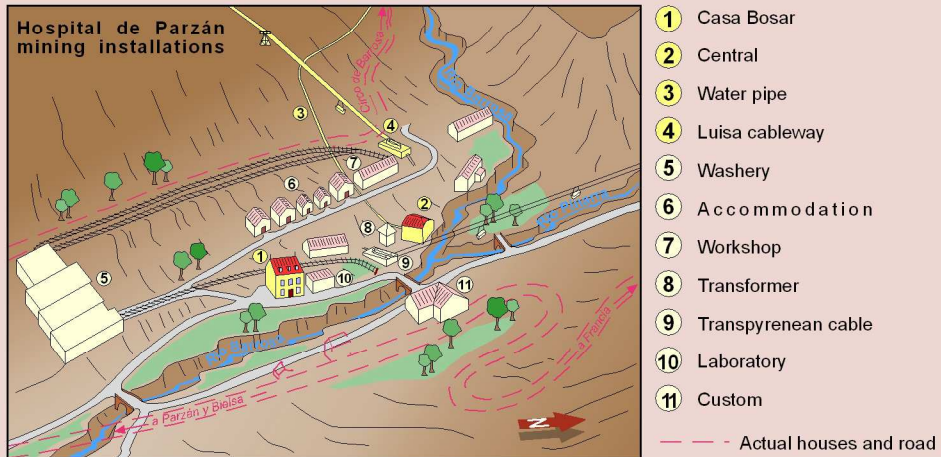
FLUORITE - CaF_2		<p>A common mineral found in many of the lodes. Although it can be colourless or have any of the colours of the rainbow, here it is usually white.</p>		<p>Uses: enamels for kitchen utensils, fluoride for dental hygiene products, etc.</p>
GALENA - PbS		<p>It often contains silver which was exploited here. Uses: extraction of lead for manufacturing electrical accumulators and anti-rust varnishes. Its use in pipes and petrol is disappearing due to its toxic and contaminating effects.</p>		<p>Silver uses: jewellery alloys, computer micro circuits and manufacture of films and photographic paper.</p>
PYRITE - FeS_2		<p>The most common metal in these mines. Found in the contact areas between the lode and the enclosing rock. It can contain gold and copper.</p>		<p>Uses: Sulphuric acid production, dyes, wood protectors and disinfectants. It is not apt for iron extraction due to its sulphur content which makes it brittle.</p>
HERMATITE - Fe_2O_3		<p>Locally known as "Oligisto", the Iron Oxide found in the Chistau valley is a shiny grey color whereas normally it is red. It's easily confused with Galena (Lead II Sulfide) and can be distinguished by the colour of its powder form (which in this case is red).</p>		<p>Uses: Iron was often extracted, but it was also used for staining or dyeing.</p>
HALITE - NaCl		<p>Also known as rock salt or locally as "Gema" salt, it was mined at Salinas de Trillo, where, once spread out on the drying surfaces it took on a white transparent appearance.</p>		<p>Uses: Food preparation and preservation.</p>
SIDERITE - FeCO_3		<p>It can be black, brown or yellow. Uses: Iron from these valleys which became internationally famous for its quality was often extracted from this mineral. However, the main iron mineral that was used was GOETHITE $\text{FeO}(\text{OH})$ a derivative of Limonite.</p>	<p><i>El Escorial (Madrid)</i></p> 	

The transformation of the landscape

AGGRESSIVE ACTIVITIES FOR THE ENVIRONMENT

In spite of the fact that most of mineral was not processed in these valleys, the infrastructure needed for the exploitation, and the mining activities on their own, caused a significant impact on the landscape: blasting, tips, extensive tree felling, pollution, etc.

After that the facilities were abandoned, nature recovers little by little from its old wounds.



Photos: Bielsa museum

Mining activities in the 20 century

AN EXHAUSTING ROUTINE

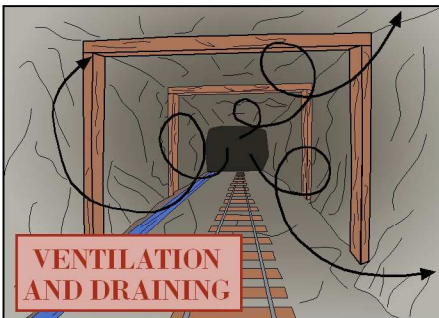
Work was performed by 34 people in 4 shifts getting paid between 70 and 75 centimes of peseta (0,004 - 0,005€) per hour.



Until the arrival of pneumatic perforators, excavation of the rock was carried out with iron bars introduced into the rock by means of sledgehammer blows. Perforators quadrupled performance.



Galleries were underpinned to avoid cave ins.



Galleries were designed in such a way so that they did not require any machinery.

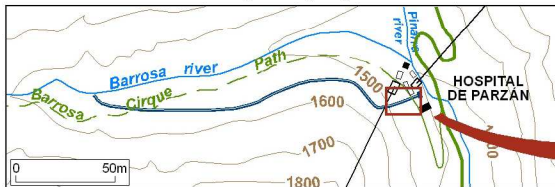


Animals and men pulled and pushed trolleys on rails in the galleries.

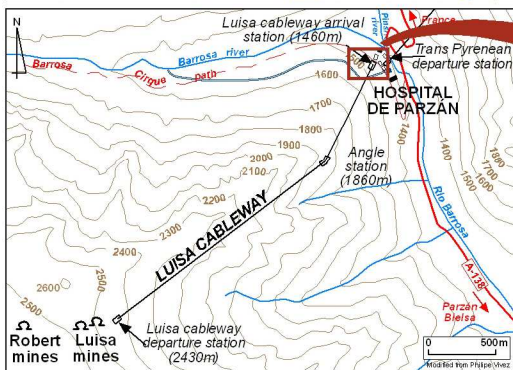
The industrial revolution and the power of electricity

TECHNOLOGICAL ADVANCES SOON EXHAUSTED THE AVAILABLE RESOURCES

The hydro-electrical power station used the power of water from the Barrosa river, that was channelled using the big difference in level. The energy produced was such that after supplying all the mining facilities, the Company Sociedad de Minas de Parzán sold what was left over to the electricity company.



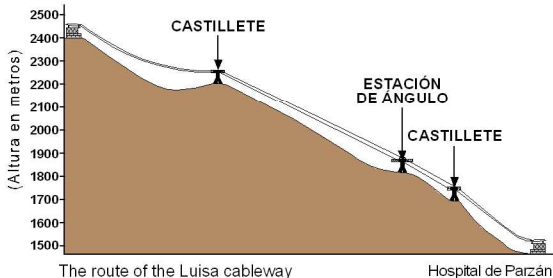
Water pipe



Transport of minerals by aerial cableway meant a revolution in work efficiency. Using technology which is still current nowadays on modern cableways (disengageable clamp), each car transported 300kg rapidly, a load which previously required 2 to 3 donkeys.



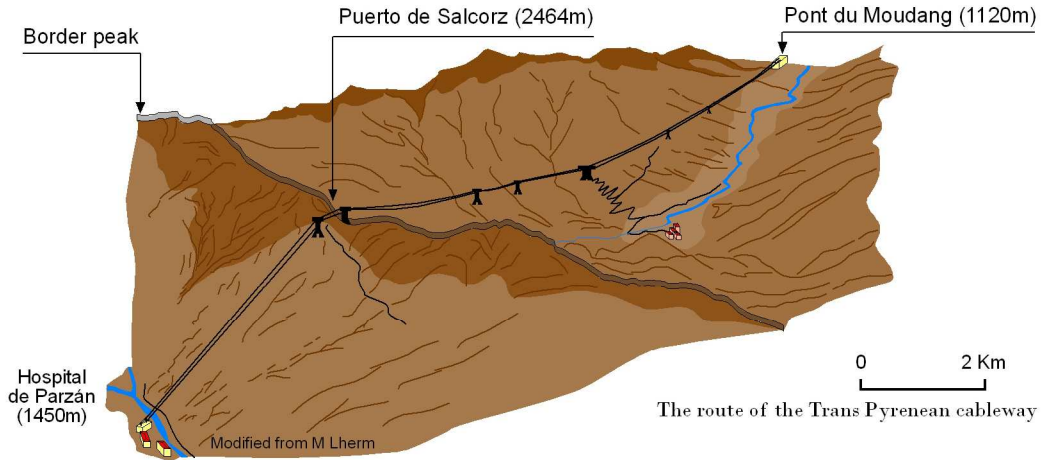
Luisa cableway arrival station



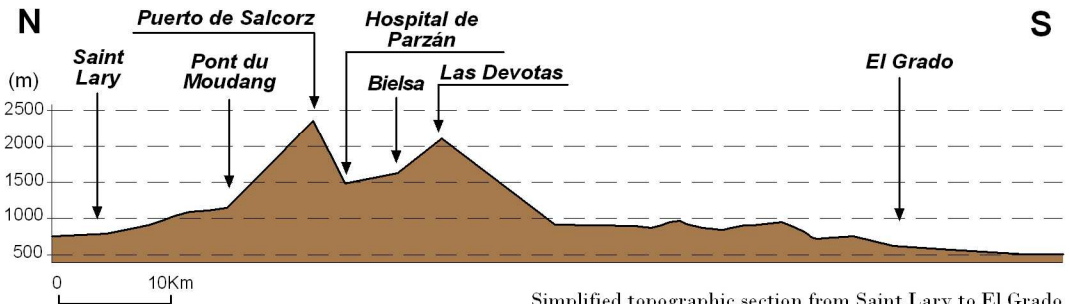
Fleeting wealth flies away

WHY TO FRANCE?

Until the current construction of the Cinca River valley road, communications of the mines with France and the main cities of Huesca - where the minerals could be processed - was very complicated mainly due to relief and the distance. The difficulty was such, those responsible for the mining exploitation decided to build an aerial cableway (the Trans Pyrenean) to transport the minerals to France, passing through the Salcorz border at 2.464m.



The route of the Trans Pyrenean cableway



Simplified topographic section from Saint Lary to El Grado

The protagonists of this history

TRAPPED BY A STYLE OF LIFE

As a new aspect of the hard life on the high mountain, many families were trapped by a lifestyle that promised wealth during many generations. The mines took many lives at the cost of making a few very rich.

These mineral deposits were never very copious in minerals and each technological advancement accelerated a wealth that was disappearing rapidly.

There is evidence from Roman times of silver coins minted with the mineral extracted from these mines. After a faltering start, silver, iron and lead reached their maximum splendour in the 16th century – the royal Mines of Páezán-, along with wealth came fratricidal battles. The railings at El Escorial (Madrid) were forged with iron from these mines.

Subsequently, exploitation of the mine went through many different national and international hands, with a decreasing success, until closure of the last mine in 1970.

Afterwards, there was only silence ... and the memory.



El Escorial (Madrid)

Historic Geo-Mining itinerary

In the high valleys of the Cinca, there are still some metal and stone remains from an old mining activity, though currently abandoned

The mining facilities are a vivid reminder of a wealthy mining heritage.



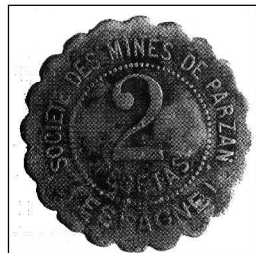
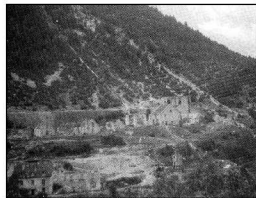
Cover channeling



Casa Bosar

The Bielsa museums offers a complete historical perspective of the local society.

LOCATION OF THE SIGNPOSTS



 Parking

 Location of the signposts

 Trekking
PR HU-187

A tribute to the memory of our elders

The time has come – while the last miners can still tell us their story – to turn an exhausted activity into an educational, cultural and entertaining visitors attraction, which will help us to understand the historical reality of the high valleys of the Cinca River.

We understand that the promotion of this mining wealth is based on the respect, admiration and the memory of the thousands of children, women and men who were touched by the ephemeral wealth hidden under these mountains.

ENJOY YOUR VISIT SAFETY

- The **Historic Geo-mining itinerary** is a trail marked with information panels along the way on a stretch of the PR-HU 187 route.
- The **mines and adjoining infrastructures cannot be visited** due to their condition and consequent health and safety issues. An exception is the tile oven at Almazorre which can be freely visited.
- **Respect the geological outcrops.** Do not break off samples of rock, mineral or fossils; only take the loose pieces.
- **Safe visits, unforgettable experiences.** There are companies who collaborate with the Geopark where you can hire specialized guides to make your tour a unique and safe experience.
- The outcrops and the parking areas have a limited capacity.
- When walking on roads always look out for traffic.
- Those responsible for Group visits should ask the Guardia Civil (Police) or Town Halls for information about road safety procedures.



TO COMPLETE THE HISTORIC GEO-MINING ITINERARY

Bielsa Museum. Tel. (0034) 974 501 000 - Bielsa www.bielsa.com
The Geopark Information Centre. Tel. (0034)974 500 614. Castle of Ainsa
www.geoparquepirineos.com

FRANCIA

Historic Geo-mining Trail



- Iron ore mining 
- Lead and Zinc mining 
- Cobalt and Nickel mining 
- Aluminium-rich rock mining 
- Carbon Rock mining 
- Salt mining 
- Thermal waters 
- Sulphurous waters 
- Signposts 
- Tourism information office 
- Museum 

MORE INFORMATION:
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