THEN, THERE WERE MINES

Volume 4

Margaret Davies

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Contents

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Chapter 1. Ghosts of the Ghost Towns.

Avguadalupe las herrerias : facebook wall.

I was sceptical when, on one of my first visits to the Sierra Almagrera, I was told that thousands of people used to work in the mountains. The main reason for my doubts was the apparent absence of any significant mining town or even mining village. The miners' quarters at El Arteal were relatively modern, and in any case could never have accommodated the sort of numbers that I was hearing about. With the exception of Las Herrerías, with its few workers' cottages, the settlements bordering the foothills showed no evidence of a previous population expansion and subsequent decline. As I became more familiar with the history of the mining activity in the Sierra Almagrera, I no longer doubted the numbers of people involved. However, it still didn't explain the lack of any kind of 'mining community' or even shanty towns at the foot of the barrancos. Even more puzzling was the lack of reference to any mining activity in the street names. In my early days, the streets in Las Herrerías had very few signs, at least now it has a place named after Santa Barbara, the patron saint of miners. This in itself is a mystery, since, unlike other parts of Spain, where there were numerous processions and fiestas in her honour, the miners in this area had no particular devotion to her in the 19th century. The Las Herrerías celebrations were a 20th century event, largely influenced by mine workers from other areas and countries. The place where this lack of mining community was most striking was Los Lobos, the gateway to the famous Barranco Jaroso. Here, the only evidence of a massive population explosion and urban expansion was the coming of the Brits in the 1980's, buying into the speculative urbanizations that sprung up overnight like mushrooms. Apart from filling the cemeteries with their broken bodies and financing the palatial houses in Cuevas and Vera, how was it that these thousands of souls left so little mark on the surrounding landscape? Who were they, where did they come from, and, more intriguingly, where did they live?

The first wave consisted of men from the Sierra de Gádor or the Alpujarras, relatively experienced in mining, having worked lead, either on their own land or on others, while at the same time working their smallholdings when necessary. I suspect that these men from the Alpujarras came and worked as groups or teams, in much the same way as lead and tin miners did in 19th century Britain, although possibly in a less formal manner.

Next came local men with no experience but attracted by paid work as more concessions were granted. As the fame of the Sierra Almagrera spread, men came from far and wide. As well as agricultural workers, no doubt the mines also attracted drifters, petty criminals, runaways and political opponents of the successive regimes which plagued Spain during the 19th Century, in the same way as they were attracted to the Linares mines. As with any boom, with labour in short supply, questions weren't asked, and anyone and everyone was taken on. With no mechanisation, man power had to suffice, even if it was an unskilled, disorganized workforce.

The magnetism of the mines very quickly had a serious impact on agriculture in the whole, wider area. While some of the more local agricultural workers, and indeed those from further afield, simply absented themselves to return home for planting and harvesting, work that the women and children could not do alone, landowners found it almost impossible to find labour for such tasks. The economy of supply and demand came into play, the wages of agricultural workers rose, gaining parity with those of unskilled mine workers. Many of the mine owners were also landowners, and so had no desire to see their labour costs rising, both on the land, and, in the mines. The solution was to formalise the peasant-miner's practice of working the land when necessary, by shutting down mining operations several times a year. This was not to give the men a holiday, it simply freed up a labour force for the landowners' needs. A certain degree of plurality of employment existed in many parts of Europe during the 19th century in areas where subsistence farming couldn't provide for the needs of a family, but tended to die out as mining became more industrialized and required a more skilled workforce. Its normalization in the Sierra Almagrera however, gave rise to a workforce comprising mainly of, what many foreign mining experts of the time disparagingly described as, 'miners who would always be peasants'. Indeed, when the mines were paralysed in the 1880's, those miners who came from the Alpujarras migrated to Cartagena, to work in the la Unión mines, but the rest of the work force mostly returned to their rural poverty until things improved. As a province, Andalucía would see this seasonal migratory pattern in one form or another until well into the 20th century.

So where did those early miners lay their heads in the Sierra Almagrera? Wherever they could find shelter from the rain, with room to lie down was the short answer. Caves and make-shift shelters served as lodgings for the pioneers. For those from the Alpujarras, the conditions were better than they were used to, as in winter, the Almagrera is nowhere near as cold as the Sierra Nevada.

In 1867 Simonin, in 'La Vie Souterraine' ('Life Underground'), wrote this of the miners of the Almagrera and the Alpujarras;
"A wide pair of cloth breeches ending at the knee; a belt fastened round the waist, in which tobacco, knife and money are put; a handkerchief folded round the head by way of a hat; together with a shirt-constitute all the accoutrement of the miner. Sandals made of esparto, and the cloak, la manta, a covering of many bright colours: at once a cloak, a blanket and a bed at need. A good miner of Almería lives and dies in his manta, and transmits it to his descendants.

The dwellings of these mountaineers are on a par with their dress, and consist of a bad cabin built of stones and mud. Here and there some culinary utensils of iron or copper, the water bottle or alcarazza of porous clay for keeping the water cool and baskets made of esparto or wicker. The fireplace is in the middle of the floor; the bed nowhere: they lie on the ground, anywhere, rolled in the woollen manta."

The Common Room of the Alpujarras Miner. *Simonin.*

Looking at Rodrigo's photographs of the mining installations in the Barranco Jaroso one could easily mistake them for a village, or even a town. However, Rodrigo, helpfully, numbered and labelled each building, indicating that good accommodation was provided for the mines' administrators and those charged with essential tasks. In addition, these more profitable mines built dormitories which were no better and no worse than anywhere else in Europe. A shelf for possessions and a mattress filled with whatever could be found by way of brushwood.

The operatives of the Jaroso pumping station were housed in the two story building to the left of the picture. *Rodrigo.*

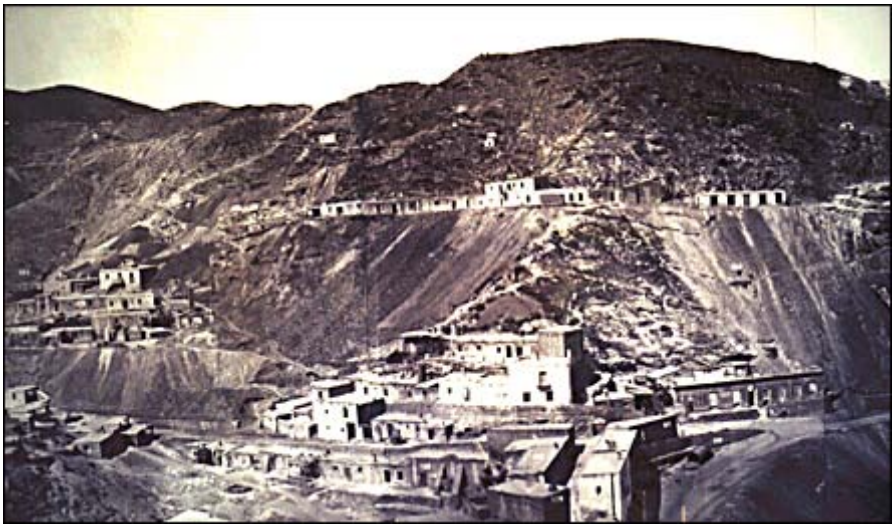
However, even with bunks and hot-bedding, the barrack block of the individual mines could not have housed all of the men on the payroll. For those who worked in smaller, less profitable mines, possibly on the floor of any mine building where there was room to lie down had to suffice. Some workers would have found lodgings in the nearby villages, walking every day to and from their mine. Eventually, most mines had some form of bunk house, but there were considerable differences between them. The smaller ones had pretty primitive buildings and bleak surroundings, while others were quite homely. As can be seen from the picture, the mine La Ibería had quite a pleasant garden.

The pleasant garden at the La Ibería mine.

Left, as it was then. *Rodrigo.*

Right, La Ibería today.
Author's photo.

In the Barranco Jaroso, at the area known as the Plaza, situated in the heart of the 'Minas Ricas' there was a chapel and a hospital, and on Saturdays, a very small market selling basic necessities, was held in the area where the watercourse was culverted. This may have given giving the area a 'village' feel, but it was never a mining town like la Unión, or any of the other mining towns in Andalucía.



The mine Esperanza Circa 1875, and Purísima Concepción on the left. *Rodrigo.*

Purísima Concepción as it is today.
Author's photo.

The plaza below Purísima Concepción.
Author's photo.

The other area where one could believe there had once been a village is at the site of the pumping station built by the Compañia de Águilas, at San Juan, in the Barranco del Francés. This is often referred to as the 'lost village' because it is easy to imagine it as such. However, the only accommodation here was a house for the Director, and what looks like a row of houses, which served as a canteen and living quarters for the station operatives for the 13 months that the plant was in service

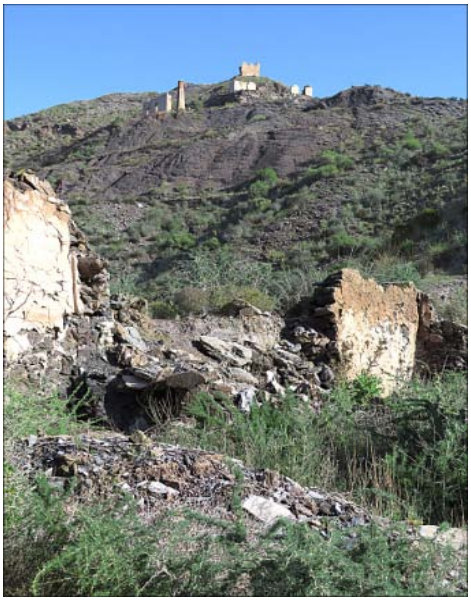
San Juan today.
Author's photo.

All that remains of the canteen and living quarters.

Author's photo.

The arrival of foreign companies, like the Compañia de Águilas, saw the building of quite palatial headquarters such as la Casa del Águilas in the Barranco Jaroso and la Casa Dos Mundos, at the head of the Barranco del Francés. Such places were for the, mainly foreign, directors and engineers, and not for the common miner.

Ventas, or what we would think of as ale houses, started to appear in the Sierra. These basic buildings served as meeting places for men from neighbouring mines, where rough wine could be bought, and the fat chewed. Some of these, like the ruins of the one pictured, started life as mine kitchens, built in the early days to provide food for the men. Later, food was provided by outside contractors and so the kitchens became redundant.



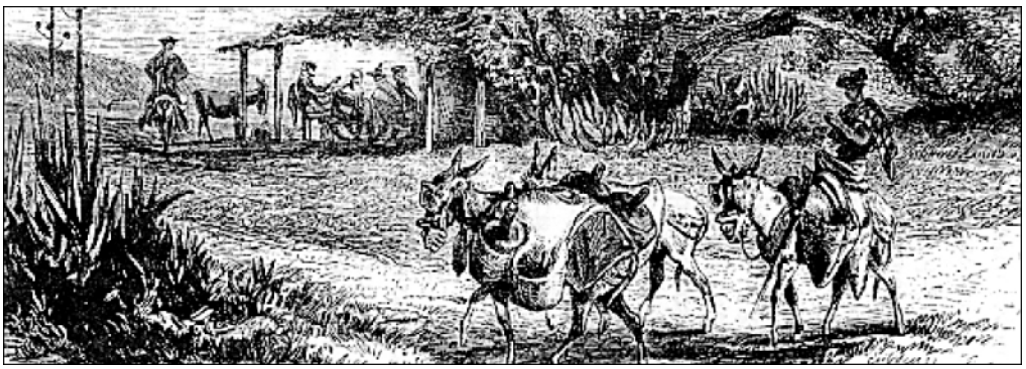
The ruins of a venta in the Barranco del Francés.

Author's photos.

The Venta (the single story white building, bottom left) in the Barranco del Francés in Rodrigo's photograph.

Hugh James Rose, in his book 'Untrodden Spain and her Black Country', describes ventas in the mining area of Linares in the 1870's, and it is probably safe to assume that those in and around the Sierra Almagrera were very similar.

"The venta is one small dark room, with a heavy curtain across the door, within which stands a barrel of white and a barrel of red Val-de-Peñas. A few tiny shelves in one corner of the venta are studded with bottles of various colours; the white fluid (aguardiente blanco) predominates; then comes mentha, or mint spirit; apio, or liqueur of celery, and probably a rough kind of plum-brandy and cherry-brandy.
The wine is sold in a vaso, or tumbler, the half tumbler being called 'caño de vino', the full, 'ration' in vulgar Spanish. On the road to mines from any town, the ventas are little windowless, chairless, one roomed stone shanties, and, the wine is vilely adulterated as a rule."



A Venta in the 1870's.

On all of the roads and tracks leading to the Sierra Almagrera were stalls selling liquor. Known as ventorillos, or small ventas, they were often no more than a trestle table, with a bucket of water in which to swill the glasses serving, in this case, a Jumilla rather than a Val-de-Peñas wine. A characteristic of these ventas was the split-cane awning, sheltering them from the sun. They looked very similar to the modern day beach chiringuitos. The bar/restaurant El Perejil started life as a ventorillo, and the village El Largo was know as Ventorillo el Largo until very recently.

The story goes that the cortijada, or hamlet, of Los Lobos got its name from a venta run by a couple of particularly wolfish looking gentlemen. Until I actually started on my research, I rather took that with a pinch of salt. Now, I find it perfectly credible.

On the face of it then, el Arteal seems to have been the only nucleus that could be called a mining village, and then only in its post civil war era. Plans of el Arteal prior to that time show the usual foreign countries' set up of good housing for the director and engineers, in this case villas, but nothing for the workers. However, in those days, el Arteal was primarily a pumping station with little mining and processing being carried out. Neither was it remote, being at the foot of the mountain and close to the settlements of Villaricos, Palomares, Las Herrerías and La Muleria, the workers could get to it relatively easily.

The engineers' villas at el Arteal. *Un Siglo de Historia Minera. Bolea*

The innovations and technologies, as well as some aspects of life at el Arteal were covered in Volume 1, but since then I have come to understand a little more about its post Civil War history. I knew that there was very little mining expertise left locally as there were only a handful of mines still operational at this time, and, that migration and emigration had led to severe depopulation of both towns and villages. The population of Cuevas in 1910 was more than 26,000, but in 1940 it was little more than 10,000. I also knew that Franco wanted a mining industry free from foreign ownership, but what I had never thought about were the socio-political factors that were in play at el Arteal.

MASA, the company set up to exploit the remaining reserves, first had to up-grade the machinery for the pumping station, and then drive the Santa Barbara tunnel from el Arteal through the Sierra to the mine Guzmana. There are varying accounts of what accommodation was provided for those undertaking these tasks. One source speaks of there being lodgings for 96 single workers and 7 houses for married ones, while another cites the building of a barrack block for 150 workers. The houses for families might well have been the old engineers' villas, the house with the towers in the garden, the houses to the right, and the one on the left, of the entrance to the Casualidad adit, and the gate house. For the first four or five years the workforce held steady at around 200. Between 1949 and 1951 it rose sharply to 600 as work on the tunnel and the processing plant progressed. A further single workers' block to house 200 single employees and the 200 unit complex for married workers were constructed between 1951 and 1953 by which time 907 people were on the payroll. Figures show that a mere 0.05% of the workforce were administrative or technical personnel. By 1954 the workforce was at its peak with 1,200 employees on the books.

Single workers block.

Minas De Almagrera, S A Sánchez Picón

Aerial view of married quarters.

Tres Casos de Poblados Obreros M A Sebastián

In some ways this was a model village. The bath houses for the underground workers were palatial. The barrack block was light and airy, well furnished and equipped, and meals in the canteen were subsidised. The three bedroomed apartments for married personnel each had showers and indoor sanitation, water came out of taps and coal was provided for the kitchen ranges. There was a school, medical care, a social club, a cinema, freshly baked bread, a co-op shop, a regular supply of fresh produce brought to the door, and more besides. All very orderly, all very contained, and more to the point, all very controlled. A colony, rather than a village, created artificially and, with the exception of Las Herrerías, having few links to the surrounding area.

What of those who worked there? A few were local, from nearby cottages and villages, who could leave the land, but the majority had to be recruited. This is where there was a problem. For those of us lucky enough to have not experienced the aftermath of a civil war, it is difficult to fully understand the impact of it on every aspect of industry, business and even daily, family life. Those on the ‘wrong’ side’ of the conflict could not be employed directly, nor could subcontractors employ them. This rather reduced the pool of available labour, even though unemployment was high. Skilled, experienced underground workers were in short supply since they were already employed in other mining areas, and had no desire to up sticks and move to this impoverished area. In the end a rather mixed bag of people came in their place. German, British, and other foreign nationals were amongst them, swelling the ranks of those deemed desirable, all hoping for a better life. In some ways it was a better life, and many remember it fondly. However it was very short lived and, by 1959, only 40 people were on the payroll tasked with dismantling the plant and machinery.

A stencilled frieze in one of the apartments. Pride was taken by someone who lived here for that short time.

Tres casos de poblado obrero. M A Sebastián

So why did el Arteal earn the sobriquet Korea? This was a question that I couldn’t answer until I started examining life at el Arteal more closely. Amidst the rural poverty of the area this Utopia appeared, almost overnight. Homes with indoor toilets, running water, a coal allowance, more than one bedroom, a regular income, and, unbelievably, an 8 hour day, so what was the problem? Well, even the local people who managed to get work there were excluded from these benefits, apart from the short, paid day, so the idea that the haves and have-nots would co-exist in absolute harmony was wishful thinking. So too was the hope that el Arteal’s multi-nationalism would be entirely harmonious. Some conflict was inevitable, but definitely not on the scale of the Korean war, waged between 1950 and 1953, but the disharmony was sufficient for the locals to refer to the place as Corea. (So, unsurprisingly, a dispute concerning a well in a local village some years later saw that area referred to as Vietnam.)

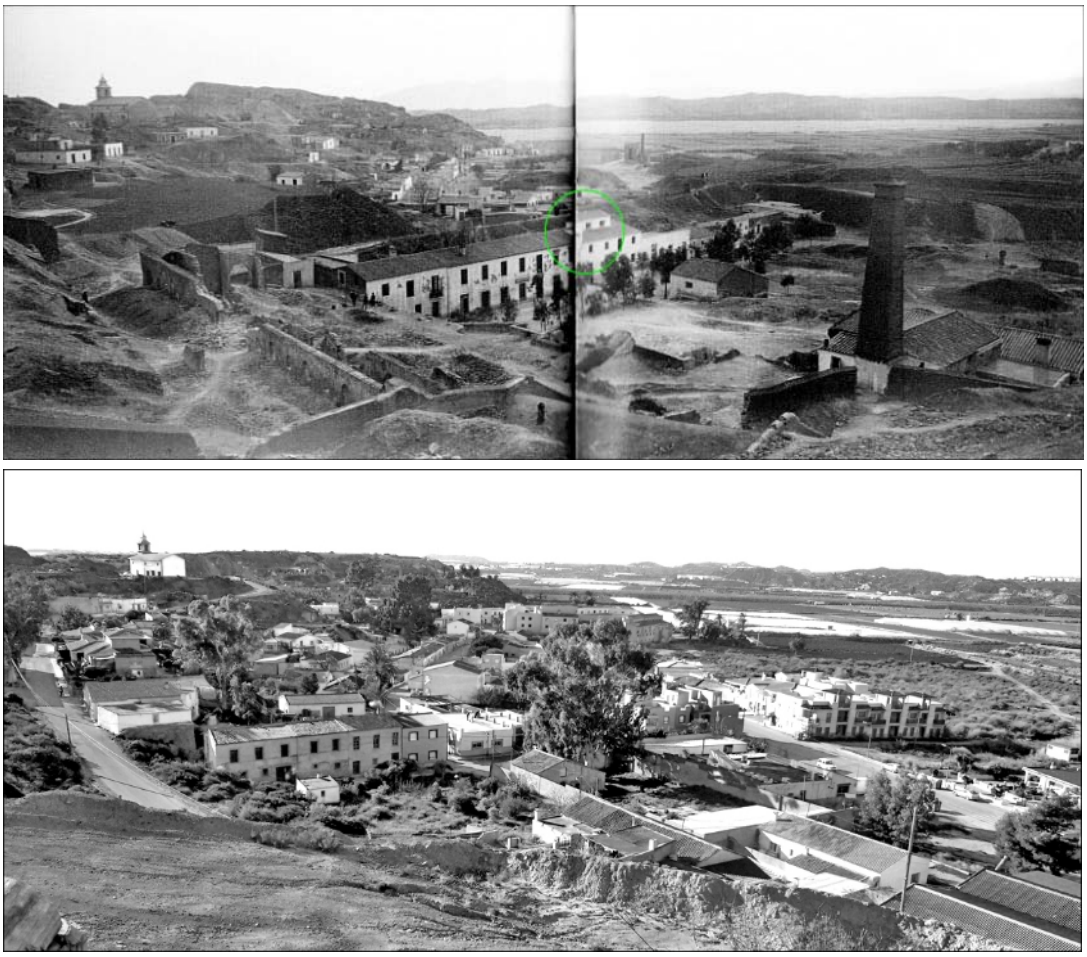
The other thing that I puzzled over was the presence of the Guardia Civil at el Arteal. I hadn’t appreciated that the Guardia was omnipresent at this time, again because of having no experience of a repressive regime. A Spanish gentleman described the situation to me in this way;
“*Once the war was over, the Franco regime carried out a very strong repression, a true "ideological cleansing" that involved the extermination of any political party or union that opposed the totalitarian character of the regime. These workers were neither union nor politically organized. For ideological control there were ecclesiastical parish organizations. On the other hand, a series of socio-sanitary*

measures (social security) and labour (8-hour shift) were beginning to be applied, they were provided with housing, etc., together with the existence of the Civil Guard as a repressive force if necessary."
It would appear that, during this time, the Church had as much influence on the lives of the people here as it did on those in the Republic of Ireland.

El Padre de Higinio Robles Campos a member of the Guardia, who patrolled el Arteal.

Collection: The Robles Campos Family.

I posed the question as to whether or not the Guardia were stationed at el Arteal. They were, but only when operations ceased. They occupied the first block, next to the electricity substation, and protected the place from looters until MASA had cleared the site. During the heyday of el Arteal, the Guardia were stationed in Las Herrerías, in a building next to the old hospital.



Las Herrerías in 1915 & 2015. The Guardia were stationed in the building with the belvedere (top picture).

Sierra Almagrera y Herrerías. Bolea

I was surprised to learn that relations between the Guardia and the villagers were very cordial. There may have been a certain degree of like-mindedness about the ‘luxuries’ enjoyed at el Arteal, but the main reason seems to have been that they integrated into village life. They were stationed there for a long time, their children played with the village children, they married local girls and, I think, were probably decent, ordinary guys. They are certainly remembered with respect and affection by many of the older inhabitants of Las Herrerías.

Once the Guardia left el Arteal, thieves came in the night, as it were. The comprehensive destruction of the kitchens and bathrooms was not to deter squatters, as I had supposed, but was the result of the theft of all the pipework. A sign that mining in the area had ceased is the fact that some window and door frames are still intact. The accommodation block at the San Juan pumping station in the Barranco del Francés hasn’t a stick of wood remaining, timber for the mine workings being in such short supply. Visiting the married quarters today, it is almost impossible to believe that, in 2004, they were declared part of the Real Estate Heritage of Andalusia. Soon, even this evidence of a mining village will have disappeared, probably hidden beneath greenhouses.

Just when I thought that el Arteal had been the only mining village, I discovered how wrong I had been. Many years ago, I had heard that hundreds of people lived in a village along the coast where the remains of the chapel were. The site referred to was the headquarters of the Basque company, the Argentífera de Almagrera. Like the Compañia de Águilas, they built a palatial residence for the top echelon, the ruins of which are still standing, and, on the same site, they built the electrical generating station to power their modern technical innovations. This would hardly qualify as being a mining town or village, so I dismissed the story as misinformation. I have since discovered that, like so much that one hears about this area, it was misplaced information rather than misinformation.

I have Pedro Perales Larios to thank for giving me the truth about a long lost settlement, a village, situated on the coast, associated with the Argentífera, but at the Cala de las Conchas.

This was their gateway to the sea, here steamers were loaded with ore, transported from the other side of the Sierra Almagrera, initially by aero-cable and then later by rail and inclined plane, to be shipped to Bilbao for processing. The traces and ruins of the various parts of this transport system are there for all to see, and are documented in Volume 2, Chapter 3, The Men from Bilbao. However, what I had failed to see, and still struggle to make out, are the remains of a barrida, a settlement, a village, a town almost.

Pedro’s Facebook post concerned the details of a 2001 Bill of Sale for the “urban core in a ruinous state, called the Old Embarcadero de Calas Conchas”. Following the sale, the ruins of the cortijo on the site were renovated. The document listed, in rather a haphazard fashion, the 90 structures that had stood along the 21 streets on the site in the 1920’s.

The ruins of the cortijo in the 1980’s

J.M.Parra

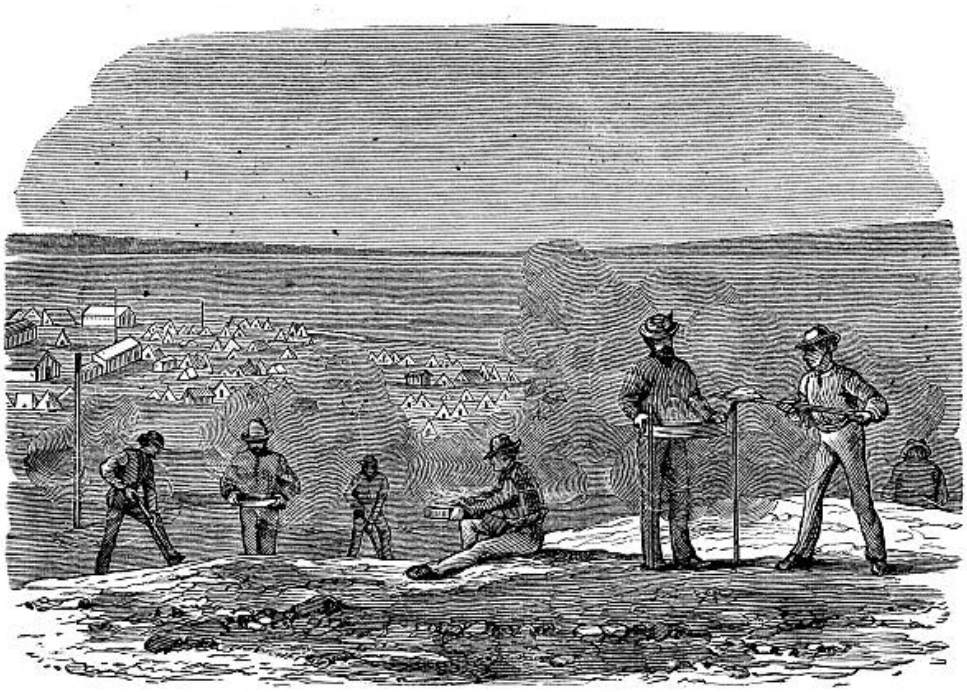
The reformed property today.

Listed were all of the buildings that one would expect from an ore processing and loading site, the warehouses and stores, the forge, metal workers' and parts shop; the stables, smithy, and harness maker. The canteens, guard room, fire station, landing station, weighbridge and the all important wages office were all there. Then there was a list of casas, not necessarily all houses in the sense that we know them. Those of the masons, bricklayers, sawyers, carpenters, machinists, machine operators, winch-man, foremen and engineers, the look-out, the boatman, the muleteer, the labourer and the coal-man. Given the isolation of this site, only reached via a tortuous overland path or, more easily, by sea, the coast road not yet having been built, all these dwellings aren't surprising. But the document lists so much more besides; the butcher, the baker, the shoemaker, the potter, the hairdresser even. The hospital, the infirmary, the doctor, the nurse and the pharmacist; the church and the priest are all mentioned, as are two hardware shops and four other unspecified shops. As well as all of the surface workers, miners and other underground workers also lived here. Miners' accommodation seems to have been in buildings of various sizes, from single occupancy to a row or block of eight units. In all 33 units are listed.

There seems to have been a two-tiered level of provision, one for the common worker and the other for those in the higher echelons. As well as canteens there were dining rooms, there was a boarding house, and stabling for saddle horses. A tasca and a fonda are both mentioned. Tasca translates as a venta, while fonda translates as an inn. Interestingly, there is no mention of a brothel, unless it is lost in translation.
So was it a true mining village? Did families live there, or was it just for workers? I don't know the answer, but if an urban nucleus of this magnitude can leave so little trace, I can no longer be so certain that there weren't others somewhere that I have yet to hear about.

Where are the remains of 21 streets and 90 buildings? What happened to bring about such total obliteration?

Chapter 2. The Division of Labour

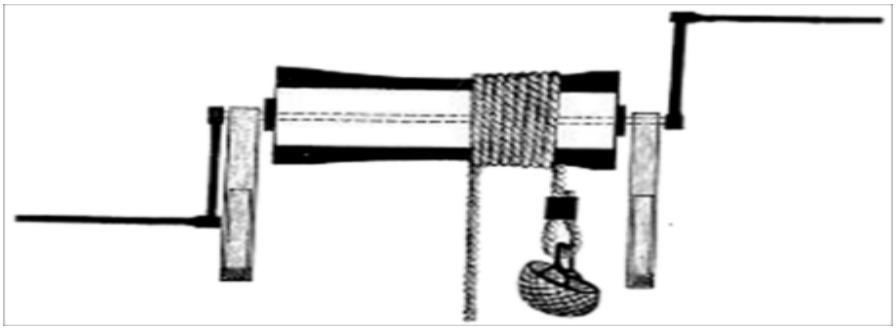


Dry Sieving by hand. *Getty Images*

In the early days, mining and associated activities in the Sierra Almagrera were extremely labour intensive due to an almost total absence of mechanisation. Animal powered winches were installed in the more profitable mines but even this low level of technology was not employed by other mines, where the manual winch was the norm. With an absence of any reliable flow of water to power machinery, ore dressing at the pit head was also an almost exclusively manual affair, with the occasional mule doing a bit of the donkey work.

Some mines installed animal powered winches but, in the early days, manual winches (below) were the norm.

geovirtual



bocamina.es

Provisioning this workforce was also labour intensive, with everything from water to woven esparto ore baskets having to be brought up the mountain side on the backs of mules or donkeys. Ore, ready for smelting, was brought down in the same way. The animals proved to be something of a diversion for the workers as the muleteers drove them up and down. Bets could be placed as to which mule train would be the first to reach a given point, those labouring up the steep slope, or, those struggling to keep their feet as they slid down laden with two 50 kilo sacks of ore.

A mule train.

anon.

The lead animals were decorated with pompoms and bells and were controlled, in theory, by the shouts of the muleteer. The ensuing riotous mêlée when two teams crossed on the narrow paths would have been pure Spanish drama. A similar raucous greeting was extended to any woman seen to set foot on the tracks up the mountain.

The lead animal's harness was colourfully decorated.

Mulesaleresmipueblo.

J Ezquerra del Bayo, in his Datos y Observaciones Sobre la Industria Mineria, listed the workers at the Observación mine, one of the so called Jaroso Rich Mines, in 1844. The information was given to him by one of the foremen and interestingly doesn't include anyone higher up the chain than himself, so no mention of the director, or the engineers. Bayo was rather scathing about these capataces principales, or foremen, in the mines mainly because they were inexperienced. It was many years before the Vera school of mines opened its doors, so a capataz or foreman generally had little more knowledge than a chargehand, or indeed of any of the men beneath him. Observación had 8 foreman, two were principals responsible for directing the overall operation of the mine and working under the direction of the engineers, one during the day and the other at night. Two more were responsible for extraction operations, these were the captaces de picadores, one for each shift. Then there were the two capataces de gavia, these would best be described as overseers, responsible for the movement of equipment and ore both above and below ground. (More about these characters later as they were the bogeymen of the mines.) The capataz de fortificatión was responsible for all of the shoring and other general safety features underground, while the capataz de garvilladores oversaw ore-dressing operations above ground.

Surprisingly, out of the 260 operatives, only 46 are described as picadores or pick-wielders, in other words, men actually winning the ore. These men would have been split into two shifts and generally worked in pairs which gives some indication of both the compact size of these small mining concessions and of the difficulties of mining veins rather than seams such as coal.

Picadores or barrenos.

grassingtonmines

Once the picadores, also known as barrenos, had drilled and blasted the rock, the resulting pieces were roughly sorted into mena and gangue at the face. Llenadores then filled esparto baskets, the waste, or gangue, was not taken to the surface, but was used to backfill stopes, while the valuable ore, or mena, was taken by gavias to the main shaft.

At the shaft, onsetters, known as enganchadores, either hooked the baskets on to the winch rope, or emptied the baskets into large kibbles to be raised to the surface where they were removed or emptied by banks-men known as amainadores.

Right: Enganchadores hooked the kibbles to the winch rope.

geevor.

Below: Amainadores unhooked them at the surface.

smhccg.org

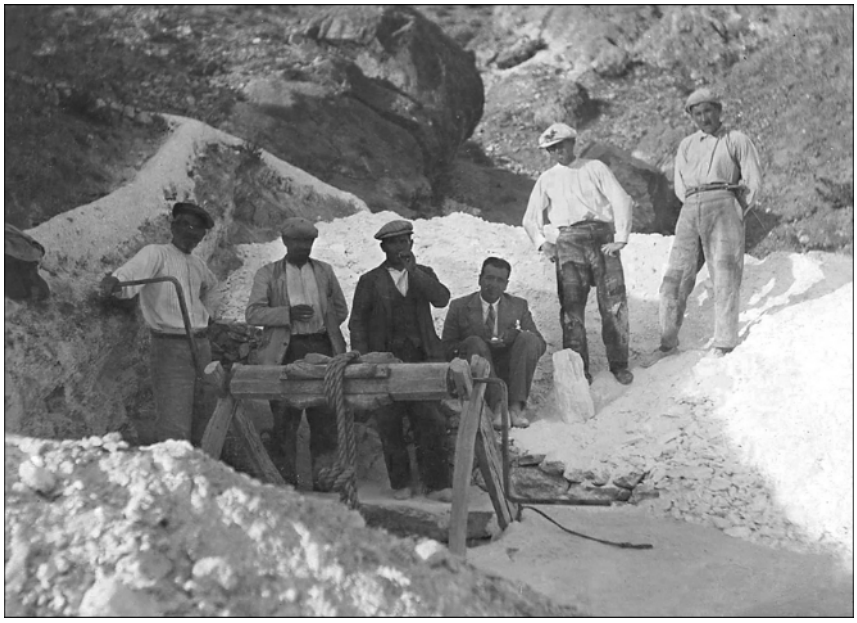
Including the army of 86 gavias and the 46 picadores, a further 34 men were employed in getting the ore to the surface, 20 of whom were torneros. Torneros, or winchmen, worked the double handled winches with the pack-saddle shaped barrel known as a torno de albardillo. It was no easy task lifting the esparto baskets laden with heavy ore, so they sometimes used a system known as the torno corrido, or running winch. Included by Halse in his 1908 Dictionary of Spanish Mining Terms, and attributed to Molina, it is described as:

'Torno corrido, mines of Gador and Almagrera, Sp. method of extracting with a winch by using five men, one or more of whom rest alternately so that the extraction continues without loss of time (Molina);'

A torno no corrido!

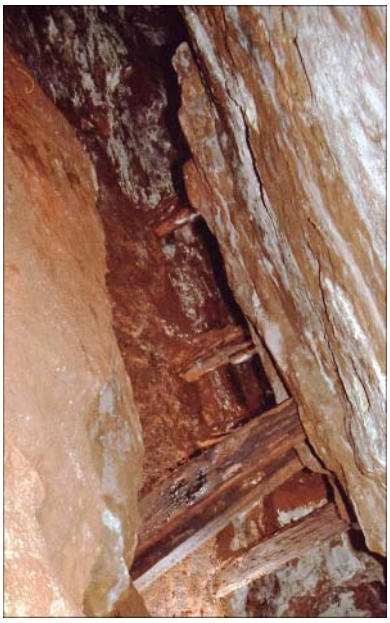
Not in the Almagrera but at a talc mine in the 1940's.

Los berruezo.



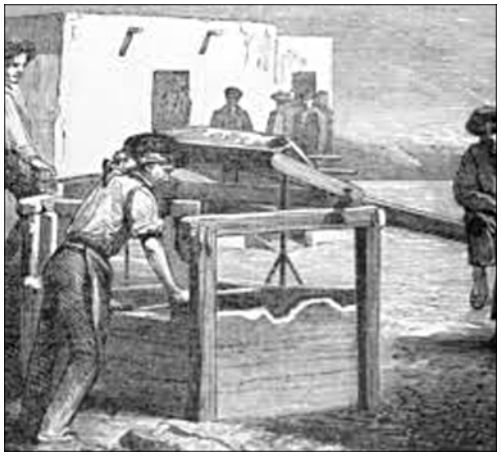
There were also three bricklayers and one carpenter on the Observación's payroll. With so little timber available for fortification and general shoring of the work areas, it was often cheaper to use the locally made brick. In 1867, Casimir Delamarre wrote of the fortification in the mines, in the Bulletin de la Société de Géographie:

'The descent by the ladders is solid enough, but the interior work is far from what is desired. The integrity of our (French) engineers would never allow such placement of props so flimsy, often broken so as to be useless. But in the province of Almería, wood is expensive and a man's life costs little. Any accident results in 'requiescat in pace' and a stone in a cemetery.



Platform timbering and props were probably recycled as wood was in such short supply. *geevor.*

Before larger ore processing mills, or lavaderos, were set up along the banks of the Rambla de Muleria, the extracted material was dressed at the pit head before being taken to the smelters. Due to the chronic shortage of water in this arid area, the ore had to be dry dressed without even the use hotching tubs. With the introduction of steam power to the Sierra Almagrera, rainwater collection cisterns, known as balsas, were constructed. These allowed the occasional use of hotching tubs, and, there are examples of round buddles, or rumbos, in the Jaroso ravine, which made use of the outfall water from the pumping station, but without water to grade ore gravimetrically and to power machinery, recourse to manual methods was needed.



A hotching tub, or criba cartagenera in use. *lámpara minera.*

A buddle, or rumbo in the Jaroso ravine, both seperation methods required water for their operation. *Author's Photo.*

One of the problems of this dry, manual processing of ore was that clay particles were not washed out of the mix and the presence of so much sterile material added to the cost of smelting. This was one of the reasons why the fine powder resulting from all of the manual operations was generally regarded as waste, whereas with wet processing, the resulting fine particles mixed with water, and known as slimes, were routinely processed and smelted. Observación seems to have been one of the first mines that processed the fine powder, known as polvo. Madoz in his Diccionario Geográfico, Estadístico y Histórico de España, y sus posesiones de Ultramar wrote, "*In addition, the shareholders of the Observación have sold the dust and dirt resulting from previous sievings that had been left on the ground up until last year, when they learned to smelt it, giving it a value. This revenue was sufficient to cover their operating costs for the year, so such an operation was very profitable, but little seen at other mines.* Observación's shareholders also had interests in the San Ramon smelt mill on the coast at Garrucha, where there was abundant water. Here, hotching tubs were used to wash the ore prior to smelting, and the polvo would either have been treated in settlement tanks or have been treated in kieves, a kind of dolly tub. In a kieve, the fine dust was shovelled carefully down the sides of tubs half filled with water. Everything was then vigorously stirred with a paddle, to the point where the water almost reached the top of the tub. The slurry was then allowed to settle, with the lead ore settling at the bottom. Apparently the sides of the tub were also hit with hammers to encourage settling. The water was then syphoned off into another tub, the waste skimmed off, and the ore shovelled out.

A dolly tub and paddle. *killhope*
The Observación's slimes might well have been treated in kieves similar to these.

Although the initial sorting of the mena from the gangue was done by the barrenos and the llenadores in the mine itself, the material required further sorting at the surface, where it was sorted into ore, waste and undifferentiated material. Any pure ore, graded as recio, was broken and stored, the waste was dumped, and the remainder, the mixed, was processed further. A laborious cycle and recycle of grading, using either ramp or hand-held sieves, pounding with hammers, and picking by hand followed.

Above, galena with associated gangue & right, the same sample after crushing. *foro de minerologíe*

Three limpiadores (cleaners), 65 garbilladores (sievers), and 12 guardilloneros (who dealt with what was left), are listed by Bayo at this mine and all 80 men were involved in ore dressing.

Two french engineers, M Pernolet and M Saglio wrote for the Annales Des Mines, Vol. 16, 1849. They documented the preparation of minerals in the Sierra Almagrera and is the only source that I have found which details this dry processing.

The limpiadores, or cleaners, selected the pieces of recio (rich ore) and using small hammers, knocked as much gangue as possible from them. Then, after reducing the ore with heavy, short handled hammers and hand picking, this recio was screened, weighed, bagged, sealed and securely stored. (Although crime had already been committed as some inferior grade material was routinely added to the bags). The work of these limpiadores was carried out by women in many other parts of Spain and the rest of Europe.

Cornish Bal Maidens knocking waste off ore.

HendersonCobbingLge.

Bal Maidens crushing ore.

Wikipedia.

The term ‘garbilladores’ like so many terms in the Sierra Almagrera was brought from the Alpajurras, where a garbillo was the name given to a simple piece of equipment which was used as a substitute for a hotching tub. It was made of a 70cm diameter esparto mat and a 50 cm diameter piece of tarred canvas, attached to a wooden hoop in much the same way as an embroidery hoop. An incredible 17 kilos of crushed ore was put into the canvas and then the worker, holding the hooped screen by the edges at waist height, performed a series of semi-circular movements, while at the same time tilting the screen from side to side. This had the effect of setting the contents into a rolling motion, with the lighter, waste elements working to the top. The screen was then lifted to head height and flipped rapidly backwards and forwards, causing the waste scree to be jettisoned over the edge. The sequence of movements were carried out fluidly and rapidly, an incredible feat given the weight of the charge. These garbillos were little used in the Sierra Almagrera, where the differing densities of the ore and the waste were not such that they could be separated in this way and needed to be hand-picked. However, the term garbillo was used for the similar looking sieves, but with an open side, used to concentrate the crushed ore, and garbilladores were the men who used them.

The garbilladores operated a system of crushing the better grade ore in a stone-lined circle and then sieving it in fashion closely resembling winnowing. The men positioned themselves where there was a good up-draught of air, then, rather than the usual side to side sieving motion, an up and down motion was used. The combination of gravity pull and air up-force worked to separate the contents of the sieve in the same way that wheat is separated from chaff. The heavier lead particles were allowed to fall into a second sieve placed on the ground and the waste was blown away. When the second sieve was almost full it too was treated in the same way. The cycle was repeated until the material in the garbillo was judged to be of the right grade to satisfy the assayers.

Ore was crushed in stone lined circles like this one in the Jaroso ravine. *Author's Photo.*

The ore was 'winnowed' in sieves similar to these shown above.

wikipedia & imagescollections mfa.org

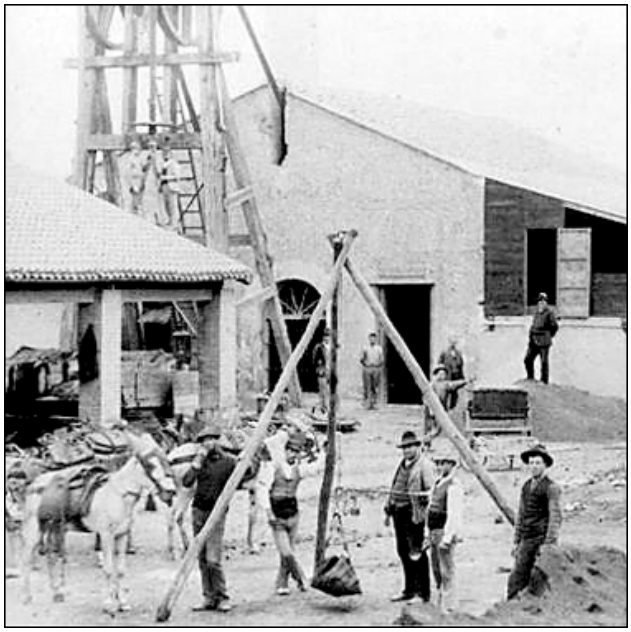
Only 15 of the 65 garbilladores at the Observación mine were on the pay-roll, the rest were working 'á partido' and were paid by the quintal (approx. 46kg.) of ore which they processed.

Mixed material from the primary screening, which was obviously poor grade but not worthless, was processed in the same way as the good grade, but by a group of workers known as guardilloneros, and the results were classed as guardillon, which roughly translates as leftovers.

Primary screening would have either been with hand sieves (left), or with (right) ramp sieves.

Cerand10

educateyourselftogrowblogspot



Bagging and weighing the processed ore.

La Verdad Pozo Montserrat Murcia.

Guarding all of the stored ore were 2 guardas, the night guard and a day guard.

And so to the gavia army and their overseers. Gavias were the children who were paid a pittance to do all of the fetching and carrying above and below ground. It was upon the bony shoulders of these children, who comprised one third of the workforce, that the results of poor organization and lack of mechanisation were carried.

The next chapter is theirs.

Chapter 3. The Gavia Army.

Gavia.

Memoriadecartagena.

Ezquerra del Bayo in his 1844 Datos y Observaciones Sobre la Industria Mineria wrote:

‘*Gavia is the name given to the gang of boys who are put to work bringing ore to the on-setters at the shaft station, or in the case of a poorly laid out mine, bringing ore to the surface, passing the baskets from hand to hand. Among these boys, three or four of the brightest are chosen as correos (couriers) and mencheros who have a reale or two extra on their pay’.*

The correos were at the beck and call of everyone in the mine. They carried with them candles, oil cans and wicks to service the men’s lamps. They also had the wearisome task of taking the tools, blunted by use, all the way up to the mine’s forge to be sharpened. They then had to take replacements back down the seemingly endless ladders to the waiting workers. The mencheros carried the mechas or fuse cartridges for the barrenos to plug into the holes which they had drilled, ready for blasting.

The correos took the miners’ tools for sharpening.

Getty Images.

The menchero carried the fuse cartridges to the barrenos.

The gavia army was divided into sections dependent primarily on the age of the child, but also on his capacity to carry heavy loads. In theory, gavia primera were 18 or older and capable of carrying between 18 and 22 kilos of mineral from the face to the shaft. Gavia segunda were youths between 15 and 17, and capable of carrying between 12 and 18 kilos, while the third category, gavia tercera were children who were, in theory, between 12 and 15, able to transport loads of 12 kilos. They were paid according to their classification. Since non of them needed to show, or even possessed, a birth certificate, it is reasonable to suppose that they and their fathers were ‘economic with the truth’ when stating their age. Certainly, there were children as young as 10 working in the mines.

The conditions in which these youngsters worked were horrendous, dark, dank and dangerous. Long hours, both day and night, in poorly ventilated galleries and stopes, sometimes cold and other times suffocatingly hot. Breathing air full of the acrid smelling fumes from tallow candles and lamps of rancid oil. Picking their way through a labyrinth of narrow passage ways full of gunpowder smoke, dust and broken rock, carrying loads far too heavy for their growing bodies. The phrase used to describe how they carried these loads was ‘tirar de costilla’ because of the cords of their esparto back-packs against their bony ribs, or costillas. Over time, their backs became callused by the chaffing of the esparto, a condition known as tortoise back. Added to their misery was their overseer, the dreaded Capataz de Gavia.

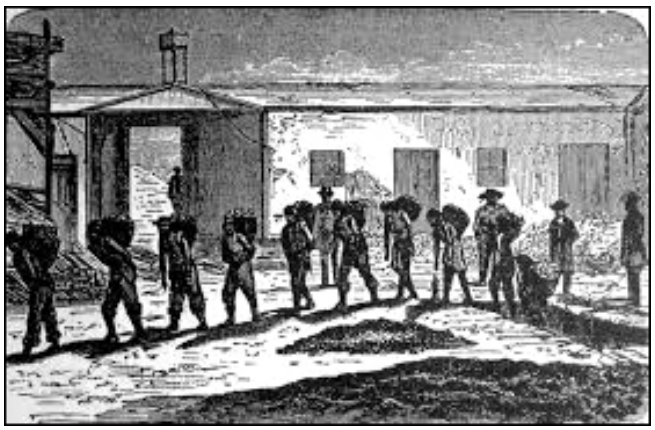
Ore was carried on the boys' backs.
Simonin.

Whilst Bayo accepted the employment of children without demur, he was shocked by their treatment at the hands of these foremen. He wrote:
'As can be seen, they (the boys) all understand what needs to be done. So what strikes me as strange is the habit of the gavia foremen of always being armed with a whip, as if they were dealing with slaves or horses, and I note that they mercilessly mishandle this mark of their authority. I know full well that it isn't easy to order a gang of lads, away from their town, and from their circle, and out of the reach of parental control, but it seems to me that a thin rod would suffice, similar to that held in the military'.

Bayo was writing in 1844, but things were no better in 1883 when J Pie y Allué, director of the Vera School of Mining Foreman, wrote:
'You don't have to be tender hearted to be sad watching gangs of children, hauling around all day and all night, on their bare backs, baskets of ore through miserable rises persecuted by the foreman's lash when they do not run quickly enough to clear the debris'.

Nor were things any better in 1899, when Souviron wrote in an article for the Revista Minera Metalúrgica y de Ingeniería:

'Slithering through galleries and hard to access winzes and loaded with a heavy basket of mineral, circulate, one after another, these wretches, resembling a monstrous accordion of huge ants.'



Men carrying mineral from an American mine in the same way as the boys did.
scielo.conicyt.cl

Things were only a little better for the boys who worked in the dust and the blazing sun, dressing ore at the surface. or those who worked in the heat and toxic fumes of the smelters. A handkerchief over the mouth and nose was little protection against lead poisoning as they went through the fume tunnels, scraping the deposits off the walls so that it could be recuperated. Yet, despite the privations and hardship they, apparently, were all cheerful. According to Bayo:

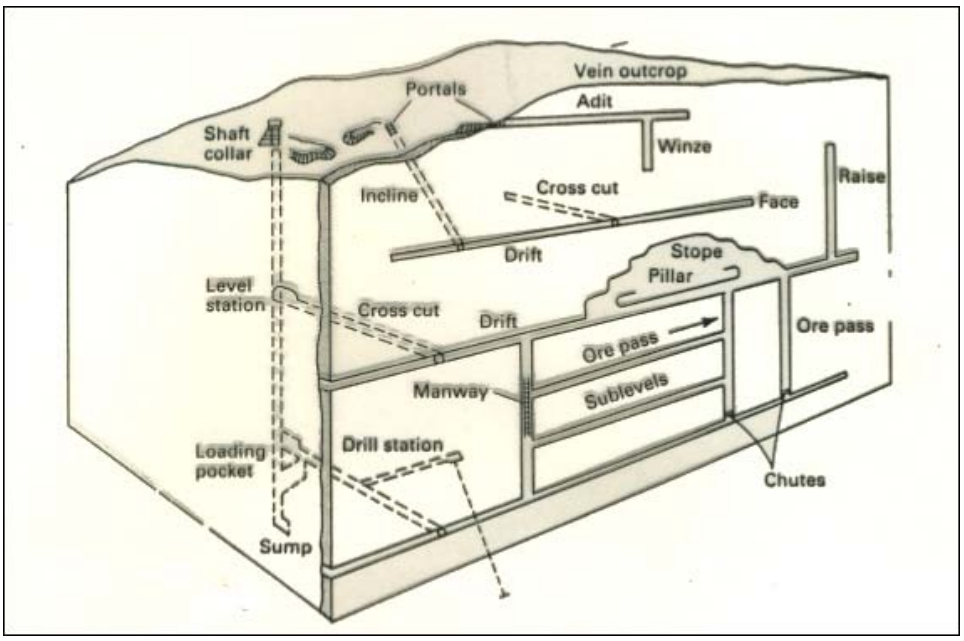
'*It's necessary to be a Spanish lad in order to bear such tremendous fatigue, because, despite so much work, they go up and down, singing and prancing, telling jokes to all whom they meet on their way, especially newcomers'*.

The playfulness of the young is irrepressible it seems, as other accounts tell of them playing tricks on the foreman in the dark, and of finding ways to avoid some tasks. The luckiest boys were those who worked with the muleteers, although, there are accounts, written by foreigners, of the boys' cruelty towards the beasts in their charge.

The question that needs to be asked is, why did children make up a third of the workforce of a mine as profitable as Observación, and in some mines 50%? One reason is the fact that there were no women employed in the Almagrera mines unlike in other parts of Spain and indeed the whole of Europe. Elsewhere, women did most of the ore dressing and in some areas worked underground, carrying material, most especially in coal mines. Another reason was that the low wages paid to the men meant a means of augmenting it was necessary in order to feed a family.

Women dressed ore in other parts of Spain, but not in the Sierra Almagrera.

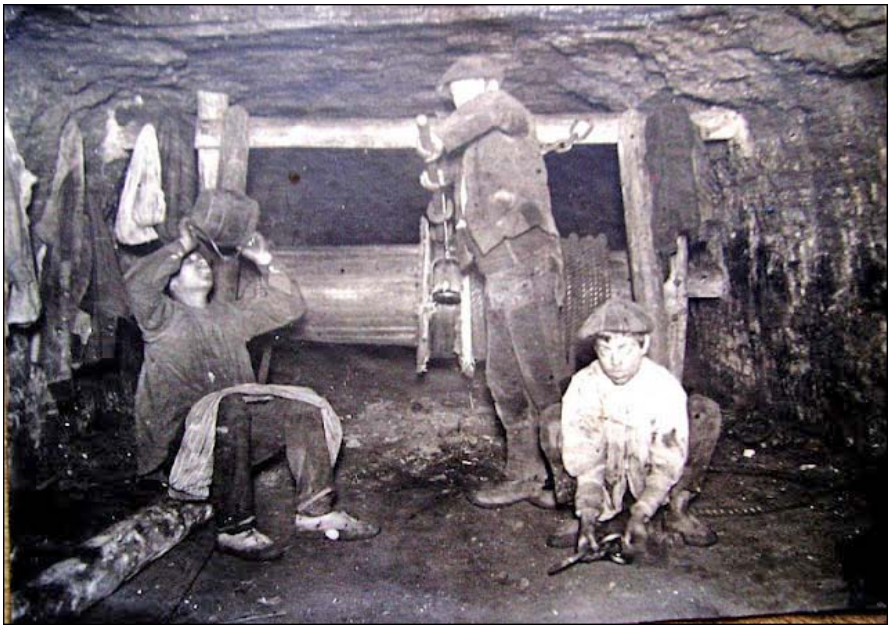
The main reason for the high numbers of children working underground in the Almagrera mines though, was the poor layout of the workings. Bayo bemoaned it in 1844, and J Pie y Allué in 1883 was, if anything, more scathing. According to him, apart from those mines employing competent mining engineers forceful enough to stand up to the owners and to command the captaces, the mine workings left much to be desired. Instead of ordered gallery levels, adits, ore passes, rises and winzes, in the Almagrera the wish to get rich quickly led to chaotic workings. Poor access shafts and rises gave access to galleries that simply followed the uneven paths of the veins, and winzes communicating with lower galleries were haphazardly sited. Many mines had no fixed rule for the separation of the levels or for the direction of the galleries, which were of inadequate dimensions made worse by the accumulation of waste material in them.



A well ordered mine, something not found in the Almagrera.

mineral-resources-and-mining

With such irregular, haphazard workings it was impossible to lay tracks in the galleries for small waggons which could be pushed manually, or hauled by animals. Ore passes, where the ore could be allowed to fall into waiting waggons were unknown and inclined shafts, fitted with winches existed in only a couple of mines. In the mines at La Unión in Cartagenea where such winches did exist, they were operated by children as can be seen in this picture.



Children operating an underground winch at La Unión.

Rogelio Mouzo Pagán.Crónicasmineras.blogspot.com

the

Effectively, there was only one transport system available, and that was the callused backs of those hundreds of boys who struggled on all fours up the rough steps in the rises, and picked their way along rock-strewn passageways to distant extraction shafts bent under weight of their load, all the while, spurred on by the threat of a lashing.

Gavia.

Memoriadecartagena.

Child Labour.

The concept of children not working until they are in their late teens is a modern one. Many would argue that today we have taken things too far the other way. Are we in fact doing children and young adults a disservice by not allowing them to experience the responsibility of contributing to the family finances? Do we think that children, who have never been allowed to go anywhere on their own, will suddenly become street-wise? Or those, who have never helped around the house, will magically be able to fend for themselves? Children learn by imitation and, throughout the ages, accompanied their parents as they went about their daily tasks. In the home and in the fields and workshops, learning skills and helping out was simply part of growing up and becoming a member of a community. Industrialisation put an end to that, and as adults were sucked into the new economy, so too were their children. In some respects some of a miner's children in the Almagrera were more fortunate than others since they were required to help the womenfolk work the land while the men were away. Elsewhere, throughout the whole of Europe, children were put to work, often to the detriment of their health and to their physical development. Physicians everywhere were noting that, along with other ailments afflicting them, the growth of many working children was stunted. Malnutrition and excessive demands upon growing bones were taking their toll. So were parents being cruel, putting their children forward for work, or, were they accepting the cruel reality that the additional wage helped put food on the table? Were the mine and factory owners being exploitative when the wages that they paid were insufficient for a worker's needs? Was the State colluding in this abuse?

1873. The first labour law in Spain the 'ley Benôt' was enacted by the First Republic. It decreed that no children under the age of 10 should be employed: children under 13 should have no more than a 5 hour working day while those over 13 could work no more than an 8 hour one. It was universally ignored.

1900. The law prohibited children under 16 from working underground, and outlawed night work for those under 14. It stipulated a maximum 8 hour day with two hours of education daily which were not counted in the eight hours. These restrictions paralysed some mines in Murcia province, and the owners petitioned against the law. The City Council of La Unión approved a request for night work and underground work for children under 14 on the grounds that such work constituted a basis for sustenance for families. Elsewhere, things carried on a before.

1902-1910 The decade saw a raft of legislation governing child labour. The Royal Decree of 1902 prohibited children under 16 from working in mines. They were to have a 66 hour week and Sundays off. What happened to the 8 hour day for those over 13 stipulated in the 1873 law? This 11 hour day gives some indication of the extent that the previous laws were flouted. Also, up until this point, mining had been exempted from the Sabbath Day restrictions. The Royal Decree of the Ministry of the Interior in 1908 prohibited those under 16 working in the mines and quarries from cutting and extraction activities. It also banned the transport of ore on the head or shoulders in the galleries. The law of 1910 prohibited the employment of minors of under 18 years from working underground if in contact with explosives. Few restrictions were ever enforced.

The job of enforcing and controlling these regulations was down to the so-called mining police, comprising of the mining engineers who were effectively self-policing. (Or not, as the case maybe.)
Possibly because of mining's importance to the economy, in 1924 and again in 1940, workers' safety in mines and quarries was trusted exclusively to the Mining Engineers. Under age workers were not high on their list of priorities, in fact, from an economic standpoint it was good mining practice. As one engineer pointed out, young children carrying ore underground more than compensated for the lower weight they transported by the speed at which they carried out the task. They were more concerned with the prevention of accidents which halted production than with assessing the age of a child. When everyone, from the children themselves, their parents, the mine owners, engineers and physicians, were complicit in the deceit, it is small wonder that child labour continued in Spain long after it had been largely eliminated in other countries.

However, in the words of Ángel Hernández Sobrino from his blog Los Niños Mineros,

"It is estimated that there are currently one million children in the world working in mines and quarries, Asia, Africa and South America being the continents where there is most child exploitation. These small miners spend ten or twelve hours a day extracting various minerals from unsafe and unhealthy underground workings, extracting gold from river floods, transporting clay to make bricks, or pounding rocks in quarries to turn them into gravel. In addition to the danger of losing their lives or being disabled, most suffer from malnutrition, which causes them to deteriorate physically and mentally, and all of them will lose their childhood years without receiving the education that would allow them to enjoy a better future".

Phlipines, MSNBC News.

India, The Logical Indian.

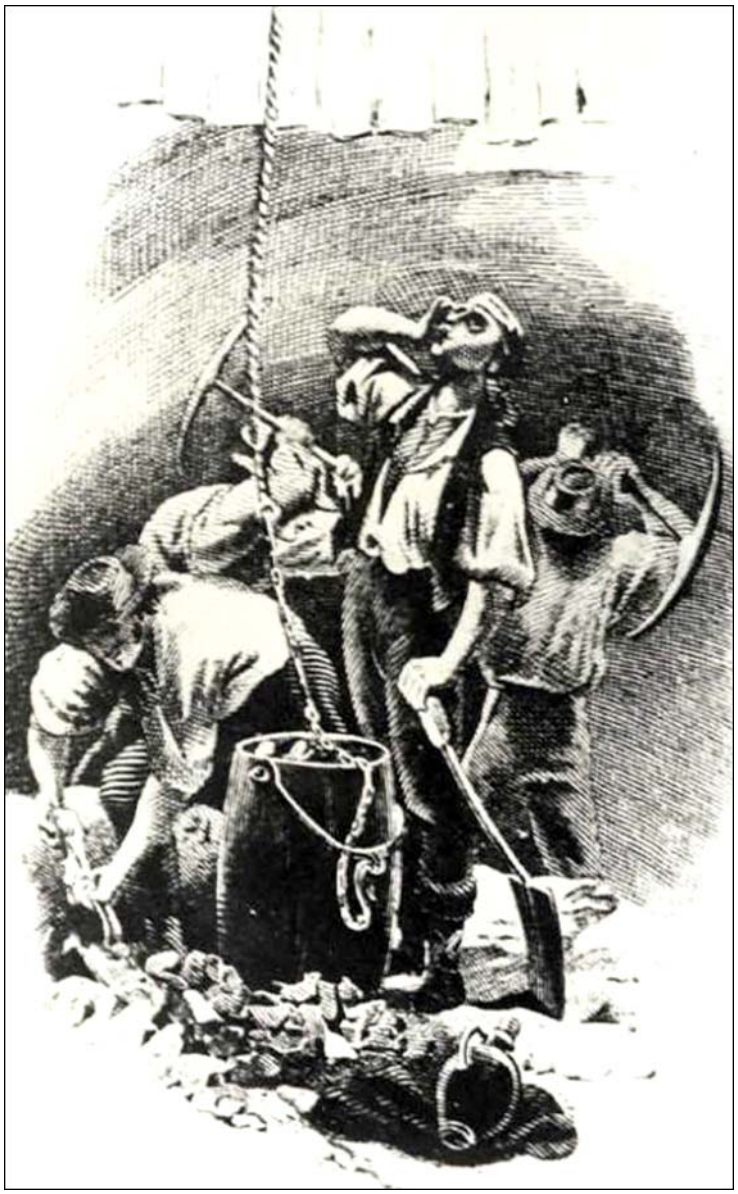
The worldnews.net

treasure.net

Calls for ‘greener’ cars, and the other modern devices that require batteries - our laptops, mobile phones, games consoles, etc., further add to these children’s misery.

Google search ‘child miners’ for yourself, but be prepared to be shocked by what you see.

Chapter 4. The Dead Workers' Work.



In a mine, unlike extraction, excavation or development work that is not productive is known as dead work. This covers shaft sinking and level driving, and it was customary throughout Europe to contract out excavation work and, although the terms of the contracts varied little from country to country, the rewards for the men actually doing the work varied considerably. The Cornish model was of small co-operatives of "tut" workers who shared the rewards equably, as was the North Pennine "bargain" system. However, the Spanish model seems to be along the lines of a contractor acting as a gang master. In "Untrodden Spain and her Black Country", Hugh James Rose writes about the contractor keeping the lion's share of the money and paying the workers piteous amounts.

Joaquín Ezquerra del Bayo in "Datos y Observaciones Sobre la Industria Minera" doesn't mention how the payment in the Sierra Almagrera was distributed but does go into great detail about the costs to the mine owner of dead work.

There were two main types of contract. One was where the mine owner bore the cost of bringing the broken country rock (deads) and any ore to the surface and the other, more usual type, where the contractor undertook to clear the site of any broken rock. Payment to the contractor was per vara (about 0.80 metres) linear in both shafts and levels. The mine Observación had a slight variation to the usual payments. The 100 to 150 vara section was paid at 30 reales rather than the usual 50 reales, but the owner provided the gunpowder and oil for the lamps and sharpened the contractor's tools. In addition, the contractor only lifted the deads up as far as the next level and the owner then bore the cost of raising them to the surface. At depths greater than 150 varas, the owner provided the labourers with their food as well, but the payment per vara was only 59 reales as opposed to 64 reales.

The remains of this winch (pictured below), recently found in a long abandoned shaft was a staging winch used to lift material up a level.

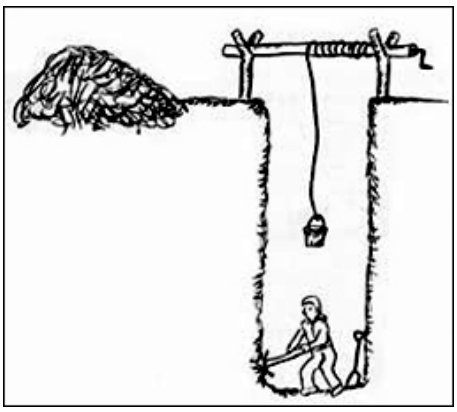
The remains of a torno de albardilla

Fran Mulero.

A stage winch in use.

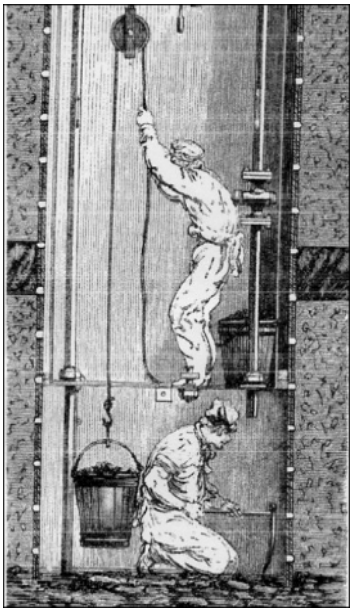
In shafts, the payment increased every 50 varas (just over 40 metres) of depth, with a higher payment for a narrower shaft. At first glance it seems nonsensical that the payment per cubic vara differed from shaft to shaft, with the excavation of a narrow shaft costing more than that of a wide shaft. However, this cost

difference is still apparent in modern mining and is due to the problems of shaft driving in a confined space.



Digging the shaft …

Lupton.



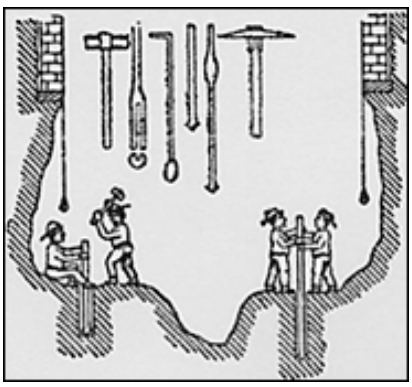
Working in a confined space.

Simonin.

To drive a shaft, shot holes, known as sumpers, were bored in either a circular or a square pattern, depending on the stability and density of the rock, at the centre of shaft's desired position. The holes were bored downward at an angle so that a wedge of rock could be blasted out to form a sump. Once this blasted rock had been broken sufficiently to load it into the baskets or tubs, it was winched to the surface. Then, another set of shot holes could be bored, again downward, and fired. As broken rock occupies 40% more space than unbroken rock, the sump was needed to accommodate the debris. Once that waste had been broken and removed, the next set of holes could either be bored downward, or, bored horizontally towards the proposed walls of the shaft. The men were able to stand and work in the already excavated space. In a shaft measuring a mere 1.25 x1.25 metres there was hardly room to swing a cat never mind a pick. These narrow shafts had to be drilled by single handed jacking, where the worker wielded a 1.80kg hammer and held his own drill rod or jack. This was inefficient, costly and painfully slow, with a single 20 centimetre hole, into which explosives were packed, taking an hour to be drilled.

Single handed jacking.

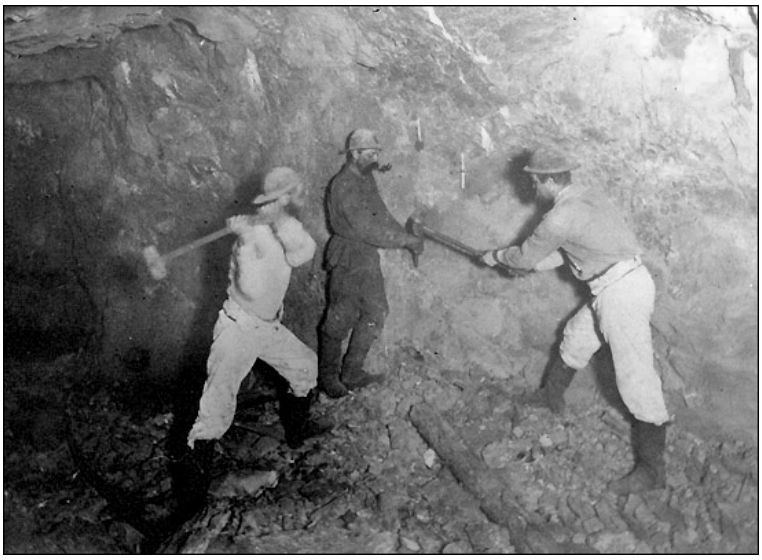
The wider the shaft, the more cubic metres of excavation can be effected in less time and therefore at a lesser cost to the mine owner. With more space available, two teams of drillers using a double-jack technique could, just about, work simultaneously. In double-jacking, one man would swing a 4kg hammer while his partner held the drill and rotated it in the hole. This was more efficient than single jacking as a 60 centimetre hole could be bored in an hour. It took 30 to 60 holes to be able to blast away sufficient rock to advance a shaft half a metre.



Sketch showing 2 teams sinking a shaft. The sump has been cleared and is ready for the debris of the next round of blasting.

Lupton

In wider shafts, a third man could be added, also with a 4kg hammer, in order to increase the drilling speed. While this looked impressive, with the drill being hit rhythmically by the two men, the addition of a third man didn't increase the speed sufficiently to generally warrant the practice.



Two handed jacking like this looked and sounded impressive, but the resulting saving in time and money were insufficient to make it a common practice.

Boring and blasting weren't the only things which took a long time. Breaking the rock into pieces small enough to be loaded into the tubs or baskets ready for hauling up to the surface was time consuming. So too was the actual raising of the debris which was hand-winched in shafts up to 50 metres deep.

In shaft sinking, raising the debris posed a threat to the sinkers as there was nowhere to shelter from the possibility of falling chunks of rock. Even though a torno de albardilla or saddle winch was used in the Sierra Almagrera, which centred the containers in the shaft, the risk of them colliding as they passed one another was quite high. Also, if the supports of the winch weren't high enough there was the risk of the tubs hitting the collar of the shaft as they were brought over to be emptied and of rock falling down the shaft onto the men below. The Northern expression for raising material to the surface was 'to bank' and the Cornish was 'to grass'.

The term used in the Sierra Almagrera was, unsurprisingly, 'al sol', to the sun.

'Mucking off' or clearing the debris.

Emptying the tubs at the pit bank posed a threat to the shaft drivers.

Buck O'Donnell.

The greater load capacity of the horse whim buckets speeded up the process of mucking off in a wider shaft where there was the man-power to fill the containers. The dangers to the men in the shaft of raising the debris were less but were still ever present. 200 metres was about the maximum depth that could be mucked off using a horse whim. Anything below this depth required powered winding gear.

Shafts required ventilation below a certain depth. If there was no other shaft twinned, the shaft being driven needed a brattice or boarded channel up the side of it to create an upcast and a downcast of air. In the Sierra Almagrera, where wood was in short supply, brattices were fashioned out of brushwood and plaster in the manner of wattle and daub.

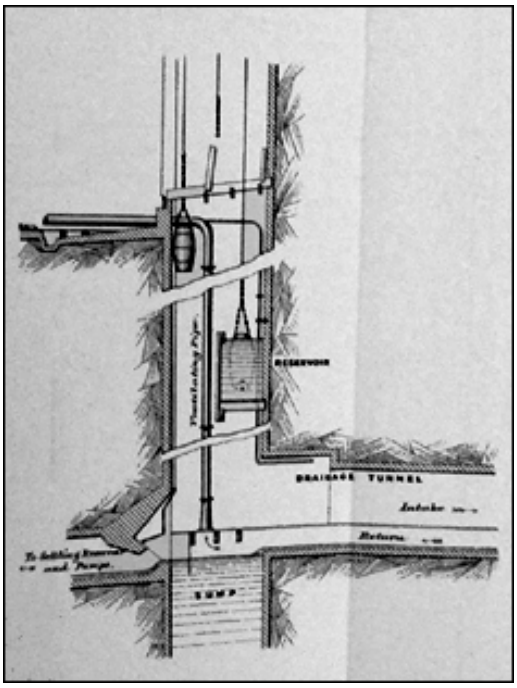
The ventilation channel, which would have been boarded, can be seen to right the of the shaft. The rings round the shaft give some indication of how much progress was made by each round of blasting.

Photo. A.G.Jódar.

In the 1840's, at the start of the Almagrera mining boom, only 3 to 4 metres of shaft per month could be driven. By the 1900's this had risen threefold to between10 and 12 metres a month. The figure had reached 30 to 40 metres by 1940. The reasons for the dramatic improvements were, firstly, the transition from manual to horse, and then, from steam to electrical powered lifting. Secondly, improvements in the type of explosives used from gunpowder to dynamite, and thirdly, at a later date, the introduction of the pneumatic drill. However the basic principle of drilling and excavating a central core and then working out towards the sides, remained the same.

When the El Arteal pumping station was constructed in 1898, the five associated shafts were excavated by experienced local workers. The site engineer, Gustave Reinhold, gave a detailed account of the work in a paper presented to the Institution of Civil Engineers. The men involved in the shaft excavation worked three 8 hour shifts, while those working at the surface worked two 12 hour shifts. By this time the sunrise to sunset shift pattern was being challenged in the Sierra Almagrera.

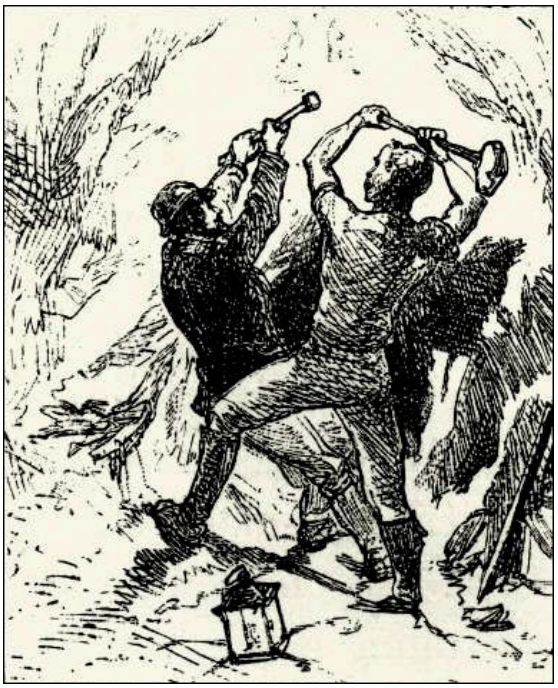
The five, circular and elliptical shafts were excavated in the traditional manner, using a borer, or bar drill, and hammer to make the bore-holes for the explosive charge. Health and Safety was considered on this site. When the kibbles containing the broken rock were raised, a trap-door was lowered over the shaft before the kibbles were emptied, protecting the men beneath. The use of traditional methods, rather than mechanical methods, to excavate the shafts at the pumping station was due to the nature of the terrain being bored and the dimensions of the shafts.



The water and ore kibbles in the main shaft, Encarnación.

Contractors were also used to drive the main levels, or galleries, to access the ore veins. The same drilling procedure was used for this. First a central core was blasted and then the rock above, with the debris falling into the space formed by the first round of blasts. Finally the lower section was drilled downwards and blasted. This lifted the broken rock up to from the floor level from where it could be cleared.

Payment for driving levels was also by the cubic vara and depended on the depth at which the level connected with the extraction shaft, and was higher than that for shaft sinking being as much as 150 reales per cubic vara. The elevated cost was mainly due to the need for an additional labourer to convey the deads along the tunnel to the main shaft. Again, there was a difference in the costs between low roofed and higher roofed workings, however, in the Sierra Almagrera, it was the reverse of what one would expect, with the more spacious area costing more. Bayo has an interesting explanation for this anomaly, according to him, it was because the local workforce, influenced by the practices of the miners from the Alpujarros, preferred to work seated rather than kneeling or standing. With wood to make work platforms in short supply, they were in the habit of filling baskets with broken rock and sitting on them to work, rather than kneeling on one knee or standing when driving higher roofed levels. Bayo considered this practice abhorrent and against the “art” of mining.

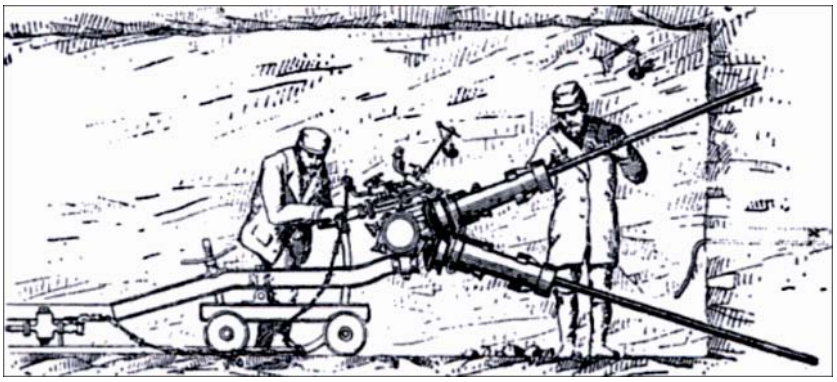


Driving a tunnel.

The local workers preferred to sit rather than kneel like this when working.

Buck O'Donnell.

When the galleries into the slate of the mountain were driven at the el Arteal pumping station Brandt hydraulic rock drills were used which was the first time that such type of machinery had been employed in the Almagrera. Unlike pneumatic drills, Brandt's drill was powered by water under pressure from a force pump at the surface. Steel sectioned pipes could be uncoupled when the drills were drawn back into refuges during blasting. The sequence and position of the bore holes still followed the usual pattern. Reinhold speaks of the men learning quickly how to handle the drills, spurred on by generous bonuses. Hydraulic drills were an option at el Arteal because water was piped in from the Almanzora river.



Brandt hydraulic drill.

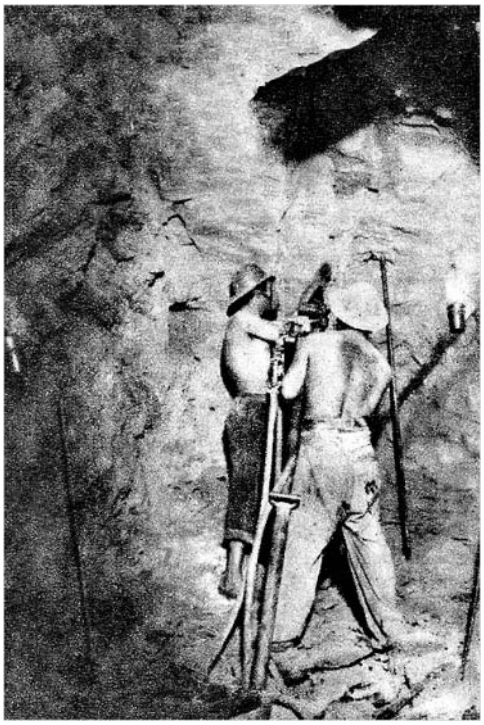
At what point pneumatic drills drills made an appearance in the area I don't know. It is probable that the Basque companies employed them from the turn of the century, given their willingness to embrace new technologies, but I haven't found any documentary evidence of it. However, it is unlikely that workers here never encountered the notorious widow maker or single line drills. These, in contrast to Brandt's hydraulic drill, created massive amounts of injurious dust, which coupled with the increased use of dynamite, caused the frequent disabling and death of thousands of miners due to pneumosilicosis, in as little as 8 years. Portable compressors mounted on small trailers, pulled up my mule would probably have supplied the air for the pneumatic drills. The website, farodebedar.com in the article Minería de Bédar: los compresores de Hierros de Garrucha speculates in detail about the type of machinery used during this undocumented period.

Single line pneumatic drill, known as a widow maker.

Shropshiremines.org.uk

When the Santa Bárbara tunnel was driven along the spine of the Sierra Almagrera, unusually for 1940's Spain, double line jack drills, possibly of the make ASTRA, were used and dust masks were provided. The use of an air and a water line helping to limit the dust present in the atmosphere. No such considerations were afforded to the prisoners of war forced to excavate Franco's mausoleum, many of whom were dead even before it was completed.

While this photograph, published by MASA, shows best practice, it was possibly a bit of a publicity exercise. Some local elderly residents, whose fathers worked at el Arteal, saw them suffer and die of silicosis. Given the short time that operations here lasted, this raises questions about the safety of their working conditions. To my untutored eye, the clothing of the miners pictured looks remarkably dry considering that they were, in theory, operating a twin line drill.



Using a twin line jack hammer in the Santa Bárbara tunnel.

An advertisement for an Astra drill.

Chapter 5. A Casual Exploitation.

Vale *Nicolás Rodríguez*

‘If his work is painful, his rest seems so too,
for his bed is a blanket, and his dwelling, a narrow cave or a hovel,
where several miners gather to sleep,
accompanied by all the miseries and plagues of poverty.’
J Pie y Allué 1883.

The labour terms and conditions of those working in the early days of the mines were well documented by Bayo and Madoz, and then, over the years, by acting engineers and visiting interested parties. Rural, agricultural labour norms, such as working from sunrise to sunset, and only receiving remuneration when the crop had been sold, were transferred to the mining sector. Paying the workers when the ore had been sold was of great benefit to the mine owners, in that it reduced their operating costs. This was particularly true when a mine was being first developed. It also secured their workforce for several months since it effectively preventing the men from leaving. Delamarre neatly summed up the situation like this,

“The advantages for the operator are to maintain its workers for the entire duration of a varada, so making a lucrative trade at his expense and, finally, that of being able to operate with a more limited volume of capital since part of the production of the mine can be sold and collected even before the workers who have extracted it have been paid”.

Working from sunrise to sunset was a different matter, seasonal variations in the relative lengths of night and day, gave rise to corresponding variations in the length of the day and night shifts. As Madoz commented no one, not even a Spaniard, could work effectively and efficiently underground for up to a 16 hour period. This fact was lost on the mine owners as the ‘sol á sol’ system was still operating until at least the turn of the century, and the men continued to find ways of resting when they were thought to be working.

With much of the workforce travelling long distances and the exemption of mining from the Sunday working laws, the miners worked continuously for blocks of between 7 and 9 weeks before returning home. The blocks were known as varadas and corresponded to the main events of the religious calendar and local patron saint’s days and festivals, in much the same way that school terms and half terms still regulate the academic year today.

New Year to Shrove Tuesday.
Shrove Tuesday to Easter.
Easter to Corpus Christi.
Corpus Christi to Virgin of Carmen.
Virgin of Carmen to Cuevas Festival.
Cuevas Festival to Christmas.

Longer breaks were at Christmas, Easter and the feast of Assumption in August, which corresponded to the Cuevas Festival, with the shorter breaks in between. When the breaks between the varadas were for just a few days, those unable to return home in that a short time, made their way to the coast in order to wash themselves and their clothes.

Unusually, miners in the Sierra Almagrera in the early days did not have to provide their own tools, possibly because, at the start of the mining boom, the majority of the workforce had no mining experience. At the end of a shift, the men left their tools where they were, ready for the incoming shift to use. This was in order to prevent theft, but as Bayo pointed out, the men wore little more than a shirt and pants, and sometimes simply a loin cloth, so could hardly smuggle a borer and a hammer past the watchful eye of the foreman at the pithead. Tools were far more likely to become buried under rubble or to lie unused for several days as the foremen were largely incapable of properly ordering the work.

Unlike nearly everywhere else, the miners' tools in the Sierra Almagrera were provided by the mine owners.

Un mineur de Heulgoat (Pitre-Chevalier)

The men worked semi-naked.

mileneo.com

Wages didn't vary greatly since prices were stable until the turn of the century, when there was a moderate rise. Rampant inflation only came when so much of Europe was engaged in the First World War. Souviron lists the wages in 1898 as 0.80 pesetas for boys, 1.12 pesetas for adult labourers and 1.65 for picadors, as well as lipmiadores and other positions which required some skill or knowledge. Whilst he described these rates as not been excessively low, he commented on how the owners found ways of clawing some of the money back.

All the while that the men were at work their needs were met by the mine owners, not just their food but also any clothes and personal items, with payment being deducted from their salaries. This benefited the mine owners as they could charge above the odds for the goods which they provided, although the deduction for food was equitable. Since the owner was the only person who would give them credit, the men had little choice but to accept the situation. This credit system became increasingly more disadvantageous for the miners as the years went by. I don't know whether it was foreign companies or local companies which promulgated the iniquitous 'truck system' of payment in this area, but by the end of the century it had become widespread.

The payment of all, or part, of a miner's wages in the form of tokens was outlawed in England in 1831 but did continue in some parts until 1887. It was widespread in Europe and America, where there was a shortage of paper money, and everywhere, it benefited the employer and disadvantaged the worker. Under the truck system, workers were given vales, (tokens) or coupons which had to be exchanged for goods at designated outlets. Employers usually either had interests in such establishments, or received a percentage of the transaction amount. The worker suffered because there was no price competition, nor redress or refund if the goods amount was less than the coupon amount. There was one such 'company store' in Las Herrerías, but I don't know if one existed in Los Lobos.

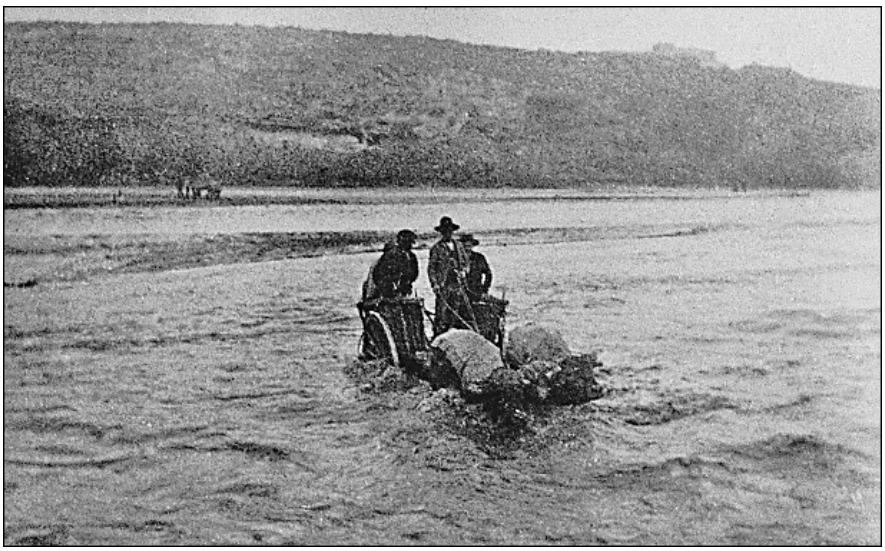
The 'company store' in Las Herrerías where coupons or vales could be exchanged for goods.

Author's photo.

Come the end of a varada the cash sale of the ore was so great that an ox-cart was needed to transport it to the Cuevas houses of the owners of the Jaroso Rich Mines, while the men were given what was left of their wages with the inevitable consequences, as described by Delamarre:
"*Payday presents the immense inconvenience of putting in their hand suddenly and precisely in times of distraction quite a large sum. They don't take long in wasting it, and after an absence of a few eight days they return to work, as poor as before. They start their regular three-month period of work again, during which they will have no rest day, not even on Sundays."*

It required an ox-cart to transport the owners' money. *todocoleccion*

In 1884, the year of the great rains, the Almanzora was running so high at Cuevas that is was impassable and 2,000 men returning home from the mines, probably having patronized some of the ventas on the way, were stranded on its banks in the Portilla area. With no food available, some of them took to helping themselves from the surrounding homes and gardens, while others attempted the crossing, cheered on by their compatriots. Some were successful, some were not, and for the bystanders, some wagers were won, and some were lost. Unfortunately, when many of the men returned at the start of the following varada, they found themselves out of work as the excessive rainfall had flooded many of the mine workings.



Oxen proved to be invaluable when the Almanzora was in flood.

From " Water and Life " by Enrique Fdez. Bolea / Col. Juan Grima]

Mine kitchens were superseded quite early on by food supplied by catering contractors. Provided that the caterer's pack animals arrived on time, everyone ate breakfast before starting work, but if not then they went to work on an empty stomach. When the food arrived, a foreman repeatedly struck the winch supports with a bar and shouted at the top of his voice ¡Cadena!. The cry was taken up by the on-setters at the bottom of the shaft, where it was happily taken up by others voices and passed on until it reached the furtherest corners of the mine. Then, everyone started the arduous climb up the interminable ladders to breathe the fresh air. The same process was repeated at midday when all of the workers, surface and underground, came together to eat, with the boys standing a little way apart from the men. In addition to the hour's break at midday, there were five or six short breaks of 15 minutes or so, which were at the discretion of the foreman. These were signalled by the cry ¡tabaco! and were terminated by the call ¡á otro!

Miners taking a short break. *nuestrotiempo*

Bayo surmised that the shout of ¡Cadena!, (chain,!) stemmed from the time when mines in Spain, particularly mercury ones, were worked by convicts. Up until 1799 men held in the gaol at Almadén worked in the mines there, later, Franco used the gaol and its inmates to the same ends until 1944. Others have postulated that the call comes from the Roman times when mines were worked by slaves. Though neither slaves nor convicts, these men's lives were little better.

Inmates of the gaol at Almadén worked in the mercury mines until 1944.
Foto Centro de Estudios de Castille La Mancha Almaden

Slaves operating a water extraction system in a mine. *proyectoarrayanes*

For the majority of the workers, the food provided by the caterers was part of their salary since they were paid ‘con rancho’. The remainder, who possibly lived quite locally, or, worked as a team on different shifts and so able to source food, fended for themselves. Bayo described what was provided in detail and, like so many things in the Sierra Almagrera, the meals were given colloquial names, specific to the area. Breakfast was known as ‘café’, despite being a concoction of oil, fried garlic and boiled salted water, into which which the men dunked their ration of bread. Lunch was called ‘bazófia’, an unlovely way of describing food since it means everything from leftovers to excrement. It was actually a stew made from vegetables, pulses, typically dried beans or chick peas, and carbohydrates in the form of rice, pasta or potatoes, and the inevitable oil and paprika. Again, this was mopped up with a ration of bread. Supper went by the name of ‘gandinga’, a word of Puerto Rican origin for a soup made of, amongst other ingredients, pigs offal. This sobriquet was possibly a wry comment on the fact that there was little hope of there being anything other than vegetables in the stew that was presented. The menu remained pretty much unchanged for two decades, when gradually, some mine owners stipulated the addition of small amounts of dried fish, bacon or fresh meat to the pot. This was in recognition of the fact that much of the workforce was malnourished.

Food was brought in by catering contractors.
lookandlearn.com

Workers slaking their thirst.
Anon

Over the years many people, mainly foreign mine engineers and other interested parties, have commented disparagingly on the food provided. They were firmly of the opinion that the lack of animal proteins was scandalous. Bayo, however, made no comment apart from saying,
'Of course, it is possible to presume that all these meals, as a matter of contract, are not always the most exquisite, despite the efforts made by the owners of the mines to oblige the contractors to comply with the stipulations'.

In other words, he only had an issue with the overall taste of the food, and was satisfied with what was provided. Unlike later in-comers, Bayo understood the world in which rural people lived. He knew that what was provided for the men in the mines was far superior to what they had at home. When you look at the meals, apart from being monotonous, they are actually a balanced vegetarian diet, with all of the complementary proteins. Malnutrition was mainly due to the prevalence of tapeworms and to the quality and insufficient quantity of the bread which, at times, was absolutely inedible so that too few calories were being consumed for the work performed.

Bread and water were the two major overheads for the contractors who, over the years, were both commended for doing a good job and castigated for not. I suspect that there were good people and bad people, with a shortage of supplies, weevils in the flour, blight of the potatoes, and a host of other circumstances affecting the feeding of the five thousand, it was a thankless task at the best of times. However, fraud existed at every level in the Sierra Almagrera. Bayo dedicated a whole chapter to the subject and Souviron half a century later commented
"Food, consisting of a broth in the morning, a stew in the middle day and another broth at night, bread and sometimes fruits when they are almost given away in the countryside, all of which is supposed to be worth 0.75 pesetas, to me it seems useless to go into details, since everyone can imagine that the food goes hand in hand with everything else related to mines and workers."

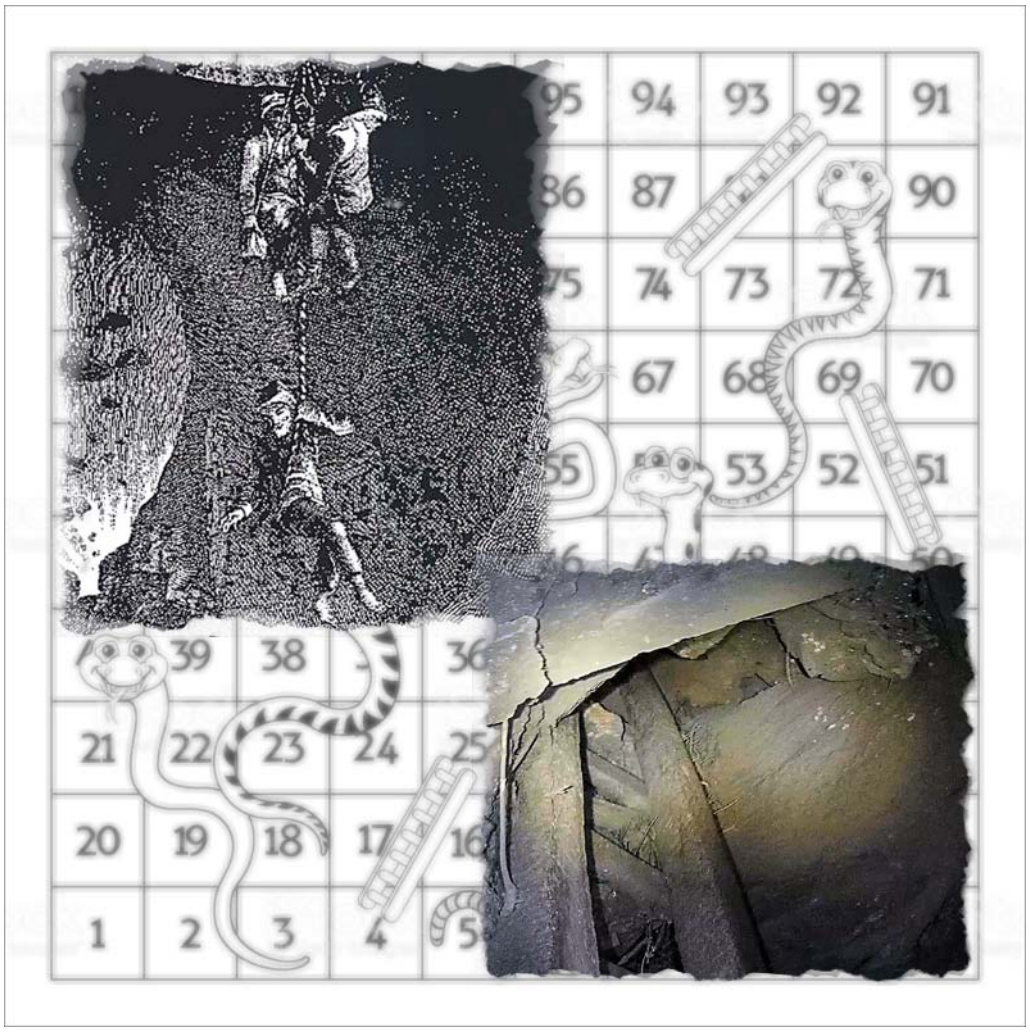
Following widespread protests the practice was largely abandoned in 1902. However, despite it becoming illegal in 1907 the loss of profit to the company was so great that the Basques re-introduced the system. The threat of strike action in 1911 seems to have brought an end to the long-running dispute.

In the 1950s El Arteal had a canteen and an economato, a discount store, both subsidized by MASA. As part of the Franco's state, political and social paternalism the economato operated in the opposite way to the truck system in that the workers benefited from it, but the company still had the whip hand.

The ruins of an economato. *twimg.com.*

Chapter 6.

Snakes and Ladders.



Top left: bristolexplorersclub. *Bottom right: Fran Mulero.*

Getting to and from work was probably the most dangerous part of the miners' working day. Not getting to the mine, but going in to it. The small size of the concessions in the Sierra Almagrera means that there are very few adits, so the only way to enter the mine is down a shaft. Virtually every mine had an extraction and an access shaft, this gave the men a choice between the lift and the stairs, the winch or the ladders. However, there is a Dutch proverb which tells us that, 'He that has a choice has trouble'.

On the face of it, you would expect the ladder shaft to be the better option. But was it? Going up and down twice a day was exhausting, time consuming and dangerous. Contemporary illustrations of ladder shafts show, short runs of sturdy ladders and wide rest platforms, all German best practice, but the reality in the Almagrera, and in fact most of Spain, was far different.

The spacious ladder shaft in the Harz mines, N. Germany.
Simonin.

The requirement for platforms and inclined, rather than vertical ladders, in an access shaft only became compulsory in England in 1872, so it is highly unlikely that either were the norm in the early days of the local mining boom. Access shafts in the Almagrera tended to be a mere 1.80 by 1.80 metres, so any platforms were small and could only serve their primary purpose, that of arresting a fall, rather than providing a resting place for a weary miner climbing each narrow, 4 metre long ladder.

Looking up at the remains of the ladders and platforms in a shaft in the Sierra Almagrera.

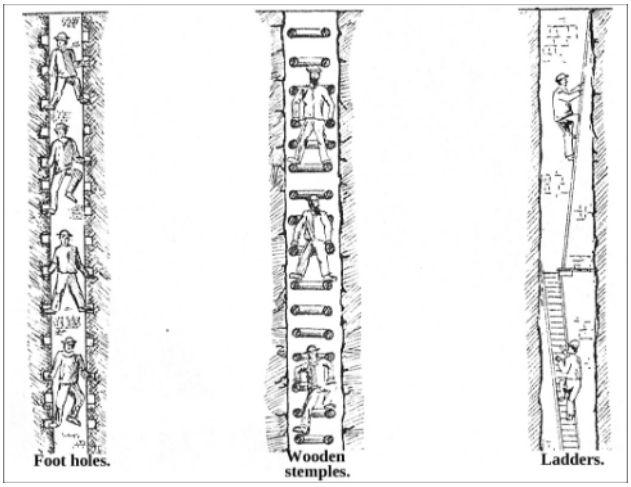
Fran Mulero.

There were several dangers in a ladder shaft, the first was from an object being dropped by someone on the climb above. A dropped lamp, accelerating at 32ft (9.75m) per second squared as it falls down a 200 metre shaft could be sufficient to kill a man, but his death was more likely to be from a startled fall.
The second danger was from someone slipping and falling down the ladder which frequently had a domino effect, dislodging others below. The rungs of the ladders were slippery with an accumulation of sweat, candle wax and lamp oil. They were also often irregularly spaced or shaped, almost never reinforced, and frequently poorly maintained.

Looking up the ladder shaft.

Reaching the bottom. *Both, Fran Mulero.*

Ladders between the various mine levels were no doubt even worse, or indeed non existent. In England, until well into the second half of the 19th century, stemples, (wooden pegs) and foot holes set into the sides of narrow winze shafts between levels were both in use. It is reasonable to suppose that the same basic shaft climbing methods were used in the winzes here, with foot holes probably more common than stemples given the scarcity of wood.



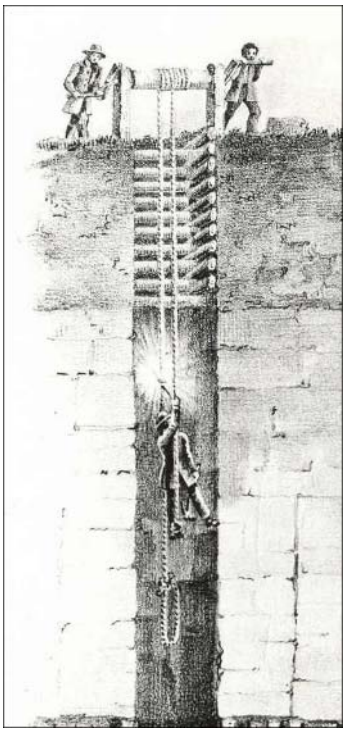
Methods of climbing between levels. *British Metal Mining Tech.*

It can only be hoped that these steps cut into the side of the ventilation shaft at the mine Monserrate were for emergency use only. *Author's photo.*

In 1888, Derbyshire Mine Inspectors' reports showed that, together with blasting accidents, falls from ladders was the largest single cause of injuries and fatalities underground. Not only that, but climbing up a deep shaft twice a day put a tremendous strain on the hearts of those men already suffering from lung diseases. This either proved fatal or rendered the miner incapable of working by the time he reached 35. Coal miners, who tended to work in shallower pits had a life expectancy of 48 years.

From the mine owners point of view, using the ladders affected the mines profitability. In the first instance, it took a lot of time, and in the second, it was calculated that a miner might expend a third of their work effort climbing once between the surface and the work face. The Almagrera miners made the journey twice a day, but some owners, when they became aware of the effect of this on their bottom line, had the men's mid-shift meal sent down to them.

What of the alternative? If you don't take the stairs, there is always the lift! In Belgium, an extraction shaft was called la fosse, the grave, and for good reason. In every country miners acknowledged their god before descending such shafts. Faith or superstition, both helped to hold fear at bay, but neither repressed the recklessness of the Almerían miner.



Even in 1883, the most common way of riding a shaft was by hanging on to an esparto or, if you were lucky, a manilla hemp rope. Pie y Allué described it like this:
'The descent by winch, preferred by the worker as being more comfortable, is more dangerous, often due to their own indifference and carelessness. The miner passes his leg through the eyelet at the end of a hemp rope, sometimes even an esparto one! Holding it with one hand to form a belt and with the other hand he holds his lamp and descends 80 metre shafts, singing and joking with the worker who, in the same manner, is going up the other way'.

Descending a shaft, holding on to the rope.
Jamieson Museum

Similar means of descent were, or had been, common in other countries, but with certain modifications which lessened the risks. The most common was to form a swing seat with either the rope or with a piece of wood. Another variation was to pass each leg through a loop and to secure the torso to the rope. The wonderful engraving of five men descending the shaft of the Wielliezka salt mine, looking for all the world like a human chandelier, actually showed quite a sophisticated system described by Simonin as:

*'The extremity of a rope, brought to the surface, carried round a knot five or six ropes'-ends looped up like a swing, and furnished with a couple of transverse bands, one of which served for a seat, the other for a support for the back'.*These men certainly had a safer, more comfortable journey than those in the Sierra Almagrera.

The rope hoist at Wielliezka. *Simonin*

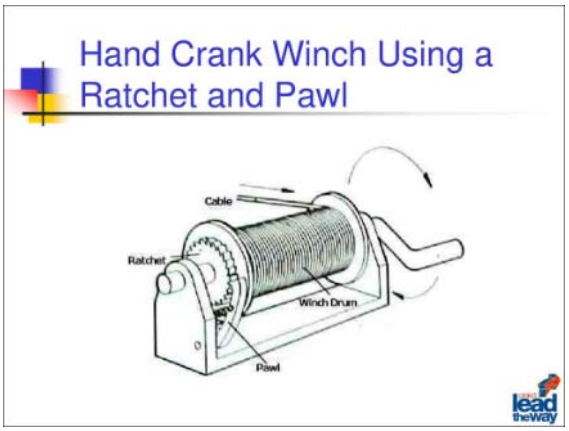
Everything about riding a shaft was dangerous. For the descent, positioning the foot and winding the rope round the waist over the gaping hole must have been heart-stopping, as must have been disentangling oneself in order to gain solid ground after the ride back up. Even getting ready for the ascent was dangerous, as it was not unknown for the winchman to start turning before the hapless worker was properly positioned hoisting him by the leg with his head hanging downwards.

In the Almagrera, men were also raised and lowered two at a time in the esparto baskets used for raising ore. While more comfortable for the workers, it was no less dangerous.

Even with the saddle-shaped barrel of the torno de albadilla, there was a tendency for the baskets to brush against each other as they crossed in the shaft. A slight swing of either load could, and did, have fatal consequences. (It was not unknown for the riders themselves to set the basket swinging!)

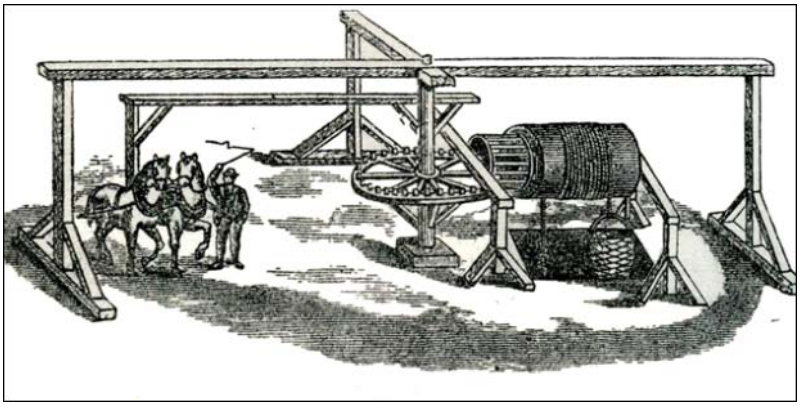
The winch itself was a very primitive affair, having neither cap boards to keep the barrel ends and handles secure in the uprights, nor any form of braking system. Pie y Allué was shocked, remarking that:
'The winch is made of wood, the archetype of simplicity, without a pawl or even a ratchet, unlike those employed in lifting masonry blocks in the event of a handle breaking or parting. That's to say that everywhere an ashlar or a keystone is treated with more consideration than a human being.

A torno de albardilla. *Mtiblog*



The winches had neither a pawl nor a ratchet.

Things were no better with the introduction of horse gins and whims. The increased power afforded by the animal allowed the esparto baskets to be replaced by larger, tubs, or kibbles, made of wood or leather. This multiplied the risk of collision at the cross over point as the kibbles were larger than the baskets. Gins, with their wooden rung and peg gearing system, unless scrupulously maintained, often had worn or missing pegs. This had the effect of causing the kibbles to jerk unexpectedly as they were hauled up. This was a particular problem if the men were riding a kibble part filled with ore, or even worse, if they were standing on the edge of it.



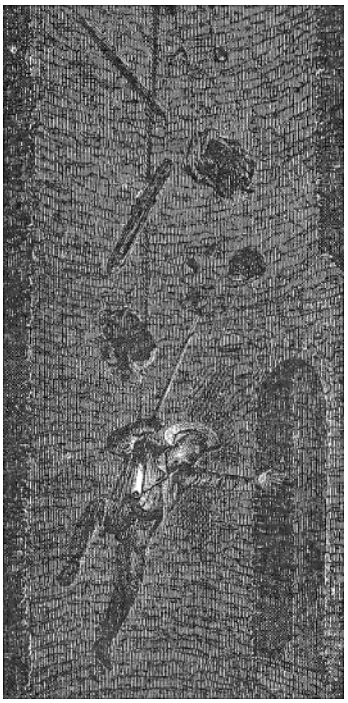
Missing pegs could cause the kibbles to jerk.
Centro de Interpretatíon, Linares

An accident at Saint- Etienne where tubs collided.
Simonin

Made from natural fibres, the ropes used on winches, whims and gins were prone to fraying and breaking and esparto in particular had a very limited life-span. The manilla hemp ropes - made from abacá, a variety of banana tree - were slightly more durable because of the length of the fibres but both were frequently used past their safe point and rope snaps were not unknown.

Above, abacá fibre rope. *Professorhedgehogsjournal*
Left, Manilla hemp is fibre from the abacá tree. *Britannica*.

Unlike a ladder shaft, which was covered, extraction shafts were open and there was always the danger of some piece of material falling in from above, or indeed from any of the loading points of the galleries situated at intervals down the shaft. Incredibly, there was no warning system in the shaft, not even a rope with a bell attached to it. Pie y Allué fumed:
'In these shafts there is also no rope or warning to avoid an accident, such a simple precaution, because although the voice is generally perceived from the mouth of the shaft, you can't hear well when the worker is half way down, and there are times when it is essential to promptly and clearly notify a stop or change of movement.'

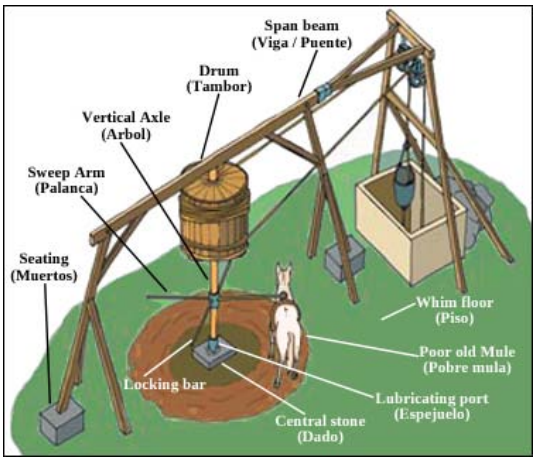


Falling masonry was always a problem and there was no warning system.
Simonin

Surprisingly, one of the most common accidents was where men hit their heads on the drum of the winch because the winchman failed to stop winding until it was too late. Like the simple winch, the gin had no brake. The peg and cage arrangement held the movement if the animal stopped, but if the animal continued to move for whatever reason, there was no override braking mechanism, and no means of stopping the kibbles, or the men inside them, from hitting the drum. Pie y Allué had probably witnessed an accident involving a skittish or frightened animal because he wrote:
'In addition to the danger of rope breakage, that first that comes to mind, and perhaps others less obvious, have to be feared as causes of unfortunate accidents: the tangling of the ropes, their sliding on the winch,

getting snagged in a crevice in the shaft wall, the breaking of a winch handle, and the fall of some stone or pebble as it is dislodged from walls. All these dangers grow, they multiply, when the rise or fall it is achieved by horse winches.'

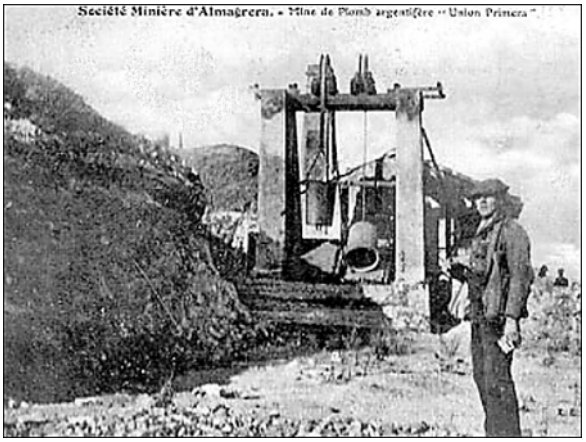
Even though the horse whims had a manual brake, accidents could still happen since the muleteer was quite a distance from the mouth of the shaft and needed to rely on a call as he could not see the shaft mouth. Because of the height of the pulley sheaves above the shaft there was a better margin of error, and fewer cases of men striking their heads.



The whim had a brake, but the muleteer was quite a distance from the shaft. *Coquetandcoast.co.uk*

The mule walked round the central circle and the shaft mouth was behind the wall. *Drone shot, A G Jódar*

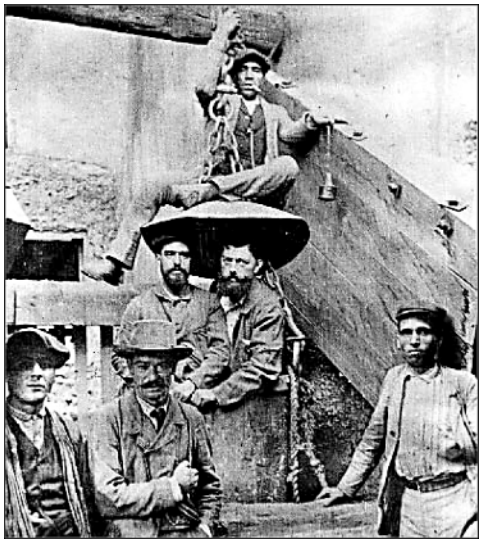
However, the introduction of the steam powered winch brought a new twist to the over-running accident. Either because he was unable to see the shaft mouth from his position or through inattentiveness, there were cases of the kibble being raised up and hitting the sheave wheels, and the men being thrown out and falling to their deaths down the shaft.



Extraction shaft showing an upturned kibble at the mine Union Primera. *E. L. Morin*

Gradually things improved, a signalling system – simply a bell on a rope - and without a universal signal code, was introduced in many mines, particularly those with powered winches.

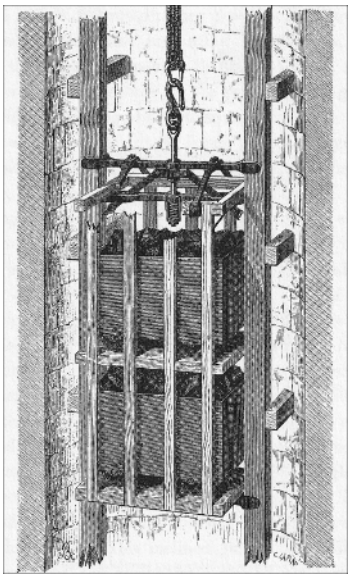
Kibbles became more sturdy, often made of metal, and fitted with what the French called a parachute and what was known in Britain as a bonnet. This was a hat-like roof covering over the kibble, made of sheet-iron or stout leather, which protected the men from falling material. The insouciance and recklessness of the man sitting on the top of this canopy (right) is breathtaking, as is the indifference of the mining engineer to the situation.



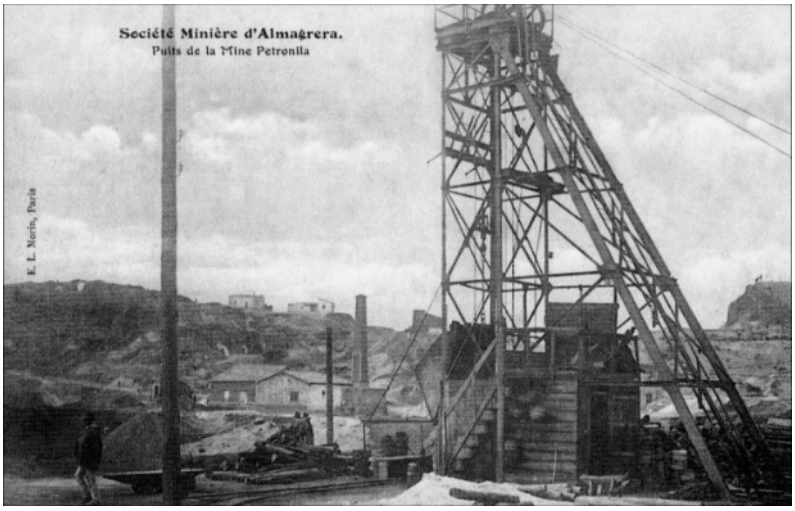
This picture was taken in Bédar, but it could well have been in the Sierra Almagrera. *Memoría Fotográfica de Garrucha*

The El Arteal pumping station installed lift cages in its access shaft in 1898. The were probably similar to the pictured safety cage, where the spring attached to the rope is clutched and holds the levers against the two side of the guide rods in the shafts.

In Las Herrerías, Luis Siret's Sociéte Minière d'Almagrera had cage shafts at the mines Petronila and Iberia and possibly others. Pozo Susana, at the Ibería mine is still standing, dominating the skyline at Las Herrerías. These were extraction shafts, but it is possible that the men either rode in the ore trucks or stood on the platforms onto which the trucks were run.

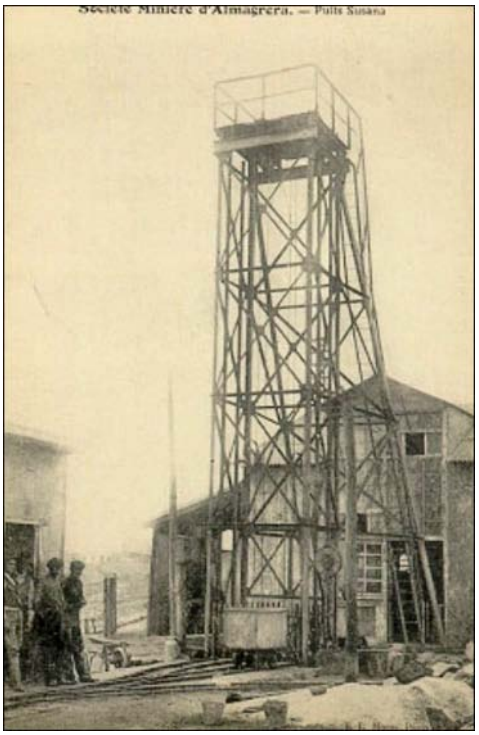


Right, an early safety cage. Simonin.



Left, the mine Petronila.

E L Morin, taken from Memoria Visual del Siglo XX, Enrique Fernández Bolea.



Left, Pozo Susana.

E L Morin

Right, Pozo Susana today.

Author's photo.

The Men from Bilbao, the Basques, installed safety lift cages in the main shaft of their Guzmana mine. A visitor to the mine in 1890 described ore trucks and men being raised to the surface. This is the only reference that I have found of their use, but it is likely that the Basques had them at other mines given their love of technological innovations. Unfortunately, there is a paucity of documentation on the period between the turn of the century and the Spanish Civil War. Elsewhere in Europe, safety cages were the norm and ladder shafts were, by law, only to be used in emergencies.

MASA renovated the access shafts to the Santa Bárbara tunnel, so it is impossible to know whether they had all previously been fitted with cages. The fittings at the Guzmana mine don't look like the original 1890 ones, and the Independiente mine, just below the Guzmana has an unusual arrangement of ladders and platforms alongside the cage runs. It is likely that MASA simply re-timbered the original laddered section and had it as an emergency exit in the case of a power failure to the cage mechanism.

The extraction shaft of La Guzmana, the guide rail fittings can be seen.

The dual purpose shaft of Independiente.

Both photos, A G Jódar

A miner cried out in the bottom of a mine,
Aye, what loneliness I have!
And although I have a lamp,
I cannot find my way out.

You say that you are Laura,
that Laura is your name.
But you are not of the laurels,
for the laurels are firm.

In saying, line up to enter!
All of the miners tremble,
to see that their fate
hangs on a rope.

Don't be frightened señora,
it's just a miner singing,
with the smoke of the mine
his voice has turned hoarse.

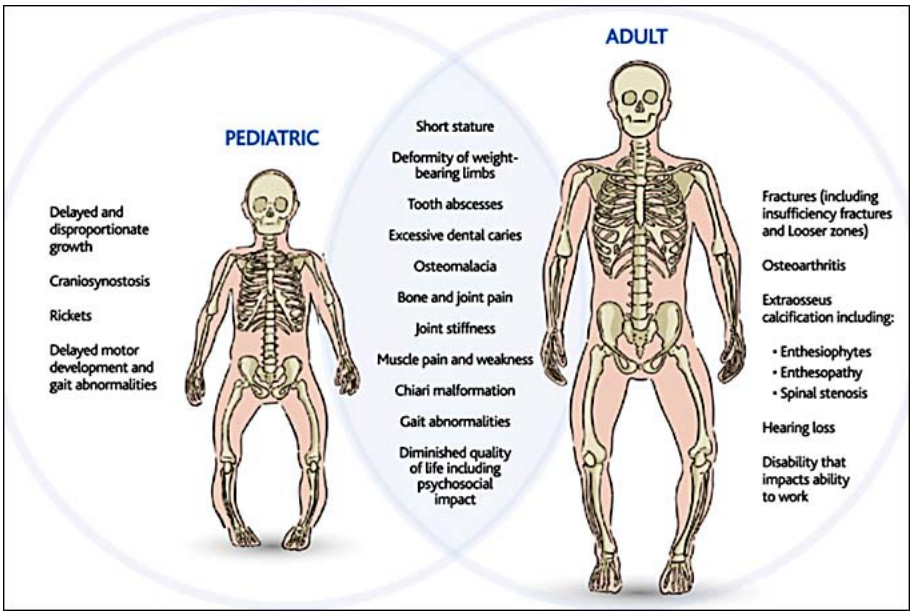
It's perhaps no wonder that this was a popular miners 'cante flamenco' or flamenco singing. They knew only too well that their lives often relied on no more than a rope but they could still dream of a lady.

Chapter 7.

In Sickness and ...

The Cough. Noel Counihan

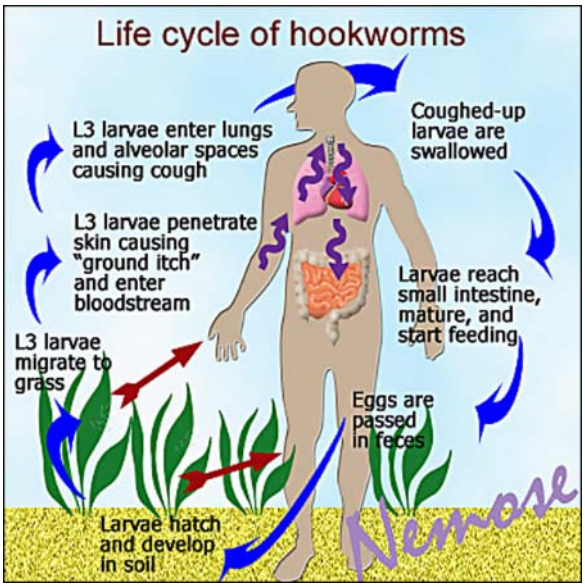
While the mine owners believed that they were promoting the health of their workforce by providing them with their food, this was not necessarily the case. In the long term, greed affected the quality of the food particularly the bread, as much as the scarcity of animal proteins. This meant that insufficient calories were consumed for the energy expended by the men and, more particularly, the boys. The poor development of adolescents caught up in the Industrial Revolution had come to the attention of medical men through out Europe. While in Cuevas, one doctor, José Doménech Sáez, published a memorandum in 1888 on the health of those working in the local mining sector in which he echoed the findings of his counterparts, that those men who had been working since a young age in the mines had failed to achieve their growth potential. Not only that, but the average height of the general population of the surrounding district was diminishing even though the mines were enjoying their most profitable period. The 'casual exploitation', described in Chapter 5, affected not just the miners themselves, but as the bread-winners, the wider population. The inevitable outcome of poor diet was poor growth, and this was further compounded by the fact that the men and boys worked from dawn to dusk for moths on end. Lack of the sunshine vitamin, vitamin D, so necessary for the absorption of calcium and phosphates, combined with few calcium rich foods in the diet, inhibited the bone growth of the youngsters with some, no doubt, suffering from rickets.



The effects of vitamin D deficiency on the bones of an adult and child. Researchgate.net

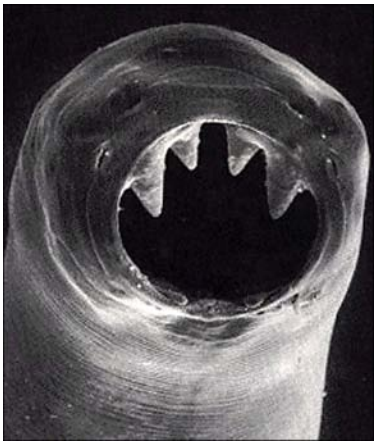
The causes of diseases affecting the workforce are complex and the simple diagnosis of them often overlooked this, and also, the possibility of multiple underlying health issues. Not that this made much difference to the sufferers, as treatments were neither curative, nor even palliative.

There was a condition known as miner's anaemia and while vitamin D deficiency is often associated with this, it is thought that the primary cause was parasitic hookworms. The life cycle of Ancyclostomo duodenale, the hookworm, is relatively simple because it only has one host, us humans. The eggs are passed through the faeces of the human host onto the ground where they develop into its first stage, the larvae. After moulting twice, they develop into filariform, the infectious stage, stop growing and wait for a passing human. When the host is infected through direct contact, for example via a small cut or abrasion, the parasite then migrates to the circulatory system until it reaches the lungs. The host then coughs it up and swallows it, allowing it to reach the small intestines. If infection occurs through ingestion, the parasite passes to the small intestine directly Once in the gut, the hookworms latch on to the inner wall by biting with their teeth and proceed to feast, mature and reproduce, laying up to 30,000 eggs a day. The eggs are then excreted from the host and the cycle begins anew. Iron deficiency anaemia results from the blood lost as the adults feed, and protein deficiency is also a consequence of long term infection. Hookworm infection was particularly damaging to the younger workers as the protein deficiency led to arrested musculoskeletal growth.



The life cycle of a hookworm. *infection landscape.org*

Hookworm filariform (L3 in diagram). *Microbeworld.org*



The fearsome teeth of the worm itself. *Wikipedia*

The unsanitary conditions in which the men lived and worked greatly facilitated the life cycle of the hookworm. There was little, or no, water available for personal hygiene, and no toilets underground, or indeed above ground. Evidence of a latrine has so far been found at just one mine in the whole Sierra. (See The Better Baritel in the Some Sidelines section of the website). However there was water underground, the toxic thermal water that created the perfect warm, damp environment for the larvae to thrive in. As nearly every man would have had some form of cut or abrasion on his body, and often worked barefoot, there was an easy pathway for the filariform to enter the bloodstream.

The conditions in which the men lived and worked were also the perfect breeding ground for that other scourge of the poor, tuberculosis, or pulmonary consumption as it was known. This was before the days of antibiotics and before there was any understanding of its cause. Despite the Frenchman, Jean Antoine Villemin, proving in 1868 that it was contagious, it was not generally recognized that it was a disease passed on through airborne droplets from when an infected person coughed or sneezed, so it was attributed to a variety of circumstances. Rose, in his 'Untrodden Spain and Her Black Country' listed these as:

Breathing the unwholesome, confined, sulphurous air of the mine; by working with wet feet; by the exertion of climbing up the perpendicular ladders quickly and eagerly to get to the surface, which induces profound perspiration and also palpitation of the heart.

The sudden changes in temperatures both inside the mine workings and on exiting the mine into the chill evening or early morning air, were also believed to induce tuberculosis.

Robert Koch discovered the bacillus in 1882, and in 1921 Albert Calmette and Camille Guerin's vaccine, the Bacille Calmette-Guerin, or BCG, was used for the first time. I thought that TB had largely been eradicated by the BCG vaccination so I was surprised to read a hundred years after its development the following extract, published in 2016 by sciencedirect.com in an article entitled Tuberculosis in the mines of Zambia:

'TB being an airborne disease means that enclosed areas such as mining sites with poor ventilation create favourable environments for TB transmission. TB is one of the main health risks which have been found to be associated with mining. Mine workers in Southern Africa including Zambia tend to have poor living and working conditions thereby having increased risk of TB and in addition working in the mines increases exposure to silica dust leading them to developing silicosis which increases their risk of developing pulmonary tuberculosis.'

I also found a scientific study into the treatment of tuberculosis among the poor in South Africa, where it was found that traditional herbal remedies were effective.[1] The most common treatment is wormwood, lemon oil and mint, and I wondered if this ancient remedy had ever been used in Spain. Artemesia Absinthium, Wormwood or Ajenjo in Spanish, would have certainly been more efficacious than bleeding, which was the common way of treating those patients who could afford a doctor.

Artemesia Absinthium, or Wormwood is still used as a treatment for tuberculosis in Africa. *wikipedia*

While not the cause of tuberculosis, pneumonia and bronchitis, the conditions in which the men worked certainly exacerbated them. One disease that was definitely caused by the work environment was silicosis. José Doménech Sáez observed and commented on the condition in his memorandum. Known as Miners' Fatigue, Doménech described the classic symptoms of silicosis, Chronic, nagging cough, shortness of breath on exertion, weakness and fatigue, fever, difficulty breathing, weight loss, night sweats and chest pain. He also added to the list discolouration of the sputum caused by breathing the acrid smoke from the lamps and candles, but which could equally have been a symptom of TB, lung cancer, or even of lead poisoning, which was the most probable cause of the discolouration of the teeth that he also cited. While on the right track when he attributed the blame to the workers' environment, Doménech did not identify exposure to silica dust as the culprit although he wasn't too wide of the mark when he blamed the black dust that was everywhere in the air. In their book, 'Mines, Cables, Railways, Foundries and Mineral Loading', Andrew Dewey and Juan Antonio Sóler Jódar make this observation,

'Undoubtedly, observations like those of Dr. Doménech would have ended up quickly identifying the environment of the mine and specifically the dust as the first cause of this disease. But paradoxically, the discovery of the tuberculosis bacillus in the 1880's decade, one of the most important events in the history of medicine, was the one that relegated the role of dust to a second tier as a cause of lung disease. In this new scenario, tuberculosis bacillus was the main causal agent of diseases, so that the medical interest in dust reduction amongst workers in the late nineteenth and early twentieth centuries only found justification as an alleged carrier of the tuberculosis bacillus.'

***Footnote 1**. Medicinal Plants Used for the Treatment of Tuberculosis by Bapedi Traditional Healers in Three Districts of the Limpopo Province, South Africa. Semenya and Maroyi.*

The incidence of silicosis did not decrease with the introduction of more modern technology, but rather increased with the greater use of the infamous ‘widow maker’ pneumatic drills. The safer, air and water, rock drills were invented by the Holman Brothers in Camborne in 1882 and were used in Cornish mines from that date, but they were rarely used in Spain until well into the 20th century.

Single line hammer drill. *Crónicas Mineras de Roglio Mouzo Pagán*

Single line jack-leg drill. *William J Priest*

Men continued to waste away with few seeing their 35th birthday. Even so, children followed their father’s footsteps into the mines in order to support their widowed mothers. Sadly, the same is still true in some mining areas around the world today.

Nigerian miners grinding gold ore, with significant exposure to both lead and silica dust. *okinternational.org*

Doménech also described a condition which afflicted those men and boys who worked with the donkeys and mules, transporting ore to the foundries. Affecting principally the head, face and hands, he describes it as starting with small red patches, graduating to blisters and then black pustules. It sounds as if he was describing ringworm, a fungal infection, caused not by worms but by mould-like parasites. If left untreated, the parasites can invade the lower areas of the skin particularly through hair follicles. These can become infected with bacteria, causing the blisters which develop into the black pustules as described by Doménech. Ringworm is a zoonotic disease, in that it can be passed from animals to humans, as well as between humans.

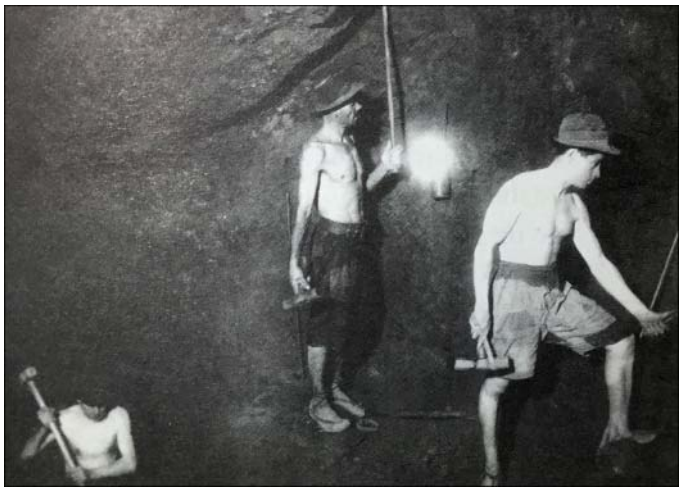
Left, the characteristic ring-like patch which gives ringworm its name. *skinhealth.ind*

Right, Tinea barbae. The parasites invaded the subcutaneous layer of skin via the hair follicles. *auroh.*

A horse with ringworm. *thevetexpert*

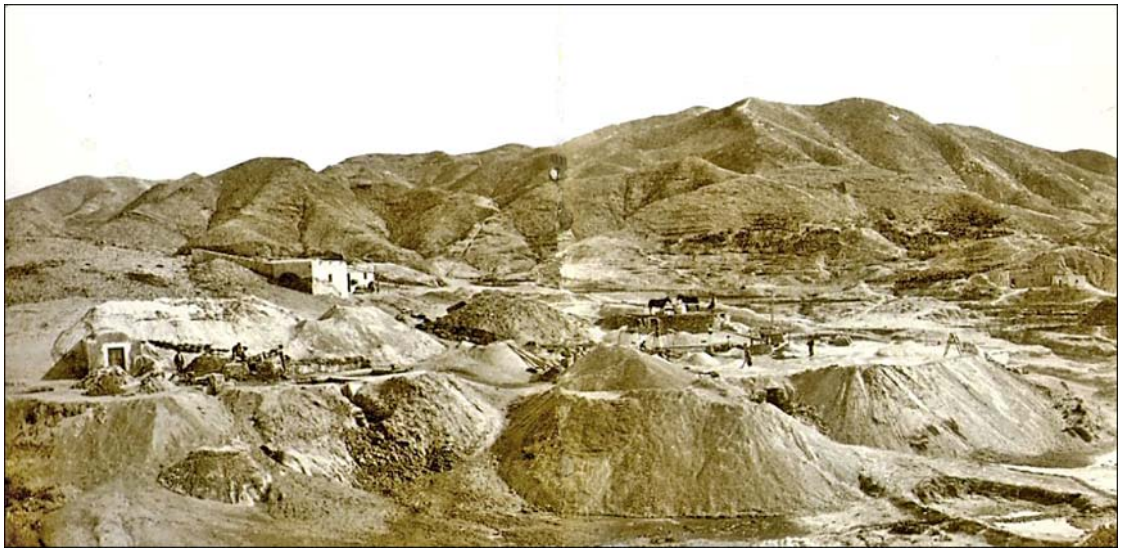
The most well known of the conditions that blighted the lives of the miners and associated workers was lead poisoning and there was no doubting what caused it. The effects depended on the contamination load with an incremental severity of symptoms as the amount of lead in the bloodstream increased. As well as the tell-tale ‘Burton line’, the black line along the gums, early signs were nausea, diarrhoea, constipation, fatigue and a metallic taste in the mouth. These gave way to anaemia, severe abdominal colic and paroxysms, then encephalopathy, delirium and finally fatal seizures. The poisoning was through inhalation, ingestion or direct contact with the mouth, nose, or the mucous membrane of the eyes, and through breaks in the skin. A shocking 95% of inhaled contaminant goes into the bloodstream and 15% of that which is ingested does.

Of all of the workers, possibly the least affected were the miners themselves, but they were not immune. The increased use of dynamite and the fact that there were no specific blasting times meant that there was more lead laden dust in the mine’s atmosphere. The Spanish practice was to bore and blast the lead vein rather than the surrounding sterile. This increased the amount of lead dust, but, by the same token, blasting the sterile increased the silicosis risk, so they could not win either way. Other countries, notably Germany, blasted at the end of work periods in order to give the dust time to settle before the next shift started.



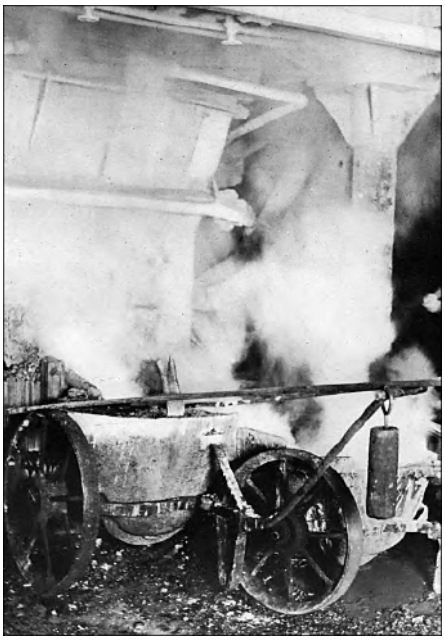
Hand drilling exposed the miners to less lead dust than using pneumatic drills.
Memoria de Cartagena.es

The amount of leaded dust that the surface workers must have inhaled doesn't bear thinking about, long days, winnowing and sifting, shovelling and bagging pulverized galena. There was dust generated at the lavaderos where the ore was wet-processed, but there was less in the air than in the dry processing carried out at the pit-head. However, the ground underfoot was heavily contaminated and the slightest wind would have blown it around, also, inadequate hand washing facilities increased the risk of poisoning through ingestion.



The lavadero at el Tomillar. The wind would have blown the leaded dust into the air. *Rodrigo.*

Smelt mills were the most dangerous environment, where the men were exposed to toxic, lead and sulphurous fumes and leaded dust. There were flume hoods over the furnaces, not for the benefit of the workers, but to direct the flume into the condensation tunnels in order to recuperate lead from the deposits on their walls. Then There Were Mines, Volume 1, Chapter 2.10 refers to the men and boys recuperating the lead from the tunnels being equipped with a handkerchief to cover and protect their mouths and noses and a day off to purge their systems. There were no hoods over the areas where the furnaces were charged and discharged, nor over other areas in the foundry where the molten ore was manipulated. Dust was allowed to accumulate, drinking water was frequently dispensed from buckets without covers and there were no hand washing facilities.



Left, fumes in an American foundry in 1914. *Royal Meeker*

Above, a Spanish foundry operating with inadequate ventilation even in 2007! *OEFA*

A measure of the concern of mine owners for their workforce can be deduced from the fact that it was only when livestock died from grazing in the vicinity of the foundry at Los Lobos that any move was made to direct the fumes away from the workplace.

The flume chimney was moved away from the village of Los Lobos only after livestock had died from lead poisoning. *Author's photo.*

Contamination of the land used for grazing and crop growing, as well as contamination of both ground and drinking water put the whole of the local population at a certain level of risk. Although the Jara, or Spanish broom, which gave the Jaroso its name, is growing in abundance again, analysis of soil samples in the area, even today, make for uncomfortable reading.

Prevention was better than cure, but few steps were taken. Rose tells of a conversation with two managers of a large smelting works in Linares, where certain measures were taken:

'They found it possible to keep off the foe, in great measure, by exercise, if possible, great personal cleanliness, frequent doses of simple aperients (laxatives) as compound rhubarb pills, and above all, by regular and judicious use of acids, which do much towards neutralising the poison. A few drops of some preparation of sulphuric acid in water,- a bottle of this is put at the service of the miners at every mine, they come with a tin mug of water, and take thirty one drops in it – or lemonade, tartaric acid, and the like. They assure me they had found of the greatest possible benefit.'

A Google search of 'sulphuric acid in relation to prevention of lead poisoning' yields several treatises from the late 19th century extolling its virtue, but this view seems to have tailed off in the 20th century.

Bayo devotes a whole chapter in his ;Datos y Observaciones Sobre la Industria Mineria', to the work of a French doctor, Tanquerel des Planches. Said doctor faithfully documented the symptoms of lead poisoning and a day by day account of his treatment regime for the severe colic that it caused. It is a wonder that anyone survived his administration of emetics and opiates daily, and laxatives twice or even three times a day.

Lead poisoning was treated emetics, opiates and laxatives. *Farmacia Minelli.*

An Apothecary balance. *antiques.knowtolove.com*

The formulæ of the doctor's prescriptions were:

- *A simple sudorific tisane:* an infusion of guayacan, the tree of life, to promote sweating. Guayacan was also used as a treatment for syphilis.
- *A Sudorific laxative:* an infusion of guayacan and senna in equal parts.
- *Cassia water with grains of emetic*: Essence of tamarind made from 10 ounces of fruit combined with senna water together with antimony and potassium tartrate, (tartar emetic).
- *Emeticated Holy water:* Ordinary water with antimony and potassium tartrate.
- *Purgative potion:* Infusion of senna containing a concoction of sweetened dates, buckthorn syrup and jalapa, the 4 o'clock plant.
- *Painters' Purgative.* (Artists also suffered from lead poisoning.): A massive dose of senna, with sodium sulphate, sweetened dates and ground jalapa.
- *Mild laxative:* walnut oil and red wine.
- *Theriac lozenge:* an antidotal large tablet containing numerous ingredients, principally opium with myrrh, saffron, ginger, cinnamon and castor to name but a few.

Left, flowers of the guayacán. *pixabay*

Senna flowers. *healthline*

Tamarind. *Souschef*

Purging buckthorn. *CumbriaTreeGrowers*

Jalapa or four o'clock plant. *sonremedioscaseros*

Many of the plants in these prescriptions are still used in herbal preparations today and like wormwood as a treatment for TB, and eucalyptus which was widely used alongside quinine for malarial fever, their possible role in current medicine is being re-evaluated. For example, buckthorn syrup, as well as being a laxative, is also a vermifuge – a medicine used to destroy parasitic worms – so helping to eliminate hookworms from the digestive tract of men infected by them.

However, Bayo gave the soundest advice of all on the treatment for lead poisoning he urged miners and those working in the foundries:

'At the first indication of discolouration of the gums, or any other discomforts which might signal the onset of the disease, go immediately and look for other work, preferably field work, and don't return until you are in better health.'

Bayo also understood the reasons why few would follow his advice for as he wryly commented:

'*The desire to earn higher wages can cause them to be unable to earn nothing for a long time and even worse than that, to lose their life.'*

By 'the desire', we can assume that he meant 'the need'.

Chapter 8.

… In Health.

Mirabel and friends at the El Arteal hospital.
Auguardalupe Las Herrerias Facebook Page.

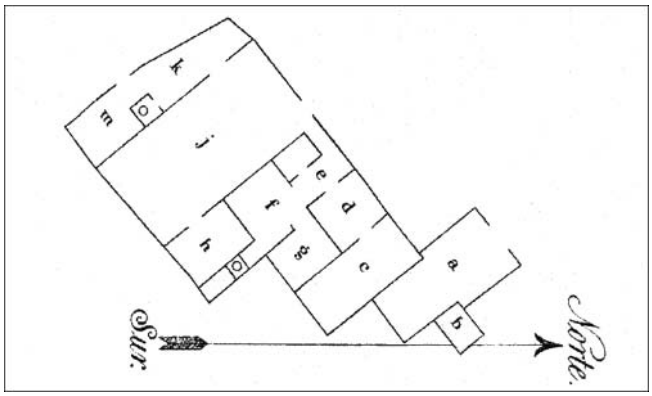
The nearest hospital was the Hospital de San Antón in Cuevas. It had belonged to the French order of friars, the Hospital Brothers of Saint Anthony, until the order was suppressed in 1800 following the French Revolution. Cuevas City Council took the building over in 1802 and converted it into a Charity hospital, employing four doctors. They were assisted by the Sisters of Charity of Saint Vincent de Paul, who also staffed the nursing home and orphanage attached to the building. Although still technically called the Hospital de San Antón it is always referred to as the Hospital de la Caridad (Charity). The orphanage no longer exists, but there is still a nursing home (asilo) there.

Two views of the Hospital de San Antón known as the Hospital de la Caridad.

Left, Federico de Blain.

Below, IAPH.

Those injured in the mines had to be taken to the Hospital San Antón for treatment. The appalling state of the road added to the length of time that it took to cover the distance and many men did not survive the journey. The parish priest José Sánchez Puerta, one of the several clergymen who had shares in the Esperanza mine, together with the mining engineer Antonio de Falces Yesares drew up plans for the building and funding of a hospital in the Jaroso. The small Hospital of Our Lady of Carmen was built on land in the Diosa concession and opened in 1861 under the directorship of Vincent Juan y Esteban and staffed by nuns. Many lives were saved due to the more prompt treatment received in this establishment. It was funded by the mine owners and operators, who were contracted to make annual contributions based on their profits, and by the miners themselves, who had a small amount of pay docked by their employer each varada.



Plan of the original Hospital of Our Lady of Carmen.

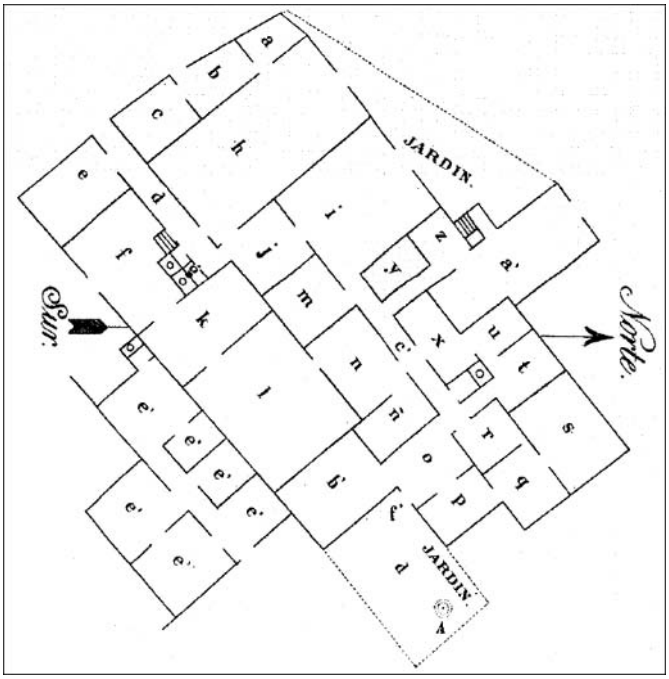
From Sierra Almagrera y Herrerías. Enrique Fernández Bolea.

Key:

a. Chapel
b. Sacristy
c. Nuns Dormitory
d. Community Hall
e. Entrance
f. Kitchen
g. Refectory
h. Patients Dormitory
j. Sick Room
k. Patio
m. Pharmacy

By 1875 there were concerns among some mine owners that the small hospital was inadequate and outdated, and that they were not getting good returns on their contributions. In 1879 it closed for a while and was then reopened, this time under the supervision of the Cuevas Charity Board, while plans were drawn up for improvements to the establishment. In 1883, responsibility for the hospital was passed back to the mine owners and in 1885, working to plans drawn up by Guillermo Muller, the hospital was re-modeled. As can be seen, the new building befitted its purpose, with medical, surgical and recovery wards and more importantly an isolation ward for infectious and contagious cases.

Plan of the remodeled hospital.
From Sierra Almagrera y Herrerías. Enrique Fernández Bolea



<u>Key:</u>

a. Bathroom	*b. Reception Patio*
c. Contagious Ward	*d. Passage*
e. Mortuary	*f. Courtyard*
g. Toilets	*h. Medical Ward*
i. Surgical Ward	*j. Rest Room*
k. Store Room	*l. Patio*
m. Refectory	*n. Kitchen*
ñ. Dispensary	*o. Entrance*
p. Nuns Common Room	*q. Nursing Sisters Room*
r. Maids Room	*s. Nuns Dormitory*
t. Pharmacy	*u. Laboratory*
x. Herbarium	*y. Laundry*
z. Sacristy	*a^1. Chapel*
b^1. Boardroom	*c^1. Corridor*
d^1. Courtyard Garden	*e^1. Chaplains Rooms*
f^1. Garden Entrance.	*A. Aljibe.*

The alterations had been desperately needed, the single ward (*j* on the old plan) had nowhere near the capacity that was required. In 1883, Pié y Allué railed against the conditions there in an article published in El Minero de Almagrera, under the title El Hospital de Sierra Almagrera. He described the ward as a place where the slightly and the seriously injured were cheek to jowl with the dying, and where even the spaces between the beds were filled, forming a continuous row of patients. Despite many mines still being unable to operate because of flooding, the hospital was often so full that the sick could not be admitted, and patients were discharged before they were healed in order to admit others in a more serious condition.

Two views of the hospital (highlighted). On the left, the hospital seen from the North and right, seen from the East just before its closure. *Left photo, Rodrigo. Right photo, E. L. Morin.*

The man charged with running the re-vamped hospital, Dr. Vincent Juan Blanes soon realized what had been going on for years and publicly denounced it. Between 1884 and 1885 alone, there had been a short-

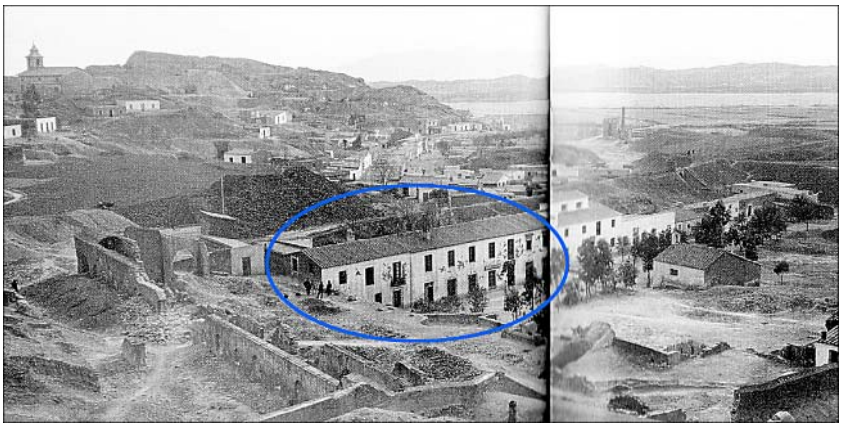
fall in the contributions from the mine companies of 4,000 reales. This disregard for a contractual agreement is truly shocking, all the more so when one considers that the same companies were still docking the workers' contribution. However, Blanes' naming and shaming had little effect and by 1895 due to lack of money the building, which unfortunately had not been well constructed in the first place, had become very dilapidated. Its condition was so serious that the staff needed to be evacuated while the most urgent work was carried out.

Despite donations from some of the more worthy mine owners, the Hospital Board struggled to find the funds needed complete the necessary repairs to the buildings. One owner, Andrés Márquez Navarro, offered a loan, which was to be repaid by charging the mine operators for using the hospital. While this move kept the hospital doors open for a while longer, it operated at a very reduced level. Because of the lack of funding the Sisters of Charity, who ran the place in everything but name, had to return to the San Antón Hospital in Cuevas, leaving just one doctor to cover the Our Lady of Carmen site. The unscrupulous mine owners continued to send men to both hospitals, and continued neglecting to pay the bill. Finally, in 1899, a more water-tight contract was drawn up to cover the running costs of the establishment, but it came too late to restore it to its former glory. Fortunately for the men themselves, another hospital was about to open.

The ruins seen from the plaza.
Author's photo.

The ruins seen from above.
Author's photo.

The new hospital was in Las Herrerías, set up by Luis Siret in the largest building of the old Atravida foundry and was dedicated to Saint Mary Magdalene. Although the building itself was not new, it was soundly built, and, converted into housing, still stands today. The conversion resulted in a spacious, well equipped hospital that served the needs of both the miners from Las Herrerías itself, and also those from the Sierra Almagrera. It was staffed by the doctor, Carlos Salas Parés, assisted by the Sisters of Charity. How Luis Siret managed to secure the ongoing funding of this establishment isn't clear, and I don't know how long it continued to function for after 1928, when the Société Minière d'Almagera ceased activities in Las Herrerías.



The Saint Mary Magdalene Hospital in 1905

E. L. Morin

The hospital building still stands today.

Author's photo.

Meanwhile, the Basque company, Argentífera de Almagrera, had their own hospital at Cala de las Conchas, but very little has been documented about it. All that I know is that there was an infirmary, a doctor and at least one nurse. This would have been very much their own health care initiative since Cala de las Conchas was very remote from other companies' operations and, unlike Las Herrerías probably didn't treat men from mines other than their own.

The Argentífera de Almagrera company had a hospital somewhere on this site at Cala de las Conchas.

Google Earth.

Company doctors and hospitals didn't enjoy a very good reputation in Spain in the early 20th century, with doctors under pressure to play down illnesses and injuries where the company could be held liable. Putting 'colic' as a cause of death for someone who had died of lead poisoning was just one example of how a company doctor would be pressured into being 'economic with the truth'.

The driver behind such practices was the gradual rise in legislation concerning a company's responsibility towards the health and safety of its workers, and the company's efforts to circumvent such legislation.

Whether such practices had died out by the time that MASA opened its small company hospital at El Arteal I don't know. Given that this was a government backed initiative in the period immediately after the Civil War, I suspect that there was no need for such circumvention.

Details of the hospital at El Arteal are to be found in Volume 1, Chapter 6 section 3, and in section 4 is an account of a young girl called Maribel who worked there. I have since found this photograph of her at El Arteal. (She is also on the left of this chapter's cover picture.)

Left, Maribel on her way to work at MASA's hospital.

Auguardalupe Las Herrerías Facebook page.

Right, a small side ward at the hospital at El Arteal.

Author's photo.

Given the poor outcome of a stay in hospital for so many people, their only other recourse was prayer and the hope for a miracle. As well as the chapel attached to the hospital, there was one built on the nearby Carmen concession. (One can't help but wonder if this was funded solely by the Church.) The men had a late start on Sundays, allowing them time to attend Mass. The Argentífera de Almagrera company built a chapel for their workers in the Sierra, and unlike the one at the Carmen concession, the remains of this one, at the Herminia concession, can still be seen. The ruins high up in the mountains have an air of peace and sanctity even today.

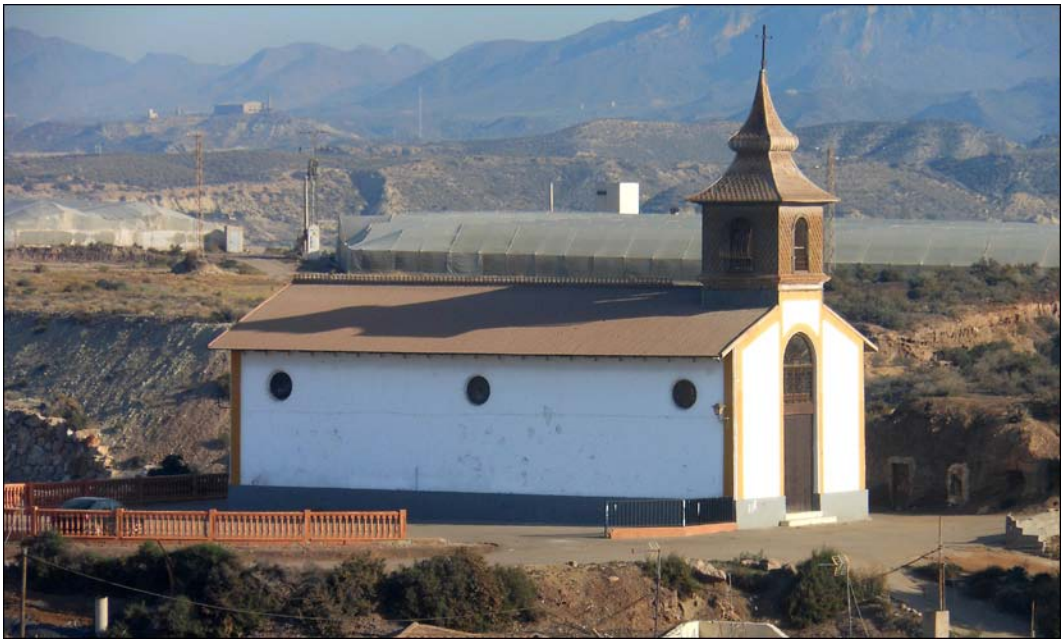
The sacristy and part of the arch doorway of the chapel at the Herminia Mine.

Author's photo.

The Argentífera also had a chapel at their headquarters on the coast just outside Villaricos. This was a grander affair. Money was spent a while ago to make the ruins more attractive, unfortunately, painting the walls provided graffiti artists (?) with an irresistible canvas. They also had a chapel at Cala de las Conchas, of which nothing remains.

The chapel at the Argentífera's headquarters just outside Villaricos.
Author's photo.

Standing high above the village of Las Herrerías, Luis Siret's beautiful church with its Northern European spire looks incongruous. Apparently Siret asked Gaudí to design a church for him but they couldn't agree on the costing so Siret designed it himself. The church, built in 1905, is dedicated to the Sagrada Familia. It is still very much an important place for the local residents, with processions to and from it on important feast days. One of these processions is held on the feast of Saint Barbara, the patron saint of miners. In the 1950's, during MASA's time, a statue of her was commissioned for the church, before then, the veneration of Saint Barbara was not a tradition in this area.



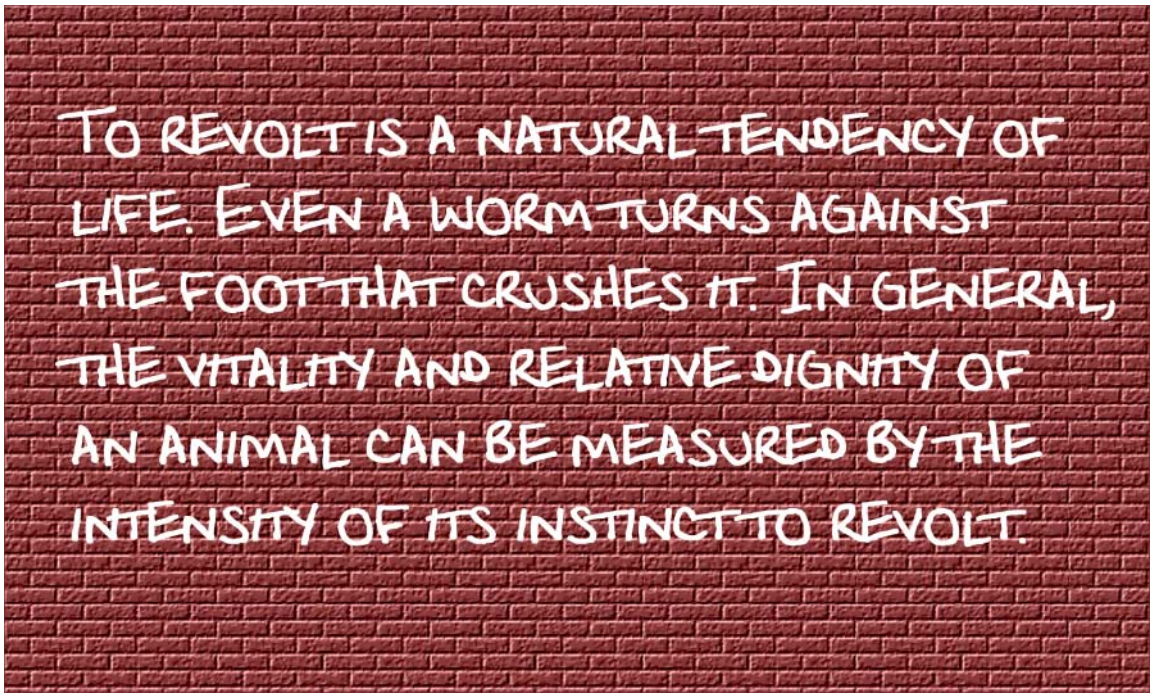
The church of the Holy Family. *Author's photo.*

A celebration in the church. *Auguardalupe Las Herrerías Facebook page.*

A wedding at the church. *Auguardalupe Las Herrerías Facebook page.*

Chapter 9.

The Worm Begins To Turn.



Mikhail Bakunin. Russian Revolutionary.

A succession of notable visitors to the Sierra Almagrera wrote accounts of their impressions of the mines and of the miners themselves. When I read the first of these accounts of the workers, I thought that they were somewhat fanciful. All that whistling and singing, cheerfulness and good humour seemed too good to be true. I rather suspected that it was an act, a diversion tactic to divert attention away from whatever fraud, trick or racket that they were engaged in. However, the same things were remarked upon time and time again. Pié y Allué in 1883 wrote,
"The Almagrera miner is, without dispute, the worker most praiseworthy that can be known: fearlessness, good nature, sobriety, obedience and honesty are the virtues that are readily noticed in them."

Even Simonin, who had visited mines throughout the world, wrote in 1867,
"They are a warlike, orderly, brave and intelligent race, all of whom, whether miners, muleteers, or founders, do their duty without noise, and obey the orders of their chiefs."
So, was I simply being cynical and was my past experience in the world of work scams clouding my judgment?

The plurality of their occupations may have shaped their temperament. Stoicism is the only defence against weather, remonstrating won't bring rain to your parched fields, complaining won't abate the wind, lamenting won't revive livestock that has been lost. So accept what can't be changed, smile, sing and be merry (and cheat a little along the way). Isolation and ignorance were two other factors which would have influenced the workers' acceptance of the conditions of near servitude in which they lived and worked. Far from any sizable town and unable to read or write, what is, is, and how would you know any different? Even the migratory work pattern did not reveal a better way of life, for they were masters of neither the land nor the mine and so the status quo was maintained. But, as those who started working there as young boys grew old, and their children also, and with more and more abusive practices being heaped upon them, things were bound to change. A hint of the change of can be sensed in Souviron's comments in 1898, he is full of praise for the workers but comments on the fact that they are prone to excesses. He doesn't go into detail, but it was probably the same thing to which the working classes in other parts of Europe turned to, the blessed oblivion of alcohol.
"Despite, going through a neglected childhood and poorly nourished puberty, overloaded with excess physical work in the most unhygienic conditions that is possible to imagine, this operator, not stout and sturdy, is nevertheless capable of developing incredible stamina at work. Of tanned skin, lean musculature, steely tendons and strong skeleton, admirably supporting fatigue, for which he seems trained and in which he has been hardened since childhood, although so robust natures often decay prematurely into the senseless wantonness with which they exhaust his reserves."

The rich were getting richer and the poor were getting poorer. As the workers passed through Cuevas to their homes at the end of each varada, they surely could not have failed to notice the houses that were being built, each one more magnificent than the next. All the while their own fortunes were precarious. Agriculture was dependent on the rain, while the mines were frequently flooded and men laid off. A prolonged period of drought in the 1880's, coupled with problems with the pumping station saw many unemployed. Finally, the workers found a voice, albeit a timid one. It was not against the work conditions that they spoke, but rather against the employment of foreigners when they themselves were without work. How often does this trope raise its head? The idea of this measure as a solution to their woes came from La Unión, the place not the organization, where foreign workers had been replaced by unemployed locals following protests. The authorities in Cuevas were either sympathetic to the workers concerns, or worried by the sight of quite large groups of men on the streets, and tried to find employment for them on civil projects.

The next decade saw the opposite problem for agriculture, a series of devastating floods, while the mines were completely paralyzed, inundated once more due to problems with the pumping station. Once again, the men went to Cuevas, demanding – respectfully – that something be done to alleviate the situation. It must be remembered that one of the principle problems with the de-watering plant was the non-payment of

contributions to its running costs by the mine owners. As the number of people on the streets increased and became bolder and more vociferous, promises were made and this time kept. The Cuevas dignitaries made representations to the Ministry of Development and the courts passed a law in 1889 enforcing payment of contributions. The new desagüe at El Arteal revitalized the Sierra Almagrera's mining industry, work was to be found, and the abusive exploitation of the workers carried on unabated.

The pumping station in the Jaroso. Failure of the pumps saw the men frequently laid off with no pay. *Rodgrigo.*

Like everywhere else in Europe, Socialism had been on the rise in Spain throughout the second part of the 19th Century. The first strike in Spain was in 1855, The Spanish Socialist Workers Party, the PSOE, was founded in 1879 and the UGT, the Unión General de Trabajadores was formed in 1882. Even the church was getting in on the act, Pope Leo XII in 1891 published the Social Doctrine of the Church and the Christian Labour Movement came into being. All of this largely passed the Almagrera by. With no concentration of the population in a mining town and, by now, fewer workers at the individual mines, the critical mass needed for action against injustices simply wasn't present. The Frenchman Casimir Delamarre wrote,

"If you wanted to judge the workers in southern Spain comparing them with those of the most advanced players in Europe, you would make big mistakes. Indeed, workers in the province of Almería lack the training and the desire to improve, unlike those of our country. They ignore the value of the word democracy, they don't know what is meant by socialism and communism. In fact, even those who all year round work in the mines, they are still peasants. If they are lucky, they leave to serve the king, but not the country, a meaningless expression for them; they also respect authority. Yet, his character is proud, and even when the victims of misery they do not become servile or obsequious."

A rallying call to strike action.

Peñas Negras.

Dissent however was on the wind. A little further north in Murcia, in the mining town of La Unión, the worm was turning in earnest, and it was against the payment by vales, the truck system that provoked the men. La Unión was a mining town in the fullest sense of the word, everyone depended upon the industry and more importantly they were unionized. The 1898 strike against this system was a very violent affair. The rail and telegraph lines were cut, the City Hall and Civil Registry were burnt down, and, when joined by workers from neighbouring districts, the Civil Guard Barracks suffered the same fate. With three dead and many injured, the Civil Governor declared a 'state of war' in the province. The point had been made and thereafter the workers were paid in real money, rather than with coupons. This result was in contrast to the outcome of a protest in the Almagrera, in 1895 against the same system. In this case it was the men who transported the ore from the mine Convenio de Vergara in the Jaroso to the foundry who protested. It was not so much that the system was unfair to them, so much as it affected their mules and donkeys, since fodder had to be bought from the company source at massively inflated prices. The refusal to transport the ore was short lived, just a few days, before penury persuaded the men to go back to work.

While workings and workers were relatively scattered in the mountains, the same was not true of Las Herrerías. The massive, opencast exploitation of iron ore brought hundreds of workers together. News from the wider world was coming in to the area, brought in by the steamers that carried coal in and iron ore out. There had been grumblings about the length of the working day and workers' remuneration in Las Herrerías before, negotiations with the operators resulted in a theoretical reduction in hours. When, a year later in 1989, the same hours were still being worked, the first strike there occurred. The working day was reduced to 10 hours, which was sensible since most of the workings were opencast. Satisfied with that, and somewhat intimidated by a strong contingent of the Civil Guard, the workers returned to work. The company responded by sacking the instigators of the unrest, and cutting the meal and rest breaks of the workers, thus lengthening the working day. With no union backing it was, to say the least, a hollow victory!

The new century saw more organized protests, but not necessarily instigated by the mine workers, nor initially against their working conditions. The burden of taxes was having an effect on all sections of society in Cuevas. The impact on the mines was crippling, particularly hard hit were those mines worked 'a partido', that is to say leased for a percentage of output. With margins cut to the bone additional taxes resulted in the closure of many of the smaller mines and unemployment for many workers. In 1902, alongside people from all works of life, the miners walked the streets of Cuevas in an attempt to save their jobs. Under the banner, 'Trabajo – Supresión de Impuestos', they called for less taxation in order that they might work, even though the conditions of that work were deplorable.

The rally in Cuevas.

de Blain.
From Memoria Visual del Siglo XX.
Enrique Fernández Bolea.

The gathering of so many miners, followed probably, by groups from different mines coming together in ventas, seems to have fostered a new feeling of solidarity amongst them, for two months later they again took to the streets in force. This doesn't appear to have been an organized affair, it seems to have been more

a fluid event, when workers in the Rosario mine downed tools and headed for Guzmana and Fuensanta, where others joined them. As they headed down the Jaroso, they were joined by more and more men. Eventually, according to accounts, more than 3,000 men from the Sierra Almagrera and Las Herrerías joined in a demonstration in the Plaza de la Constitución in Cuevas. They asked to meet the mayor to present their petition for a 10 hour working day, increased wages and the commitment not to hire foreign workers while there was unemployment in the sector. (Sounds familiar!) A couple of days later, the Guardia arrested eight workers and hauled them off to Cuevas, provoking a protest which was met by force at the entrance to the town. A young man died, two were critically injured and dozens had serious injuries, but were unable to enter the town to seek treatment.

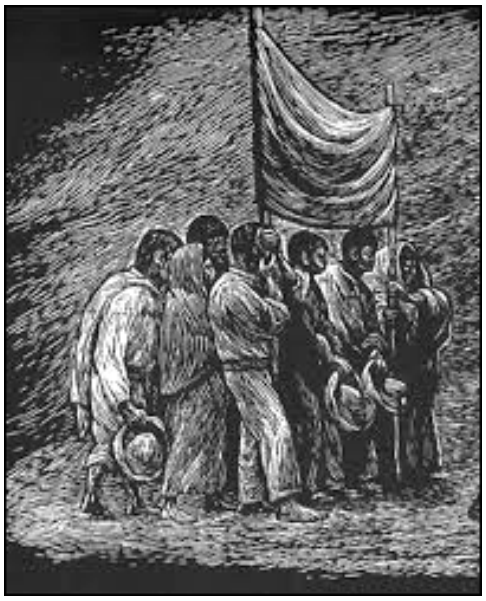
A similar strike, demanding bread and work at an unknown town, in the early 20th century.

elcuadrenodigital.com

The hero of the hour was the mayor, Segura Campoy, who, rather than raise the stakes in the conflict, decided to facilitate negotiations between the parties concerned. Whether this was because he himself considered their demands to be just, or whether he was very aware of the events which were sweeping Europe, and saw that change was inevitable, is unknown. In the event, using the poor state of the mines and of the mining industry as a mitigating factor, the owners managed to negotiate a settlement which only went some way towards meeting the workers' demands. The working day was set as from six to six with two hours for rest and meals within that period, giving a 10 hour working day. A demand for bi-weekly payment of wages was not met, but monthly payment was agreed, advances on pay were accepted in the form of vales, providing that they could be exchanged equitably. The owners side-stepped the demand for more pay by allowing the men to provide their own food if they so wished. Those who chose to do so would thus receive the 75 cents which previously had been withheld, effectively giving them a miniscule pay rise. The men returned to work, no doubt knowing in their heart of hearts that the accord would be short lived.

Following these negotiations, Segura Campoy set up a board, to be chaired by himself, comprising three workers' representatives and three employers' representatives. This move, recognising and championing the inherent pragmatism of the peasant miners, was to his credit and probably saved the area from the mass disturbances which were blighting the rest of the country. Indeed, over the following years, Campoy and his successor Andrés Márquez Navarro, acted as mediators, negotiating peaceful settlements in the inevitable disputes caused when companies back-tracked on previous agreements. The most notable of which was one involving the Men from Bilbao, the Argentífera, at the Guzmana mine. Here, the underground workers had

secured a small pay increase, which the company financed by reinstating catering contractors, unilaterally deducting the 75 cents from the workers. The surface workers wanted a comparative pay rise, and all of the workers wanted a cessation of the contract meals. When the hundred workers concerned went to Cuevas, the mayor negotiated on behalf of the men and secured both the pay rise and the return to the no meal deal. The company was also dissuaded from pursuing its hard-line approach towards the workers' representatives whom they wished to fire.



Making the case.
relats.org

The Argentífera, who were by this time the dominant player in the Almagrera, continued to maintain an uncompromising approach to labour relations, refusing to be part of the employers' and workers' board, and always seeking ways to circumvent injunctions. This stance became less tenable when the men affiliated themselves with the moderate workers' association, Amor Y Liberdad. Now they were speaking with one voice, still had the support of the mayor of Cuevas, and, more importantly, were prepared for peaceful strike action when reasonable negotiations failed. It still took several years for full compliance with the 1902 conditions to be achieved, but it did finally come about, along with the end of workers having to live on credit. This particular breakthrough was brought about by threatened strike action in Las Herrerías against Luis Siret's Société Minière d'Almagrera. While the workers demanded weekly payment, a complicated compromise system was settled upon whereby 80% of the accrued wages were paid every 10 days, together with the 20% balance from the previous month. The days of being in debt to your employer were over, but the tallyman took his place.

The area never fully recovered from the aftermath of the First World War, wages were the lowest in the whole of Spain, the working day continued to be excessively long, and workers' safety was never a consideration. The excesses of Socialism, Communism and Anarchism largely passed the area by and as Spain descended into the horrors of the Civil War, the Almagrera people continued to, '*do their duty without noise, and obey the orders of their chiefs'*. Here, the worm only wriggled, and never really turned, for revenge was never sought, rather, they succeeded because their famed physical stamina was matched by their indefatigable tenacity.

Acknowledgement and Bibliography.

For the chapters on the hospitals and industrial unrest, I have relied heavily upon Enrique Fernández Bolea's seminal work, Sierra Almagrera Y Herrerías: Un Siglo de Historia Minera. My copy of this book is now falling apart, and although difficult for me to read, it is my go-to reference book.

I have relied as much as possible on contemporary accounts of life and conditions for this volume these include:
J Pie y Allué. Una Visita a Sierra Almagrera en La Provincia de Almería. La Revista Minera y Metalúrgica (1883)
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Casimir Delamarre, "La Province D´Almería économique et sociale" el Bulletin de la Société de Géographie, París, (1867)
From time to time accounts such as these are uploaded to the internet by the Diputación de Almería but I haven't been able to access a catalogue of what they hold, which is a shame, because I'm certain that they have treasure trove of material.

I am grateful to Juan Antonio Soler Jódar for pointing me in the direction of these two visitors to the area:
M. Siglio. Préparation Mecanique de Minerais dans le midi de l'Espagne. Annales des Mines (1849)
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Asociacionismo obrero - Región de Murcia Digital

I was lucky enough to have been given a sneak preview of:

Mines, Cables, Railways, Foundries and Mineral Loading, Andrew Dewey and Juan Antonio Sóler Jódar which is awaiting publication.

I would like to thank all those wonderful Facebook contacts who have furnished me with information that has not yet found its way into academic publications.

Also, special thanks to Pedro Perales Larios, Enrique Fernández Bolea, Andrés Sánchez Picón, Juan Antonio Soler Jódar and Andrew Dewey, all of whom have kindly answered my e-mails and questions.