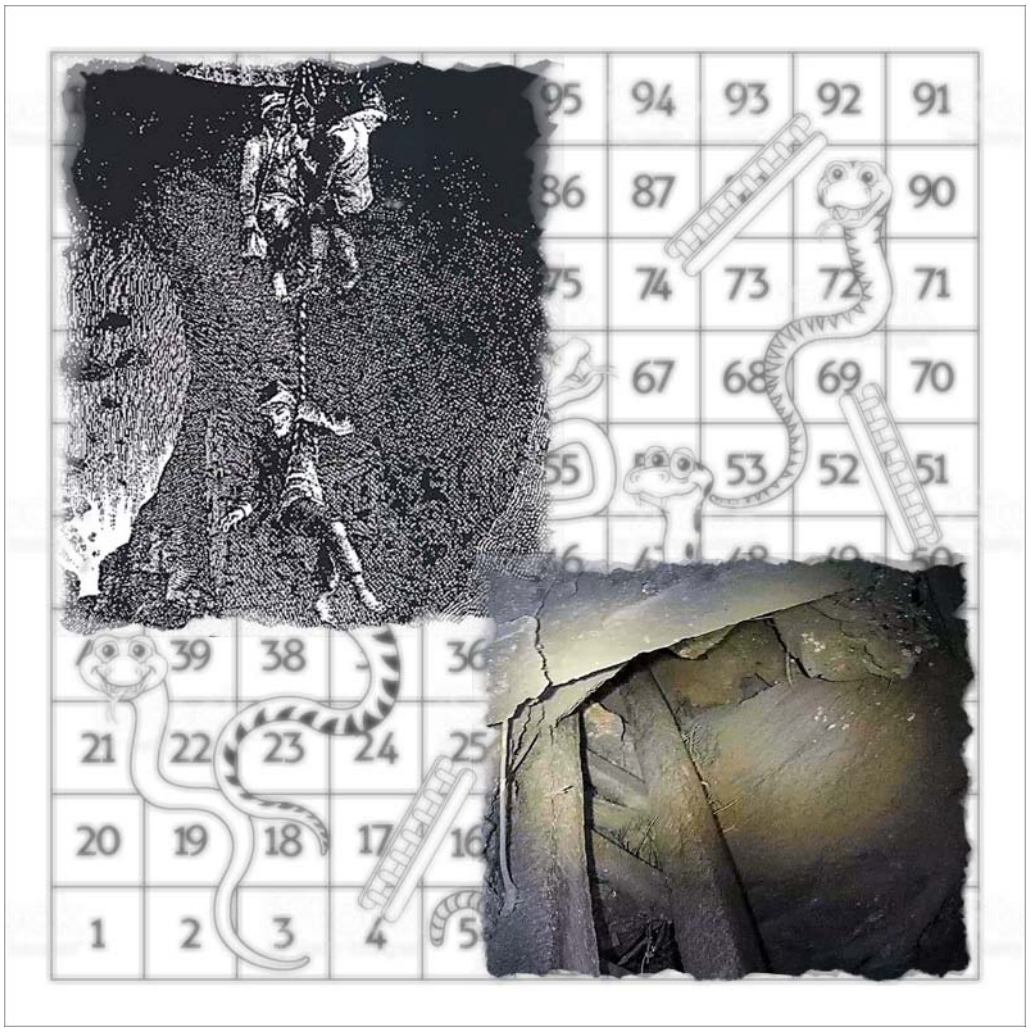
Chapter 6.

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.

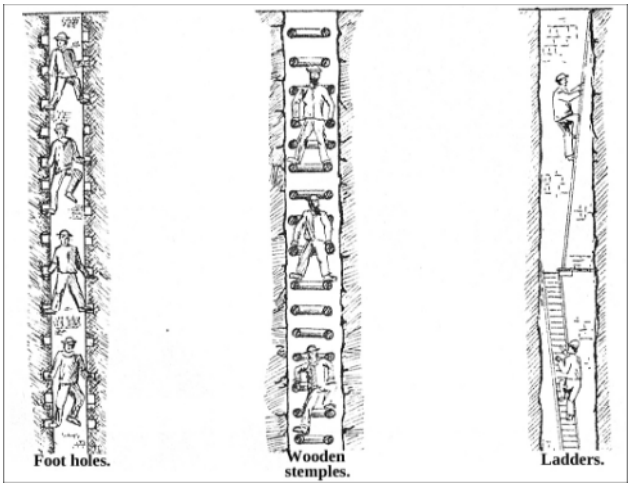
Fran Mulero.

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.



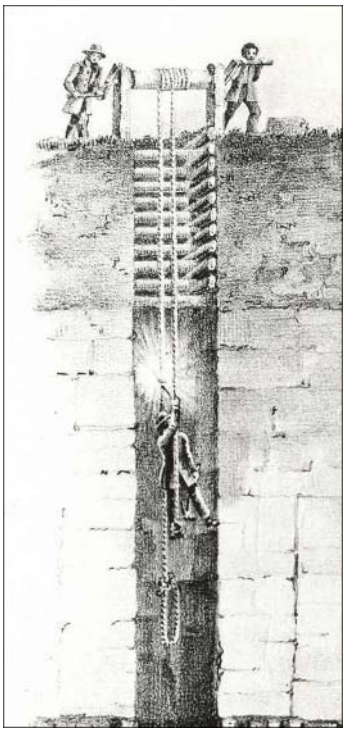
Methods of climbing between levels. *British Metal Mining Tech.*

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*

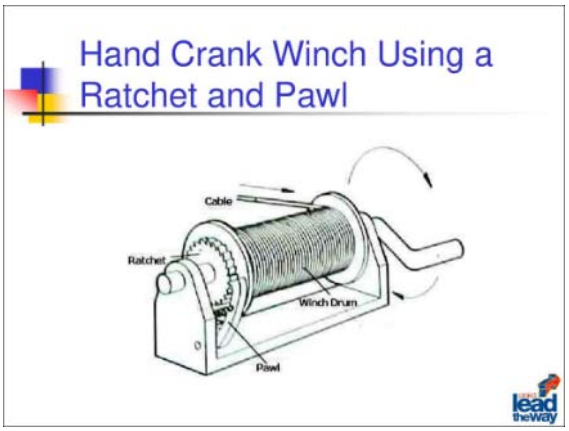
Everything about riding a shaft was dangerous. For the descent, positioning the foot and winding the rope round the waist over the gaping hole must have been heart-stopping, as must have been disentangling oneself in order to gain solid ground after the ride back up. Even getting ready for the ascent 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!)

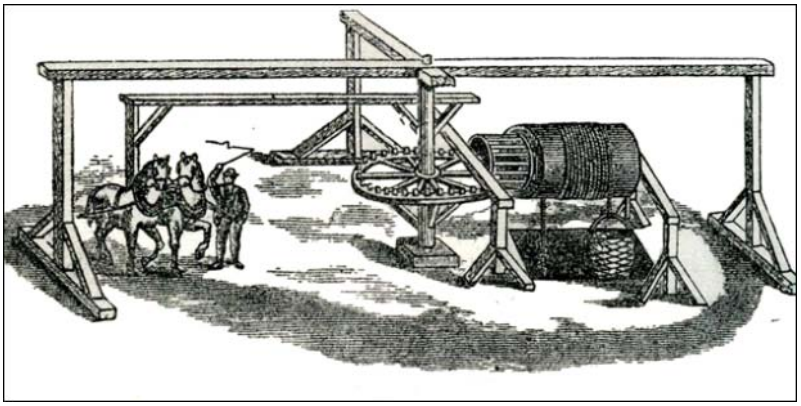
The winch itself was a very primitive affair, having neither cap boards to keep the barrel ends and handles secure in the uprights, nor any form of braking system. Pie y Allué was shocked, remarking that:
'The winch is made of wood, the archetype of simplicity, without a pawl or even a ratchet, unlike 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.



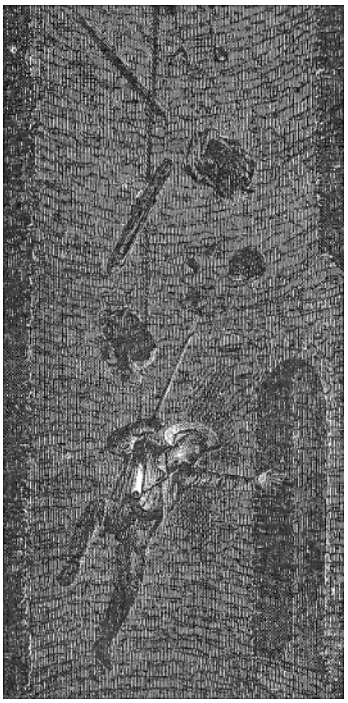
Missing pegs could cause the kibbles to jerk.
Centro de Interpretatíon, Linares

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.'

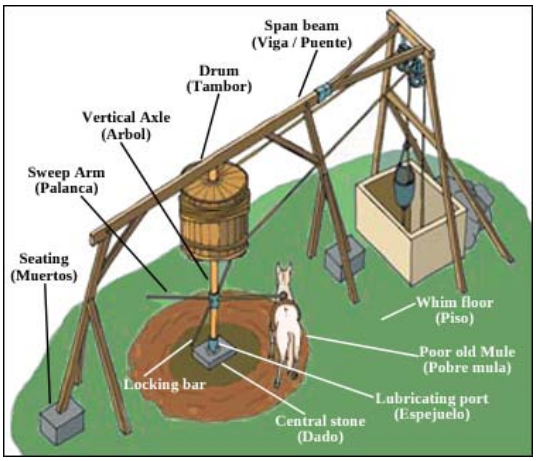


Falling masonry was always a problem and there was no warning system.
Simonin

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.'

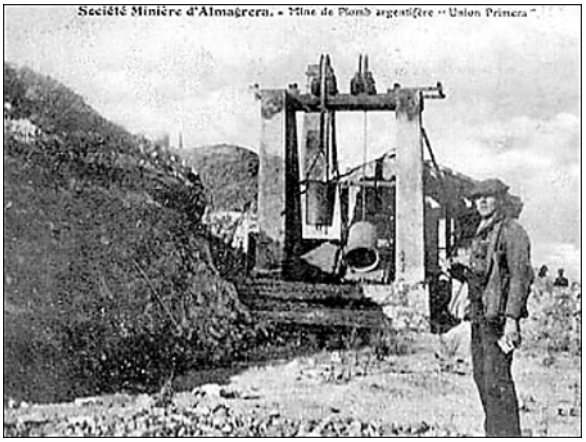
Even though the horse whims had a manual brake, accidents could still happen since the muleteer was quite a distance from the mouth of the shaft and needed to rely on a call as he could not see the shaft mouth. Because of the height of the pulley sheaves above the shaft there was a better margin of error,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

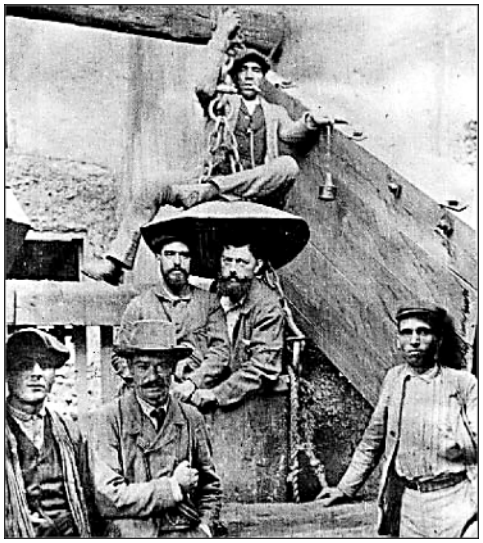
However, the introduction of the steam powered winch brought a new twist to the over-running accident. Either because he was unable to see the shaft mouth from his position or through inattentiveness, there were cases of the kibble being raised up and hitting the sheave wheels, and the men being thrown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

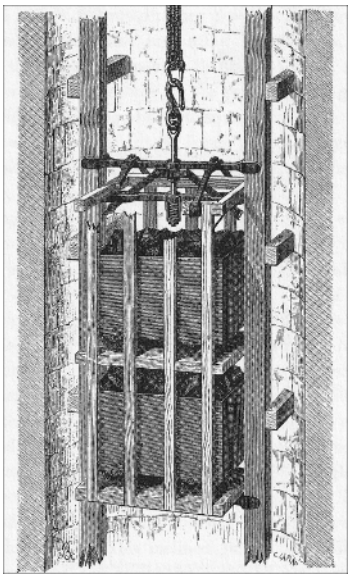
Kibbles became more sturdy, often made of metal, and fitted with what the French called a parachute and what was known in Britain as a bonnet. This was a hat-like roof covering over the kibble, made of sheet-iron or stout leather, which protected the men from falling material. The insouciance and recklessness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



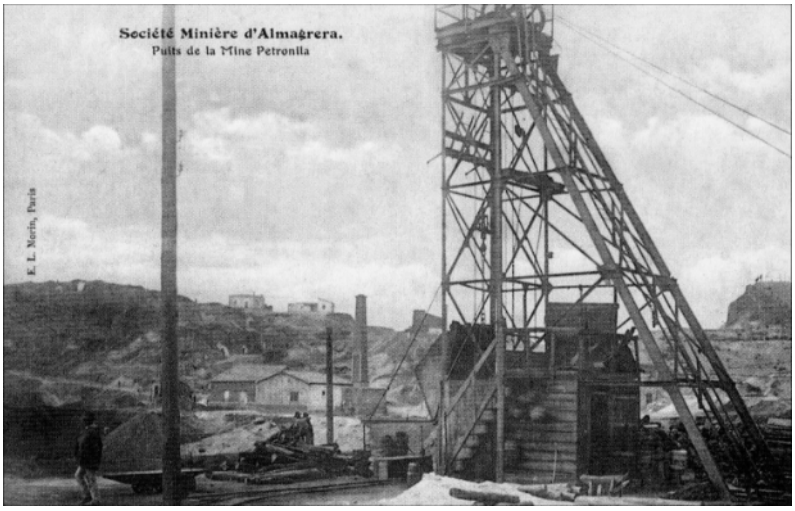
This picture was taken in Bédar, but it could well have been in the Sierra Almagrera. *Memoría Fotográfica de Garrucha*

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.

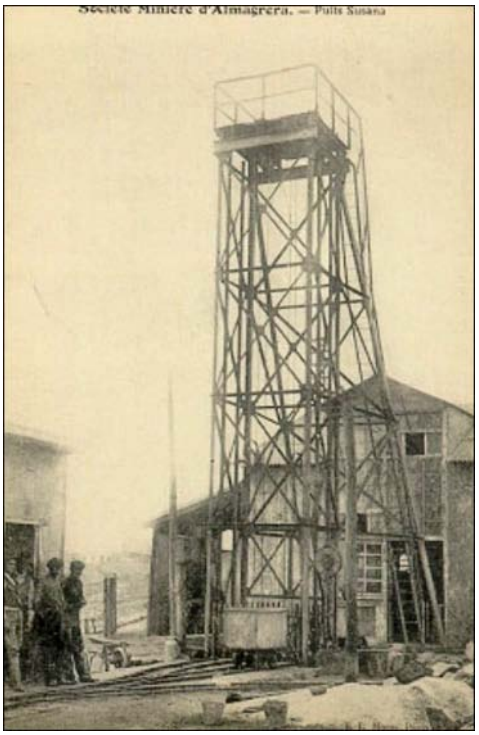


Right, an early safety cage. Simonin.



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.