

### Chapter 3. To Fetch a Pail of Water.



## Wells.

Moving down from the Sierra and on to lower ground, other ways were found of supplying water. Looking rather like the entrance to a small aljibes, the local wells are to be seen wherever there is the possibility of finding water. There is an old well at the head of the valley which runs north before El Arteal. Frequently dry, this was the only source of water, apart from collected rain water, for those living on the East side of the Rambla de Muleria. An old man that I spoke to clearly remembers having to fetch the water from it. I'm assuming that it was easier to get to in those days. The way to it up the valley is very overgrown, and it is best accessed from above, skirting the hill opposite the rear of the new build on the way up to the Barranco del Chico de la Torre. It is a good example of the local style, built of field stone, with a domed roof. The pulley and bucket were attached to a timber set across the hole in the roof. Since there was an opening in the roof, I can only assume that rain water was allowed to freely enter the hole.



Not all holes in the ground with water at the bottom are wells. What looks like a well, round by the goat pen in El Arteal isn't a well at all (below, left). It is a pocillo, or little shaft, probably sunk as a trial in 1898 when the first drainage tunnel was driven. The water in it drains from mine workings and has percolated through the conglomerate. Although smelling sulphurous, it is not thermal water but neither is it fit for human consumption.



*Definitely not a well!*

There is a similar one in the field between the miners' quarters and the Rambla de Muleria, (above, right) that also has water in it. What purpose this one served I don't know, but it is unlikely to be potable.

Another strange, water associated feature is to be found in the Barranco de Sima. This is obviously relatively recent, as the pump house is made of breeze block rather than the usual county rock. Someone was prospecting for water for what ever reason, whether looking for a source of irrigation water or thermal water I have no idea. I do wonder if it was associated with Peñarrolla's investigations into the possibility of extracting lithium from the thermal water under the Sierra. However, for the time being, it remains a mystery.

*Built in an attempt to find water in the Barranco de Sima.*



**Norias.**

In 1845, Madoz, in his ‘Diccionario Geográfico Estadístico Histórico de España y sus Posesiones de Ultramar’ described the Madrileña foundry which covered the area from Quitapellejos beach at Palomares to the mouth of the Almanzora. This impressive complex, consisting of 32 furnaces, of various types, together with the company’s headquarters was situated behind the pine grove on the Garrucha to Villaricos road. In addition, Madoz described the surrounding land, also owned by the company, as being cultivated and supplied with copious amounts of water from a noria.

When I read his account, I started to wonder about the rusty looking wheel, covered in wire mesh, surrounded by concrete that is at the edge of a field, opposite the pine grove. Could this be the remains of a noria?



*The rusty looking wheel in the field.*

Up until then, my only understanding of a noria was of the wind powered, water lifting devices that you see in the region of Cartagena. Or rather you see the remains of them, looking like ordinary windmills, alongside the Autopista del Mediterráneo.

*Remains of a wind powered noria.  
Spanish Waterworks. Jill Dickin Schinas.*

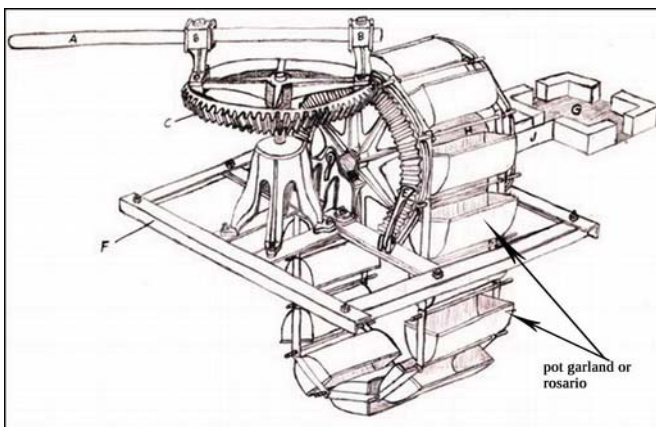


With my curiosity piqued, I started researching norias. I had, indeed discovered the remains of one, not a wind powered one but a “noria de sangre”. The use of the word “sangre” or blood, sounds rather melodramatic, but when applied to a machine, it simply means animal traction. It was a mule powered water lifting machine. Such machines are known as “aceña” in other parts of Spain.

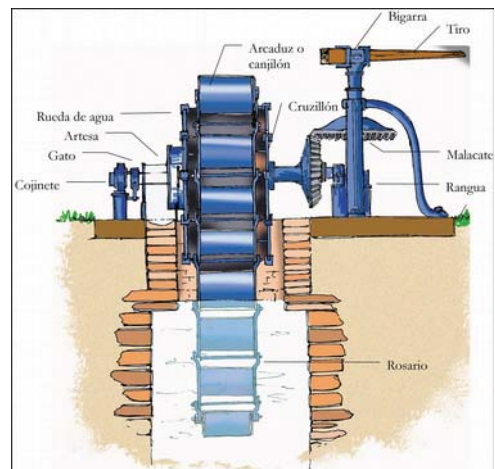


*A noria de sangre in use.*

However, the term “noria” is rather romantic. It comes from the Arabic “na’ura”, meaning to shed tears or to weep. A string of small buckets or pots looped over and down from a large wheel into a water source, shed “tears” when they reach the top. The Spanish term for the pot garland is a rosario as in rosary, or prayer beads.



*The mechanics of a noria. The pot garland or rosario hangs down from the wheel.*



They are simple, effective machines. The animal turns a horizontal wheel, which engages with a vertical one, causing it to turn. The pots or buckets hanging from the vertical wheel scoop up a small amount of water. As the wheel rotates the pots are carried up to the top and then start their descent again, tipping the water into a trough as they do so. The containers have a hole in their base, necessary because, without one they would float, rather than sink and fill with water. As they rise, any water escaping from a pot is caught by the one underneath, and so on.

*The remains of the transmission gearing and the water wheel of the Madrileña Noria.*



*The water was channelled into this balsa.*

The size of the balsa alongside the noria gives some indication of the efficiency of the machine. I assume that the channel between the waterwheel and the balsa was covered so that the diameter of the mule's circle was not excessively large.

*A noria in use. Note that the animal is blindfolded to prevent giddiness.*

*Spanish Waterworks. Jill Dickin Schinas.*



This Madrileña's noria was probably in use until the late 1960's when most of the water sources became too saline.

I found these lines of poetry in an article in [diariodesoria.es](http://diariodesoria.es) by Jose A. Martin de Marco.

*"yo no se que noble,  
divino poeta,  
unió a la amargura de la eterna rueda,  
la dulce armonía del agua que sueña,  
y vendó tus ojos,  
¡ pobre mula vieja"...*

Roughly translated it reads,

*"I don't know that noble,  
divine poet,  
yoked to the bitterness of the eternal wheel,  
the sweet harmony of dreaming water,  
your eyes blindfolded.  
Poor old mule!"*

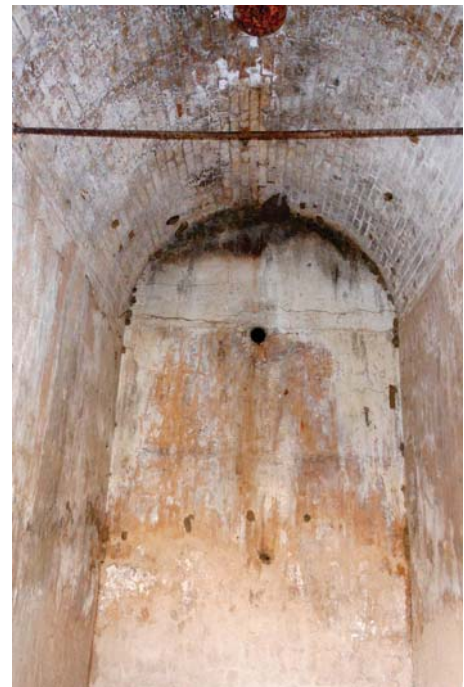
In actual fact, what are known as noria in southern Spain are actually sakia. A true noria lifts water by using the power of undershot, running water to turn the wheel with its garland of pots.

#### **MASA's monuments.**

When El Arteal was remodelled in 1908 by the Compañía Minera é Industrial Para España, a rather sophisticated water purification plant was installed. It's purpose was not to provide potable water, but to provide water which was free of lime. The water from the Las Rozas well contained very high levels of calcium carbonate, magnesium, calcium and sodium sulphate, which together with the sodium chloride also present in it, had a serious effect on the boilers. Using the water resulted in corrosive encrustations 12 or more millimetres thick in just two weeks of operation. The encrustations had to be chipped off, an operation which took several days and damaged the internal surfaces of the boilers.



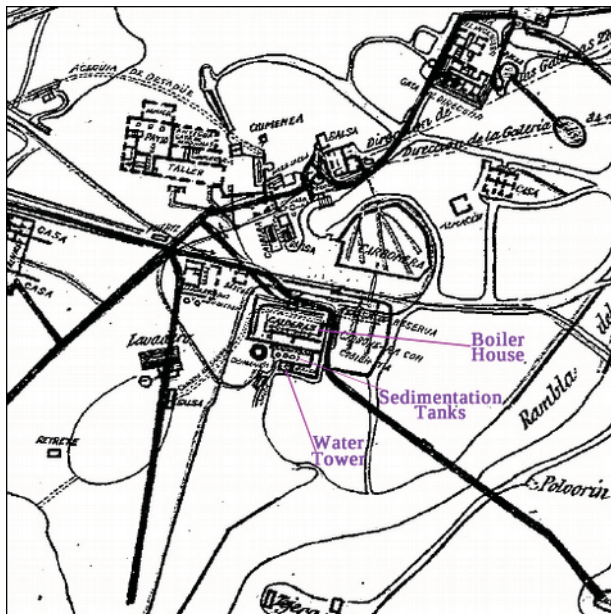
*This tower supported a large water tank.*



*Inside the tower*

Water was pumped up to a large tank situated above the tower shown. In a separate receptacle, mounted on an iron tripod above the tank, sodium carbonate was dissolved in constantly steam-heated water. Then, in carefully measured proportions, water containing the reagent was piped into large capacity tanks. Steam jets were fed into the tanks so as to speed up the chemical reaction of the sodium carbonate on the water. The treated water was then passed into six circular tanks where the various salts precipitated out. These were extracted and, after passing through a series of filters, the water was ready for use. Due to the combination of the chemical action of the reagent and the physical action of the heat, the water was free of lime salts, but did still contain small amounts of magnesium and sodium salts. Using water treated in this way, the boilers simply needed washing out with jet of water once a fortnight.

The settlement tanks are shown in the plan below as circles, situated between the water tower and the boiler house.



1908 Plan detail.



*The sedimentation tanks were in this area between the tower and the boiler house.*

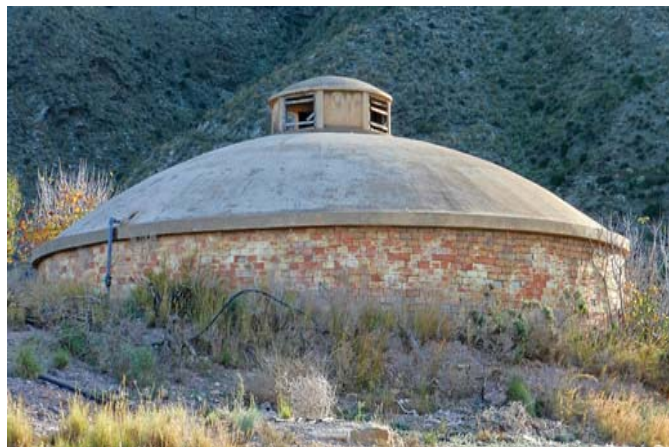
With the move to powering the pumps at El Ardeal by electricity, the water treatment plant probably became redundant and had most likely been dismantled by the time that MASA reactivated the pumping station. A well and a few small balsas were definitely not sufficient to supply water for MASA's needs. In addition to their ore processing activities, they needed water for the 200 apartments housing the married personnel and for the bath houses.

For a long time I thought that this tower, pictured below, was a type of shot-tower, and that the small domed structures next to it were old smelting furnaces. How wrong can you be? It was a water filtration and storage system. Fortunately, it wasn't demolished when the adjacent house was refurbished. In fact, rather a feature was made of it, making it look like something from a fairy story.



*“Rapunzel's Tower”, the water filtration and storage system next to the doctor's old house.*

I don't know if the water was treated in any way, but it was filtered down inside the tower and passed into the domed settlement structures. The filtered water was then pumped up to another other, larger, circular cistern which is in the area above the greenhouses. The height of this large cistern gave enough pressure to gravity feed the married quarters, which had running water, while water for the bath houses and the lavadero needed to be pump assisted.



*The other domed water storage structure.*

The water was definitely not potable, the warnings about this fact can still be seen by the sinks in some of the miners' quarters. It still came from the same well in Las Rozas, which was sunk in 1898 when the El Arteal pumping station was built. Now capped, it was opposite the junction of the Las Rozas road with the Las Herrerías to Palomares road. I assume that MASA installed a new pump, but I don't know whether or not they renewed the original steel pipeline.





*The well, above, has now been capped, right.*

Drinking water was brought in by bowsers from the Cabrera. I think that it may have been stored in an underground water deposit fitted with a pump at the miners' quarters. Unfortunately, nowadays, the passageway between the blocks above it is too overgrown to take a good look. Its position is marked by the spray-painted warning "POZO!" on the entrance to the courtyard.

*A bowser of the type used in the 1950's.*



MASA also supplied Villaricos with both potable and non-potable water. The drinking water was brought in by tanker, while surface water was collected, filtered using white netting and stored in metal deposits at Patio Borracho. I think that the ugly, squat building on at the junction of the Palomares river crossing and the Villaricos to Las Herrerías road is the aljibe where the water was collected.



*The ugly aljibe by Los Conteros.*

It was claimed that the run off from the lavadero at El Arteal had contaminated Villaricos's natural water supply which was from the wells by the castle. Needless to say, MASA denied any responsibility for the contamination. It is rather a grey area as mining has been going on here for well over 100 years. However, MASA's activities were of a different nature to what had gone before. What measures were taken to render the liquid waste from the froth floatation process less toxic? Either way, a government sponsored company in 1950's Spain would never have been held to account.

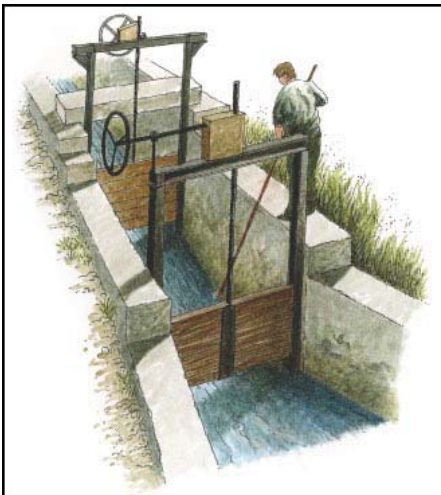
When MASA pulled out, Villaricos was left with no fresh water supply at all. The owner of the house with the belvedere sold surplus water from the large aljibe in its grounds and one or two people brought canteens of water in from Palomares to sell.



*Surplus rain water was sold from the aljibe of this house.*

#### **More modern times.**

For landowners and tenants, water, or the lack of it, has always been a problem in this area. Irrigation was by means of ditches called "acequias" the remains of which can be seen everywhere.



*An Acequia or irrigation channel.*



*The well preserved acequia in Las Rozas.*

The one that runs down through Burjulu, round Las Herrerías and through Las Rozas is one of the best preserved ones in the neighbourhood. The flow of the water could be diverted by means of sluice gates.

*Right, the sluice gate mechanism by the road crossing.*



*Above, the old Las Rozas-Villaricos railway bridge over the acequia in las Rozas.*



These acequias are clearly marked on Spanish maps, with the direction of flow indicated by blue arrows. Even though the majority are no longer used, the line of them is still clearly visible. Wherever you see a line of bushes or canes, if you look more closely, you will see the remains of a ditch and often some remains of a sluice gate.

The acequia which runs along the track by the entrance to El arteal was fed from the Rambla del Arteal. To achieve this, the Rambla del Arteal was dammed by the wall just past the goat pen. The remains of the sluice gate and the tunnel which fed the water under the hill are still there. The water then was piped under the track and into the ditch. Any excess was stored in a small deposit that used to be next to the olive grove



*The wall damming the Rambla del Arteal can be seen in the centre right of the picture.*



*The sluice gate and the entrance to the water channel under the hill.*

When the Almanzora was canalized, the feed to the many of these irrigation ditches was lost. The fields were then irrigated by means of large water deposits. In addition to collected rainwater, groundwater from wells, such as the one at Las Rozas, was pumped up into these irrigation deposits. There used to be several of these agricultural reservoirs in the area. As they were constructed on high ground there was sufficient pressure to gravity feed crops via irrigation pipes. Nowadays only one or two are maintained.

*One of the few agricultural water deposits still in use.*



Some have been filled in and planted over and others, like the one behind the transformer building at El Arteal, have been abandoned. The one on the way up to the lost village used to be a favourite swimming pool for the dogs, but now only has water in it after heavy rain.



*The dogs cooling off in the abandoned water deposit.*



*The pump house next to the Portillo substation and inside the building.*

The rise of giants like Primaflor, and horticulture on an industrial scale, necessitated better irrigation infrastructure. This innocuous building by the Portillo substation in Las Rozas houses a modern pump. It is one of the main sources of agricultural water for the immediate area. Whether it pumps groundwater or

water supplied via the Negratín-Almanzora basin transfer system, I don't know. Wherever it comes from, the pressure within the pipes is now so great that the old water deposits are largely redundant. However, it does require a cheerful man in a red bandanna, riding round all day on a moped, monitoring the system for leaks.

While horticulture is on an industrial scale, and the infrastructure is monitored, the maintenance of it is somewhat 'laissez-faire'. The stick in this picture has been supporting the high pressure pipe for several years now.



*The pipe and the stick.*