THEN, THERE WERE MINES

Volume
5

Margaret Davies

2024

Contents

Cover photograph with kind permission of Rob Vernon

Bibliography

Bibliographies are found at the end of each section.

Whilst I have tried to identify and attribute copyright holders to illustrations and photographs, I would be grateful for information about those where this has not been possible and would be glad to rectify any such omissions.

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Chapter 1

Garrucha

José González

1 The Lie of the Land.

Why the title? Noun **Lie:** an intentionally false statement or one founded on a false impression.
Noun **Lie:** the way, direction, or position in which something is situated.
The chapter alludes to both definitions.

Over the last 10 years while I have been researching the area around the Sierra Almagrera, more and more information has been disseminated via the internet as the Spanish research and reclaim their industrial heritage. I last looked at the foundries in Garrucha when I was writing Volume One of Then, There Were Mines in 2016, and the work was based on findings from web-sites and other material that was available then. Since some of these sources were official I took them in good faith. The much delayed publication, in Spanish and English, of the book *Mines, Cables, Railways, Foundries and Mineral Loading, Bédar, Los Gallardos, Garrucha, Mojácar, Turre and Vera (1840-1970)* by Andrew Devey and Juan A. Soler Jódar threw a whole new light on the subject.

So, to the lie of the land. Of the three foundries that once existed in Garrucha just two chimneys are preserved. One is in Garrucha itself, and the other is actually in the municipality of Vera but at the end of Garrucha beach. The one in Garrucha proper stands on the hill known as Calvary and is the tall, draw chimney for the condensation tunnels of one establishment, the other, smaller chimney at the Garrucha end of the Las Marinas beach is the chimney of another foundry. Various sources attribute the smaller chimney as belonging to the San Jacinto foundry and the taller chimney as belonging to the San Ramón foundry.

Above: the chimney on Calvary. *mtiblog*

Right: The chimney on the beach. *mtiblog*

They are known as the San Ramón and San Jacinto chimneys respectively.

Neither of these accreditations is correct. The smaller chimney is that of the La Española foundry, while the taller one is that of the San Jacinto foundry. Nothing remains of the San Ramón foundry apart from the street name, Calle Martinete (martinete = a drop hammer), which was how the San Ramón was known to the locals.

How did this misunderstanding come about? The answer appears to lie with the Almería archives which houses copies of photographs by the 19th century photographer Rodrigo. The photograph, below left, which unmistakably shows the chimney of the foundry at the Las Marinas end of the beach is catalogued as being of the Fundición Anglanda, a reference to Jacinto Anglanda the owner of the San Jacínto foundry. When researching for their book, Andrew Devey and Juan Antonio Soler Jódar found documentary evidence that this was in fact the site of the La Española foundry belonging to Enrique Calvet y Lara.

Above: the wrongly accredited photograph held in the Almería archives.
Rodrigo.

Right: Andrew Devey standing by the newly installed information board at Plaza de la Pérgola, the site of the La Española foundry.

There are several incorrect accreditations in the Almería archive images. Those of Guillermo Huelin's two foundries are both referred to as being of San Jacinto despite being of the Araucana, known as the Boliche, in Las Herrrerías and the San Javier foundry in Palomares.

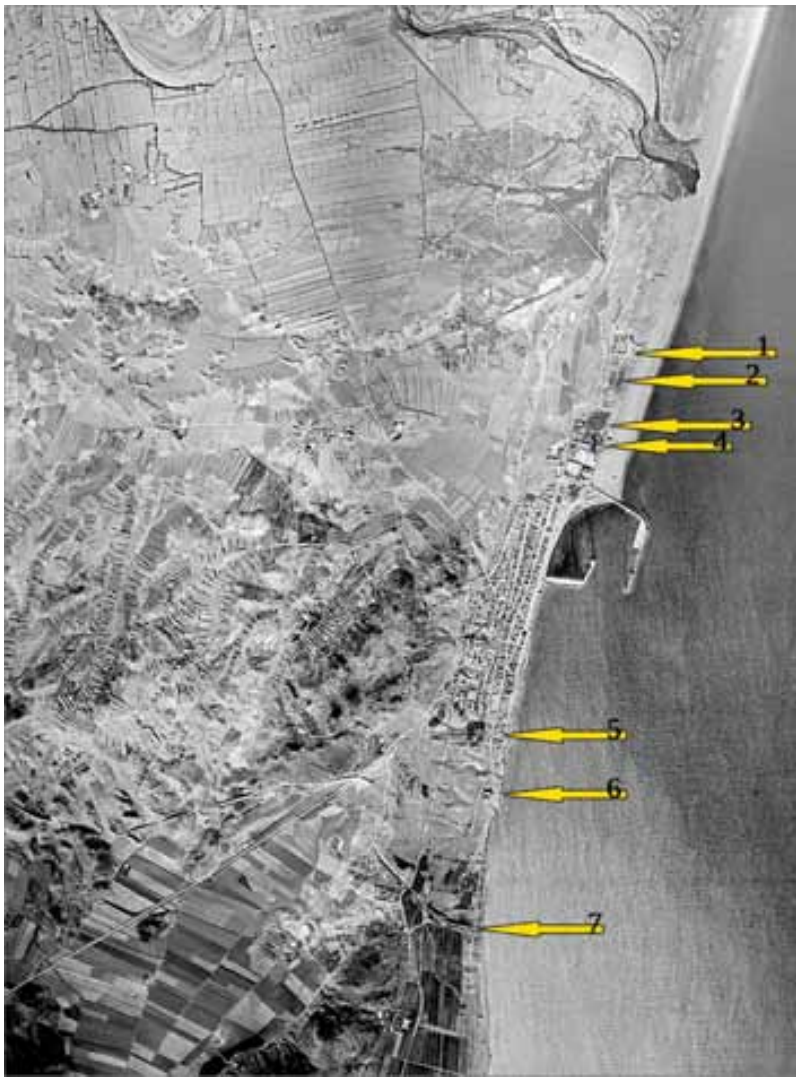
There is also this copy of a postcard bearing the title '6. Vera. Fábrica de Hierro y Altos Hornos' with a hand-written date on it of April 1906. I knew that the San Ramón fábrica had an alto horno and that Garrucha was formerly classed as Vera, so I assumed that it was in fact a picture of the San Ramón foundry. The date was puzzling because the San Ramón was closed by 1906, but a hand-written date on the front of a card was no indication of the actual date of the image. However, when I dug a little deeper, I found another postcard in the same series and discovered that both pictures were of the steel works Fábrica de Acero in Bidasoa, Vera (also known as Bera) … in the Region of Navarra.

Left: postcard image held in the Almería archives.
Above: postcard No. 12 in the same series.

The Fábrica's letterhead. *Fundiciones de Bera Ondaregia.*

Sometimes, all is not as it would seem!

So, where were the foundries actually situated? In these aerial views kindly provided by Andy Devey the position of the foundries and some of the ruins can be seen.



1956 aerial view. *Vera Archive.*

1. La Española foundry.

2. 1888. La Compañía de Águilas. Aero cable terminal.

3. 1956. Hierros de Garrucha. Aero cable loading station.

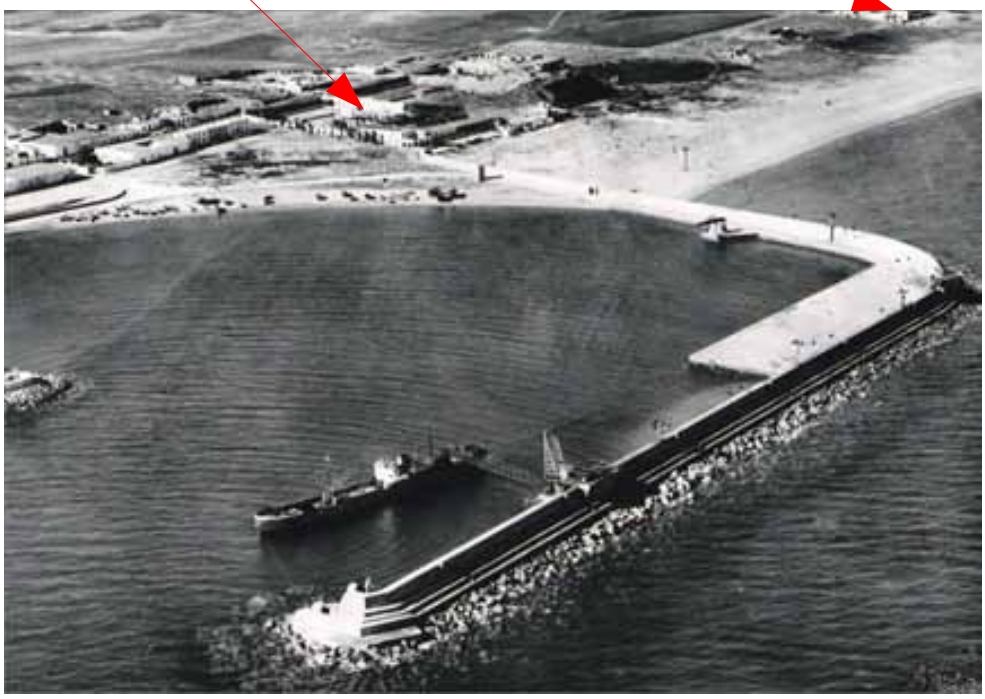
4. San Jacinto foundry.

5. San Ramón foundry.

6. Garrucha castle.

7. 1896. Chávarri, Lecoq & Company. Mineral line terminal.

San Jacinto. *La Española.*



1957. Garrucha harbour. *Practicosgarruchacarboneras.com*

In this last photograph the ruins of San Jacinto (to the left) and Española (on the right) can be seen behind the cargo ship.

Garrucha Antigua

2 The San Ramón Foundry.

San Ramón was the first foundry to be built in Garrucha. It was the property of Ramón Orozco Gerez and the shareholders of the Observación mine, one of the so-called Minas Ricas, or rich mines, of the Sierra Almagrera's Jaroso valley. Opened in 1841 it had the usual plethora of furnaces, 15 English calcination ovens, probably Flintshire type, 7 ore hearths, originally known as hornos de manga because the bellows were hand, or sometimes, leg operated. The foundry however used a 14 horse-power steam engine to operate the bellows. This combination of ovens wasn't found in England where the Flintshire furnace was used for both calcination and smelting, but was common in Spain. Cupellation was effected using 3 cupellation ovens, producing silver of a very high quality which was exported to France through the port of Marseilles. In addition there were 2 Spanish reverberatory furnaces for the scavenging of slag. Also, because it had washing floors, the San Ramón foundry scavenged the dust from the dry processing of galena carried out at the pit head of the Observación which proved very profitable. The site was quite extensive, in addition to the battery of ovens and the washing floors there were several ore yards and storage sheds, an assay laboratory, general and accounts offices, accommodation for the English operatives and a porters lodge.

The foundry stood at the Western end of Garrucha and occupied much of the land between Calle Castelar and the Carretera de Turre. Its condensation tunnels probably snaked up the hill and over the A370 Garrucha by-pass, with the 72 foot draw chimney situated somewhere to the West of the Urbanización Los Farmacéutcos. It is possible that they ran to where the San Jacinto chimney now stands.

Modern day Garrucha.
The San Ramón foundry was located in the area highlighted.
Los Farmacéutcos apartments are on the right-hand side of the hill.

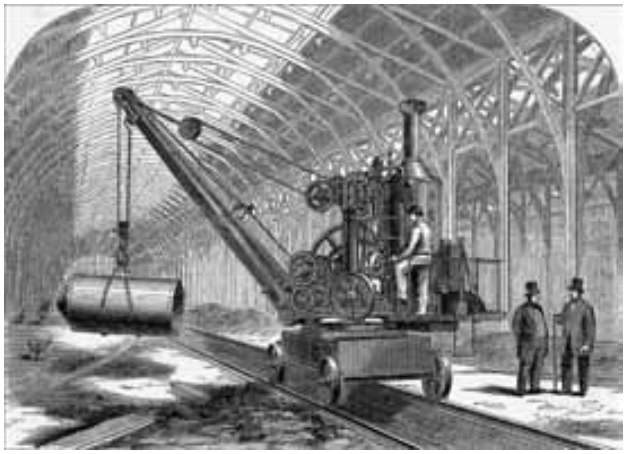
Archivo Mnicipio de Garrucha

The remains of the foundry can be seen in the highlighted area of this picture taken after a snowfall in 1934.

Garrucha Antigua

The problems caused by mine drainage in the Sierra Almagrera frequently interrupted the supply of lead ore to the foundry. This was compounded by the presence of too many competiing establishments and the collapse of the French market due to the Révolution de Février which led to France's Second Republic. The foundry became uneconomic and it closed in 1848.

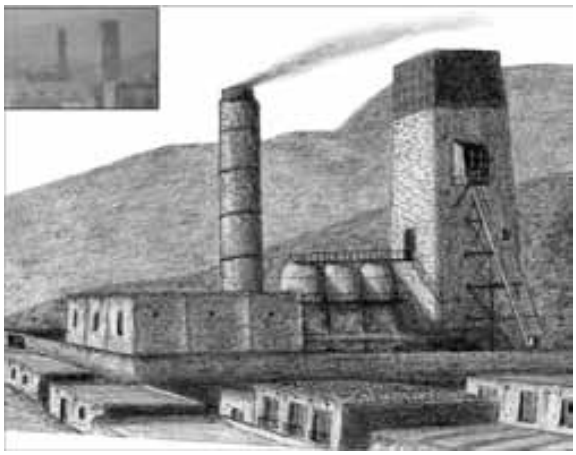
Following the closure of the foundry, Ramón Orozco moved to Almería and pursued his business interests there, but he also maintained and augmented those that he had in the Garrucha area. The quality of the iron ore from mines which he owned in the Garrucha, Mojácar, and Bédar areas led him to try to emulate the success of the metallurgical establishments belonging to Manuel Heredia in Malaga. To this end he repurposed the San Ramón foundry in 1857 to the smelting of iron ore, installing a state of the art blast furnace to produce pig iron, 4 reverberatory puddling furnaces to convert the pig iron to wrought iron, and a refining furnace to convert pig iron into cast iron. The resulting metals were worked on site in an iron works, producing the tools and equipment used in the local mining industry, agricultural implements, together with items for domestic use including stoves. Orozco exhibited at the 1862 London International Exhibition and had retail outlets in Almería and Madrid selling all manner of metal objects. He was able to benefit from the existing cabotage freedoms to ship his goods as part cargoes to wherever they were required. The slag from the blast furnace was sold as an ingredient in the manufacture of cement.



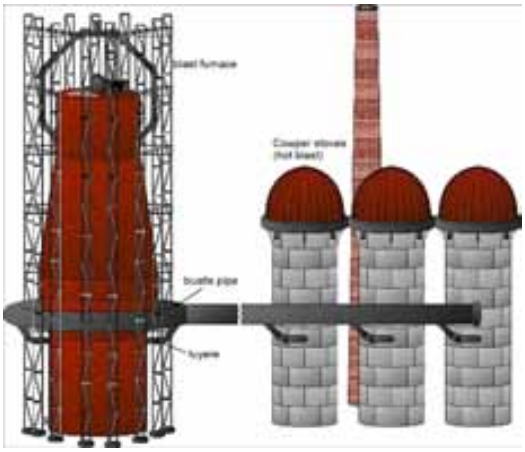
Left: Crystal Palace.
Above: The steam-crane used to assemble exhibits.

Both John Agnew

Based on a blurry photographic image, Juan Antonio Soler Jódar has drawn an approximate re-creation of the famous alto horno, or blast furnace known as the Martinete of San Ramón. The furnace was housed in a rectangular tower and fed from above. Juan supposes that the pre heated, hot air blast that is a feature of this type of furnace was provided by Cowper towers.



The Martinete. Juan Antonio's recreation of the Alto Horno.



Cowper stoves provided the hot air blast.

diagram.IQS directory.

The alto horno and the chimney were situated quite close to the beach as can be seen in the following images.

The alto horno and chimney are on the far left and what looks like the chimney of the original foundry can be seen in the centre of this 1870 image. *Garrucha Antigua*

A view of the chimney showing above the town hall.

Garrucha Antigua

Despite Orozco's drive and the imported expertise of his foundry's engineer the success of the smelting furnace was short lived. It ceased operation in 1864, though the iron works continued production using the accumulated pig iron on site until it was exhausted.

The reasons for its demise are manifold: insufficient supply of raw material to keep the enormous blast furnace continuously fed. (Some mine owners preferred to export their ore rather than have it processed locally). Problems with the coke needed for its operation, both in terms of the high import costs and in its quality, in terms of the amount of sulphur it contained. Eliminating this impurity required further costly puddling. The final nail in the coffin was the reduction of protective tariffs on home produced iron.

3 The San Jacinto Foundry.

The San Jacinto foundry was situated between the beach and to the side of where the Mercadona supermarket currently stands. It made use of the slope that characterises this area of Garrucha with its condensation tunnels winding up and back and forth to the chimney that stands on the hill known as Calvary, nearly a kilometre to the south west. The iconic chimney still serves today as a reference point for those approaching Garrucha by sea, just as it has for the last 160 years.

The San Jacinto chimney is still a landmark for sea-farers. *De Blain.*

San Jacinto started life as a company dedicated to facilitating the marketing and shipping of ores and bullion from the Sierra Almagrera. It was owned by Jacinto Anglada senior and Antonio Canga-Argüelles. Anglada was an associate of Ramón Orozco and held shares in both the Observación mine and the San Ramón foundry. Following Anglada's death his son Jacinto Anglada junior and Canga-Argüelles branched into ore processing and opened the San Jacinto foundry in 1860. Canga-Argüelles left in 1866 and Jacinto Anglada junior, together with his brother-in-law, Enrique Calvet y Lara, took over. They traded under the name Anglada Hermanos. In 1876 its seven furnaces produced 378,000 kgs a month. El Minero de Almagrera reported that in 1880 San Jacinto's exports through the port of Garrucha had been 2,489,278 kgs in the preceding year. Small wonder then that La Compañía de Águilas had them in their sights and, in 1881, they purchased the company. By 1883 the foundry has 14 furnaces and was about to install a German blast furnace thought to have been a Piltz furnace.

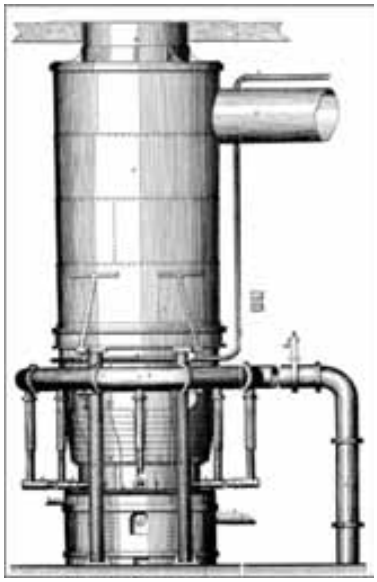


Illustration of a Piltz funrnace thought to have been installed in the San Jacinto foundry.

M Eissler

Rodrigo's photographs date from the days of the Compañía de Águilas and are unusual in that they were taken when the foundry was full of workers. However, it looks as if they were staged since there is no smoke coming from the chimney. It does though give us an insight into the workings of the foundry. I am grateful to Andy Devey for explaining to me what the cones in front of the arches of the funrnace housing are. They are the slag from the furnaces.

Inside the foundry. *Rodrigo*

Even though the foundry was owned by the Compañía de Águilas it was always referred to as belonging to the Anglada brothers. Since Calvet was one of the 'brothers', this may have been part of the reason for the incorrect labelling of the La Española photographs.

In the years following its closure in 1887, the condensation tunnels became home to Gypsies and this photograph, taken on the turn of the century, shows it became a reclamation site where any recyclable material was sorted and sold.

Neat piles of material awaiting collection surround the artfully posed lady.
José González

4 The La Española Foundry.

The La Española foundry was a mystery to me. I knew that a foundry of that name existed, but no idea where in Garrucha it was located. I knew from Rodrigo's photographs that it had a beautiful steam engine and a bank of strange looking ovens. I also knew that it was the property of one Enrique Calvet y Lara. Full stop.

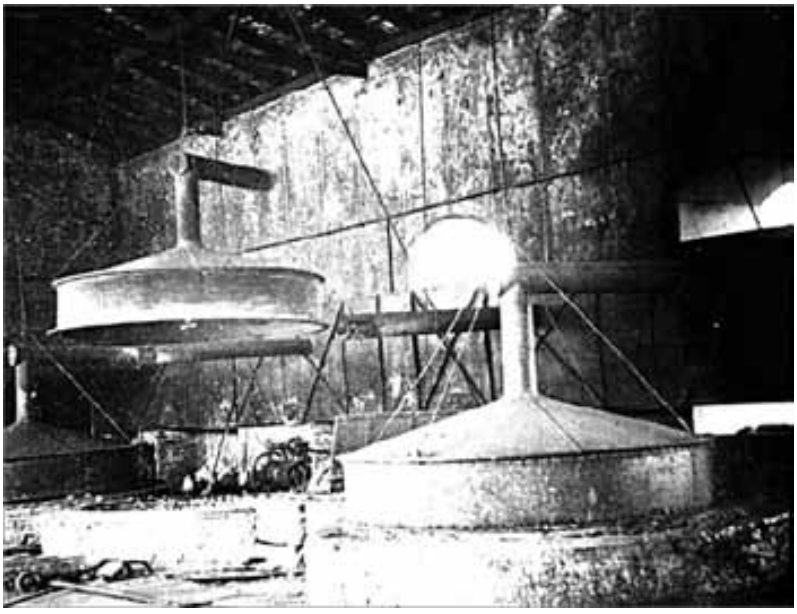
Now the confusion over the title of the Rodrigo photograph has been cleared and the La Española has definitely been located where the chimney on the sea front stands. It is the taller of the two chimneys, the shorter chimney was for the boiler and the small tower was the water tower.

The incorrectly labelled photograph showing the readily identifiable chimney. *Rodrigo.*

The conserved chimney. *mtiblog*

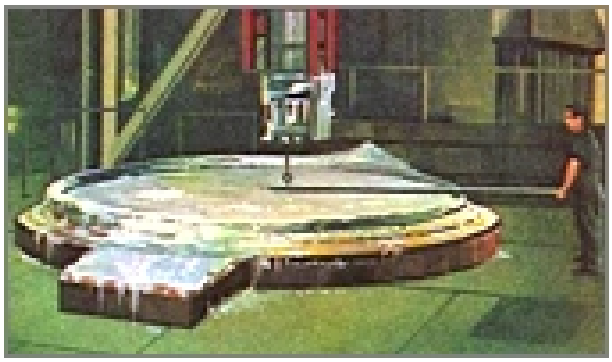
An archive search of Enrique Calvet y Lara in El Minero de Almagrera produced a very informative piece about the La Española. Under the directorship of the German metallurgist Gustavo Gresf (sic.), the foundry de-silvered the argentiferous galena using the zinc process. As far as I know, it was the only foundry in the area to use this method. The galena was smelted in a blast furnace with the air blast provided by a steam engine. The resulting lead bullion was then transferred to the strange looking ovens shown below.

The bank of 4 ovens used in the zinc-silver process. *Rodrigo*

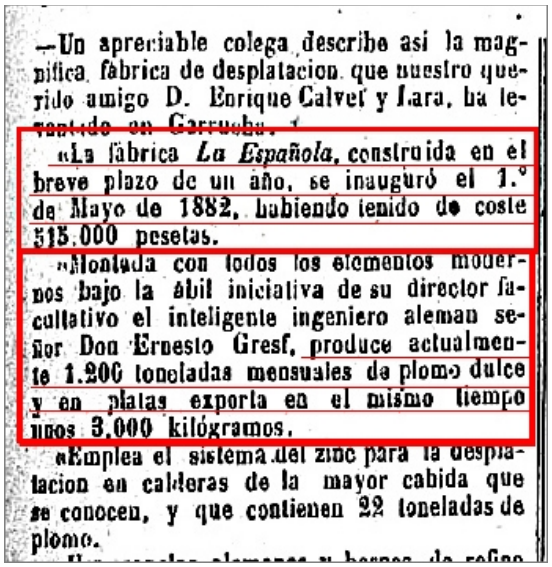


Using the winding mechanism which can be seen between the ovens the hoods were lowered to align with their vent-pipes and the bullion heated until it reached 420 degrees, the melting point of zinc. Crushed zinc was then added to the lead, and the mixture stirred and allowed to slowly cool.

As silver is much more soluble in zinc than in lead, most of the silver migrated to the layer of molten zinc which floated on top of the lead. As the zinc-silver alloy cooled it formed a crust which was carefully skimmed off using perforated ladles. The cover was then lowered once more and the temperature raised for further additions of zinc.



Modern day Removal of the zinc- silver alloy.
The worlds of David Darling Ag.



—Un apreciable colega describe así la magnífica fábrica de desplatacion que nuestro querido amigo D. Enrique Calvet y Lara, ha levantado en Garrucha.

«La fábrica *La Española*, construida en el breve plazo de un año, se inauguró el 1.° de Mayo de 1882, habiendo tenido de coste 515.000 pesetas.

«Montada con todos los elementos modernos bajo la ábil iniciativa de su director facultativo el inteligente ingeniero aleman señor Don Ernesto Gresf, produce actualmente 1.200 toneladas mensuales de plomo dulce y en platas exporta en el mismo tiempo unos 3.000 kilógramos.

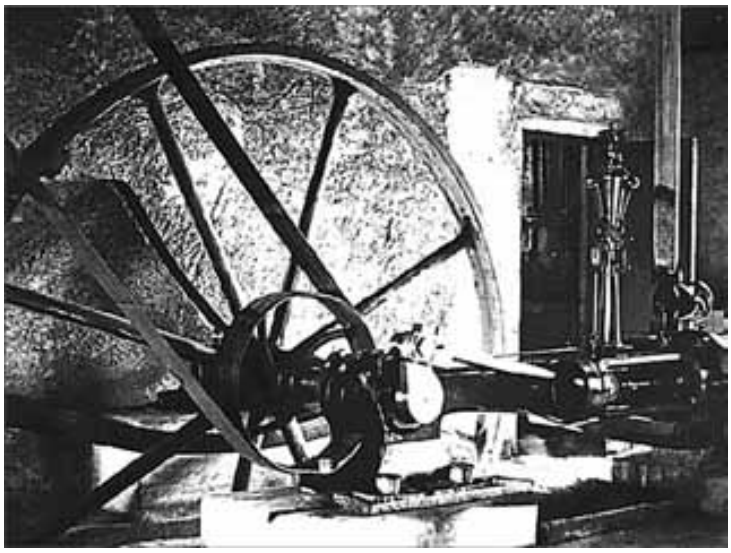
«Emplea el sistema del zinc para la desplatacion en calderas de la mayor cabida que se conocen, y que contienen 22 toneladas de plomo.

Extract from El Minero de Almagrera, 8th June 1883.

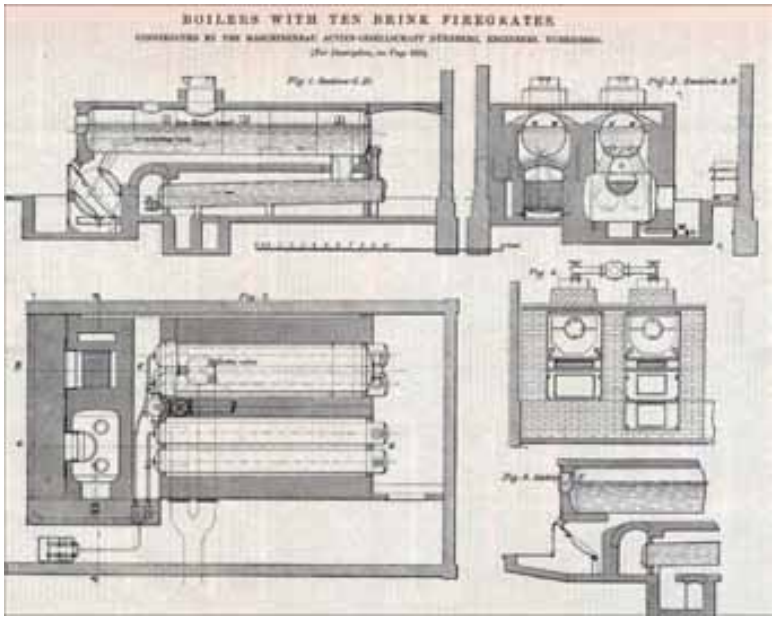
El Minero de Almegrera reported that the foundry was constructed '*in the brief space of a year and opened on the first of May 1882*' and was producing '*1,900 toneladas (Castillian tones) a month of sweet lead and was exporting 3,000Kgms of silver'*. (It is difficult to quantify the early 19th century tonelada, but it was just short of the present day metric tonne.) The de-silvering ovens, (described as boilers in the article) had a capacity of 22 toneladas. The cupellation oven for the separation of the silver from the zinc, the refining ovens, and the specially constructed zinc distillation oven, capable of holding a tonelada of zinc, were also German.

The German cupellation oven at the La Española foundry. *Rodrigo.*

The 30 horse power steam engine provided the blast for the cupellation furnace and a reduction furnace and it also powered a grinding mill to powder the zinc. The steam from the boiler, which was one of the newly invented, efficient, ten brink type, was used in the process of removing any zinc left in the lead after de-silvering.



The 30 horse-power steam engine. *Rodrigo*

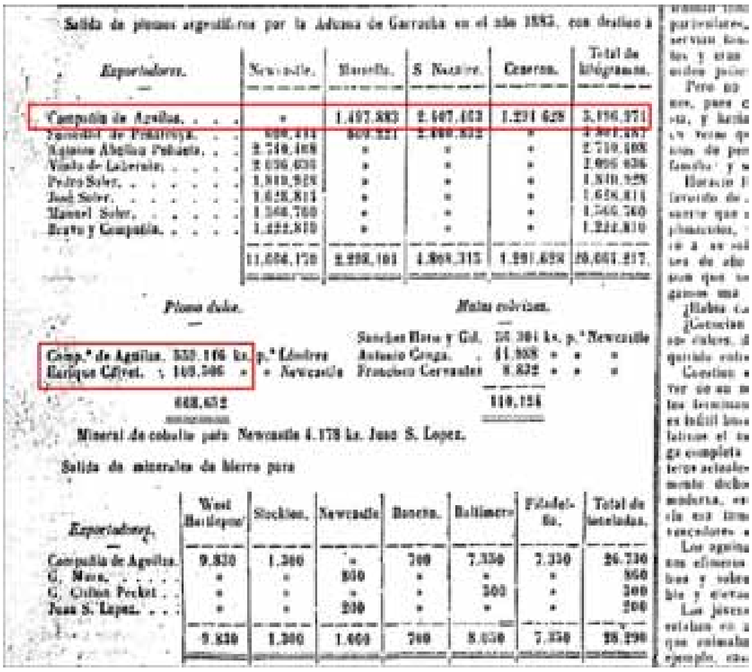


A diagram of a ten brink boiler of the type possibly installed at the foundry.

Though Calvet owned mines in the Sierra Almagrera, he also purchased large amounts of lead ore for processing. The resulting sweet lead and silver commanded a high price, so he was able to penetrate the English, German and Chinese markets. The quality of his product was such that he sold on the French market at the highest listed price, but even so, the foundry only operated for a period of two years.

The reasons for its closure are not clear, both El Minero de Almagrera and the Cronica Meridonal reported that the operating director Ernesto Grief had taken up a position in Mazarron with a German company that had close ties with La Compañía de Águilas, but neither publication make any mention of the reason for his departure.

Extract from El Minero de Almagrera, 10th January,1886



Salida de plomos argentíferos por la Aduana de Garrucha en el año 1885, con destino á

Exportadores.	Newcastle.	Marsella.	S. Nazaire.	Cesarea.	Total de kilógramos.
Compañía de Águilas.	»	1.497.883	2.407.463	1.291.628	5.196.971
Sociedad de Peñarroya.	[illegible]	800.221	2.400.852	»	[illegible]
Agustín Abellán Pelluete.	2.710.408	»	»	»	2.710.408
Viuda de Laberaiz.	2.096.636	»	»	»	2.096.636
Pedro Soler.	1.810.928	»	»	»	1.810.928
José Soler.	1.628.811	»	»	»	1.628.811
Manuel Soler.	1.366.760	»	»	»	1.366.760
Bravo y Compañía.	1.222.810	»	»	»	1.222.810
	11.006.170	2.298.101	4.808.315	1.291.628	20.061.217

Plomo dulce.

Comp.ª de Águilas. 559.116 ks. p.ª Lóndres
Enrique Calvet. 109.506 » » Newcastle
668.622

Matas cobrizas.

Sánchez Hora y Cía. 56.384 ks. p.ª Newcastle
Antonio Conga. 44.908 » » »
Francisco Cervantes 8.832 » » »
110.124

Mineral de cobalto para Newcastle 4.178 ks. Juan S. Lopez.

Salida de minerales de hierro para

Exportadores.	West Hartlepool	Stockton.	Newcastle	Boston.	Baltimore	Filadelfia.	Total de toneladas.
Compañía de Águilas.	9.830	1.300	»	700	7.350	7.350	26.730
G. Mora.	»	»	850	»	»	»	850
G. Gillon Pecket.	»	»	»	»	300	»	300
Juan S. Lopez.	»	»	200	»	»	»	200
	9.830	1.300	1.050	700	8.050	7.350	28.290

Opening La Española so soon after selling San Jacinto was not a sound business decision for Calvet. He could not compete with La Compañía de Águilas who had not only acquired the San Jacinto foundry, but also foundries in Palomares and Las Herrerias. It is also possible that they had been instrumental in Grief's departure. El Minero de Almagrera reported on 10/01/86 that Calvet had exported through Garrucha customs a mere 109,506 kgs of sweet lead during 1885, indicating that the foundry closed at some point in that year. (This figure was against exports by La Compañía de Águilas of 559,116kgs of sweet lead and 5,196,971kgs of argentiferous lead.)

The Hotel Maricielo from Accidente Nuclear de Palomares.
Consecencias. José Herrera Plaza

This photograph showing the remains of the Española was taken by Bill Barton of the Sandia Corporation towards the end of the American occupation. It also features the Hotel Maricielo which opened out-of-season to accommodate the senior American officials

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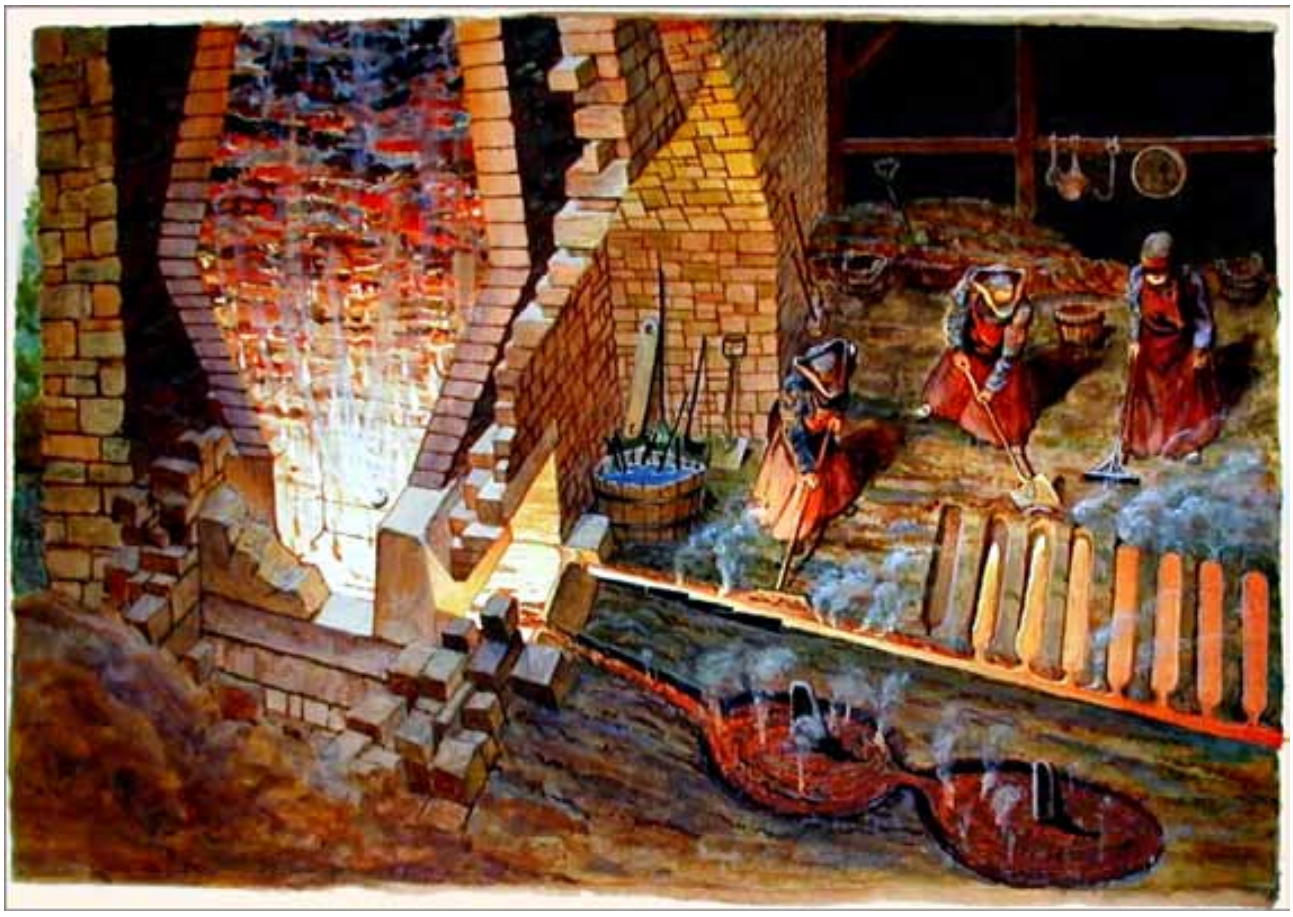
Metallury of Argentiferous Lead. M.Eissler 1891

The 1862 London International Exhibition. John Agnew.

Chapter 2

The Powerhouse that was Palomares

1 The Trinidad foundry
2 The Madrileña foundry
3 The San Francisco Javier foundry
4 The San Andrés foundry
5 The Don Guillermo foundry
6 The Lonely Tower



Introduction.

2021 saw an up-tick in interest in the Palomares foundries. Enrique Fernández Bolea responded to a Facebook request from Levante Almeriense for information about the San Andrés foundry, believed to have been known as he ‘hunger factory’. His detailed reply to the post nailed the confusion between the Don Guillermo and the San André foundries. However, it was 2023 that saw a phenomenal surge of investigation.

In early January, following a bank repossession, heavy plant rolled into the ruins of the San Andrés foundry and started scrub clearance of the site. Although the ruins had been listed in the protected monuments register it had never been allocated a number which meant that it was not actually protected. This was probably due in part to the fact that it had been sold to a developer before protection could be applied for. Alarm bells were ringing. The San Andés ruins were too important to to be razed to the ground and the land sold for development.

Juan Antonio Soler Jódar produced a series of blog posts which were the driver and basis of a conference in Palomares. Held in March 2023, entitled “**La Industria Metalúrgica en Palomares y su entorno durante el siglo XIX**” this spearheaded a movement to preserve the site.

This chapter is principally a summary of the work of Enrique and Juan Antonio. It details the history of the four previously known foundries: Madrileña, San Francisco Javier, Don Guillermo and San Andrés. It also details the brief history of the previously undocumented Trinidad foundry. San Francisco’s chimney and the San Andrés ruins are all that remains today of the powerhouse that was Palomares.

It is to be hoped that the San Andrés site will be preserved but I suspect the information boards will become sun-bleached or defaced and be indecipherable in a very short space of time.

The information board at the San Andrés foundry.

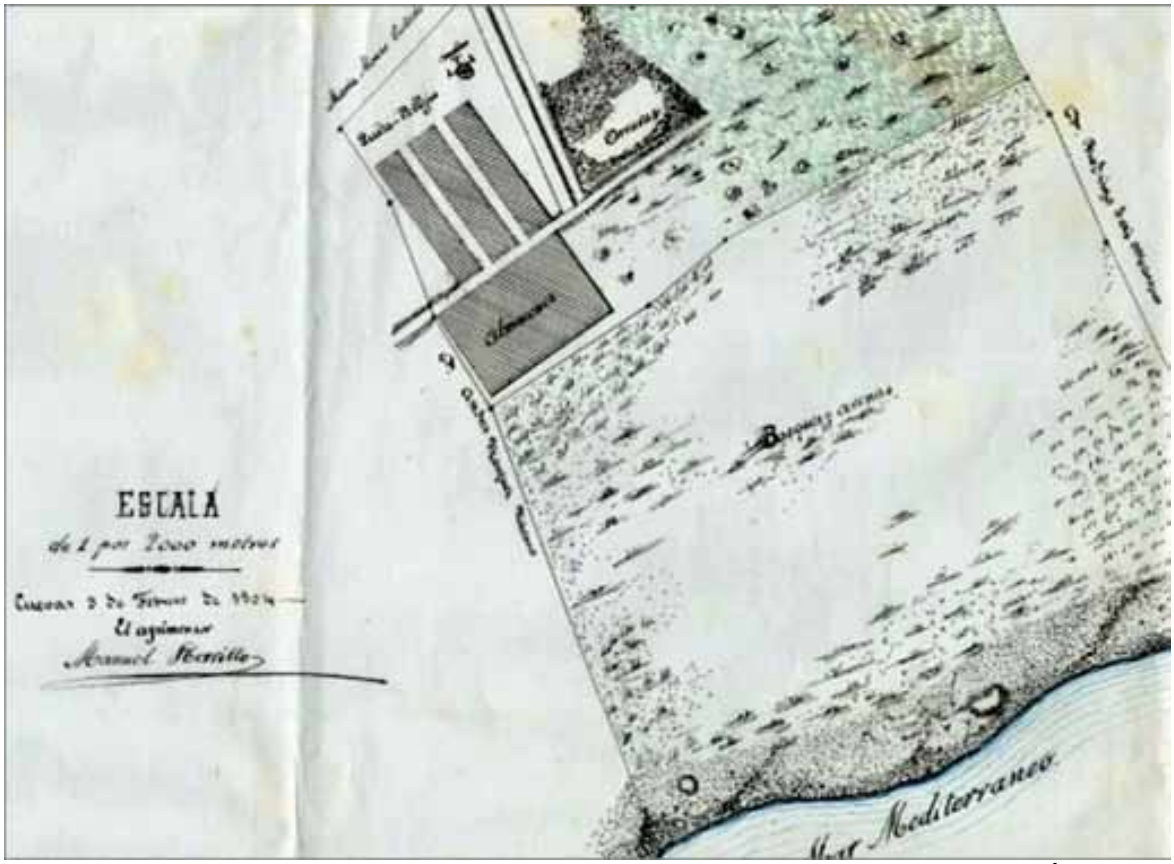
1 The Trinidad Foundry

The existence of the first foundry in Palomares was rediscovered thanks to the detective work of Juan Antonio Soler Jódar and his associates Magda Navarro Arías and Jóse Berruezo Garcia.

The Trinidad foundry was built in 1845 and had the shortest lifespan of any of the foundries in the region, a mere three months.

This simple foundry was situated south-west of the tower at Quitapellejos beach, close to the Cañada del Jático. Its owner was a Frenchman by the name of Hilarion Roux who had business interests in Mazarrón and Cartagena and had close ties with Rothschilds. His aim was to reprocess old slag heaps in order to extract any remaining lead or silver. The two banks of furnaces were most likely Cartagena furnaces. These were specifically designed to scavenge slags and had the advantage of not requiring any forced air.

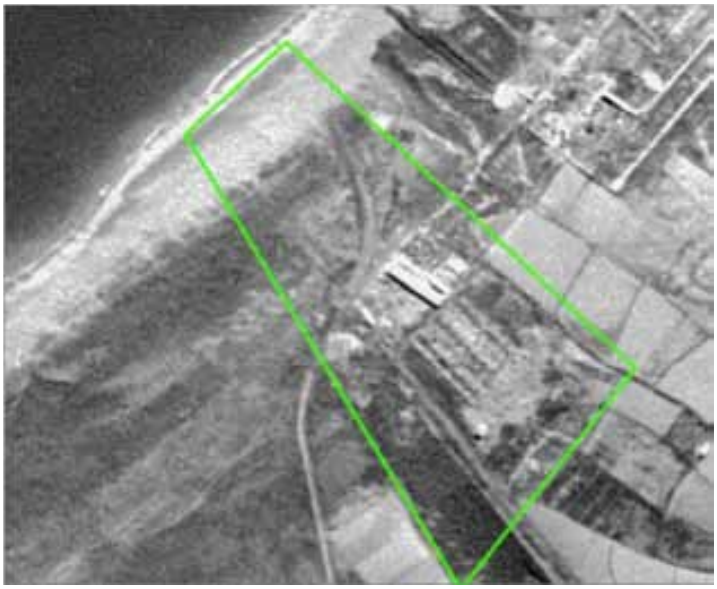
When La Compañia de Águilas bought the San Francisco Javier foundry they also acquired the ruins of the Trinidad which they used for warehousing.

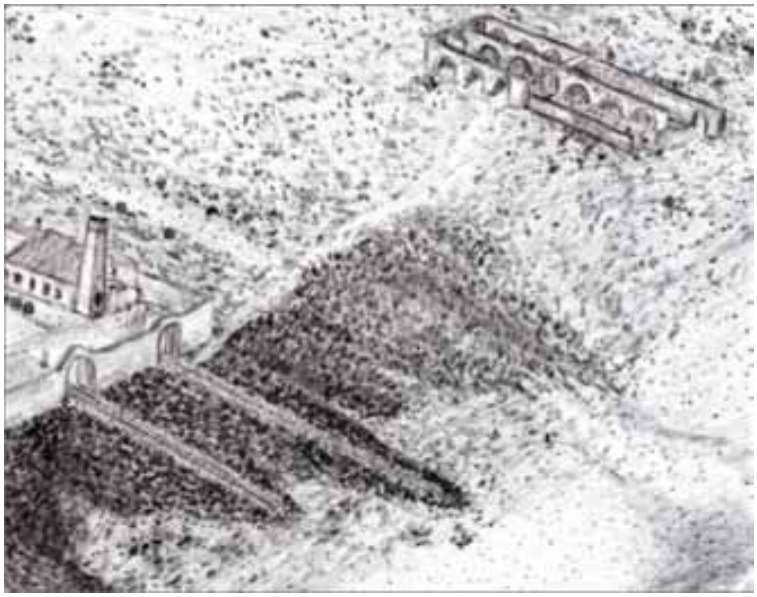


Above: the 1904 map showing, in the top left corner, the holdings of La Compañia de Águilas at Quitapellejos. The ruins and the storehouse (almacenes) are clearly marked. Also marked is the slag heap from the foundry. Here it is referred to as a horruras rather than the more usual term escorias. *farodebedar.com*

Some of the slag from the Trinidad can still be seen at the side of the road down to the sea.

A 1956 aerial shot of the site where the ruins can still be seen. *farodebedar.com*





Juan Antonio's interpretation of Trinidad (top right) based on aerial photographs and maps.

farodebedar.com

The ruins of Trinidad can be seen in this shot of barrels of contaminated soil (from the Palomares nuclear incident) awaiting shipment at the small promontory marking the Cañada del Jatico.

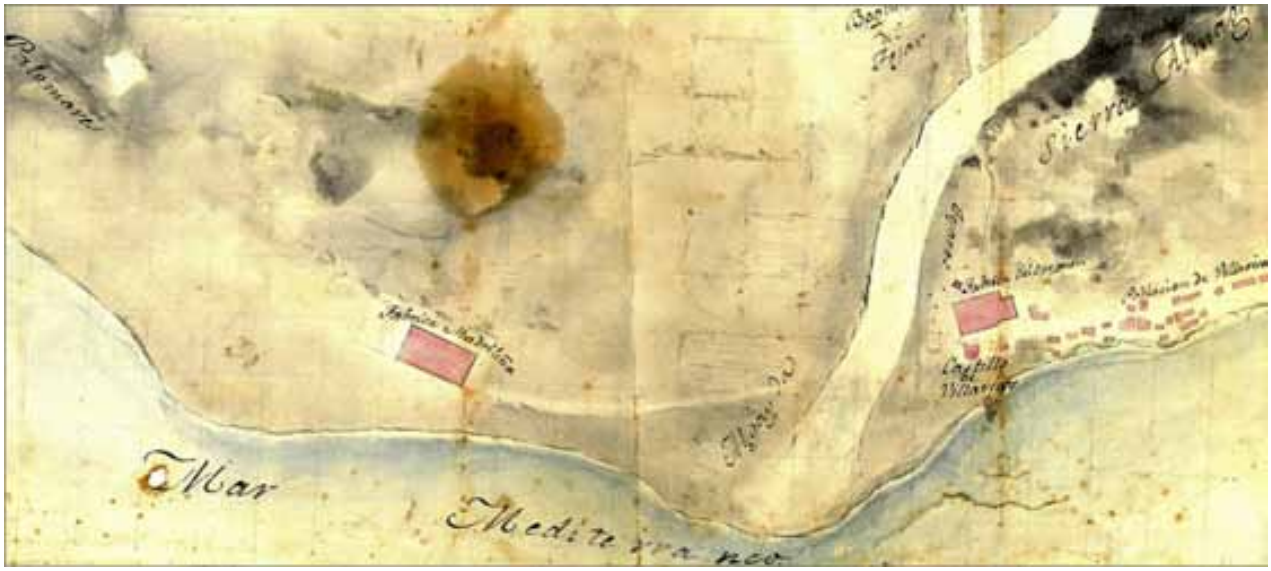
Why the foundry was so short lived is a mystery. Reprocessing slag was big business in the Mazarrón and Cartagena areas so why was it such a failure here? It is possible that Roux, as an outsider, was denied access to sufficient quantities of slag. Whatever the reason, Roux went on to be one of the founders of the very successful La Compagnie Francaise de Mines et Usines de Escombrera in Bleyberg , profitably reprocessing slag in Belgium.

The site today. The picture was taken from just above the shoreline which gives a good indication of the amount of coastal erosion there has been since the 1904 map was drawn.

Screen shot showing the approximate location of the Trinidad foundry.

2 The Madrileña Foundry.

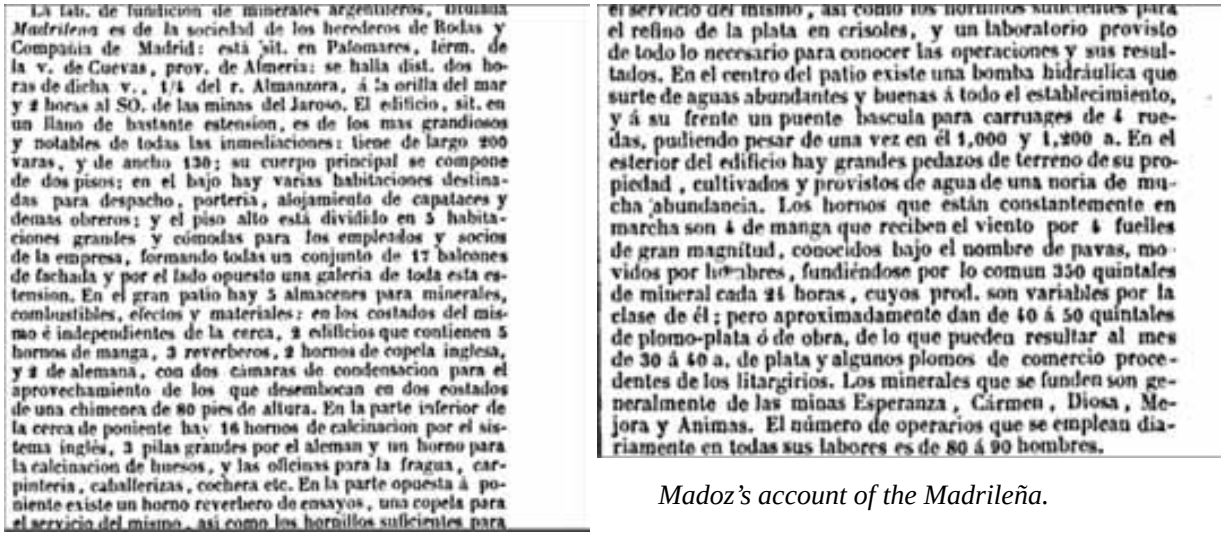
Another foundry of which nothing remains today was the Madrileña, also known as the Duro. It's position is shown on the 1844 Ordnance map and today the Punta de los Hornicos marked on current maps is a reference to its hornos or furnaces. It was owned by Herederos de Roda y Cia, headed by Rafael de Roda and Pedro Duro, hence its popular name.



1844 Ordnance map. *Bolea Facebook post.*

Google screenshot showing the Madrileña foundry.
Punta De los Hornicos refers to the furnaces or hornos.

Madoz, in his 1845 Geographical Dictionary, gave this detailed description of the foundry:



La fab. de fundicion de minerales argentíferos, titulada *Madrileña* es de la sociedad de los herederos de Rodas y Compañía de Madrid: está sit. en Palomares, término de la v. de Cuevas, prov. de Almería: se halla dist. dos horas de dicha v., 1/4 del r. Almanzora, á la orilla del mar y 2 horas al SO. de las minas del Jaroso. El edificio, sit. en un llano de bastante estension, es de los mas grandiosos y notables de todas las inmediaciones: tiene de largo 200 varas, y de ancho 130; su cuerpo principal se compone de dos pisos; en el bajo hay varias habitaciones destinadas para despacho, portería, alojamiento de capataces y demas obreros; y el piso alto está dividido en 5 habitaciones grandes y cómodas para los empleados y socios de la empresa, formando todas un conjunto de 17 balcones de fachada y por el lado opuesto una galería de toda esta estension. En el gran patio hay 5 almacenes para minerales, combustibles, efectos y materiales: en los costados del mismo é independientes de la cerca, 2 edificios que contienen 5 hornos de manga, 3 reverberos, 2 hornos de copela inglesa, y 2 de alemana, con dos cámaras de condensacion para el aprovechamiento de los que desembocan en dos costados de una chimenea de 80 pies de altura. En la parte inferior de la cerca de poniente hay 16 hornos de calcinacion por el sistema inglés, 3 pilas grandes por el aleman y un horno para la calcinacion de huesos, y las oficinas para la fragua, carpintería, caballerizas, cochera etc. En la parte opuesta á poniente existe un horno reverbero de ensayos, una copela para el servicio del mismo, así como los hornillos suficientes para el servicio del mismo, así como los hornillos suficientes para el refino de la plata en crisoles, y un laboratorio provisto de todo lo necesario para conocer las operaciones y sus resultados. En el centro del patio existe una bomba hidráulica que surte de aguas abundantes y buenas á todo el establecimiento, y á su frente un puente báscula para carruages de 4 ruedas, pudiendo pesar de una vez en él 1,000 y 1,200 a. En el esterior del edificio hay grandes pedazos de terreno de su propiedad, cultivados y provistos de agua de una noria de mucha abundancia. Los hornos que están constantemente en marcha son 4 de manga que reciben el viento por 4 fuelles de gran magnitud, conocidos bajo el nombre de pavas, movidos por hombres, fundiéndose por lo comun 350 quintales de mineral cada 24 horas, cuyos prod. son variables por la clase de él; pero aproximadamente dan de 40 á 50 quintales de plomo-plata ó de obra, de lo que pueden resultar al mes de 30 á 40 a. de plata y algunos plomos de comercio procedentes de los litargirios. Los minerales que se funden son generalmente de las minas Esperanza, Cármen, Diosa, Mejora y Animas. El número de operarios que se emplean diariamente en todas sus labores es de 80 á 90 hombres.

Madoz's account of the Madrileña.

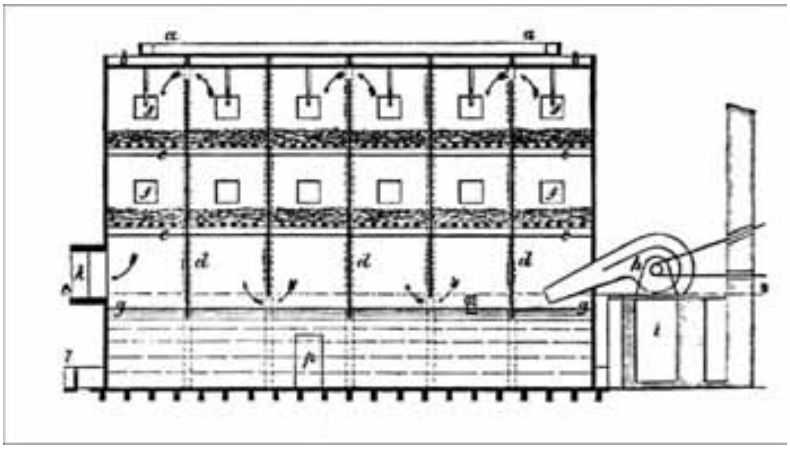
"The building on a fairly extensive plain is one of the most grandiose and notable in all the surrounding areas: it is 200 yards long and 130 yards wide. Its main body is made up of two floors; On the ground floor there are several rooms intended for offices, porter's lodge, accommodation for foremen and other workers; and the upper floor is divided into 5 large and comfortable rooms for employees and company partners, all forming a set of 17 balconies along the frontage and on the opposite side a gallery all the way along.
In the main courtyard there are 5 warehouses for minerals, fuels, effects and materials; on the sides of it and independent of it are 2 buildings one that contains 5 ore hearths. 3 reverberatory furnaces, 2 English cupellation furnaces and 2 German ones. For the flow from all of these there are two chambers which connect into two sides of an 80-foot-high chimney.
The lower one, on the Western side, has 16 English calcination ovens, 3 large German coking ovens, and a bone calcining oven, together with smiths' and carpenters' workshops, stables and coach-house etc.. On the opposite, Eastern side is a reverberatory assay oven and a cupellation oven for the same purpose, as well as sufficient ovens for …

… refining silver in crucibles, together with a laboratory provided with everything necessary to understand and calculate their results. In the centre of the main courtyard is a water pump which provides a plentiful supply of good water to the whole establishment, and in front of it a weighbridge for four wheeled carriages capable of weighing 1,000 to 1,200 arrobas at a time. Beyond the buildings large parcels of cultivated land are owned, provided with water by an abundantly supplied noria. The furnaces which are in constant use are 4 ore hearths which receive the air draught from 4 enormous bellows, known by the name of 'pavas', operated by 4 men. Usually fusioning 350 quintals of mineral every 24 hours, whose production depends on the its composition, the work can result in 30 - 40 arrobas of silver per month together with some commercial leads from the lithage. The minerals that they treat are generally from the mines Esperanza, Cármen, Dioso, Mejora(?) and Ánimas. The number of workers employed daily in all the tasks is between 80 and 90 men."
(1 ton equals aproximately 18.2 arrobas)

Only the noria – a water lifting wheel - is still in existence.

The remains of the noria alongside the Villaricos to Garrucha road. Covered by a protective mesh it is easily missed.

The chambers between the furnaces and the chimney, to which Madoz refers, were probably a pair of Stokoe condensing chambers, where the flume from the furnaces was passed through a mist of water in order to recuperate any lithage. This system negated the need for the long condensation tunnels which were a feature of most of the foundries in the area.



Left: diagram of a Stokoe condensor.

Below: key to Stokoe diagram.

Percy

a a. Trough of wood or water-box for supplying water.

b b. Cistern covered with sheet-lead, from which descends a series of zinc pipes 3' long closed at the bottom and having numerous holes in the lower half by which water escapes in fine jets (see figs. 133, 135). The bottom of the cistern is also perforated with small holes, through which water also descends (see fig. 136).

c. Pipe 3" in diameter for supplying water to the trough a a.

d d d. Vertical partitions 14" thick, dividing each condenser into six compartments. Space is left along the top of every alternate partition, and at the bottom every such alternate partition descends lower than the other partitions respectively.

d' d' d' d'. Stays 6" × 3", tied by bolts which go through from side to side.

e e e e. Floors of 3" square joists, dividing each condenser into three stories. Thus each condenser contains 18 equal and similar compartments. The joists are covered with a layer 1' thick of faggots, or thorns, as they are termed.

f f f f. Doors, of which there is one to each compartment, except in the lowermost story.

g g. Level of the water contained in the lower part of the condenser.

A. Fan for propelling the smoke into the condensers; there is a fan to each condenser.

i. Flue through which the smoke is conveyed from the furnaces to the fan.

k k. Flue for the outlet of the uncondensable part of the smoke, 3' 6" high and 3' wide.

l l l l. Trough for the outflow of water from the condenser.

m. Channel of communication between the two condensers.

n. Gutter for the outflow of water from the condensers.

o. Steps leading to the top of the condensers.

p. Doorway through which the deposit of fume at the bottom may be removed when necessary.

q. Cistern supplied partly with fresh water and partly from that conveyed by the gutters n; the surplus water runs into a large pit where any fume carried over may be deposited.

Various sources state that the Madrileña opened in 1847, others in 1841, but pre 1844 is more likely since it is shown on the 1844 map and was included in Madoz's 1845 Dictionary. It is possible that Roda and Company took it over in 1847. Either way, it was only operational for a short time. The mid-century crisis in the Almagrera mining industry lead to the closure of this magnificent foundry in 1857.

In 1881, monks of the French Benedictine Celestine Order settled in the abandoned Madrileña buildings where they established an agricultural colony called the Sancti Spiritus. Their original plan was to benefit the local population by draining the stinking, malarial swamps that existed at the mouth of the Almanzora and to promote advances in the local agricultural methods. The project of drying out the marshes never got off the ground. The monks turned to the manufacture of mother-of-pearl buttons, planning to add yarn spinning to this venture at a later date. This enterprise was also doomed to failure and within a year of their arrival they had abandoned the foundry. The relationship between the monks and the Cuevas clergy was not particularly cordial so the monks, even though they didn't speak Spanish, went to confession in the private chapel of the owner of the San Fransico Javier foundry.

The ornate interior of the Guillermo Huelin's chapel. *Bolea Facebook post.*

The ruins had a further lease of life following the Palomares Nuclear Incident in 1966. The Americans patched up some of the ruins and incorporated them into their Camp Wilson on Quitapellejos beach. One of the buildings still had walls sufficiently high and in reasonably good condition to provide protection from the

wind. They roofed it using rough-hewn poles supporting plywood sheets covered with tarpaulins and used the building as a kitchen. Some of those working in the kitchen were local fishermen who were unable to work due to the fall-out from the accident. On the 27th of February, with winds approaching 60 miles per hour, the order was given to evacuate the building. Almost immediately the wind changed direction and ripped the temporary roof off. Two cousins, José Zapata Fernandez and Bartolomé Fernandez Berruezo were injured by the flying debris, suffering serious fractures and lacerations. While Bartolomé recovered from his injuries, José never did. According to to his wife, “he didn’t lift his head, and wasn’t the same”. Neither man received any compensation for their injuries, nor were they paid for the time which they were unable to work.

Queueing for food at Camp Wilson Canteen. *Transcend.org.*

3 The San Francisco Javier Foundry.

Site map showing the approximate boundary of the of the foundry

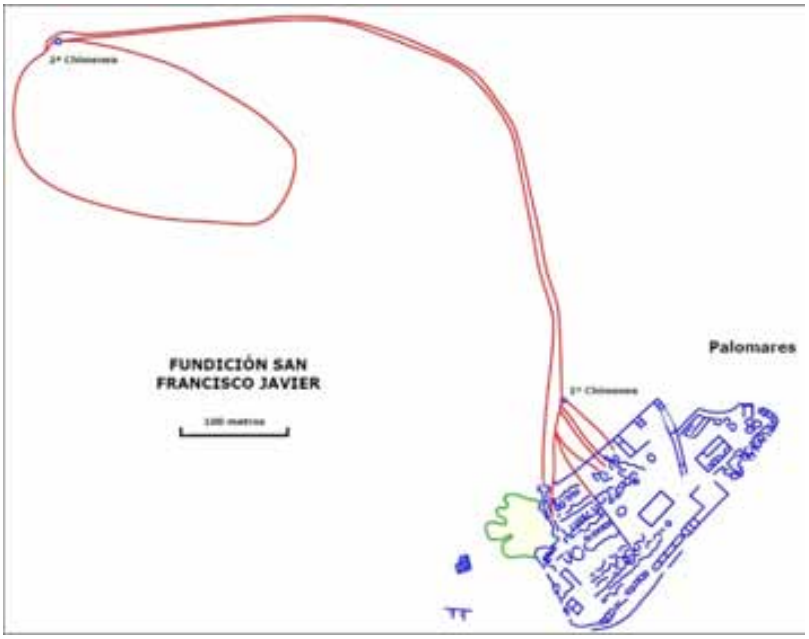
The entrance to the foundry *Rodrigo*

The small, original foundry on this Palomares Bajo site was called the Elisa and was owned by one Francisco Alcázar. In 1853 it was purchased and renamed the San Fracisco Javier, by Guillermo Huelin Newman, a prominent businessman of English heritage. He was closely associated with the Heredia family from Malaga who partially financed the 17,000 reales required for this venture. He also aquired the Santa Matilde mine in Las Herrerías and introduced open-cast mining to the area, extracting iron ore. The area became known as the Roza de Huelin because of this scratching and scraping method of mining, giving rise to what is now called Las Rozas. (The noun roza translates as cleared land, and the verb rozar means to scrape).

It was the iron ore of Santa Matilde that drove the expansion of the San Francisco Javier, together with Huelin's willingness to embrace new technology such as the installation of a steam engine. By 1870 it was one of the biggest processors of iron ore in the province, employing 500 men and boys.

Its condensation tunnels snaked round the hill behind the foundry and culminated in a tall chimney, long since disappeared, to the North West of the foundry. All that remains today is the boiler chimney of the foundry proper and the names of streets such as Calle La Chimenea and Calle San Francisco Javier.

The remains of the chimney. *mtiblog*



Sketch plan of the foundry. *Juan Antoio Soler Jódar*

Rodrigo’s wonderful photographs give some idea of the scale and grandeur of the establishment.

Looking towards the sea.

Patio de minerales

Above: views inside the foundry.

Huelin built the cortijo surrounded by a beautiful garden next to the Cañada del Jatico. He preferred to spend his time there rather than in his house in Garrucha. He died at the age of 60 at the foundry, Depending on which source you read, he died of pneumonia or had an accident. Either way he was buried in the private chapel which I think was in the grounds of his Cortijo Virgin de las Angustias rather than within the confines of the foundry.

The garden of Huelin's cortijo. *Bolea facebook post*

The Cortijo Virgin de las Angustias today. Currently the property of the Cervantes family of Vera. The road to it called the Camino los Cervantes.

Following Huelin's sudden death in 1876, his son Carlos Huelin Larrain took over the running of his father's interests for a while. However in 1882 he sold both the Roza and the foundry to La Compañía de Águilas. They linked the two with a mineral line and ran a steam train on it. It is likely that they extended the line along the haul road which still runs from the foundry to the coast.
(For more about the railway see *Then, There Were Mines, Volume 2 Chapter 1*)

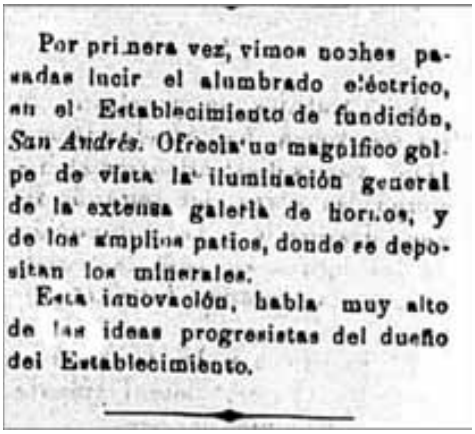
The Compañía de Águilas was responsible for the catastrophic flooding of the Las Herrerías mines in 1884 and despite their best efforts they failed to dry out Santa Malide. In 1886 both pumping stations in the Almagrera ceased functioning paralysing the mines. The Compañía de Águilas pulled out of the area altogether and closed the San Francisco Javier. They transported all remaining mineral, probably by sea, to their San Jacinto foundry in Garrucha where their single Piltz furnace was capable of processing as much ore as 14 ordinary furnaces.

The ruins of the foundry before development of the site. *Andrés Sanchez Picon*

4 The San Andrés Foundry.

The San Andrés foundry was originally opened in 1872 by Francisco Bravo Alarcón and had 6 furnaces operating in 1876. The collapse of the mining industry in the Sierra Almagrera saw it close in 1890. It was acquired 4 years later by Manuel Campoy Sánchez and Manuel Gimínez Sánchez who processed argentiferous minerals in 14 furnaces from the Virtud de San José mine in las Herrerías.
The golden age of the foundry came when the 'Men From Bilbao', the Sociedad Agentífera de Almagrera took it over in 1901. They introduced steam power and a modern Piltz furnace, together with a more modern calcination oven. This company had its headquarters along the coast between the Invencible foundry and the former Blanquizares Guadia barracks, next to which they built an electricity generating plant. (See Then There Were Mines Vol 2 Ch 3). This plant supplied electricity to the San Andrés foundry, illuminating the main yard and mineral deposits together with the battery of furnaces.

The remains of the cold water inlet which fed the turbine condensers and the boiler at the generating plant.



Por primera vez, vimos noches pasadas lucir el alumbrado eléctrico, en el Establecimiento de fundición, *San Andrés*. Ofrecía un magnífico golpe de vista la iluminación general de la extensa galería de hornos, y de los amplios patios, donde se depositan los minerales.

Esta innovación, habla muy alto de las ideas progresistas del dueño del Establecimiento.

Notice in el Minero de Almagrera 25th August 1905 about the lighting.

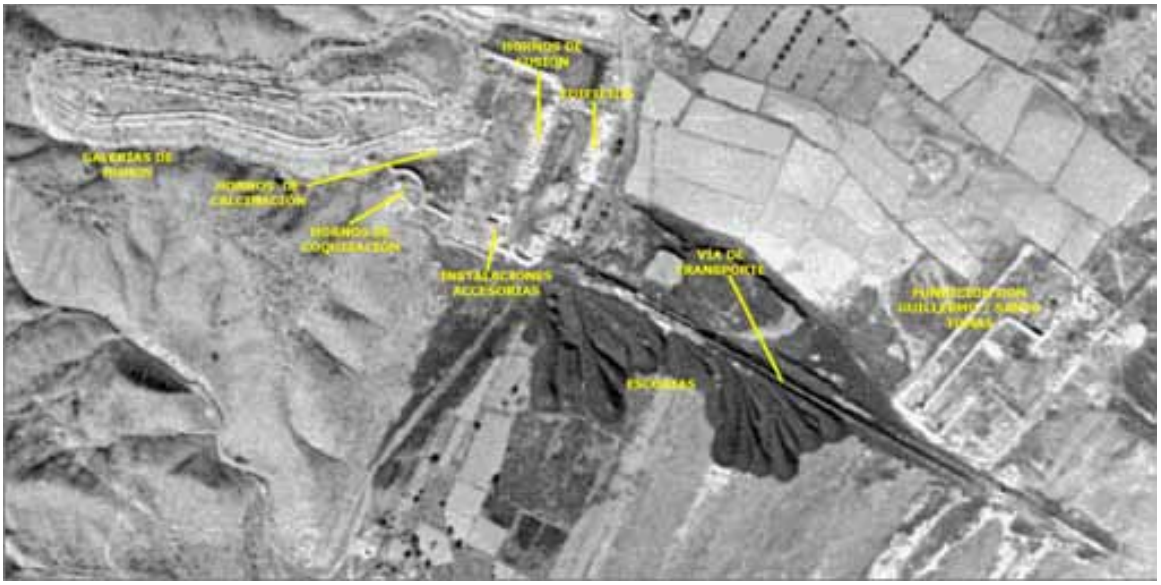
The output of San Andrés was mainly shipped to Newcastle on Tyne with the ships returning laden with coal. The foundry had coking ovens and converted the coal to coke for both their modern furnaces and also for the generating plant along the coast.

The condensation tunnels of the foundry are remarkably well preserved. They are also very complicated with internal partitions and had several small chimneys allowing for the regulation of the draught depending on which furnaces were operating, and are believed to be the longest in Andalucía. Neither the main draw chimney, nor the smaller chimneys have survived.

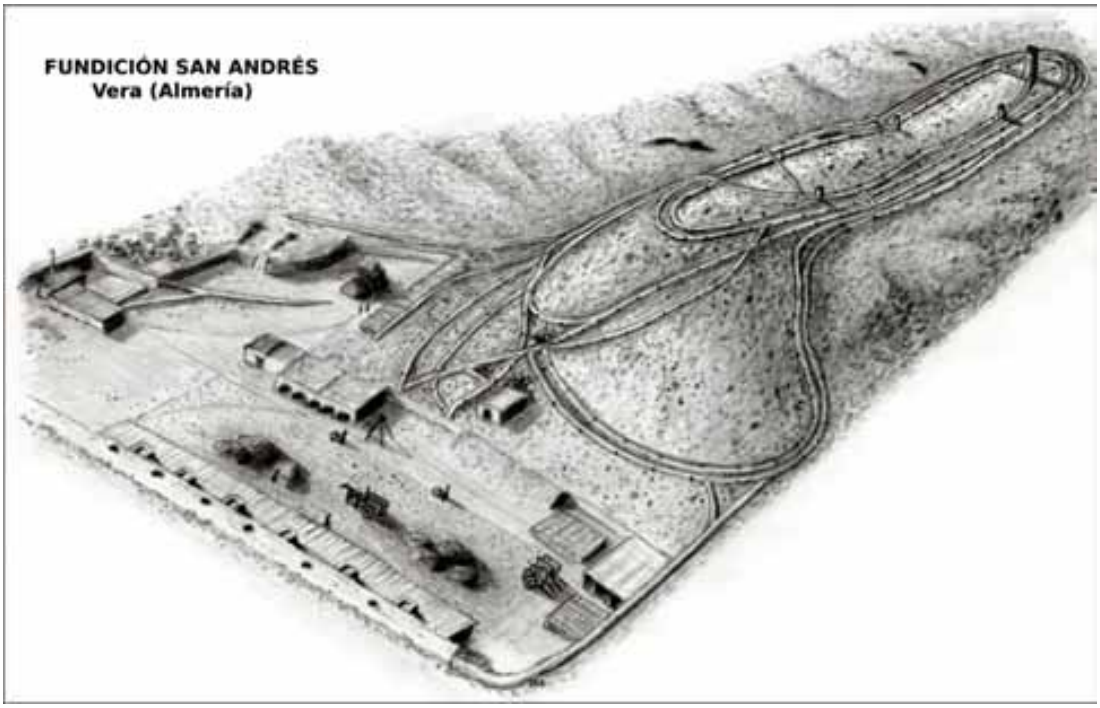
Interior of the condensation tunnels. *farodebedar.com*

The full extent of the tunnel network and the foundry can be seen in this drone's eye view. *Antonio Jódar.*

Based on the present day drone's eye view and the 1956 aerial view, Juan Antonio's artist's representation gives an excellent idea of what the foundry was like in its heyday.

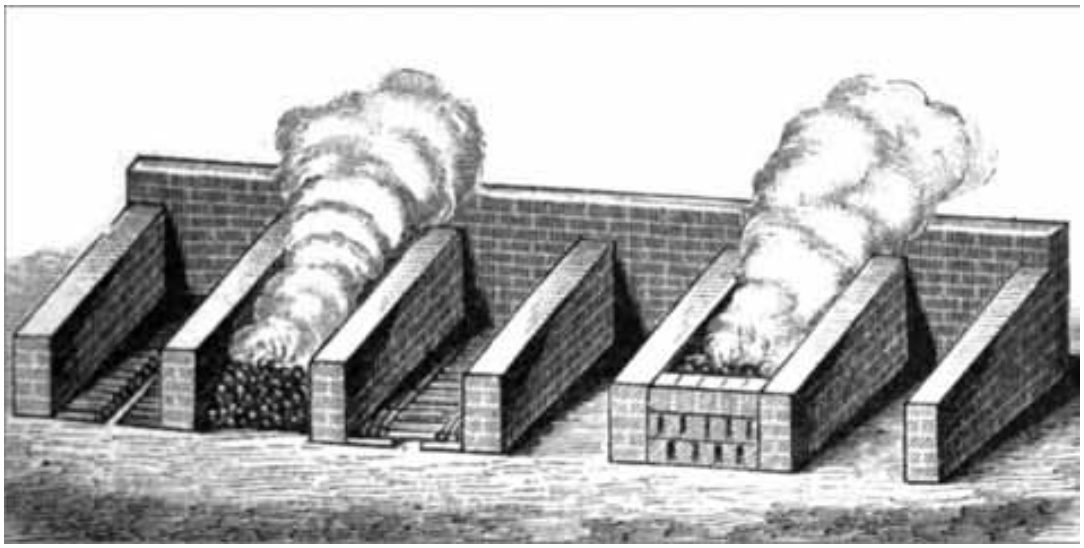


The 1956 aerial view, annotated by Juan Antonio, showing the condensation tunnels, the line of furnaces, the line of calcination ovens, the coking plant, additional buildings, probably the boiler house, the line of buildings which would have comprised the offices, porter's lodge, etc., (now under the Garrucha to Villaricos road) and the haul road leading down to the sea passing by the Don Guillermo/ Santo Tómas foundry.



Juan Antonio's representation.

It is difficult to tell whether the calcination ovens were actual furnaces or merely open air roasting stalls linked to the condensation tunnels in order to dissipate the sulphurous fumes. Juan Antonio is of the opinion that they were stalls similar to those found in one of the Garrucha foundries. What little remains of them is inconclusive, but given the amount of discolouration of the masonry I'm inclined to agree with him.



Juan Antonio's representation of the calcination stalls.

The remains of the calcination bank, only the orange red deposits on the masonry and rubble indicate when the ore was calcined.

In 1902 a more modern method of calcination was introduced in the form of the Huntington Herberlein reverberatory furnace, known as the Huntington Herberlein Pot. The pot was the lower half, where the charge was laid over a segmented grate in the bottom and air was forced in. The upper half was a hood fitted with a flue which was lifted by crane when the calcination was completed. The pot was then also lifted and turned over in mid-air and the agglomerated red hot mass was dumped onto the ground raising clouds of dust and fumes.

Although a more modern method of calcination than the open air stalls, the Huntington Herberlein pot was if anything even more toxic. The dust created when the pot was emptied and when the matte was crushed was known to be responsible for a marked increase in the incidence of lead poisoning of workers in American foundries where it was in use.

Huntington Herberlein Pot.

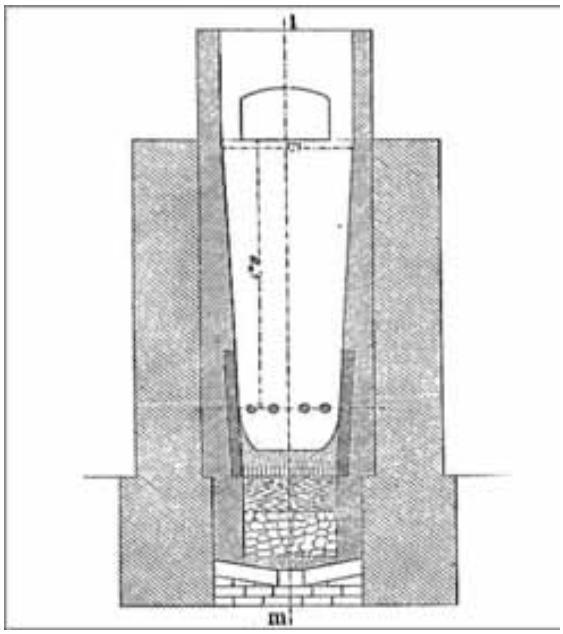
Lead poisoning in smelting and refining of lead. US Department of Labor 1914.

On the 17th of June 1905 the cartoon on the left was published in El Ferrocarrilico following complaints about the fumes from the foundry which hung over Palomares. Possibly to avoid litigation, the foundry pictured is clearly the San Francisco Javier which had been closed for more than a decade. The only foundry in the vicinity operating in 1905 was the San Andrés so everyone knew who it was aimed at.

LA BRUJA-

Swoops the witch o'er Palomares
Mounted on her broom
That cleaves the air
Which streams red
Takes care by sorcery
To avoid the fume
Which could engulf her.

The ruins of the main bank of furnaces appear to be those of a line of Spanish blast furnaces which were quite compact and squat. Until the introduction of a mechanically induced air blast the motive force for the bellows was animal or man power. The ones at San Andrés were either built or modified to have a steam driven air blast.



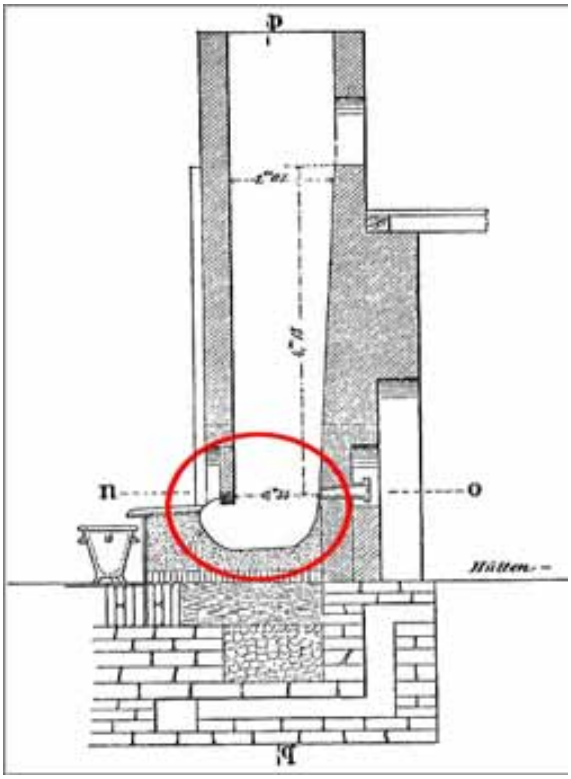
Above: probable form of the San Andrés Furnaces. *M Eissler*
Right: the ruins of the central furnace.

The majority of the furnaces now look like a row of broken, decayed teeth from which old fillings have dropped out. Alongside several of them are the large lumps of solidified material, probably left in the furnaces after their final firing, which have tumbled to the ground when the surrounding masonry disintegrated.

All that remains of the furnaces.

One of the lumps of solidified material which has the imprint of the furnace walls in its surface.

Fallen lump. Looks like a mix of slag, flux and smelted ore.



Possibly the source of the lump?
M Eissler

5 The Don Guillermo Foundry.

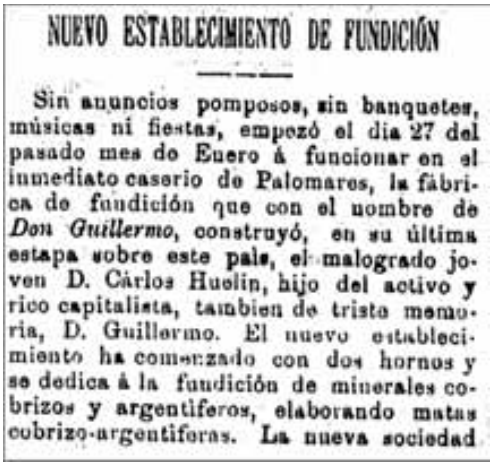
While the Compañía de Águilas were closing his father's former foundry Carlos Heulin was opening a new one named the Don Guillermo after his father. It was always known locally as 'El Hambre', the hunger, because the late 1880's were a time of great hardship for the local people with the mines paralysed and hunger a daily reality. It was situated on the waterfront to the South East of the San Andrés Foundry, bounded by the San Andrés haul road on one side, and by the Cañada del Jatico on the other. The Playa Marqués urbanization now occupies the site.

Google screen shot of the position of the Don Guillermo.

The local press had a full page spread on March the 29th 1887 about the opening of the foundry. It was part eulogy for the late Don Guillermo and part praise for Don Carlos. The great and the good of the area were in attendance proposing toasts with seemingly gay abandon beneath the inevitable benediction of the local priest. What does come over in the somewhat sycophantic article is the regard in which Don Carlos was held for wanting to open the foundry and provide employment for many of those who had been laid off by the Compañía de Águilas. Using the description given in press coverage Juan Antonio Soler Jódar has drawn an artistic representation of the foundry which comprised of eight furnaces, the draught for which was supplied by a 15 h.p. steam engine, and the usual working, living and storage areas. Don Carlos was hoping to benefit from the increasing demand for copper with his new venture.

Juan Antonio's drawing of the Don Guillermo. The haul road of the San Andés ran to the left of the Don Guillermo and the Cañada del Jatico to the right. The Trinidad foundry was on the other side of the Jatico. *farodebedar.com*

Like his father before him, Carlos Heulin needed financial backing for the venture in order to purchase the necessary machinery and coke for the furnaces. In this case the backer was a certain Augustus Stubbs Hillhouse, who appears to have been well known in local circles as representative and facilitator for British interests in Las Herrerías amongst other places. The Minero de Almagrera reported on March 3rd 1894 that the foundry was under new ownership with Stubbs as the director. The new owners intended to start production of copper and silver initially using 2 furnaces, and hoped to light 4 more in the near future. They also intended to recommence the processing of agentiferous galena. Unfortunately, there is no mention of the name of the new company.

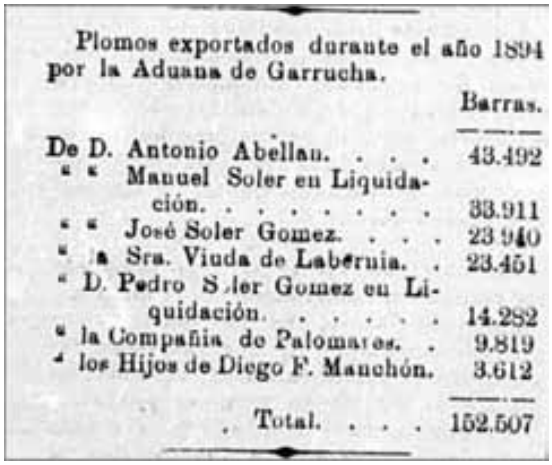


NUEVO ESTABLECIMIENTO DE FUNDICIÓN

Sin anuncios pomposos, sin banquetes, músicas ni fiestas, empezó el dia 27 del pasado mes de Enero á funcionar en el inmediato caserio de Palomares, la fábrica de fundición que con el nombre de *Don Guillermo*, construyó, en su última estapa sobre este país, el malogrado joven D. Cárlos Huelin, hijo del activo y rico capitalista, tambien de triste memoria, D. Guillermo. El nuevo establecimiento ha comenzado con dos hornos y se dedica á la fundición de minerales cobrizos y argentiferos, elaborando matas cobrizo-argentiferas. La nueva sociedad se propone encender cuatro hornos mas destinados al mismo objeto y además algunos otros á la fundición y producción de plomos argentiferos. Felicitamos á la nueva empresa y le deseamos mucha suerte en sus operaciones, principalmente dirijimos nuestro humilde saludo, á nuestro antiguo amigo D. Augusto Sttus, director, segúu tenemos entendido, de este establecimiento.

The report in the Minero de Almegrera.

The customs' lead exports report through the port of Garrucha for 1894 names a Compañia de Palomares with a figure of 9,819 barras. As Andrés Sánchez Picón in his Minerea e Industrializacion en la Almería del siglo XIX cites Sheldon Bus (sic.) PSC. rather than the Palomares Company as the owners of the Don Guillermo I assume that was who the new owners were.

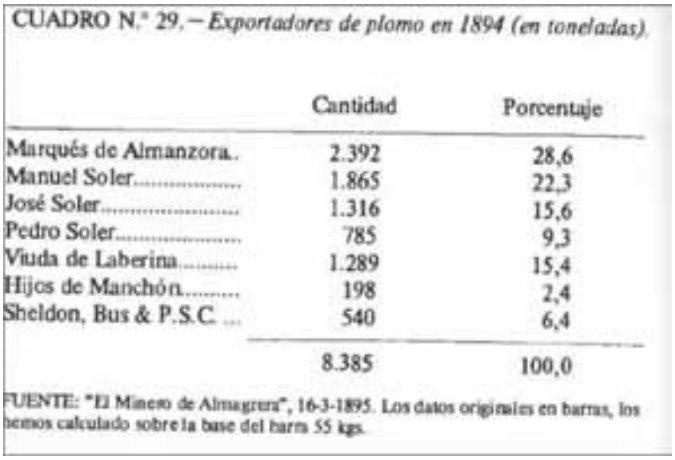


Plomos exportados durante el año 1894 por la Aduana de Garrucha.

	Barras.
De D. Antonio Abellan. . . .	43.492
" " Manuel Soler en Liquidación.	33.911
" " José Soler Gomez. . . .	23.940
" la Sra. Viuda de Laberuia. .	23.451
" D. Pedro Soler Gomez en Liquidación.	14.282
" la Compañia de Palomares. .	9.819
" los Hijos de Diego F. Manchón.	3.612
Total. . . .	152.507

Table showing the amount of lead exported through Garrucha for the year 1895.

el Minero de Almagrera



CUADRO N.° 29.—*Exportadores de plomo en 1894 (en toneladas).*

	Cantidad	Porcentaje
Marqués de Almanzora	2.392	28,6
Manuel Soler	1.865	22,3
José Soler	1.316	15,6
Pedro Soler	785	9,3
Viuda de Laberina	1.289	15,4
Hijos de Manchón	198	2,4
Sheldon, Bus & P.S.C.	540	6,4
	8.385	100,0

FUENTE: "El Minero de Almagrera", 16-3-1895. Los datos originales en barras, los hemos calculado sobre la base del barra 55 kgs.

Andrés Sánchez Picón's table (expressed in metric tons)

Sheldon Bush Patent Shot Company of Bristol not only produced lead shot but also sheet lead and pipes. Their shot tower was the oldest known shot tower in the world. In 1782 a local Bristol plumber by the name of William Watts patented an improved method for making lead shot which at the time was made in moulds. His method was very simple, he poured lead through a perforated zinc tray causing it form globules. These were then allowed to fall sufficient distance to allow them to cool and harden. Watts built a tower into and above a late 17th Century house and pulled up the flag stones in the kitche in order to access the well beneath

it in order to temper the shot. The business passed through various hands until Sheldon and Bush took it over in 1868. The original structure was in use until as late as 1968 when the company relocated to the Bristol floating dock and a modern tower was built. Shot production ceased in 1995.

Above: Sheldon Bush's shot tower. *Bristol Industrial Museum*

Right: Drawing of the shot tower. *b-i-a-s.org.uk*

According to Juan Antoio Soler Jódar the foundry passed to another British Company, Elliot's Metals Co., in 1899 who renamed it Santo Tómas. Elliot's were manufactures of optical and scientific instruments so were probably interested in the copper output from the foundry. As a company they eventually became part of BAE systems. Their tenure was short lived and by 1902 the foundry was in the hands of another Bristol company, and close neighbour of Sheldon and Bush, Rowe Brothers. Rowe Brothers were manufacturers of brass and sanitary ware and had lead rolling mills in Exeter, Birmingham and Liverpool as well as Bristol. As reported in La Crónica Merdional their chief engineer in Palomares was a Mr. H Brown.

It is thought that the foundry closed in about 1903

Two views of the interior of the Santo Tómas foundry taken from Andrés Sánchez Picón's 'La Mineria de Levante Almeriense, 1838-1938'.

The ruins of the Don Guillermo feature in many of the photographs taken around the time of the Palomares Nuclear Incident.

Americans on Parade in front of the ruins.

Loading aircraft wreckage from off the beach

6 The Lonely Tower.

So to the tower which has stood for 170 years by the side of the road leading down to Quitapellejos beach. Several websites, mine included, refer to it as a calcination oven but that, it is not! I had never actually been inside the tower until January 2023 but when I did it was clear that it wasn't a calcination oven at all. By one of life's coincidences, Enrique Fernández Bolea posted a piece on Facebook that same month about the remains of the windmill, the mystery tower.

The tower on Quitapellejos beach.

Apparently, when Guillermo Huelin bought the Elisa foundry, which he renamed the San Francisco Javier, he also bought much of the land between the Vera salinas and the Almanzora river known as Casa Marqués. This was, and still is, an extremely fertile estate and Huelin put it to cereal production, possibly wheat, but it could have been maize or millet.

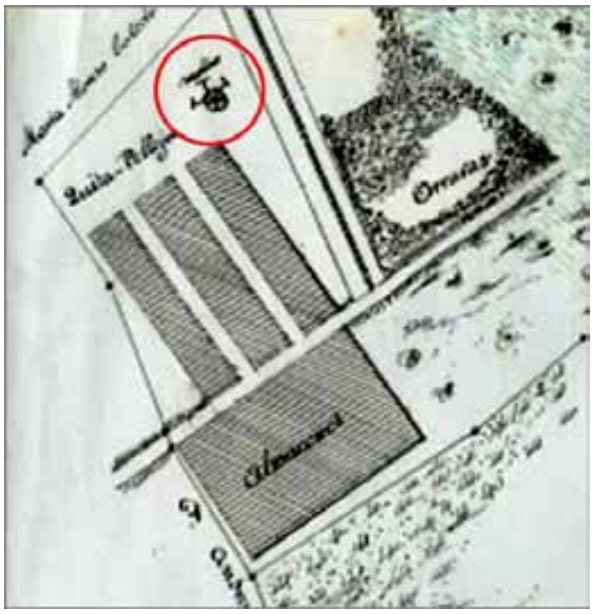
The population of Palomares was burgeoning as Huelin employed more and more workers who moved there with their families, so it made economic sense for him to grind his own flour and sell it to those same workers. The mill was built within two years of him taking over the foundry, but within 20 years it was derelict. The inventory compiled four years after Huelin's death describes 'The masonry and works of a rotational mill, powered by wind, without its sails and in ruins'. The document also gives the circumference of its base as just over 27 meters and describes the miller's house as being 10 by 4 metres and standing 26 metres to the west of the mill.

The reasons for its parlous state are unclear. It could be that on the death of Guillermo Huelin his son Carlos had no interest in maintaining it. It might have fallen foul of a sudden rapid change of wind direction, causing it to 'sink its beak' as the Spanish would say, when the cap of a mill is dislodged, requiring major repairs. It could be that the estate was failing to grow sufficient grain or that other growers were taking their produce to one of the hydraulic mills that existed along the banks of the Almanzora making running the mill uneconomic. Whatever the reason, and, or, reasons, for its demise, the tower still stands and together with Huelin's cortijo, serve as a point of reference in so many of the photographs of the area.

Now, when you think of a windmill, the image which springs so readily to mind is the classic tower with four rectangular slatted sails which feature so largely in Don Quixote. However, a close look at the 1904 map of the holdings of La Compañia de Águilas at Quitapellejos shows the mill as a circle with what look like flags

sticking out of it. Huelin's mill was an Andalucian mill, once common but alas, now only a few ruins survive and only one or two have been restored. One of the best examples is actually not in Andalucia but in Cartagena.

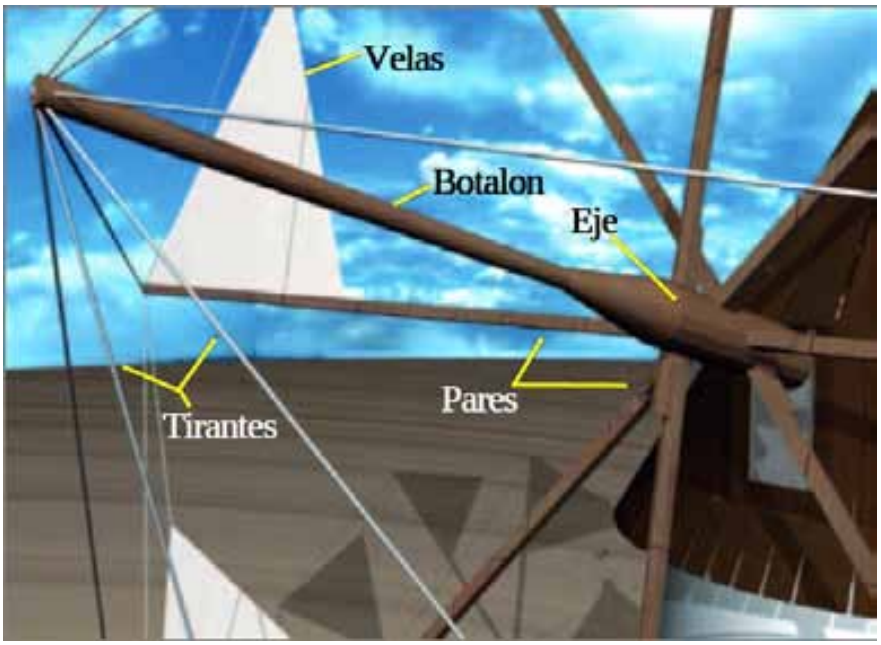
Above: a La Mancha mill which, popularised by Don Quixote, is how most people would imagine a windmill.



The mill (highlighted) is shown on this map as a circle with flags around it. farobedar.com

The reason for this strange representation of a mill becomes clear when you see a picture of an Andalucian mill with its triangular sail-cloth sails. Some mills had 4 sails and others had 8 and as far as I know there is no record of how many sails the Palomares mill had. The 1904 map appears to indicate 4 sails, but by 1904 the mill would have been minus its sails, but could still have had its struts. Either way, they remind me of a jolly, handkerchief waving, country dancer.

A restored Andalucian mill in Cartagena. Cartagena Antigua.



A computor generated image of the sail structure of an 8 sail mill. vela=sail, botalon=boom, eje=axle, tirantes=braces, pares=struts.

Collado Espejo P.E.

The rotation of the sail structure turned the large crown wheel which meshed with a lantern cog causing it to rotate and turn the upper mill stone, the runner, over the lower stone, the bed stone.

Apart from the sails and their arrangement the Andalucian mill is very similar to an ordinary mill. The conical chapitre or cap was made of wooden boards laid over over poles and the whole structure could be rotated by means of the external guia, a massive wooden beam, often a salvaged ship's mast. Surrounding the tower were a series of wooden pillars, sunk into the ground to which the beam could be attached with guy-ropes. Mills had two opposing entrance ways allowing access no matter which way the sails were facing.

The guia can clearly be seen in this picture of the molino del Collado de los Genoveses with the ring of anchor pillars.

José Ignacio Rojas-Sola y Juan Manuel Amezcua-Ogáyar.

The opposing entrances to the mill.

Below the cap was the floor where the mill stones were located which was where the grain was fed in. The resultant flour was passed by chutes to the ground floor. This upper storey was accessed by a spiral staircase, with probably a trap door between the ground and the upper floor to lessen the risks of explosion and fire that flour dust poses.

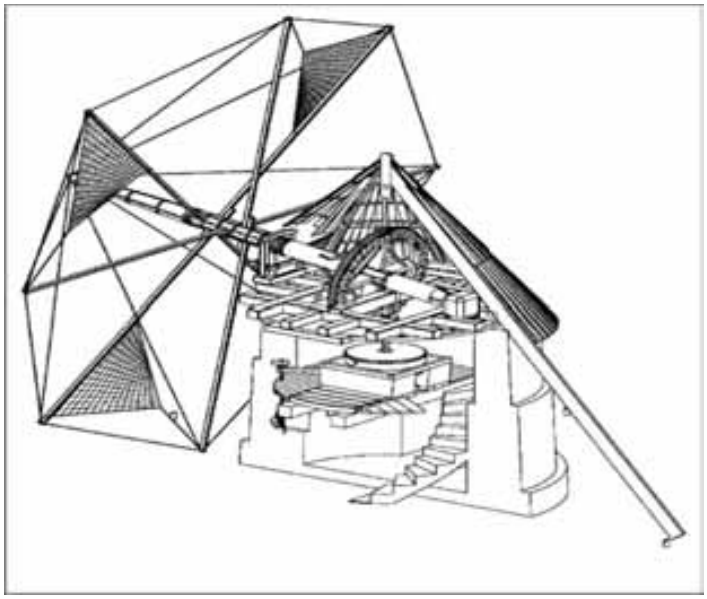
The traces of the spiral staircase up to the top of the Palomares mill.

The ground floor was where the flour was weighed, usually on a steelyard balance known as a romana. I think that the niche in the wall of the Palomares mill accommodated part of a balance of this type. Such a niche is a common feature to be found in the ruins of these mills.

Above: Steelyard balance. *Sheila Terry*

Right: Niche in the wall of the Palomares mill.

The paper, Estudio Grafico y Técnico de Molinos de Viento en Espania by José Ignacio Rojas-Sola y Juan Manuel Amezcua-Ogáyar is fascinating to read. It is a serious study of the wind dynamics of the triangular cloth sail and the more traditional rectangular wooden one amongst other things. The image shown below is the result of multiple precise measurements of the Genoveses mill and gives a very clear picture of what such mills were like.



Computor generated image of the Collado de los Genoveses showing its internal layout.

It would be nice to see an information board next to this lonely edifice if only to lay to rest its misrepresentation as being the remains of a furnace.

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Chapter 3

Villaricos

1 Baria

2 Foundries

3 Brownfield

4 Re-marketed

castillodevillaicos.com

Ciudad de Baria. City of Baria, the present day Villaricos.

1 Baria. the present day Villaricos.

The 19th century mining boom in the Sierra Almagrera and Las Herrerías with the resultant rise in the importance of Villaricos was actually history repeating itself. The first boom occurred at some point in the second half of the 7th Century BC when Phoenician seafaring merchants founded the town of Baria, on the site of the present day Villaricos and also a mining community at Almizaraque, just south of Las Herrerías.

If, like me, your knowledge of Ancient Civilizations was scant I'll share a little of what I've learnt.

The Canaanite people who occupied the narrow strip of land that today encompasses parts of Turkey, Lebanon, Israel and Syria were called Phoenicians by the ancient Greeks. The Romans later described them as Punics. There was never a Phoenician Nation State as such, but rather a confederation of independent city-states such as Tyre, Sidon and Byblos, then later and most importantly, Carthage. Because these states held insufficient land to support a population large enough to raise armies wherever possible they preferred trade to war. Even when the 12th Century BC conflicts with the mysterious Sea People, (possibly the Philistines referred to by the Israelites), at the end of the bronze age raged they managed to maintain, despite occupation, their city-state status based on trade. So, as Greece and Egypt spiralled into decline the Phoenicians continued building their ships and growing the largest Mediterranean trade network ever seen.

Map of the Phoenician world at its height. *curiousstoryofourworld.blogspot.com*

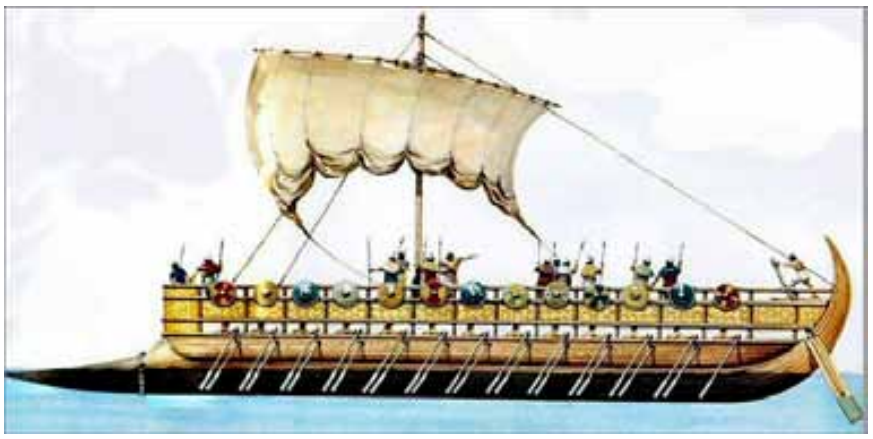
They were great navigators and their broad trading ships circumnavigated Africa, reached as far as the British Isles, and, it is speculated that they even reached the Americas. They had a wily, non aggressive way of defending their more distant trade links. By promulgating myths about sea monsters living in the waters beyond the Straits of Gibraltar few rivals were prepared to venture there for fear of encountering them. While they didn't have armies they certainly had warships and defended their territories and trade routes and weren't averse to enslaving their adversaries. They were master shipbuilders and are believed to be the first to build ships with keels, giving them stability and strength, and they also learnt how to caulk the planks, making them water-tight.

The Phoenicians had three types of ship all of which were steered by an oar-like blade attached to the port side. For fishing, local trade and hauling cedar logs they had small boats which had a carved horse's head at the bow and a single bank of oars. Their fishermen are credited with introducing the 'almadraba' fishing technique which is still used today. Using an underwater labyrinth of nets either fixed or attached to boats, migrating tuna are guided into a final net suspended from a ring of boats, where they are trapped and killed.

A Phoenician small boat hauling cedar logs.
Wikipedia

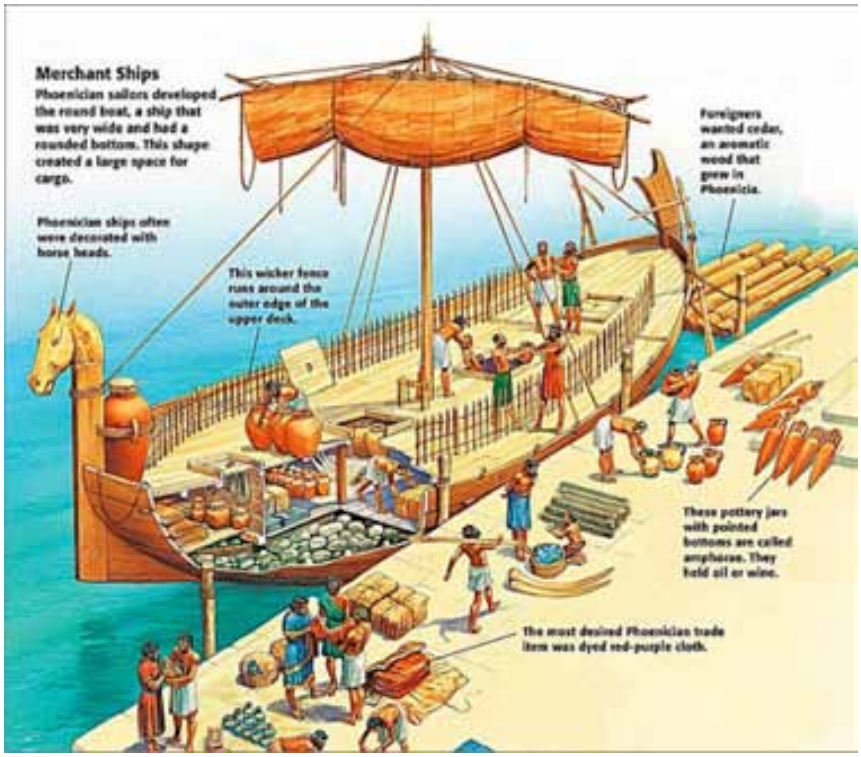
The final net of the 'almadraba'.
net.epicureanways.com

Their warships were long, narrow and shallow keeled, with a convex stern. They were known as biremes and propelled by two sails together with two banks of oars, one above the other. They had a partially covered deck, and were fitted with a fearsome bronze tipped battering ram low on the bow. The forecastle provided a platform for archers and catapults. They were so effective that, when the Romans took Carthage they copied the design of the captured biremes.



A Phoenician warship *weebly.com*

Their cargo ships had wide, big-bellied hulls, with a convex stern and bow, and were much heavier than the warships. They had a giant sail in the centre hung from a yard which could be turned to catch the wind. It is thought that their early ships had a type of fencing on the deck in order to stack additional cargo when the hold was full. On later ships a quarterdeck housed the crew and additional cargo. Their cargo capacity was somewhere in the region of 450 tons. A fleet might consist of up to 50 cargo vessels, and such fleets are depicted in reliefs being escorted by a number of warships. Their ships had eyes painted on them to frighten enemies and the horses head at the prow was in honour of the sea god.



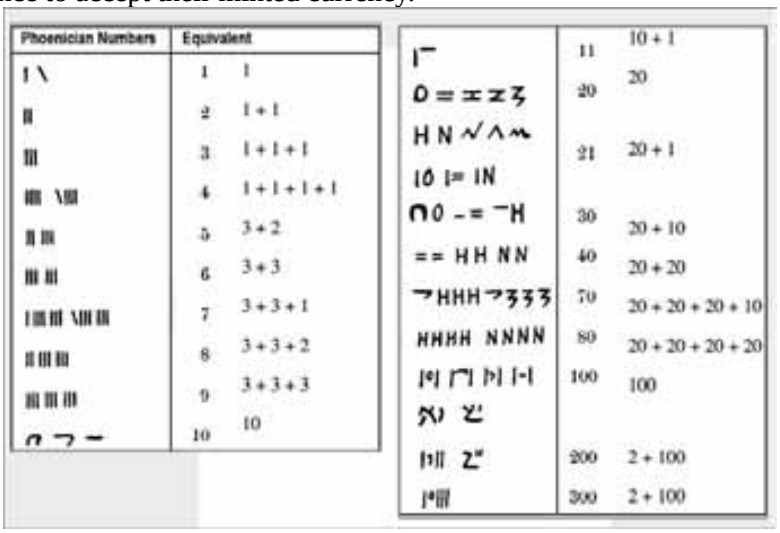
Loading cargo.
weebly.com

The Phoenicia, a replica Phoenician cargo ship. *sailworld.com*

Commerce required accounting systems and the Phoenicians had the mastery of both writing and numeracy. One of their great gifts to our modern world was their alphabet, with 22 symbols indicating sounds, it was the basis of so many ancient and current languages. As they established states around the Mediterranean the system spread with civilizations, such as the Greeks, adopting and adapting it by adding extra vowels. It was a great leveller as ordinary people could understand and use it, writing was no longer the preserve of scribes.

The Phoenician alphabet *weebly.com*

Their numbering system was also very simple, but although worked in base 10 it lacked the ingenuity of the zero, which the Arab world would later introduce, but they did use a comma between numbers. One thing that the Phoenicians were slow to adopt was coinage, preferring to use the weight of precious metals rather than stamped coins. This is thought to have been either because of the breadth of their trading area where various different, non interchangeable coinage systems were present or, they could see how easily it could be manipulated and debased. Another possibility is that they were known to be sharp traders and there may have been a certain reluctance to accept their minted currency.



The Phoenician number system *phoenicia.org*

Although they held few territories, their systems of land management were widely copied. Crop rotation, irrigation and the use of manure as fertilizer optimized the returns on the land which they had. They introduced olives and grapes to Spain and many other areas around the Mediterranean and traded beautifully crafted artefacts, wine, olive oil and grain for other commodities, one of the most important of which was metals.

In the 7th century B.C. it is thought that the Almanzora was navigable at least as far as its confluence with the Rambla de Muleria and that the coast line was just south of the Palomares outcrop with much of the present Casa Marqués estate underwater. The area we know as Villaricos was attractive to the Phoenicians for several reasons. The small bay to the east of the castillo had water deep enough to provide anchorage for both their fighting ships and their bigger trading vessels. The Almanzora provided protection from raiders from the west, while the land on its eastern bank was sufficiently elevated to be suitable for a defensive position. In addition, the lands of Natí, Dirí and Almizaraque were extremely fertile, thanks to fluvial flooding by the river, so crops could be grown to support the population.

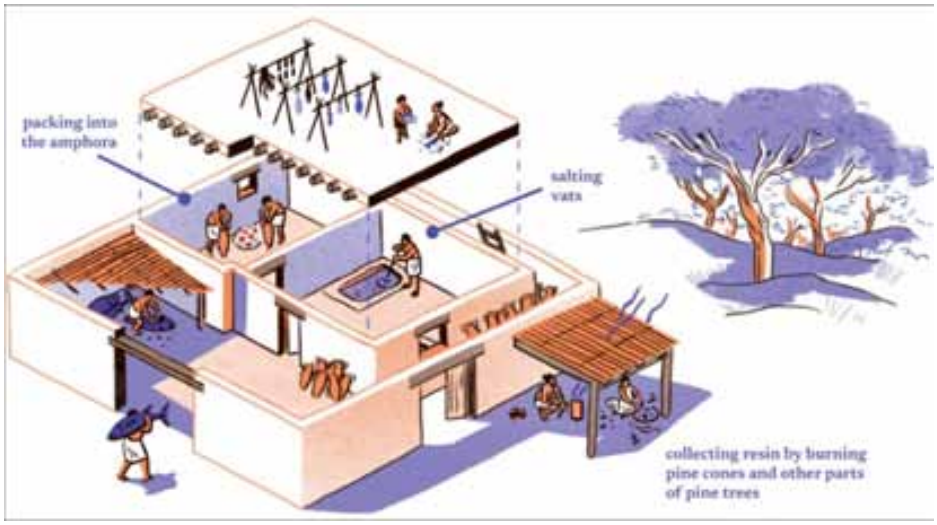
The residential area was in the present day nucleus of Villaricos. The houses were well built with good foundations and thick walls, arranged in more or less straight streets. To the North of the present Los Conteros urbanization was the town's necropolis and to the East of this, the acropolis with its temple dedicated to the goddess Astaré. The territory of Baria extended as far a Mojácar, taking in Turre, los Gallardos, Antas, Vera and Cuevas.

Phoenician Baria *Google screen shot.*

The coastal area between the Castillo and the town was given over to salazones where fish was salted and garum produced. Salted, air dried tuna know as majama is still a delicacy in the region today and is comparable to air dried beef or pork. Garum, the umami flavoured sauce, was made from the otherwise unusable parts of the fish used in the salazón production.

The siting of these factories was influenced by the availability of salt from the nearby salinas or salterns, water, from wells and the river, and local clay for the manufacture of amphorae.

In the salazones tuna and other varieties of fish were trimmed, gutted and filleted then interlaid with sea salt in rectangular vats and left for a few days. They were then washed in freshwater and hung to dry. When ready they were packed into amphorae whose interior had been sealed with pine resin. These containers were capped with either cork or clay and stored to await shipment. They were carefully loaded into the hold where they were kept upright by inserting the tapered bases into ballast and then roping them together.

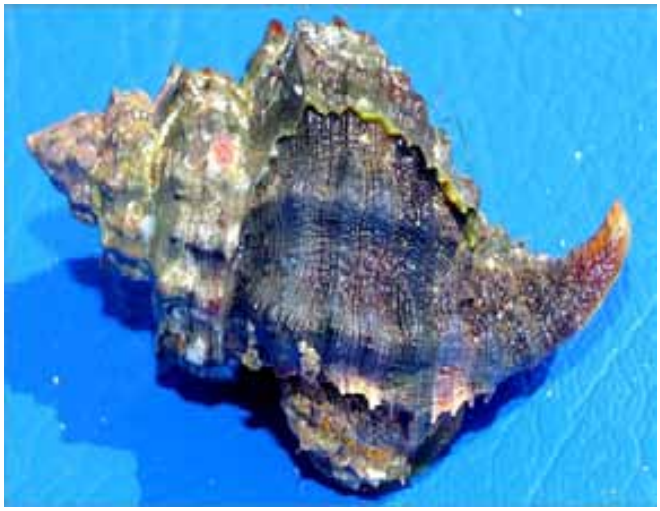


The lay-out of a Salazón. *planettuna.com*

Garum was made from the waste of the fish, the blood, soft organs, intestines, seminal fluid and eggs. These parts were placed in a wooden or terracotta container along with a mix of aromatic herbs and spices and copious amounts of salt. The mass was left to ferment in the sun for two to three months and stirred occasionally until it had reduced. Although garum smelt awful it wasn't putrefied. Through fermentation, the salt and enzymes broke down the organic substances into simpler compounds. Decomposition was not the result of bacterial action but due to enzymes present in the fishes' viscera which broke down the proteins. This process was accelerated by exposure to the sun and the presence of salt which drew water out of the tissues. The resulting briny pickle prevented oxidation and spoilage.

Preparing the herbs and spices for the garum. *Visor de libros*

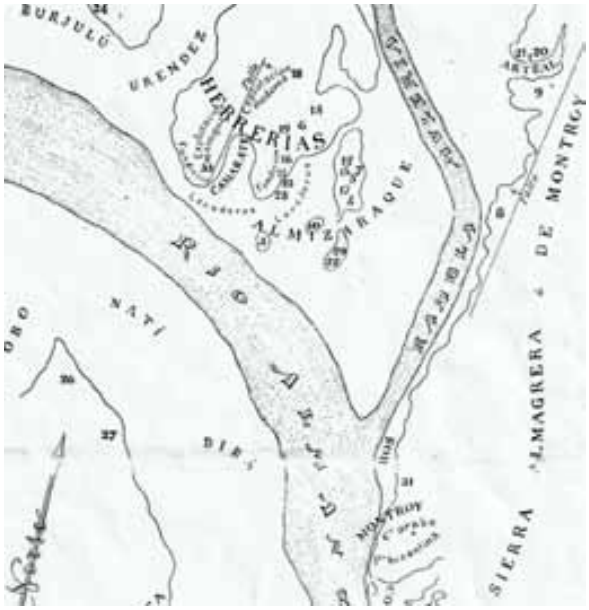
It is thought that the famous dye, Tyrian Purple (also known as Royal or Imperial purple), named after the city of Tyre, was also produced in the area around the salazones. Unusually though, here it is thought to have been produced from the Janthinas sea snail rather than from the more usual Murex snail. Luis Siret noted accumulations of crushed Janthinas shells but no accumulations of crushed Murex shells. Both are predatory gastropods which were harvested for the extraction of dye. The snails were crushed and the mucous secretion from the hypobrachial gland, similar to an ink sac, collected. In nature this secretion, an organic compound of bromine, serves as a defence mechanism by sedating predators. The glands were removed, placed in lead pots filled with brine, and heated slowly for a few days. After cooling, the gland fluid turned from pale cream to purple, a process accelerated by exposure to sun light. Like the production of garum, the production of Tryian Purple was extremely malodourous.



Banded Dye Murex *academicaccelerator.com*

Janithas, or Violet Sea Snail, held afloat by its bubble raft. *Wikipedia*

Important though the fish, garum and dye industries were they were secondary to the exploitation of minerals. The Phoenicians didn't find an empty landscape when they arrived, there were people already living in the area, and had been since neolithic times. The indigenous population traded with the incomers and either became absorbed into their culture or migrated towards Vera and beyond. They were already surface or shallow mining lead and copper in the foothills of the Sierra Almagrera but they had no regard for the silver content of ore. On the other hand, the Phoenicians valued it greatly and found the silver lodes that existed to the west of the Herrerías fault line. In order to extract the silver content of the ore they traded quality goods with the locals in exchange for the argentiferous galena mined in the Almagrera. The galena was crushed and washed and added to the Herrerías mineral. The mixture was then roasted and smelted producing pure silver and a by-product of lithage. The washing floors and foundries were in the Las Rozas area and the people that worked in them and in the mines settled in the area known as Almizaraque which had been occupied since Neolithic times. A fence protects the small mound where the site was.



Luis Siret's plan of Las Herrerías showing the sites old metallurgical installations. Villaricos y Herrerías.

Google screen shot of the same area.

As the Roman Empire became more powerful it set its sights on the rich city of Carthage and after a series of battles, known as the Punic Wars, the city fell. It was the beginning of the end of the Phoenician civilization. The Romans could not be bought off with trade deals and one by one the states were brought relatively peacefully under Roman control. Baria was an exception, the people here fiercely resisted the Romans but in the end it was to no avail, the town and the acropolis were in ruins.

The Romans initially populated the areas between the Almanzora and the Castillo, and where the Los Conteros urbanisation is today. Later they moved a little further inland and built on the slopes of the Cerro de Montroy. This fortified settlement was crowned with an acropolis and a watchtower. Much later, the Arabs used the tower's foundations as a base for their atalaya or watchtower.

Foundations of the towers. A G Jódar

Google screen shot of Roman sites.

Looking up to the Cerro de Montroy

While the Roman town was never very large, it was quite an important industrial settlement and marked the limit of the province of Bética. The Romans constructed further salazones and continued to salt fish, and produce garum and purple dye. Again, like the Phoenicians, their real interest was in the mining and processing of metals. They had a foundry on the slopes of the hill on which the Phoenician acropolis was located and they mined at Las Herrerías and at el Arteal. The el Arteal mine, known as the Mina Romana, is a fine example of Roman mine. Its gallery walls look as if they have been cut by machine and the ventilation is excellent. Unfortunately, a relatively recent fall has blocked the main gallery and it is no longer possible to follow it right the way to the Casa de Vacas mine.

There was talk in 2016 of developing the Mina Romana into a tourist attraction but nothing has come of it as the funding was allocated to other projects following a change of party in Cuevas. For now it's there for anyone who finds it to enter it.

The entrance to the Mina Romana

The main gallery and the entrance to a second level.

A coffin gallery in the mine.

A ventilation shaft

Above right and bottom two photos, Mario López Martínez

Civilizations rise and fall. The Romans gave way to the Visigoths, who in turn were conquered by the Muslims. Some mining continued around Baria but appears to have ceased in the 13th century when the coastal settlements were abandoned and the Muslims retreated inland. The name Baria fell into disuse along with the buildings and were soon forgotten.

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Baria, the present day Villaricos.

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Villaricos

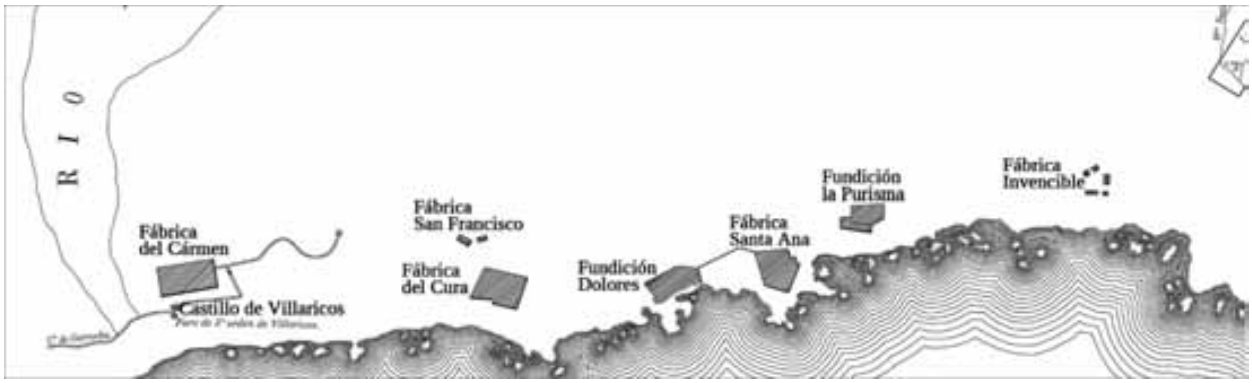
2 Foundries

1 The Carmelita **2** The Esperanza **3** The San Francisco
4 The Santa Ana **5** The Purisma **6** The Dolores
7 The Invencible **8** The Esperanza II **9** The Boliche del General

Aeronomadas Indalo Paramotor

Smelters, Serpents, Smokestacks and Slag.

The 1838 mining fever that gripped the Sierra Almagrera spilled over into Villaricos when the owners of the most productive mines decided to process their own ore rather than sending it to independent foundries. The proliferation of these establishments came in two main stages reflecting the vacillations of the mines' fortunes. The first stage saw the establishment in Villaricos of the Carmelita, the Esperanza, and the Tres Amigos (San Francisco) foundries. Followed by the Santa Anna, Dolores, Purísma Concepción and the Invencible. Later, the Esperanza II also known as the Fabrica Nueva.



Plan of locations. This plan showing the locations of the Villaricos foundries was drawn up before the Fabrica Nueva was built.

The approximate locations of the Villaricos foundries. *Google.*

1 The Carmelita.

In 1842 the Carmelita (or Carmen) foundry was built on the ruins of Roman Baria, today the site of the los Conteros urbanisation. Ezquerra del Bayo describing the foundry recounted that all of the material for its construction came from the foundations of that ancient city. Although the building of the foundry uncovered some treasures, marble columns, inscriptions, amphorae, utensils etc. no evidence of a temple or magnificent villas were discovered so he surmised that Roman Baria was a settlement of mine and foundry workers rather than one of private wealth or important governance. As he pointed out, in Roman times, there were no mine owners nor shareholders as everything belonged to the state. He was also perceptive enough to remark that the new town of Villaricos had been built for the same reasons as Baria had been, and would, when the boom was over, once again fall into obscurity.

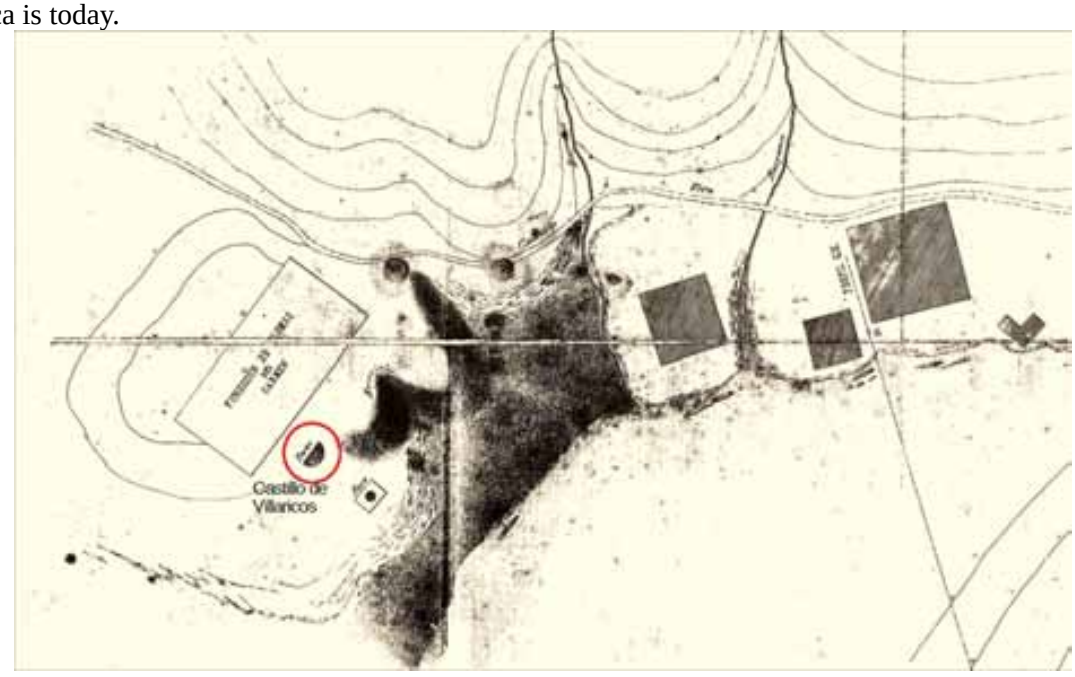
The owner of the Carmelita was Manuel Soler Flores, one of the principal shareholders in the Carmen mine. The early days of the foundry were not very successful due to inadequate calcination of the ore. Undeterred, Soler Flores went to Germany and returned with two German engineers who transformed the fortunes of the foundry by completely remodelling it. Pascual Madoz recounted that within the confines of the Carmelita there existed a primitive smelt house that had been made redundant by the new installations, so it would appear that they started again from scratch. At the time of Madoz's visit in 1845 there were eight ore hearths,

and one English and two German cupellation ovens, the blast for all of which was supplied by a 10hp steam engine.

In 1842, in order to raise capital for further expansion, Soler Flores formed the Carmelita society. 64% of the shareholders were also shareholders in the Carmen and Consortes mining company, while the others were local dignitaries with interests in other mines and foundries. Madoz described the expanding foundry, where a bank of a further eight furnaces, a new engine house, and a 30 metre chimney at the end of the condensation tunnels were in the process of being constructed. The site also boasted a magnificent modern house for the director, and premises for the accountant and the warehouse guard. There were other premises for visiting partners as well as accommodation for the foundry operatives.

One interesting thing that Madoz described was “un brocardo para moler las tierras margas para las cupelas”. I have translated this to mean a pug mill to prepare the clay for making the cupels used in the cupellation furnaces. This is the first time that I have encountered any mention of using clay for cupels. Normally bone ash was used, the Madrileña foundry on the other side of the Almanzora had a bone calcining furnace for that very purpose. However, research indicates that either or both could be used provided that the clay was properly prepared, hence the need for a pug mill. It is unclear from Madoz’s account whether it was animal or steam powered.

The Carmelita processed ore from the mines Ánimas and Carmen with 80 workers keeping the furnaces running 24 hours a day. Although successful the foundry ran into trouble when the prices began to fall. Despite these fluctuations, the shareholders continued to expect the same dividends as previously to the point where they bled the company dry. When things picked up again Manuel Soler Flores’s son, Francisco, bought and reopened the foundry and operated it profitably until the end of the 19th Century. Enormous amounts of slag from the smelting process were dumped on the site of the Roman and Phoenician salazones in the area below the castillo completely covering any remains, and extending down to where the Puerto de la Balsica is today.



The extent of the Carmelita slag heaps can be seen in the plan.

From Enrique Fernández Bolea’s Facebook post El Faro de Villaricos.

All that remains of the Carmelita today is vestiges of the condensation tunnels extending up towards the Galasa building.

The remains of the Carmelita condensation tunnels.

Pedro Perales Larios

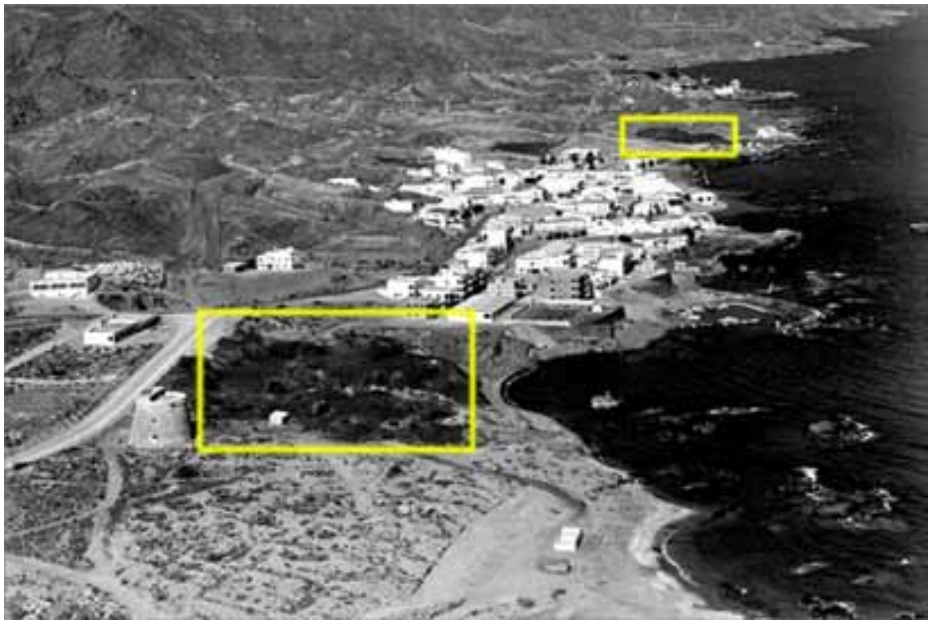
2 The Esperanza.

The second foundry to open in Villaricos, also in 1842, was the Esperanza, known as the Fabrica del Cura because its principle promoter was the parish priest of Cuevas, José Sanchez Puerta. Like Soler Flores, Sanchez Puerta formed a society to raise capital. In this case the principal shareholders were also shareholders in the Esperanza mine. It was a more modest affair than the Carmelita, having eight furnaces and employing 90 workers. A few years later it was taken over and run for a while by Antonio José Romero, the owner of the Aguila Mine and the San José de Águilas foundry. At some point, probably in the 1850's, it was acquired by Manuel Soler Gómez and continued to be profitably operated by his heirs until the turn of the century, processing ore from both the Almagrera and from Las Herrerías. Ore was also imported from other areas, brought in by the company's own ships. Evidently the foundry had been expanded and updated since it also imported vast quantities of coke from England which would have been used in more modern furnaces.

The Esperanza was situated at the Northern end of Villaricos in the area of the present day Esperanza Port and the site of the massive Harbour Lights urbanisation. Apart from the layer of fine grey material underfoot indicating where the extensive slag heaps were, nothing of this foundry remains.

The site of the Esperanza (Fabrica del Cura)

Google



The remains of Esperanza's slag heaps can be seen on the right hand side and those of the Carmelita are in the foreground.

Enrique Fernández *Bolea's Facebook post El Faro de Villaricos*

3 The Tres Amigos / San Francisco

The third foundry to be built in Villaricos was the Tres Amigos. It was situated in the area to the west of the primary school and its stepped, rectangular draw chimney is still standing on the hill on the other side of the Villaricos by-pass. This foundry was opened in 1847 by a group of Madrileños headed by the Duke of Riansares, the husband of María Cristina, the regent who was contentiously holding the throne for her daughter Isabella. Compared with the Esperanza and the Carmelita it was a modest affair having 8 furnaces with the air blast provided by bellows using mules or donkeys as the motive force. It was short lived and closed in 1856. However it was modernized and reopened in the 1870's by Alarcón Pérez y Compañia and renamed the San Francisco.

The draw chimney of the Tres Amigos/San Fransico.

Pedro Perales Larios

4 The Santa Ana.

Santa Ana was built at sometime between the two stages of development. In the first half of the 19th Century the mouth of the Almanzora was choked with sediment and large areas of swamps had formed in the area below the castle. Malarial bearing mosquitoes seriously affected the workforce of the Carmelita foundry during the summer months. In order to continue production, a summer only foundry was built on the promontory known as the Piedra Llana, the flat area where the original Deretil buildings are. A series of floods in the 1880's flushed the swamps and reconfigured the river mouth rendering the Santa Ana unnecessary. It was sold to Jóse Soler Gómez, the brother of the owner of the Esperanza. Its draw chimney is situated in the confines of the Deretil factory on the hill opposite the promontory.

The draw chimney of the Santa Ana. *Pedro Perales Larios.*

The site of the chimney in the confines of Deretil *Google*

6 The Purísma Concepción Segunda.

The first foundry of the second wave was the Purísma Concepción which opened in 1874. It was titled the ‘second’ to distinguish it from the foundry of the same name at Pozo del Esparto. It was situated in the area just past the Deretil promontory and belonged to Bernabé Soler y Segura. Little is known about this foundry which was very short lived operating for only one or two years. It was reopened as the San Juan a little while later and was then taken over by one Juan Nuñez who processed silver there for a short while. Several sources erroneously cite his workshop, the Taller de Desplatación de Juan Nuñez as having been at the site of the Fabrica Nueva. The remains of its draw chimney are in the North Eastern confines of the Deretil complex.

The draw chimney of the Purísma Concepción. *Pedro Perales Larios*

6 The Dolores.

Another Soler Gómez brother, Pedro, opened the Dolores foundry in 1875 in the area between the Esperanza and the Santa Ana, and the two foundries worked in tandem. Both were well equipped and operated almost continually until the start of the 20th Century. Power for both foundries was provided by steam, using sea water in the boilers and coke imported from England. Ore from the foundries was loaded from metal quays rather than from the beach. A few remains of the foundry are just about still standing on the Cala Dolores beach.

Ruins of the Dolores on the beach.

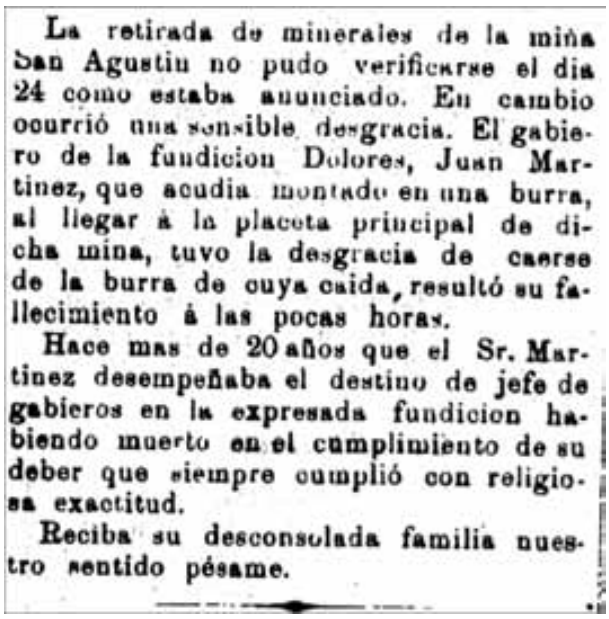
Possible ruins of the furnace housing.

The Dolores condensation tunnels circle the hill which is surmounted by the draw chimney to the west of Deretil.

The Dolores condensation tunnels and draw chimney (highlighted).
Google

The Dolores draw chimney.
Pedro Perales Larios.

When researching the Villaricos foundries I chanced on the following notice tucked away in the Miscellaneous section of El Minero de Almagrera periodical for the 2nd September. 1897.



La retirada de minerales de la mina San Agustin no pudo verificarse el dia 24 como estaba anunciado. En cambio ocurrió una sensible desgracia. El gabiero de la fundicion Dolores, Juan Martinez, que acudia montado en una burra, al llegar á la placeta principal de dicha mina, tuvo la desgracia de caerse de la burra de cuya caida, resultó su fallecimiento á las pocas horas.

Hace mas de 20 años que el Sr. Martinez desempeñaba el destino de jefe de gabieros en la expresada fundicion habiendo muerto en el cumplimiento de su deber que siempre cumplió con religiosa exactitud.

Reciba su desconsolada familia nuestro sentido pésame.

Article in el Minero de Almagrera.

'The transport of minerals from the St Augustin mine could not take place on the 24th as announced. Rather, a serious misfortune occurred. The manager of the Dolores foundry, Juan Martinez, was riding on a donkey, when, on reaching the main plaza of said mine, had the misfortune of falling off the donkey, which resulted in his death. He died within a few hours.

For more than 20 years Mr Martinez held the position of general chief in the aforementioned foundry, having died in the performance of his duty, which he always fulfilled with religious exactness.

His heartbroken family receives our sincere condolences.'

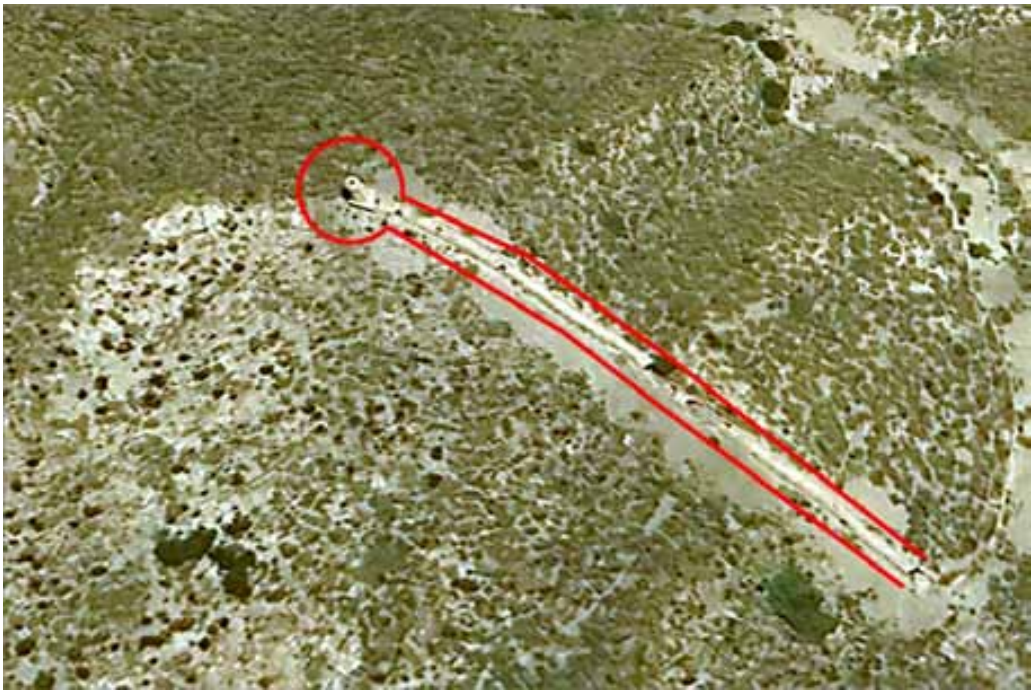
7 The Invencible.

The remains of the Invencible foundry are impossible to miss if you are travelling along the coast road. The arches under which the furnaces were situated and which supported the condensation flues resemble railway arches. The road, when it was built, cut through the foundry. The blast for the furnaces was supplied by steam.

The remains of the Invencible arches

Some of the Invencible's remains on the other side of the road.

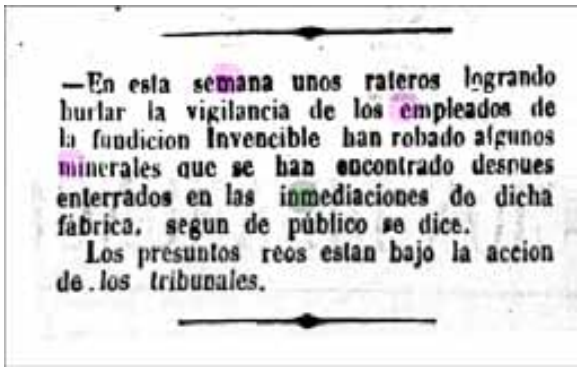
Apart from the arches, the condensation tunnels and the draw chimney everything else is in a very poor state. The property of Abellán Soto y Compañia, it is thought to have opened in 1875. Like the Purísma Concepción it only operated for a few years although Antonio Abellén's other foundry, the Atrevida, in Las Herrerías, operated until 1899.



The condensation tunnels of the Invencible. *Google*

The draw chimney of the Invencible. *Pedro Perales Larios*

While trying, unsuccessfully, to find out more about the Invencible I came across this bit of information in El Minero de Almagrera 24th July 1877.



—En esta semana unos rateros logrando burlar la vigilancia de los empleados de la fundicion Invencible han robado algunos minerales que se han encontrado despues enterrados en las inmediaciones de dicha fábrica, segun de público se dice.

Los presuntos reos estan bajo la accion de los tribunales.

‘ - This week some thieves managed to evade the surveillance of the employees of the Invencible foundry. Some minerals have been stolen and later found buried in the vicinity of said factory, according to the public. The alleged prisoners are under court proceedings.’

8 The Esperanza II or Fábrica Nueva.

In 1900 reports were circulating that the Compañia Metalúrgica de Mazarrón were looking to build a foundry in Palomares. The local mining gazette El Minero de Almagrera of 29th August, 1900 was very scathing about the project, pointing out that there were already a plethora of foundries in the Garuucha, Palomares and Villaricos area. They also highlighted the elevated costs of transporting ore from the Sierra Almagrera to Palomares and the difficulties of crossing the Almanzora river. In the event, the company did not proceed with the project and I did wonder if they then decided to build the foundry further along the coast called the Esperanza II, more commonly known as the Fabrica Nueva. As with so many of my thoughts I now know that I was mistaken. It was in fact built by the Compañía Metalúrgica de Villaricos which was formed in 1908. It was funded by the Marquis of Portago, former mayor of Madrid and Manuel Rodríguez-Acosta, businessman and banker, with the mining engineer Juan Figueras de Vargas y Coche as the administrator. Figueras was married to Magdalena Martínez Soler, a member of the all important Soler dynasty which may explain why ownership of the Esperanza II is credited to Don Pedro Soler on the information board at the site.

The name of the foundry probably comes from the fact that its construction was overseen by a former director of the Esperanza foundry in Villaricos, Manuel Pérez Flores.

The ruins of the FUNDICIÓN "FABRICA NUEVA"
The fishermen called it the New Factory, which suggests that it was built after the others which follow along the same coast. However, that isn't its name, it should be called the Esperanza II. The owner, Don Pedro Soler, gave it that name because there was a previous Esperanza. … … ...

The information board

Flores and Juan Figueras certainly knew how to construct a good foundry. Water for its construction was piped from the Almanzora, and two lime kilns for the necessary mortar together with two coking ovens were built taking advantage of the steep slope up from the coast. The battery of Piltz furnaces were also built into the slope so that they could be charged from the upper level and emptied at the lower one, with the condensation flue running along the upper level. This main flue then encircled the higher outcrop, closely following the contours, and ending in the draw chimney.

The upper furnace loading area.

The battery of furnaces from the lower level.

The second, prominent, stepped flue, seen on the other side of the coast road served calcination ovens which were probably arranged in the normal manner around a mineral patio. The coast road was built over the area where they were situated.

The stepped flue from the now disappeared calcination ovens.

The condensation tunnels following the contours.

The upper and lower working area were served by road or more likely railways, linking them to a wharf, accessed via a cutting. A support for the upper link can be seen from the coast road.

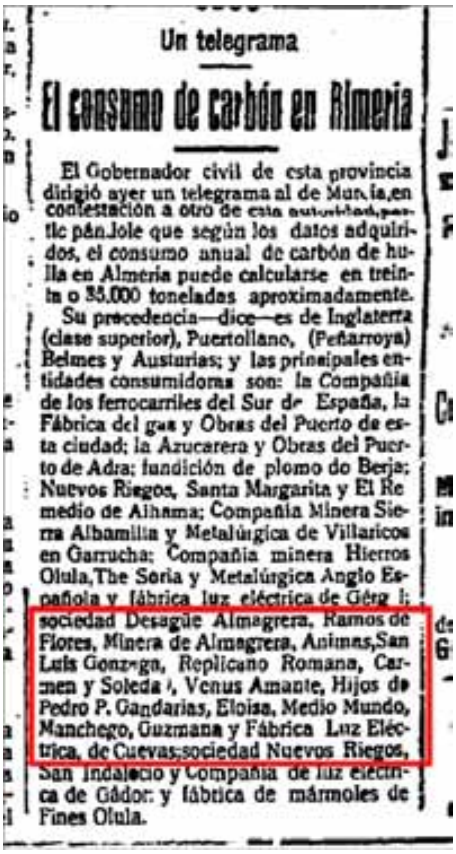
A view of a support for the haulage way to the upper level.

Another prominent feature of the Esperanza site is the tall chimney close to the sea. An aerial view reveals that this boiler house is part of an L shaped group of buildings, thought to have been a forge and workshops. What is less obvious is that there is a similar shaped group of buildings, close to the coast at the other end of the site, near to the remains of the lime kilns and coking ovens. These probably comprised of accommodation, offices and store rooms.

The boiler chimney.

This Google Earth view shows the extent of the Esperanza II site.

The date of the foundry's closure is uncertain, but is thought to have been around 1916. I found the company's name in a newspaper article, listing the top importers of coal for 1915 but after that I could find no further mention. The article listed several of the Almagrera mines which were also still continuing to operate.



Un telegrama

El consumo de carbón en Almería

El Gobernador civil de esta provincia dirigió ayer un telegrama al de Murcia,en contestación a otro de esta autoridad,participándole que según los datos adquiridos, el consumo anual de carbón de hulla en Almería puede calcularse en treinta o 35.000 toneladas aproximadamente.

Su procedencia—dice—es de Inglaterra (clase superior), Puertollano, (Peñarroya) Belmes y Asturias; y las principales entidades consumidoras son: la Compañía de los ferrocarriles del Sur de España, la Fábrica del gas y Obras del Puerto de esta ciudad; la Azucarera y Obras del Puerto de Adra; fundición de plomo de Berja; Nuevos Riegos, Santa Margarita y El Remedio de Alhama; Compañía Minera Sierra Alhamilla y Metalúrgica de Villaricos en Garrucha; Compañía minera Hierros Olula,The Soria y Metalúrgica Anglo Española y fábrica luz eléctrica de Gérgal; sociedad Desagüe Almagrera, Ramos de Flores, Minera de Almagrera, Animas,San Luis Gonzaga, Replicano Romana, Carmen y Soledad, Venus Amante, Hijos de Pedro P. Gandarias, Eloisa, Medio Mundo, Manchego, Guzmana y Fábrica Luz Eléctrica, de Cuevas;sociedad Nuevos Riegos, San Indalecio y Compañía de luz eléctrica de Gádor: y fábrica de mármoles de Fines Olula.

La Independencia newspaper of 21 February, 1916 provides a list of mines and power stations that were still operational.

9 The Boliche del General.

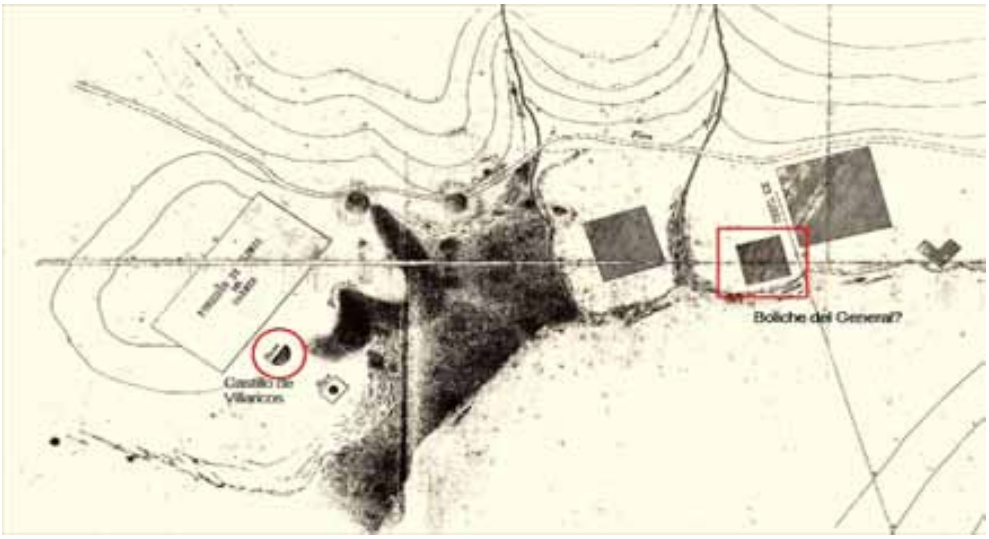
On the beach, just before the remains of the Dolores foundry is a very primitive smelter similar to the old bole smelters that existed in 18th century Britain. It is known as the boliche del general and if little is known about the Taller de desplatación de Juan Núñez, even less is known about the Boliche del General. In the long article pouring cold water on plans of the Compañia Metalúrgica de Mazarron to open a foundry in Palomares the Minero de Almagrera lists the foundries already existing along the coast. One of the listed foundries was the Boliche del General. There was a certain amount of journalistic licence in inferring that all of these foundries were still operational in 1900 because they were not. The Purísma Concepción and the Invencible definitely weren't, and I am almost certain that the Boliche del General had long since ceased to exist and that the only trace of it then was the same primitive smelter that is there to this day.

Two views of the rudimentary furnace of the Boliche del General.

de la produccion de mineral.

Estas fábricas se denominaron Purisima Concepcion, en Pozo del Esparto; Invencible, Purisima Concepcion 2.ª, Santa Ana, Dolores, Boliche del General, Esperanza, San Francisco y Carmen en Villaricos; Duro, en Casa-Marqués; Lavadero de los Franceses, Araucana y Atrevida, en Herrerias; Encarnacion y San Antonio, en Tomillar. Un poco mas distante, San Javier, Don Guillermo (hoy

El Minero de Almagrera 29 August,1900



From Enrique Fernández Bolea's Facebook post El Faro de Villaricos.

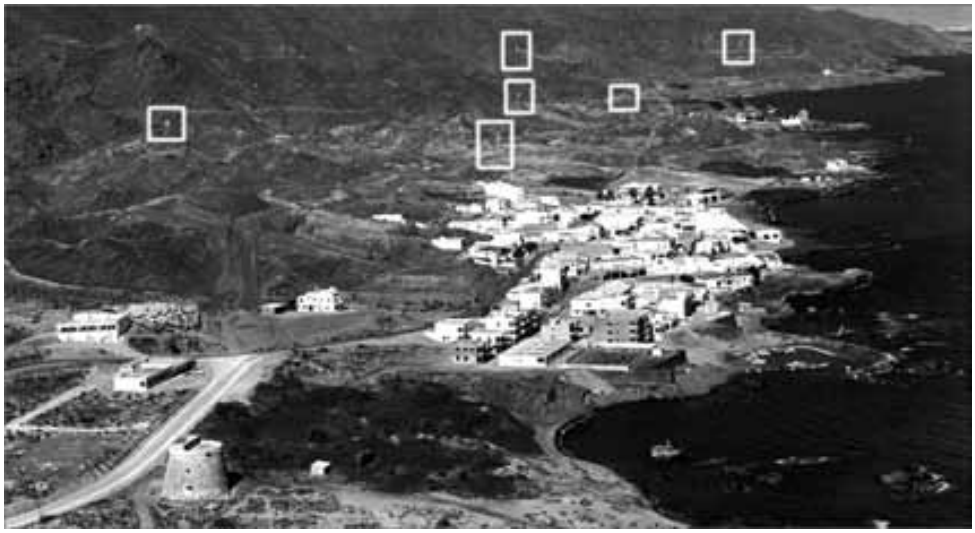
However, a closer look at the plan of the foundries shows five significant buildings, from left to right these are, the Carmelita, Esperanza, an unknown foundry, the Dolores and lastly, the 'V' shaped Santa Ana. Could this unknown foundry be the Boliche del General?

Thanks to Juan Antonio Soler Jódar I now know that it was the Boliche General and the eponymous General was Blas Requena Fernández and the proper name of the foundry was the Confabulación. It was registered in 1851 and the only other mention is that it was producing lead ingots in 1853.

At least the primitive furnace of this foundry remains.

Apparently there was a further and hitherto unknown foundry in the area of which nothing remains. It was owned by an Englishman named only as Don Federico. Registered in 1865 and called the Santo Domingo, this one was situated in the area just beyond the Esperanza port, in the area known locally as the Lomo del Boliche. A name that I always took to be a reference to the Esperanza foundry

A closer look at the photograph taken of Villaricos in the 1970's shows the vestiges of all of the foundries apart from the Boliche del General and Esperanza II. Of the Carmelita and the Esperanza only sections of the slag dumps are still present, while the chimney of the San Francisco can be seen but not its dumps. The chimneys and the remains of the dumps of the other foundries can all be seen.



The draw chimneys, with the exception of the Esperanza II, are highlighted in this photograph.

Enrique Fernández Bolea.

Locations of the draw chimneys. *Google.*

When you consider that in the old photograph we are looking at just the vestiges of the scoria. Fran Mulero's drone shot of the remains of the slag dump at el Tomillar give some idea of the magnitude of some of those of the Villaricos foundries, particularly those which operated for a number of years. Lately, the el Tomillar dump has been excavated, possibly for reprocessing, leaving only its outer edges but it still gives an idea of the sheer size of the dump.

Fran Mulero's drone shot of the remains of the el Tomillar slag heap.

There are still remains of slag heaps around Villaricos and they don't seem to bother anybody. Of more concern is the concentration of finer, looser waste material on the slopes above the Villaricos by-pass. After really heavy rain these deposits, in the form of black sludge, surge into the village flooding houses and drains.

Bibliography.

I am indebted to Antonio González Jódar, Juan Antonio Soler Jódar, José Berruezo García and M.ª Magdalena Navarro Arias and their paper ‘Copper mining and metallurgy in the east of Almeria (19th and 20th centuries): the example of the Esperanza Segunda Smelter (Cuevas del Almanzora).

Atlas Illustrado de las Fundiciones del Levante Almeriense (SS. X1X-XX), Juan Antonio Soler Jódar, Magda Navarro Arias, José Berruezo García and Antonio González Jódar.

For information on the other Villaricos foundries I have drawn heavily on Enrique Fernández Bolea’s book: Sierra Almagrera y Herrerías: Un Siglo de Historia Minera, and on his Facebook post El Faro de Villaricos. Special thanks go to Pedro Perales Larios for his photographs of the various chimneys from his Facebook post Fundiciones Mineros en Villaricos.

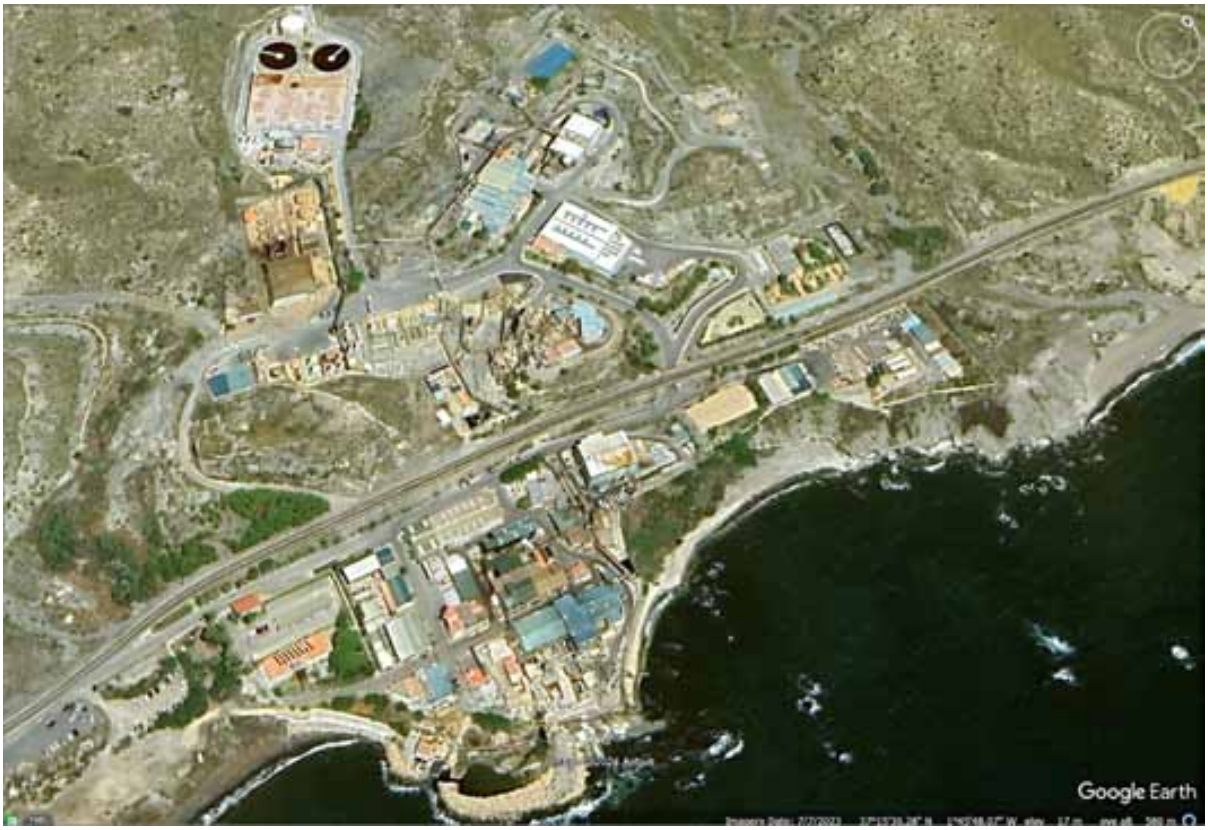
Datos y observaciones sobre la industria minera. Joaquín Ezquerra del Bayo, and
Diccionario Geografico y Estadistico Historico de España y sus posesiones de Ultramar. Madoz both give contemporary descriptions of some of the foundries.

The Almería Archives. Archivo Biblioteca. www.dipalme.org holds back-copies of el Minero de Almagrera and all of the other historic regional newspapers and is subscription free.

Villaricos

3 Brownfield

Deretil develops the Santa Ana foundry site.



Google Earth shot of the Deretil site from 2023

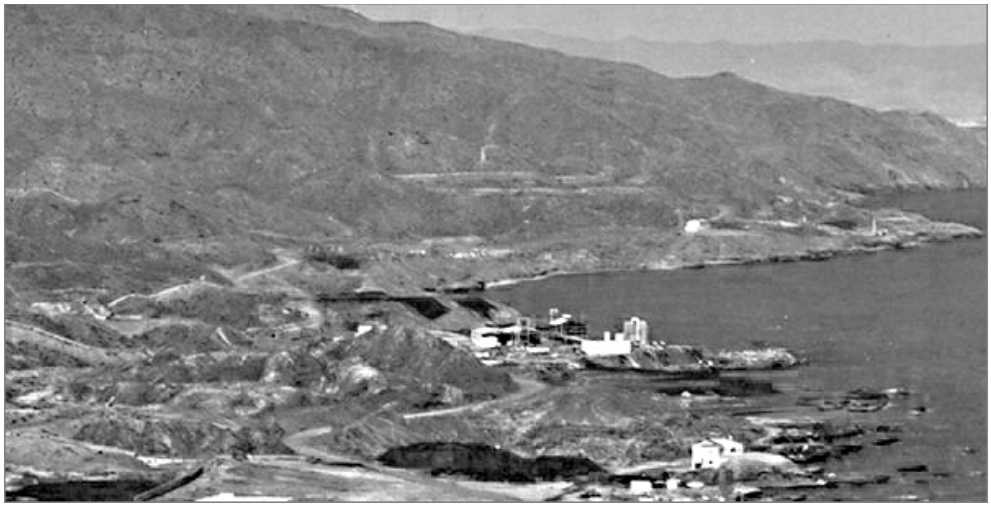
Deretil develops the Santa Ana foundry site.

Currently, the sole industry in Villaricos is that associated with the pharmaceutical company Deretil which has a 'special relationship' with Cuevas del Almanzora and Villaricos. The history of Deretil's presence in Villaricos goes back to the hardship years following the collapse of the mining industry and then, shortly after, the collapse of fishing and farming activities due to the American nuclear incident of 1966.
Post Civil War Spain operated on a system of autarky where national companies needed to compensate for the paucity of countries willing to export to the Franco regime by being as self-sufficient as possible. One such company was the Barcelona based Deretil, Derivados del Etilo, S.A. (ethyl derivatives) who produced Dibromoethane fuel additive used as an antiknock agent in leaded petrol and polybrominated diphenyl ethers used in anti flame retardants. A principle ingredient of both products was bromine, which was also an important constituent of the much needed fertilizers and pesticides which the company was looking to produce. At the time most bromine was imported, so the hunt was on to find a viable national source of it. According to the company's account, the sea water around Villaricos contained elevated concentrations of bromine. The reason for this has never, to the best of my knowledge, been fully explained although high evaporation rate of the sea water and low amounts of fresh water entering from the Almanzora have been cited. Whatever, Deretil put in a proposal to build a manufacturing plant in the area, extracting bromine from the sea water and manufacturing fertilizers and pesticides. The cards were stacked in their favour. The area was on its knees, widely associated with contamination, and the site that they were interested ticked all the boxes, a flat promontory that had already been used for industrial purposes. With the promise of preferential consideration of local people for employment the deal was done. Permission was granted in 1967 for the plant to be built on the site of the Santa Ana foundry which Deretil bought from Minas de Almagrera S.A. who owned all of the old foundry sites. The plant opened in 1968 and was welcomed by almost everyone apart from those concerned about the environmental impact.

The original plant consisted of a few buildings on the Piedra Llana promontory which even up to 1978 was only accessed by a dirt road. Deretil collaborated with Antonio Llaguno Rojas, a former mayor of Cuevas, in the publication of his book Villaricos Trienta Siglos de Historia and furnished him with a series of photographs from their collection. I contacted Deretil explaining about this project and asked them for information about the buildings and permission to use the photographs. I received the following reply;

"I inform you that our company is a private entity and we do not usually carry out external collaborations in a private and individualized manner like the ones you propose.
Our corporate presentations and photographs are part of the intellectual property of the company, so you cannot use them for the purposes indicated. Our corporate presentations are used for exclusively commercial and business purposes and we do not transfer them to third parties.
Indeed, at the time we collaborated with the former mayor of Cuevas del Almanzora City Council, Antonio Llaguno Rojas, within the framework of the institutional relations that our company maintains with the City Council, for the edition of a book about Villaricos, which includes a chapter on the Deretil Group. I repeat the same thing, that book is protected by copyright.
For all of the above, we regret not being able to accept your invitation to collaborate on your publication."

So, I've worked round this rebuttal as best I could. The photograph on the next page was taken in the late 1970's and shows the bromine production buildings on the Piedra Llana the next image is an artist's impression of the buildings in 1978. By researching the production of bromine from sea water in the second half of the 20th century I know what structures were needed but cannot necessarily identify them from the pictures.



The early Deretil installations can be seen (centre right) on the Piedra Llana.

From Enrique Fernandez *Bolea's Facebook post El Faro de Villaricos,*

An artist's impression of the site in 1978. *A. J. Reid.*

Sea water was sucked up by huge diesel powered pumps. Chlorine gas was added to the water flow and it was passed through a blow out tower where currents of forced air stripped the bromine out of the water, which was returned to the sea. Next sulphur dioxide was added to the wet bromine laden air and the resulting mix passed through an absorption tower, known as the packing tower. Liquid chlorine was then added to the resulting hydrobromic acid which was then passed through a steaming out tower producing bromine vapour. The vapour was then condensed out and stored. 22,000 tonnes of seawater were required to produce 1 tonne of bromine.

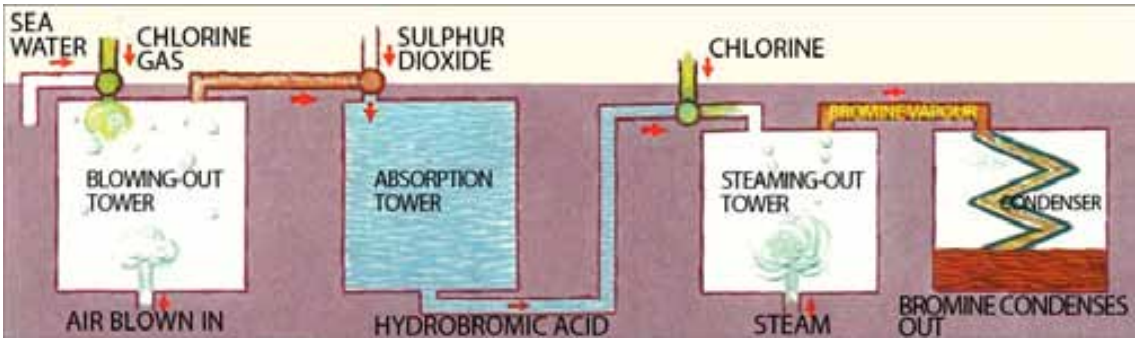


Diagram showing the Bromine extraction process. *The Worlds of David Darling.*

The early Piedra Llana site would have comprised of a seawater pump house, a tall blow-out tower, an absorption tower and a steam out tower. There would have been chlorine and sulphuric acid storage units, together with bromine storage facilities. In addition, there would have been facilities for the manufacture of dibromoethane and polybrominated diphenyl ethers.

The environmentalists had every reason to be concerned about the plant. Bromine is a volatile, fuming liquid with a suffocating odour at room temperature. Inhalation of bromine vapour has serious effects on the respiratory, nervous and endocrine systems, and contact with bromine causes skin damage. In addition, the chemicals used in the process of extracting bromine from sea water are equally hazardous.

Escape of Bromine from a tanker at Dharuch India.

Times of India

Deretil ceased production of bromine in 1983 and by 1985 the coast road had been built. The site itself had been surfaced, and the gateway and several new buildings had been constructed.

Deretil's fortunes took an upturn during the 1970's under its Dutch Director General who took the company into the manufacture and marketing of substances used in the synthesis of the antibiotic ampicillin. By the mid 80's it was one of the world's major producers of the components of antibiotics. The Piedra Llana site was transformed into a thoroughly modern production plant, complete with the very 'Spanish' Entrance Gate, approached by an asphalted roadway.

The Deretil Entrance Gate to the Piedra Llana site. *Google*

Development started on the land where the condensation tunnels and draw chimneys of the Santa Anna and the Purísima Concepción foundries were in the 1990's when two production plants for further primary materials used in antibiotics were built. However, the major development of the site happened in 1996 following the take-over of the company by the Dutch multinational company DSM. N.V after which the company was known as DSM Deretil.

The injection of cash resulting from the take-over allowed the company to seriously address two important issues. The first was the supply of energy and the second the supply of water. The second mention of Deretil in the Boletín Oficial de la Provincia de Almería (BOPA) is in 1974 when they petitioned for an electricity supply to run a pump in a fresh water well they had either dug, or was already present on the Piedra Llana site. In 1984 they were seeking permission to install a sea water refrigeration plant. Several of the subsequent petitions were for improvements to the power supply from the local grid.

Expediente:
De electrificación de un pozo.
Peticionario:
Derivados del Etilo, S. A.—(DERETIL), con domicilio en Cuevas del Almanzora, Barriada de Villaricos.
Finalidad: Suministro de energía a las instalaciones elevadoras de un pozo con destino a abastecimiento a la fábrica.
Características: Línea aérea, trifásica a 25 KV, y 320 metros de longitud, derivada del apoyo número 13 de la línea que suministra energía a la fábrica DERETIL propiedad de los peticionarios, y con final en las mencionadas instalaciones del pozo, cuya potencia en transformadores es de 200 KVA.

Left, Extract from Boletín Oficial de la Provincia de Almería (BOPA) 12/06/1974

MINISTERIO DE OBRAS PUBLICAS Y URBANISMO
DIRECCION PROVINCIAL
ALMERIA

ANUNCIO

Se ha presentado en esta Dirección Provincial (Jefatura de Puertos y Costas), la solicitud y proyecto de las instalaciones a realizar en zona Marítimo-Terrestre que se indican a continuación:
Solicitante: DERIVADOS DEL ETILO, S. A. (DERETIL).
Ubicación: Playa de Villaricos (Cala de la Cueva).
Instalaciones: CAPTACION DE AGUA DE MAR, PARA REFRIGERACION.

Right, Extract from Boletín Oficial de la Provincia de Almería (BOPA) 03/02/1984

The solution to the water and power problem was self sufficiency. In 1996 plans were submitted for a co-generation plant described in the BOPA of 28/08/96 as

> '*The project aims to define the installation of a 21,060 KW electrical co-generation plant and desalination plant, with the use of exhaust gases from fuel oil engines for the production of super heated steam in a recovery boiler, which will later be used in the DERETIL S.A.facilities. The two combustion engines are coupled to two electric alternators producing electrical energy.'*

It is obvious from the BOPA document that several objections had been raised in relation to the plant. There were concerns about the air pollutants nitric oxide, nitrogen dioxide and sulphur dioxide and about pollutants in the waste water. Noise pollution from the proposed plant was also under consideration as was the effect of the plant on the environment. There was considerable opposition to the plan and Antonio Llaguno Rojas, who was the mayor of Cuevas at the time that permission was granted, blames his support for the project for him losing the following election. The plant was built by the prominent Spanish multinational company Abengoa who were the leaders in co-generation at the time but have subsequently gone bankrupt. It is currently operated by the Neoelectrica group, but at the time of writing the operation of this, and many others plants, have been suspended due to the absence of a regulatory framework for the sector that should have been approved in May 2022 and without which its viability is not possible.

In an interview for Economía Digital The CEO of Grupo Neoelectra, Antonio Cortés, said,

"*at present, 60% of the co-generation plants in Spain have stopped their activity, and 100% will be reached if the Government does not approve the Ministerial Order to regulate and update the new calculation methodology and its remuneration parameters for the sector"*.

Presumably this situation will soon be rectified.

The co-generation plant.
Neoelectrica

The co-generation and depuration plants
Google.

The other large project was the building of a biological depuration plant to treat the contaminated waste water generated by the manufacturing processes. It was the first plant in Europe to operate with sea water. The plant has recently been updated and a solar detoxification system installed. It uses solar photons to chemically destroy toxic compounds in the waste water using a photo catalytic process.

The photo-reactors at the depuration plant. *ises.org*

Like the co-generation plant, this plant has had its detractors and usually gets the blame for any algae blooms which occur in the area despite them being natural occurrences. Deretil themselves have had to install special filters to the sea water intakes to combat algae.

Between 1996 and 2004 several new production units were built on the site as new products were brought on line, most notably Amoxicillin produced by using enzymes rather than chemicals. However, by 2005 the company was running into trouble and looked to restructure after operating at a loss. DSM Deretil ascribed the problems to loss of competitiveness and the cost of buying and producing in Euros and selling in dollars. This rather took the shine off the company's achievement of gaining accreditation in America for its product. China was rapidly becoming a serious competitor, so in 2007 DSM Deretil formed two joint-venture companies with the Chinese to switch production to China. Unbelievably, they also closed the research unit and Villaricos.

Buses carryied workers from Pulpi, Cuevas del Almanzora, Zurgena, Vera, Garrucha, Huércal-Overa and Mojácar to Villaricos every day for the three shifts that kept the production lines moving. The spectre of lay-offs loomed over a wide area. With industrial relations at an all time low strikes were called, pictures of striking workers huddled round a brazier on a cold winters morning, and manning a picket line were on the front pages of the local newspapers. 80% of the workforce supported the strike in December 2007, but the plant managed to operate using sub-contractors and a few members of staff. This particular strike turned ugly when a bus bringing non-striking workers in to the plant broke through the picket line injuring two of the strikers. None of the workers believed that the company would back down from its restructuring plan and most believed that the whole site would be closed by 2009. Against this background of turbulent times a management buy-out was launched which was completed in 2008. However, the directors stated that they were still committed to the restructuring process and the closure of one of the plants and moving production to China. (At some point, they divested themselves of this arrangement.)

While researching the history of Deretil I chanced upon a document entitled Resolución AAI/AL/057/08 published by the Junta de Andalucia Consejería de Medio Ambiente.

It appears to be the resolution to grant Integrated Environmental Authorization for the facilities. It also dismissed complaints made by a company called Villaricos S.L about the operation of Deretil. The level of detail contained in this lengthy document has more than compensated for the Deretil's 'company cold shoulder' that I received. The manufacturing processes, the power generation, the waste water treatment, health and safety, fire prevention, its was all in there.

The main process was described as the manufacture of side chains and intermediates for the pharmaceutical industry. In 2008 there were 8 plants which operated independently but were interrelated because various products produced in some of the plants were materials used in other plants.

The Plant in Area 4000 was dedicated to the production of their trademarked Danfenil, side chains used in the manufacture of Ampicillin, and Danoxi, side chains used in the manufacture of Amoxicillin. The process used reaction in an organic medium to obtain an alkali salt of the amino acid, followed by reaction of the salt with an ester. The resulting Sal de Dane, salts in crystalline form, were separated by filtration and the process liquids treated and used as raw material in the depuration plant.

Plants in Area 9000 and Area 10000 were dedicated to the production of Sal de Dane of alpha p-hydroxyphenylglycine an alpha amino acid used in the manufacture of the vancomycin group of antibiotics widely used for the treatment of MSRA.

Areas 6000, 7000, 8000, and 9000 were described as the multi-product plants consisting of three product lines and a research unit. Product Line 1, dedicated to the production of amino acids by direct synthesis, hydantoins used in anticonvulsant and antiviral drugs, and heterocycles used in antifungal, antibacterial, anticancer drugs. Line 2 dealt with the obtention from amino acids compounds known as danoxy, danphenyl and danhydro also used in the manufacture of drugs, such as those used in the treatment of Alzheimer's disease. Line 3 was the line of esters and amides derived from D-parahydroxyphenylglycine, widely used in the pharmaceutical industry for the production of amoxicillin, and penicillin, using solvents such as methanol and acetone. The solvents were recovered and treated in a processing area located near to Area 400.

The facilities in Area 14000 produced D-4-Hydroxyphenylglycine Methyl ester which was used in the production of antiviral peptides and penicillins. It is a reactive chemical that can be used in the treatment of wastewater where it binds to the active site of the enzyme, blocking the breakdown of fatty acids.
.
Area 15000 was used for the manufacture of anti-infection products such as antibacterials, antivirals, antifungals and anti parasitic medications. This particular line was possibly discontinued after the management buy-out because DSM Deretil wanted to concentrate on it so possibly made it a clause in the proceedings.

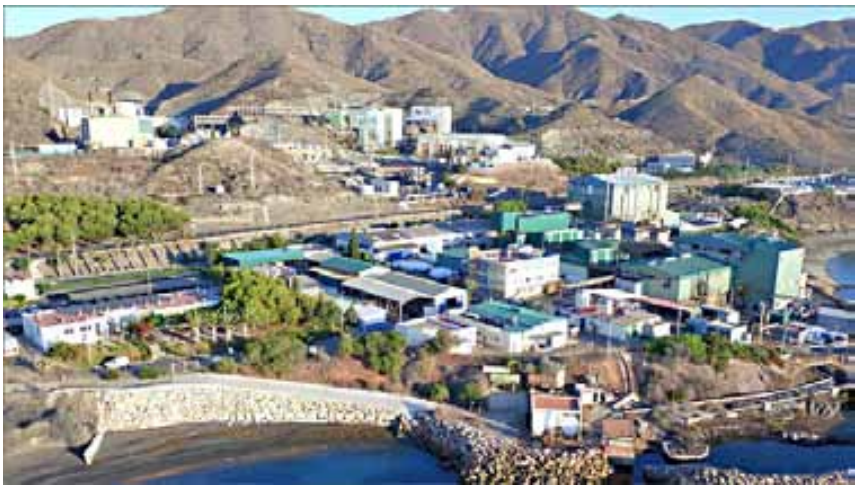
Unfortunately no plan of the site was included in the Junta de Andalucia document so apart from A900, which was located on the Piedra Llana site, I don't know where the areas were or indeed are, located.

Saturated steam for the production plants was provided by 3 Tomás Guillén Sadeca boilers which ran on BIA (red) diesel.

A Sadeca boiler of the type used to produce the saturated steam.
Tomás Guillén

Seawater was pumped up from three different levels on Piedra Llana and were linked to 6 refrigeration units, 5 of which used the now banned R22 coolant, and the other unit used ammonia.

Piedra Llana as it is today. The seawater pipelines can be seen in these two views.



Diario de Almería.
The seawater intake can be seen on the promontory.

Voz de Almería.
The pipe line can de seen snaking through the main site.

As well as supplying the refrigeration units, the seawater was used in basic operations in the manufacturing processes, and was also used to dilute wastewater going into the depuration plant. There were 10 towers for cooling the manufacturing plants, using fresh water in a closed circuit. Nitrogen was produced and stored on site and there were compressors for the supply of compressed air.

The Piedra Llana site with what I think are the refrigeration units in the foreground. *ABC Almería*

I don’t know how much has changed since the publication of the Junta de Andalucia document in terms of the lay out, processes and facilities but some elements are recognizable from pictures of the site.

The 2008 management buy-out was a success. Research and Development was ramped up. Diversification was the order of the day. In 2010 two new ventures were launched, Deretil Nature, which tapped into the rising interest in organic ingredients in cosmetics and Deretil Agronutritional, which is finding more sustainable ways of providing plant nutrition, bio-stimulation and protection of crops.

Diversifying was the right move at the right time. Deretil Nature’s grape seed extracts and olive derivatives can be found in many cosmetics and foodstuffs, while Deretil Agro’s zinc and iron granules together with other products are marketed world wide. The company has certainly come a long way since its early bromine based fertilizer days.

Like so many companies, Deretil struggled during the supply issues brought about by Covid restrictions and the effects of rising costs due to the Russian invasion of Ukraine. The Voz de Almería reported in July 2022 that Deretil was looking to suspend production of some lines. The company reported cost increases of 91% for electricity, 185% for gas and 124% for raw materials. It is small wonder that there was a Europe wide shortage of medicines.

So, to the ‘special relationship’ between Deretil and Villaricos. This dates back to 1989 when Deretil signed up to a collaboration agreement with Cuevas council. The terms were rather nebulous, but it seems to have been based on mutual benefits. The accords were renewed over the years with Deretil making major contributions to the development of Villaricos. In 1990 they stumped up a third of the cost of providing rubbish containers and street cleaning. They generously contributed to the construction of the Paseo Marítmo promenade in 1992. In 1994 it was the community centre which benefitted from their largesse. In virtually every thing concerning Villaricos, the Deretil logo appears. What is never mentioned is how Deretil benefits from this special agreement.

Bibliography.

The book, Villaricos Trienta Siglos de Historia by Antonio Llaguno Rojas, provided me with a wealth of information, as did Resolución AAI/AL/057/08 published by the Junta de Andalucia Consejería de Medio Ambiente. Both are in the public domain as are the following web-sites that I scoured for information.

http://www.anuariocritico.es 2008
https://www.ideal.es 20 December 2007
https://www.lavozdealmeria.com 12 July 22
https://www.outsourcing-pharma.com 19 October 2008
https://www.abc.es 12 July 2022
https://neoelectra.es
https://www.dipalme.org

A special thanks goes to Anthony Reid of http://www.reiddesign.co.uk for the artist’s impression of the early Deretil site.

Villaricos

4 Villaricos Remarketed

160824

4 Villaricos remarketed

The Trojan Horse for the British Invasion came in the guise of six Spanish brothers. In 1982, the Navarro Ponce brothers, property developers based in Palomares, trading under the name of Hermanos Catiros S.L. bought 40 hectares of land, the site of the Esperanza foundry and a similar area, the site of the Carmelita foundry. They had built the first 6 Moorish style houses on the Carmelita site which were spotted by two Russell brothers who were holidaying in Mojácar. They saw the potential of marketing further houses to be built on the site to the English. An agreement was reached and the Russells returned home where they contacted the up and coming Hitchins brothers, and offered them a chance to get into the Spanish property business. The result was the formation of the company Villaricos S.A. with, according to Antonio Llaguno Rojas, all three sets of brothers holding a third of the shares. The Los Conteros urbanisation was the result. It was built on two levels, the upper consisting of detached Moorish style villas and the lower of smaller, terraced blocks surrounding a small central garden. A communal pool, games courts, and a bar-restaurant completed the complex.

A 'Moorish' style villa and the games court on Los Conteros. *Google*

Clever marketing in England attracted buyers and Los Conteros became a predominantly British enclave. Some owners took up permanent residence while others used the properties as family holiday homes. None of those pioneers could have been looking for the high life because it did not exist. Perhaps it was the success of the marketing campaign that gave the Hitchins brothers the idea of transforming Villaricos into a holiday resort aimed at people who weren't seeking the Benidorm experience of strip clubs, kiss-me-quick hats, high-rise hotels and jam-packed beaches.

The development could have been worse, it could have been like Benidorm!

Villaricos was ripe for the picking. In 1985 it had a population of 300, (up from 230 in 1960 possibly due to the coming of Deretil). There were many derelict properties sitting on land classed as urban, and the entire village was surrounded by brownfield land polluted by scoria from the various foundries. It had one asphalted road, no street lighting and one public telephone. Water came from the deposit in Cuevas fed from wells at La Bababona. Stored in the GALASA deposit above the village, it was insufficient to maintain a 24 hour supply. The supply to Los Conteros was augmented by water from the well in Palomares, which was stored there in the water tower built by the Americans. This supply was only available for two hours a day, between 11 and 1.00 o'clock. While Los Conteros at least had a septic tank, Villaricos had no sewage system. The houses had pozos negros, well shaped holes in the ground lined with porous bricks. The liquid filtered through into the surrounding earth and the retained solids decomposed by bacteria.

The water tower in Palomares which was built by the Americans.

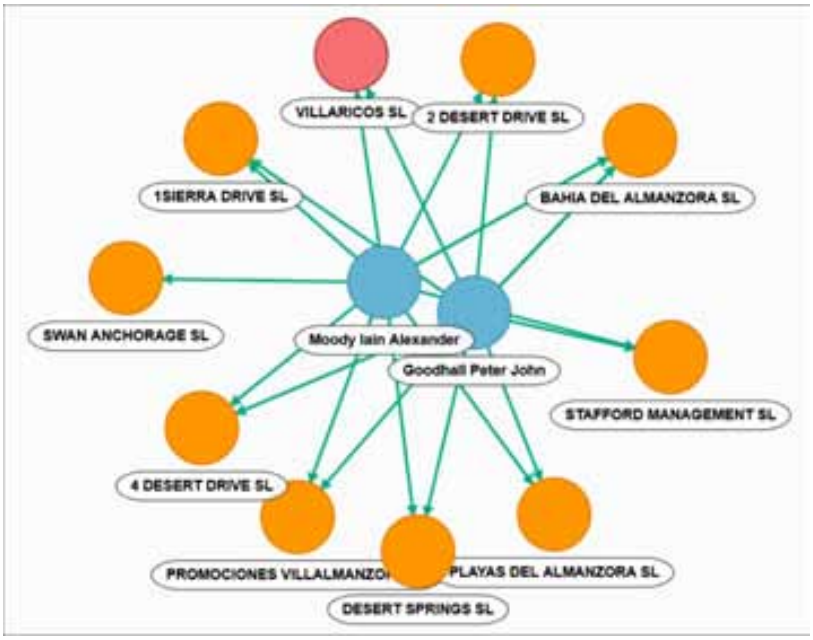
A pozo negro, a precursor of a septic tank.
Wikipedia.

Land was cheap and the Hitchins brothers bought lots of it in Villaricos itself, and as a long-term investment, the sites of the Madrileña and Don Guillermo foundries along the coast.

The 1990's brought great changes to Villaricos as it shook off the legacy of the Franco years and foreign investment poured in. Roads were asphalted, pavements and street lighting appeared, rubbish was collected and the streets cleaned. A play park, primary school, community centre, and clinic were established. The direct discharge of sewage into the sea through the pipe installed in the mid 1980's was replaced by a modern treatment plant. The seafront was transformed by the construction of the Paseo Maritimo, and the Esperanza and Balsica ports, were remodelled. The construction of the bridge over the Almanzora also made a big difference to the Village. It was no longer isolated whenever it rained. The original crossing of the Almanzora channel was a 'montaña rusa', a roller coaster, down and up the sides, impossible to attempt when the river was in full spate, and a notorious accident black-spot. Built by a British company, the bridge was thought to be unnecessarily long and wide when it was built in 1991, but has proved to have been the correct specification. It has never (yet) been swamped and it withstood the tremendous flood of 2012. Deretil and Villaricos S.A. both made significant contributions to most of these projects.

The bridge over the mouth of the Almanzora
which was fully able to withstand the 2012 flood.
Utube.

Towards the end of the 90's The Robert Hitchens Group formed a sister company called the Almanzora Group Ltd. which acts as a sales vehicle in the U.K. and elsewhere for the developments of of the companies which comprise their Almanzora Bay Group in Spain, formed in 1995. The Bay group consists of Bahia de Almanzora S.L., which according to their website develops the 'Beach Life Concept', which is still developing the site of the Don Guillermo foundry at Vera Playa, Desert Springs S.L which develops the 'Leisure Life Concept', the golf, cricketing and housing complex of Desert Springs, and Playas de Almanzora S.L., which is the holiday and sales agent in Spain. Villaricos S.A. now trades as Villaricos S.L. indicating that there was a buy-out at some point, and is the group's developer of the 'Village Life Concept' at Villaricos.



The set up of the Almanzora Bay Group. *datoscif.es*

One of their first developments was the Forteleza, constructed on the waste land on the left hand side of the main road seen in the 1978 postcard below. It is a high-end, stylish complex, with a mix of apartments and town houses surrounding courtyards, gardens and a pool. Although publicised as a development sympathetic to the village, when it was first built it contrasted starkly with the simple, unadorned dwellings which lined the other side of the road.

The Forteleza was built on the waste land on the left of this picture.
Baraza Postcard 1978

The Forteleza.
Assetia real estate.

Nowadays, those simple houses have been extended and modernized loosing all of their original features. Rather than the new fitting in with the old, the old has adapted to the new.

The old houses today.
google

Inside the Forteleza complex.
spanishpropertexpert.com

Over the years several sites of different sizes have been developed in the village, some of them more modest than others, but all built to high specifications.

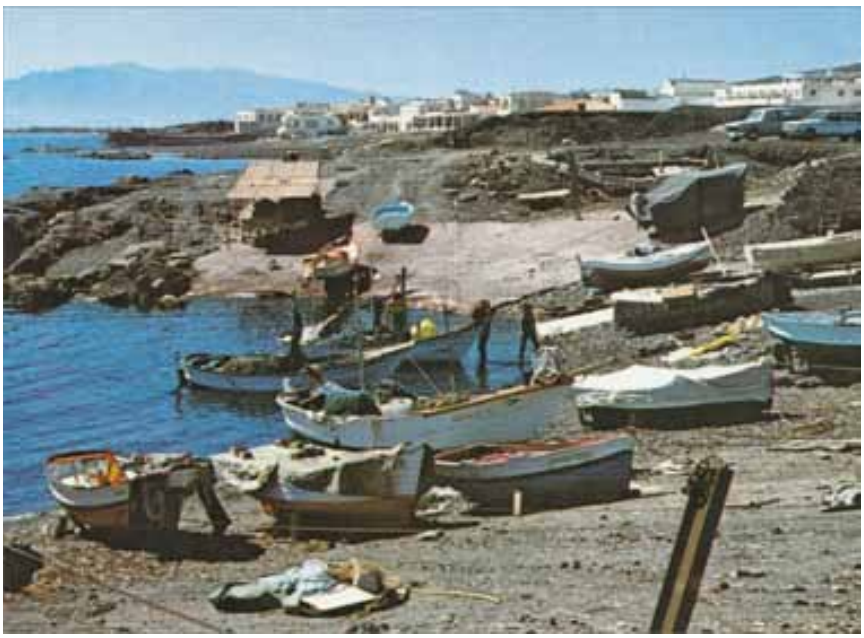
The jewel in the Villaricos S.L. crown though, is the Harbour Lights complex which is almost an urbanization in itself. It has been constructed in phases over the last 20 years, each phase with courtyards, fountains and gardens. There is still a piece of open ground adjacent to it, so no doubt it will be further developed.

Harbour Lights in 2008, note the scoria from the Esperanza foundry in front of the building.
stevie J 007

Inside the Harbour Lights.
Dave Brimson

Room for another phase of development of thr Harbour Lights. *Google*

It was the Hermanos Catiros who first thought of developing the former Esperaza foundry site on which Harbour Lights stands. They had the idea of building waterfront houses with private moorings way back in 1982. The existing small, natural cove at the Esperanza site was known as the Refugio Pescadores because it was where many of the local fishermen kept their boats. It had a very narrow rocky entrance and no protection from any rough seas. The fishermen had to haul their craft up out of the water and secure them on the stony ground.



The small cove known as the Refugio Pescadores in 1978.
Baraza Postcard.

The very narrow entrance can be seen in this old photograph.
Fabienne Berland Facebook post.

The Catiros dynamited the rocks at the entrance to the cove and excavated a small basin measuring 40 b120 metres. The basin still had no protection from rough seas, but it did help the boats to enter and leave.

The original Esperanza basin built by the Catiros Brothers.
Fabienne Berland Facebook post.

Following the hook-up with the Hitchins Group the project was mothballed, possibly because, with such poor infrastructure, there was little chance of being able to market the project. The Catiros ceded their rights to the port area to the council, opening the way for state investment in the building of the port. It took a further 15 years for the development of the port but, on its completion in 1997, the way was clear to start building on the Esperanza site.

The completed Esperanza Port and the first phase of the Harbour Lights.
steviej 007

Although plans for the Esperanza site were put on hold, the Hitchins group still had big ideas for waterside living. In 1989 they submitted development plans for the site of the Madrileña foundry. Had they holidayed at Port Grimaud, known as the Venice of the Côte d'Azur, a village constructed and surrounded by man-made canals where every house has its private jetty. Their plans, although on a smaller scale, seemed very similar, houses and apartments lining three kilometres of canals linked to the sea, each property having its own private jetty. Cuevas council turned the idea down flat, wisely foreseeing problems with the canals. (Port Grimaud was created from a swamp.)

Port Grimaud, the little Venice of the Côte d'Azur. Was it a blueprint for the Madrileña development? *Visitgrimaud.co.uk*

The Almanzora group have built several hundred housing units in Villaricos but the 2023 census count only records a population increase of 100. 63% of the new units have been sold to international buyers, mainly as second homes or rental properties. Most of them are priced out of the reach of the young locals whether they are looking to buy or to rent. The shifting, fluctuating population is breaking down the social cohesion that existed before the coming of the English.

To quote from the Amanzora Group's website, "*The objectives of the Almanzora Bay Group in the Almanzora are the creation of a wide range of opportunities for a better quality of life for both residents and visitors alike and the development of high quality residential tourism as a viable long-term alternative economy for the Almanzora, its people and its new residents."* Fine sentiments but probably unachievable objectives. Where once these developments were welcomed by the powers that be and tolerated by the inhabitants of this tiny enclave, the Entente Cordiale was shattered by the events which took place in the first decade of the 20th century. The spirits of Phoenicians and Romans joined forces with their descendents to repel this new invasion. The battle ground was the site of Baria's ancient fish, garum and dye factories situated below the castillo.

The Villaricos area had been declared a B.I.C. (Bien de Interés Cultural), an asset of cultural interest, by the Ministry of Culture in 1983, but, due to an 'administrative failure' in 1987, the Junta de Andalucía left the site unprotected when it delimitated the zone. No one has ever explained how this happened and the only defence that I can think of is the fact that, at that time, it was an extensive slag heap. Even so, the existence of archaeological remains beneath the scoria had been known since Luis Siret documented them in the early 1900's. The area had been in the hands of Villaricos S.A. (later Villaricos S.L.) as part of the Carmelita foundry land since 1985, but no move had been made to develop it until the turn of the century. 1999 had seen a change of ruling political party in Cuevas Council which may have influenced the Almanzora Group's decision to apply for planning permission to build a seven storey, 126 unit block on the site.

In 2000, news of this planning application alarmed the residents of Villaricos and protest banners started appearing on balconies. All to no avail. In December 2002 the council approved a modification of the planning restrictions applied to the Baria site, which had up until then been deemed not developable. Objections to the move that should have been lodged by the Ministry of Culture did not arrive until after the approval, by which time it was too late. The road had been cleared for the granting of a licence in the future, which was duly granted in April the following year. Had the newly elected Cuevas councillors bought into the Group's vision of Villaricos as a '*high quality residential tourism'* resort and acted out of vanity? Was it a case of ignorance or of indifference? Or, did they simply not care that Villaricos was to be marketed as a faux bijou fishing village with its millennia of history buried beneath tons of concrete?

No time was wasted, the assault was launched on Friday August 3rd 2003. A fleet of 8 lorries, two massive earth moving machines and an army of workmen at 7 o'clock in the evening started clearing the site. In the gathering darkness, surface material, and more, was piled by the heavy machinery into waiting trucks. As the trucks plied back and forth, vast amounts of spoil were dumped along the banks of the Almanzora. The good people of Villaricos were up in arms, but what was to be done? It was the weekend, it was August, Government departments were closed. Headed, ironically, by a Cuevas councillor, the population moved to defend their heritage. Quite often in life, it's not what you know, but who you know, that counts. The councillor, Francisco García Marín, contacted the influential publisher Juan Grima Cervantes, who the following morning, used his wide range of important contacts to get in touch with the General Director of Cultural Assets at the Junta de Andalucía's Culture Ministry. While the two of them considered the steps that needed to be taken to stop the destruction, Juan Grima's wife contacted every press, radio and television source in the area presenting them with the facts of what was happening. The historian Enríque Fernández Bolea hastened to Villaricos in order to photograph and document the proceedings. All the while, ceramics, stonework, columns, money and utensils were to be seen in the dumped mounds of excavated material. By 11 o'clock the scene was becoming dangerous, the police arrived along with representatives of the owners of the land. Not even the arrival of SEMPRONA, (Servicio de Protección de la Naturaleza), a specialised Guadia unit responsible for investigating attacks on heritage assets, halted the destruction. Only the arrival of the General Director of Cultural Assets himself, carrying a cessation order, finally halted this initial assault. But, winning a battle is not the same as winning a war, as the people of Villaricos were about to find out.

The mass of archaeological evidence turned over by the clearance work could not be ignored, and the Ministry of Culture ordered an emergency archaeological survey to be undertaken, financed by the developers, before any further construction work took place. The next round of hostilities was over the methods used during the excavations. The continuing use of heavy machinery to remove the top layer of material was the first issue. The site director defended this practice as being necessary in order to clear the site of scoria from the Carmelita. The residents took to combing the new spoil tips after work had finished for the day, rescuing artefacts that were mixed in with the unscreened spoil. Next, the same machinery was seen repeatedly operating inside the test trenches, a practice denied despite video evidence. The machinery however failed to hide the fact that the site was in fact that of Roman, overlying Phoenician, salazones. A cistern for the water needed for the fish and garum processing was found, remains of a small Roman bathhouse, mosaics and a beautiful stucco depiction of Bacchus, and much more was revealed. There could be no doubt that this was an important archaeological site, just as so many people had always known.

Machinery operating inside the test trenches. *Cristóbel de Haro*

The remains of a Roman bath house.
Juan Grima.

One of the fish salting tanks.
Juan Grima

Only 50% of the site was excavated.
Juan Martinez.

Finally, after much pressure from the local action group, Unidos por Baria, the site received its BIC, the long awaited protection for what was known as Section 8. the first of July 2004 was a day of celebration but also of some misgivings about the wording of the protection order. Cuevas Council was obliged to compensate both the owners and the promoters for the issue of an illegal license. An important part of this compensation was an agreement that allowed a transfer of building permission to another urban development. In this case, as far as I can work out, it was for modified plans for the Madrileña site. As to the archaeological site itself, it was decided to preserve it by protecting it from the weather and further human intervention by burying it. There was much talk of creating an archaeological park but the inevitable change of government and lack of funds has kicked that idea into the long grass.

Preserving the site, using geo-textiles and sand.
Cristóbel de Haro

But history has a habit of repeating itself. Ten years later Villaricos S.L. appealed against the application of a BIC to the entire area between the houses on the edge of the village and the Almanzora. In 2013, the Supreme Court ruled in their favour releasing a 1,300 square metre plot alongside the existing boundary line of properties from the order.

The plot of land that was released from the BIC. Almanzora.com

Although the Junta de Andalucía appealed against the ruling, unbelievably, its lawyers failed to present its case at the subsequent hearing. In the absence of submitted evidence the Supreme Court ruled in the favour of Villaricos S.L. who were only obliged to carry out an archaeological survey prior to commencing construction. 2019 saw the appearance once again of heavy machinery being used this purpose with no sieving nor documentation of the position of finds.

Heavy machinery being used to excavate the foundations of the later development.
Almeriensistas Acción por Almería

Excavation of the two story underground car park for the development revealed a sea defence wall, and further salazones of both the Roman and Phoenician eras. Once more, the Ministry of Culture was obliged to step in and halt the advance. The respite was only temporary. The land in question, together with permits to build a three-floor development of up to 30 apartments with basement parking, has been sold by Villaricos S.L. to a Madrid company called P3 plus Smileland S.L. The design of the complex looks as if it is the original Villaricos S.L. one. (They have another parcel of land near to the children's play area for sale showing exactly the same design.)

The proposed development from Smile Land's website.

The blurb on Smileland's website states that the basement carefully shelters an archaeological site and that the project values it in the most respectful way. Whatever that means.

Left and below, protests against the development by Smile Land.
Ignacio Barroso Garcia

It looks as if Villaricos S.L. is adopting a new policy for exploiting its land assets in Villaricos and elsewhere. The Baria site was sold as and the site near to the children's play area is up for sale. The remaining plots at Playa Marqués, the site of the Don Guillermo foundry at Vera Playa, are being sold for development. All of these with planning permission. There can be few places left in Villaricos for development. The Almanzora Group have spoken in the past of its vision of creating 'white villages' in the hills behind Villaricos. This is possibly why they lodged strenuous objections to Deretil's expansion plans in 2008 as they own land contiguous to Deretil. As far as I know, the plans are lying dormant. A visit to Villaricos market on a Sunday morning gives the impression of a thriving village. A wide variety of stalls line the streets and coach loads of shoppers pass up and down looking for bargains. The bars are full and the restaurants are open. The rest of the week tells a different story for Villaricos at the moment is not faring too well. Shops, restaurants and businesses are either closing or re-locating. The Esperanza Port, the responsibility of Andalucía's Port Authority, is in need of TLC., care needs to be taken when walking along the Paseo Maritimo as is surface is breaking up and massive sink holes have appeared in it in the past. Villaricos is isolated, with just one bus along the coast as far as Carbonaras outside of the peak holiday period when there are two a day, and one Vera-Villaricos-Cuevas circular in the morning, returning in the afternoon

The La Esperanza bar, hotel and restaurant has been on the market for several years. Zar2010.com

In 2023 this sink hole appeared in the Paseo Maritimo. Bob Hester.

Between 2004 and 2007, the celebrated Creamfields music festival brought up to 40,000 people each year into Villaricos, while the Dreambeach festival which superseded it attracted ten times as many. Up until 2016 the event was held on the promontory on the east bank of the mouth of the Almanzora. The camp site for the event was the land opposite Los Conteros owned by the Almanzora Group, it then moved to the 'dream beach' of Quitapellejos also owned by the group. With plans for the Madrileña coming to fruition, 2023 was the last time that Villaricos was on the festival circuit.

Surprisingly, against this backdrop of stagnation, the Almanzora Group are set to build 1,600 homes and a hotel at Quitapellejos beach, on the site of the Madrileña foundry, and are set to link the only remaining open space between Villaricos and Vera Playa with a paseo maritimo. A filling station is proposed to cater for the needs of the cars occupying the 1,000 on street parking places provided. Commercial, sports, play and green areas are also included in the plans. The environmental impact study carried out by the Junta have deemed the pine and eucalyptus grove, which features so largely in the Gypsy festivals, as being of little ecological value. Cuevas Council however have stipulated that any felling of the trees must be part of a conservation and maintenance programme.

In order to protect the sea-grass meadows, the development is to be linked to the waste treatment plant outside Villaricos. However, June 2024 saw Quitapellejos beach receive a black flag for the quality of the water due to discharge from this facility and the one in Cuevas. The environmental study also found that the area was not prone to flooding. It does however suffer from severe coastal erosion, 7,500 cubic metres of sand was shipped in to maintain the beach in 2022, and as there is no sign of the promised protective groynes the situation will get worse.

Local dignitaries standing alongside sand brought in to disguise the coastal erosion.
Groupojoly.com

Whether the water supply to the proposed 1,600 proposed properties can be maintained remains to be seen. Andalucia is experiencing prolonged droughts which are putting tremendous pressure on the supply of water with rationing being introduced in some areas.

The Almanzora Group are charged with conducting an archaeological survey before commencing construction. Uncovering of the remains of the foundry's two Stokoe condensing chambers are unlikely to halt proceedings as the environmental impact study bizarrely assesses the former presence of the foundry as "anthropogenic degradation" of the area.(i.e. deriving from human activities). It maintains that the project does not affect any special protection area for birds, nor to places of community interest, nor to areas designated as special conservation.

Quitapellejos beach. Enjoy it while you can.

The Group cares so little about the area's past that its website credits the popular name of the Madrileña foundry, the Duro, to it being the mint where silver coins were produced. It was in fact the name of one of the foundry owners.

It remains to be seen if the new high speed rail station under construction in Vera will bring buyers for the proposed properties which will be constructed in phases and who knows, perhaps the bus service will improve! Also, as the Villaricos desalination plant has been out of action since 2012 perhaps this development will hasten its repair.

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The book, **Villaricos Trienta Siglos de Historia, by Antonio Llaguna Rojas** is a wonderful record of the recent history of Villaricos. It contains poignant snapshots recording the lives and leisure of the residents of this sleepy village whose lives were changed by the invasion of the British.

The publication Axaquía No 9 Verano 2004, **Baria: Una Ciudad de la Antigüedad para Entender Patrimonio Histórico,** by Enrique Fernández Bolea and Juan Grima Cervantes documents the fight against the destruction of Baria and reflects the anger and frustration of those who fought for their heritage.

The Facebook group, **Asociación Unidos por Baria** provided me with a great deal of information, particularly posts by Enrique Fernández Bolea, Juan Grima Cervantes, Pedro Pereles Larios. Equally, the Facebook group **No eres de Villaricos si**… , was helpful,

Articles in the **Diario de Almería** of 18/02/22, 22/07/22 and 05/01/24 have kept me informed of developments along this part of the coast.

Reading the blurb on the **Almanzora.com** various websites, while providing me with information also made me ashamed to be British. The website **Smileland Puerto de Villaricos,** Un residencial para vivar el Mar de Almería, reassured me that it was not just the British who were Don Dineros.

I delved into the websites of several estate agents both Spanish and English, all of whom were riding on the coat-tails of the Almanzora Group, celebrating their link-ups with the big players and regurgitating the same promotional material. I will not list them!

Chapter 4

When The Boat Comes In

1 Loading and Unloading 2 Ships and Shipwrecks

3 Lead Kindly Light

José González Billón. 1903

190824

1 Loading and Unloading

Stevedores at work. *MuchoCastro*

1 Loading and Unloading

It is impossible to overstate the importance of maritime traffic to the Almagrera mining industry. Given the parlous state of the roads the coastal waters were the only reliable transport route. For this reason, the majority of the foundries were situated very close to the shore, and the later aero cables and railways also terminated there. Journeys from Villaricos to Garrucha were invariably made in the small boats which plied along the in-shore waters.

The absence of any sizeable harbour along this stretch of coast was a problem. Even Garrucha port was no more than a bay with a few simple wooden or metallic jetties only suitable for off-loading the fishing catch. Despite the massive increase in maritime activity off the coast of the town, a port authority wasn't established there until 1861. The first submission for the building of a proper harbour was in 1888, but it took until 1931 for work to commence and until 1936 for its completion. It was extended in 2009.

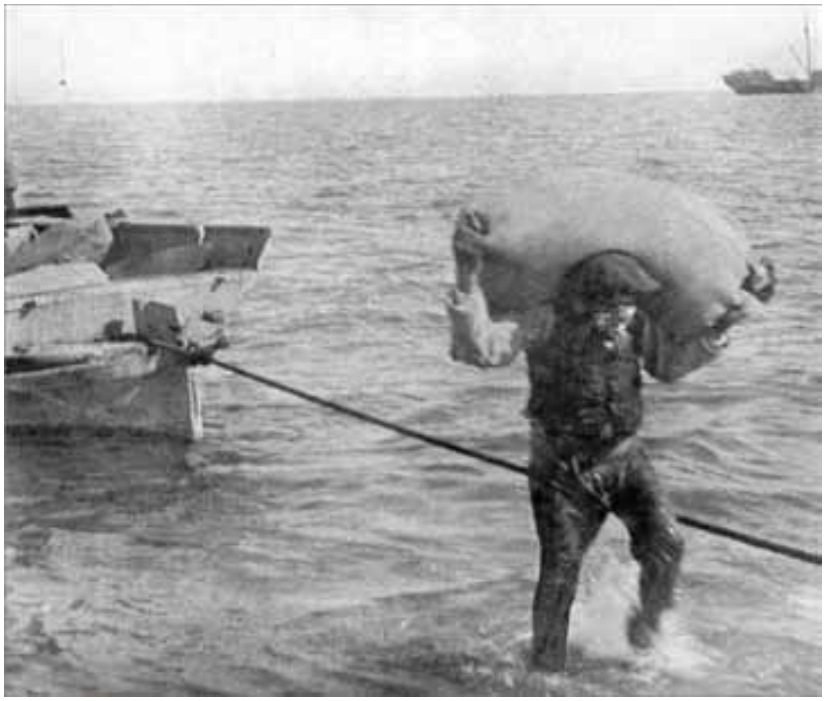
As the output of the mines increased and their consumption of coke and coal escalated with the introduction of steam power, so the number of ships plying this part of the coast multiplied. With no harbours or docks, and no mechanization they all had to be loaded and unloaded manually. Everything had to be manhandled into barges and ferried to and from vessels anchored in the deeper offshore waters.

Unloaded goods piled on the beach at Garrucha. *Garrucha Antigua.*

In 1879, the Frenchman, Casimir Delamarre, wrote an article for the Bulletin de la Société de Géographie about the workers in the Almagrera mining industry. Of those who worked loading and off loading goods he wrote,

> *"Any mineral to be directly exported is piled up on the beach where a third category of workers prepares it. Every man fills small, rounded and flattened esparto baskets, known as"cufas", and loads two or three on to his shoulders. Then, wading into the water, each man deposits them in the boats that belong to fishermen, who take them to the ships that always wait sufficiently far away from the shore. It is recognized that a considerable quantity of the mineral is lost in these successive trans-shipments, that are carried out by such primitive means.*
>
> *The loaders whose job it is to weigh the mineral and to take it to the barges earn between 80 and 90 reales for each 50 tons, that is from 1.60 to 1.80 reales per ton. Whereas the fishermen who guide the boats charge two and a half reales per ton. What distinguishes both of these groups is that they refuse to be paid by the varada, demanding payment every month. The fishermen, when not working for the mines can dedicate themselves to fishing while the loaders are simply stubborn*
> *This breed of shore-men comes almost exclusively from a certain type, who have a kind of monopoly. It's hard to believe of an occupation more arduous, only long training can put a worker in a position to bear it. With legs completely bare, the rest of the body mostly uncovered, these men have the appearance of real savages.*

Their energy is inconceivable, carrying heavy loads of ore all day, running over the warm beach, entering the water up to the waist, while the rest of the body is exposed to the hot sun, they never seem tired; if they rest at mealtime, they hardly look for a shadow to lie down for a moment. When they go on strike, which invariably happens when a lot of ships are awaiting their cargo, they cannot be replaced. The miners could not endure 24 hours of such painful work. The shore-men know their strength and attempt to impose their will in such circumstances. It can be said that they are the only workers in this part of Spain that are literally intractable."



A stevedore bringing cargo to shore from a barge.

José González Billón

Cassimir refers to these men as embarcadores but in the Garrucha area they were known as braceros, a term also applied to men who worked loading and unloading the aero cables. Elsewhere they were called estibadores, from which the word stevedores stems.

I have been unable to discover how these stevedores were organized but looking at old photographs they appear effectively to work in teams of six or seven to each barge, with each member seemingly pulling their weight. The rather blurry photograph of stevedores waiting for a cargo in Garrucha shows them standing or sitting in distinct groups which would seem to indicate that were tightly knit.

Teams of stevedores bringing the cargo to shore in Garrucha.

F. de Blain.

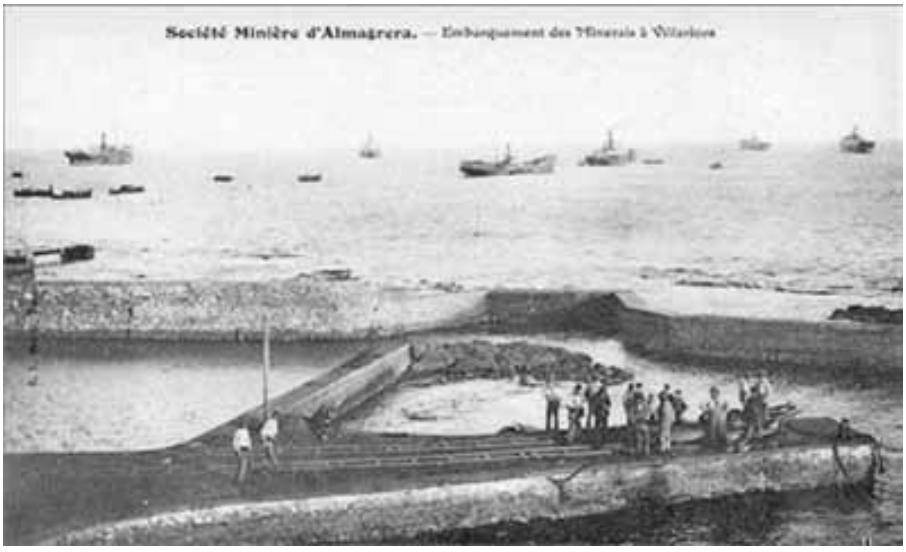
Groups of stevedores waiting for a cargo.
Garrucha Antigua.

The sheer physical effort of loading iron ore into a steam ship can be appreciated by examining the photograph of the loading of the steamship Diciembre off the coast of Villaricos. Four staging platforms have been lowered from the deck and the heavily laden esparto baskets are being passed up onto the deck. From here they are taken to the relevant hold and emptied down the hatches All of this is the work of the stevedores rather than of the ship's crew. There seem to be four distinct groups of stevedores working co-operatively watched by members of the crew. If loading seems arduous, then unloading coal or coke from such a vessel would have been even worse. Filling esparto baskets in the a ship's hold, where the air was laden with coal dust, and raising them to deck must have been back-breaking work.

The steamship Diciembre being loaded at Villaricos.
Taken from Minas y Mineros en el Pilar de Jaravía. Bolea

The barcazas, or barges were sturdy, shallow draft, rowing vessels capable of carrying 4 tonnes of cargo. Because of the lack of suitable moorings, most of them had to be hauled up slipways onto the shore once they were emptied. To mitigate against losses many of the foundries later constructed small jetties at the end of haulage paths from which to load the barges. The Dolores and Santa Ana foundries had metal jetties and the Esperanza built a stone one in 1894. It is possible that the jetty seen in the first picture below was a jetty for the Carmelita that was later used as a temporary measure by the Société Minière d'Almagrera. They later built a more solid jetty and ran a Decauville rail track along it. The forerunner of the Balsica Port was built by them as a refuge for the barges. These were still used to bring coke and coal ashore after the construction of the mechanized loading pier.

The possible Carmelita jetty used by Luis Siret. The mineral deposit is the mountainous heap to the left. The barges can be seen pulled up onto the beach. *E l Morin*



The more solid jetty and the refuge for the barges. *E L Morin.*

By the early 20th century, the use of barges for hauling mineral had largely been superseded by automated loading systems. One of the reasons for this was the decline of lead and silver processing and the massive rise in iron and copper ore extraction. Greater volumes at lower value could not sustain the cost of labour and losses during transportation. Different companies used different systems, some favouring aero cables and others mechanized loading, while others used a combination of both.

The mighty Compañía de Águilas transported ore from Bédar to Garrucha via a system of aero cables where it was stored under and around the terminal station. However they still had to rely on barges to ferry ore out to the steamers. They constructed 7 wood and metal loading piers across the beach with rails for hand pushed wagons to run on. To provide some protection for the barges from the easterly currents they built two stone walls but these piers were still frequently damaged by storms. It was small wonder that the company petitioned for at least a dock to be built at Garrucha.

The Compañía de Águilas used loading piers and hand pushed wagons. The structure on the left is the extension of the aero cable terminal under construction.
Exposicion Garrucha 1903.

The installations at Cala de las Conchas went through several stages. When they were the property of the Basque company Uriate, ore was brought to the coast by aero cable. The Minera de Almagrera of 5th of January 1899 noted that the company had received the materials necessary to build a metallic pier from which to load the barges. A year later, on the 18th of December 1900, the Eco de Levante reported that a steamer had been loaded with 3,000 toneladas of ore by this laborious method. Following the merger of Uriate with the Sociedad Argentífera de Almagrera in 1903 the whole transport system was upgraded. A Decauville rail and inclined plane replaced the aero cable and in 1912, an 87 metre long cantilevered loading pier was build to replace the jetty. Wagons laden with ore were pushed along the 14 metre high pier and emptied into the ships' holds.

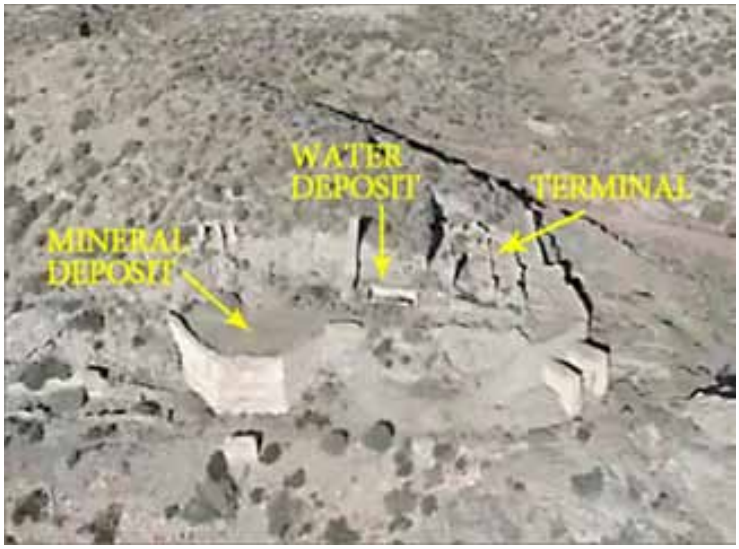
A 2004 aerial view of the installations at Cala de las Conchas. It is thought that the structure in the lower centre was the base for the earlier jetty. The later cantilevered loading pier is on the left. The barges would have sheltered in the cove on the right. *Andalucia.org*

The Cala de las Conchas loading pier in operation.

The Violeta aero cable terminal station was slightly above the sandy cove of the Cala de Las Picotas and the storage hopper was just above beach level, so loading the barges was probably done from from a simple metallic jetty.

The remains of the Violeta terminal.

Just 200 metres as the crow flies from the Violeta terminal is the Los Tres Pacos aero cable terminal. Unlike the Violeta, this one is perched on the top of a cliff. When I was writing Volume 2 of Then There Were Mines, in the absence of any information, and not seeing any remains of pier supports either on land or at sea, I posited that since the aero cable was a Bleichert-Otto tri-cable, loading was carried out directly from the cable buckets using that company's system. However, according to the periodical La Independencia 19th September 1911, the original plan was indeed for the Bleichert-Otto system, but Don Valerino Barzola, the engineering consultant for the Los Tres Pacos mine, favoured the installation of a Temperley loading system. His thinking prevailed and installation started on the first of August of that year.



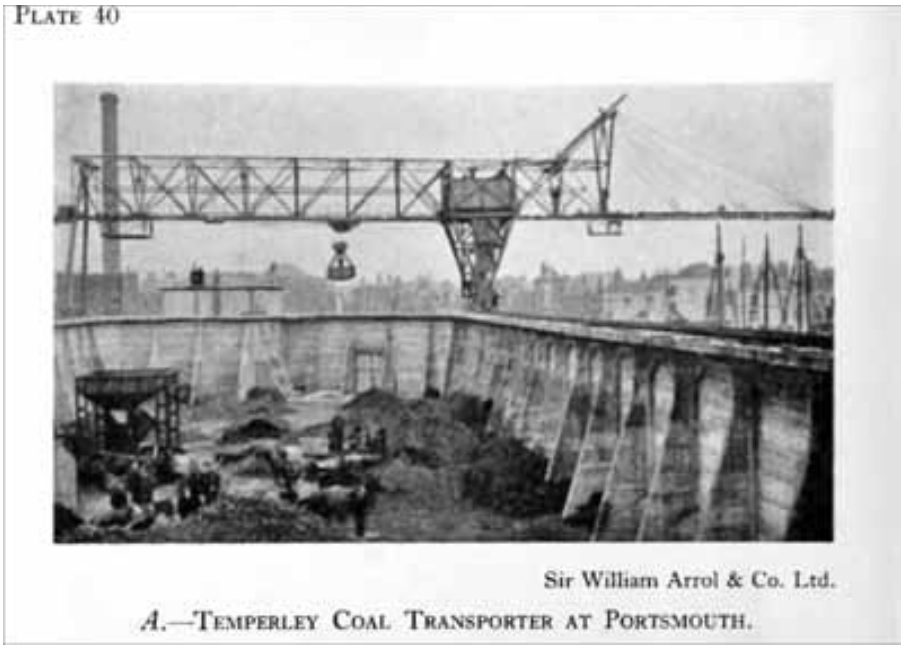
A drone shot of the remains of the installations. The mineral deposit is on the left alongside the chimney and water deposit for the steam engine. The terminal station for the aero cable is at right angles to them. *Fran Mulero.*

The first stage was to build two 3 metre wide breakwaters across two of the lines of rocks beneath the station. Material for their construction came from the Los Pacos mine itself, most probably overburden from the shafts, and was transported by the aero cable. The East pier was 120 metres long and the West pier was 35 metres. Both piers had rails running along their length. A single track inclined plane was built from the start of the East pier which ran directly up to the aero cable terminal. The winding gear was powered by a steam engine and was capable of lifting two wagons at once. The inclined plane was for transporting coal and other materials up to the aero cable where they were carried to the mine. The 56 metre long Temperley crane was erected at the end of the Eastern breakwater, with a land arm of 19 metres and a sea arm of 37 metres. Its beam supports were 24 metres.

Drone shot of the possible line of the inclined plane. *Fran Mulero.*

Looking down the possible line of the inclined plane. The eastern breakwater was constructed along the line of the rocks just visible at the top left of the picture. *Mtiblog*

The Temperley transporter was invented in 1892 by Joseph Temperley and variations of it were quickly adopted in ports, quarries and heavy metal workshops. Portsmouth dockyard used them extensively for coaling ships. The basic transporter consists of an **I** section steel beam, with an automatic trolley moving along it, operated by means of a single wire cable driven by a fixed winch. An automatic catch keeps the trolley stationary on the beam while the load is being lifted and the load is held suspended at one level while the trolley is moving along the beam. The load can be discharged at any number of points on the beam. Its simple construction lowered installation and maintenance costs. The fact that the weight of the load is on the trolley rather than on the cable greatly lengthens the cable's life. It was versatile and simple to operate and served to keep losses to an absolute minimum. Fitted with grabs, the Temperley was capable of loading and offloading cargo, the only system along this part of the coast able to do this.



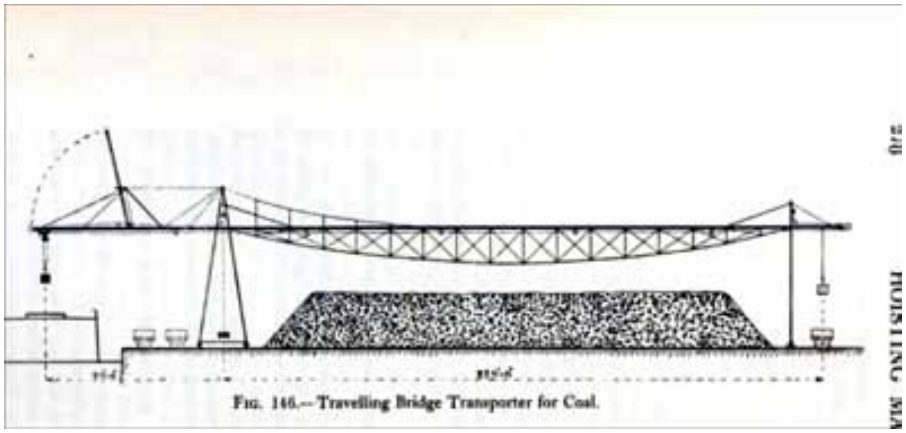


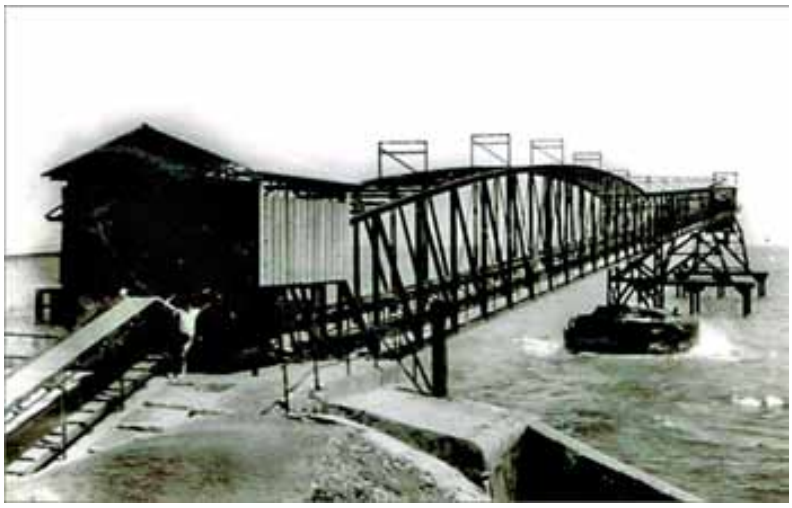
Diagram of a Temporley Transporter. *W. H. Atherton*

The Société Minière d'Almagrera's loading system in Villaricos was probably the most efficient in terms of man-power and was certainly the longest lasting. Ore was discharged from a double line of hoppers onto a conveyor to a transfer tower. From here it was discharged onto a second conveyor and dropped into the ship's hold. The end of the conveyor could be retracted to allow the ship to move forward to present other holds. All that remains today is the base of the ventilation shaft that served the conveyor machinery and the pumps needed to combat water seeping into the underground workings.

The remains of the hoppers and conveyor leading to the transfer tower. *Pedro Jiménez Morata.*

The loading system in action. *E .L.Morin*

MASA maintained the Villaricos loading pier, but by the early 1950's they were no longer using it. However, according to one José Alarcón Latorre it was used by the Los Tres Pacos mine. Their aero cable and Temperley transporter were dismantled in the late 1920's and the mine was closed in 1929 but it appears to have been in limited operation, probably scavenging, in the 1950's possibly as part of Franco's self sufficiency drive. The aforementioned gentleman recounted how he collected ore that had been brought by lorry from the mine and deposited in the quarry on the Las Herrerías road out of Villaricos. The ore was loaded in to Decauville trucks and, using Luis Siret's railway, it was transported by mule power to the loading pier. The hoppers could not be charged by lorries as they had been built as part of an animal traction system where the mule simply needed to be unhitched and taken to the rear of the line of trucks to reverse the journey. There was no circuit and insufficient width above the hoppers to turn lorries round. Not only that, but the road infrastructure round the area was inadequate.



The conveyor entering the transfer tower, as can be seen there is no circuit and there is insufficient room to turn a truck. *el abluelo facebook page*

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2 Ships and Shipwrecks

A turret running aground at Fisterra a Coruña. Aquiles Garea

190824

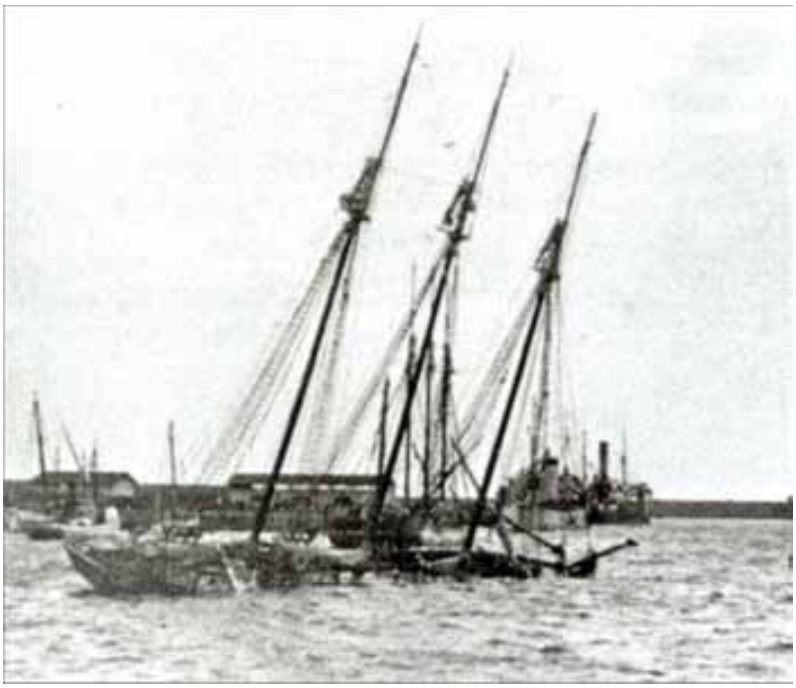
2 Ships and Shipwrecks

The Mediterranean is not always the beautiful, blue millpond that it seems to our British eyes. Because it doesn't have tides and massive cliffs with waves crashing over them, we tend to think of it as a calm sea. How wrong we are! Mediterranean storms are some of the most dangerous, especially those caused by what are known as medicanes, Mediterranean hurricanes. These are characterized by extremely strong winds bringing violent storms in a small enclosed sea where the waves can not spread as they do in an ocean. Because the waves have a shorter length, the slope between the two peaks is sharper. This increases the chances of a ship climbing at a very dangerous angle and falling back or sideways, and capsizing. Modern ships are better able to cope with these conditions but in the 19th and 20th century they did not fare so well.

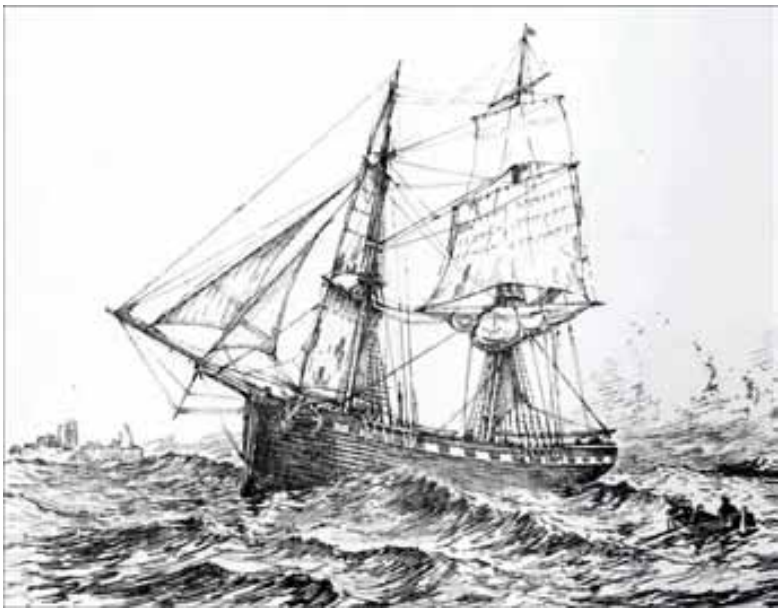
The shorter lengths of Mediterranean storm waves were a danger for ships. *bencheamotore .com*

The present day procession of ships in and out of Garrucha harbour is but a trickle compared to the maritime activity in the area in the 19th and 20th centuries. Twenty boats waiting to load or unload off the coast of Villaricos was not an uncommon sight, and all the time that they were sitting there, with no harbour to run to, they were at the mercy of the weather. One of the worst loss of ships occurred in March 1878 when a storm raged for three days and 5 ships were lost. The Cronica Meridonal of March 28th 1878 carried an account of the events,

> *'Stormy weather struck on March 16th and 17th 1878. The normally placid waters of the Mediterranean were broiling, giant waves crashed into the cliffs and on to the beaches between Garrucha and Pozo del Esparto. With no safe haven to turn to, the sailing vessels could do nothing but hope to ride out the storm. The first to lose anchor was the North American pailebote the José Caril, which, that afternoon, was dragged by the waves to Garrucha beach, where it grounded. Much of its cargo of paraffin oil was spilt, but fortunately, there was no loss of life. That night, it was the turn of the British barque, the Dudbrook which was anchored 300 metres off Villaricos when its anchor cable parted. Carrying coke and coal from Tyneside, destined for the foundries of Alarcón Pérez y Cª. and Orozco Hermanos, it broke in two on the rocky shore. Again, the crew had a lucky escape, and about 50 tons of the cargo were salvaged. Still the storms raged, the following afternoon, the Rosina and the three masted Jidaca, both flying the Italian flag, were wrecked off Palomares beach. There was no loss of life but such good fortune was not to last.'*



A wrecked pailebote
vidamaritima



A Tyneside collier of the era.
W.C.Grimes

A short way along the coast, at Pozo del Esparto, the British ship, the Trenton was in difficulties. Its master ordered the launching of the life rafts, one of which battled to the safety of the shore. The other, overcome by the massive waves, capsized, leaving its crew floundering, either clinging to the wreckage, or frantically trying to swim ashore. Despite the heroic attempts of one Marcos Antonio Linares, master of the Spanish sloop, the Carmen, who, risking his own life, entered the water in an effort to assist the beleaguered men, all were lost. The sea had claimed them as its own. George Clifton Pecket, the British Vice-Consul of Garrucha, joined other worthies and dignitaries in praising the heroic efforts of Señor Linares and everyone else who had aided those in peril.

Shipwrecks. An all to common occurrence along the coast.

I was able to find out a little about some of the vessels involved. The José Caril, was a pailebote. A Spanish corruption of ‘pilot’s boat’, this type of vessel was used extensively by pilots in English ports in the second half of the 19th century because its speed and maneuverability made it ideal for such work. They were sailing vessels with rigging similar to that of a schooner but with a shorter foremast. The hold ran the entire length apart from the bow deck and the stern chamber. It had an inner lining allowing it to carry bulk cargo when necessary.

The Dudbrook, was a wooden sailing vessel built in 1848 in Dundee, as a passenger, cargo, troop ship. Launched as the Europa, she carried troops to Bombay in 1849 and was subsequently sold several times and renamed. She was something of an accident waiting to happen. In 1871 she was damaged when leaving the Surrey Canal Dock on the Thames bound for the West Indies when she was run into by the steamer, the Countess of Dublin. Then, in 1875 she was run into again while moored at Blackwall on the Thames by not one, but two, steamers, the Cybelle and the Faithful.

The Trenton was built in the U.S in 1840, and at the time of the shipwreck it was owned by R. S. Allen and operated out of Newcastle, so it is likely that she was carrying coal and coke. 700 gross register tonnage (the measure of capacity of a ship’s hold) , so fairly large, but the Lloyds Register gives no details as to what type of vessel she was.

I was unable to find any information of the Italian Rosina and Jidica.

In November 1984 one of the ships belonging to the Compañía de Águilas went down off the coast of Carboneras as it was trying to out run a storm. The Minero de Almagrera carried an account of the event in its 8th of December edition.

> *‘The sinking of the steamer Carmen belonging to the Compañía de Águilas happened in this way. This beautiful ship was located in the port at Garrucha on the 15th or 16th of last month laden with mineral. At nightfall, an Easterly wind rose and, in a short space of time, had increased to the point where the captain found himself obliged to raise anchor and head towards a safer harbour. In front of the village of Carbonera, crashing waves swept the entire crew overboard save for the captain and the engineer. In such circumstances, the captain who was on the bridge, sought help by sounding the ship’s horn. . . .*

. . . By great fortune another steamer came to his rescue and transported the only two survivors to Barcelona. A quarter of an hour later, all was silent in the crystalline sepulchre. A fact. On the arrival of the ship in Garrucha, one of the sailors who was on board sought permission to spend the night with his wife, which was was granted, saving him, by coincidence, from certain death. This fortunate individual could never have expected that asking to spend a night with his wife would give him a reprieve of a death sentence.'

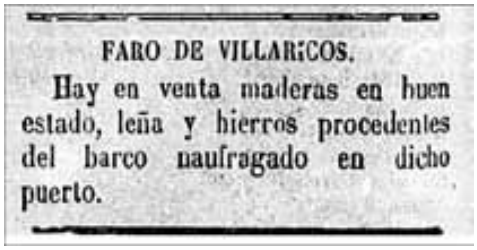
The Cronica Meridonal recorded that the ship had been carrying lead and silver ingots from the La Española foundry in Garrucha.

Two years later a notice appeared in the same publication posted by the British Vice-Consul of Garrucha, George Clifton Pecket, about the sale by auction of the remains of another (unnamed) ship that had come to grief in the same area. The hulk, sails, rigging and equipment, 833 tonnes of ballast, together with its cargo of coke were included in the sale. Such sales of salvaged goods were quite common, with the representatives of the country of ownership being responsible for the proceedings. In the case of the announcement in the Minero De Almagrera of the 8th of August 1874 the French Vice-Consul was organizing the sale of goods, but the sale was held in the premises of the British Vice-Consul. The lighthouse in Villaricos was the venue for the sale of goods from another unnamed ship.

'The French Vice-Consul is putting to public auction on the 12th of April at 11 o'clock in the morning, the hulk of the French schooner the Arica grounded on the beach at Villaricos, and the masts, sales and other effects from the aforementioned vessel that are in the manifest in the warehouse of the heirs of Alexandra Kirkpatrick, situated in Calle de Congreso in this town.

Garrucha 25th of March 1874. The French Vice-Consul. J Chasserot.'

Alexander Kirkpatrick was the British Vice-Consul in Garrucha preceeding George Clifton Pecket. The Calle de Congreso is now known as the Paseo de Malecón.


FARO DE VILLARICOS.
Hay en venta maderas en buen estado, leña y hierros procedentes del barco naufragado en dicho puerto.

This tiny notice, posted in the El Minero de Almagrera on 16th January 1880, about the sale of wood and iron from a ship wrecked off Villaricos attests to the 'every-day' nature of such events.

In 1888 two adjacent cabins were built on Garrucha sea front, one known as the Caseta de Sanidad, presumably simply a first-aid centre, and next door to it was the Caseta de Salvamento de Náufragos, the Shipwreck Rescue Society. The retired Naval Commander and renowned photographer José González Billón campaigned vigorously for the setting aside of space in the new cemetery for foreign victims of shipwrecks. The new cemetery was built alongside the old one for the burial of non-catholics as was the norm in those days. At the time, Billón was the president of the shipwreck society.

The Caseta de Sanidad and the Caseta de Salvamento de Náufragos on the Paseo Malecón.

Garrucha Ayer

I was curious about the ship the Diciembre featured in the previous section of this chapter. When compared to a the profile of the ship The Sir Charles Tennant seen loading at Águilas in 1904 it was obvious that the hull shapes were very different. It was easier to load the Diciembre because it was possible to use staging platforms up her curiously shaped hull.

Loading ore off Villaricos over over the Diciembre's strangely shaped sides.

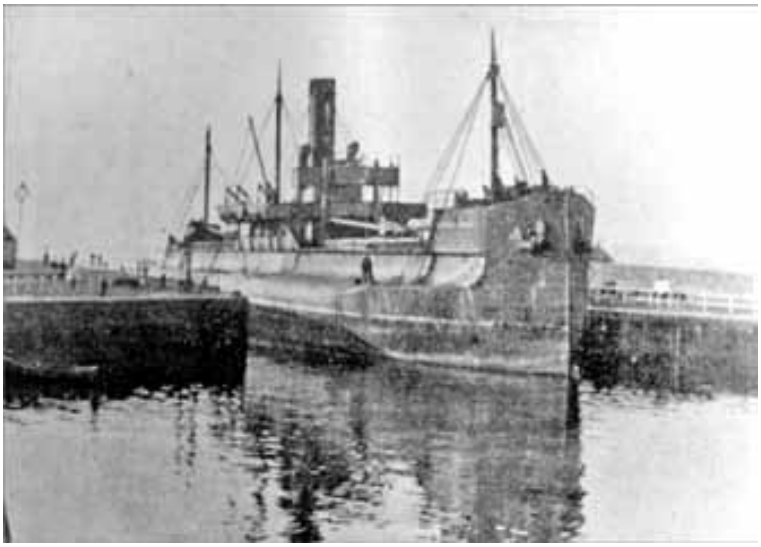
Taken from Minas y Mineros en el Pilar de Jaravía. Bolea

Loading The Sir Charles Tennant with ore at Águilas. Despite the superior loading quay the ore had to be carried up ladders on to the ship.

Archivogeneral.carm.es

An on-line search gave me the life story of the Good Ship Diciembre, one of a line of ships known as "turrets", but firstly a quote from the historian, sailor, lawyer and politician Rafael González Echegaray writing in the periodical the ABC, on the 6th of March 1963.

> *'What were the "turrets"? Reader: imagine a nightmare of naval architecture, a mixture of a children's toy store, a mining locomotive, and a deformed wagon, in the most horrendous hull that can be created in a naval birth. The "turrets" were frightful; a hybrid of merchant steamer and submarine with a scandalous seven-month belly, a tiny beam overhanging with fins for the bridge, and all of this in a hull with the docile and weary air of a helpless buoy, slow and pendulous, eternally crossing the sea.*
>
> *When the Suez Canal was opened to commercial navigation, and the system of quotation for users based on the beam of each ship was devised, the fiscal trap of the "turret-deck ship" was automatically born, that is, a ship like a floating coffin, pot-bellied and deformed, with a lid, the beam width on the upper deck which was exactly half that of its counterparts of the same size. The Celtiberian idea, encouraged in British shipyards, took off like a pumpkin in June, and between 1890 and 1911 the seven seas were plagued with these horrible contraptions that caused a sensation. In Spain we now had two left; one of the first, built in 1895, and one of the last, built in 1911.'*



A turret ship in Preston dock in 1910. The strange shape can clearly be seen. *Preston Digital*

It seems that these “turret” ships were a bit like Marmite, you either loved or hated them. Echegaray obviously had a very strong opinion about them, here, beautifully expressed. He was entitled to his opinion, he graduated through Bilbao and the Nautical School of Santander and, after 5 years at sea, taught there for a while. He studied law and became a specialist in Maritime law and later became the head of the first shipping company in Spain, The Transatlantic Company. The first of the two ships that he was referring to was the Diciembre.

Diciembre was the 15th of 176 turret-deck ships built in the Sunderland shipyard of William Droxford and Sons and was launched in 1895. These ships were the first bulk cargo vessels built and they shepherded in a new era of mercantile shipping. Their low nett tonnage in relation to their deadweight made them attractive to mercantile operators. Their narrow deck width relative to their hull width was intended to make using the Suez canal cheaper as the charge was based on the deck width. When the charges were altered turret ships ceased to be built.

The Diciembre had a long, useful, and adventurous life. It did not however have an auspicious start. She was bought by the Compañía Bilbaina de Navegación headed by Eduardo Aznar, and a crew was dispatched to bring her to Spain. The steamer in which they were travelling took a wrong course coming out of Bilbao, struck a breakwater, and was holed, so they were obliged to change ships.

Brought safely to Spain the Diciembre was put to work and proved herself an excellent work horse. Time after time, press reports mentioned the enormous tonnage, 5,600 tonnes, of mineral she was capable of carrying, (3,000 tonnes was the norm for other ships.) although ore was her main payload, she also made trips to Argentina bringing back wood and grain. Then in 1905 came the news that she had been lost in Greek waters, followed by the news that perhaps she could be re-floated. There was the necessary lifting equipment in the port of Skyros and she was duly raised and repaired sufficiently to get her back to Bilbao and back to work.

During the First World War she was to be found plying the Atlantic bringing much needed grain. This time under the ownership of the Urquijo Vascongado Bank where she became part of the fleet of the Begoña Navigation Company belonging to José María de Urquijo. A change of owner gave her a change of name to Begoña Numero 4, the second vessel of theirs to bear that name, the first having recently been sunk by the Germans in the Mediterranean. For the next few years she was a collier laden with coal from Asturia.

In 1927, a year after she was bought by the Naviera Basconia Sociedad Limitada, fire broke out on board when she was in Bilbao with a cargo of wood. Fortunately most of the cargo was saved but the crew deck was badly damaged. Shortly afterwards she was sold on to Alejandro Bengoechea and Company and given the name that she was to keep until the end of her days, Nuestra Señora del Carmen. Her time with her new owners was very short lived, in 1929 she was bought *by* José María Gutiérrez Menéndez, from Madrid.

A turret ship unloading timber in Sharpness.

shipsnostalgia.com

The Vanguardia of 25th of June 1929 carried the following article.

> *'The steamer Nuestra Señora del Carmen arrived at Musel, coming from Barcelona, with serious damage to the port side. The captain presented himself at the Navy Command, stating that on the 19th, sailing near Oporto on the return trip, due to fog it was boarded by the German steamer Vornats which caused a breach in the side where it began to take on water, and the essential work was carried out to continue sailing. After being examined, it was allowed to continue its journey to Bilbao where it will be repaired. The Navy authorities open an inquiry …'*

In was back to work for the Diciembre, plying between Asturias and Barcelona. Leaving Barcelona in 1930 she ran aground near Cádiz in a violent storm but was re-floated without suffering too much damage. Two years later she became the only vessel in the fleet of the Compañía del Vapor Carmen *S.L.* and continued on her coaling duties until she was captured by the rebels during the Spanish Civil War. Restored to her rightful owners, she worked for a further quarter of a century, running back and forth laden with coal until in 1963 she finally ran out of luck. Caught in a storm while off-loading coal at the exposed quay of the cement factory at Garraf near Barcelona, she ran aground for the last time. The crew were rescued but the valiant old lady was passed on to the insurance company, the Banco Vitalicio de España. By coincidence the only other remaining "turret" ship and the only one built in Spain, the Felguera, was scrapped at the same time.

The Diciembre as Nuestra Señora del Carmen in Bremen in 1962 with a load of ore from Cartagena. *Shipspotting.com*

Here is Echegaray's obituary to these two old ladies.

> *'Now there is no longer any turret left in the world, the flower of engineering speculations at the end of the century; and the Spanish fleet has lost two "typical Spanish antiques", which caused the astonishment and admiration of all the seafaring travellers, sailing around the peninsula on the naval routes of Europe, who came across them on their way back, breaking seas, slow and slow in the white swell of their own slamming, dragging stoic philosophy in the log of their poor five knots with average bow speeds. In this harsh winter on our coasts we are brought to a close by the funeral chronicle of the last pair of "turrets", which are leaving the world precisely under the Spanish flag, in patent homage to this incredible doctorate in hibernation that Spanish shipowners possess to preserve old ships like embalmed mummies.*
>
> *The "Carmen" and the "Felguera", the ships with the enormous belly, straight rigging, long chimney and flat hull without a sash, are being removed at this moment from the official list of Spain at sixty-eight and forty-two years, respectively, from their launching.*
>
> *With them disappears a whole era and we could even say the last vestiges of a horrible heresy in naval art; It is as if we were witnessing the closing of the last horse drawn trams, the missal of the last horn gramophones or the final blackout of the last gas lamps"…*

For all his rhetoric, I think that, deep down, Echegaray admired these work horses of the seas.

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www.dipalme.org the Almerian on-line Archivo Biblioteca carries back copies of local and regional newspapers. Of particular interest are El Minero de Almagrera and La Cronica Meridional, which carried accounts of shipwrecks.
Faros de Almería. Mucho más que ayudas a la navegación. Mario Sanz Cruz.
Los Burruezo blogspot Los Cementerios de Garrucha.
Diciembre, Begoña 4, Nueatra Señora del Carmen, el ultimo turret. Vidamaritima.com
clydeships.co.uk.
shipspotting.com.

3 Lead Kindly Light

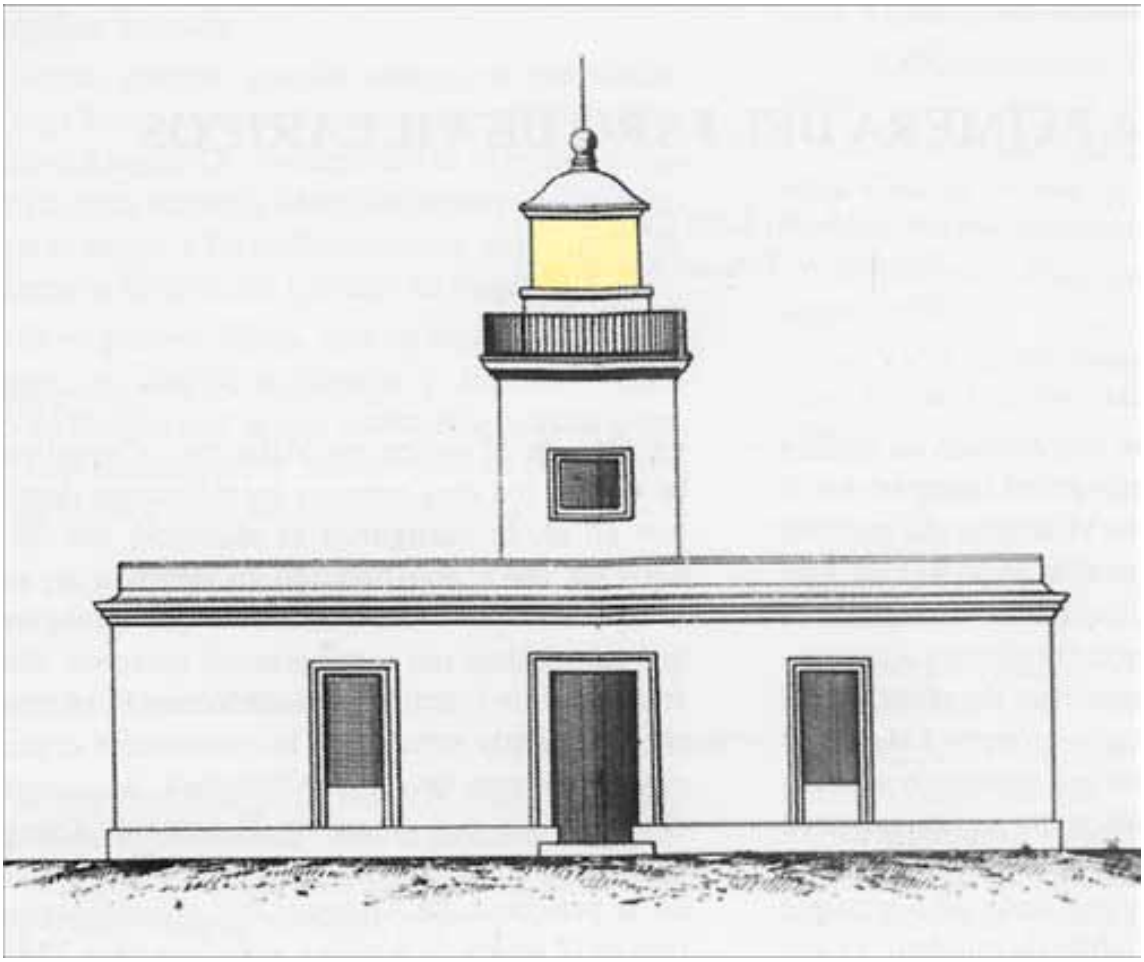


Diagram of Villaricos lighthouse.

3 Lead Kindly Light.

The 1860's saw a series of lighthouses built along the part of the coast stretching from Águilas to Carbonaras. The one in Águilas was inaugurated in 1860 and was known as the Punta Negra because it was built on the black rock promontory below the Castle of San Juan de las Águilas. At the time Águilas didn't have a harbour so the light served to warn of the rocky shore. The original lamp was a French Lepaute type burning oil, and its beam had a range of 5 nautical miles. This lamp was replaced shortly afterwards by a Maris lamp and then electrified in 1922. In order to access the building from the landward side, the keeper had to negotiate the vertiginous path down from the castle. Rather than making the steep return ascent the keeper preferred to go by boat to the shore. The story has it that during the 1985 Grand Storm the keeper had to be rescued by the garrison of the castle after attempting to do just that. In 1957 it was decided that the height of the tower needed to be 23 metres but frequent storm damage to the base over the years meant that it was not sufficiently safe to support a higher tower. The old lighthouse was demolished but the new one wasn't opened until 1973.

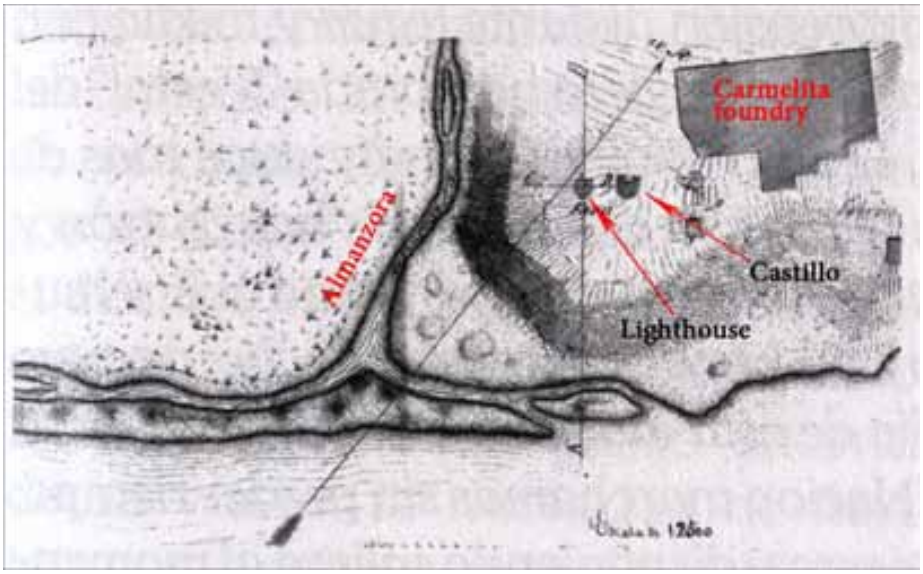
A postcard from the Casa Azna collection showing the old Águilas lighthouse.

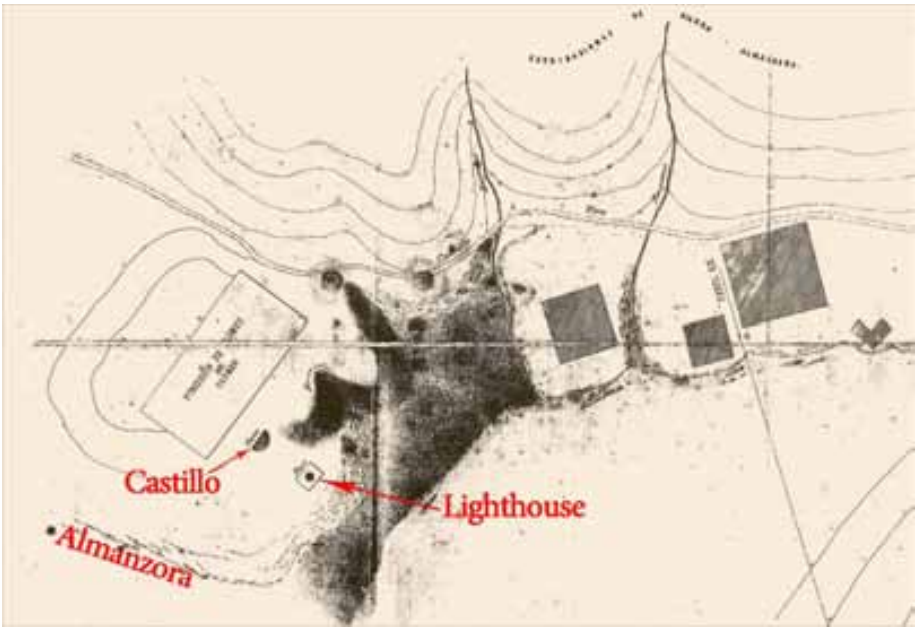
The replacement Aguilas lighthouse. turismoregiondemurcia.com

By the 1860's the marine traffic around Villaricos had dramatically increased so plans to build a lighthouse there were welcomed. Constructed on the land below the castillo the lighthouse was inaugurated in 1863. It is difficult to pinpoint its exact location as the old maps are conflicting. The initial lamp was fuelled by olive oil but was later replaced by a single wick, paraffin fuelled, Maris lamp. The fixed white light had a beam range of 9 nautical miles.

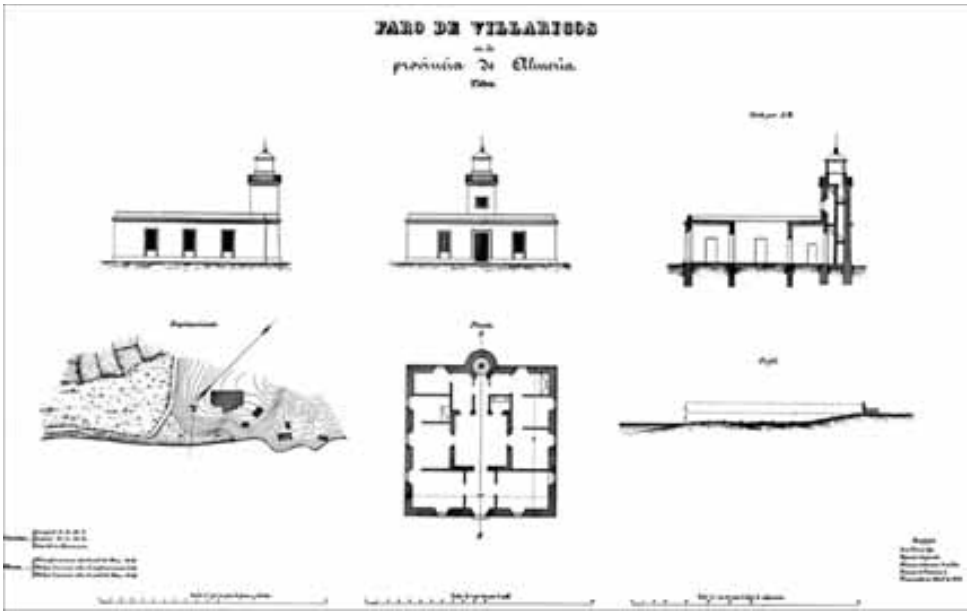
Both maps show the lighthouse, but in slightly different positions.

First imnage taken From Enrique Fernández Bolea's Facebook post El Faro de Villaricos.





The site was ill-chosen. It was not for nothing that the Carmelita foundry, situated within metres of the lighthouse, chose to close for the summer months. The malarial swamps surrounding that area at the mouth of the Almanzora river meant that it was a very unhealthy place to live and work. The lighthouse authorities soon found it very difficult to keep the light staffed. Keepers who fell ill were difficult to cover for as no-one wanted to transfer to Villaricos even for a short period. A rotation system was considered so as to limit the time that one person spent in the area. People who appeared immune to the mosquito bites were canvassed, But all to no avail. 17 years after it opened the light was extinguished. A decision had been made to move the light to Mojácar, present day Garrucha. A temporary red light was installed in the Castle of Jesús Nazareno while the new lighthouse was under construction just behind it. Virtually everything was salvaged from the Villaricos light and used for the new one.



The plans for the Villaricos Lighthouse. *Losfarosdemundo.com*

The Roqetas de Mar lighthouse was built to the same plan as the Villaricos one. *Mario Sanz Cruz.*

Garrucha lighthouse was also built to the same plan as the Villaricos lighthouse and the same equipment installed with the Maris lamp fuelled by Young's Scottish paraffin. Its white, fixed light was illuminated on the 28th of November 1881. It was classed as a resting lighthouse, meaning that its equipment was not difficult to handle, its tower was of a low height and it was close to an urban nucleus with health and religious services. It only required a single keeper, where as the Villaricos light had needed two. (Given the amount of time that one or other of them was incapacitated it was just as well.)

An 85mm incandescent paraffin lamp similar to a Maris lamp

goindustrial.co.uk

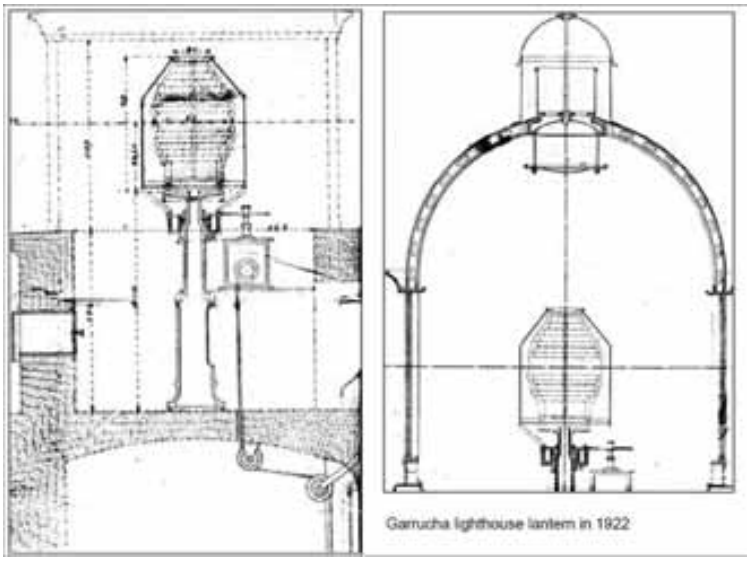
The letterhead for Youngs Scottish Paraffin oil.

scottishshale.co.uk

Águilas lighthouse was classed as a 6th order light and Villaricos and Garrucha were classed as 5th order. Spain followed the French protocol of classification based on the focal distance of the optic. First order lighthouses had a 900mm focal distance, while 6th order lighthouses with much smaller optics had a focal distance of 150mm. This governed the extent of the beam's visibility. As a 6th order installation, the beam from the Águilas lighthouse was visible for 5 nautical miles, and those of Villaricos and later Garrucha were visible for 9 nautical miles.

Garrucha lighthouse remained unchanged until the 1920's when the tower and lantern room were remodelled. The tower was strengthened and the interior clad with mahogany planks and a new lantern was fitted. It was no longer a fixed light, but one with groups of four occultations, or flashes, every 15 seconds, and so it was fitted with revolving screens to hide the light. The optic, the assembly of mirrors and prisms, was set in a mercury bath where it floated, enabling it to rotate at the speed needed for the flashes. The float was actioned by a clockwork gravity machine and the keeper had to take the weights to the top of the tower at regular intervals during the night.

The new optics and lantern installed in the 1920's.
From Almería Lighthouses. Mario Sanz Cruz.



VIII. *The Intermittent Light.*—The Catoptric intermittent light was introduced by Mr. R. Stevenson in 1830 at the Mull of Galloway. The occultations are effected by the sudden closing and opening of two intercepting opaque drums, Figs. 103 and 104, which inclose the apparatus,

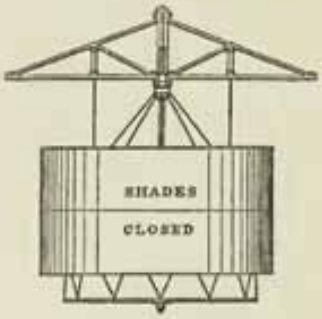


Fig. 103.

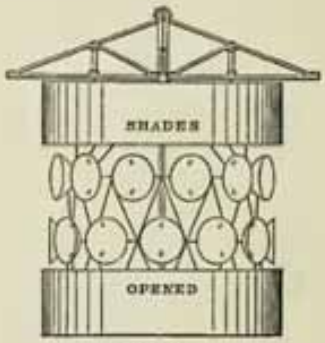


Fig. 104.

and are moved vertically in opposite directions by means of machinery.

Diagram of the rotating screens used to create flashes.

T Stevenson

The clockwork winding mechanism of the type used in Garrucha.

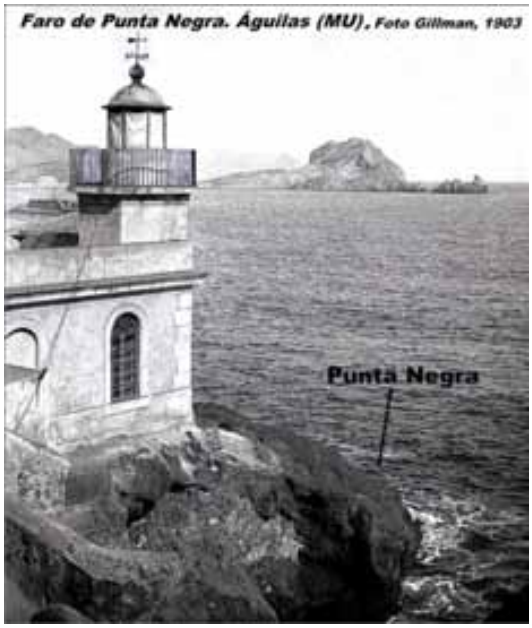
Catalogofaros.

Electricity was brought to the lighthouse and a 200 candlepower lamp was installed which was lit on January 20th 1925. The paraffin Maris lamp was kept as a back-up, which was fortunate, for it saw a lot of service during the next 40 years.

The main problem was the electricity supply, generated by the Central Hidroeléctrica de Bayarque which was unreliably intermittent, or, simply unavailable. The current reached the lighthouse at such low voltage that a supply of fuel for the Maris lamp had to be permanently held. Over the years there were many instances of no power due to lines being broken, or poles being blown down in storms, or of there simply being no supply generated. By 1934 the lighthouse roof was leaking every time that it rained. The keeper at the time was very concerned about the possibility of it causing a short circuit and the resulting sparks igniting the large amount of fuel stored for the Maris lamp.

At the beginning of the Civil War the keeper was ordered by the Committee of the Popular Anti-fascist Front of Garrucha to extinguish the light. The order was backed by threats so the keeper obeyed and informed his superiors who told him to re-ignite the lamp. The Militia returned and the keeper, rather than have them cut the cable, complied with their demands. Unlike many other keepers, the Garrucha keeper was not executed in the purges that followed the war.

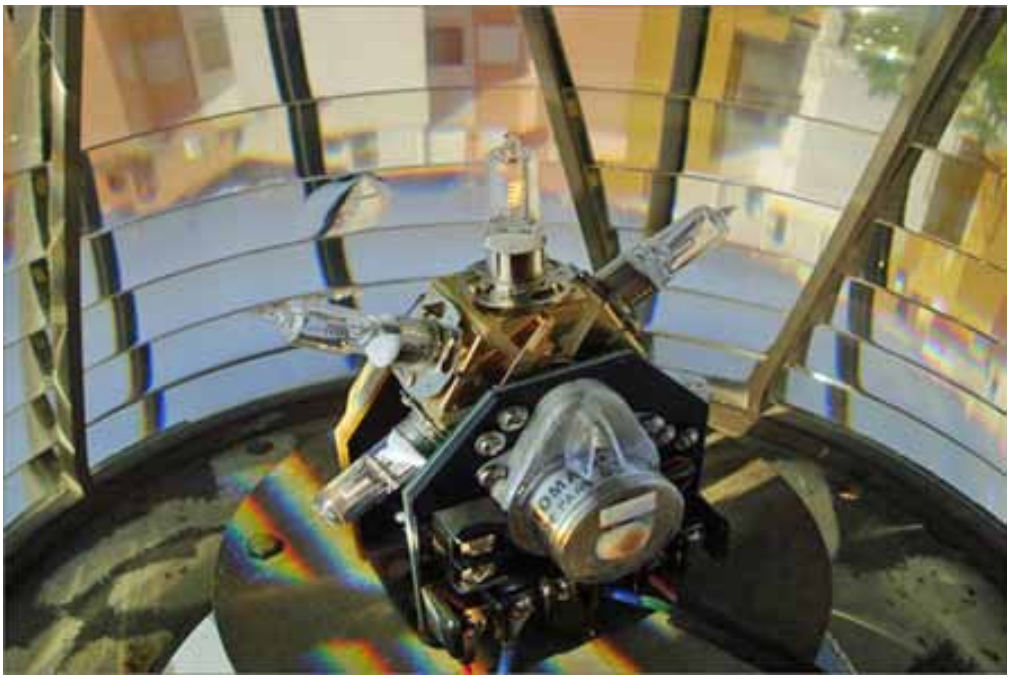
During the post war years the lighthouse, like so many other buildings, deteriorated badly. The keeper's reports are a catalogue of requests for repairs. 1944: after one storm, water was running down the stairs to the lantern room, the door to the roof terrace was off its hinges, and the entire electrical system had burned out. 1948: the blinds for the lantern room, so necessary to protect it from the burning rays of the sun, were in tatters and beyond repair. And every year, it is the supply of fuel for the Maris lamp that causes most concern. 1945: a delivery of of a 52 kilo drum contained only 39 kilos of fuel. The seal had been broken and the drum had been transported upside down. 1949: a keeper writes,*"There are many things missing for the service, that been said, the most urgent thing is oil"*.



The blinds needed to shade the lantern room can be seen in this photograph by Gustave Gillman of Águilas lighthouse.

Finally, in 1964 a generator was installed and in 1966 the mercury bath rotation machine was changed. It is now believed that one of the reasons why so many keepers suffered from behavioural and mental health problems was their exposure to, or handling of, the mercury in the float bath for the optic, rather than from their isolation.

In 1974 the lamp was changed to a 250 W. AGA acetylene Dalén light and new optics were installed. However, the town of Garrucha was changing, urban development was starting to swamp the lighthouse. By the end of the century one could walk past the building and not even realize that it was a lighthouse it had become so engulfed. Light pollution was making it difficult for shipping to see the beam. Building a taller tower was considered, but the parlous state of the building stymied those plans.



The new lamp at Garrucha installed in 1974. *sectoromaritimo.es*

It is possible to drive past the lighthouse today without even noticing it.

It was decided to construct a new lighthouse at the height of 150 metres above sea level further along the coast. Called the lighthouse of Mojácar it sits at the top of the Cerro del Moro Manco overlooking the Marina de la Torre urbanization. On the 22nd of September 2021 its flashing light was switched on, and at the same moment that of the Garrucha lighthouse was extinguished. Fully automated and containing all of the latest equipment available, it fits quietly into its urban surroundings, but has non of the romance of a traditional lighthouse. In fact it looks more like a gun emplacement than a lighthouse.

The replacement lighthouse at the Cerro del Moro Manco

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