

# Olive grove landscape: the hydraulic pressing machine and its importance in the cultural heritage of Andalusia (Spain)

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**Abstract.** The hydraulic press was patented by Bramah in 1795. Initially, it was used for keeping paper flat or pressing maps, but in 1833, in Montilla (Córdoba, Spain), the machine was properly adapted by Diego de Alvear to produce olive oil. It was an extraordinary technological advance in the olive oil sector, not only in Spain but also in other countries of the Mediterranean Basin, because it made possible to produce better olive oil in less time. The aim of this article is to analyse the importance of the invention of the hydraulic press for the olive oil industry; the influence it had on the configuration of the olive grove landscape and its heritage value as an example of the evolution of Andalusian society.

**Keywords.** Cultural Heritage, Olive oil, Hydraulic Press, Patents, Andalusia (Spain).

## Introduction

The olive grove landscapes of Andalusia were included in the Spanish Tentative List of World Heritage Sites on 27 January, 2017, in the Cultural Landscape category<sup>1</sup> (UNESCO 2017). The news, which was widely covered by the media, has been leading more and more people to take an interest in the olive oil culture in the international context.

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<sup>1</sup> On 24 April 2021, the Historical Heritage Council agreed that the application would be submitted by the Spanish Government in January 2022 to UNESCO for appraisal as a World Heritage Site (ABCdesevilla, 2021).



**Fig. 1.** Olive grove landscape, Mancha Real (Jaén). Photo by Author, 2018.

One of the elements that characterise the olive grove as a cultural landscape<sup>2</sup> (fig. 1) are the industrial buildings in which olive oil is produced<sup>3</sup>: *cortijos* (country properties)<sup>4</sup>, olive oil factories<sup>5</sup> or cooperatives<sup>6</sup>.

We should note that, according to UNESCO (2008: Annex 3): “the term cultural landscape embraces a diversity of manifestations of the interaction between humankind and its natural environment. [...] They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural

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<sup>2</sup> There are different views and approaches to the term cultural landscape, which according to Mateu I LLADÓ (2014: 254, 255) follow two main lines: the morphological vision and the symbolic vision. The morphological vision was developed by Carl Sauer (SAUER 1925 quoted by MATEU I LLADÓ 2014: 255) and “regards cultural landscape as the result of the action of a social group on an original natural landscape, through an agent, culture, the result of which would be a cultural landscape. Thus, there are two main types of landscapes - natural landscapes and cultural landscapes. The morphological vision of cultural landscapes is closely related to the historicist tradition of Geography, from which it adopts a regionalist approach for its working methods, based on fieldwork, the study of the historical evolution of the territory and the interpretation of space as a result of the intervention of the different cultures that have passed through it, and whose traces are decipherable through the landscape itself”. The latter vision, developed from the point of view of cultural and humanistic geography from the 1970s onwards, was developed by authors such as Denis Cosgrove and Stephen Daniels. (ROBERTSON and RICHARDS 2003 quoted by MATEU I LLADÓ 2014: 255).

<sup>3</sup> Also called *almazas* or olive oil mills.

<sup>4</sup> “Standalone construction in the middle of the countryside, formed by farmers dwellings and the premises necessary for farming activities grouped together next to them” (FLORIDO TRUJILLO 1996: 178, quoting TORRES BALBÁS 1930).

<sup>5</sup> “Establishment equipped with the machinery, tools and facilities necessary for manufacturing certain objects, obtaining certain products or carrying out the industrial transformation of an energy source” (RAE 2021a).

<sup>6</sup> “Which is set up by producers, sellers or consumers, for the common benefit of the members” (RAE 2021b). They were mainly built between the 1950s and the 1960s.

environment and of successive social, economic and cultural forces, both external and internal”.

For the last 50 years or so, the precious juice has been produced in modern olive oil mills using the continuous system<sup>7</sup>, a system that allowed factories to reach a truly industrial dimension (ZAMBRANA PINEDA 1993: 75) due to its high degree of automation.

However, the first industrialisation of olive oil mills in Andalusia began in the mid-19th century, when the traditional beam or tower presses (among others) began to be replaced by modern hydraulic presses, which reached their peak during the last quarter of the 19th century.

This technological advance, which, *a priori*, could have been just another invention among the many that emerged in this historical period, actually revolutionised the olive sector, without which the so-called “Golden Age of the Olive Grove” would hardly have occurred during the first three decades of the 20th century (GARRIDO GONZÁLEZ 2007: 67); it was characterised by a transformation of crops and an increase in the area planted with olive groves, which today are a hallmark of the Andalusian landscape.

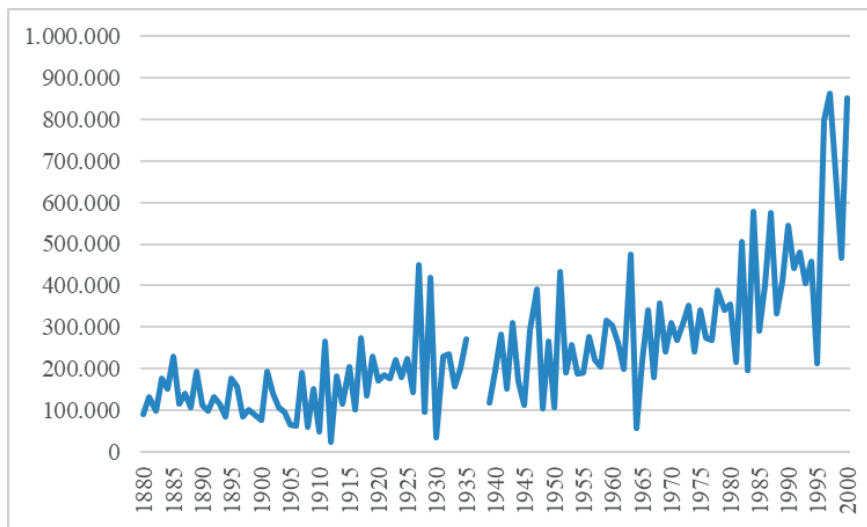
**Table 1.** Olive grove surface area in Andalusia, 1880-2000 (Hectares)

	<b>c. 1880</b>	<b>1920</b>	<b>1960</b>	<b>2000</b>
Almería	-	3.681	7.720	10.800
Cádiz	20.038	20.930	31.620	18.250
Córdoba	189.047	236.000	264.025	326.936
Granada	13.992	48.936	67.450	150.300
Huelva	-	18.109	30.280	25.822
Jaén	159.244	271.450	357.660	568.035
Málaga	25.070	43.050	90.495	113.882
Sevilla	189.501	225.265	288.900	184.636
<b>Andalucía</b>	<b>596.892</b>	<b>867.421</b>	<b>1.138.150</b>	<b>1.398.661</b>

**Source:** Atlas de Historia Económica de Andalucía, ss XIX-XX. [https://www.juntadeandalucia.es/institutodeestadisticaycartografia/atlashistoriaecon/atlas\\_cap\\_15.html](https://www.juntadeandalucia.es/institutodeestadisticaycartografia/atlashistoriaecon/atlas_cap_15.html) (accessed 12<sup>th</sup> April 2022).

<sup>7</sup> The olives, once cleaned, are ground (there are various types of mills). In order to separate the liquid part from the solid part, a thermal mixer (a machine for mixing the olive mass obtained after grinding to facilitate oil extraction) is used first (CERRETANI; GÓMEZ CARAVACA and BENDINI 2010: 181); then a centrifuge (horizontal and/or vertical) is used, which allows obtaining the oil. It can be a three-phase centrifuge (adds water) or a two-phase centrifuge (does not add water). (PALOMARES ALARCÓN 2020a: 197, 198).

**Graphic 1.** Olive oil production. Andalusia, 1880-2000 (Tons)



**Source:** Atlas de Historia Económica de Andalucía, ss XIX-XX. [https://www.juntadeandalucia.es/institutodeestadisticaycartografia/atlashistoriaecon/atlas\\_cap\\_15.html](https://www.juntadeandalucia.es/institutodeestadisticaycartografia/atlashistoriaecon/atlas_cap_15.html) (accessed 12<sup>th</sup> April 2022).

The first hydraulic press built with the intention to produce olive oil in Spain was designed by Diego de Alver y Ward (ALVEAR Y WARD 1834) who set it up at his Finca el Carril, in Montilla (Córdoba), in 1833. This first machine was manufactured in Manchester and transported from England to Andalusia (FUENTES GARCÍA; ROMERO ATELA and VEROZ HERRADÓN 1998: 29).

From this first installation onwards, Spanish foundries such as Portilla Hermanos y White (Seville); Casa Alvery (Zaragoza) or Pfeiffer (Barcelona), among others, started manufacturing different models of presses (SILVA SUÁREZ and MONTES TUBÍO 2013: 495) and farmers began setting them up in their oil mills.

Did the invention of the hydraulic press influence the configuration of the Andalusian olive grove landscape? How? How were buildings adapted?

Answering the aforementioned questions is the aim of this research, which is part of the post-doctoral research on the Mediterranean Industrial Agrifood Heritage that is being developed by the author of this article.

## The importance of the olive oil industry in the configuration of the contemporary olive grove landscape in Andalusia

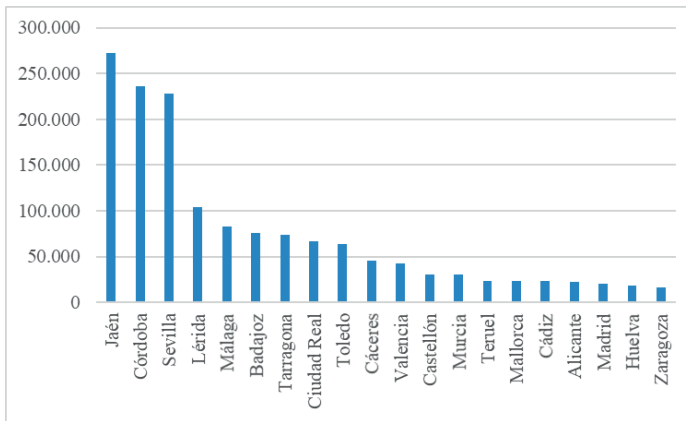
In 1840, Celedonio Rojo stated that, despite the fact that olive oil was one of Spain's main riches, there was the need to improve its quality. He referred that this branch of agriculture was so important that agronomists had been constantly coming up with new and more advantageous systems to improve the practice, and that more and more farmers were making improvements to their land and their oil mills, although it was proving difficult to get them to give up their old gadgets.

Its cultivation is, therefore, quite neglected and outdated, and the manufacture of olive oil is even more so; in such a way that one almost always notices an unpleasant and acrid taste, which makes it unbearable for people who are accustomed to the one produced in France, Italy [...] (ROJO PAYO VICENTE 1840: 244).

He insisted that there was the need for machines to crush and press the olives that arrived every day at the mills to prevent the olives stored outdoors or covered (they could be waiting their turn for up to twelve months) from rotting and, therefore, part of the oil from evaporating and part from turning into *alpechín* (black olive liquid), which gave it an awful taste.

The provinces of Andalusia were already the largest olive-growing areas in Spain in 1834. Until then, the olives were pressed in rather imperfect beam presses (the most common ones) or tower presses, among others, until, as mentioned above, Diego Alvear invented the hydraulic press in 1833 and set it up at his farmhouse in Montilla (Córdoba) to produce olive oil. This improved system made it possible to speed up the production process and, at the same time, to obtain a better quality olive oil. It was easy to handle and move.

**Graphic 2.** Provinces with the largest olive grove area in Spain in 1924 (Hectares)



**Source:** Prepared by the author based on the data from VII Congreso Internacional de Olivicultura, 5<sup>th</sup> to 9<sup>th</sup> December 1924.

Other Andalusian farmers began replacing their old beam presses (or other types) with hydraulic presses. They witnessed how the pressing time was significantly reduced and realised that the result of these modern machines was excellent. Furthermore, at the same time, the wooden screws of the tower presses began to be replaced by large iron screws, which allowed for greater durability (wooden screws broke more easily) and loading a greater quantity of olive paste at once.

Grinding mills also started to be modernised. Some owners began to replace animal power with steam power (sometimes using pomace<sup>8</sup> as fuel), as it allowed the olive oil to be produced more quickly and thus reduced the time the olives were waiting to be ground (PEQUEÑO Y MUÑOZ REPISO 1879: 219, 220).

The invention of the hydraulic press revolutionised the olive oil sector. The introduction of these presses into olive oil factories was a continuous process. At first individually, and little by little, more units were introduced depending on the mill's grinding capacity.

Manjarrés, in 1872, publicised the novelty introduced by Mr. Pérez in his olive oil mill in Bollullos de la Mitación (Seville), which consisted of 'industrialising' the olive oil manufacturing process. It was a steam mill, where, in an orderly manner, some of the staff chose and washed the olives; they then crushed the olives in two cylindrical crushing mills; they pressed the mass (first pressing) in the three

<sup>8</sup> Waste from crushed and pressed olives.

hydraulic presses that had been installed - from the Grouselle y Compañía brand (see table 1) - and obtained a superior olive oil with a 'beautiful colour and an excellent flavour; a product which, when sent to London, is paid at a higher price than in Spain' (MANJARRÉS Y BORAFULL 1872: 148).

In a second phase, in a mill with vertical iron grinding wheels that turned on an openwork metal platform, the pomace was reground and then pressed again to obtain common olive oil. Thanks to a pump, the olive oil that was in the tanks was absorbed, passed through several filters and was decanted in a series of interconnected tanks, which had taps through which, via a tin channel, it was conveyed to casks where it was stored and placed on trolleys for transport.

Over time, pulley-driven grinding mills and sets of hydraulic presses, usually comprising four units, became increasingly common and were installed in Andalusia until around the 1970s, although many of them were in operation until almost the 21<sup>st</sup> century. Currently, very few olive oil factories are still using this system.

The buildings that accommodated this machinery were representative (for the most part) of the vernacular architecture of the place and, when small, had a certain hermetic character. There is a key difference between olive oil mills and *cortijos* (country properties) (fig. 2), and cooperatives, in terms of architectural typology. Although they all developed their industrial activity horizontally and were located close to the production areas, so that the time that elapsed between the olives being picked and ground was as short as possible, factories and *cortijos* were usually associated with a residential unit (which could be two storeys high), which was not the case with cooperatives.



**Fig. 2.** Cortijo el Pozo, La Fábrica, Loja (Granada) (1940). In the foreground, a view of the old olive oil cellar of the 'cortijo'. Adjacent, on the ground floor, was the mill; the owners' home was on the top floor (TORICES ALBARCA y ZURITA POVEDANO 2003: 268). Photo by Author, 2021.

The former usually responded to a historicist language, with different decorative treatments in the residential areas and in the industrial areas, while cooperatives responded to a contemporary architecture and were mostly designed as industrial open-plan halls in which the use of prefabricated materials predominated (especially in those built at the end of the 21<sup>st</sup> century) (PALOMARES ALARCÓN 2020a).

Both are part of the Andalusian olive grove landscape. Whether built in rural or urban areas, they characterise, not only by their architecture, but also by the smell they give off, many rural areas and represent the evolution of Andalusian society and urban settlements over the years (UNESCO 2008: Annex 3).

### **Hydraulic press: Historical context and introduction in Andalusia. Privileges and patents**

The hydraulic press was invented by Joseph Bramah and patented in 1795. This machine was first used in the Tower of London (between 1806 and 1874) probably for pressing paper. Later, between 1874 and 1894, it was used for pressing maps at Woolwich Arsenal. It continued to be used for the same purpose at the Leatherhead Ordnance Survey and the Chessington Ordnance Survey, where it served until 1966. It is currently kept at the *Bramah Press Kelham Island Museum*, in Sheffield (Sheffield Industrial Museums Trust, sd).

Although, over time, hydraulic presses were also used for pressing cloth, hay or fabrics, it was not until 1833 that they were adapted for the first time for pressing olive paste (olives were previously crushed in the mill) and obtaining olive oil, at least in Spain.

Since then, these machines were gradually introduced into the olive oil industry. In fact, in the Catalogue of objects on display at the Agricultural, Industrial and Artistic Exhibition held in Seville in 1858, we find several references to hydraulic presses used for pressing olive oil:

Number 97 “A mahogany box containing a white bottle with a pound and a half of olive oil from the harvest of Mr. José M. González de Gregorio, a resident of Los Palacios, produced in his property’s hydraulic press, without further purification than the subsequent rest: all presented by him”. Number 98 “Two paintings with gilt frames, showing drawings for a hydraulic press to produce olive oil from Mr. José M. González Gregorio’s property, whose press is set up in Los Palacios” (Catálogo 1858: 13).



In addition to hydraulic presses, there was also a production of spindle presses (screw presses that began to be manufactured in metal) such as those from Portilla Hermanos y White, who had an iron foundry at Plaza de Armas, in Seville, and, among other items, presented the following at the aforementioned exhibition: “Number 653. Spindle press, capacity for twenty bushels” (Catálogo 1858: 70). Or Mr. Parisot, also from Seville, who presented various elements for olive oil presses: “Num. 962. A soft iron spindle with the corresponding fixed plate and lever part for olive press; Num. 863. Another spindle press invented by him; Num. 964. Two drawings of the aforementioned olive press” (Catálogo 1858: 100).

After Diego de Alvear y Ward’s important invention, numerous models of hydraulic presses were invented in Spain that made improvements to the original model (SILVA SUÁREZ and MONTES TUBÍO 2013: 495), some of which were granted privileges, later called patents,<sup>9</sup> which were submitted to the Spanish Patent and Trademark Office (Oficina Española de Patentes y Marcas)<sup>10</sup>.

After conducting a comprehensive search of the records regarding hydraulic presses to extract olive oil in the Historical Collection of the OEPM, whose databases are divided into Privileges (1826-1878); Patents (1878-1940); Patents (1941-1966); and Trademarks (1865-1919), we found the cases that are shown in tables 1 and 2. That is, between 1826 and 1950, 18 registrations were granted: 6 privileges (1826-1878) and 12 patents (1879-1950).

The aforementioned database includes the origin of the applicants since the registrations started being called patents, i.e., from 1878 onwards. As the results show us, 10 out of the 12 registration requests were submitted by Andalusian applicants.

Among the applicants, some were people who wanted to register their inventions as individuals, while others were representatives of major foundries such as: Mariano Beltrán de Lis Espona, from Fundación Mariano Beltrán de Lis, in Antequera (Malaga)<sup>11</sup> who patented a hydraulic press for olive oil in 1879; the various patents for hydraulic presses from the Balbontín family, from Seville, between 1913 and 1950<sup>12</sup>; or the ones from Pando, Rodríguez y Compañía, also from Seville.

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<sup>9</sup> Privilege and patent mean the same thing. The only difference is the period in which they were used. Privilege was introduced by Ferdinand VII on 27 March 1826 “as a reaction to Frenchified and liberal terms, such as patent or certificate”, and was used until 30 July 1878, when the law on patents was enacted, and the term was changed (SÁIZ 1999; ROJAS et al. 2012).

<sup>10</sup> Hereinafter, OEPM.

<sup>11</sup> The foundry was established in 1870 and operated until the early 20th century. They manufactured various types of machinery, namely agricultural machinery (four-roller iron mills, presses, machinery for manufacturing flour, cane sugar, turbines, steam engines, etc.) (DE LOS RÍOS 2020).

<sup>12</sup> Enrique Balbontín’s foundry, later called Viuda e Hijos de Balbontín y Orta, was established in Seville. They were dedicated to manufacturing machinery in general, but especially agricultural machinery (presses and mills) and especially feet for ‘singer’ sewing machines. (Momento1942: 17).

We should also highlight the patents submitted by an industrial engineer living in Malaga, Ruperto Heaton<sup>13</sup>, whose inventions (from 1885 to 1960) could be used, not only to press olives, but also all kinds of fruits<sup>14</sup>.

**Table 2.** Privileges regarding hydraulic presses to obtain olive oil in Spain

TYPE	RECORD	DATE	NAME_TITLE	APPLICANT
Privilege	9	10/7/1826	Hydraulic machine to extract oil from olive pomace.	Gabrieli Maximiliano
Privilege	987	10/11/1852	Press for olive oil extraction and other uses.	Grouselle, Nicolas & Cia. (Madrid).
Privilege	1184	28/06/1854	Double helix press to extract oil from olive pomace.	Demetrio Muñoz Amador (Béjar, Salamanca)
Privilege	4068	25/08/1865	Dynamometric spindle press for olives, grapes or other species.	Julio Parizot
Privilege	4642	10/07/1869	Affordable hydraulic press for squeezing grapes, olive oil and other oleaginous substances.	Figueras y Betllot, Antonio & Sabater y Castaña, E.
Privilege	5838	15/04/1878	Press for manufacturing oils, wines, etc.	Juan Consinon y Bernard

**Source:** prepared by the author based on the data from the OEPM.

<sup>13</sup> In 1906, he created his own factory brand, producing all kinds of industrial and agricultural machinery (BOPI 1906: 56).

<sup>14</sup> “9.163. Mr. Ruperto Heaton, resident in Malaga. Patent of invention, for 20 years, for a system for pressing all kinds of fruit, pulp or paste by introducing a piston or plunger into a receptacle whose diameter is larger than that of the former, the walls of which, or the walls and bottom of which, are perforated to allow the liquid of the fruit, pulp or paste contained within the receptacle to escape. Application submitted to the Civil Government of Malaga on 11 February, 1889. Registration received on 13 February, 1889. Patent granted on 15 February, 1889”. (BOPI 1889. nº 61; 12); [...]. 11.812. Mr. Ruperto Heaton, resident in Malaga. Patent of invention, for 20 years, for “A system of perforated filtering plates applicable to all kinds of presses, filters and devices used, or that can be used, to extract or filter oil, juice or liquid from seeds, fruits, pulp or paste, and to filter materials or liquids”. Issued on 20 March, 1891. Accredited as practicable on 8 July, 1891. (BOPI 1892, nº 130, 11).

**Table 3.** Patents regarding hydraulic presses to obtain olive oil in Spain

TYPE	RECORD	DATE	NAME_TITLE	APPLICANT
Patent	293	6/03/1879	Hydraulic mechanical press for olive oil.	Mariano Bertrán de Lis Espona (Antequera, Malaga)
Patent	1776	5/08/1881	Press applicable to olive oil, wine and other similar mills.	Juan Cousinou Monton (Seville)
Patent	3832	10/12/1883	A new hydraulic press for oils, wines and all kinds of pressing jobs.	Rafael Echeverría Cisneros (Seville)
Patent	15627	21/03/1894	A new differential hydraulic press for olive oil extraction.	Pietro Veraci (Florence, Italy)
Patent	29753	01/05/1902	A hydraulic and mechanical press for producing common and special oils without using baskets.	Blas Santisteban López (Jaén)
Patent	39849	14/01/1907	A new hydraulic press system suitable for olives.	Francisco Méndez de San Julián Belda (Córdoba)
Patent	44344	13/11/1908	A two-column hydraulic press for extracting olive oils.	Pando, Rodríguez y Compañía (Seville)
Patent	47122	31/12/1909	A hydraulic press with differential piston and double crate for wine and olive oil.	Antonio Izard Massaguer (Terrasa, Barcelona)
Patent	55625	21/05/1913	A hydraulic press for olives.	Francisco Méndez de San Julián Belda (Córdoba)
Patent	57106	20/12/1913	A hydraulic press with vessels, filters or crates for extracting olive oils.	Ana de Orta (Seville)
Patent	70686	19/08/1919	A new hydraulic press for extracting oils with metal filters and an appropriate mechanism for automatic loading and unloading.	Antonio Molina Cantos (Las Palmas de Gran Canaria)
Patent	80619	25/01/1922	A hydraulic press with vessels, filters or crates for extracting olive oils.	Enrique Balbontín Orta (Seville)
Patent	192316	28/03/1950	A high-pressure hydraulic press for extracting oils from all kinds of seeds, fruits and pomace.	Viuda e Hijos de Balbontín (Seville)

**Source:** prepared by the author based on the data from the OEPM.

We should note that, in most of the olive oil mills built in Andalusia in the 20<sup>th</sup> century (before the introduction of the continuous system) that have survived to this day, the hydraulic presses that were usually installed consisted of sets of 4 units.

Grinding mills usually had three or four truncated cone-shaped rollers (sometimes cylindrical), linked by a system of metal gears, and sometimes had a metal or mixed structure consisting of two, three or four cast iron columns, usually decorated with motifs reminiscent of the Corinthian order (fig. 3).

In this period, decanting was no longer carried out in earthenware vessels, but using a system of half-buried or underground containers with different sizes, lined with tiles and interconnected.



**Fig. 3.** Mill, hydraulic press and, in the background, large vessels for storing olive oil. ‘El molino viejo’ olive oil museum, Cabra (Córdoba). Photo by Author, 2019.

### **Hydraulic press: cultural heritage of olive oil production in the context of the Mediterranean**

According to The Dublin Principles (2011: 4) to understand the heritage value of a site, structure or landscape, it is necessary to establish a comparative component to recognise the parts that are inherent to it.

In order to establish this comparative vision, some of the conclusions we have reached so far regarding the Mediterranean industrial agrifood heritage, by analysing areas such as southern Spain and southern Italy, are set out below.<sup>15</sup>

As far as we now, in Italy, the first patent for a hydraulic press to produce oil was attributed to Pattison Cristoforo, from Naples, in 1869 (MONTE 2019: 36). So, in principle, this invention was created more than 30 years after that of Diego de Alvear y Ward in the neighbouring country.

There are two main elements that differentiate the way olive oil was produced last century in southern Italy from the way it was produced in Andalusia. On the one hand, in Italy, with regard to the presses, patents were granted for the so-called superpresses, which were arc-shaped, cast-iron hydraulic presses, which usually came in sets of 3 units and were used together with sets of hydraulic presses or spindle presses, and were normally used in a second pressing to obtain pomace (the olive mass that was left behind after the first pressing was crushed again in another crushing mill).

Usually, Andalusian oil mills resorted solely to sets of hydraulic presses and crushing mills to obtain olive oil, since there were no superpresses available. Although there were oil factories with mixed functions, i.e., which manufactured olive and pomace oil, the vast majority were specialised - they either manufactured one or the other.

On the other hand, in southern Italy, mills had two or three cylindrical grinding wheels, initially set up on stone bases, and later, as patented by Pietro Veraci<sup>16</sup>, among others, on an iron vessel about 30 cm high. This system, rarely used in Andalusia, was widely used in Portugal; in fact, these mills were known as “veraci system presses” (PALOMARES ALARCÓN 2020b: 105).

Although it is very difficult to establish an architectural typology for these factories, as they manifest themselves differently according to their location and chronological period, we can highlight one key difference between the oil mills built in southern Italy and those built in Andalusia.

Specifically, in the regions of Apulia and Basilicata, pre-industrial mills were hypogeal or semi-hypogeal and the pressing systems were called *alla calabrese* or *alla genovese*<sup>17</sup> (fig. 4). The mills had one, two or three cylindrical grinding wheels, moved by animals. Later, when hydraulic presses were introduced and industrialised, they began to be built according to the factory/open-plan hall

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<sup>15</sup> If we analyse the average olive oil production between 1915 and 1965 in Spain and Italy, Spain leads and Italy comes second (PALOMARES ALARCÓN 2020b: 69).

<sup>16</sup> Pietro Veraci was an internationally renowned Florentine company specialising in agricultural machinery which, as we can see in table 2, patented a new differential hydraulic press for oil extraction in Spain in 1894.

<sup>17</sup> On this topic, please see: (MONTE 2009) or (MONTE; PALOMARES ALARCÓN AND VISCOMI 2018).

typology - one-storey, well-lit, high-rise, open-plan buildings -, as in Andalusia. The materials, construction systems and decorative details that were used depended on each specific area.

In Andalusia, however, pre-industrial mills were one-storey buildings, usually built in *cortijos* or *haciendas* in rural areas<sup>18</sup>, associated with a residential unit and normally also dedicated to other agricultural and/or industrial activities; in urban areas, they could also take the shape of open-plan halls. There are still reminiscences, shaped as towers, of the large beam and weight presses, as they required a counterweight tower that rose between the buildings as if it were a church tower, as in the case of the Romera mill in Carmona (Seville), whose tower still stands out among the rest of the roofs of the city, despite the fact that the press has not been preserved.



**Fig. 4.** Matera Olive Oil Museum. Old hypogeal mill (15<sup>th</sup>-16<sup>th</sup> century), Matera (Italy). In the foreground, a view of four *alla genovese* presses. In the background, the mill. Photo by Author, 2021.

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<sup>18</sup> To learn more about these buildings, please see the collection “*Cortijos, Haciendas y Lagares*”, developed between 1991 and 2002 and commissioned by the Junta de Andalucía. A total of 2225 buildings located in the various Andalusian provinces (Jaén, Córdoba, Seville, Cadiz, Huelva, Málaga, Granada and Almería) were inventoried. (OLMEDO 1991-2002).

## Conclusion

Without going into details about the evolution of the term cultural heritage throughout history, analysed in the International Charters and Texts that have been accompanying its conceptual change (REY PÉREZ 2017: 35), we find it necessary to highlight that, according to the Andalusian Historical Heritage Law (Ley 14/2007), which aims to manage, disseminate, protect and enrich the Andalusian Historical Heritage, cultural assets are considered to be those that “are found in Andalusia and reveal an artistic, historical, palaeontological, archaeological, ethnological, documentary, bibliographical, scientific or technical interest”. Title VII explicitly defines Industrial Heritage and the Landscape associated with productive activities [...] as liable of being catalogued in some of its categories.

Throughout this article, we have briefly analysed the importance of the olive oil industry in the configuration of the contemporary olive grove landscape in Andalusia, in particular due to the incentive resulting from the invention of the hydraulic press applied to oil production and its installation and use in factories between the second half of the 19<sup>th</sup> century and the first decades of the 20<sup>th</sup> century. In addition, we also analysed the importance of the invention itself, by conducting a research focused on the first privileges and patents registered at the OEPM.

The hydraulic press is considered to have played a key role in the modernisation of the sector by allowing for a greater pressing capacity and improving the quality of the final product<sup>19</sup>, since it provided a further incentive to promote olive growing.

The fact that it is so important for the production of good olive oil that the time between olive picking and grounding is kept to a minimum, means that buildings related to oil production are located close to the raw materials and, therefore, have a very important presence in rural areas.

The introduction of the hydraulic press into buildings related to olive oil production occurred in two main ways: either by taking advantage of the pre-existing oil mill buildings and simply replacing their old presses with the new ones (mills with beam presses required large open-space halls, so there were no space-related problems when it came to replacing one press with another/s) or by building new oil mills, usually located in urban centres close to the raw materials.

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<sup>19</sup> It is not the aim of this article to analyse the olive grove or olive oil production from the point of view of economic history. On this topic, please see, for example: BERNAL RODRÍGUEZ 1979, ZAMBRANA PINEDA 1984, INFANTE AMATE 2012a, 2012b, 2012c.

In the case of the former, the changes made to the buildings were virtually imperceptible, apart from the construction of brick chimneys in steam mills. In the case of the latter - new buildings -, the factories generally displayed a historicist language that depended on the taste of the owner or the designer. We are dealing with buildings designed by anonymous people, engineers or architects, in many cases worthy of being catalogued and protected, whose heritage value is unquestionable, not only because of the immovable assets themselves and the movable assets they accommodate, but also because of the key role they played in the configuration of the Andalusian olive grove landscape, a reflection of the evolution of Andalusian society.

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