



**SUSTAINABLE ASPECTS OF THE ROYAL
FACTORY OF EARTHENWARE AND PORCELAIN
OF THE COUNT OF ARANDA OF ALCORA
(1726 – 1944).**

**SOCIAL, ENVIRONMENTAL AND ECONOMIC
FACTORS. INDUSTRIAL ARCHITECTURE.**

JOAQUÍN CABRERA BACHERO*

(*) Quantity Surveyor and Building Engineer.

Master's degree in Energy Efficiency and Sustainability
of Industrial Facilities and Construction.

Master's degree in Occupational Risk Prevention. Specialising in Safety.

ABSTRACT

The present paper is a summary of the research carried out by the author, for the master's degree project in Energy Efficiency and Sustainability at University *Jaume I* in Castellon, under the guidance of Professor Fermin Font Mezquita.

The paper does not intend to reflect the history and analysis of the artistic production of the Royal Factory, already studied and published by expert authors, but to provide a perspective of sustainability and energy efficiency of a leading industry of its time. A new vision of sustainable aspects which today is repeated *ad naseum*, and which has been repeated on numerous occasions throughout history.

This industry served, throughout its course, as an example of sustainable industry in social and environmental aspects, satisfying the needs of that time and respecting the environment without threatening the development of future generations.

The foundation in 1726 of The Royal Factory of Earthenware and Porcelain by the IXth Count of Aranda, developer and owner, led to the introduction, in the hand-craft factory, of a tile "**quadra**" (production group), the real driving force of **tile manufacturing** in the town, and its subsequent social and industrial development and foundation of tile production in the province today.

1. INTRODUCTION

The construction of The Royal Factory commenced at the beginning of October 1726, the Count of Aranda himself laying the first stone. Earthenware manufacturing started on 1 May 1727.

A document found in the Provincial Archive of Castellon, without author or date but which could date from around 1750, contains a detailed description of the factory in Alcora:

"The area of the factory measures 200 handspan in length and 180 in width, the walls of stone and mortar and tiles covering the roof, it is made up of two large rooms, leaving an outdoor area where there are two large water storage facilities, which collect the waters from the machine that..."

The amount of 50.000 pesos for the cost of the construction and start-up of the factory is reflected in a manuscript (1) by Governor Mr Josef Delgado (1805), preserved among a bundle of papers belonging to the Duke of Híjar in the Provincial Archive of Zaragoza.

Why did Mr Buenaventura Abarca de Bolea, IXth Count of Aranda create the aforementioned factory?

It has been suggested and is reflected in several documents, that, as Lord of the Town of Alcora, he wished to exploit the favourable conditions of the surrounding area: clays, water and firewood. Using the skills of the locals in handling clay and wheels, as well as the willingness of the townspeople to work.

In view of the good economic situation of the country, and longing to increase his income, Aranda adhered to the innovative policy of Philip V by starting up The Royal Factory following the trends of the French model of Colbertism.

The illness and subsequent death of Mr Buenaventura, IXth Count of Aranda, in 1742 led to a period of uncertainty. The precarious situation forced the Countess to lease (2) the factory. Her son and heir Mr Pedro Pablo, becomes the new owner of The Royal Factory of Earthenware of Alcora in January 1742. Under the new management the industry acquired a new drive.

After the death of Mr Pedro Pablo, Xth Count of Aranda in 1798, Mr Pedro de Alcantara de Silva, IXth Duke of Híjar inherited the Factory. And it always belonged to the heirs of the House of Híjar until 20 May 1858, when the Factory was bought by Mr Ramon Girona, according to the deeds preserved among the papers (3) of the House of Híjar in the Provincial Archive of Zaragoza.

The course of the industry during the second half of the XIXth century was marked by a progressive fall into decline with evident deterioration of its artistic production.



Photos of the building today.

In 1895 the company was taken over by Mr Cristóbal Aicart, a lawyer born in the town, who failed to improve the situation. Again by inheritance, the ownership of the company passed on to his daughter Maria Aicart de Roca in 1925.

The following owners, despite the changes implemented, also failed to achieve their intended improvements. The civil war from 1936-1939 interrupted production, and the factory closed its doors permanently in 1944.

The industrial building underwent transformations during the 1950s and 1960s to adapt to the industrial production of ceramic tiles.



Photos of the interior of the building and the entrance to kiln n° 2.

Today, what remains standing of the industrial building is completely neglected. Although there are enough remains for the research and study of the building, the same cannot be said for the production installations, as only three kilns are preserved (used for firing biscuits up to the 1960s).

2. SUSTAINABLE ASPECTS

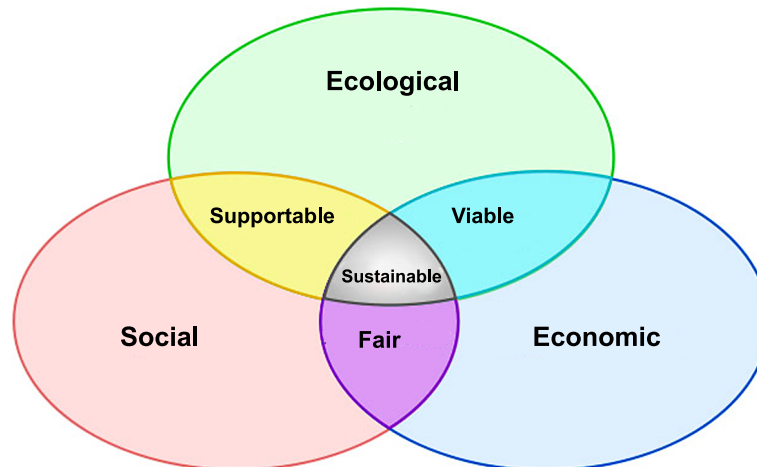
Humankind, with the Industrial Revolution, has caused great impacts on the environment of our planet: irretrievable consumption of natural resources, loss of biological diversity, deterioration of natural surroundings and global warming. Fostering the appearance of new question marks regarding the living conditions of future generations.

The General Assembly of the UN promoted the global agenda for change in 1984. In April 1987, the UN published the report "Our Common Future".

The Brundtland report establishes that humankind holds the key to **making development sustainable**: assuring that today's needs are satisfied without threatening the capacity of future generations to satisfy theirs.

The principles that define sustainability, according to the report would be:

- a) Integration of the environmental factor in development. Resources are not unlimited.
- b) Solidarity between towns and cultures. Access to all natural resources.
- c) The economic exchanges must be controlled by prices which represent real costs: productive, social and environmental.



PRINCIPAL SUSTAINABILITY FACTORS.

The aspects of sustainability which led to the establishment of The Royal Factory of Earthenware and Porcelain, are framed within the following factors:

- Social and cultural.
 - Growth of the population under the protection of the aforementioned industry.
 - Cultural development.

- Environmental or ecological.
 - Exploitation and optimisation of natural resources. Waste management.
 - Use of renewable energy.
- Economic and industrial.
 - Industrial organization. Regulations.
 - Product research and application of new technologies.
 - Industrial construction: extension and development.
 - Industrial development of the "tile factory" and its contribution to the current model of local and provincial tile industries.

2.1. SOCIAL AND CULTURAL FACTORS

The noted botanist Mr Antonio Josef Cavanilles (4), on returning from his journey through Alcora lands in 1792, wrote:

"In the middle of this pleasant land lies the hamlet of Alcora, with good buildings and broad streets, most of them downhill. 200 hundred years ago this hamlet had some 300 residents; growing slowly until 1718, and then a rise was noticed which has continued until there are today 1200 residents. Although agriculture has made progress, it is not the real cause of the rise and wealth of Alcora: the factories of earthenware and porcelain have given it new life, multiplied income and support a growing portion of the town. More than 300 men are employed in the work and in preparing firewood, and some 60 are kept busy, working and selling the work around Spain".

The description that Cavanilles gives shows a clear influence of The Royal Factory on the growth and development of the town.

The data on the population reflected in a publication (5) by Bernat i Martí and Badenes Martín on the residents and/or inhabitants are as follows:

<i>Neighbourhood of Campoflorido (1712-1713)</i>	<i>.....300...taxpayers.</i>
<i>Register for the Equivalent of 1730</i>	<i>.....289...residents.</i>
<i>Census of Floridablanca 1786</i>	<i>.....3.783...inhabitants.</i>
<i>According to The Journal of Valencia 16-XI-1793</i>	<i>.....1.007...residents.</i>
<i>Census in 1842 published by Madoz</i>	<i>.....5.609...inhabitants.</i>
<i>Census of inhabitants in 1857</i>	<i>.....5.052...inhabitants.</i>

Despite the disparity of the figures of residents (taxpayers) and other figures of the inhabitants of the period studied, the notable influence of the factory on the rise in population is evident.

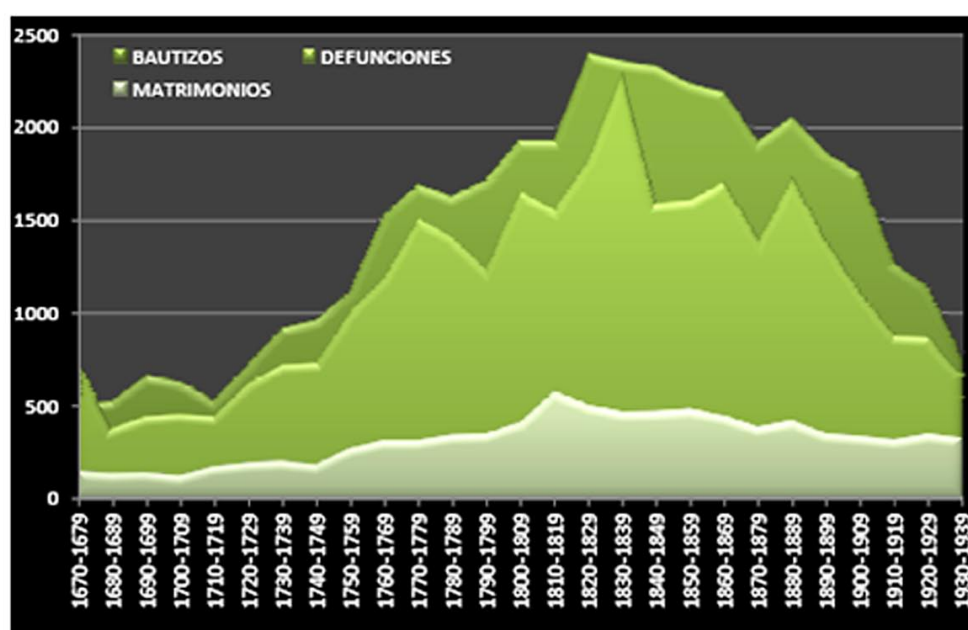
In a publication (6) by Mr Carlos Sarthou Carreres, a reference is made of the official census published of the towns in the province of Castellon. Giving the following figures for Alcora:

Census of inhabitants in 1888.....3.827...inhabitants.

Census of inhabitants in 1900.....4.551...inhabitants.

Census of inhabitants in 1910.....4.880...inhabitants.

The best argument for the contribution of the county factory to the social development of Alcora may be found in the archive of the town Parish of The Assumption (7):



The figures come from the accumulated data broken down by decades, and allow the most significant events to be related to the social development of the town.

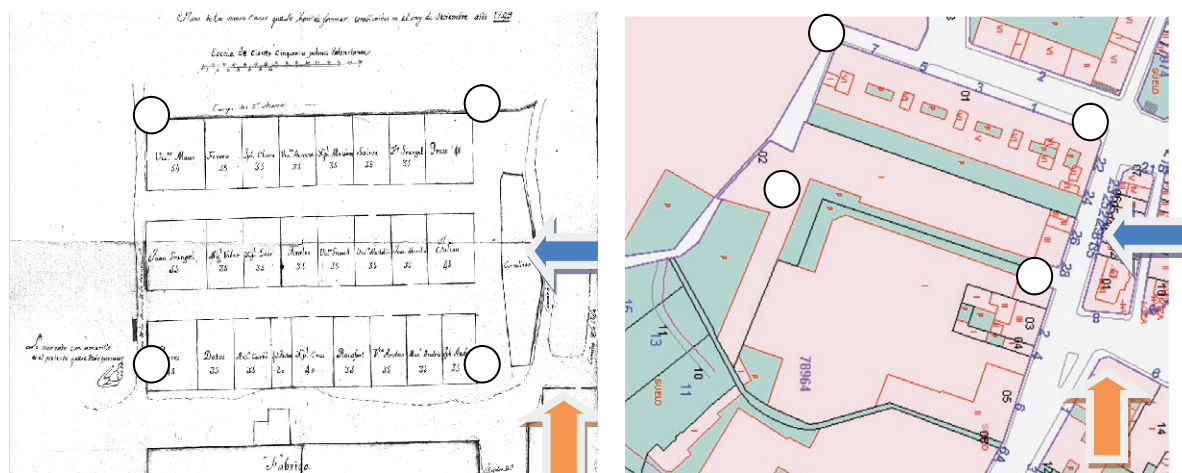
In the above entry by Cavanilles (4), the number of workers is mentioned: "more than 300 men are employed in the work and in preparing firewood, and some 60 are kept busy, working and selling the work around Spain". These figures on the population clearly indicate that the aforementioned industry was the principal motor of economy in the town.

Mr Pascual Madoz e Ibañez in an article (8) in 1845 wrote: "The necessary firewood is also found within the area, more than 300 labourers being occupied with collection: the other raw materials such as lead, tin, salt, glaze, sulphur, soda, aqua fortis and vitriol spirit are brought from Valencia. Every year 15.000 pieces of porcelain, 500.000 pieces of flint and 1.000.000 pieces of common earthenware are made: the workers are 7 skilled masters, 136 journeymen, 55 apprentices and 195 labourers. The manufacturers do not need to be distracted from their tasks

to deliver the products of their industry: many mule drivers load them from the warehouses and export them to all the inland provinces, to America in large consignments and even abroad”.

But the best way to understand the influence of this industry on employment is the figures provided by each of the REGULATIONS published by the owners of the company at different periods.

One of the most significant social factors focuses on the “housing of the workers”. “New houses” are mentioned, implying the existence of other previous houses. The plans of 1759 shown below (9) from the Historic Archive of Zaragoza, reflect the project to be implemented:



Plans of “the houses to be built”, and location within the current town planning.

The houses with the future tenants can be appreciated on the plans, always workers of the factory. The surface area of the houses varies according to the category of the worker. The names reflected on the plans appear on the lists of the workers of the factory, published (10) by the Count of Casal.

To the present author’s understanding, the aforementioned houses were never built. It could be said that given the location of the houses within the site of the factory, they had to be demolished in a relatively short period of time due to the rapid growth of the installations. The existence of earlier houses for workers was not confirmed after a study of the Royal Factory site.

The “Academy of Apprentices” was created in the factory. In all the published regulations, their work and operation was regulated, as may be observed in their analysis.



PRINTS (DRAWINGS) FROM THE SCHOOL OF APPRENTICES.

Mr José Sánchez Adell (11) relates: *"The first Regulation for the governance of the factory, enacted by the Count of Aranda in 1727, establishes the existence of an academy of apprentices from twelve to sixteen years old, who must be native of the region of the barony of Alcalatén".*

2.2. ENVIRONMENTAL AND/OR ECOLOGICAL FACTORS

The principal raw materials came from town lands. The clay came "a quarter and half hour" from the vicinity of the reservoir, close to the San Vicente hermitage and mount San Cristóbal, which collapsed in 1734 due to a rainstorm, thus ending exploitation.

The raw materials for glazes and colours: sulphur, lead, tin, antimony, etc. came from different sources. The factory enjoyed tax exemption for the import of these raw materials, by means of Royal Certificates, whose dates were successively extended.

In the case of lead, a mine was exploited in the proximity of Alcora, but in a minor way. Limestone was extracted from the surrounding area of the Castle of Alcalatén (used in the first half of the XX century for the local production of cement).

In a publication by the Count of Casal (10) the original formulas of the artists of The Royal Factory are compiled. The preparation procedures and compounds were detailed as follows:

Preparation for making Porcelain.

Article N° 1- Clay will be taken that is used for porcelain N.3º. N.4º. will be used in the same way.

Art N°2- prepared limestone will be taken in the same way, and powder N°1 is added as in porcelain.

Note.- In the absence of limestone, transparent flint can be used, prepared in the same way as limestone, but it is never equivalent.

From the study of these documented formulas, the local auxiliary materials used can be listed: Red clay (Roxa) from Lugar de Lamata, River water, clay from the other bank of the river in Saloni, etc.

As regards the firewood, the most valued for the kilns was that from the proximity of Villafamés. Its storage and control, given its importance, was reflected in all the Regulations. In fact, the shortage and rise in price in certain periods led to serious problems in the company. It even employed up to 300 labourers for firewood collection.

Water was also a vital element for the factory, in fact the installations were located "*in the most convenient place close to water and land*" next to the largest irrigation channel of the town. It was used for the preparation of clays, glazes and paints, as well as for turning the mills. Despite water abundance, wells for water supply were built inside the factory.

The wood used for packaging for the stores, transport and sales came specially from the pine forests of Vistabella, from the foot of the Peñagolosa mountain.

The waste from the factory, such as ceramic scrap, was produced from the classification of pieces, breakages, laboratory tests and mainly from the deficiencies in manufacturing and firing. The waste was deposited close to the factory, and used for filling uneven land and excavations. The Museum of Ceramics of Alcora have been studying the "**testars**" (fired scap), which have appeared by chance as a result building works. This enabled them to be related to different production periods and learn of different decorating techniques.

In the wrought iron structures of the existing building, the remains of casts have been observed between the beams. It is assumed that due to the lightness of the casts, they were stored there for use as filling material in later renovations or extensions.

2.3. INDUSTRIAL AND ECONOMIC FACTORS

2.3.1. Industrial organisation. Regulations.

The events that affected the company organisation were reflected in the course of time, in accordance with the Regulations laid down. The study and evolution of the Regulations resembles the Quality Manuals of today's companies in their structure and approach: Declaration of company policy, management, job positions, procedures, instructions, documentation archives, etc. All were revised and updated from time to time, though with excessively long intervals.

First Regulations (Year 1727) (12)

"... give, and order to observe the present Regulations which, by looking at the four objects of Justice, Governance, Policy and Economy, constitute in the aforementioned Factory a fair way of working; a harmonious dependence in the Ministers of the factory and other employees; a step forward in this Trade, and a Policy of Treatment; and a beneficial usefulness for those concerned".



First figures of employment "a little under a hundred journeymen,..."

REGULATIONS, WHICH LOOK AT JUSTICE, and Jurisdiction.

1.- Appointment of "Chief Manager" as Governing Manager and his Deputy Manager. With duties to be fulfilled and to observe the Jurisdiction established in the company itself.

2.- The rules to be observed and the punishment to be applied in the event of failure to comply are established.

REGULATIONS FOR GOOD GOVERNANCE

1.- Appointment of *Ministers*: Chief director "Manager of the whole Factory", assistant Manager, two Warehouse Guards, a Constable, a Porter and a Master Alderman of each Production Group (of Modellers, Painters, Models, Wheels, Kilns, Furniture, Ceramic Tiles and of each established office). Each with the corresponding duties.

2.- Master Draftsman leader of his Production Group *"... and must have a public school for all of the apprentices native to our Town of Alcora... We enforce the obligation of the referred Master Draftsman that he must teach painting, architecture, carving and sculpture..."*

REGULATIONS FOR POLICY.

1.- Obligation to pray on Saturday and on the eve of feast days in each of the Production Groups without interrupting the duties.

2.- Regulations of the internal conduct: obedience, respect, personal hygiene, rewards and bonuses.

REGULATIONS CONCERNING ECONOMY.

1.- The rules of economic control are established: Book of Stocktaking, General debit and credit account book, Register of materials, wood and other, Book of General Accounts, etc. Obligation to report monthly.

2.- Rules for supplies and stock control: *"that our Manager has supplies of Glazes, and Colours for two years and Clay for one"*.

3.- Special bonuses: *"We order our Manager to offer and give bonuses, pending our prior approval, to anyone who discovers Lead Mines, Sand Mines closer to those in use and particularly within the region of our State"*.

Second Regulations (Year 1749) (13)

"... established for manufacturing, more than one hundred journeymen, it has seemed to me convenient, so that they would have subsistence, and no disorder would take place among so many people, whose number increases day by day, to give and order observation of the present Regulations, which looking at the objects of governance, policy and economy, make in the Factory a fair way of working, a harmonious dependence of the Ministers of the factory and other employees, a step forward in this Trade, and a Policy of Treatment; and a beneficial usefulness for all those concerned".



Regarding the previous Regulations, the managerial positions are maintained, with minor changes. A list of 34 points to be observed is established, some of which are noted below:

1.- A work timetable, for Winter and Summer. With reductions in the monthly salary *"when absent from work"*.

2.- Financial aid is considered for work accidents in the factory itself: *"in the event of an accident, help with some daily assignment..."*

3.- New timetables are established for the Academy of Apprentices, with rewards *"for the best workers"* and all of the Apprentices are provided with *"the necessary paper, and pencils for their drawings..."*. The Apprentices *"must be native of my State, and between twelve and sixteen years old, bound by Contract for ten years, the first four years with a salary of half a silver real, the following four with a salary of one silver real, and the last two years with five Valencian wages"*.

4.- Access to each of the duties is regulated, closing the doors of the Factory during the placing and removal of tiles from the kilns. A work contract is introduced *"Every worker will have a contract, because enjoying...."*

5.- Research in the factory itself is rewarded: *"He who advances in the quality of glaze, composition of colours, new designs, casts, making the clay transparent, and adding Gold to the Earthenware making it resistant to firing, will be rewarded"*.

Third Regulations (Year 1799) (14)

"Desirous that my Factory of Earthenware of Alcora should reach its highest perfection and progress in the products manufactured for a better service to the Public, and that it should produce the interests it is subject to: I have decided to establish some Regulations to that effect, so that greater clarity is reached, and the objectives I desire, which are the following;"



These Regulations, the first of the House of Híjar, establish in thirty chapters, the positions in the Factory from General Management down to the Guards of the Factory. All the corresponding documents, obligations and duties to be carried out are explained. With this an attempt is made to reorganise the internal running of the factory established by his predecessor the Count of Aranda.

Three chapters appear, with new rules:

1.- Appointment of GENERAL INSPECTOR OF THE FACTORY, who will perform inspections on a yearly basis or when deemed convenient, the inspections will be reflected in a Work Inspection Book. The Inspector will be responsible for reporting all incidences to the owner- the Duke of Híjar.

2.- Arrangement to supply the pieces to the Court " *according to what is used and liked in the country, and the goods, which are more difficult to sell in Madrid or which the chargers do not want to dispatch*".

3.- *GENERAL ORDERS WHICH INCLUDE EVERY person of the factory.*

Obscene and dishonest words, challenges, etc. are forbidden. With the establishment of punishment in the *Cepo* (cell). Nicknames are forbidden and superiors should be respected and obeyed. Pieces cannot be removed from the factory and after a day's work no unfinished pieces may remain.

This Regulation was completed, with the *ADDITIONS OF 15th JULY 1800*, in which some observations are made regarding the aforementioned regulation. It holds that the 23 Chapters are to be observed and adds the following modifications:

1.- The first and second administrators are relieved of some duties and assigned new controls.

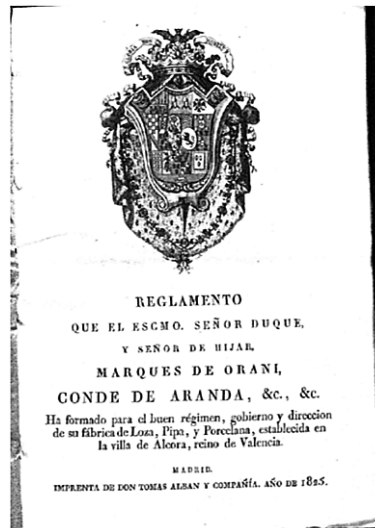
2.-The work of the Masters is reorganised- according to their names-master of fine painting, Colours, sculpture, Glazes, with new powers and work procedures.

3.- It establishes new procedures for loading kilns and firing, knowledge and selection of clays, composition of glazes, tests and study of costs.

4.-It establishes a price list of sales, supplies and transport of goods.

Fourth Regulations (Year 1810)

"So that my Factory of Earthenware established in my town of Alcora may reach its highest perfection in all the products manufactured, as well as a better service to the public, exceeding and making it possible to reach distant lands, and that there is also a governance that endeavours to fulfil my intentions, I have laid down the regulations to be applied, and which are the following".



The new regulations are detailed in 29 chapters which include some changes:

1.- Each of the positions of Master along with their obligations and responsibilities are defined *"to which I will attend and reward according to their merit; and those, who progress in improving the work which to them is peculiar, making it more consistent, beautiful and less expensive, will be equally attended and rewarded"*.

2.- New work timetables for two seasons: Summer and Winter. *"I forbid at present to work on the eve of holidays, as due to the war there is less extraction of earthenware than before..."*

3.- Other work procedures and documentation are introduced:

"On Saturday of every week, when work is concluded, a board will be held, which Management and masters of the factory will attend, recording what is dealt with and stipulated, which will be convenient to the economic governance and advances of funds..."

"that the inspection has made up two inventories of all the papers that have entered the factory, one related to revenue, concessions and rights of the factory, cash books, books of firewood supplies, designs and other papers included... I want them to be placed in two different cabinets: One for the use of the factory... the other will be used for the documents of Management,...in each cabinet a notebook or blank book will be placed so that when a document related to the factory or to my states needs to be extracted a register will be made with the receipt of the person who required the document..."

Fifth Regulations (Year 1825). (16)

In the introductory title the lines of production are mentioned for the first time: *"Has formed for the good conduct, governance and management **of his factory of Earthenware, Pipe Clay and Porcelain**, established in the town of Alcora, kingdom of Valencia"*.

"As far as I can gather the regulations given by my predecessors for the good conduct and governance of my factory have been unsatisfactory to fulfil these objectives, and the lack of executive and rapid solution in the business of the factory, has caused considerable damage to my interest because of the distance, and also because there are immediate cases that require a rapid solution in order to produce the desired effect, I have come to establish these regulations and create the position of Supervisor, whose powers and those of others are set out extensively in the following way:"



They are the most extensively enacted to that date, and include all the procedures and instructions for each section of the factory. Model forms for the control of duties, reception and distribution of materials, goods and economic control are included.

It is worth noting in the new regulations:

1.- The creation of the position of Supervisor of the factory, as the General Representative of the Duke of Híjar in Valencia.

2.- Detailed definition of each of the positions, sections and duties, with their corresponding articles: GENERAL MANAGEMENT, ACCOUNTANT, TREASURER, WAREHOUSE-GUARD AND AUDITOR OF MATERIALS, GUARD OF PIPE CLAY AND PORCELAIN WAREHOUSES, COMMON EARTHENWARE, PAINTING ROOM, SCULPTURE AND CASTS ROOM, EARTHENWARE AND GLAZE COMPOSITIONS PORCELAIN MILLSTONE ROOM, COMMON ROOM, GLAZES, KILNS, FIREWOOD SORTING AND SUPERINTENDENT OFFICE.

3.- GENERAL CHAPTERS.

Orders of material, tools and stocks. Attendance to the weekly board meetings. Harmony maintained among the workers. So that the estates of the debtors to the Factory are not allocated to the workers. So that the Factory workers cannot introduce firewood to their estates. So that preference is given to the sons of good workers. On the sale of earthenware and reduction of rates. *On the changing of casts and sizes of the pieces. On the working hours in the Factory. On the revision of duties and payroll of the workers. Timetable of the school of drawing.*

2.3.2. Product Research and application of new technologies.

The publication by Pascual Madoz (8) dated in 1845, relates: *"the building is solid and impressive and of admirable interior distribution for all the operations; porcelain tiles as perfect as the foreign ones and 3 types of earthenware called faience, pipe and fire are manufactured in 7 departments..."*

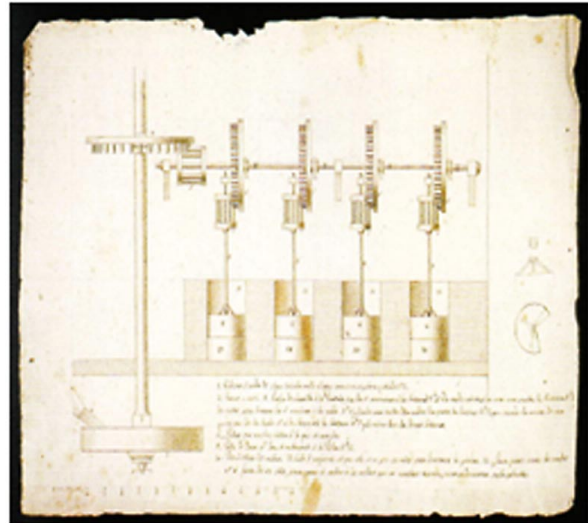
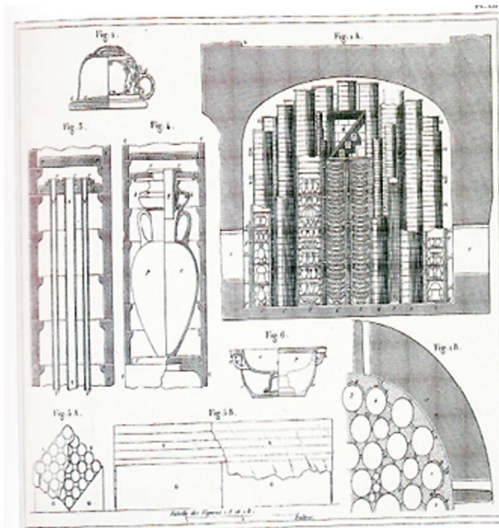
These denominations correspond to the lines of production of the Factory, after years of research, of exploitation of new plots discovered in the locality, as well as the involvement of prominent skilled Masters.

In subsequent Regulations, the incorporation of these clays is mentioned. New work procedures and control of production costs are established in 1810 and 1825. Employees, who provided new developments in product and design, were also rewarded.

The application of new technologies was constant, Sanchez Adell (11) writes:

"Regarding the kilns, of which there were already two between 1729 and 1730, another one was built inside the new enclosure. In 1734 a new warehouse was built, where the earthenware was deposited when removed from the kilns. As regards the mills for grinding colours and glazes, there was a mill of eight stones from the beginning and another was added with the same number of stones in 1731.

In the decade from 1743 to 1753 some innovations were introduced, such as two horse- or mule-powered mills, one of the most extraordinary machines in Europe for refining glaze and bringing it to its best, two kilns for firing, new storage facilities for clay and the construction of new industrial buildings which could accommodate up to three thousand workers".



Plans of kiln and mill.



Photo of the roof of the existing kiln.

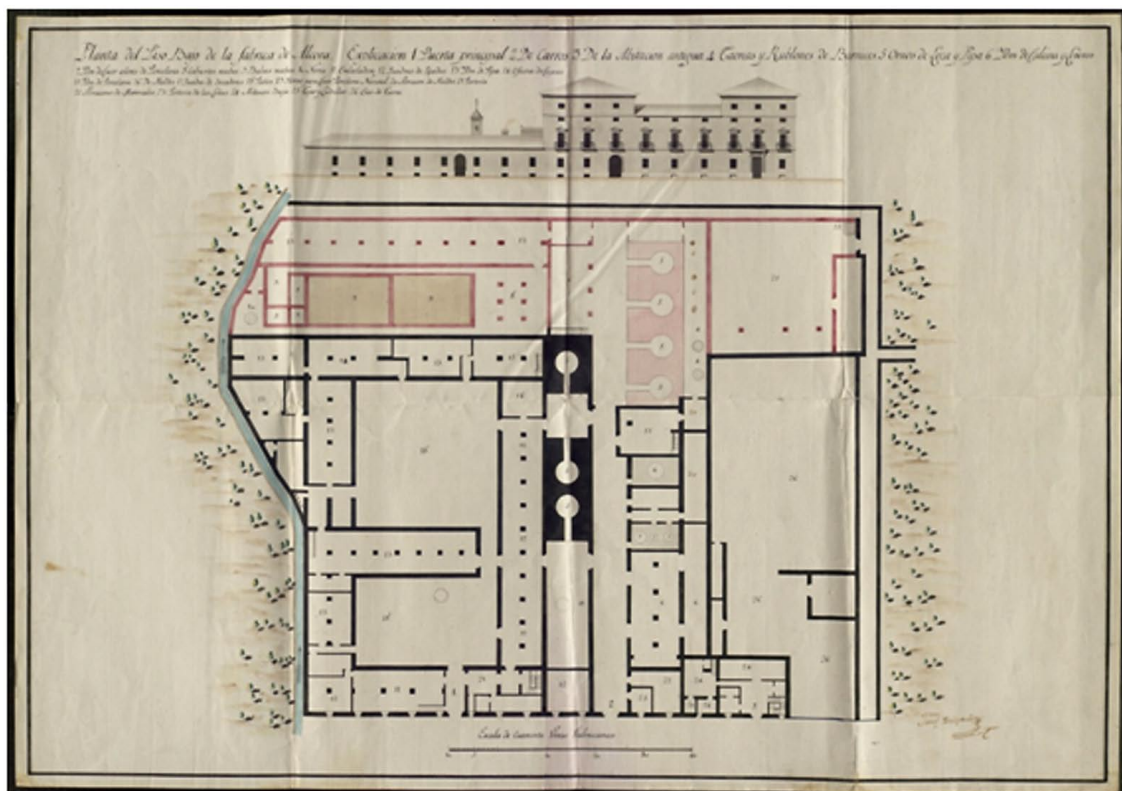
2.3.3. Industrial construction: extensions and development.

The following quote is mentioned in the publication by Cavanilles (4): "*come to see the factory, which is a magnificent building. The managers fully satisfied my wishes, showing me the use of clays and other materials, the laboratories, kilns, deposits and offices: it all breathes grandeur*".



Old photos of the industrial construction, from the beginning of the last century.

It is unknown whether an original project existed but none has been preserved; only the description of the first building is available (1) thanks to historic documentation. The only plan (17) preserved was drawn up at the beginning of 1800 by Mr Josef Delgado, who was Governor of the Royal Factory. Only the ground floor and façade can be observed.



The draft (17) by Governor Delgado, drawn in sepia and black ink measuring 60x80 cm, details each and every one of the rooms of the building. The façade shows some “additions and symmetries” which differ from the building work carried out. This would be due to some adjustments to give a sense of greatness and splendour.

Recently the ceramist Ximo Todolí Pérez de León published (18) a detailed study of the building using the aforementioned draft and the historic data gathered.

The description in the document, kept in the Provincial Archive of Castellon, introduces the first perspective of the project:

"The surface area of the factory measures 200 handspan in length and 180 in width, the walls of stone and mortar and tiles covering the roof, it is made up of two large rooms, leaving an outdoor area for two large wells..."

The construction of the building was very fast and the factory continued growing up to the beginning of 1800. The publication by Mr Sánchez Adell (11), relates: *"Despite the slackness of the business, improvements were continuously made in the factory in the first years of operation. Between 1729 and 1735 the extension work carried out involved walling a large open area, where a warehouse was built for storing clay and firewood".*

There is further documentation on the development of the industrial architecture of the factory. With a view to analysing the building in depth, the preserved part is in the process of being measured *in situ*, followed by a subsequent land survey. From which the following conclusions can be made from the perspective of the factors of sustainability:

1. The first data obtained, fully coincide with the historical data: dimensions and materials. All the measurements taken are multiples of the Valencian handspan (22.56 cm).
2. The construction systems are of great simplicity and rapid execution, using low cost materials which came from the locality itself: bricks and ceramic roofing tiles, stone, sand, plaster and lime.



Photos of external components (enclosures).



Photos of internal structural components.

2.3.4. Industrial development of the “tile factory” and its contribution to the current model of local and provincial tile industry.

The introduction of the quadra or tile production group since the foundation, suggests that tile manufacturing was as productive as ceramic artware. But as research developed, this idea was progressively dropped.

Recently the publication (10) by Inocencio V. Pérez de Guillén, refutes the authorship of the factory of Alcora in relation to “the ceramics of the Palace of the Marquis of Benicarló”. Widely defended by some authors and in particular the Count of Casal (10).



Nor did any of the decorations from the aforementioned Palace, found in the chapel of the Nursing Home in Alcora, come from the kilns of the county factory.

On the other hand, other examples found in the Church of San Miguel of La Foya, skirting from the Church of the Blood in Castellon, house of Bishop Beltran de Sierra Engarceran, etc. are indeed considered “ceramics from Alcora”.

From this it may be inferred that production of ceramic tiles was scarce; it would be down to specific orders and building work from the town itself.

Workers left The Royal Factory to establish new workshops in neighbouring towns: Ribesalbes and Onda. Their artistic production did not enjoy the same recognition as the factory of Alcora, but it gave way to the commencement of their ceramic tradition.

The manufacturers of fine earthenware refocused their production in the middle of the XIXth century, opening new roads for the development of the sector. The Factory of the Count of Aranda became the training school which would provide tile companies with their workforce. However, previous resources such as the Arab kiln were still being used.



The beginning of the XXth century, with the appearance of new technologies and the rise in modern architecture, provide new drive for the tile industry. Ceramics was revalorised in all its manifestations with a wide range of decorations.

During the first quarter of the XXth century, the province of Castellon became the leader of Spanish production. In 1929 the province in its manufacturing centres of Alcora, Onda and Castellon had 41 factories, 143 Arab kilns and produced almost 5000 m²/day.

From the 1930s onwards, the first innovations were introduced which affected pressing, clay and glaze preparation, and the firing process. Subsequently passage kilns were introduced for second firing. The 1950s and 1960s, with the national housing plans, led to the first industry upgrade.

Hydraulic presses and tunnel kilns, which involved a great production increases, were introduced. Since then the tile industry has evolved in technology and development of new products to the present day.

The last owners of The Royal Factory of Earthenware and Porcelain of Alcora could not keep up with the changing times. The Factory closed its doors permanently in 1944, and the installations were subsequently sold.

3. CONCLUSIONS

From the initial approach of sustainability and the data provided, the following conclusions may be drawn:

1. The Count of Aranda manufacturing company was a pioneering industry of its time, which fulfilled the parameters considered today as "sustainable":
 - Social growth and cultural development.
 - Consumption of renewable energy.
 - Use of local resources and raw materials.
2. It was the foundation of today's tile industry whose rapid growth, for a long time, failed to respect the criteria of environmental sustainability. The imitation of this industry in neighbouring localities allowed later readjustment to ceramic tile manufacturing.
3. Its establishment in the town of Alcora allowed the development of the locality to evolve towards today's ceramic sector, principal source of wealth. Its unquestionable artistic value has brought to the Town the knowledge of its industry for generations.

It would be appropriate to end this paper with the following quote by philosopher Jose Ortega y Gasset:

Progress does not consist of destroying today that of yesterday, but rather to preserve that essence of yesterday which had the virtue to make this today even better.

Jose Ortega y Gasset (1883-1955). Spanish teacher, philosopher and essayist belonging to the 1914 Generation.

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