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Digital Modernism Heritage Lexicon

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Contents

Steel and Architecture: Analysis of Some Singular Italian Experiments of the Sixties of the Last Century	1
Marcello Zordan	
Modernism/Modernisms. The Two Souls of Modernity Before Modernity	23
Enrico Cicalò and Michele Valentino	
The Brazilian 20th Century’s Houses. Digital Documentation for Preservation and Enhancement of Modernist Architecture and Design Processes	35
Marcello Balzani and Luca Rossato	
Between the Layers. Transparent Paper as a Modernist Architectural Design Environment	57
Fabio Colonnese	
Tamed Tropics: Modern Architecture in the Colombian Caribbean	81
Massimo Leserri, Merwan Chaverra Suárez, and Pedro Martínez Osorio	
Blossoming of a Modernist Lexicon. Camillo Autore and the Reconstruction of Reggio Calabria	115
Daniele Colistra and Francesco De Lorenzo	
The Missing Piece. Luigi Moretti’s Shrine to the Martyrs of the Fascist Revolution at the Foro Mussolini, Rome	141
Marco Giunta and Fabio Colonnese	
“Case del Fascio”: Forgotten ‘Fragments’ in Contemporary Rome	163
Marina Docci	

The New Astronomical Observatory of Rome. A Philological Reinterpretation of an Unfinished and Monumental Modern Complex	189
Arturo Gallozzi and Rodolfo Maria Strollo	
Mediterranean Islands' Vernacular Architecture and the Origin of Modern Architecture	209
Pedro Miguel Jiménez-Vicario, María Mestre-Martí, and Manuel Alejandro Ródenas-López	
Modern Construction in Bologna. The Faculty of Engineering by Giuseppe Vaccaro, 1932–1935	233
Giorgia Predari, Davide Prati, and Angelo Massafra	
The Church of Cristo Re in Cagliari, 1952–1963, G. Genta and S. Panzarasa: Tradition and Modernity in the Architecture of the Central Sacred Space	259
Andrés Martínez-Medina, Vincenzo Bagnolo, and Andrea Pirinu	
Bari Discovering Dioguardi. Possible Strategies for Reading the Built Work of Saverio Dioguardi	285
Valentina Castagnolo and Anna Christiana Maiorano	
From the Office Skyscraper to the Residential Tower: The Case of the Vistamar Tower in Alicante, 1962–1965	307
Justo Oliva-Meyer, Andrés Martínez-Medina, and Marco Lucchini	
Architecture and a Systematic Approach as Amplification of the Modern Project Lexicon. Modernist Experiences in Argentina Around the 1960s	331
Luis Müller and Cecilia Parera	
Elaboration of a Critical Paradigm for Interpreting Modern Architecture: The Almost Intangible Essence of Luigi Moretti's Casa del Balilla at Trecate	347
Salvatore Damiano and Eleonora Di Mauro	
Historical-Graphic Introspection on Catalan Modernism the Architectural Lexicon of Agricultural Structures	371
Caterina Palestini and Carlos Cacciavillani	
Icons of the Italian Style. The Façade of Olivetti Headquarters Building in Milan (1954)	397
Anna Chiara Benedetti, Carlo Costantino, and Riccardo Gulli	
Mutant Bodies. Statue Digitization and Exhibition at the National Archaeological Museum of Venice	425
Massimiliano Ciammaichella and Gabriella Liva	

Historical-Graphic Introspection on Catalan Modernism the Architectural Lexicon of Agricultural Structures



Caterina Palestini and Carlos Cacciavillani

Abstract The research proposes a graphic introspection of Catalan Modernism which, in relation to the corresponding European artistic manifestations, generates a cultural movement with political, social and economic implications from which the elaboration of the peculiar architectural lexicon is derived. The intensity of the phenomenon is linked to the desire to overcome the long phase of decadence that had affected the region in previous centuries, from the fifteenth to the seventeenth century, manifested with the redemption of its own national identity. The eloquent expressive variety is not limited to prestigious buildings, but also characterizes the structures for work, such as the agricultural ones that take on the role of cathedrals of production. In particular the wine cellars, the wine factories that show a construction repertoire of great architectural level and bold structural complexity with the use of parabolic arches and vaults that generate large communicating spaces, supported by vaulted spaces defined by the wise use of brick. Specifically, the contribution proposes the graphic analysis of two emblematic examples, extrapolated from the extensive case study produced by César Martinell i Brunet, these are the structures created for the cooperatives of Pinell de Brai and Gadesa, which represent significant typological models in the context of broader research on the theme. The wineries have been examined through the tools of representation, both traditional and digital, with the aim of graphically documenting the formal qualities of the works, investigated through surveys that, from the whole to the detail, witness the autochthonous expression of Catalan Modernism, the material and immaterial values preserved in them.

Keywords Catalan modernism · Representation · Agricultural structures · Wine cellars · Graphic analysis

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1 Introduction

The origin of Catalan Modernism with its political, economic, social and artistic implications is manifested in the moment in which the Catalogna feels the need to define the meaning of one's own identity, involving different cultural spheres [1]. The region to the north-east of Spain was the first to undertake a process of modernization parallel to that of Europe, participating in the collective ferment that will direct it towards the change affirmed by industrial revolution [2]. In this sense the eighteenth century marks the beginning of the demographic recovery, of the commercial and agricultural process that will determine the conditions that are necessary to implement the transformations linked to the evolutions introduced by the new technological possibilities. Specifically, from Barcelona, the capital of the region, cosmopolitan exchanges start which, starting from 1778, the year in which Charles III introduced the Regia Cedola, crossed national borders.

Economic and social progress initiates the cultural renaissance from which derives the interest in the constitution of a unitary spirit, extinct for centuries, which gave rise to the birth of the first Catalan nationalist movement that preliminarily concerns the literary sphere [3]. The dichotomy between tradition and modernization is underlined in numerous writings of the time as evidenced by the works of architects who actively participated in the cultural and political debate, including Domenech i Montaner, Puig i Cadafalch, Rubio i Bellver who were the theoretical spokespersons of the new architecture. The period marked by the nineteenth century actually introduces a moment of industrial prosperity, of European integration that takes the name of *Renaixença*, a term coined to include the material and intellectual motivations, defined for the rebirth of the whole country. Among the objectives set, the ratification of the linguistic idiom emerges, validated in the appropriate forms to make it current; the revitalization of universities, academies, scientific researches, museums, rethought according to the new social, aristocratic and bourgeois classes which included the proletariat, political parties and various forms of government. The country tried to adapt by finding a way to be Catalanist, with all the implications that the definition entails [1].

In this attempt to rediscover the authenticity of the country by conforming to the innovative mentality of Europe, there are the architectural and artistic experiences that live a moment of great expressive vivacity.

The search for one's own artistic identity that was autonomous—linked to extinct but prestigious medieval traditions, to the popular element that characterized Catalan traditions—animates the artistic and cultural process which at the same time had to respond to a modern attitude, conform to the industrialized European progressive mentality [3].

To analyze the characteristics of Modernist architecture, it is necessary to establish chronological limits, a task made difficult by the extraordinary and multifaceted flowering of trends. Beginning with Medievalism, Modernism will subsequently acquire elements of Neomudejar, dall'Art Nouveau, from oriental architecture, to reach its most typical expression foreshadowed by Domenech i Montaner already in

1878 in the article “En busca de un arquitectura nacional” published in the magazine *Renaixença*.

In general, the studies agree in fixing the beginning of the movement around 1880. Trying to free itself from revivals, Modernism will progressively assert itself as the desire to express a new architecture that will find its greatest manifestation with the Universal Exposition of Barcelona in 1888.

The investigation is more complex when trying to establish the final date of the movement. In his text “Modernismo y modernistas” he indicates 1907 as the final date, Bohigas extends the period until 1926, the year of Gaudi’s death; while Collins in his Bibliography further extends the time frame and identifies the end of the Catalan Movement in 1930. It is evident that the longer the period studied, the more comprehensible the style, Collins’s delimitation appears in this sense the more reliable, and especially that it refers to the Catalan cultural movement in general.

Modernism really deserves to be considered more than the last style of the nineteenth century, the first of the twentieth century. From the structural point of view, it did not bring innovative technical solutions, restricting to find models and forms deduced from the rationalism of Violet le-Duc, applied casually to buildings that reproduced the true national tradition, or Romanesque and Renaissance models [4].

In art, Catalan Modernism outlines a style characterized by a chromatic, dynamic and romantic feeling in line with the Liberty for which the role of the Parisian artistic environment must be considered, frequented since 1850 by the many Catalan artists: Ramon Marti y Alina, Simo Gomez, Modesto Urgell, Gaspare Miro, Roma Ribera, characters who somehow set the stage for the emergence of the new avant-garde current in the Spanish movement.

In architecture, Modernism showed the anticipation of curved and asymmetrical forms combined with a particular taste for the use of materials and colors related to the type-logical and structural characters, as well as to the most visible decorative apparatus. The use of ceramics in facings, introduced to reach the maximum chromatic and stylistic expressiveness, is manifested with floral and geometric designs applied to building facades, roofs and interior spaces.

However, the use of ornaments is not limited to the external shells—tiled with azulejos, plaster graffiti and enriched with polychrome stained glass windows—but defines the composition by including the constructive elements such as brick, adopted in the wall texture as a structural and decorative element, to which is added the dynamism given to the buildings by the use of plastic elements and the romanticism of Gothic and Muslim inspiration [5].

2 Phases of Catalan Modernism

In order to frame the scenario in which the architects of Catalan Modernism move, it is necessary make a specific distinction regarding the evolutionary phases, to understand the works derived from them and the related constructive implications.

2.1 *Premodernism*

Juan Bassegoda Nonell identifies a pre-modernist phase in Catalan architecture, and argues that no fashion or style arises from nothing and that, in this sense, even Modernism has had an important gestation period during which many architects, having overcome the eclectic phase, experimented with personalized architecture, adapted to the evolving tastes of the artistic trend.

In fact, considering the short time span that defines the modernist period, it is plausible that in Catalonia there must have been a cultural root placed before the official beginning. Reasons that are reflected in the facts and lead to broaden the chronological period of reference, by tracing the start prior to 1893 also in consideration of the recognition obtained in the aforementioned Exposition—Universal area of Barcelona.

The recognition of a premodernist movement assumes a fundamental importance, because in this way numerous early works by those who subsequently became the main protagonists of Modernism such as Bernardí Martorell i Puig and Lluís Domènech i Montaner [6].

2.2 *Full Modernism*

The period in which the modernist movement reached its maximum splendor is located in the years ranging from 1893 to 1910. The first date marks the moment of conjunction with the components, gothic and mudejar, of premodernism which fused giving rise to the distinctive style of the central period of Catalan architecture. The most celebrated moment sees as the undisputed protagonist Lluís Domènech i Montaner, creator of original architectures, including in Barcelona the Montaner Palace, the well-known Palace of Catalan Music and the Hospital of Sant Pau. Added also are the architects Pedro Falqués i Urpi, Andrés Audet i Puig, Pablo Salvat i Espasa, Antonio Ruiz i Casamitjana and Geronimo Granell i Manresa who built numerous buildings in the expansion of Barcelona.

The union of elements—derived from French Gothic, from the Venetian medieval style, from the plastic shapes of the Baroque, the use of exposed brick and ceramic decorated by talented sculptors, painters, ceramic artists and craftsmen—concur to configure the multifaceted compositions resulting from the phase of full blown modernism [6].

In this context, the singular artistic personality of Antoni Gaudí cannot be overlooked that in his own way combined modern figurative expressions with new technical achievements, although according to him placed the creation of his works in the context of the Byzantine tradition [5].

In reality, his unusual architecture does not allow for classifications. The expression of its organic forms, of the extraordinary structures deriving from theories based on a philosophical-mystic-rationalist system constitute a unicum while materially

belonging to the places and to the cultural moment in progress, of which he shared the ideological and thematic presuppositions, in which he participates in his time with a very exclusive and personal contribution sui generis.

2.3 The Second Modernism

To delimit the second modernism, one cannot resort to a simple chronological parameter. This second phase corresponds to a production of works created by a series of architects such as José Puig i Cadafalch, Antonio Maria Gallisà i Soqué, José Font i Gumà, Enrique Sagnier i Villavecchia, Joaquín and Buonaventura Bassego-da i Amigó that at the same time as the great masters or in later times, develop an eclectic style always based on the neogothic and mudejar one with elements of plateresque derivation, producing a large number of buildings that at some point acquired a character of modernist derivation without belonging to the absolute manifestation of style.

2.4 Last Phase of Modernism

The modernist movement was in fact short-lived, already in the Turin exhibition of 1902 the style was in a decreasing phase, its major creators abandoned it or completely transformed it by virtue of a new formal language that banned decoration to enhance functionality. Modernism in Spain holds a very particular phenomenon, for the diversified protagonists of the architectural scene, whose works contain elements that can refer to both to the work of Doménech i Montaner, and to that of Antoni Gaudí [5].

In this final phase of Modernism that we could define as a transition between the two cultural movements, included is the work of Cesar Martinell i Brunet (1888–1973), the youngest representative of gaudinism who elaborates his architectures between Modernism and Noventism, considered opposing but through which the architect manages to express an interesting expressive lexicon of continuity.

3 Cesar Martinell i Brunet Between Modernism and Twentieth Century

The activity of Cesar Martinell i Brunet, historical art architect, collaborator and friend of Antoni Gaudí, fits within the cultural themes of the twentieth century with a peculiar position that, as anticipated, carries on in continuation with the modernist experience.

It is no coincidence that Lluís Domènech i Montaner appears among his teachers, from which Cesar perceives the interest not only for his multifaceted architecture, but also for his historiography. Another mentor was Francesc Galí of whom he attended the avant-garde art school, sharing the new aesthetic expressions with Mirò and other artists of the cenacle who influenced his training. These cultural influences are evidenced by the writings and the graphics that accompany his first book *El arte de la danza* of 1912, in which he proposes small watercolor perspectives in pastel tones, collected in an album published in 1924, which anticipate the refined drawings of agricultural projects, known as “cathedrals of wine”.

The architectures for production built between 1918 and 1921, derived from adherence to a Mancomunidades corporate programme which recognized the right to farmers join associations according to a law issued in 1913 by King Alfonso XIII, represent, for their quality and number, the identifying typology of the work of the versatile Catalan architect. The architectural success achieved by agricultural architecture, considered as representative buildings, is linked to the political and cultural event of the constitution of the Confederation of Catalonia, decreed by the progressive reform of the region which autonomously managed to override the traditional systems of power prevailing in the rest of Spain [7] (Fig. 1).

This happy situation characterized the construction of the numerous structures intended to accommodate wine cellars and oil mills. Forty-eight factories built over thirty years, 34 of which are newly built and 14 extensions, as documented in the

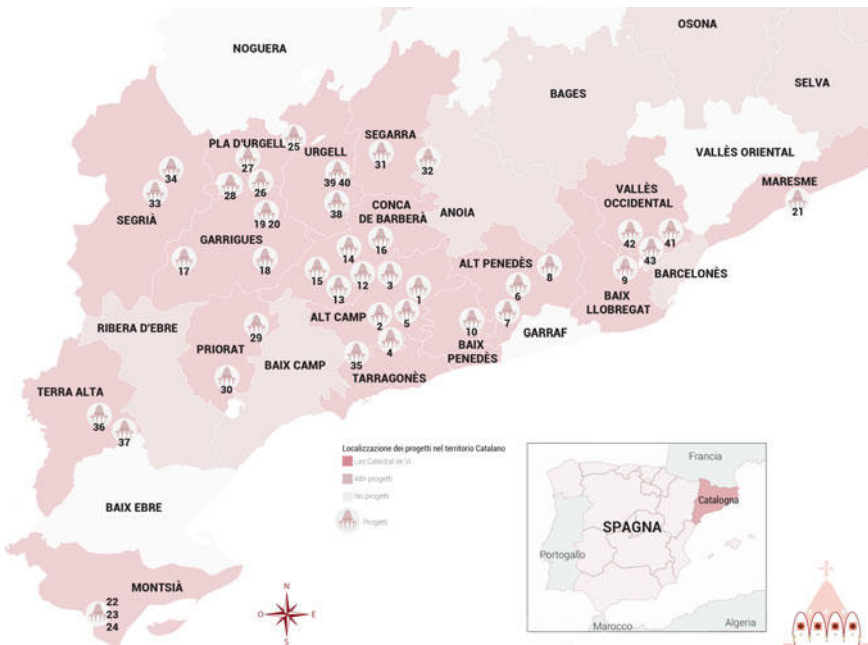


Fig. 1 Localization of agricultural structures in the Catalan territory



Fig. 2 Pinell de Brai: ceramic frieze made by Xavier Nogués i Casas

Historical Archive of the Official College of Architects of Catalonia and Balearics, in which the original projects by Cèsar Martinell i Brunet are conserved and by which shows that the most remarkable production takes place in the first three years of assignment. Later after the death of the first president Prat de la Riba, in 1917, with the election of his successor, Josep Puig i Cadafalch, the Mancomunitat is preparing to live less fortunate events, and the worsening of social struggles weakens the policy of the Lliga which will archive the projects of autonomy by opting for more conservative positions.

Historical events outline and in some way condition the architect's stylistic choices which, especially in the thirties, adhere to the twentieth-century ideology in its aims of cultural dissemination, and of political and social program. Its most unitary production, dating back to the youthful period, belongs instead to the gaudinian-inspired language, although it has progressed towards a more rational sensibility that marks an important evolutionary phase from modernism, imbued with the new ideology developed in the early decades of the twentieth century. From this arises the indecision of the historiographical judgments on Cesar Martinell i Brunet, of his being a modernist or a twentieth century artist, in particular with respect to his first and largest production, that of agricultural architectures, object of study (Fig. 2).

Oriol Bohigas is the first to consider him as an architect belonging to that phenomenon of "survival of Modernism" which extends it to the decade of the twentieth century with a line of gaudiana descent [2]. Ignaci de Solà Morales, on the other hand, emphasizes the twentieth-century character of Martinell's work, referring not only to its stylistic connotations, but also to cultural theoretical activity publicly linked to institutional programs [8].

The controversies of belonging dissolve in the observation of the works, of the formal references which combine several factors: those of the gaudiniana methodological lesson, of the interest for the historiographical investigation inherited from Lluís Domènech i Montaner, of the possibility of exploring the construction systems of the Catalan vault, of traditional brick, of modernist ornamentation, of his expressive and symbolic involvement that leads him towards a more purified and rational synthesis [6].

The need to recover historical traditions, a constant feature of Catalan culture especially from the period of *Renaixença*, shared in different forms by Modernism and from the twentieth century, is expressed in C. Martinell i Brunet with the restoration and development of the local techniques that Modernism had favored in the need to revalue native prerogatives.

In summary, the agricultural architectures, as shown, correspond to the first stylistic cycle of Martinell i Brunet's work which specifically concerns the number of cooperative agricultural buildings that define a homogeneous and typologically new group. The creations with an unmistakable style, offer advanced solutions, defined by large spans resolved through balanced structural systems that demonstrate a wide experimentation of the thin brick vault or "Catalan style" [9] raised with the use of brick.

C. Martinell i Brunet in these buildings demonstrates a wide use of construction systems and traditional materials, introduced in experimental architectural models linked to functionality and customs of the rural centers in which he works.

Typical local materials are therefore used in the decorative apparatus, such as the stone of the basements, the exposed brick used in the construction elements, in the load-bearing arches, in the definition of the openings. Polychrome ceramics are added as ornaments, in particular those of the twentieth-century artist Xavier Noguès i Casas [10], which are applied in a sober and controlled measure without exceeding the modernist taste, to leave room for the reading of volumes and surfaces.

Much of the expressiveness is connected with the construction systems used: the balanced arches and the *bóveda tabicada*, that is the vault built in sheet form; the first derived from the *gaudiniana* lesson, the second from the ancient popular traditions.

The research on agricultural constructions cannot be separated from the economic, political and cultural context from which it is generated and connected, from the project idea to the realization of the work which with its appearance demonstrates the intentions and the cultural and political role of the architect.

The idea of agricultural architecture is elaborated by Martinell i Brunet through the application of three fundamental principles: utility, economy, aesthetics [11].

The first condition is that the building corresponds to its purposes, including technical spatial and distributive needs. The way to realize these conditions of "utility" leads to study the project in its various technical implications, starting from the organization and the elaboration process, in this case, of the optimal wine production. In this way "utility" can intervene in the economic criteria, recommending the preference of new buildings, built with *avant-garde* distribution concepts which, if initially they represent a greater expense, offer the guarantee and the benefit of a better performance over time.

The second condition in order of importance is the economy; this will be based on a distribution study of the services and components of the building, rather than on the construction criteria, considering the importance of obtaining the maximum capacity in the smallest building volume. The distributive study thus leads to the use of underground deposits, of spaces dedicated to the profitable organization of work without excess volumes.

These singular architectures represented a breath of fresh air, the testimony and the affirmation of a productive Catalogna, capable of investing in the efficiency of the cooperative system. These factors, ethical and aesthetic, have characterized the entire architectural production of Martinell i Brunet, offering us the fascinating collection of agricultural architecture which, in addition to historical introspection, have been investigated through graphic analysis, with the exploration of decomposed forms and reassembled within the architectural shell.

4 Agricultural Architecture: Cesar Martinell i Brunet *Cellers*

The birth of agricultural architecture, as described, is linked to the socio-cultural factors that involve the renewal of Catalogna, in particular, agriculture reaches an economically prosperous period in the second half of the nineteenth century which directs it towards wine production, compared to the more usual wheat cultivation. The orientation is suggested by an environmental factor, by a greater oenological demand by France which was struggling to eradicate phylloxera, a parasite that was the scourge of European viticulture. The increased commitment of individual producers thus pushes to seek new methods of agricultural organization, including “associationism” which, in opposition to the landowner monopoly, offers more workforces, more assistance, dissemination of technical knowledge, organization of production and sale.

In the field of agronomy, therefore, there is a need to conduct well-structured investigations to respond to the updated production requests, implemented with the foundation of a School of Agriculture in 1894, subsequently expanded by Mancomunitat. The latter as anticipated from 1913 effectively increases the policy of agrarian cooperativism allowing the flourishing expansion derived from it.

The cooperative cellers thus find themselves representing the perfect form of collaboration in viticulture: they deal with production, transformation, conservation and sale creating a qualified product that does not require intermediaries. From these specific stresses the demand for rural architectures for production is introduced. Specifically implemented with the construction of functional buildings for the transformation of wine and oil, configured as spacious cathedrals for work.

An preview to the phenomenon, to the flourishing typological development that will take place in the twentieth century, is represented by two important buildings ahead of its time, the first is the singular cellar built for Count Güell in the Garraf mountains, a few kilometers from Barcelona, by Antoni Gaudí with his collaborator Francesc Berenguer. The second prototype is designed by the architect Josep Puig i Cadafalch in the industrial complex Les cases Codorniu in Sant Sadurní d'Anoia; later it will be the architect Lluís Domènech i Montaner try his hand at the design of the cellar of Esplugu di Francoli that his son Pere Domènech i Roura will build

in 1913, and which will become the first example of cooperative construction in Catalogna.

From these compositional models, the typology is outlined which highlights the importance of a formal beauty to be considered together with the functional and technical aspects; these reasons led the winemakers of the first cooperatives of Conca de Barberà and Alt Camp of Tarragona to entrust to Martinell i Brunet with the task of setting up their cellars, they specifically asked him to express a monumental aesthetic that the architect defined “The practical value of beauty”.

Agricultural architectures had to represent the new economic power, express the dignity of cooperative agricultural work introduced in Catalogna at the turn of the century.

This opens up an innovative constructive repertoire, that of the Catedrals del vi, Catalan, which, between 1919 and 1923, offers a remarkable typological sample, largely attributable to the commitment and role carried out by Cèsar Martinell i Brunet.

The agricultural architectures scattered in the small rural centers, mainly in south of Spain, form a homogeneous whole, expressing an unmistakable style.

In just two years, between 1918 and 1919, in the area of Alt Camp, Conca de Barberà, Tarragona and neighboring provinces, C. Martinell i Brunet readjusted and built many cellars as documented in the table that locates the structures within the Catalan territory.

Among the first interventions, in 1917, the prospect of the Aliò winery was ascribed to be considered as a promotional start-up operation. The renovated façade features brick and ceramic decorations that frame the windows and the portal being in the central part up to and including the round arch. The latter presents a crown of triangular elements in bricks, alternating full and empty, which introduce the contour band on which the words *Sindicat Agrícola D’Aliò* stands out. He then builds the Rocafort de Queralt winery from scratch in the Conca di Barberà area, where he begins to experiment with the construction system of the slender brick arches placed to support of the wooden roof. The Nulles winery proposes the evolution of the planimetric system that becomes a double nave, without internal divisions to favor spatial unity and on the facade shows the scans of the internal arches, in order to combine structure and decoration. In the Pira winery he experiments with the three-nave basilica plan with a double row of pillars supporting the trusses (Fig. 3).

In the cellar of Vilarrodona it evokes the appearance of a Romanesque church, featuring the facades with cadences of brick pillars and the portal surmounted by a large arched cornice, inside which opens a sequence of slender windows that recall medieval archetypes.

In the Priorat area he built the agricultural structure of Cornudella which combines the cellar and the oil mill by proposing the single nave with a central corridor dividing the two rows of side barrels.

The exterior reflects the simplicity of the interior spaces; it presents a finish in stone blocks and brick appeals and in the main facade introduces a slender three-light window perforated above by one reticular brick decoration with gothic motifs and ceramic inserts. The basement floor is interesting, covered by a system of *bòvedas*



Fig. 3 Pinell de Brai: internal views of the vaulted systems

tabicadas vaults divided by ogival arches, in which other rows of vats with lateral passages are placed centrally. The oil mill is next to the main body as is also the case in Cabra del Camp and in other examples where wine and oil production are combined.

In the province of Conca de Barberá the Montblanch winery is raised and expanded, organized in a single nave with internal spaces divided by arches that act as a diaphragm for the various working functions. On the outside, simple finishes reflect the gothic tradition of the town; the central body is highlighted by the insertion of the tympanum decorated with exposed brick motifs. Another characteristic element of these structures is the constant presence of water tanks that stand out like bell towers assuming, in addition to their functional value, a symbolic image that encloses the sacred and the profane (Fig. 4).

From the broad repertoire, briefly reported, two relevant production structures have been extrapolated that include the cellar and the oil mill, significant examples for their formal and technical characteristics, suitable for documenting their specific connotations through design and graphic analysis. This is the cellar of Pinell de

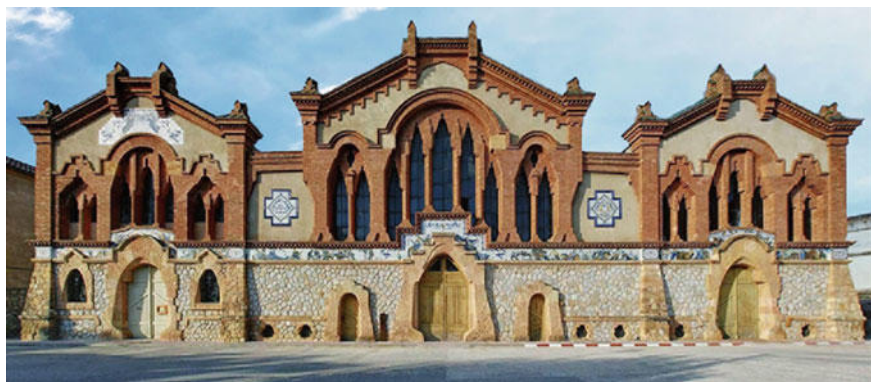


Fig. 4 Pinell de Brai: main facade of the agricultural complex

Brai, emblematically defined The cathedral of wine, and that of Gandesa, called the Temple of Bacchus which represent different solutions of the same compositional lexicon; the first with a more monumental character expressed in the architectural composition and in the rich decoration of the majolica frieze depicting the production phases, the second expressing a more plastic and modern character in its appearance.

5 Reading Through Drawing

The agricultural complexes of Pinell del Brai and Gandesa located in the territory of Terra Alta, one of the 41 municipalities in Catalogna, both built between 1917–19, represent indicative typological models that the same author identifies as exemplary constructions, out of the usual for the formal and structural solutions adopted. These considerations guided the choice to deepen the knowledge of the two production structures from a graphic point of view. Starting from the project drawings compared with the current situation, acquired through integrated surveys, to arrive at the construction of three-dimensional study models that have made it possible to obtain an overall reading of the volumes and interior spaces, investigated as a whole and in the individual constituent elements.

5.1 *Pinell de Brai* “La Catedral de vi”

The construction of the cellar of Pinell de Brai, with an adjoining oil mill, is symbolically elected to represent the achievement of the country’s economic “redemption” goal [12]. The concomitance of the installation of the electrical and telephone networks and of the upgrading of the road infrastructure had made it possible to carry out the work, supported by the Mancomunitat and by the participation of the cooperativists who previously sold their products to near the capital of Gandesa, not having adequate facilities for processing and trade. These reasons led the architect to ask for the collaboration of experts in the sector, the oenologist I. Campllonch and the oil technician Emili Rovirosa, to combine the perfect efficiency of the technical systems with the aesthetics of the project. The initial solution involved four buildings side by side, then synthesized into three, bringing together the two central ones in a single large nave higher than the side ones (Fig. 5).

The main façade is structured in a high base band, in shaped stone, which houses the three main access portals, flanked in the central entrance by two minor openings. The upper part has large windows divided in their inner part in polilobate mullioned windows and pentapart glass windows. made with the skillful use of the shaped brick used to support the curvilinear shapes, to lighten the pillars that mark the openings. The front of the building is crowned by a frame that is richly decorated with various motifs: moldings, dentils and a frieze formed by a delicate battlement that follows the inclination of the two-pitched roof. In the central part there was a cistern for the

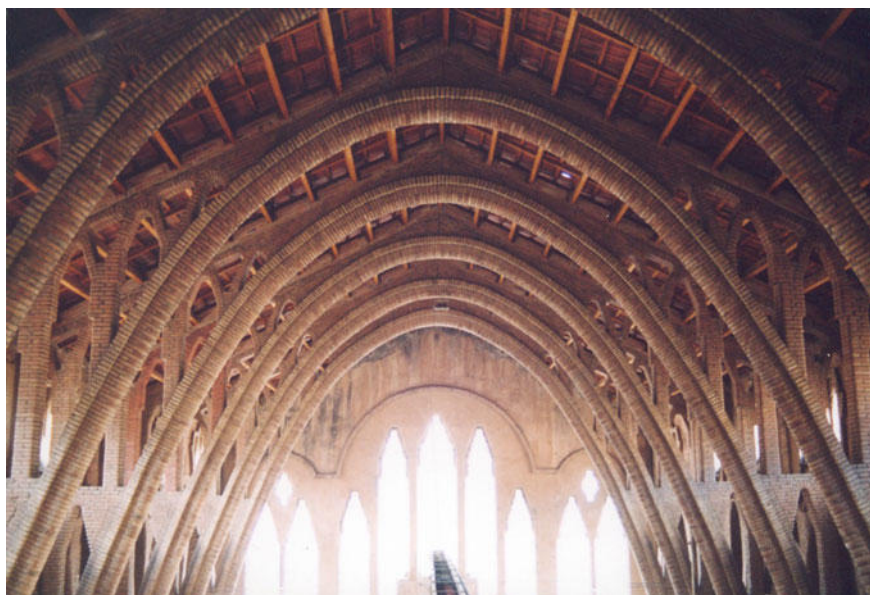


Fig. 5 Pinell de Brai: internal view of the vaulted system with balanced arches

storage of water, as visible in the project drawing, which had to assume the appearance of a towering bell tower, confirming the analogy with the religious architecture from which the nickname Cathedral of wine was invented.

The term Cathedral was also used as a function of the perceptual aspect since, seen from a distance, the shapes of the tanks were compared with the bell towers of the surrounding villages. In case of Pinell de Brai, the tower was no longer built, for which the appellation is attributed basically to the grandeur of the building, to the magnificence of the vaulted spaces [13]. The interior, in the left side body, houses the crusher or oil mill completely independent from the cellar, distributed on two levels with a simple wooden chypre roof. The two naves reserved for the cellar are instead made with a system of balanced arches that, in their parabolic shape, allow a homogeneous redistribution of structural loads. The width of the full-height space creates a greater complexity of the vaulted plant, generating a series of interesting structural solutions masterfully resolved through intersections and connections between arches. Of particular effect, in the central building, is the meeting solution large balanced arches of the higher volumes with the lower lateral one; the connection takes place through arches on small pillars, originating from the larger central ones, which cross, and they sinuously blend with the curves generated by the longitudinally arranged pillars. The transverse and longitudinal walls, supported by the arches, acquire an effective effect of diaphanousness, modeling themselves in a refined structural game of pillars, enriched by the masterful use of brick left exposed and shaped according

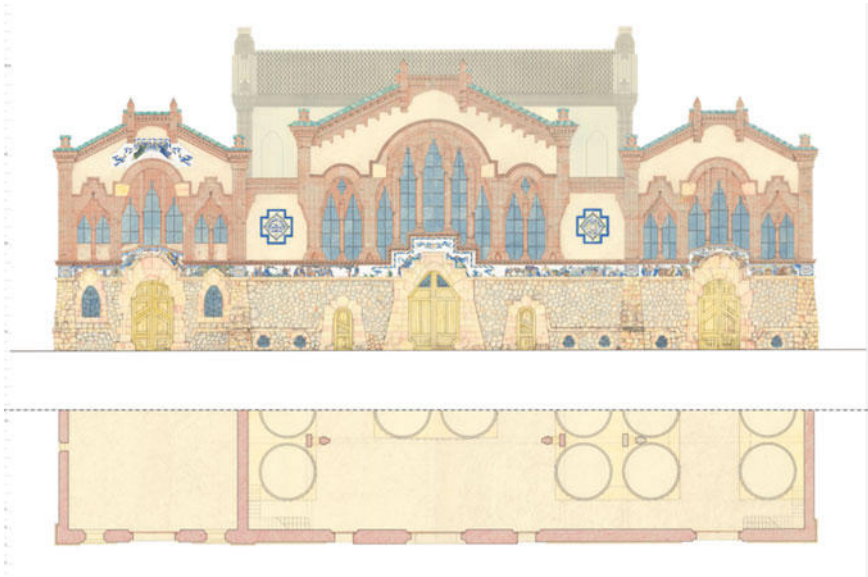


Fig. 6 Pinell de Brai: survey and thematic representation of the main facade

to the different curves that achieves a refined aesthetic result. The spatiality, the lightness, the amber color of the brick, are intimately linked to structure that achieves stenographic effects (Fig. 6).

Also interesting is the configuration of the underground deposits built with partitions of vaults double-curved vaults to avoid cracks. Passages were installed to facilitate cleaning and maintenance of the systems which provided for special ducts to allow air circulation. The outlet of this ventilation system, which is important to prevent the carbonic acid from rising due to fermentation, can be seen on the facade in the hexagonal openings, placed at ground level. The side elevations support the morphology of the ground by proposing a scan of windows and portals which, despite their diversity, are uniformed with the stylistic features of the main front, with the similar brick finishes that plastically enliven the facade surfaces. On the rear side, a rhythmic pronaos by a sequence of arches welcomes the environment intended for underground tanks for harvesting grapes (Fig. 7).

The materials used are almost exclusively local, both for the masonry and for the brick parts, the latter being of excellent quality for the semi-refractory clay of which the surrounding land is rich of. The flat tile was used for the roofing in order to lighten the weight and obtain a better aesthetic result achieved also with the insertion of some green majolica tiles, which give value to the roof through the combination of geometric patterns.

The expressive value of the work is further expanded by the insertion of a ceramic decoration, unique of its kind, placed on the main facade [10].

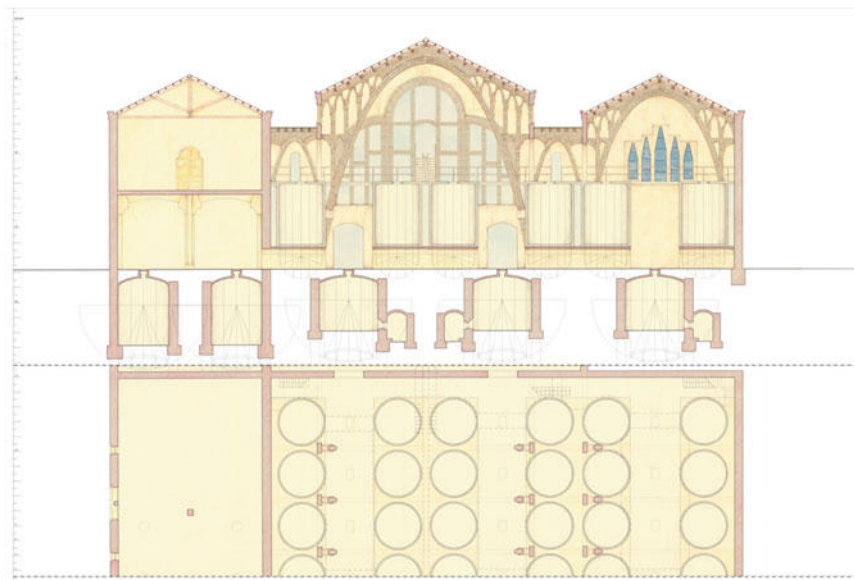


Fig. 7 Pinell de Brai: cross section of the crusher and the cellar

The frieze made by the famous twentieth-century ceramist Xavier Nogués i Casas, 80 cm high and 42 m long, horizontally delimits the façade crowning the stone base, creating an ornament of great artistic and symbolic value [12].

The idea of creating an allegorical decoration with scenes that illustrate the working phases of the products derived from the agricultural complex was born to C. Martinell i Brunet seeing some caricatures of drunkards made by Xavier Nogués i Casas (1873–1941). Although the high prices of these works constituted an extraordinary cost for a utilitarian building, they were stubbornly supported by the cooperative members who, to distinguish themselves from the ordinary, wanted to change the white and blue azulejos foreseen in the project, revealing in this way the intrinsic values of the associative work (Fig. 8).

Xavier Nogués i Casas was thus commissioned to create the frieze of exceptional length, with representations and phrases relating to the production of wine and oil. The scenes placed consequentially in correspondence with the respective portions of the facade, describe on one side scenes relating to the harvesting, pressing and processing of oil and, on the other, of wine.

The iconography of the grape processing process starts from the harvest passes through the transformation into fermented mash, enjoyed by tasters, to end in the tavern where there are men who drink the wine and where a drunk also appears. The characters with their strong arms depict the physical effort, the sacrifices of agricultural activity illustrated in the scene of the grape harvest, from which then

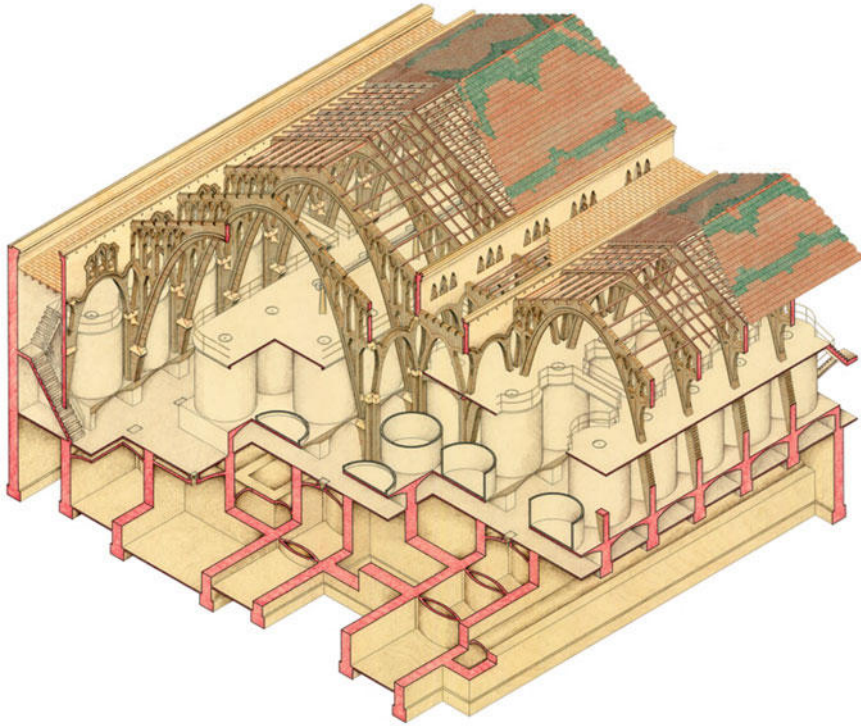


Fig. 8 Pinell de Brai: axonometric cross-section of the cellar

derive the results shown in an idealized vision, with a harmony representing the work done in an idyllic countryside.

In addition to the symbolic aspect attributable to the specific representation, derived from the happy combination of economic support, architecture and art, the more general stylistic characteristics of modernist inspiration remain at the base, and among them the masterful use of decoration with azulejos, linked to the progress cooking techniques that will allow their use in internal and external coatings (Figs. 9, 10 and 11).

The happy union of the decorative apparatus with the mastery of construction techniques in which it transpires the gaudinista teaching, expressed in the complexity of the vaulted systems with balanced arches, used by Gaudi in the temple of the Sagrada Família in Barcelona, makes the structure of Pinell de Brai unique of its kind, as found in the graphics attached to the text (Fig. 12).

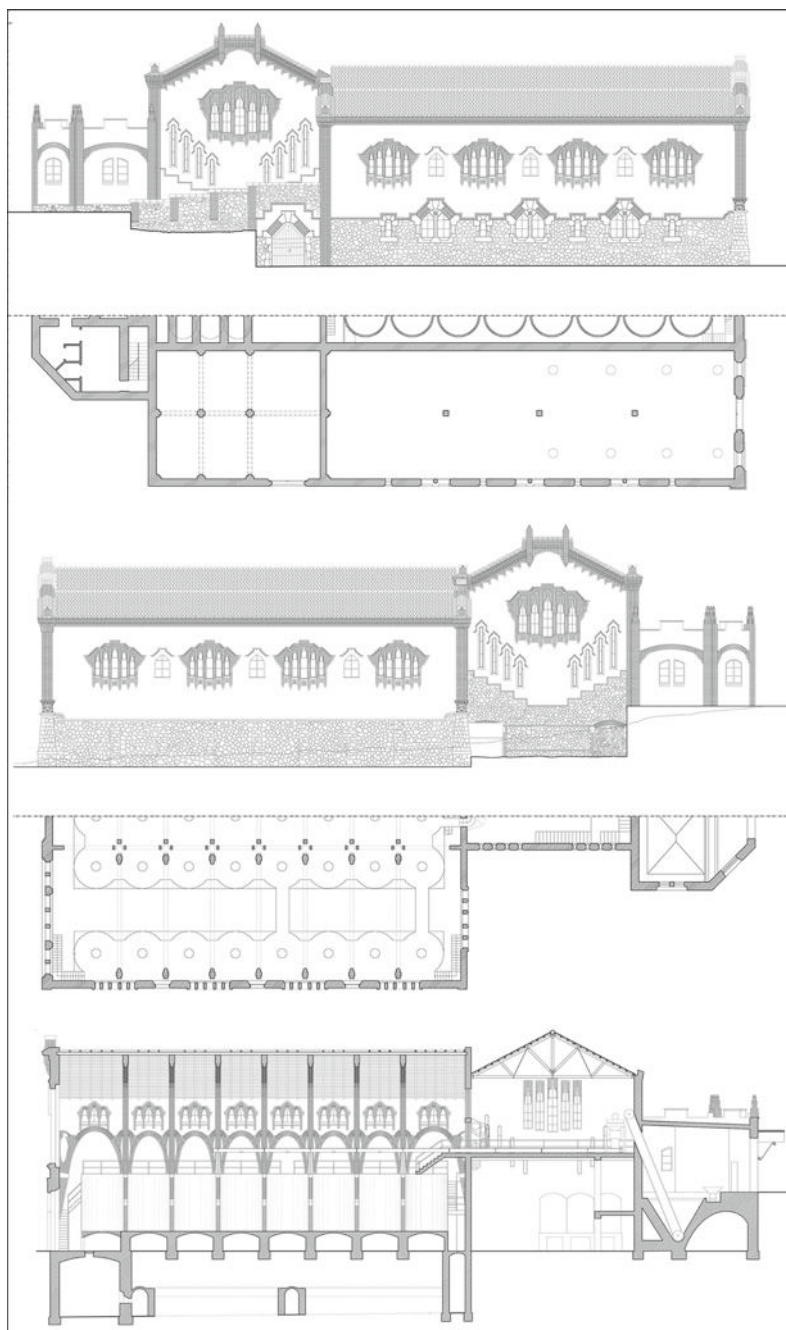


Fig. 9 Pinell de Brai: side elevations and longitudinal section



Fig. 10 Pinell de Brai: particular frieze with scenes of the grape harvest



Fig. 11 Pinell de Brai: particular decorative frieze with men drinking wine



Fig. 12 Pinell de Brai: particular frieze with the harvest of olives

5.2 Gandesa “*El Templo de Bacus*”

In the Gandesa complex, begun in January 1919, C. Martinell i Brunet has the opportunity of optimizing the construction process of the vaulted system, the experience gained suggests to him the idea of creating a homogeneous masonry structure, with the exclusion of wood and any other roofing material. Purpose never realized in previous factories due to the difficulties connected with the technical skills of the workers. The cooperative society grants him the choice of a trusted agent for the

management of the construction site, providing him with the opportunity to experiment with an innovative structural system that achieves a surprisingly consistent result.

The technical evolution leads him to convert even the formal aspect of the architectural composition which externally loses the usual basilica connotation, the classic symmetrical arrangement that characterized the previous agricultural buildings, in this case made more modern and plastic.

The rectangular plan structure, internally marked by a series of spaces generated by the system of arches, consists of two buildings for the celler—one of which was built as an extension in 1920, including the highest large processing room—and of the mill housed in a trapezoidal-shaped space containing three hydraulic presses, also added in 1920 [14].

The complex is structured in an articulated system of balanced arches, made of brick and covered by ribbed vaults in *rasillas*, or in thin brick [15].

The two bodies intended for celler, of different heights, are resolved with a double structure of balanced arches, combined to reduce the risk of cracking due to possible dilations. The system of double consecutive arches transversely supports a higher central ribbed vault and two lower lateral arches, to facilitate the entry of light through small openings. The room of preparation, in the higher part, is built on exposed masonry pillars that support a vaulted roof, sail vault.

The mill is instead covered by a system of stellar vaults, supported by three pillars arranged on the central axis and by shelves leaning against the side walls, covered above with the technical analogy of folio vaults with *tabicadas and in rasillas*. These vaults are specifically made with three layers of thin brick, left exposed indoors and finished externally in Portland, a hydraulic binder used to make them waterproof. In the construction phases, tie rods were provided which then remained as a permanent solution, in order to ensure greater stability.

The aesthetic dimension of this building is, more than others, closely connected to the structural system which amplifies its technical connotations without neglecting the decorative aspects.

The richness of the interior spaces is established by the curved rhythms of the exposed *rasillas* roofing that blend with the textures of the brick arches, wisely exploited through the use of shaped brick.

The underground rooms are distributed in four departments, separated from each other by vaults divided vertically, a system that helps reduce the transmission of temperature. On the ground floor, in correspondence with these rooms, there are large barrels of 300 hectoliters each which together were capable of containing a total of 17,000 hectoliters of wine. This capacity proved insufficient by enlarging the structure with an additional body, built in 1920 with the same features (Fig. 13).

The external appearance appears more essential than the previous example, following a compositional line centered on a more modern technical solution.

The formal expression thus reaches the maximum purification, by binding more to the functional aspect, without excluding the aesthetic qualities.

The smooth walls are treated with white plaster; the windows defined by a sequence of tripartite arches are decorated with a single brick frame. The stone base,



Fig. 13 Gandesa: external view main front facade

less impressive than that applied in the example of Pinell de Brai, is equally characterized by the presence of small openings intended for ventilation. In the main facade, located on the longer side of the lower nave, the oxygenation outlets are visible, located at ground level, alternating with buttresses positioned in correspondence with the discharge points of the balanced arches.

The entrance bordered by a parabolic arched portal, finished with a simple brick squaring, is located in the center of the façade which on the upper floor houses the succession of windows. The predominant decorative element is the ceramic sign, arranged in the rounded corner that faces the entrance of the producers. The latter is in turn characterized by a shelter that protects the underground tanks in which the grapes are harvested during the harvesting phases, with a truncated pyramidal shape.

The large cartouche, 2 m. × 4 m., made of glazed tiles, composed in a rectangle with a mixtilinear shape, which joins a round arch at the top, bears the name and the emblem of the agricultural cooperative. The work also performed on this occasion by the artist Xavier Nogués i Casas adopts the typical colors of azulejos, blue on a white background with the addition of decorative elements in yellow. The current cladding was recomposed with a copy of the original tiles lost during the war of 1936 [11].

A particular identifying note of the Gandesa cooperative is given by the two towers containing the water deposits, cylindrical in shape with a rounded conical termination at the tip, which initially provided for a ceramic decoration with geometric motifs [16]. The water towers remained unfinished until 1983 when the architect Ribes Pieras, during the restorations, completed them faithfully following the project drawings (Figs. 14 and 15).

Water deposits are recurring elements in Catalan cellers, through their function they offer the opportunity to give visibility and appeal to agricultural structures, offering an original range of solutions, with a circular or polygonal plan, with plaster finishes and exposed brick, which are combined with ceramic and wrought iron decorations [11] (Fig. 16).

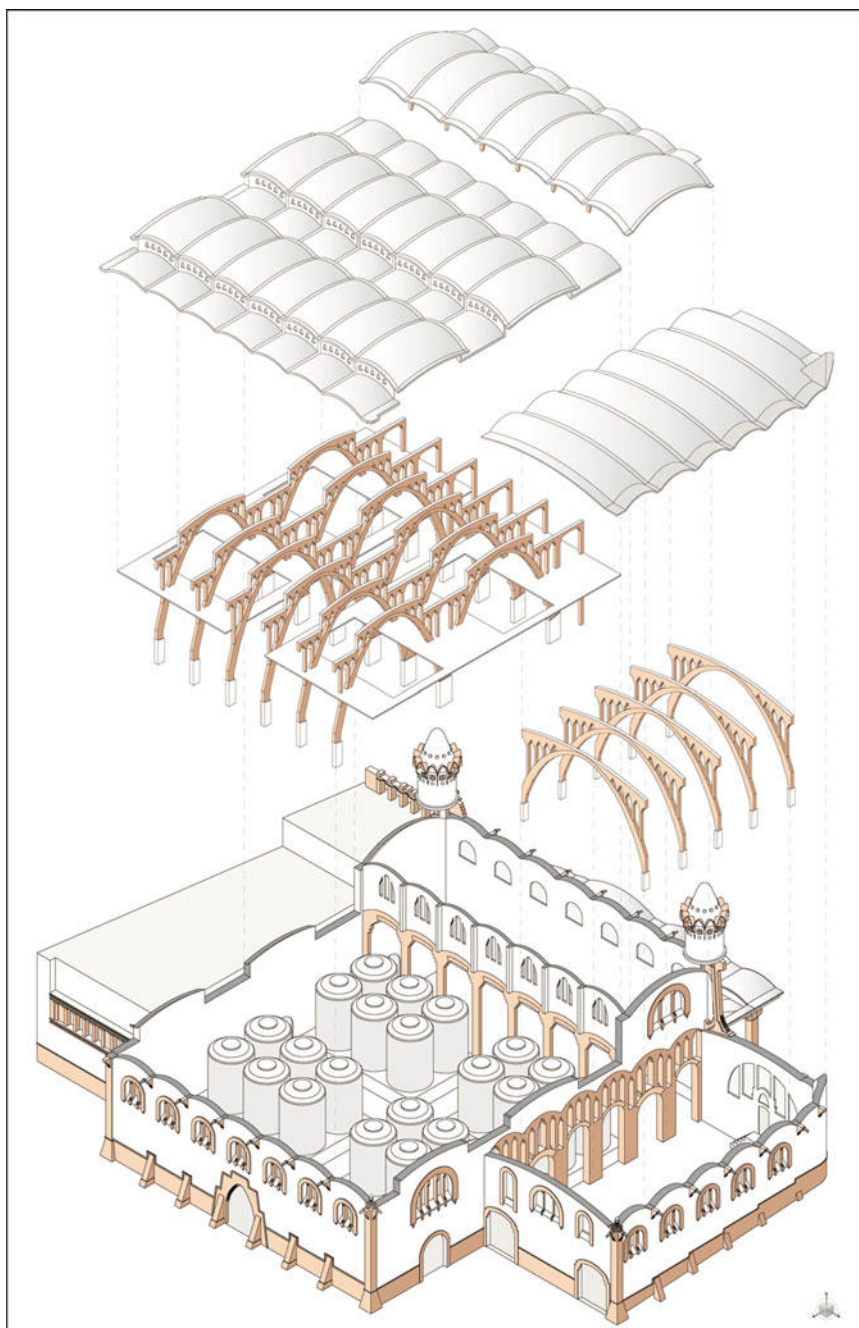


Fig. 14 Gandesa: exploded axonometric, internal analysis and vaulted system

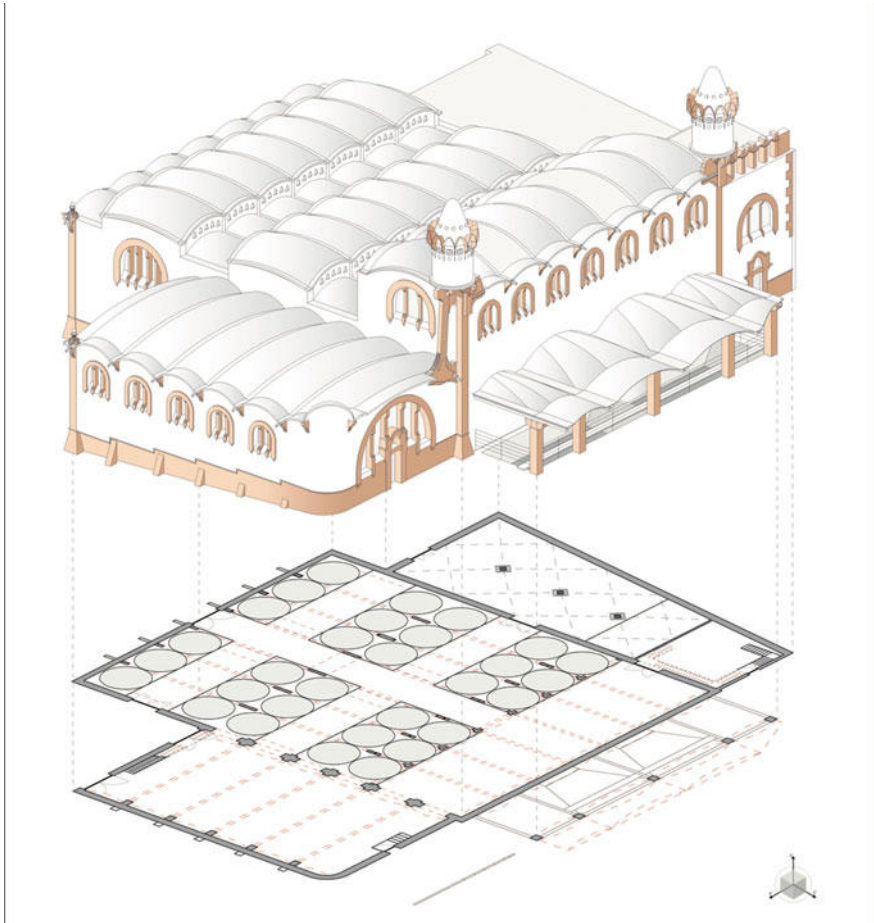


Fig. 15 Gandesa: exploded axonometric, external volumetric and plant analysis

Evoking towers or minarets, they interact with the surrounding landscape by configuring themselves as architectural elements, single or incorporated in buildings, and specifically, in productive architectures in which they express the values of the modernist lexicon.

In conclusion, the main connotation of Gandesa's celler is decreed by the plasticity of the roof, obtained with the cadenced rhythms of the vaults that in this case are also revealed externally, as stated by Martinell i Brunet himself: "I consider the result of this system satisfied, thanks to the careful labor with which a construction of great simplicity has been obtained and its constructive elements have, at the same time, that decorative value that does not belong to passing fashions and they give character to the building with their mechanical forms and textures that cannot detach themselves from construction" [11].

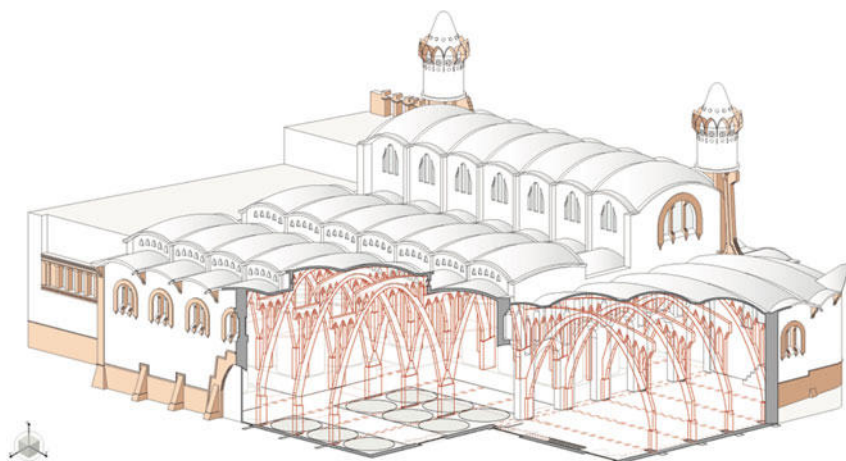


Fig. 16 Gandesa: three-dimensional section, main elevation view

In Gandesa the Gaudinian lesson emerges once again, acquired, made its own and expressed in a renewed rationalist synthesis that is projected towards the new principles of twentieth century synthesis, initially expressed in the precious preparatory drawings, in the graceful watercolors drawn by C. Martinell i Brunet, then applied in the construction of concrete production realities and now revisited through the tools of digital representation.

6 Conclusions

The Research on agricultural architectures offers a significant historical in the economic and social moment experienced by Catalonia at the time of their creation. The phenomenon has led to retrace, albeit briefly, the phases of Modernism through an introspection, first historical and then graphic, of the cultural aspects from which the multifaceted artistic and architectural expressions were generated (Fig. 17).

The interesting figure of Cesar Martinell i Brunet made it possible to make stylistic comparisons between the protagonists of the period, offering interpretations regarding the formation, influences and rapid evolutions of Modernism. Passages that outline the understanding of the architectural forms produced.

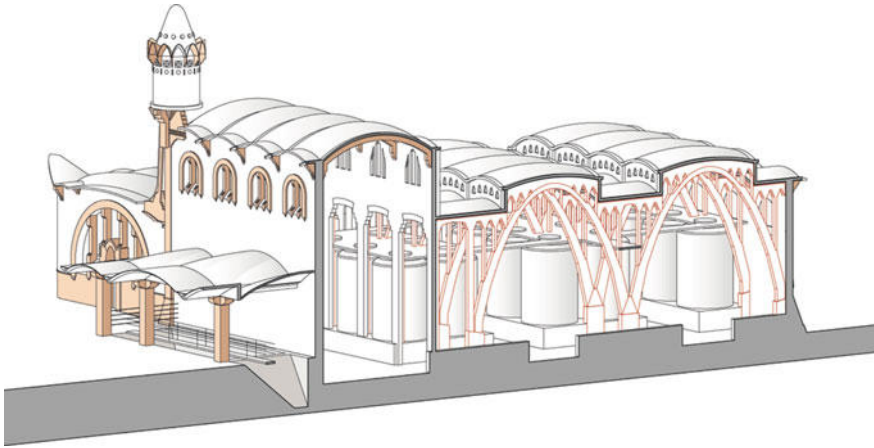


Fig. 17 Gandesa: three-dimensional section, back side view discharge grapes

The investigation¹ carried out on the singular production structures has revealed the extraordinary compositional and structural complexity, from which the architectural lexicon translated through drawing is deduced, through images that clarify the construction process, from the project idea to its realization. In particular, the reconstructions of three-dimensional study models make it possible to analyze the complex geometries that can be explored from several points of view, as documented by the graphic apparatus accompanying the text.

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¹ It is specified that chapters “[Steel and Architecture: Analysis of Some Singular Italian Experiments of the Sixties of the Last Century](#)”, “[Modernism/Modernisms. The Two Souls of Modernity Before Modernity](#)” and “[The Brazilian 20th Century’s Houses. Digital Documentation for Preservation and Enhancement of Modernist Architecture and Design Processes](#)” related to the historical investigation of Catalan Modernism have been developed by Prof. Carlos Cacciavillani; chapters “[Between the Layers Transparent Paper as a Modernist Architectural Design Environment](#)”, “[Tamed Tropics: Modern Architecture in the Colombian Caribbean](#)” and “[Blossoming of a Modernist Lexicon. Camillo Autore and the Reconstruction of Reggio Calabria](#)” related to case studies, graphic, two and three-dimensional representations and analyses have been written by Prof. Caterina Palestini with the collaboration of Salvatore Mele and Mattia Spina.

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