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FERNAND POUILLON'S ATYPICAL ARCHITECTURE: A VISIONARY AND INNOVATIVE APPROACH

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ABSTRACT

The article was written based on the memoirs of architect Fernand Pouillon, the research and work by specialists such as Roger Lacroix, Eugène Freyssinet, Yvan Delemontey, and others, as well as on the site visit inspection report that we conducted for projects located in the city of Algiers. It highlights the different approaches of prefabrication in architecture, showcasing Pouillon's projects and innovations in the field. The article emphasizes the importance of simplicity of forms and structures, as well as the impact of industrialization on the architectural production of the time. Concrete examples of projects and construction methods are cited to illustrate the concepts discussed. How did Pouillon contribute to the evolution of construction methods and the rise of prefabrication in the context of post-war reconstruction? What were its main challenges and criticisms of the architectural practices of its time? This research demonstrates that Pouillon's work has significantly contributed to the evolution of construction methods by promoting prefabrication and exploring new constructive systems. His criticisms of the practices of the time highlighted the importance of technological innovation and economic efficiency in architecture. In conclusion, his legacy in the field of construction lies in his ability to combine tradition and modernity to meet the challenges of his time, thus influencing the architecture of the period of reconstruction and paving the way for new constructive approaches.

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Introduction.

Fernand Pouillon, famous for his innovative approach to architecture, marked the 1950s with the bold design of many projects around the world, especially in Algeria. His experimental vision, rigorous site management and technological innovations distinguish him among his contemporaries. His competence and prolificity placed him in the foreground of the architects requested by the French government during and after the Second World War, with the housing estates of Algiers as a remarkable testimony of his work.

Although long marginalized, his legacy is now of great interest to research scientists, and his principles are widely incorporated into the curricula of architecture schools. Several of his achievements have been recognized as 20th century remarkable heritage (French Ministry of Culture, 2024), and

recently, five of his projects have been classified as national heritage in France. The study of his works, from an architectural, urban, landscape, social and constructive point of view, is the subject of an increasing number of scientific researches, testifying to his creative genius and his lasting impact.

This article aims to explore the atypical architecture of this architect by tracing the major stages of his career, his sources of inspiration, and the innovations that marked his work. We will begin with an overview of his career, and then analyze the influences that shaped his unique architectural style. Finally, we will provide an inventory of his most significant achievements, highlighting the innovative techniques he employed and the impact of his work on post-World War II reconstruction and modern construction techniques.

The discussion will underscore not only the innovative nature of his designs but also the lasting impact of his achievements on the contemporary architectural landscape. We will explore his groundbreaking techniques and the pivotal role his work has played in shaping modern construction and post-war reconstruction efforts.

Research methodology.

The research methodology of this study is based on a thorough analysis of the writings and memoirs of Pouillon, research work by specialists such as Roger Lacroix, Eugène Freyssinet, Yvan Delemontey, on the consultation of relevant historical sources and archives, as well as on the site visit inspection report that we conducted for projects located in the city of Algiers (Fig.1). By examining Pouillon's criticisms of the construction methods of his time, his technological innovations and his use of prefabrication, this study also sheds light on the impact of his ideas on post-war architecture. By cross-referencing information from various sources and comparing it to existing research on the subject, this methodology has led to robust and informative results regarding Pouillon's role in the history of architecture.

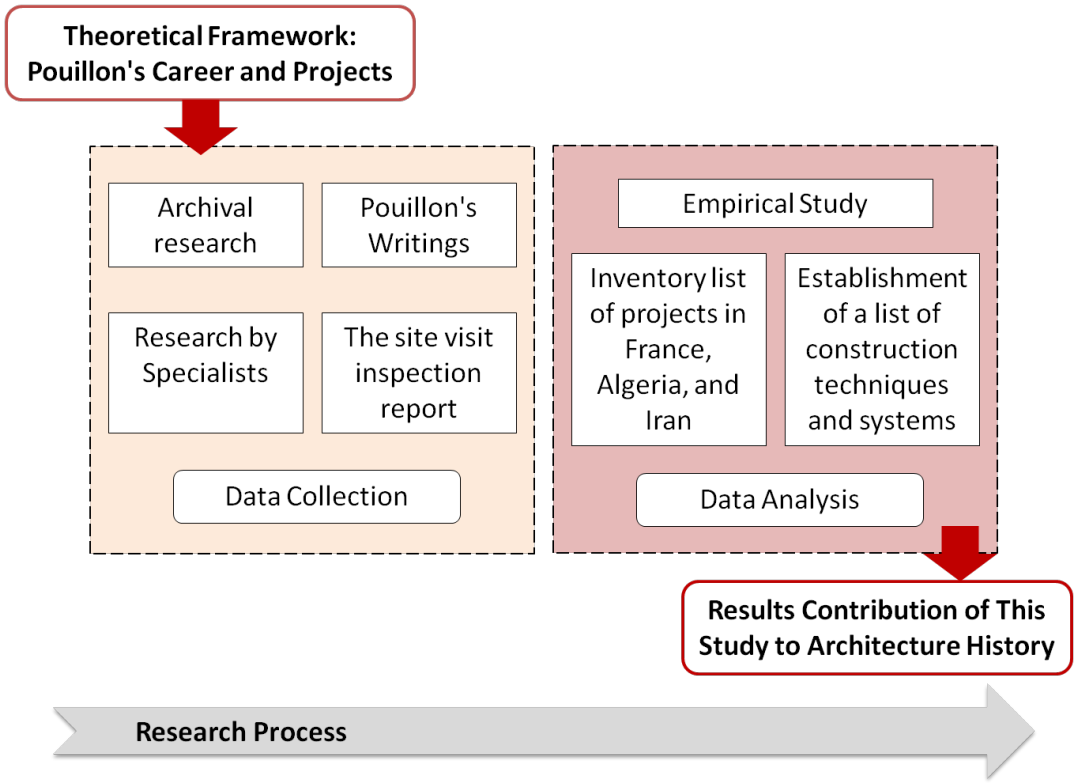


Figure 1. Research framework for this study

Literature reviews.

The four epochs of Fernand Pouillon's architectural career.

Pouillon's work can be divided into four distinct periods, each marked by specific challenges that significantly shaped his architectural and urban approach. The following information is drawn from

the data of Bernard Félix-Dubor (Dubor, 1986) and from the website of Éditions d'Architecture (Sayen, 2014). Here is a summary of the key stages of his career:

– *Foundations and reconstruction: the early years of Pouillon (1936-1953):* This initial period was characterized by his first project in Aix-en-Provence and Marseille, culminating in the reconstruction of the Old Port of Marseille under the direction of Beaudoin. During the period of reconstruction after the Second World War, He faced the challenges of urban rehabilitation and architectural development.

– Expanding horizons, Pouillon's impact in Algiers and Iran (1953-1957): He was appointed chief architect of Algiers in 1953, where he carried out the ambitious projects of the housing cities as a response to urgent housing needs. At the same time, he extended his influence in Iran with significant projects in Tehran and other cities.

– *The Parisian experience architectural ambitions and controversies, Pouillon's Parisian endeavors (1957-1962):* During this intense period, he worked actively in the Parisian suburbs with ambitious projects that included the creation of the "*Comptoir National du Logement*". However, this period was interrupted by his arrest in 1961 in a controversial case.

– *Revival and innovation, Pouillon's post-independence contributions to Algerian tourism (1965-1984):* After his release in 1964, he returned to Algeria to contribute massively to the country's tourism development, overseeing many infrastructure projects. His commitment marks a significant period of achievement in a post-independence context.

Training and sources of inspiration: the beginnings of an architecture "Pouillonienne" through the writings.

a) History of architecture as a source of inspiration.

Pouillon's architecture is often cited as an emblematic example of the fusion between tradition and modernity. He revisits earlier architectural models by adapting them to the contemporary context, while integrating the technological advances of his time. Zeynep Çelik points out that his work in Algeria is a "*modernist hybrid, nourished by local heritage and classical antiquity*" (Lejeune, 2009).

Among his notable influences, he shows a deep admiration for medieval architecture, especially the monuments of the Roman and Cistercian period (Voldman, 2006). For example, the abbey of Thoronet, mentioned in his writings, illustrates his attachment to tradition while reinterpreting the ancient construction techniques in Aix-en-Provence and Marseille.

Classical architecture also plays a major role in his designs, influenced by the history of Aix-en-Provence, which he explores in his book on ordinances (Pouillon, 1953). This influence is reflected in the use of stone, fountains and arcades, as in the city of 200 dwellings in Aix-en-Provence. Moreover, his admiration for the neoclassical architect Claude-Nicolas Ledoux is evident in his architectural choices (Voldman, 2006).

When he arrived in Algeria, Pouillon included in his repertoire the architecture of the Casbah of Algiers, model of exemplary historic cities. He highlights the similarity between the spatial organization of the Casbah and that of housing estates such as Diar es Saada (Tehami, 2018) and Diar el Mahçoul. In his memoirs, he describes how Turkish and Spanish architectural elements influenced these achievements, thus enriching the Algerian urban landscape (Pouillon, 1968).

In an interview with Hélène Roy, Pouillon explains her creative approach, claiming to find her inspiration not in academic works but in nature and the Algerian landscape (Roy, 1977). He thus rejected the dominant academic approach of his time, notably that advocated by Le Corbusier and his disciples, whom he openly criticized for their lack of innovation and their rigid adaptation of architectural principles.

Adding to this, in another conversation with Petruccioli, he emphasizes that "*wise architectures never have an era*" (Petruccioli, 1982), highlighting his timeless and distinct approach to architecture.

b) Influences and collaborations: Pouillon's partnerships with Beaudouin and Perret.

Pouillon's collaborations with architects such as Eugène Beaudouin and Auguste Perret profoundly marked his professional development. He recognizes the major influence of Eugène Beaudouin on his conception of monumental urban ensembles and the spatial composition of projects in Marseille and Algiers (Petruccioli, 1982). This collaboration has shaped his vision of architecture as a means of organizing and enhancing urban space.

As for Auguste Perret, an expert in reinforced concrete, their association for the reconstruction of the old port of Marseille introduced Pouillon to the strict forms of structural classicism and rigor in

the arrangement of spaces (Roy, 1977). Despite their philosophical differences on regional architecture, this period has enriched its technical and aesthetic palette.

c) Rebelling against convention: Pouillon's critique of modern architecture .

Pouillon has always challenged the dominant architectural trends of his time, openly criticizing modern architecture, which he describes as sterile and devoid of emotion (Pouillon, 1968). His refusal to conform to academic standards has often sparked controversy among his peers, notably with André Bloch, who resigned his post at today's Architecture magazine after a controversy over Pouillon's achievements.

d) Two million square meters of visionary design.

Between 1934 and 1986, he marked the history of architecture with the realization of more than two million square meters of buildings, thus constituting a considerable production in France, Algeria and Iran. Despite the scale of his work, his achievements are widely recognized today. His portfolio includes numerous residential buildings, tourist complexes (Maachi, 2008; Maachi, 2021), university institutions such as faculties, libraries and student residences, as well as schools, high schools, postal agencies, cinemas and individual houses.

From the construction of his first apartment building in 1934 until the publication of his memoirs in 1968, Pouillon estimates to have built the equivalent of a city with between two and three hundred thousand inhabitants. In his own words, "*I conceived and realized in my life the mass and equipment of a city of two to three hundred thousand inhabitants*." (Pouillon, 1968).

Data collection results.

Industrialisation and its impact on Pouillon's architectural production.

In recent years, research in architecture, geography, history, economics and sociology on projects built after the Second World War has seen a significant increase. The contemporary history of the building, particularly the period of reconstruction (1940-1980), is now well documented. This renewed interest, especially for the technical aspects (materials and constructive processes), is largely due to the rehabilitation and renovation of old built heritage.

Manufacturing companies were strongly encouraged by the French government, particularly through public bodies such as the Ministry of Reconstruction and Urbanism (MRU) created in November 1944 to pilot the reconstruction operations, the French Standards Association (AFNOR) authorized to issue the NF Mark, the Technical Office for the Use of Steel (OTUA), and the Scientific and Technical Centre for Building (CSTB) established in 1947 to promote the use of new construction techniques in reconstruction projects. In addition, experimental projects and competitions played a crucial role in the French government's policy of building industrialization.

Contemporary experts note that the emblematic projects of the reconstruction resulted from a collaboration between the architects of the CIAM and the engineers of the Bridges and Roads. Despite their crucial role, they are rarely highlighted in research and media. Engineers have often held strategic leadership positions. What role did they play in the reconstruction? The main historical studies published to date mainly focus on the intervention of architects in architecture. However, engineers, especially those of the Bridges and Roads, played a decisive role, especially from 1935.

Whether working in design offices or in companies, they pioneers of the main prefabrication methods used at the time period, such as the Camus, Barets, Cauvet, Coignet, or those of Jean Prouvé. Although studies on this subject are rare, it is clear that the engineers of Bridges and Roads have held the majority of management positions within the MRU, led by engineer Adrien Spinetta.

The prefabricated building perfectly met the needs of reconstruction in France, offering the ability to accommodate increased programs, reduce labor on construction sites, and decrease construction time and costs without compromising quality. Given the urgency of construction, the use of industrial methods and prefabrication in the workshop appeared as an unavoidable solution.

In this context, the OTUA organized an architecture competition in 1931, encouraging architects to collaborate with engineers to develop industrialized building systems with prefabricated elements (framework, floor, facade, roof and partition). The OTUA required the use of steel for the supporting structure, leaving architects the freedom to choose materials compatible with other elements. This initiative was followed by the experimental projects set up by the MRU and the launch of a competition for the construction of 50 collective housing units in 1947. Later, a similar policy was adopted for the construction of 200 housing units across four sites (Compiègne, Chartres, Créole, and Villeneuve-Saint-Georges). The Strasbourg competition, won by Eugène Beaudouin in 1951 with a program for 800

housing units, marked the peak and end of experimental projects, paving the way for the era of mass housing and large housing estates.

During the reconstruction period, two approaches stood out: one, represented by Roger Hummel, André Dubreuil, and Pouillon, favored heavy prefabrication using inexpensive, dense materials (stone, sand, gravel, cement); the other, represented by Auguste Perret, Pol Abraham, and Marcel Lods, opted for a complete break from traditional construction methods, favoring light prefabrication with more costly materials (steel, stainless metals, wood, plastics, lightweight metals), which were processed and shaped in workshops. The scarcity of metals greatly contributed to the triumph of heavy prefabrication.

The construction director of the MRU, Antoine Spinetta, stated on this subject: "*Our country needs a lightweight concrete industry and a panel industry... It is necessary to keep things simple and rustic. The simplicity of forms and structures makes possible the rusticity of methods and assumes good efficiency"*(Lucan, 2001). Several prefabrication systems (Fig.2) used after World War II are now well known thanks to the research work of Roger Lacroix on Eugène Freyssinet (Lacroix, 2004) and Yvan Delemontey (Delemontey, 2009; Freyssinet, 2004) on the forms and figures of prefabrication in France between 1947 and 1952 (CNAM, 2009).

Figure 2. ERIES, a method awarded in the competition by the Ministry of Reconstruction and Urban Planning (MRU), and the L.M.B construction method patented by the S.G.D.G (Architecture d'aujourd'hui, 1946).

Between 1945 and 1950, the approval committee reviewed no fewer than 390 modern materials and non-traditional construction methods, granting 325 provisional approvals for 91 wall systems and over 100 processes, some of which had been developed between the wars. Among the most notable patented systems are the Cauvet and Barets process invented in 1946 and the heavy prefabrication method developed by Raymond Camus in 1948.

Representative examples of industrialization and prefabrication.

It is difficult to provide a comprehensive list of reconstruction projects, but four representative examples of industrialization and prefabrication in France can be cited. The first is the Cité La Muette in Drancy (1931-1934), designed by architects Eugène Beaudouin and Marcel Lods, in collaboration with engineer Eugène Mopin. This prefabrication project, using molded concrete elements, greatly inspired Pouillon at the beginning of his professional career. The second is the HBM housing group in Maisons-Alfort, completed by architects Roger Hummel and André Dubreuil in 1933. The third is the Orleans project, one of the large experimental sites led by architect Pol Abraham in 1944. The last is the "*Opération Éclair*" in Saint-Étienne-du-Rouvray, completed by the Coignet Company in 1958, a project that perfectly met the requirements of prefabrication.

The first example, the cité of Muette in Drancy (1931-1934), designed by Eugène Beaudouin (Grand Prix de Rome), Marcel Lods (government-certified architect), in collaboration with civil engineer Eugène Mopin, the Cité of Muette in Drancy represents a pioneering approach to building industrialization. This project is an exemplary model of 1930s light prefabrication. Comprising 1200 housing units spread over approximately 11 hectares, this affordable housing complex (H.B.M.) also includes a church, a school group, a kindergarten, and a nursery. The buildings are constructed from vibrated concrete castings, assembled on a prefabricated metal frame according to specific dimensions, and quickly erected on site (Fig.3a). This method of construction using standardized vibrated concrete elements, patented by E. Mopin, was chosen by the architects. The harmonious collaboration between architects and engineers from the early phases of the project led to a satisfactory, simple, and cost-effective solution, notably due to the reduction in on-site fabrication costs and the elimination of transportation of external prefabricated elements.

The second example, the HBM Housing Group in Maisons-Alfort consists of 600 housing units, located in Maisons-Alfort at the place known as "*Vert de Maisons*", covers an area of approximately 2.5 hectares. They were built in 1933 by architects Roger Hummel and André Dubreuil, who were laureates of the *Prix de Rome*. Unlike the *Cité de la Muette*, this project exemplifies heavy prefabrication. Its distinctive feature is the use of red facing bricks for the facades (Fig.3b), reinforced concrete floors with hollow terracotta blocks, and interior partitions made of plaster tiles or hollow bricks. Despite the urgent housing needs requiring industrialized solutions, the architects succeeded in ensuring comfort, speed of execution and reduced costs.

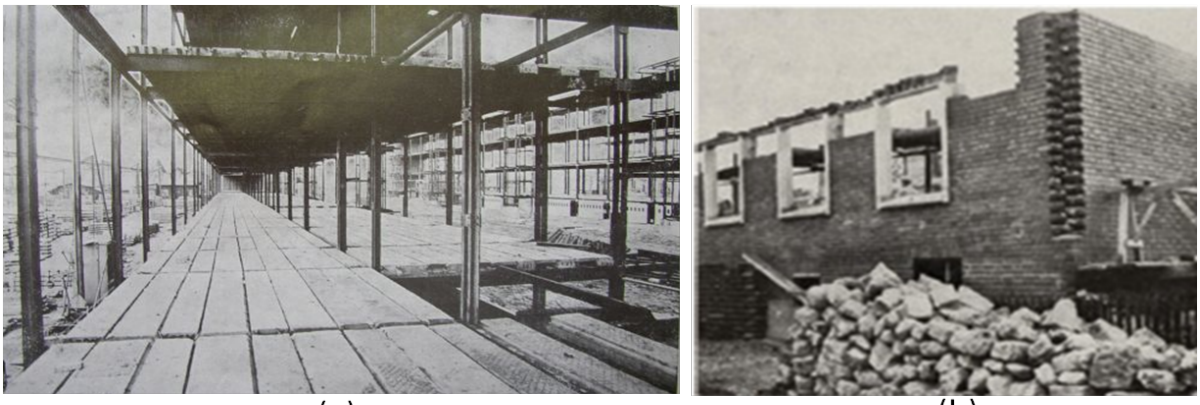
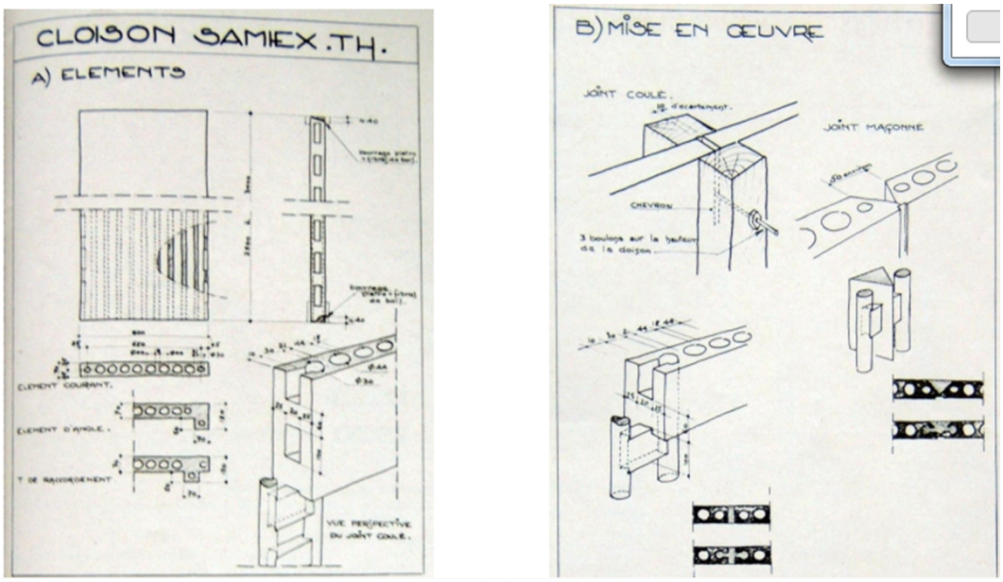


Figure 3. ***(a)*** *Prefabricated metal frame, the cité of Muette in Drancy (Pouvreau, August 2024),* ***(b)*** *The HBM Housing Group in Maisons-Alfort (Revue Chantiers, April-May 1933).*

The third example, the Orleans site, led by architect Pol Abraham in 1944, implemented prefabrication solutions in all the constructed buildings. In response to the universal housing crisis, the Ministry of Reconstruction and Urban Planning (MRU) launched two large-scale experimental sites: Orleans and the Noisy-le-Sec testing center. This project marks the first industrial application of prestressed concrete, developed by French engineer Eugène Freyssinet, for S.T.U.P. residential floors. The walls are made of reinforced concrete panels, using the S.E.P.C.A. process, installed with the help of a temporary metal framework. Floating ceilings made of expanded plasterboard Samiex (Fig.4c) are suspended by springs. This site allowed for the testing and refinement of prefabrication methods, significantly contributing to the evolution of construction techniques.

The fourth example, the "*Operation Éclair*" in Saint-Étienne-du-Rouvray (Rouen) aimed to develop a prototype of series buildings using construction with fully factory-produced standardized elements (Fig.4d). Completed by the Coignet Company in 12 days, this 50-unit building, spread across five floors, was assembled from February 17 to March 1, 1958, with each floor completed in two days. The building is composed of prestressed concrete panels manufactured by the Sotteville factory, assembled on-site with the help of a crane and a team of 17 men. The wall and floor elements interlock dry, without the use of mortar. Unlike traditional constructions, this prototype aimed to eliminate complex formwork and plaster finishes, thereby reducing labor and material costs. Like many

reconstruction projects, this initiative addressed an urgent need, prioritizing functionality and economic efficiency over architectural appearance.



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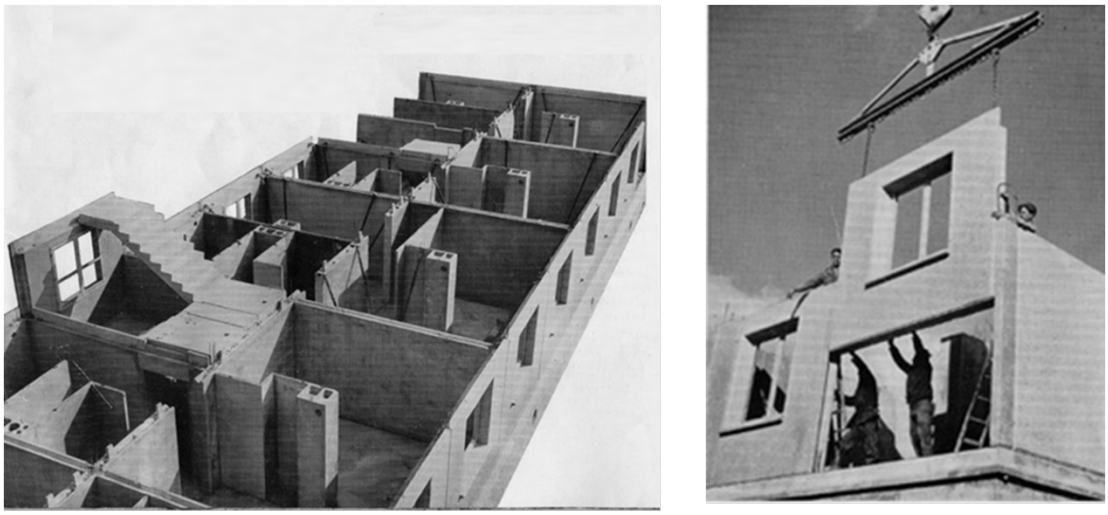


(d)

Figure 4. Samiex approved by the CSTB in 1956, Orleans site (CNAM, 2009), ***(d)*** *Overview of a floor under assembly and an example of the assembly of a standardized facade element (Nogue, 2014).*

The rise of new reconstruction projects.

From the 1970s onward, the future of mass housing became a central issue in proposals for the redevelopment of French cities. A significant portion of the housing stock from the reconstruction era had to be renovated due to its deteriorated condition. These mass-produced homes, which had become unsuitable for the evolving needs of families and no longer met current building standards, required urgent intervention.

Prefabricated buildings, initially designed as consumer products to quickly address a housing crisis, were intended to be temporary, with a projected lifespan of 30 to 40 years. This period, marked by both failures and successes, remains one of the most productive in building history, having witnessed significant advances in construction methods. The emblematic works of architects such as Eugène Beaudouin and Pouillon stand as testament to this era.

Pouillon's projects include approximately 13745 housing units across various reconstruction projects. In France, his notable projects are: Sablettes in Toulon with 150 apartments (1950), Aix-en-Provence with 159 apartments (1952), Buffalo residence in Montrouge with 466 apartments (1955-58), Victor Hugo residence in Pantin with 282 apartments (1955-57), The Parc residence in Meudon-la-Forêt with 2,635 apartments (1957-62), and Point du Jour residence in Boulogne-Billancourt with 2,260 apartments (1957-63). In Algeria, his significant projects include Diar es Saada in El Madania with 800 apartments (1953), Diar el Mahçoul in El Madania with 1,800 apartments (1954), and Climat de France in Algiers with 3500 apartments (1955).

His early experimental projects focused on integrating pre-cut stone into prefabricated projects, notably during the reconstruction of the Old Port of Marseille (1949-1953). He then conducted experimental projects in Iran (1954-1958), using prefabricated metal structures from France assembled on site in Iran. In the 1970s, he innovated by developing a metal house construction process, implemented in various projects in France.

Throughout his career, he favored the use of Fontvieille stone facades in his heavy prefabrication projects. However, the residence "*La Croix d'Oiseaux*" in Avignon (1955-1960), constructed from prefabricated elements, was demolished in 1998 due to the deterioration of the buildings.

In his memoirs, he expresses his disappointment with this project, which was completed without his direct involvement in the plans, and condemns the high costs of the experimental structures used. He also criticizes the industrialized construction methods of the time, highlighting their negative impact on architecture and the environment.

Technological innovation and modernization of traditional construction systems.

In order to meet the Ministry of Reconstruction and Urban Planning's (MRU) requirements for economical, comfortable, and quickly achievable housing, Pouillon developed various construction systems combining walls, floors, and roofs (Fig.5). He extensively used Fontvieille stone in his 1950s projects, despite experimenting with metal structures (Mohammedi et al., 2021). According to this architect, natural materials like stone and marble offer superior durability compared to plaster and concrete, which age poorly. He demonstrated that alternative methods could allow for the construction of economical structures in record time.

– *Prefabricated Stone.*

The construction system, combining load-bearing walls of cut stone, brick partitions, vaulted ceilings supported by metal tie rods, and terracotta floors, was first used in the *"La Tourette"* project in Marseille in 1948. This exemplary project achieved 200 housing units in 18 months at a reduced cost. The system was later reused in other projects, including the three major housing complexes in Algiers starting in 1953. Paul Marcerou's invention, which enabled the precise extraction and cutting of stone blocks, revolutionized the stone industry in construction. Prefabricated stone thus became a competitive material, used by the architect to execute numerous high-quality projects.

– *Wall Construction system.*

In Pouillon's projects, the stone blocks are arranged so that the stones of one course interlock with those of the adjacent courses, creating an aesthetic pattern and ensuring wall stability (Mohammedi et al., 2021; Mohammedi et al., 2018). The stone blocks, ranging in thickness from 40 cm to 80 cm and a height of 70 cm, are laid in four rows per floor, demonstrating the strength and durability of his constructions.

– *Construction materials in Algerian housing complexes.*

In the large housing complexes of Algiers, various materials were considered for bonding the stones. Ultimately, in agreement with the SECURITAS office, it was decided to use Paris plaster (Pouillon, 1953) for its rapid setting and strength properties for the stone wall joints. The exterior joints were to be made with French fat lime mortar, while some buildings required cement mortar joints. Hydraulic lime was not used (Pouillon, 1954).

The French lime-based mortar does not play a structural role but serves solely as a sealant for water and air. The stability of the façades relies on the weight of the stones and the friction between the rows. The inertia of the walls, measuring 80x80x70 cm and 80x40x70 cm, also contributes to the stability of the structure (Mohammedi et al., 2020). The façades of the buildings in Algiers feature large-span cut stone lintels, executed in three sections to optimize the use of cut stone. These lintels, with a span of 3.60 meters, include suspension reinforcements embedded in reinforced concrete chains and are set within the thickness of the stone.

Each independent voussoir is anchored within the chain. According to the Diar es Saada construction reports (Bertero, 1983), the anchoring of the suspension reinforcements in the stone is done in 3 cm diameter and 25 cm deep holes. To ensure the effectiveness of the anchoring, the holes are cleaned with a mortar bath before the chains are executed.

– *Boarded stone " pierre banchée".*

Boarded stone consists of stone slabs fitted with clamps and reserved in the formwork. After pouring the reinforced concrete and removing the supports, these stones create a shell for the building, serving as a permanent formwork. Compared to traditional methods, this system offers significant time savings and cost reductions by eliminating the need for wooden formwork assembly.

He developed this system for some facades of his architectural projects, such as part of the housing complex *"La Tourette"* and the *"Lycée Colbert"* in Marseille (1952-1954). The seaside building's facades were rehabilitated in 2006, as the facing stone had to be removed due to instability. Unlike other works by Pouillon using this principle, this building poorly withstood the surrounding conditions. A report from the Provence-Alpes-Côte d'Azur regional council indicates that two types of stone were used: Cassis stone for the base and Estaillade stone for the rest of the facade.

– *Load-bearing hollow brick partitions "Pouillon".*

The interior partitions of Pouillon's large housing complexes are made from hollow terracotta bricks covered with plaster. They are vertically arranged to enhance the structural strength and prevent crushing. By filling the voids in the bricks with mortar or micro-concrete, the compressive strength is nearly doubled. Each floor includes thirteen rows of 20 cm high bricks to avoid cutting materials on-site (Mohammedi et al., 07-08 May 2018).

– *Pouillon's special floors.*

Pouillon's flooring, designed using a personal method, consists of square molds in plaster forming the ceiling, in which joists are cast according to a regular grid (Sayen, 2014). They are covered with concrete from above. The terracotta or concrete boxes serve as permanent formwork. This process was first experimented with on the old port project in Marseille. The boxes visually and structurally recall the reinforced concrete vault of the Orvieto hangar, designed by Italian engineer Pier Luigi Nervi during World War II.

– *Pouillon's vault and beam system.*

The roofing structure of the 200-unit housing project in Aix-en-Provence consists of a thin vault made of terracotta bricks resting on thick walls of solid stone blocks. The vault is supported by steel ties and covered with round tiles. The space between the vault and the tiles is filled with concrete. At a time when wood was expensive, the elimination of the wooden frame led to a significant reduction in construction costs.

– *The "fusée céramique".*

Pouillon also used *"fusée céramique"* in the construction of a prisoner camp in Marseille in 1945. This unusual material, which had been discarded by the Germans, was invented by Jacques Couëlle and manufactured by the General Company of Marseille Tiling (SGTM) during the war. It consists of prefabricated terracotta elements shaped like bottomless bottles, which interlock to form a large-span arch reinforced with metal rods.

The assembly method allows for the adjustment of the row inclinations to design the shape of the arch. Once assembled, these elements are covered with cement. This process enables rapid form removal, just 24 hours after placement, saving on formwork materials, reducing construction time, and the number of workers on site. Pouillon describes this assembly process in his memoirs:

"*It is difficult to explain in a few words how the buildings were to be constructed: the combined formworks in two elements would be assembled and bolted with spacers. This frame, which supported the hardboard, was abundantly greased with waste oil. As the rockets were assembled, the necks were greased and cement was projected onto them to a thickness of two centimeters. The "fusée céramique" looked exactly like Bordeaux bottles without bottoms, with part of the neck cut off. Each row of bottles was mounted on either side of the formwork and met at the top of the vault. Naturally, the joints were staggered: one had to avoid a central meeting line by extending the laying direction alternately from one side or the other. Indeed, it resembled bamboo shaped on formwork. The vault was coated with a very well-dosed fine mortar, which constituted the exterior finish. A waterproof paint was planned to protect the entire structure. The total thickness was nine to ten centimeters. The next day, the formworks*

were dismantled, tipped for removal, placed back on rollers, and the operation was repeated." (Pouillon, 1968).

– *Thin and crossed ribbed vaults.*

He experimented with new implementation techniques on all his sites, resulting in numerous typologies: brick vault frameworks, thin brick vaults on metal pillars, crossed vaults, ribbed vaults, ribbed vaults, and barrel vaults. These vaults can be found in covered passages and galleries of housing complexes in France and Algeria. They reflect a blend of traditional craftsmanship and technical innovations.

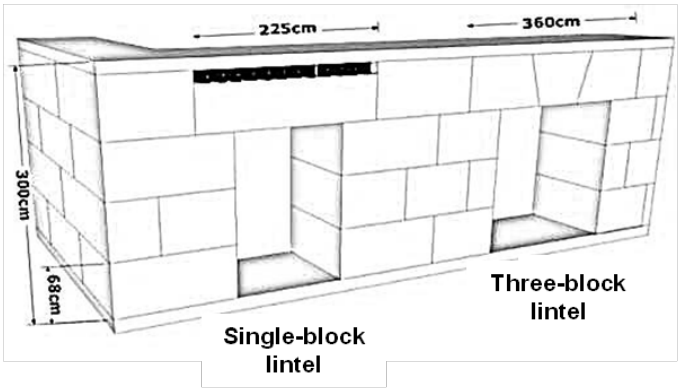
– *Terracotta Screens.*

From 1952, Pouillon incorporated terracotta screens made of ceramic tiles into the infill of openings. These screens were produced in series by the Milles factory and designed by Philippe Sourdive (Aucouturier, 2017). The screens, available in various shapes (round, square, rectangular), were made from a range of materials, including terracotta, concrete, and wood. In addition to the screens, Pouillon used cored brick as a decorative element. This hollow brick, filled with concrete or lime, serves to infill openings, balconies, loggias, and façades. The University Campus of the Gazelles in Aix-en-Provence is a remarkable example of the use of cored brick (Mohammedi et al., December 2018; Mohammedi et al., 15 -18 May 2018).

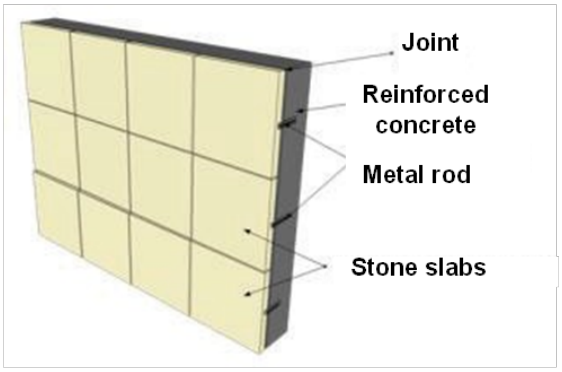
– *The FP Home system.*

There is little documentation on the FP Home system or prefabricated metal houses invented by Pouillon in 1970. Three prototypes of machined metal houses, named FP I, FP II, and FP III, were created. No patents were issued due to the complexity of the process. FP Homes had subsidiaries in France, Switzerland, and Algeria.

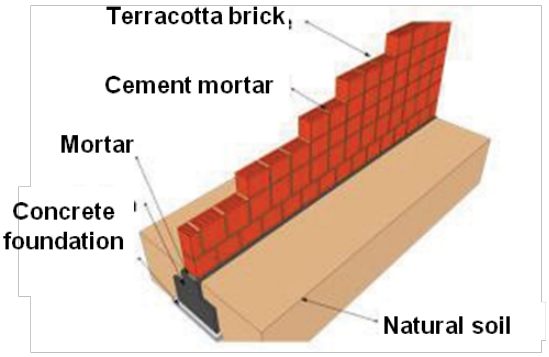
The FP Home process is named after the engineering company created by architect Fernand Pouillon, aimed at promoting industrialized housing (Bonillo, 2001). According to the association "*Les Pierres Sauvages de Belcastel*", prototypes of these metal houses can be found in Jonchery-sur-Vesle, Saint-Brice-Courcelles, Vandeuil (Marne), as well as in Liège (Belgium), Chéraga, and El Biar (Algiers).



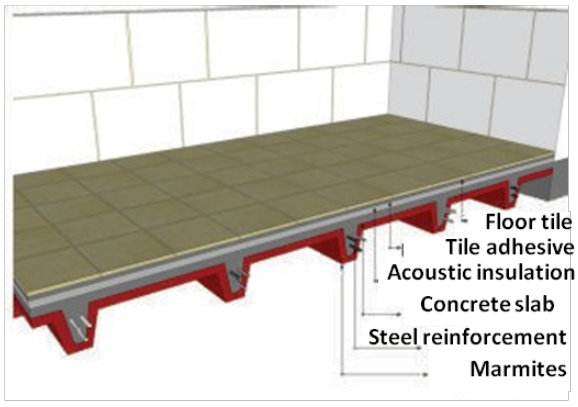
Stone blocks facade



Boarded stone " *pierre banchée*"



Load-bearing brick partitions



Pouillon's special floors

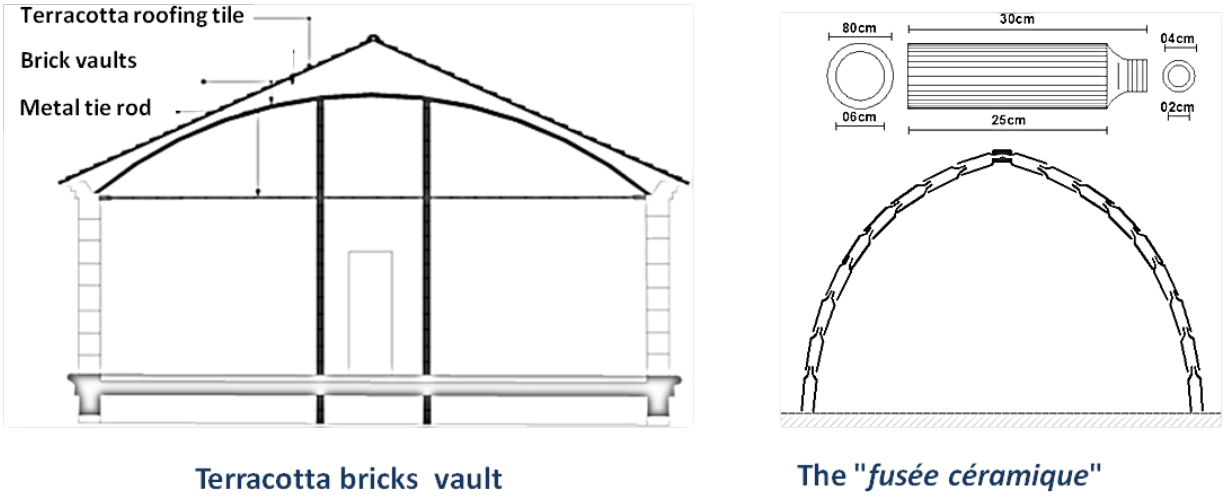


Figure 5. Construction systems developed by Pouillon (Mohammedi, 2021).

Conclusion.

Fernand Pouillon remains an iconic figure of the 20th century, and his achievements continue to embody architectural innovation. His success rests not only on a favorable political context but also on his talent, experimental audacity, and undeniable expertise. This architect sought to offer an alternative to reinforced concrete and steel by developing a construction method based on the large-scale use of cut stone, in its various forms (massive or shuttered), for both structure and architectural expression. However, due to the almost total absence of technical standards for this type of construction, thorough studies on the stability of masonry structures were necessary.

His impact on the construction field remains undeniable, making him an indispensable figure in 20th-century architecture. His ability to blend tradition and modernity, challenge established conventions, and promote technological innovation profoundly marked his era and continues to inspire contemporary architects. His incisive critiques of the construction methods of his time paved the way for more efficient and economical approaches, while emphasizing the importance of simplicity in forms and structures.

Pouillon's legacy resides not only in his architectural works but also in his work philosophy, characterized by the constant search for innovative solutions and the desire to push the boundaries of construction. Today, his ideas continue to influence the architectural landscape, reminding professionals of the importance of boldness, creativity, and commitment to innovation. Pouillon thus remains an inspiring model for future generations of architects, illustrating how the fusion of tradition and modernity can lead to significant advancements in contemporary architecture.

In conclusion, the contributions of this study provide valuable insights into the history of architecture by highlighting Pouillon's essential role in the evolution of post-war architectural practices.

By examining his critiques of contemporary construction methods, his constant pursuit of innovation, and his early use of prefabrication, this study enhances our understanding of the influences and trends that shaped 20th-century architecture. By emphasizing the importance of boldness, creativity, and commitment to innovation, this research sheds light on Pouillon's enduring legacy in the field of architecture and its impact on contemporary practices.

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