

# THE POETICS AND PRAGMATISM OF LIGHTNESS.

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When we talk about architecture, lightness is always first a practical matter.

Over the last century, lightness or the *dream for lightness* shaped and boosted a whole new way of making architecture:

simple, practical, affordable, flexible and light.

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I would like to thank the professors and assistants who have followed me and helped me develop the content of this brief paper. Most of all, I have to thank them for pushing me to discover new things and challenge myself. A special thank also goes to my friends for the support and the help they showed me throughout this unusual period.



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# INTRODUCTION

This brief essay explores the concept of lightness in architecture; dealing with its poetical and technical aspects with the purpose of understanding what is the role of *lightness* in today's architecture.

The final goal is to create a consistent theoretical basis for my diploma's project, collecting ideas and projects that will be part of the set of references that will drive me through the design of the final proposal, which will be conceived as a possible answer to this topic.

The projects that will be explored throughout the pages are mainly from the 19th and 20th century; the architects dealt with in this paper represent only a small part of all those who have approached this subject by any means. Consequently, is important to point out that this essay does not claim to offer a full historical portrait of lightness in the history of architecture; instead it presents a selection of some works that, in my opinion, are still current and relevant, thanks to their ability to find solutions to the problems of their time, always keeping an eye towards the future.

One of the most famous texts on this subject is the first chapter of "Six memos for the next millennium" written by Italo Calvino in 1987, where he suggests that lightness should be the ultimate purpose to keep in mind for the new era that was, at the time, about to begin.

In architecture, however, the concept of lightness necessarily implies a more pragmatic aspect: firstly, it is a physical measure and expresses a less than standard weight. It refers to the weight of a material, an element, or even an entire building.

Something light is then consequently easy to transport, easy to build and easy to modify. Lightness, therefore, comes close to the definitions of speed, movement and flexibility.

This paper is divided into three parts, keeping both poetic and pragmatic

aspects of lightness as a common thread.

The first one, the *myth of lightness*, serves as an introduction to the whole exposition, giving a historical overview of the theme.

The projects presented are all, so to speak, “non-ordinary” and indeed often perceived as an extravagant exception or a small utopia. Their poetic aspects helped establish the myth of lightness.

The second part, the *beauty of technical objects*, focuses exclusively on the work of the French *constructeur* Jean Prouvé, one of the pioneers of lightness in Europe. *Simple, practical, economical* and *accessible* are keywords in the work of Prouvé. Setting aside the more utopian aspect of lightness, the whole poetic and fascination of Jean Prouvé lies in everyday life and technical objects.

The third and final part of this thesis presents itself as a question: *what is lightness today?* By now we know the limits of modernist “positivist- thinking”, so what is left from their philosophy of lightness? This last section analyses the limitations and heritage of this attitude.







## PART ONE

*The Myth of Lightness*

Calvino reminds us that the Greek philosopher Parmenides theorised the “opposition pairs”. According to him, one of the two poles was always *positive*, while the other was *negative* and, of course, neither of them could exist without the other one. In particular, *lightness - heaviness* becomes for Parmenides an extension of the “to be - not to be” question where lightness stands for *not being* and it is, therefore, always *negative*.

In architecture, there is no need to define any of them as *negative*.

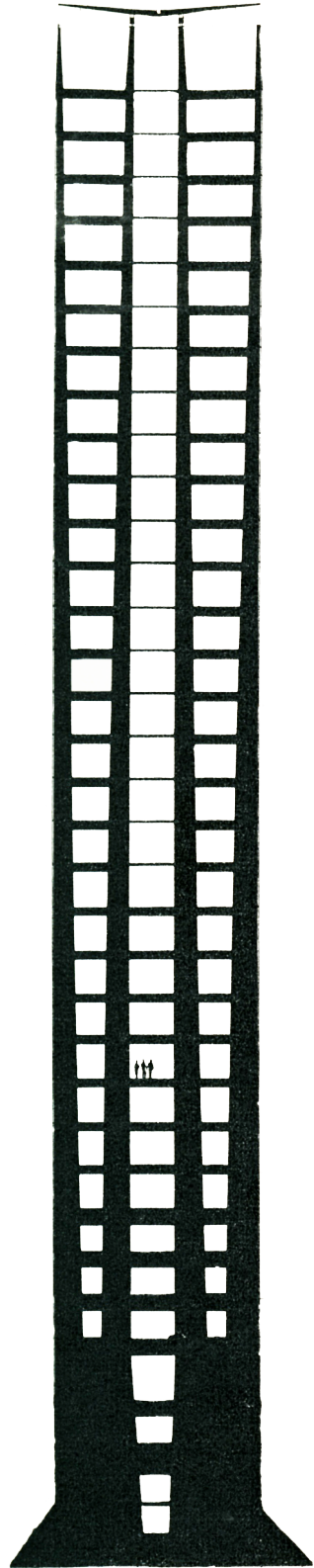
Instead, the pair lightness-heaviness has always been firstly a matter of equilibrium of the two, especially in construction and therefore strictly related to the buildings elements’ weight.

## THE HIGHER IT IS, THE LIGHTER IT IS

According to Vitruvius’ *firmitas*, the lighter elements were to be supported by the heavier ones and were, in fact, constituting the building’s ceilings most of the time. That was not only helping the stability of the structure but also giving a sense of security to the ones who were approaching the building and, on top of that, was likewise conveying an absolute beauty of proportions to the construction.

For instance, the great dome of the Pantheon of Rome, built around 120 a.c., is an outstanding attempt towards lightness: the cupula is composed of a very lightweight concrete, a remarkable technological innovation for those times that required an immense construction effort, taking into account the geometric precision of the formwork used to cast it. The quest for lightness becomes, in this case, a boost for new construction techniques that allow creating something never seen before.

The space underneath is immense and completely free, which over the centuries allowed it to take on various functions before returning to be used as a



1  
progressive thinning of the structure  
structural section of the Pirelli Tower  
Gio Ponti, 1960.

place of worship, remaining to this day the largest concrete dome ever built. The Gothic cathedrals of the Middle Ages also took up the same principle but applied it to the stone pillars that thinned as the structure grew and extended into arches and buttresses. The large windows helped to emphasise this aspect, emptying the massive perimeter walls' structure and allowing light to enter, creating multiple colour effects with the famous stained glass. The effect of this light inside emphasised, even more, the verticality of the pillars and gave solemnity and sacredness to these places.

Many centuries after the construction of the Pantheon, in the 1960s, Gio Ponti built the first skyscraper of Milan, the Pirelli Tower. The entire supporting structure, design by Pier Luigi Nervi, is made of reinforced concrete, an unusual choice for such a high building.

The framework's vertical elements are four pillars (visible also from the outside as they run in pairs along with the height of the facades). They are tapered pillars: two metres wide at the base and fifty cm wide at the top, just like the Pantheon structure.<sup>1</sup> Overall, the Milanese building seeks lightness in the form: both in the vertical look and in the plan's horizontality, a free plan, repeated on every floor and adapted to every possible use.

## PREFABRICATION AND MODULAR SYSTEM

There have been two centuries where lightness has, in a certain sense, been the undisputed star of architecture. We are talking about the 19th and 20th centuries: the years of the Industrial Revolution and the uncontrolled technological development. For centuries, architecture focused mainly on four materials: concrete, brick, stone and wood; in the 1800s, glass, metal and reinforced concrete became construction materials, opening the doors to new construction types.

The cathedrals of the past are now industrial buildings and skyscrapers.

The Crystal Palace, built in 1851, can be considered a real turning point: it was a gigantic modular building made of iron, wood and glass, made of components which were meant to be recyclable.<sup>2</sup> The intention was to celebrate the greatness of the England's kingdom, the capital of the industrial revolu-

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1 Maristella Casciato, Fulvio Irace, a cura di, *GIO PONTI. AMARE L'ARCHITETTURA*, Forma Edizioni, Roma, 2020 .

2 Hermione Hobhouse, *The Crystal Palace and the Great Exhibition of the Works of Industry of All Nations*. London, 2002, Athlone. pp. 34.



2

Structure made of a repeated module in glass and metal that seems to be projected into infinity and the possibility of the space to house the most different circumstances

Interior view Crystal Palace by John Paxton  
London, 1851.

tion, and amaze the visitors with a building that represented the maximum of modernity and introduced them to an entirely new type of space.

“ However, the visitor, seeing for the first time such an immense building which was not massive and which did not consist of solid masonry, saw the notions which had served them until now to judge the architecture gradually crumble away. ”<sup>3</sup>

The production and the assembly of the building parts were both rapid and economical. The crystal palace embodies the latest advances in British industry and the application of the most straightforward and rational system of production: mass production.<sup>4</sup> Each module was identical, entirely prefabricated, self-supporting and fast and easy to erect. If we imagine multiplying these modules into a grid, the structure could be extended possibly infinitely. Thanks to its comparatively low weight, the Crystal Palace needed absolutely no heavy masonry, and since it was covered almost entirely in glass and, for the same reason, it also needed no artificial lighting.

The result was an unprecedented exhibition space where the construction, acting as a self-supporting shell, maximised interior space. The visitors were shocked by the magnificence of the structure, which to them seemed to be supported by glass.

As we saw with the Crystal Palace example, the industrialisation of construction is strictly connected to the radical transformation of architecture: both in language and technique during the 20th century.<sup>5</sup> The industrialisation of buildings summoned both technical and political imperatives and utopian associations.<sup>6</sup>

The modern production of components makes it possible to reproduce the buildings identically or with some variants if necessary. This procedure saved time and money. In this regard, wars were a significant accelerator for industrialisation for at least two reasons: the first is that the army industry quite naturally reinvents itself for civil production; the second is that territory was left wasted by wartime destruction and, whole towns included, had to be

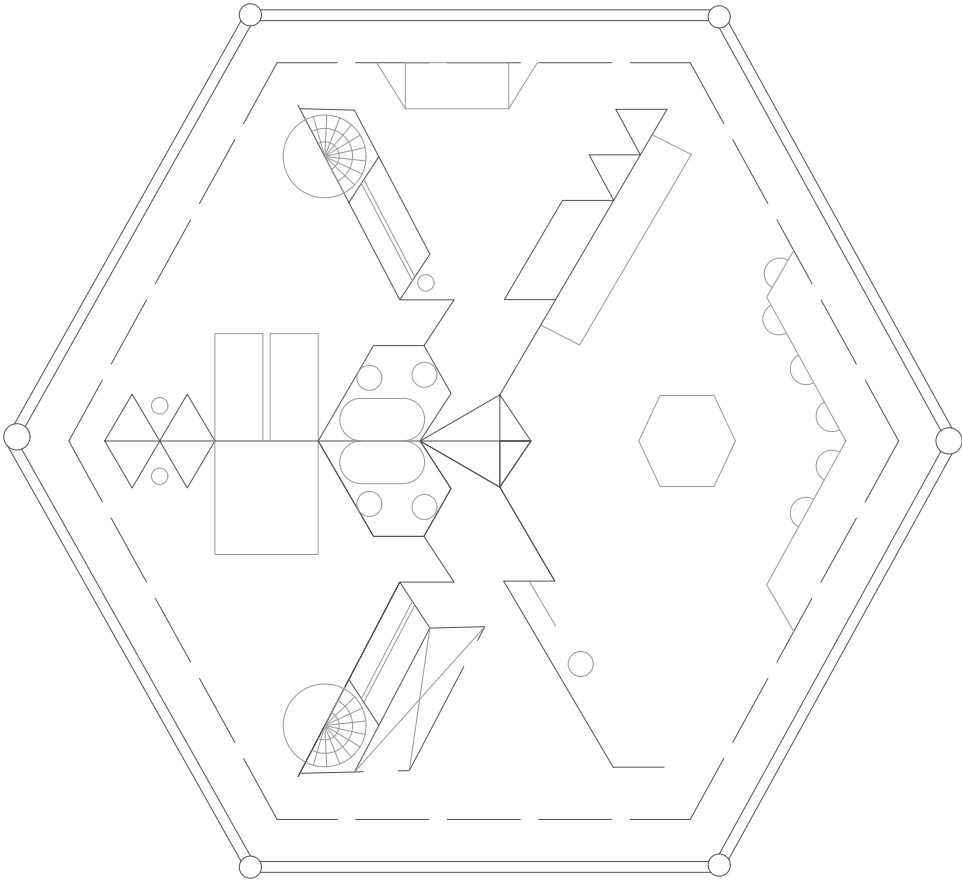
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3 Lothar Bucher, *Kulturhistorische Skizzen aus der Industrieausstellung aller Völker*, Francfort, 1851, pp. 174.

4 Giedion, Siegfried, Sigfried Giedion, Françoise Rosset, and Irmeline Lebeer. *Espace, temps, architecture*. Paris: Denoël, 1990, pp. 162.

5 Graf, F. & Delemontey, Y. (2012) *Architecture industrialisée et préfabriquée : connaissance et sauvegarde*. Lausanne: Presses polytechniques et universitaires romandes. pp. 38.

6 Graf, F. & Delemontey, Y. (2012) *Architecture industrialisée et préfabriquée : connaissance et sauvegarde*. Lausanne: Presses polytechniques et universitaires romandes., pp. 39.



Central floor plan without a precise orientation, where the walls seem to be an integral part of the furniture  
Dymaxion House  
R. Buckminster Fuller, c. 1927.



rebuilt.<sup>7</sup> This was one of the significant issues of the post-war period, which occupied the thought of so many architects; one of the most urgent aspects concerned housing for the thousands of people who had lost theirs during the bombings.

The first example that springs to mind is for sure Richard Buckminster Fuller. The housing crisis led him to imagine a standardised affordable housing production: with industrial production processes and materials. He imagined them to be like cars: lightweight, quick to assemble and easy to transport.

During the 1920s, he started his studies for a new habit space, known as the 4D house, later re-named Dymaxion (i.e. from dynamic, maximum, tension). Dymaxion began a way of tackling housing by optimising the use of energy, time and resources.

The shell of the prototype house is made of aluminium, just like the car frame. This material was thin, cheap, effortless to find, simple to produce and shape, and easy to clean. In this project, Buckminster Fuller approaches the idea of a *whole space* with the maximum comfort for its inhabitants. The prototype has a central service space where all the technical services are located: the rest of the space is designed to be free, or rather *not strictly defined*. There are partitions, but these are semi-fixed and feel more like pieces of furniture than real walls.

The efficacy is measured in terms of the object's ability to produce the most significant result with the smallest of means: doing more with less.<sup>8</sup>

One of his fundamental objectives was to reduce the actual weight of building so that they could be easily transported in containers and trucks.

Buckminster Fuller had always dreamed of buildings *as light as bubbles* and the Dymaxion House signalled its lightness of weight ostentatiously: three tonnes of material was the final tally – one-fiftieth the weight of an equivalent standard house.<sup>9</sup>

The dymaxion house is no longer a house, it is a pure object, perfectly engineered, ready to be assembled anywhere, a product of a new time in which the mechanics of function wins out over the safety of stone and brick.<sup>10</sup>

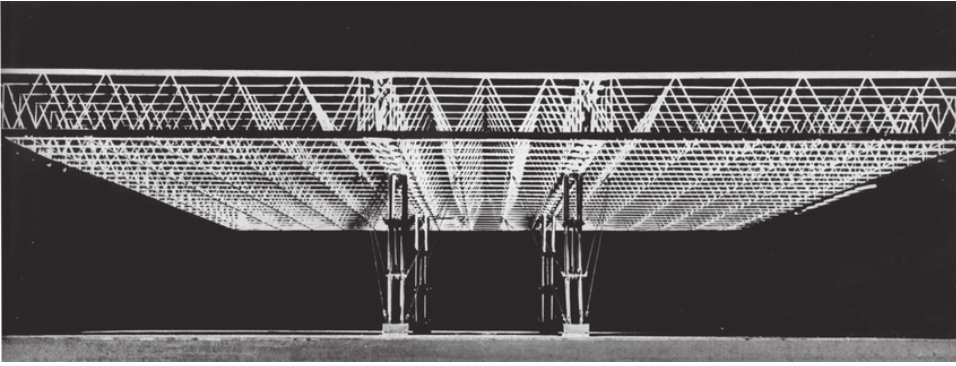
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7 See Cohen, Jean-Louis, *Architecture en uniforme. Projeter et construire par la Seconde Guerre mondiale*, CCA./Hazan, Paris 2011.

8 It is impossible not to think of Mies Van Der Rohe's famous statement "less is more".

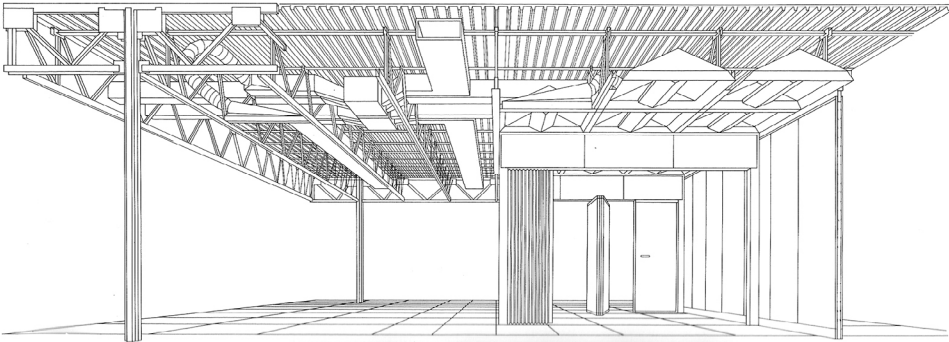
9 Neder, Federico. *Les Maisons De Fuller : La Dymaxion House De R. Buckminster Fuller Et Autres Machines à Habiter*. Gollion: Infolio, 2008.

10 Molinari, Luca. *Le case che siamo*. Roma: Nottetempo, 2016.



3

Horizontal space defined only by the roof and a few pillars  
Hangar for the Atlas Aircraft Corporation with the Mobilar System,  
K. Wahcsmann, 1945-1946



4

Space defined only by the structure, roof, partitions and technical services.  
School Construction Systems Design,  
Ezra Ehrenkrantz, 1964

Konrad Wachsmann was a German-born American architect and a pioneer in the field of prefabrication. Following in Fuller's footsteps, he also designed together with Gropius a prefabricated and fully demountable housing system to react to the need for shelters during the Second World War.

As with the Dymaxion House, the building's market side was not a success. The elements' production was again too long and laborious and soon the production of this prototype was stopped altogether.

The highlight of Wachsmann's research was the hangar prototype for exceptionally sized aircrafts, based on a system of prefabricated components, developed since 1951 (exactly 100 years after the Crystal Palace).

It consists of a spatial reticular structural system with tetrahedral development made of steel pipe that generates a horizontal, infinite, undefined, and flexible space. Wachsmann's roofs were metal framework structures that were so light that they were placed on the ground and raised over the pillars by a few men. The quest for this sort of space became an obsession for the German architect. In his notes, he writes: "free space will influence every design (...) the importance of axes and other means of formation will be replaced by the functional rhythm of openings and screens. The load-bearing elements will be moved more and more towards the centre of the construction. (...) The search for lightness and the visual overcoming of gravity will find its fulfilment in vertical surfaces freed from weight and supports." <sup>11</sup>

Ehrenkrant develops the dream of the horizontal free surface that Wachsmann introduced: for him, the building is only divided into a structure, roof, partitions and services. He will refine this concept of free space, designing a prototype of School Construction Systems Design (SCSD) that aimed to create more flexible, affordable and efficient schools by building them with standardized modular components. <sup>12</sup>

In this first part, the projects analysed all deal with lightness differently, poetically and pragmatically, and helped us understand and contextualise how the myth of lightness came about.

The Pantheon and the Pirelli tower, for example, show us the lightness of concrete and the freedom of having a space without partitions which can be adapted to any use.

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11 Wachsmann, Konrad, Giulio Carlo Argan, and Paola Rotti. *Una svolta nelle costruzioni*. Milano: Il Saggiatore, 1960, pp 232 .

12 Benet, James; Christopher Arnold, Jonathan King, and James Robertson. *SCSD: the Project and the Schools*. New York, NY: Educational Facilities Laboratories, Inc, 1967.

On the other hand, Buckminster Fuller imagines houses as if they were small vessels, so light and easy to transport that they can be “anchored” anywhere wanted.

The projects by Paxton, Wachsmann and Ehrenkrant explore the prefabricated module concept, so quick and easy to assemble that we can easily imagine doing it repeatedly and having a potentially infinite horizontal space.

However fascinating they may be, the projects presented are often either incomplete utopias, as in the case of Fuller and Wachsmann’s living prototypes, or buildings that we could consider non-ordinary, in the sense that they are *one of a kind*, such as the Pirelli Tower or the Crystal Palace.





## PART TWO

*Poetics of Technical Objects*

The second part of this text is dedicated to the work of Jean Prouvé. Lightness for him was a solid starting point: an essential step towards industrialisation and affordable architecture, driven by his engagement with technological and social advances.

Prouvé was a tireless builder who managed to complete numerous projects on both a small and large scale, all of which were based on his poetic of technical objects.

## JEAN PROUVÉ

Jean Prouvé was born in 1901 to Victor Prouvé, one of the founders of the art movement of “l'École de Nancy”, whose aim was to forge links between art and industry and art and social consciousness. In his youth, he was trained as a blacksmith and he will always identify with this part of his personality.

According to Prouvé, lightness was indeed a question of weight above everything else. As a connoisseur of the art of building, he knew the difficulties of heavy elements and materials: for instances, they were often expensive as they required much workforce to handle and were difficult to move, shift and rearrange.

In his workshop in Maxéville, together with almost 250 people (working almost as a collective), Prouvé experimented with various materials, including different types of metal, wood and even concrete. The creations were always taking inspiration from the domain of technology and machines to make efficient and intelligent products, be they either components, buildings or furnishings.<sup>1</sup>

Since Maxéville was, in fact, a small factory, the concept of industrialisation became central for the work Prouvé: he was the one who designed, produced

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<sup>1</sup> Picchi F, *Prouvé inventore : 32 brevetti. Prouvé, the inventor*, in Domus, n. 807, 1998, pp. 52-60.



5  
load-bearing structure of a building and that of a table compared  
on show at the Galerie Jousse-Seguin,  
Paris, 1988



and assembled his projects. At the beginning of 1950s, he claimed he was “*ready to manufacture houses in large series, as Citroën had done since 1919 for automobiles.*”<sup>2</sup> As we have already seen, he shared this dream with Buckminster Fuller, not only in the aspect of industrial production but also in focus on social housing for the lower classes.

Remarkably, he specialised in the design of modular constructions, either single or composable, which all had a punctual load-bearing element as a common feature, which later became one of his trademarks.

The work on a module’s design was meticulous: the number of parts was kept to a minimum and each part was conceived to be lightweight and manageable enough to be carried by just two men. Regularly, Prouvé even organised public exhibitions in which he demonstrated the ease with which his buildings could be constructed for educational and advertising purposes.

### “IL N’Y A PAS DE DIFFÉRENCE ENTRE LA CONSTRUCTION D’UN MEUBLE ET D’UNE MAISON”<sup>3</sup>

Starting from the statement that there was no structural difference between a piece of furniture and a building, Jean Prouvé developed a “constructional philosophy” whose artifice-free aesthetic of functionality and fabrication applied the same principles to furnishings and architecture.

First produced in small series in the 1930s, his structures were assembled and integrated with the aid of shrewdly designed systems for modification, dismantling and moving of both furniture and buildings.<sup>4</sup>

They were designed to be as practical and straightforward as possible. The materials used were light so that they were easy to move, the dimensions were minimal and standardised, and the construction was as simple as possible so that they could be easily dismantled and reassembled.

The extensive furniture production is not limited to articles for the *Habitat Industrielle*, such as chairs, tables, bookcases and lamps. Jean Prouvé also designed furniture for the school buildings he designed, to which he also devoted a pedagogical study.

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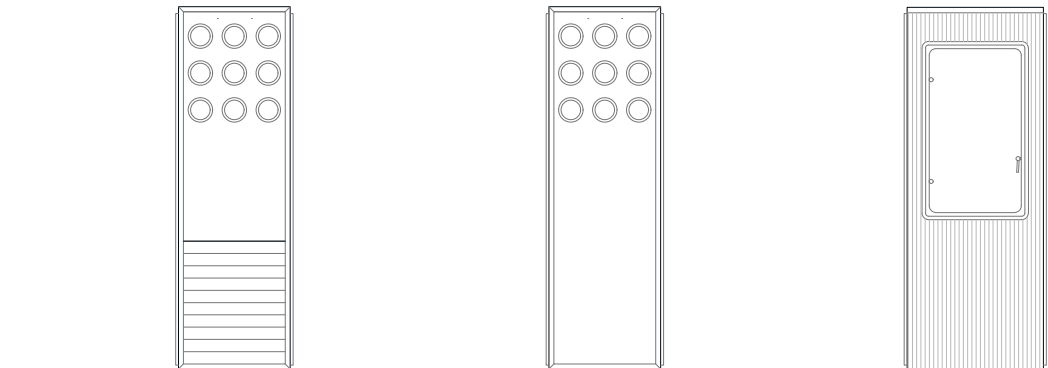
2 : Jean-Louis Cohen, *Architectures du Front populaire*, Editions l’Atelier on behalf of Association Le Mouvement Social, Jan. - Mar., 1989, No. 146.

3 Prouvé, Jean, and Lavalou, Armelle. *Jean Prouvé Par Lui-même*. Paris: Editions Du Linteau, 2001.

4 *A Passion for Jean Prouvé: From Furniture to Architecture*. The Laurence and Patrick Seguin Collection, Pinacoteca Giovanni e Marella Agnelli, GaleriePatrick Seguin.

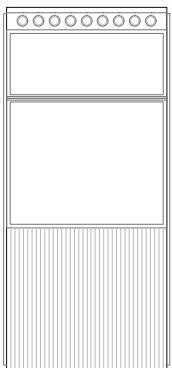
The panels he designed, all of which are the same size so that they can be efficiently composed, feature numerous innovations from a technical perspective, both in materials, assembling systems and sunlight screening. The most famous of these are those of Maison Tropicale, designed to control temperature, ventilation and light.

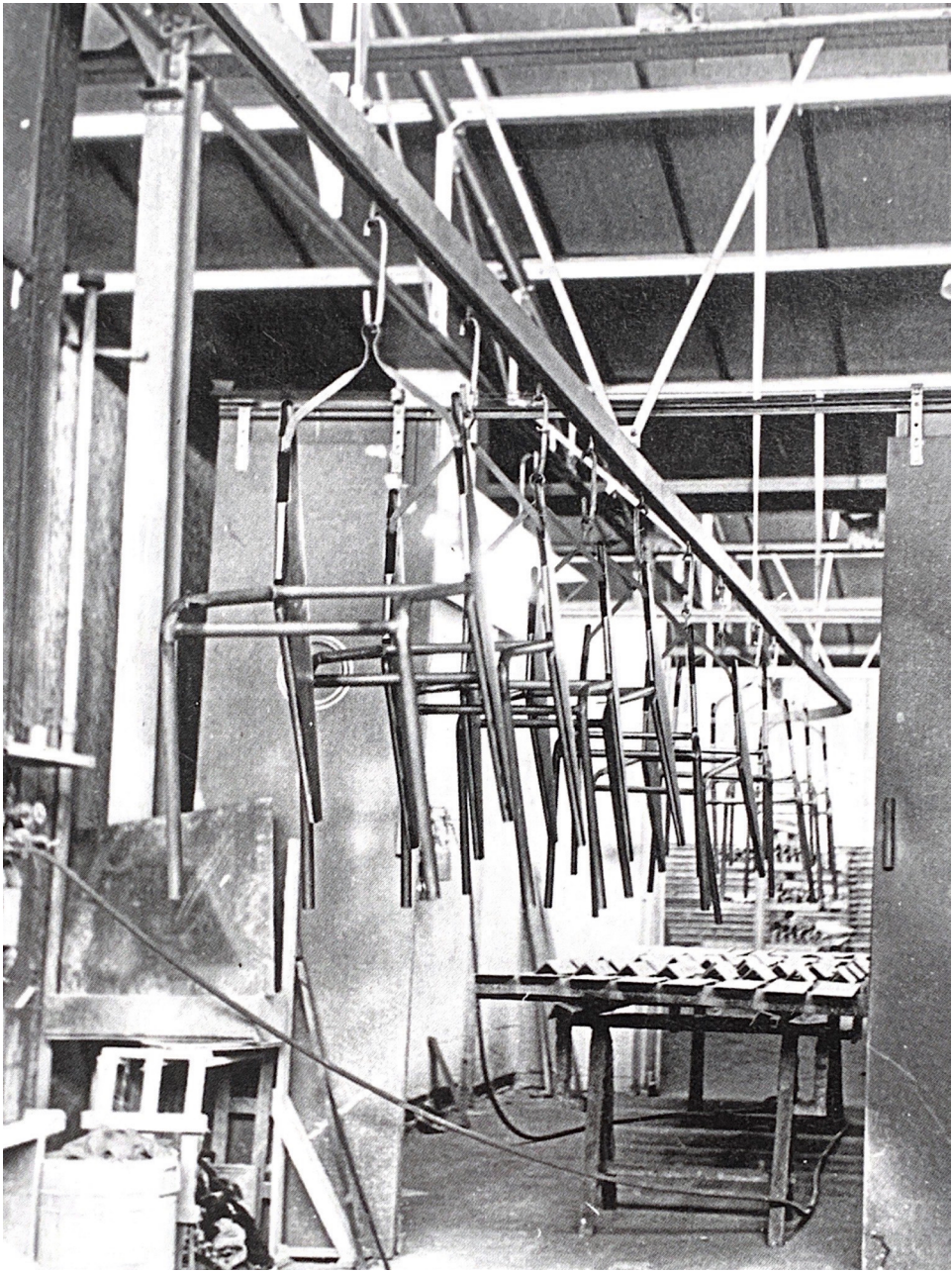
Jean Prouvé's panels became one of his symbols, in fact, he became so specialised in the design of facades that he was very often called upon by other architects just to take care of this part.



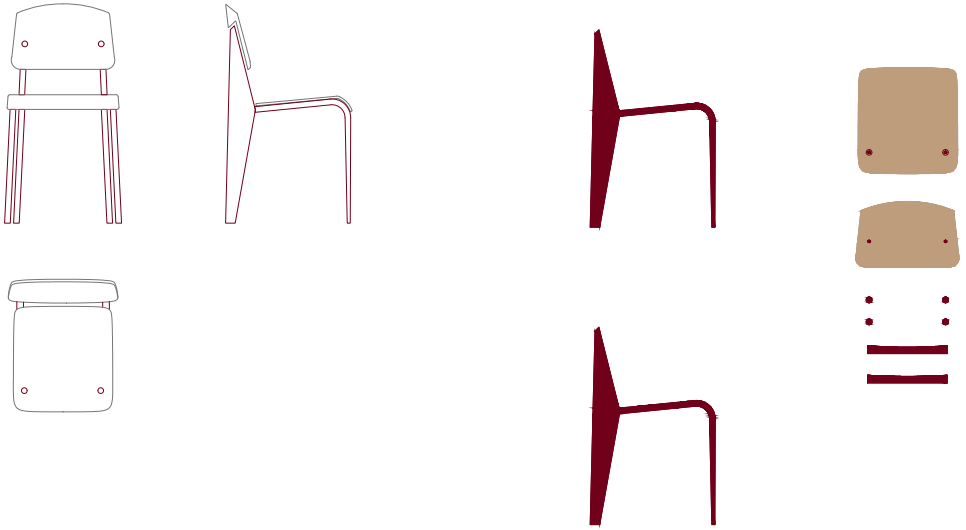
metal and wood facade panels

from left to right:  
metal and wood porthole panel; full metal porthole panel; facade metal panel with small opening; facade metal panel with window; wood panel for the maison 6x6; wood panel for the maison 6x6 with guillotine window.

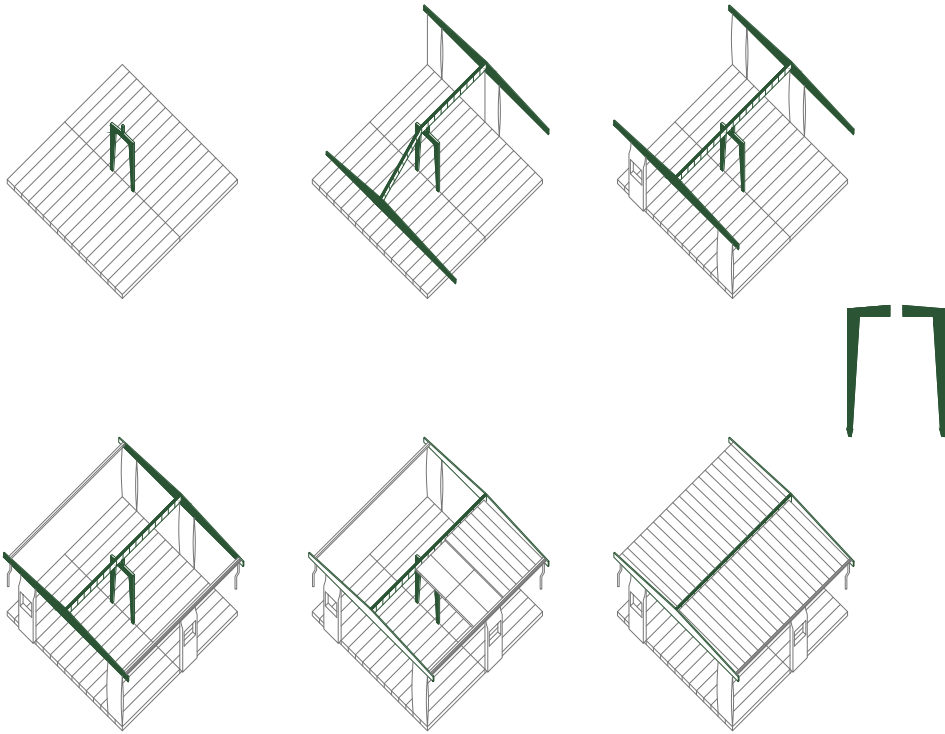




6  
Mass-produced chairs ready to be painted  
Maxéville factory, ca. 1952



Standard Chair  
1934\50  
Jean Prouvé  
credit: Vitra Design Museum



Axonometric drawings of the construction phases,  
the house could be easily built in two days by two men  
Maison démontable 6x6  
France, 1944.

## MAISONS DÉMONTABLES

The research and study of a housing system that could entirely meet the necessities of the neediest classes were one of the main themes of the work of Jean Prouvé, who devoted himself tirelessly to the subject.

In response to an order from the state, at the end of the War, Prouvé began designing temporary houses for the homeless in Lorraine and Franche-Comté.<sup>5</sup> One of these is the Maison 6x6, designed in 1944.

The Minister of Reconstruction defined the size of the 6x6 square, which could be divided into three rooms instantly habitable on the day of assemblage. It was, in fact, designed to be quickly erected on the sites of destroyed homes and therefore were made up of light, prefabricated components of metal and wood. Steel was reserved for the bent steel skeleton, into which were inserted simple, standardised wood panels. The structure has been designed in such detail as to have the minimum necessary elements. Each one is lightweight and practical to handle so that it is easy to ship and transport all over the country.

Jean Prouvé would later develop and reapply this constructive principle to durable and lasting construction.

In 2016, Jean Nouville embarked on a reinterpretation of this project, regarding the original by Prouvé he says:

*“ The DNA of this house is more Japanese than European : the sliding doors are at the origin of its flexibility. Simple, it is a square surface, 6 meters by 6 meters, except for the sliding doors that gather and transform hours after hours the house functions (..)”*<sup>6</sup>

More than ten years later, in 1956, Prouvé designed the Maison Des Jours Meilleurs, on the commission of abbé Pierre.<sup>7</sup>

The name of the house already implies a strong social and human ambition. This commitment to the design of modern housing for the poorest appears to be the obvious meeting point in the trajectory of the two men.<sup>8</sup>

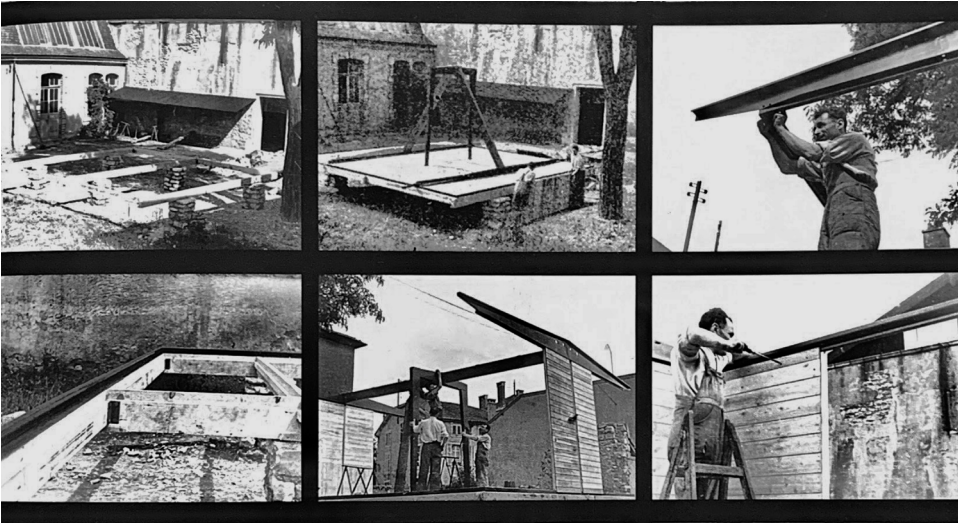
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5 *A Passion for Jean Prouvé: From Furniture to Architecture*. The Laurence and Patrick Seguin Collection, Pinacoteca Giovanni e Marella Agnelli, GaleriePatrick Seguin.

6 Jean Nouville, *Simple 2016 - Prefab House*, available on [www.jeannouveldesign.fr](http://www.jeannouveldesign.fr).

7 Abbé Pierre was a French Catholic priest, partisan, politician and founder in 1949 of the Compagnons d'Emmaüs, an organisation for the poor and refugees.

8 Prouvé, Jean, Bernard Marrey, and *Abbé Pierre*. *L'Abbé Pierre et Jean Prouvé : la Maison des jours meilleurs*. Paris: Éd. du Linteau, 2010.



7  
 Construction site of the  
 prototype of the Maison 6x6  
 Maxéville, 1944



8  
 Construction site of the  
 Maison Des Jours Meilleurs  
 Paris, 1956



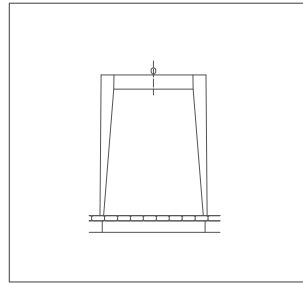
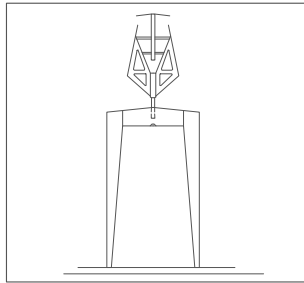
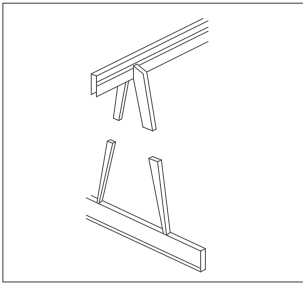
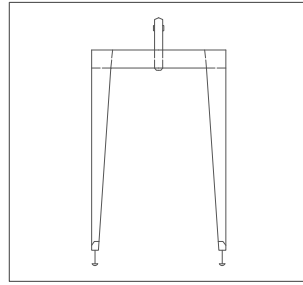
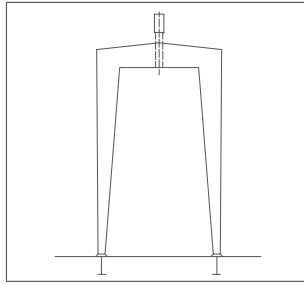
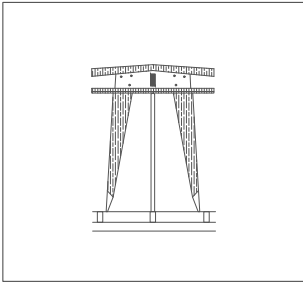
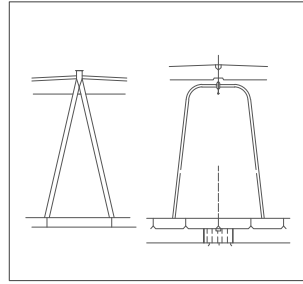
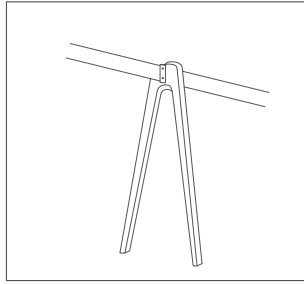
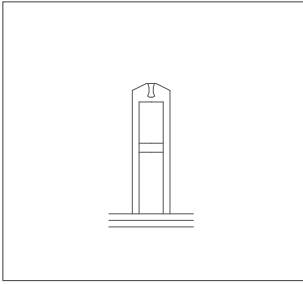
This building consolidates the notion of the mass-produced demountable dwelling: the lasting, light, cheap and comfortable that he had been working on for over fifteen years.

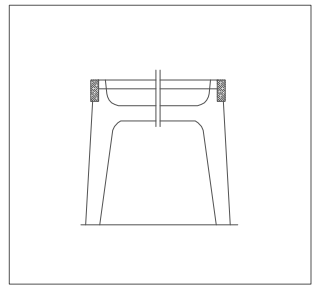
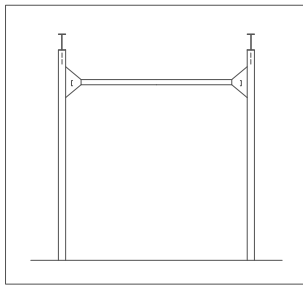
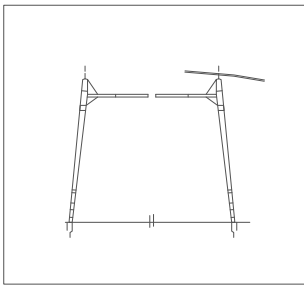
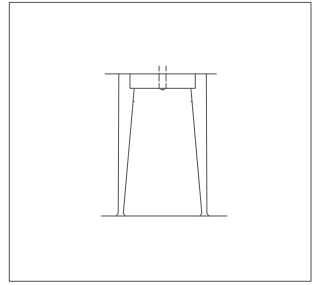
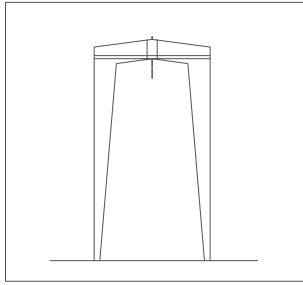
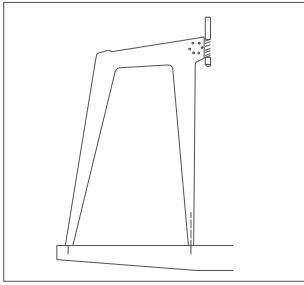
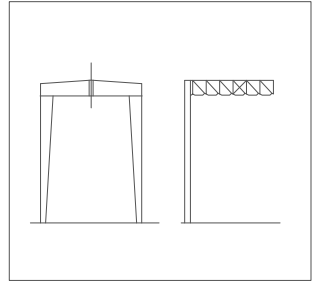
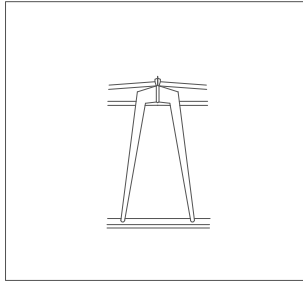
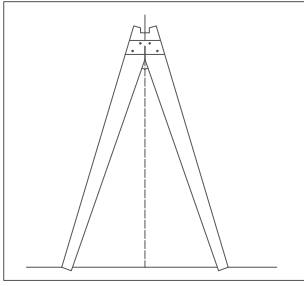
Unlike the Maison 6x6, in this pavilion we could find a prefabricated steel central unit, housing the kitchen, bathroom and toilet, that is placed on a dished concrete base; the unit supported a pressed steel beam and constituted the substructure. This element gives a strong centrality to the building's plan and leaves everything around it as free space. The shell was made of thermoformed wood sandwich panels and the roof of aluminium slabs that also extended to cover the porch.

Despite being described by Le Corbusier as “*the most handsome house I know of*”<sup>9</sup>, this 57m<sup>2</sup> house that took only seven hours to assemble was too revolutionary for its time: the official approval needed for mass-production was not forthcoming, and only five were ever built.

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<sup>9</sup> “Jean Prouvé, on the *Quai Alexander III* has constructed the most beautiful house I know: the most perfect way of living, the most brilliant thing built. And all this is true, built, made, entered into a life of research. And it was the Abbe Pierre who has commissioned him!” - Le Corbusier after visiting the prototype in Paris in 1956.

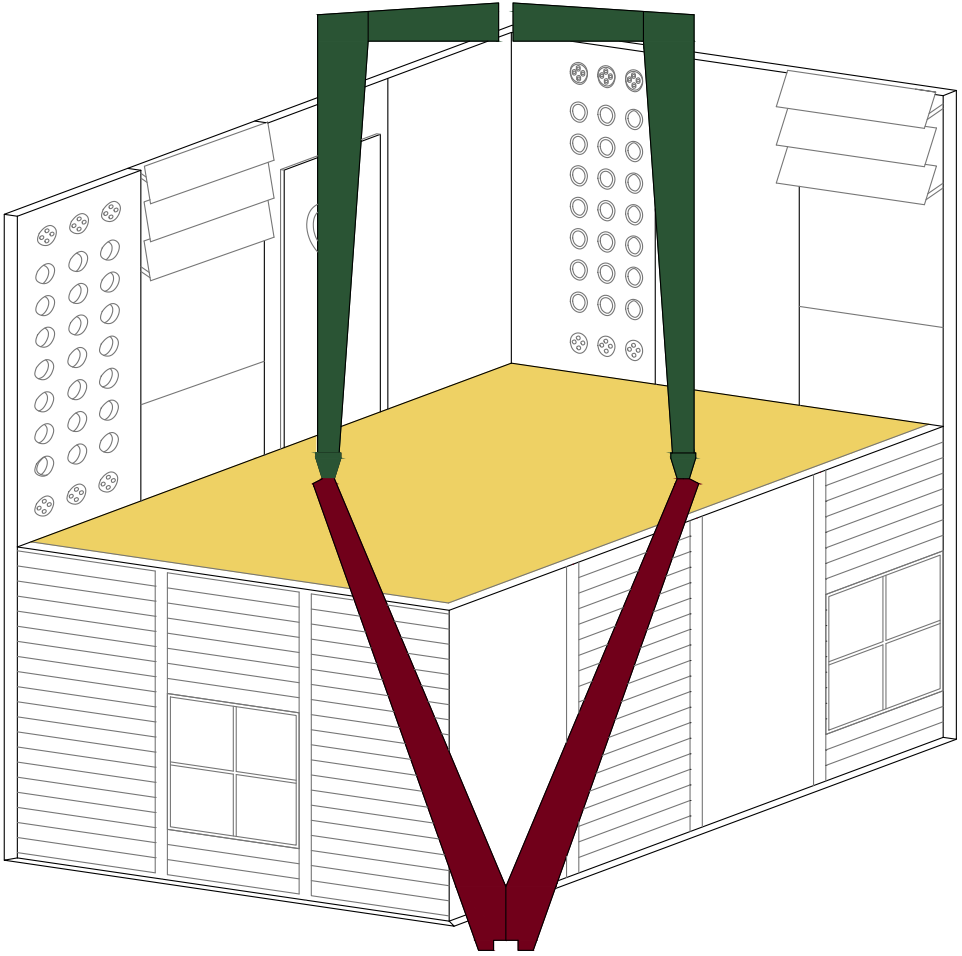




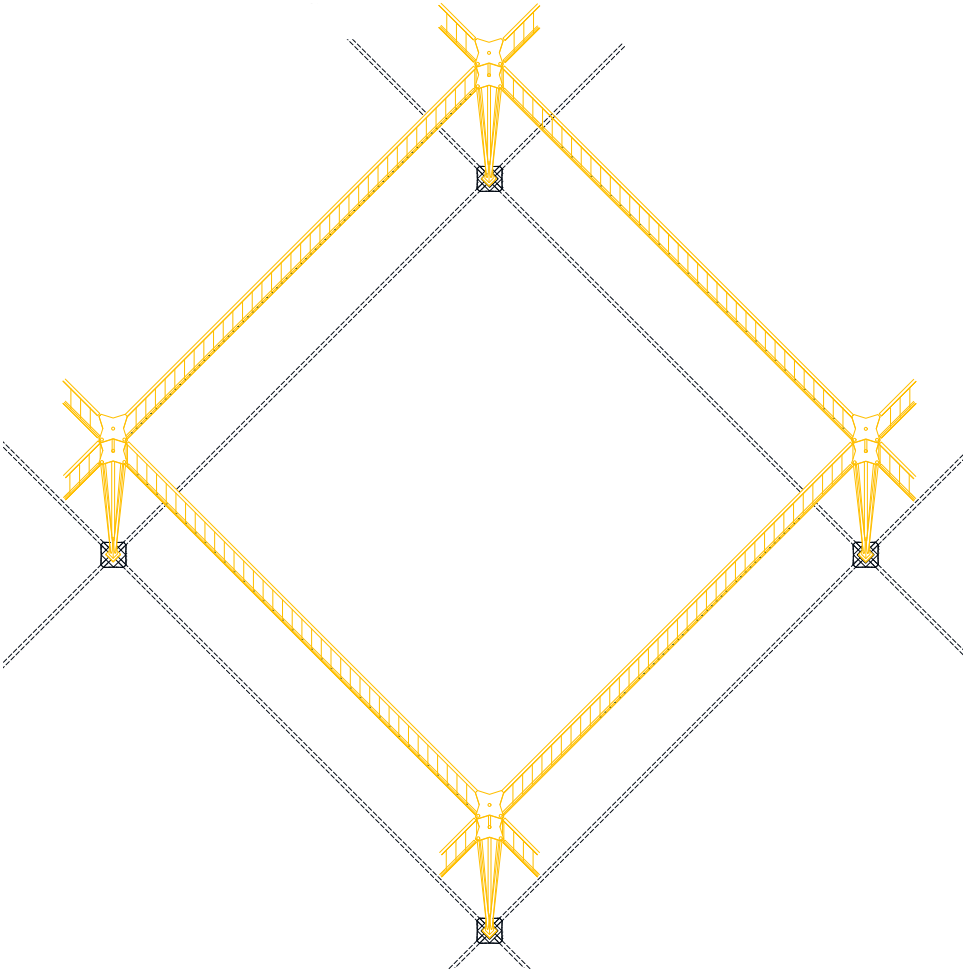
Portal frame systems collection  
wood/steel  
designed by J. Prouvé  
1938 - 1962



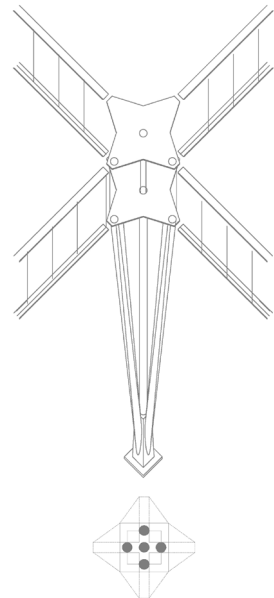
9  
Maquettes of the maisons démontables,  
Galerie Patrick Seguin  
Paris, 2015



Axonometry with mixed elements  
from the architectures of  
Jean Prouvé



Axonometry of the structure +  
Detail of the pillar  
of the Alpexpo,  
Grenoble, 1969



## PUBLIC BUILDINGS

Prouvé also devoted himself to the design of other buildings besides houses, always with an eye and regard for social causes. It is impossible to forget his contribution to the Maison du Peuple's design or his incredible commitment to the design of temporary school buildings in France during the post-war period.

The most remarkable example is the one of "Temporary School of Villejuif", built in 1957. The specifications called for a lightweight building that could be put together quickly and would lend itself to being dismantled and re-erected elsewhere.<sup>10</sup> Modular and flexible, it was possible to adapt it to different needs and situations, as the one later designed by Ezra Ehrenkrantz.

The Alpexpo was commissioned in 1968 for Grenoble's Winter Olympics Games and served as a bus station. The experience of Jean Prouvé as a furniture maker, compensating for his inexperience in masonry, always led him to search for stability in buildings through self-supporting structures portal-frame-type systems, looking like a table-like system where the legs are joined to the frame of the top and rest directly on the ground. This is the case with the Alpexpo's stool.<sup>11</sup>

The building is based entirely on a symmetric square grid with 36 metres between each post and an overhang to the sides of 6 metres from which it is connected the system of the suspended facade. A potentially independent module is defined every four posts and it could be repeated infinitely in a horizontal space.

The building is designed to have flexible use and shape in order to be "recycled" over time: now it works as an exhibition space and over the years its surface area has been increased.

Each post is composed of five smaller pillars that, opening upwards, take the shape of an inverted cone to support the secondary roof structure. This shape, indeed chosen for its static properties, further emphasises the idea of lightness provided by this metal structure. The lightweight of the metal structure, together with prefabricated modules, made it possible to construct the building in a short time and reduce costs considerably.

One of the peculiarities of this building is the curtain wall: its distinctive feature is undoubtedly the rounded corner that gives continuity to the surface of the facade, making it increasingly difficult to give it an orientation to the building.

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10 A Passion for Jean Prouvé: From Furniture to Architecture. The Laurence and Patrick Seguin Collection, Pinacoteca Giovanni e Marella Agnelli, GaleriePatrick Seguin.

11 Prouvé, Jean, and Alexander Vegesack. *Jean Prouvé : the Poetics of the Technical Object* : [catalogue]. Weil am Rhein: Vitra Design Museum, 2006. pp. 102.

In a chapter entitled “*Prouvé versus Mies: Alpexpo*”<sup>12</sup> Jean Pierre Cêtre ventures the idea that the Grenoble exhibition building could be a response to Mies Van der Rohe’s Neue Nationalgalerie in Berlin.

“*There is little doubt that Prouvé wanted to express how his own attitude contrasted with that of Mies, and if we compare the structures of the Neue Nationalgalerie and Alpexpo, the first seems like a monster while the second looks like a masterpiece of restraint (..)*”  
- claims Cêtre.

The two structures are indeed similar, but the Neue Nationalgalerie is subjected to much greater<sup>13</sup> stress than Prouvé’s building (64 mt spans, instead of 36 Alpexpo).

The objectives are entirely different: Jean Prouvé wants to show the structure’s beauty, which has a more than reasonable span between the pillars, a low price and fast construction method. On the other hand, the Neue Nationalgalerie pillars’ span is immense; the roof is actually pretty heavy and it required the use of costly materials, extending the construction time considerably.

Nevertheless, Mies’ building almost fools the visitor’s eye with a roof that seems to be so light it can float on a glass box.

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12 Prouvé, Jean, and Alexander Vegesack. *Jean Prouvé : the Poetics of the Technical Object* : [catalogue]. Weil am Rhein: Vitra Design Museum, 2006.

13 For the structural calculations see footnote n° 3 at page 103 from Prouvé, Jean, and Alexander Vegesack. *Jean Prouvé : the Poetics of the Technical Object* : [catalogue]. Weil am Rhein: Vitra Design Museum, 2006.







## PART THREE

*what is lightness today?*

In 2014, Jean Luis Cohen presented “*La modernité, promesse ou menace? France: 101 bâtiments 1914-2014*” as the theme of the French pavilion exhibition at the Venice biennale directed by Rem Koolhaas. The exhibition was organised in response to the theme given by the curator: “*Absorbing Modernity*”.

Cohen makes a critical analysis of modernism and, in particular, French, modernism while recognising the significant contribution it made to the development of modern architecture.

*Jean Prouvé: constructive imagination or utopia?*<sup>1</sup>: one of the rooms was entirely dedicated to Jean Prouvé, where his works, such as panels, furniture or construction systems, were exposed as if they were works of art.

Modernist architects believed that technical and scientific development would resolve society’s problems. The disillusionment with this possibility had many reasons: both economic and social. For instance, there was no adequate demand for the production of “mass” architecture. Also, once the ideology of democratic equality had been overcome and there was a need for difference, variety and recognisability, values that the models of socialist and egalitarian ideology had decreased.

Prouvé also saw the necessary relationship between architecture and industry:

“*The single-family house must be light and dynamic, which is the expression of mass production, and therefore characteristic of industry.*”<sup>2</sup>

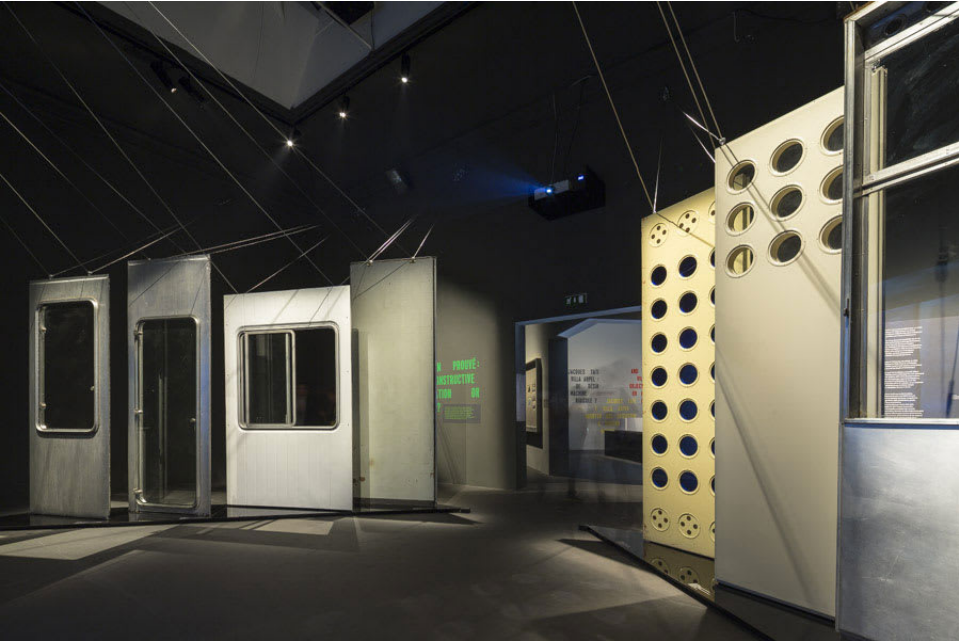
The constructive idea was always immediate and to be verified quickly: a day passed from the idea to the prototype. For this reason, the design studio - according to Prouvé - had to be alongside production.

If this could be valid for industrial products, it did not work for architecture.

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<sup>1</sup> “*Jean Prouvé: constructive imagination or utopia?*” was the title of the room dedicated to J. Prouvé at the Biennale of Venice curated by Jean Louis Cohen in 2014.

<sup>2</sup> In Huber B., Steinegger J.C., (ed.), *Jean Prouvé. Une architecture par l'industrie. Architektur aus der Fabrik*. Industrial Architecture, Les Editions d'Architecture Artemis Zurich, 1971, Basel.



10

*“Jean Prouve: constructive imagination or utopia?”*

picture of the exhibition space

Biennale di Architettura of Venice, 2014

credits: Andrea Avezzù

In his book “*La mort de Jean Prouvé*”<sup>3</sup>, Bernard Murray identifies the closure of the Maxeville atelier in 1952 as the *spiritual death* of the French blacksmith. It was actually a challenging time for him, where he would go through a phase of severe depression due to the shattering of one of his great bets: the industrialisation of architecture, aka the failure of Maxeville.

This period is all the more crucial as Prouvé, although amputated from his factory, he produced some of his most beautiful masterpieces, such as the aluminium centenary pavilion, the Evian refreshment bar or the Alpexpo in Grenoble.<sup>4</sup>

These projects all leave the concept of industrialisation more to one side to give more space to the other elements of Prouvé’s thinking: the focus on ecology and light, prefabricated construction elements, the ambition to always get the most out of the minimum number of elements in a project and the idea of designing a space with the knowledge that in the future it could become something else.

## L’HOMME DE BEAUBOURG

Although he was not fully understood and appreciated by those of his time (because of the reasons we have already examined), Jean Prouvé’s work has been extensively re-evaluated in the recent decade.

He has been the subject of numerous publications and exhibitions and many contemporary architects have often referred to him as a maestro, such as Jean Nouvel, Richard Rogers and Renzo Piano. The last two are deeply connected to the french blacksmith: Prouvé, as commissioner of the jury for the construction of the Beaubourg Centre in Paris, was the one who pushed the most for the realisation of their visionary project.

Prouvé saw in the Beaubourg Centre the natural extension of his ideals. As in Prouvé’s “little machines”, the Centre Pompidou is supposed to produce naked spaces. The only closed spaces (sanitary block and offices) are designed and built as construction site huts, which can be dismantled and easily transported from one end to the other of a plateau. The absence of separations in the original version of the building was intended to favour interdisciplinarity, the movable partitions being moved according to the needs: temporary exhibitions, redrawing of the departments.<sup>5</sup>

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3 Bernard Murray, *La mort de Jean Prouvé*. Paris: Editions Du Linteau, 2005.

4 Bernard Murray, *La mort de Jean Prouvé*. Paris: Editions Du Linteau, 2005.

5 Moulin, François. *Jean Prouvé : Le Maître Du Métal*. Strasbourg: La Nuée Bleue, 2001, pp. 189.



11, 12

The appropriation of the space

Photos of the restoration of the Tour Bois-le-Prêtre,  
Paris, 2013

These kinds of ideals are the same as those found in one of Jean Prouvé's very first works: the Maison du Peuple, with which Centre Beaubourg seems to have many affinities.

Bruno Reichlin writes about it: “*Its light and transformable metallic structure simultaneously hosted a market, a cinema with retractable floorboards, and offices for local grass-root organisations. This was the inception of a type of public facility that would inspire the creators of the Centre George Pompidou thirty years later.*”<sup>6</sup>

## LIGHTNESS AS ECONOMY OF MEANS

Another aspect of Jean Prouvé's lightweight architecture that has undoubtedly stood the test of time is that it consists of the smallest possible number of elements. This practice is called the economy of means.

This aspect of lightness has many facets, for example, a significant reduction in costs, materials and energy used to construct buildings. Indeed, we are now increasingly inclined to take this aspect into account, given the ever-increasing ecological problem.

“*In support of their search for the greatest economy of means, Lacaton and Vassal are looking for what they call lightness: an attempt to respond to the need for protection that one expects from a building with the minimum of things*”<sup>7</sup>

The restoration of the Tour Bois-le-Prêtre is an excellent example of the application of these principles. This project has prevented the demolition of this large residential complex on the edge of central Paris, avoiding additional costs (indeed, it cost almost half the budget) and tenants' displacement. It is the practical application of a research carried out by the two French architects about the reuse and transformation of modernist social housing complexes built between the 1960s and 1970s. It is a strong position against the French government's demolition proposals, which saw them as architectural failures.<sup>8</sup>

The transformation involves replacing the facades with a winter garden and

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6 Bruno Reichlin, “Maison du peuple at Clichy, a masterpiece of ‘synthetic’ functionalism?”, *Daidalos*, no. 18, December 1985, pp. 88-99.

7 Lapierre Eric, *Inquiétant ready-made. A propos d'une maison de Lacaton et Vassal*, matières n° 7, août 2004.

8 See conference given by Anna Lacaton for The Swedish Centre for Architecture and Design and organized by the Stockholm Association of Architects on the 14th of June 2013.

a balcony, which reduces energy consumption and increases the residents' quality of life.

Through a minimal intervention (the construction site lasted only a couple of months and the inhabitants were able to remain in their homes for the entire period), the architects managed to transform the flats completely: increasing their surface area and providing them with extra space (the only real luxury in modern society), with the maximum of modern living comfort. It is interesting to see how this space has no defined character and each inhabitant is encouraged to give it a personal one. The photos, taken a few months after the end of the construction site, present these neutral and repetitive spaces as a hymn to appropriation, where everyone did what they preferred.<sup>9</sup>

As Jean Prouvé did, they designed by imagining that their building might not last forever or might have a change of use or function over time. This leads them to imagine a lightness of space, which in their architecture tends to be as neutral as possible so that it is the person who lives in it who sets the precise tone for the space.

In this way, the search for pragmatic lightness in architecture results in an ontological lightness of spaces: neutral, undefined and flexible.

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<sup>9</sup> Lacaton, Anne, Jean-Philippe Vassal, Fernando Márquez Cecilia, and Richard C. Levene. *Lacaton & Vassal 1993-2015 : horizonte post-mediático = post-media horizon*. Madrid: El Croquis Editorial, 2015.







# CONCLUSIONS

This work investigates the poetics and pragmatism of lightness in architecture. Firstly it presents how lightness established its own myth through history and finally became a major theme in the architecture of the 20th century; the second part, through the analysis of Jean Prouvé's work, addresses lightness as a starting point to make architecture more affordable, accessible and flexible. After having been despised by his contemporaries, Prouvé is now experiencing certain notoriety, proving that he was a pioneer in many fields. The last part takes the opportunity to analyse the limits and the legacies of the quest for lightness carried out during the 20th century.

What is then the role of lightness in today's architecture?

Compared to the 1940s, sustainability is now less of a choice and more of a duty. As architects, we have to ask ourselves questions about it, as others like Buckminster Fuller, Wachssmann and Prouvé himself have done before us.

The projects analysed highlight two significant issues: the first one concerns the social implications of building something light in terms of costs and sustainability; the second regards the relationship between physical lightness, space flexibility and adaptation over time.

As we have seen, several 'heirs of lightness' have managed to forego its more utopian aspects and focus on the great potential of lightweight constructions.

If lighter means cheaper and easier to build, then lighter also means more accessible. This approach also implies an architectural research for the minimum elements needed for the project. In a way, lightweight architectures are then more free, allowing occupants to define their own space, without expecting it to remain unchanged over time. This is how lightness, through its speed of change, becomes flexibility.





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## DRAWINGS:

All the line drawings included in this book were made by the author on the basis of the original drawings. This work was an integral part of the process of understanding the analysed buildings.

For the details of each drawing, please check the caption of it.



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