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"Revolution can be avoided" : Le Corbusier and Taylorism in France, 1914-1929

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"Revolution can be avoided": Le Corbusier and Taylorism in France, 1914-1929

by

Ian Jacob Guenther

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Program of Study Committee:
John Maves, Major Professor
Brett Bowles
John Monroe

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2005

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Graduate College
Iowa State University

This is to certify that the master’s thesis of

Ian Jacob Guenther

has met the thesis requirements of Iowa State University

Signatures have been redacted for privacy
To My Parents
# TABLE OF CONTENTS

- LIST OF ILLUSTRATIONS AND CREDITS: v
- ABSTRACT: viii
- PREFACE: 1
- INTRODUCTION: TAYLORISM IN FRANCE: 6
- CHAPTER ONE: LE CORBUSIER AND THE TECHNOCRATIC IDEOLOGY: 21
- CHAPTER TWO: TOWARDS A TAYLORIZED ARCHITECTURE: 57
- CONCLUSIONS: 92
- BIBLIOGRAPHY: 98
- BIOGRAPHICAL SKETCH: 102
## LIST OF ILLUSTRATIONS AND CREDITS

<table>
<thead>
<tr>
<th>No.</th>
<th>Illustration</th>
<th>Artist/Project</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Le Corbusier and His Parents, 1909.</td>
<td>From Brooks, fig. 142.</td>
<td>21</td>
</tr>
<tr>
<td>3.</td>
<td>Le Corbusier. Watch case engraving, c. 1906.</td>
<td>From Brooks, fig. 56.</td>
<td>22</td>
</tr>
<tr>
<td>4.</td>
<td>Villa Fallet, La Chaux-de-Fonds, 1906.</td>
<td>From Brooks, fig. 63.</td>
<td>24</td>
</tr>
<tr>
<td>5.</td>
<td>Floor plan and cross section, Charterhouse, Ema, Tuscany.</td>
<td>From Brooks, fig. 89.</td>
<td>25</td>
</tr>
<tr>
<td>6.</td>
<td>25 bis rue Franklin Apartments, Paris, 1905.</td>
<td>From Curtis, fig. 70.</td>
<td>26</td>
</tr>
<tr>
<td>7.</td>
<td>AEG Turbine Factory, Berlin, 1909.</td>
<td>From Curtis, fig. 99.</td>
<td>28</td>
</tr>
<tr>
<td>8.</td>
<td>Le Corbusier, “The Useful Voyage”</td>
<td>From Jencks, fig. 35.</td>
<td>29</td>
</tr>
<tr>
<td>9.</td>
<td>Le Corbusier, Sketch of Simonos Petras monastery, Mount Athos.</td>
<td>From Jencks, fig. 38.</td>
<td>29</td>
</tr>
<tr>
<td>11.</td>
<td>Le Corbusier, Sketch of the Parthenon, Athens.</td>
<td>From Brooks, fig. 202.</td>
<td>29</td>
</tr>
<tr>
<td>12.</td>
<td>Perspective, Dom-ino system, 1914.</td>
<td>From Brooks, fig. 309.</td>
<td>33</td>
</tr>
<tr>
<td>13.</td>
<td>Site Plan, Dom-ino Housing Development.</td>
<td>From Le Corbusier, <em>Œuvre Complète</em>, p. 25.</td>
<td>33</td>
</tr>
<tr>
<td>14.</td>
<td>Ozennfant and Jeanneret in a Hot-Air Balloon at the Eiffel Tower.</td>
<td>From Jencks, fig. 73.</td>
<td>38</td>
</tr>
</tbody>
</table>

16. Le Corbusier in 1921.
From Jencks, fig. 1.

17. Advertisement, Alfortville Brick Factory.
From Brooks, fig. 429.

18. Maison Jeanneret-Perret, La Chaux-de-Fonds, c. 1915.
From Brooks, fig. 241.

From Brooks, fig. 427.

20. Scale Model of Maison Citrohan.
From Le Corbusier, *Œuvre Complète*, p. 45.

From Jencks, fig. 111.

22. Axonometric, Le Corbusier’s Villas at Weissenhof, Stuttgart.
From Le Corbusier, *Œuvre Complète*, p. 150.


From Curtis, fig. 335.

25. Cross Section, Villa Savoye, Poissy.
From Curtis, fig. 341.

26. First Floor Plan, Villa Savoye, Poissy.

27. Ground Floor plan, Villa Savoye, Poissy.
From Curtis, fig. 345.

28. Garnier, Passenger Railway Station, Cité Industrielle, 1904.
From Curtis, fig. 78.

29. Sant’Elia, Central Railway Station, La Citta Nuova, 1913.
From Curtis, fig. 113.
30. Perspective View, Contemporary City, 1922.
From Le Corbusier, *Œuvre Complète*, p. 36.

31. Plan, Contemporary City, 1922.
From Jencks, fig. 87.

32. Diagram for a regional-syndicalist system of government, 1933.
From Jencks, fig. 7.


34. Plan Voisin superimposed over a map of Paris.

35. Louis XIV commanding the building of the Invalides.
From Le Corbusier, *The City of To-morrow and Its Planning*, p. 301.

36. Axonometric, Pessac, 1924.
From Le Corbusier, *Œuvre Complète*, p. 78.

37. *Gratte-ciel* prototype, Pessac, 1924.
Photograph by author.

38. Arcade prototype, Pessac, 1924.
Photograph by author.
ABSTRACT

Le Corbusier’s (1887-1965) adoption of Frederick Winslow Taylor’s Scientific Management in 1918 was a pivotal moment in Modern architecture. Taylorism promised social stability through the rationalization of the factory, increased profits and workers’ wages. The adaptation of Tayloristic standardization and modularity formed the aesthetic basis of Le Corbusier’s architecture of the 1920s. Taylorism endowed his architecture and urbanism with a greater social mission, justifying an elitist, technocratic and authoritarian ideology in the socially conservative tradition of the French political Right.

The thesis examines the development of Taylorism in France as a component of dirigisme during and after World War I. The planned economy was a critical tool of the technocratic state and advocated by the authoritarian and traditionalist Action Française. Viewing Le Corbusier in this model, the thesis traces the formation of his political ideology through his early education and career.

The maisons en série projects, new systems of construction employing the Tayloristic principles of standardization and modularity, were critical to the formulation of Le Corbusier’s Purist aesthetic during the 1920s, and are examined in the villas at Weissenhof, Stuttgart (1927) and the Villa Savoye, Poissy (1928). Social organization is examined in the Contemporary City for Three Million (1922) and Plan Voisin (1925). The Workers’ City at Pessac (1924) is studied as a synthesis of the Le Corbusier’s architecture and urbanism.

The principles of Taylorism adopted by Le Corbusier established him as a leader in the Modern movement, fulfilling his aspirations as a messianic figure. Through the rationalization of construction and planning systems, Le Corbusier’s legacy profoundly shaped architecture in the twentieth century.
Society is filled with a violent desire for something which it may obtain or may not. Everything lies in that: everything depends on the effort made and the attention paid to these alarming symptoms.

Architecture or Revolution.

Revolution can be avoided.

Le Corbusier

Towards a New Architecture (1923)

Le Corbusier’s famous conclusion to his polemical attack on nineteenth-century academicism and the superficially ornamented style espoused by the École des Beaux-Arts was a direct response to destabilizing social trends that had been steadily worsening since the beginning of the Industrial Revolution. Believing in the morally regenerative power of architecture and its ability to prevent social revolution, Le Corbusier came to adopt the industrial organization scheme of American engineer Frederick Winslow Taylor. Called Scientific Management, Taylor’s system proposed to eliminate class resentment and rivalry in the workplace, in favor of a new spirit of cooperation between management and labor.

His adoption of Taylorism in 1918 would prove momentous to his still-developing career. The adaptation of key elements of Taylorism such as standardization and modularity would not only serve as the aesthetic basis of much of his architecture, but would also endow it with a greater social mission, justifying an elitist, technocratic and authoritarian ideology that dominated his politics in the interwar period.
This thesis will address Le Corbusier's Tayloristic ideology and aesthetic in three parts. The introduction, "Taylorism in France," will briefly outline the principles of the American engineer Frederick Winslow Taylor's system of industrial organization, Scientific Management. This will be followed by a discussion of the development of the system in Europe from 1900. The introduction will conclude with the governmentally-dictated implementation of the system in French industry in order to meet rising production goals during World War I, as well as to support of the rapid postwar reconstruction of northern France. This significantly influenced the economic philosophy of the Third Republic, as *laissez-faire* business policies were replaced by a technocratic administration that viewed the planned economy as a vital extension of national security.

Chapter One, "Le Corbusier and the Technocratic Ideology" will examine the formation of both Le Corbusier's personal and political ideologies, originating at his birthplace of La Chaux-de-Fonds, Switzerland, where he attended the art school directed by Charles L'Eplattenier. The influence of his apprenticeships at the architectural offices of Auguste Perret and Peter Behrens, two great forerunners of Modernism, will be followed by a discussion of the *Voyage d'Orient*, his grand tour of Eastern Europe that would serve as a substitute for Le Corbusier's lack of formal academic training. Following this will be an examination of Le Corbusier's final move to Paris in 1917, his discovery of Taylor's Scientific Management and critical association with Purist painter Amédée Ozenfant. This friendship would be pivotal in the development of Le Corbusier's architectural persona, and their joint publication of the journal *L'Esprit Nouveau* would bring the unheralded Le Corbusier to the forefront of the Parisian *avant-garde*. The chapter will conclude with a discussion of two schematic systems of construction developed by Le Corbusier in response
to the destruction of World War I. The *maisons en série* prototypes, Taylorized, standardized and modular systems of construction would form the basis of Le Corbusier’s architectural and urban projects during the 1920s.

Chapter Two, “Towards a Taylorized Architecture,” will begin with an analysis of the influence of Taylorism on Le Corbusier’s architecture, in the organizational and aesthetic motifs of two of his 1920s villas, the duplex house at Weissenhof, Stuttgart (1927), and the Villa Savoye, Poissy (1928). Le Corbusier’s two major urban projects of the 1920s will also be studied: his idealized city, the Contemporary City of Three Million (1922), and its specific adaptation to the urban context of central Paris, the Plan Voisin (1925). These urban proposals express Le Corbusier’s desire to create a technocratic utopia free from class-based conflict. This would be achieved through the symbolic segregation of social classes through the decentralization and dispersal of the working classes from the city center to peripheral “garden cities”. Having studied the application of Taylorism to both Le Corbusier’s architecture and his urbanism, the chapter will conclude with the project for the workers’ housing at Pessac. As a synthesis of Le Corbusier’s Taylorized architecture and urbanism, Pessac presents a unique opportunity to see the actual results of his still-controversial theories.

Through this discussion of Le Corbusier and Taylorism, we shall see that while Le Corbusier was nominally interested in the stabilizing component of Taylorism, his true interest in the system was more selfish. As the self-appointed prophet of Modernism, Le Corbusier needed Taylorism to justify his affinity towards geometrically pure forms. By endowing his architecture with a role of social improvement, it superseded his own personal taste. His architecture became a matter of life and death, the only tool that could avert
catastrophic socialist revolution at a time of growing socio-economic instability. This 
preoccupation was shared by the socially-conscious elite who financed the vast majority of 
arhitectural commissions in the early twentieth century.

Politically, Le Corbusier was an authoritarian technocrat. He advocated no political 
party; indeed he courted both the communist and fascist parties later in his career. As an 
intellectual and social visionary, Le Corbusier was more interested in the power and ability 
of a regime or party to impose his vision of modern society, developed from 1922 onward. 
Le Corbusier’s politics reflected the authoritarian, hierarchical and socially traditionalist 
Bonapartists of the nineteenth century, whose legacy in early-twentieth-century France was 
perpetuated by the Catholic Action Française of Charles Maurras.

To avoid confusion, the terms “Scientific Management” and “Taylorist” will be 
employed when referring to the complete system as originally conceived by Taylor as a 
component of laissez-faire capitalism. In later French cases, where aspects Taylor’s system 
were selectively adopted by industry as part of a governmentally-sponsored initiative to 
increase production or in the establishment of a state-directed economy, the terms 
“Taylorism” and “Tayloristic” will be employed.

Charles-Edouard Jeanneret adopted the name Le Corbusier as his architectural 
persona in 1920. He continued to sign his paintings with his birth name until 1928, when he 
dropped the Jeanneret name entirely. For the sake of clarity, “Le Corbusier” will be 
exclusively employed throughout this thesis. The reader should remember that the adoption 
of this name in 1920 represented an important moment in the development of Le Corbusier’s 
ego, transforming him from the shy apprentice architect from rural Switzerland into “Père
Corbu”, the supremely confident prophet of Modernism, destined to reconcile humanity with the age of the machine.
INTRODUCTION:
TAYLORISM IN FRANCE

The Labor Problem and Scientific Management

The nineteenth century was a time of drastic social upheaval, due in part to fundamental changes in the organization of industry. The rise of the middle-class and increased consumer demand for goods presented new opportunities for profits. To meet demand, the traditional master-apprentice structure of the workshop was abandoned in favor of the division of labor envisioned by Adam Smith. Skilled craftsmen, once intimately involved in all stages of production, were now responsible for only a small portion of the manufacturing process.

Technological innovation hastened this trend. As knowledge of power systems, metallurgy and mechanics advanced, factories came to rely more on machines than the skill of the worker. Skilled craftsmen such as shoemakers, glassblowers, blacksmiths and weavers found themselves underemployed as their jobs were simplified and mechanized. This almost imperceptible “deskilling” of workers would ultimately be responsible for decreased wages, which resulted in increased resentment between labor and their capitalist employers.

Once decently paid for their skill, craftsmen now found themselves unable to compete with factories, which could produce goods cheaply and in significantly higher quantities than the small workshop. Advances in transportation and distribution networks exacerbated the problem for the artisan-worker. Unprecedented numbers of laborers and peasants were lured to the cities from the provinces by the promises of higher pay and increased opportunity.

The labor struggle naturally was born in these industrial cities. Unemployment, crime and disease were rife in the poorer districts of the great nineteenth century industrial cities.
These were highly unstable places, due to the large numbers of destitute and unemployed workers, who increasingly came to resent the capitalism of their employers. As the plight of the urban worker worsened, violence directed against the moneyed classes became more common. Often, this violence was fanned by the inflammatory writings and speeches of the social philosophers and political agitators who frequented the political clubs and cafés: sans-culottes, Marxists, anarchists and syndicalists. In Paris alone, the poor had played a critical role in four major revolutions, from the 1789 women's march on Versailles to the bloody Paris Commune of 1871.

However, from the earliest stages of the labor struggle, reform-minded social theorists had sought peaceful solutions to this destabilization. Myriad proposals for the fundamental reorganization of society were now offered as potential cures for social ills. These were conceived through the “scientific” analysis of human needs and were to be rationally organized by assumedly just and benevolent notables whose wisdom would protect the best interests of society and its people. Many of these early utopian socialists, such as Henri de Saint-Simon, Auguste Comte and Charles Fourier proposed new, rationally organized and cooperative societies in which all members could be happy and content.

It was in this turbulent century that the American engineer Frederick Taylor proposed his own system of industrial organization, Scientific Management. This system, while developed primarily to increase factory production, had a social component: to preserve the existing economic system of capitalism by addressing growing concerns over labor unrest. His solution differed from previous social thinkers by viewing the working class and their employers not as competitors, but as partners in prosperity.
In combating the "evils" of underworking and inefficiency that afflicted the working class, Taylor found a certain paternalistic morality in the enforcement of efficient industrial production. He saw the underworking and contempt for employers that "afflicted" the working class as symptomatic of an amoral illness. The cure, he concluded, was to convince labor that cooperation with management was in the best interests of both parties. This could be demonstrated by creating a new organizational system that would obtain maximum productivity in exchange for maximum wages.

Taylor believed that by optimizing efficiency in the factory, industrial output would grow, increasing the revenues of industrialists. Increased profits would augment wages, and greater production would result in larger numbers of consumer goods in the marketplace. The law of supply and demand ensured lower prices, and with their increased wages, the working class would be able to afford more luxuries and conveniences than under the old system. Everyone would benefit. The factory owner would see increased profits and his employees would gain a new sense of vertical mobility as they began to enjoy the material comforts of the middle class.

In order to implement Scientific Management, Taylor outlined four imperatives for factory managers. First, each element of a man's work should be rationally observed and analyzed, and that new "scientific" methods, based on these data, should be implemented. These would include stopwatch-timed studies of individual tasks and the design of more efficient tools and machines, replacing old rule-of-thumb practices and methods. Second, each worker should be objectively selected, trained, and developed for a job for which he was properly suited. Third, a spirit of cooperation and mutual understanding, based on the principle of maximum production for maximum wages should be nurtured between labor and
management. Fourth, work and responsibility should be equally divided between worker and manager, with the latter taking over all work for which they are better suited.¹

Perhaps nowhere else outside the United States was the implementation of Taylorism more influential than in France. Here, variants of Taylor’s system were incorporated into industry despite early worker opposition, and would eventually play an important role in accelerating the production of munitions, armaments and vehicles for the French army in World War I, as well as in supporting the postwar planning and reconstruction of northern France.

**Henri Le Châtelier and Taylorism in Europe**

Europe was first introduced to Scientific Management at the Paris Exposition Universelle of 1900. The exhibition was to serve as the triumphal conclusion to the nineteenth century, celebrating the achievements and inventions of the first one hundred years of the Industrial Revolution, while serving as a springboard toward a new century of progress. For France, the fair was also a matter of national pride. In the wake of political scandal and the Dreyfus Affair, and in the shadow of the stunning economic and political rebirth of her rival Germany, the Parisian fair was meant to rekindle France’s national spirit and reestablish French leadership in art, literature, science and technology. To France’s embarrassment, the fair was not able to turn a profit, and Germany and the United States, not France, emerged as the world leaders in technological innovation and ingenuity.²

One example of American ingenuity was exhibited by the Bethlehem Steel Company of Bethlehem, Pennsylvania. Its exhibit featured a demonstration of a new method for hardening steel, developed by Taylor while employed by Bethlehem as an efficiency
consultant. Taylor’s new method produced more durable steel, appropriate for use in the production of high-speed cutting tools, which were capable of cutting metal twice as fast as normal machine tools.\(^3\) In addition to this demonstration (which won a gold medal), the fair provided Taylor an opportunity to promote his emerging theories of Scientific Management. He emphasized that the development of his process for hardening steel resulted from the rigorous application of rational and scientific study to industrial efficiency of production and management of labor.\(^4\)

Shortly after the Paris exhibition, Henri Le Châtelier (1850-1936), the prominent French chemist, became an ardent supporter of Taylor’s system in Europe. He believed that Scientific Management offered a workable solution to the “grave crisis of industry,” and that “incessant struggles between capital and labor were an impediment to further progress and a threat to the progress already achieved.”\(^5\) Le Châtelier, a strongly Catholic anti-Dreyfusard, and graduate of the École polytechnique, was steeped in the positivistic spirit of that institution, believing it the duty of the educated and privileged classes to provide leadership for laborers. To Le Châtelier, the organization of labor was as old as society itself, and he compared Taylor to King Solomon, who employed 3,300 managers to oversee the construction of his temple in Jerusalem.\(^6\)

Le Châtelier immediately saw the potential Taylor’s high-speed steel held for French industry, and promoted it as early as 1904 in his *Revue de métallurgie*. This article soon came to Taylor’s attention, prompting correspondence between the two engineers. Taylor eventually sent a Le Châtelier a copy of his recent presentation, “Shop Management,” for review. The rational organization of the factory proposed by Taylor excited the French
chemist: “from that day on I felt myself obliged...to constitute myself an apostle of the Taylor system.”

Le Châtelier worked diligently to bring Scientific Management to France, and used his positions as Sorbonne professor and Inspector General of Mines to promote Taylor’s ideas, quickly becoming their most vocal European advocate. Later he would translate and publish Taylor’s *The Principles of Scientific Management* (1912) as *Principes d’Organisation du Travail* and his term, *organisation scientifique*, quickly became the accepted translation of “Scientific Management.” Thanks to Le Châtelier’s support, Taylorism soon interested several large French manufacturing concerns, including the Michelin brothers, and both the Renault and Panhard automakers.

It was at Renault’s Billancourt factory near Paris that Taylorism was first exposed to the French public. Following a 1911 trip to the United States, where he met Taylor and Henry Ford, progressive industrialist Louis Renault began selectively introducing aspects of Scientific Management into his factory operations. In an effort to eliminate the inefficient use of time, Renault determined that workers should no longer take their customary three-minute cigarette break each hour. Multiplied by ten hours and ten thousand workers, Renault calculated approximately five thousand man-hours lost per day due to the breaks, and resolved that workers should only smoke at home or on their way to or from work.

The classically French response of the workers to this seemingly innocuous reform was widespread demonstrations against Taylorism. Disgruntled laborers immediately labeled Renault’s time-study experiments unfair and artificial, claiming that the best materials and the sharpest tools were given to only the most able and experienced machinists. The proposed implementation of new machines also drew the ire of the workers, who claimed
that by denying their skill as craftsmen, mechanization insulted their dignity as human beings. One labor agitator, a large, bearded man, popularly known among workers as Ali Baba, claimed “We are not machines—we are men!...The modernization of the factories can only increase the riches of the rich and the poverty of the poor.”

A second difficulty facing Renault was misinformation about the American system spread by the French press. In one example, tales of overworking under Taylorism in the United States were spread by editorialist Charles Faroux in the magazine *L’Auto*. The article outraged readers and factory workers with erroneous reports of shortened worker life expectancy in American factories due to management by stopwatch.\(^{10}\) The hostility generated at Billancourt toward Taylorism led to a general strike by workers on February 10, 1913.

Renault refused to give in to the workers, bringing in Socialist leader Albert Thomas to address the strikers and convince them that the modernization of industry was necessary to maintain France’s position in the world economy. He equated the health of France’s economy with the well-being of its workers, arguing that if industry suffered, employers would be forced to eliminate jobs. Moreover, he promised that Renault, who was respected by his employees for paying relatively high wages, could be trusted to increase salaries when production increased.\(^{12}\)

Thomas’s argument was well-received. Renault invited the workers back to their jobs, and the strike was all but over in ten days. The incident would later be known as the *grève du chronométrage*, or time-study strike, and it gave the French public its first exposure to Taylorism, setting off a wave of debate over the system in French trade journals. Alphonse Merrheim, a prominent leader of the Syndicalists, declared Taylorism “the most
ferocious, the most barbaric” system of work devised by capitalists, which “eliminated, annihilated and banished personality, intelligence, even the very desires of the workers, from the workshops and factories.” Émile Pouget, the director of the C.G.T.,* dubbed Taylorism the “organization of exhaustion.”

Le Châtelier vehemently defended Taylor’s system against such critics, publishing several articles in the engineering journal, La Technique Moderne throughout 1913. In addition, he wrote to Taylor explaining the causes and results of the strike, as well as the continuing prospects for the implementation of Scientific Management in France in the wake of the strike:

The strike at Renault is over, all the workers have returned without I believe, having obtained anything. Despite the defective conditions and excess rapidity under which your system had been applied, the workers obtained an important salary increase, and they did not want to lose their [bonuses]. Do not concern yourself with that strike, it has not at all inhibited the application of your system in France. On the contrary it has contributed to its general recognition, and sales of your most recent book have rapidly accelerated.

Taylor’s reaction was that French automakers had disregarded his instructions and tried to implement the system piecemeal: “If [Renault] deliberately goes against the experience of men who know what they are talking about, and refuses to follow advice given in a kind but unmistakable way, it seems to me that he deserves to get into trouble.”

Taylor was referring to Renault’s failure to apply the principles of Scientific Management in toto. Taylor felt that in order to succeed, industrialists must apply it as a whole system:

*Confédération Générale du Travail, the socialist trade union.
It is no single element, but rather this whole combination, that constitutes Scientific Management, which may be summarized as:
Science, not rule of thumb.
Harmony, not discord.
Cooperation, not individualism.
Maximum output, in place of restricted output.
The development of each man to his greatest efficiency and prosperity.17

Taylorism’s next major exposure in France came with the outbreak of war in 1914. The looming prospect of war with Germany, with her industrial might and large population, was ominous for France, whose economy in 1914 was relatively stagnant and whose birthrate had been in decline since the early nineteenth century. Additionally, the Franco-Prussian War of 1871 was still vivid in the French collective memory, which included the shame and embarrassment of the Paris Commune as well as the indignity and economic loss of the coal- and iron-rich provinces of Alsace and Lorraine.

If France was to survive the war intact, its people needed to set aside their political differences in the interest of defending the Republic from German imperialism through the uninhibited manufacture of vital war materiel. This could not be achieved if factories were being shut down due to labor disputes. Temporary cooperation and alliance among government, capital and labor was made reality in the union sacrée, or sacred union. It recognized the “crisis of production” France was facing, and would minimize the interruption of wartime production by labor and political agitation.

The union sacrée allowed the government to impose Tayloristic principles on industry without suffering the protests of labor. Attaining maximum production was now the patriotic duty of all factory workers, and Taylorism the chosen method. Additionally, with most able-bodied men at the front, factories were now being filled by women and imported
labor, temporary workers with no strong attachment to the artisan tradition. This further minimized worker opposition to the implementation of the new methods.\textsuperscript{18}

The implementation of Taylorism in critical industries was encouraged by the Third Republic. In 1915, as it became clear that the war would not end quickly, Thomas, who had been so instrumental in resolving the strike at Billancourt, was appointed undersecretary of state for artillery and munitions and was assigned the task of increasing production to meet military quotas in vital industries such as munitions, automobiles, aviation, and metallurgy.

A socialist, Thomas was among the growing number of left-wing parliamentarians who believed that the path to social reform lay not in proletarian revolution, but in increased cooperation between labor and capital, enabled by the government as an impartial arbiter of disputes. Thomas was also a strong believer in \textit{dirigisme}, or the state-directed economy. By centralizing and concentrating capital under governmental aegis, \textit{dirigistes} hoped to overcome the "anarchy" they saw as inherent in \textit{laissez-faire} capitalism. The state would nationalize such vital industries as the railroads and oil production, while encouraging the establishment of consumer cooperatives. By coordinating private initiative and public control, the organized economy would supposedly enable more efficient and harmonious means of production.\textsuperscript{19}

Thomas saw tremendous potential in Taylorism as the basic industrial principle of \textit{dirigisme}. By 1916, he advocated the widespread adoption of Tayloristic principles by industry in order to meet the army's unmet production quotas:

The directors of establishments must organize immediately, by the most skillful and efficient combinations, the [use] of their personnel based on the following principles: the most perfect utilization possible of the efforts of each worker through the use of the Taylor system; job specialization
based on individual aptitudes; and organization of shifts in a manner to prevent equipment standing idle.\textsuperscript{20}

Thomas's significance lay in the variation of Taylorism he proposed for France. While Taylor and Le Chatelier favored \textit{laissez-faire}, leaving the successful implementation of Taylorism entirely up to the dictates of the free market, Thomas saw Taylorism as a tool to be used by the state in the implementation of a centrally-planned economy. This wartime experimentation was the first widespread application of Taylorism to French industry, and was responsible for launching the system into a prominent and more favorable position in the French public eye.\textsuperscript{21} The success attributed to Taylorism in alleviating the wartime production crisis came to the attention of Le Corbusier, who would come to advocate the application of the system's technocratic aspects in the remaking of society through architecture and urban design.

With the election of the Painlevé government in 1917, the undersecretariat for artillery and munitions was absorbed into the newly-created Ministry of Armaments. Although Thomas was initially selected to head the new ministry, he was forced to resign his nomination after parliament voted not to confirm the new cabinet.

His replacement was Louis Loucheur, an administrator who had served as an advisor under Thomas. Unlike Thomas, Loucheur was not a career politician, but an engineer and contractor in reinforced concrete. Like Le Chatelier, he was a fellow \textit{polytechnicien} and a self-made man who had earned a fortune in the construction of large electrification projects in Eastern Europe. He ran his new ministry like the director of a large company, surrounding himself with like-minded industrialists and engineers, and did not hesitate to extend his new authority over industry, directing its efforts toward specific wartime production goals.\textsuperscript{22}
Although Loucheur was a liberal businessman from the *laissez-faire* tradition, he also showed a pragmatism befitting his engineering background. During his ministry he thought of himself not as a politician, but as a problem solver. To him, the problem of increasing wartime production was large and important enough that state direction of industry was necessary. Like the military, Loucheur viewed the economy as another tool of the state to be employed toward defeating the Germans. Both industrialists and workers had a patriotic duty to achieve the necessary production quotas.
Despite the initial success of the union sacrée, the length of the seemingly unending war began to erode these patriotic feelings. Labor agitation was once again on the rise, and Loucheur utilized autocratic methods to ensure the fulfillment of quotas. Despite the decreasing power of labor under the union sacrée, the government claimed to be impartial in these disputes. In practice, the state more often took the side of industry. When aviation factory workers struck in 1917, Loucheur ordered them to return to their jobs or face a military tribunal.

By the time of the armistice, Loucheur had begun to turn his attention toward the postwar necessity of rebuilding the North. Applications of technology towards military goals—precise and coordinated artillery and aerial bombardment, chemical and biological weapons—utterly destroyed large parts of Belgium and northern France, often annihilating entire villages [fig. 1]. In all, the war destroyed 352,000 homes, rendered three million acres of land unsuitable for cultivation, and left overall industrial output at only at sixty percent of prewar levels. Additionally, 620 northern communes had been completely destroyed. The larger cities of Armentières, Soissons and Reims were heavily damaged, with an estimated eighty percent of structures damaged or destroyed. The population of the northern départements dwindled to a mere fifty-six percent of prewar numbers.

Even as the 1919 Treaty of Versailles was being finalized, the race for economic supremacy in postwar Europe had begun. Although the treaty imposed harsh penalties and reparations upon Germany, many French believed that the German economy would eventually recover and once again surpass that of France, whose economy still stagnated under the Third Republic. Economic prosperity again became a matter of French national security and pride, and if France was to maintain its status as an economic power, the North
must be rebuilt. Loucheur, who had effectively directed the wartime efforts of French industry, now took a leading role in the state-directed reconstruction.

The "housing problem" was widely perceived to be the most immediate challenge of postwar reconstruction, and many, including the bureaucrats and politicians of the Third Republic, believed the postwar continuation and expansion of Tayloristic practices to be the ideal solution to rebuilding France and her economy. In the area of housing, as Le Corbusier later noted, Loucheur demanded "a law authorizing the construction of five hundred thousand dwellings to be built well and cheaply."²⁸

Although contrary to the spirit of laissez-faire capitalism, state intervention in the affairs of commerce and industry thus continued after the war. This was often aided by the industrialists themselves, who found the government a powerful ally in their struggle against labor agitation. The cooperative relationship between free enterprise and government regulation would be central to the establishment of a postwar technocratic state that embraced the Saint-Simonian model of a government-directed economy.

The economy was now an extension of the state, a tool to be used in establishing dominance over other nations that required an administration of expert managers and engineers. It was precisely because of the possibilities it held for architects that Le Corbusier came to support Taylorism. The destruction of the war, combined with the authoritarian and technocratic organization required by Taylorism, presented architects with the unique opportunity to be the planners of postwar Europe. The development of Le Corbusier's own personal ideology was instrumental in his adoption of these technocratic and authoritarian politics during the 1920s.
INTRODUCTION:

1 Taylor, Principles, p. 36-37.
2 Mandell, p. 121.
4 Bloemen, p. 112.
5 Rabinbach, p. 245.
6 Bloemen, p. 116.
8 Bloemen, p. 123.
9 Laux, p. 191-192.
10 Rhodes, p. 72-73.
11 Humphreys, p. 109-110.
12 Rhodes, p. 73-74.
13 Rabinbach, p. 241, 244.
14 Rabinbach, p. 244.
15 Rabinbach, p. 245-246. I have changed the translation from premiums to bonuses to more accurately reflect the original French primes.
16 Nelson, p. 179.
17 Taylor, Principles, p. 140.
18 Humphreys, p. 157-158.
19 Hardach, p. 78-79.
21 Humphreys, p. 48-49.
23 Kuisel, p. 52.
24 Kuisel, p. 49.
26 Bury, p. 23-25.
27 Clout, p. 53.
28 Le Corbusier, Towards a New Architecture, p. 229.
CHAPTER ONE:
LE CORBUSIER AND THE TECHNOCRATIC IDEOLOGY

The Formation of an Ideology

Le Corbusier was born Charles-Edouard Jeanneret on October 6, 1887, in the small manufacturing town of La Chaux-de-Fonds, in the Jura region of northwestern Switzerland. From an early age Le Corbusier was aware of the effects of the transition to a modern factory system. His father, Georges Jeanneret-Perret, was a watch case engraver, a skilled craftsman whose livelihood was threatened by the increasing mechanization and standardization of industry. The depression of 1893 was the source of much economic hardship for the family, which would never fully recover.

La Chaux was likewise affected by the trend toward mass production. In volume one of *Capital* (1867), Karl Marx mentions La Chaux, calling the town a “huge watch manufactory,” in his discussion of the division of labor. Like Georges Jeanneret-Perret, many of the townspeople worked in their homes, specializing in the handcrafting of watch components, which were later hand-assembled into finished products. A Calvinist view of labor was characteristic of the workers of La Chaux, who took pride in the “nobility and sobriety” of the meticulous and careful production of handcrafted pieces.

Fig. 2. Le Corbusier and his parents, 1907.
Handcrafts, while of high quality, could not compete in price or volume with goods mass produced in factories. La Chaux's declining economic situation, the somber but proud disposition of its increasingly antiquated craftsman inhabitants, and its pragmatic layout on a grid of streets (adopted in 1835 after a devastating fire) became the town's best-known characteristics. In Switzerland, La Chaux was more familiarly known as "la Ville triste" - "the sad city".²

Le Corbusier would not forget the effects that industry's shift away from the small craftsman had on his family and his hometown. For Le Corbusier this transition and its effect on his father's career were symptomatic of the inevitable advance of industry, as older modes of production, such as handcraft, were replaced with the more efficient and cost-effective system of mechanized mass production. He would later say of mass production's displacement of traditional handcraft: "Industry, overwhelming us like a flood, rolls on to its predestined ends."³

Drawn to the visual arts, Le Corbusier enrolled at the age of twelve in the La Chaux art school directed by Charles L'Eplattenier (1874-1946). L'Eplattenier was intent on developing a regional style within the Art Nouveau movement, "based on the flora and fauna of the Jura."⁴ An early watch case engraved by Le Corbusier at the school [fig. 3], gives some indication of his interpretation of

Fig. 3. Watch case designed and executed by Le Corbusier, 1906. Materials: diamonds, gold, silver, copper and steel.
Jura regionalism: an expressively-rendered, three-dimensional bee motif emerges from a series of flat and rigidly geometric tiles staggered over the watch case surface.

L'Eplattenier's major influence on the career of Le Corbusier was in his introduction of his student to the morality of art. L'Eplattenier instructed his students that art should be considered a tool which could be used for the regeneration of society, introducing Le Corbusier to several books, including Ruskin and Henri Provensal's *L'Art de demain* (1904), which advocated a reconciliation of the material and the spiritual in art and architecture, an idea complementary to Le Corbusier's Calvinist heritage. As we shall see later, Le Corbusier would eventually abandon the Jura regionalist aesthetic, although L'Eplattenier's moral instruction seems to have stuck with him, for throughout his career architecture took on a role of social improvement.

While enrolled in the postgraduate "Cours Supérieur d'Art et Décoration" (Advanced Studies in Art and Decoration) at L'Eplattenier's school, Le Corbusier's impulse was toward painting, contrary to the advice of his mentor, who believed he should be an architect. He was finally convinced to pursue architecture after reading Charles Blanc's *Grammaire des arts du dessin* (1881), which argued that the architecture of the future would be based on new construction methods and respect for the past. Blanc stressed that this veneration for the past should be expressed not through simple imitation, but by taking the spirit of exceptional ideas that had come before. This veneration for the past would continue to be seen throughout Le Corbusier's career, especially in his conception of architecture not as surface-applied decoration, in the academic Beaux-Arts tradition, but as the "pure" geometric forms of ancient Greece:
Architecture is the masterly, correct and magnificent play of masses brought together in light. Our eyes are made to see forms in light; light and shade reveal these forms; cubes, cones, spheres, cylinders or pyramids are the great primary forms which light reveals to advantage; the image of these is distinct and tangible within us and without ambiguity.7

Le Corbusier completed his first commission, Villa Fallet (1906) [fig. 4], at the age of nineteen. Here one can see L’Eplattenier’s regionalist influence on Le Corbusier’s earliest architecture. Derived from the vernacular form of the Swiss chalet, representations of natural forms are applied for decorative effect. Abstractions of native evergreen trees are scattered throughout the villa, from the iron rails of the terrace, to the mullions of the windows. This abstracted vernacular was typical of Le Corbusier’s earliest house designs in La Chaux.

Le Corbusier left La Chaux to travel through Italy and Austria in 1907, visiting the Carthusian monastery at Ema, Tuscany, where he was impressed with the austerity of the monks’ cells, seeing them as the ideal housing type for self-reflection and moral fulfillment: “I would like to live all my life in what [the monks] call their cells. It is the perfect solution to the working man’s house, a unique type or rather an earthly paradise.”8 The monastery, where individual monks

Fig. 4. Villa Fallet, La Chaux-de-Fonds, 1906. View from south.
sacrifice their identities in favor of harmonious coexistence and the search for moral truth under a strictly hierarchical organization, gives us the first indications of Le Corbusier’s affinity for the technocratic society.

Eventually reaching Vienna, he was offered employment by Austrian Secessionist architect Josef Hoffman (1870-1956), but decided instead to leave for Paris, where he found part-time employment in the office of Auguste Perret (1874-1954). Perret, an early proponent of reinforced concrete, introduced Le Corbusier to both its structural applications, as pioneered by the engineer François Hennebique (1803-1877), as well as the expressive possibilities of the material. Perret’s fusion of science and poetry is best typified by his 25 bis rue Franklin Apartments (1905) [fig. 6]. Le Corbusier was impressed with the structurally expressive architecture of his mentor:

Fig. 5. Floor plan and cross section, Charterhouse of Ema, drawn on September 1907. The plan and section foreshadow the Le Corbusier’s layout of Maison Citrohan in 1920.
with it a new attitude to architecture. In the history of modern architecture Auguste Perret holds a very precise position, and a very high rank. He is a ‘builder.’ Whenever I talked about him in Germany in 1910 and declared that he alone at the time was moving in a new architectural direction, I was laughed at, disbelieved, and overruled: he was totally ignored. His house in rue Franklin was denounced as Jugendstil [Art Nouveau] because he covered it with faïence [decorative panels]. But that house was a manifesto...9

Perret stressed the importance of a technical education and Le Corbusier was tutored in advanced mathematics and structures by an engineer working in Perret’s office. It was also Perret who introduced him to the work of Eugène Viollet-le-Duc (1814-1879), whose structural rationalism foreshadowed Modern functionalism.10 Le Corbusier read his multivolume Dictionary of French Architecture (1854-1868), which demonstrated that the flying buttresses of Gothic cathedrals were not merely ornamental, but necessary and integral components of an overall structural logic, the result of centuries of construction experience.

In Viollet-le-Duc the first indications of Le Corbusier’s love of the machine aesthetic are perceptible. The nineteenth-century theorist expanded the domain of architecture for the first time to include

Fig. 6. 25 bis rue Franklin Apartments, Paris, 1905.
warehouses and ships, corresponding with Le Corbusier’s later adoration of the “engineer’s aesthetic.”

This aesthetic could also be found in the reinforced concrete structural frame favored by Perret. His influence was profound. The younger Le Corbusier would almost exclusively favor reinforced concrete until his death in 1965. This marked a radical departure from the regional traditionalism of L’Eplattenier. Le Corbusier explained his change in taste to his old master:

These eight months in Paris cry out to me: Logic, truth, away with the dream of the arts of the past. Eyes front, forward! Word for word, with all the meanings of words, Paris tells me: ‘Burn what you have loved, and love what you once burned.’

The move to Paris was also very important to the formulation of Le Corbusier’s personal ideology. His departure from the comfortable surroundings of his birthplace required self-discipline. Paris could either strengthen him, allowing him to thrive, or the unforgiving city could grind him down and consume him:

Time spent in Paris is time well spent, to reap a harvest of strength. Paris is the immense city of ideas—where you are lost unless you remain severe with yourself. Life is austere and active there. Paris is the crack of the whip at every moment, death for dreamers.

Having already read and been influenced by such works as Ernest Renan’s *Life of Jesus* (1863) and Nietzsche’s *Thus Spake Zarathustra* (1883-1885), Le Corbusier began to cultivate his own “will to power” around becoming a “prophet” for mankind, one who would lead humanity towards reconciliation with the emerging age of the machine.

Another important mentor to Le Corbusier was Peter Behrens (1868-1940), chief architect and engineer of the Allgemeine Elektrizitäts-Gesellschaft (AEG), the internationally
prominent electrical manufacturer, based in Berlin. After a trip to Germany in 1910, Le Corbusier took a job under Behrens. His employment at the AEG was brief, lasting only five months, but his stint there further encouraged a love of the machine and its aesthetic.13

Behrens’s influence on the early Modernists should not be underestimated, as three of its yet unknown masters (Le Corbusier, Walter Gropius and Ludwig Mies van der Rohe) were all employed there at one time or another. His influence on the young Swiss architect was significant, as Le Corbusier wrote in a letter to L’Eplattenier:

I arrived at Behrens’s knowing almost nothing about what was a style, and totally ignorant of the art of profiles and their harmonious relation. I assure you it isn’t easy. And yet it is these relationships that give rise to harmonious form... Behrens rigidly insists upon rhythm and subtle proportions and so many other things that were entirely unknown to me.14

Behrens’s work stemmed from design problems that arose in the AEG, and was not limited to architectural projects. From the design of factories [fig. 7], equipment, even the company letterhead, he was responsible for the AEG’s entire corporate image.15 Given the international prominence of the electrical giant, Behrens’s designs were largely responsible for the worldwide public image of German industry in the years preceding the First World War.

In 1911, Le Corbusier’s early training and education reached its apogee on his *Voyage d’Orient*, or Journey to the East. Leaving Behrens’s office with fellow draftsman Auguste Klipstein, the journey took them through central Europe and the Balkans.

Fig. 7. AEG Turbine Factory, Berlin, 1909.
Le Corbusier, already something of a favorite son in La Chaux, kept a diary, sending notes and sketches of his visits to the local newspaper back home. He was enthralled with simple peasant dwellings, and in Constantinople (Istanbul) the common Byzantine house mesmerized him as much as the great mosques of the city during his seven-week sojourn.

Fig. 8 (above left). Le Corbusier, "The Useful Voyage," a map of his 1911 Voyage d'Orient.

Fig. 9 (above). Le Corbusier, sketch of Simonos Petras monastery, Mount Athos.

Fig. 10 (middle left). Le Corbusier, sketch of the Acropolis, Athens.

Fig. 11 (lower left). Le Corbusier, sketch of the Parthenon, Athens.
The highlight of the *Voyage d'Orient* was undoubtedly Greece. On the journey here from Constantinople, Le Corbusier fell ill with a serious case of diarrhea. Arriving at the monastery on Mount Athos, he was nursed back to health by the monks. The eighteen days spent recovering there was a revelation for Le Corbusier, who was again impressed with the meditative possibilities of the monastery housing type, recalling a spirituality and simplicity that had been lost to the modern world. Le Corbusier resolved to create architecture similarly worthy of man:

To provide the Mother of God with a house of stone sheltered from old misdeeds and to arrange the volumes of that sanctuary in such a way that a spirit emanates from it, inspiring through its mysterious relationships of form and color the respect of everyone, silence upon the lips, and fostering nothing but the rise of prayers and the singing of canticles in the rhythm of the controlled light—what a divine calling for the ancient builders! The purity of their purpose, of their efforts is lost. The discipline from now on is unknown to us, the bunglers of today. God! How painful was the ecstasy that seized us in those temples of the East! How withdrawn I felt, overcome by shame. Yet the hours spent in those silent sanctuaries inspired in me a youthful courage and the true desire to become an honorable builder....

Upon recovery, Le Corbusier's next stop was Athens and the Parthenon, which would surpass his already high expectations. Being well-acquainted with *The Life of Jesus*, Le Corbusier had probably also read Renan's "Prayer on the Acropolis," in which the author lauds the Parthenon as the most perfect and eternally beautiful expression of reason:

I had hitherto thought that perfection was not to be found in this world; one thing alone seemed to come anywhere near to perfection. For some time past I had ceased to believe in miracles strictly speaking, though the singular destiny of the Jewish people, leading up to Jesus and Christianity, appeared to me to stand alone. And now suddenly there arose by the side of the Jewish miracle the Greek miracle, a thing which has only existed once, which had never been seen before, which will
never be seen again, but the effect of which will last for ever, an eternal type of beauty, without a single blemish, local or national.\(^\text{17}\)

On the approach to Athens, Le Corbusier remarked on the noble and brutal power of the distantly visible ruin, calling it "a terrible machine [that] grinds and dominates; seen from as far as a four-hour walk and one hour by boat, alone it is a sovereign cube facing the sea."\(^\text{18}\) His senses enhanced by the resin wine he had been drinking to ward off his illness, Le Corbusier waited until sunset to climb the Acropolis, when the sun bathed the ruins in a dramatic reddish-gold light.

Like Renan, Le Corbusier found these ruins to be the perfection of construction, the embodiment of architectural rationalism, built entirely of standardized parts, each one the result of five hundred years of geometric selection. Le Corbusier spent nearly two weeks visiting, measuring and sketching them. To him, they combined the sublime interaction of geometric forms with mathematically perfect proportion and dimension—a harmony based on a natural response to universal laws. Le Corbusier was awestruck, utterly intimidated by the classical structure:

Painstaking hours spent in the revealing light of the Acropolis. Perilous hours, provoking heartrending doubt in the strength of our strength, in the art of our art.... Those who, while practicing the art of architecture, find themselves at a moment in their career somewhat empty-headed, their confidence depleted by doubt before that task of giving a living form to inert matter, will understand the melancholy of my soliloquies amid ruins—and my chilling dialogues with silent stones. Very often, I left the Acropolis burdened by a heavy premonition, not daring to imagine that one day I would have to create.\(^\text{19}\)

Le Corbusier would labor to capture its spiritual essence throughout his career, to create an architecture that combined the spirituality and poetry of the Parthenon with a
functionalism appropriate to the machine age. Upon his return to Switzerland, ruins of a different sort would capture his imagination. The destruction of Belgium and northern France in World War I, and the widely-anticipated need for reconstruction, presented Le Corbusier with the opportunity to create a technical prototype for his new architecture.

**Dom-ino System**

The destruction of World War I was apocalyptic. Entire villages had been erased from the face of the earth by new deadlier weapons. Once it became clear that the fighting would not end quickly, and both sides dug in for a long and devastating war of attrition, many politicians and architects began making plans for eventual postwar reconstruction. Le Corbusier was no exception. From the earliest days of the war, he saw opportunity and devised architectural strategies for rebuilding the towns and cities of the North. The key, he believed, lay in the development of an entirely new system of construction, utilizing new materials that could achieve this goal quickly and inexpensively.

Le Corbusier recognized that war would be the springboard from which the new architecture of the machine age could be launched. Comparing the war to the ultimate "client", Le Corbusier called for an engineered and rational society in which old, outmoded systems would be replaced by stronger, more efficient ones:

The War was an insatiable 'client'; never satisfied, always demanding better. The orders were to succeed at all costs and death followed a mistake remorselessly. We may then affirm that the airplane mobilized invention, intelligence and daring: *imagination* and *cold reason*. It is the same spirit that built the Parthenon. 

20
In this we see the technocratic struggle that Le Corbusier thought necessary to achieve a working social order. He argued that man was not able to achieve flight by creating devices that simply mimicked the wings of birds. This was an empirical and unscientific approach that could not succeed. Rather, flight was a scientific problem that could only be solved by creating machines à voler, or "machines for flying", the end result of rigorous experimentation based on scientific principles.

From the outset of war in 1914, Le Corbusier began development of the Dom-ino construction system [fig. 12, 13], named as a compound of the Latin "domus" ("house") and "innovation". This name held a double meaning, in the system's diagrammatic resemblance of its plan to the domino number six. Continuing the analogy, individual modules could be placed end to end to form an infinitely extendable and variable arrangement of individual modules. This enabled variety of form and the modularity of the system allowed for rapid and economic construction of buildings.21

Fig. 12 (above). Perspective, Dom-ino system, 1914.

Fig. 13 (right). Site plan of a Dom-ino housing development.
The individual modules themselves are constructed of four standardized reinforced concrete elements—footing, slab, column and stairs. The two floor slabs and the roof are supported by slender columns, set back from the building edges, carrying structural forces down to concrete footings and the ground below. Circulation between levels is facilitated by concrete stairs that double back upon themselves, passing through openings cut into the slabs. The separation of the structure from the exterior building envelope offered the architect considerable freedom in design, allowing for large expanses of windows and flexibility in the placement of interior walls.

Indeed, Le Corbusier would long believe that standardization was the solution to the housing problem. As he stated later in *Towards a New Architecture* (1923): “Dwellings...will be enormous and square-built and no longer a dismal congeries; they will incorporate the principle of mass-production and of large-scale industrialization.” Although Le Corbusier would not discover Taylor’s system for three more years, the techniques of standardization and mass production he applied in Dom-ino foreshadow his adaptation of Tayloristic efficiency to architecture and society.

**Le Corbusier, Taylorism and Purism**

1917 was a pivotal year in the formation of Le Corbusier’s political and personal ideologies. His discovery of Taylorism reinforced and expanded the architectural program of standardization and modularity he had developed in Dom-ino. In addition, Le Corbusier met a disillusioned Cubist painter named Amédée Ozenfant. The friendship would not only lead Le Corbusier to the adoption of an aesthetic of “pure” geometric forms, but would also
profoundly influence the formation of Le Corbusier’s architectural identity and messianic personality.

When Le Corbusier first encountered Taylorism during research at the Bibliothèque Nationale, he called it “the horrible and inevitable life of the future.” In spite of this initial apprehension, his opinion seems to have changed rather quickly, and by 1918 he was a solid supporter of Taylorism and would continue to refer to himself as a “Taylorist” through the 1920s:

> Current evolutionary trends in work lead through utility to synthesis and order. This has been called ‘Taylorism’, and in a pejorative sense. In fact, it is only a matter of the intelligent exploitation of scientific discoveries. Instinct, trial-and-error, empiricism are replaced by scientific principles of analysis, by organization and classification.

His reversal of opinion concerning Taylorism is somewhat surprising and warrants further examination. Events of the period would have underscored for Le Corbusier the importance of maintaining the existing social order. Throughout Europe, subordinates were revolting against their superiors. To a budding technocrat, the disastrous consequences of these events would have confirmed for him the folly of revolution. An ordered social hierarchy was, Le Corbusier believed, necessary to keep the machinery of society running smoothly and to prevent anarchy.

Such a breakdown would have been disastrous for a technocratic architect like Le Corbusier. The upending of society along Marxist lines would reverse traditional roles, with labor controlling production processes instead of the socially elite. To Le Corbusier, a Maurrasian social traditionalist, this would be tantamount to putting the lunatics in charge of
the asylum. Two events of 1917 would have particularly stood out to Le Corbusier as examples of this madness: the mutinies of French soldiers and the Russian revolutions.

In World War I, the frontal assault tactic favored by the French army sent its soldiers, affectionately known as *poilus*, out of their trenches into No Man's Land, where German artillery and machine gun fire resulted in heavy casualties and shattered morale on the front lines. When the order came to go "over the top", the *poilus*, discouraged by ten months of bloody fighting and increasingly pointless and deadly attacks on the German lines at Verdun, could be heard saying, "Baa... Baa... I am the sheep on his way to the slaughterhouse."²⁵

Their fears were not unfounded – at the Battle of Verdun there were an estimated seven hundred thousand casualties. French regiments began mutinying against their officers, refusing to take part in any frontal attacks they deemed suicidal. With an army near rebellion, and the ever-present threat of Germans on French soil, it seemed that defeat was near. The Republic was on the brink of collapse, and widespread rebellion was only avoided by promises of the high command to abandon such costly offensives, in favor of a defensive war of attrition.

In 1917, Russia saw two governments toppled in the space of eight months. The February revolution deposed Nicholas II in favor of a democratically-elected legislature and executive, only to be overturned once more by the Bolsheviks in October. Both revolutions were initially almost bloodless. The relative ease with which the revolutionaries overthrew first the Tsar then the Republic, resulting food shortages, and the chaotic and often violent seizure of private property in the name of the proletariat would have been as shocking to the bourgeois architect from Switzerland as it was to many of his contemporaries.
Le Corbusier was impressed with Taylor’s assertion that the rational reorganization of modes of production could lead to increased social harmony. Humanity, he argued, was suffering under the new realities of the age of the machine, typified by speed and mass production. Man’s suffering was due to outmoded systems of housing, which did not adequately provide for life in the machine age. If catastrophic revolution was to be avoided, architects must conceive and provide new types of dwelling which would reconcile humanity with these new conditions of life:

The machinery of Society, profoundly out of gear, oscillates between an amelioration, of historical importance, and a catastrophe.
The primordial instinct of every human being is to assure himself of a shelter.
The various classes of workers in society to-day no longer have dwellings adapted to their needs; neither the artisan nor the intellectual.
It is a question of building which is at the root of the social unrest of to-day; architecture or revolution.26

No discussion of Le Corbusier’s early career would be complete without addressing his relationship with the painter Amedée Ozenfant (1886-1966). In May 1917, seeking publication of his book France ou Allemagne, in which he argued for the revival of native French art, Le Corbusier attended a luncheon of the group Art et Liberté, an association of avant-garde artists founded to discuss and defend their new art against “false traditionalists who argued their work was anti-French.”27 At this meeting, Le Corbusier was introduced to Ozenfant. The two artists soon formed a close friendship and collaborated in the creation of a new artistic movement for postwar France.

Le Corbusier and Ozenfant would together found the artistic movement of Purism. In the wake of World War I, they proposed to glorify an ordered and rational technological
society, and were opposed to the nihilism and disillusionment of Dada, which had recently relocated from Zurich to Paris. The Dadaists took a pessimistic view of the horrors of war as the direct consequence of such long-held European values as militarism, nationalism, and reason. Dada ridiculed social norms with an absurd art that reveled in upsetting these values. Purism was also founded in reaction to the war, but differed considerably from the "art of the absurd." While the Dadaists were lampooning nationalism and reason, Ozenfant and Le Corbusier responded by founding a movement bent on celebrating and promoting those same values.

Like Le Corbusier, Ozenfant showed an affinity for Maurrasian values. Hailing from Saint Quentin in Brittany, his family was devoutly Catholic. For his education, they sent Amédée to a Dominican academy near Bordeaux, which was disbanded in 1902 under governmental pressure to secularize all French schools. The Ozenfants were not dissuaded, and Amédée finished his education at another Dominican academy in Spain.²⁸

Denied enlistment in the army because of the pleurisy he had suffered since childhood, Ozenfant spent the war as editor of the strongly nationalistic art journal L'Élan. This journal provided a link between the French artists serving at the front and those who
remained in Paris, by advocating a nationalistic aesthetic. As the first issue stated: “[L’Elan] will struggle against the Enemy everywhere he is encountered... L’Elan’s only goal being the propaganda of French art, of French independence, in sum, of the true French spirit.”

In spite of the destruction wrought by the war, Le Corbusier and Ozenfant saw it not as industrialized murder, but as a painful and necessary scouring of the old from the landscape. This “great Competition” would enable the construction of a new, ideal society, based on the efficiency of the machine, and a new spirit of reason would be shared by each individual. Four days after the armistice of November 1918, Ozenfant and Le Corbusier jointly published their manifesto of Purism, Après le Cubisme.

The War over, everything organizes, everything is clarified and purified; factories rise, already nothing remains as it was before the War: the great Competition has tested everything and everyone, it has gotten rid of aging methods and imposed in their place others that the struggle has proven their betters...Never since the age of Pericles has thought been so lucid.

This opportunistic reaction to the horror of war recalls the Futurists’ earlier hubris and glorification of the “cleansing” and “moral” aspects of war: “We will glorify war – the world’s only hygiene – militarism, patriotism, the destructive gestures of the freedom-bringers, beautiful ideas worth dying for...”

To Le Corbusier and Ozenfant, the then-dominant Cubist movement was unclear, imprecise, irrational, representational and “romantic,” inappropriate to the new realities of life in the aftermath of the most horrific war humanity had yet experienced. Le Corbusier would later remember in 1948: “Realizing how much our world was convulsed by the birth pains of the machine age, it seemed to me that to achieve harmony ought to be the only goal.”
Le Corbusier and Ozenfant saw art as a science, and just as the rationality of science best expressed the spirit of the machine age, so too was Purism to be a clearly rational expression of rigor and precision:

The modern spirit is not borne out by the art of today...

Current evolutionary trends in work lead through utility to synthesis and order. This has been called 'Taylorism,' and in a pejorative sense. In fact, it is only a matter of the intelligent exploitation of scientific discoveries. Instinct, trial-and-error, empiricism are replaced by scientific principles of analysis, by organization and classification....

Science advances only by dint of rigor. Today’s spirit is a tendency toward rigor, toward precision, toward the best utilization of forces and materials, with the least waste, in a sum toward purity. This is also the definition of art....

Cubism, regardless of what is said about it, remains a decorative art, a romantic ornamentation.

There is an artistic hierarchy: decorative art at the bottom, the human figure at the top.

The value of painting derives from the intrinsic qualities of plastic elements and not from their representational or narrative potential.

PURISM expresses not variations, but what is invariable. The work should not be accidental, exceptional, impressionistic, inorganic, contestatory, picturesque but on the contrary general, static, expressive of what is constant.

With Ozenfant and the poet Paul Dermée, Le Corbusier founded the journal *L'Esprit Nouveau: Revue internationale d'esthétique* in 1920. Dedicating the magazine to the advancement and discussion of the Purist movement, Le Corbusier and Ozenfant published articles on a wide...
range of subjects, from technology to the arts. In the first issue, Le Corbusier and Ozenfant co-wrote an article entitled, “Three Reminders to Architects.” This series of articles would later be published in *Towards a New Architecture*, and featured illustrations depicting the achievements of American engineers: grain silos, bridges and factories [figure 15]:

> Here are American silos and factories, magnificent BEGINNINGS of a new age, AMERICAN ENGINEERS DESTROYING A DYING ARCHITECTURE WITH THEIR CALCULATIONS.

— LE CORBUSIER-SAUGNIER

Just as Vladimir Ilich Ulyanov’s adoption of the name Lenin became a rallying point for the Bolsheviks in Russia, Ozenfant believed that his and Le Corbusier’s adoption of new names would similarly affect the Parisian avant-garde, as well as insulate the two unknown painters against any potentially embarrassing and/or hostile criticisms of their often controversial writing. Hence, in 1920, with the first issue of *L’Esprit Nouveau*, Ozenfant became Saugnier while Jeanneret became Le Corbusier, the moniker he would carry the rest of his life. Ozenfant later recalled the conversation:

> I wished to keep my real name Ozenfant for articles on painting and aesthetics in general. ‘For architecture I will take the name of my mother: Saugnier. Take that of your mother… Impossible, she is a Perret! Like Auguste!

> ‘Well then, take that of a cousin…’

> ‘We have the Lecorbésier (or Lecorbézier), who are happily all dead…’

> ‘Good, you will revive the name, you will be Le Corbusier in two parts, which will make it richer!’

The renaming of Le Corbusier is important in understanding how he viewed himself and his role within society. As historian Charles Jencks astutely observes, the adoption of a
new name crystallized his transformation into the persona he would play until his death in 1965. By simply separating the article “Le”, the name was suddenly imbued with an air of nobility and singularity:

...As if Le Corbusier were himself some object type or ‘homme-type,’ perfected by thousands of years of economic history. Indeed the persona allowed Jeanneret to write about himself in the third person as ‘he’ or ‘our man did this’ as if he were some universal witness suffering the course of twentieth-century history for all men. The pseudonym was at the same time a protective mask and a means of self-dramatization.36

This renaming was an important step in Le Corbusier’s Nietzschean self-realization as the messianic prophet of modernity. He was no longer Charles-Edouard Jeanneret, the insecure, quiet, and socially awkward young architect from an isolated and economically depressed corner of Switzerland. He was now and would forever be known as Le Corbusier. Taking cues both from Nietzsche’s Ubermensch and Renan’s Jesus, “Père Corbu” (as his students, employees and admirers would later reverently and affectionately call him) presented himself as both the Superman and the Everyman; a stern yet playful and charismatic prophet, messiah and father figure.

Fig. 16. Le Corbusier, prophet of Modernism, 1921.
who would lead humanity into a new era of happiness, prosperity, and reason.

Le Corbusier’s Justification of Authoritarian and Technocratic Capitalism

Le Corbusier made several business endeavors during the later years of World War I, mainly in the manufacture of building materials. These enterprises were not undertaken for the sake of capitalism itself, but as a means to an end. By succeeding in business, he hoped to amass enough money to ensure a comfortable living, allowing him to fully devote his time and energy to painting. Of his appointment to managing director (administrateur délégué) of the Société d’enterprises industrielles et d’études (SEIE) on January 7, 1919, Le Corbusier wrote to his parents: “My position as administrateur délégué completely transforms my career. I soon hope to have all [the money] that is necessary to totally liberate me from the material worries of life.” We see here that it cannot be said conclusively that Le Corbusier was interested in capitalism for its own sake. More likely, he was an apolitical opportunist and saw capitalism as the most convenient existing means by which he could quickly become independently wealthy, allowing him to devote himself fully to his first love, painting.

SEIE had been founded in Paris by Le Corbusier’s childhood friend Max du Bois to organize and coordinate all of his and partner Edgar Bornand’s business ventures in the electrical power industry under one organizational umbrella. Under this arrangement, Du Bois’ own company concerned itself with developing an electrical production and distribution network, while Bornand’s firm specialized in the design of electrical equipment and facilities.

Integral to SEIE was the Société d’applications du béton armé (SABA), a building contractor specializing in the construction of reinforced concrete structures, such as dams,
bridges and factories. In addition, SEIE oversaw the operation of a brick factory at Alfortville, immediately southwest of Paris. Le Corbusier’s nascent architectural practice, too, was given a place underneath the SEIE umbrella, and many of SABA’s design projects found their way into his office.  

Le Corbusier was not content to be merely a consultant to the work of SEIE, and invested heavily into the Alfortville brickworks, eventually becoming the subsidiary’s managing director. Alfortville manufactured a new type of concrete block, created by combining the recycled waste cinders lining the furnaces of SEIE’s industrial plants with Portland cement. Alfortville then sold the finished bricks to SABA, which in turn incorporated them into their various construction projects.

Le Corbusier’s belief in the profit potential of new building materials and methods is confirmed by his management (from August 1918) and considerable investment into the Société d’applications de l’Everite, which manufactured a new building product, Eternite. Comprised of asbestos fibers and Portland cement, Eternite could be either rolled into thin sheets or molded into various forms. Le Corbusier was already quite familiar with the material, having specified its installation as the sheet material used on the roof of the Maison Jeanneret-Perret, built for his parents at La Chaux in 1912 [fig. 18]. In spite of Le Corbusier’s optimistic appraisal of these new building materials, both Everite and the Alfortville brickworks failed, and were liquidated in 1920 and 1921 respectively, leaving him with large debts.
The business ventures most important to his later architectural works were the army-sponsored competitions for the designs of the *abattoirs* (slaughterhouses) at Challuy and Garchizy. Le Corbusier found Taylorism well suited to the efficient operation of a slaughterhouse. In a letter to his parents dated November 22, 1917, he wrote:

> The solution is the opposite of European methods, and it is surprisingly simple and logical. Truly we [Europeans] have our eyes in the back of our heads.... My life is a paradox; exhausting. By day I am an American (as this designation seems timely) [and] read Taylor and practice Taylorism.9

Le Corbusier visibly implemented Tayloristic concepts into the design of the *abattoirs*, both through their structural basis in the Dom-ino system, and through the rational and streamlined arrangement of separate production functions into a logical and lineal progression. The realization of Dom-ino, with its free plan, allowed Le Corbusier total design freedom in the logical and streamlined arrangement of production processes, while the free façade allowed uninterrupted horizontal windows to illuminate the interior of the slaughterhouse evenly with natural light.

The *abattoir* at Challuy features three separate buildings, each of which housed a distinct activity (cattle stalls, the slaughterhouse itself, and a refrigeration building). Le Corbusier described the process as “methodical, quick and clean.... In this study the sequence of different functions becomes the basis of the architectural expression.”40 Cattle were herded onto a ramp leading from the stockyards up to the top of the slaughterhouse.
Once killed, the carcasses followed a predetermined route to be bled, skinned and cut by machine. Belts distributed the cuts of meat to their appropriate destinations, where they were packaged, ground, or squeezed into sausages, and sent on to the refrigeration building to await transportation via the adjacent railway. While this separation of function was rational, it required large amounts of real estate to build—a compact design was economically more desirable.

Le Corbusier soon began his second abattoir project, at Garchizy [fig. 19]. This time he housed each of the separate functions under the same roof, in a more compact design. However, function still determined the exterior aesthetic of the slaughterhouse through the varied treatment of fenestration, structure, and plan, depending on functional demands. Ground level cattle stalls reveal themselves through the post-and-beam reinforced concrete

Fig. 19. Elevations, Refrigerated Slaughterhouse Garchizy. February 21, 1918.
structure and windows placed high on the wall. The slaughterhouse above and its network of conveyor belts are illuminated by large and uninterrupted horizontal ribbons of glass, alternating with solid wall. Finally, refrigeration and storage facilities at the rear of the complex are presented as large and solid expanses of wall, infilling the exposed structural frame, thus resembling the grain silos of *Towards a New Architecture*.

Although neither of Le Corbusier's *abattoir* designs would be selected by the army, the young architect continued to refine his designs, particularly that of Garchizy, with the goal of building and operating slaughterhouses himself. With Bornand and Du Bois, Le Corbusier founded the Compagnie industrielle du froid (CIF) on May 1, 1918. Despite consulting with prominent engineer Tony Garnier (1869-1948) several times, no slaughterhouses were built, and like so many of Le Corbusier's other business explorations, CIF too would eventually liquidate in April 1925.

By 1920, Le Corbusier recognized his failings as a businessman. In contrast to the growing success of his architectural practice, his industrial endeavors had all failed miserably, each driving him further into debt, which eventually totaled one hundred thousand francs. He did not seem overly concerned about the large debts he had accrued. Rather, he simply accepted that he was not a businessman, and looked forward to a promising career in architecture, an activity for which he thought himself better suited. In response to his parents' understandable concern for his financial condition, he replied:

I'm losing a great deal of money, that's true. But my life has never been more replete than now. You know I'm not the type to lie down and quit. If a storm today sweeps my business away it destroys money and nothing more. I feel pity for those who are attached to money! This crisis may actually improve life for me by allowing me to undertake activities more
appropriate to my skills, and which are the result of my own initiatives.  \(^41\)

As an *avant-garde* architect, Le Corbusier understood that his livelihood depended on commissions from wealthy businessmen, but his seemingly *blasé* attitude towards his utter lack of business success and resulting financial problems suggests that he was not a strict ideological capitalist. For Le Corbusier, financial success was not a goal in and of itself. Rather, these business ventures should be viewed as Le Corbusier’s attempt to liberate and detach himself from monetary need, which he perceived as a burden that only hindered his ability to successfully pursue a career as a painter.

The significance of Le Corbusier’s business ventures lies in their influence on his view and practice of architecture. His failings made him realize that success in the machine age required a coldly rational and calculating mind, free from irrational and romantic notions of tradition and emotion carried over from the nineteenth century:

> A morass.  
> *I found myself* in industry. A factory. Machines. Taylorism, cost prices, maturities, balance-sheets. That was all it was.  
> Directing a technical consultancy: it was after the war; everywhere dreams of organisation, of creation. To conceive, create and organise an enterprise, an individual productive unit: in fact a kind of living thing...which can also die! A tough job at a time of economic crises, statistical curves going mad. It is fine for the mind to be ruled by an ardent discipline. Effervescent dreams, icy reason: with the keel gyrating wildly, one must hold onto the helm. Cold reason.  
> Exercise of the will.  
> Formulation of a clear, detached judgment.  \(^42\)

The emphasis Le Corbusier places on organization attests to his firm belief in Taylorism. If industrial organization must organized according to cold Nietzschean reason, Le Corbusier believed, so too must everyday life. The fashion in which he adapted Taylor’s
system of industrial management to architecture remained to be determined, but was one of the most important concepts in his developing architectural aesthetic and vocabulary.

**Taylorism and Architecture**

Three important Taylorist concepts would inform Le Corbusier's architectural and urbanist projects of the 1920s. The first was the *rationalization* of architecture and its treatment as not only an art, but also an applied science. Just as industrial engineers must analyze the motion and time of individual tasks, the architect must view architecture as a problem of function to be analyzed and solved through the rational application of his own knowledge of structure, technology and construction practices. Le Corbusier greatly admired the functional designs of American engineers, and such utilitarian designs as bridges and airplane hangars. In his writings, he often describes houses as *outils*, tools that can solve problems of living through their rationalized design and planning:

> The house is a tool. We demand a new tool; and we are far indeed from having it now. It is a question of *plan*. It is indeed necessary to represent that the plan of the house-tool of the machine age is not yet established.\(^4\)

We see this utilitarian perspective on architecture most prominently in *Towards a New Architecture* when Le Corbusier refers to the house as *une machine à habiter*, or "a machine for living in."\(^4\) Le Corbusier's love of technology should come as no surprise; as we have seen, this fascination and veneration of the machine was fairly common among the young Futurists and Cubists of the Paris *avant-garde*.

Second, the concept of *standardization* was critical to the architectural and urban projects and theories of Le Corbusier. He foresaw a future that embraced the fullest potential
of industrialization and mass-production. The development and introduction of standardized, manufactured building components, as well as efficient construction practices and high-tech materials, would allow for the rapid construction of homes better suited to the life of the machine age at greatly reduced cost, making quality housing affordable to people of modest means.

The concept of standardization could be implemented on a much larger scale as well, and the house itself became a standardized module within the city. Le Corbusier asserted that just as columns, beams, walls and slabs were the basic elements of the house, the house was the basic element of the city: “Temples, towns and houses are cells of identical aspect, and are made to the human scale. One may say that the human animal is like the bee, a constructor of geometric cells.”\(^{45}\) Calling the house a type-element, Le Corbusier likened it to the moveable letters of a printing press,\(^{46}\) the manipulation of which could be used to create an infinite variety of individual forms, within a coherent architectural vocabulary, while still maintaining economy and efficiency of construction.

Third, and perhaps most importantly, he advocated the technocratic reorganization of society. Throughout his early career, Le Corbusier would maintain absolute faith in the machine’s unlimited capacity for the transformation of society: “Science has given us the machine. The machine gives us unlimited power. And we in our turn can perform miracles by its means.”\(^{47}\) Applying Taylor’s theories of shop organization to larger society, Le Corbusier envisioned the Saint-Simonian reorganization of government, a “government of métier,” managed by scientists, engineers and technicians, the rational professionals of the machine age.\(^{48}\)
These new leaders would be appointed planners, not elected politicians. Free from the corrupting effects of parliamentarianism, they would supposedly impartially and collectively make decisions in the interest of society at large without having to answer to the whims of a fickle and inexpert public. This expert and efficient management of society would theoretically increase contentment in all social classes to a level that would supposedly have previously been impossible under a parliamentary system.

Le Corbusier saw this social reorganization, and the architect’s place within it, as essential to the maintenance of the existing social order. In a time of frequent and often violent workers’ strikes, he remained a firm believer in the capitalist system as a means for the socially elite to lead the people. Just as Taylor saw increased productivity and wages as key to harmonious relations between labor and management in the shop, Le Corbusier saw architecture as key to the preservation of social order, promoting architecture as the only means of avoiding violent revolution:

Society is filled with a violent desire for something which it may obtain or may not. Everything lies in that; everything depends on the effort made and the attention paid to these alarming symptoms.
Architecture or Revolution.
Revolution can be avoided.49

Le Corbusier’s view of the moral obligation of architecture as a powerful tool to be utilized toward the regeneration of society falls in line with his Calvinist heritage as well as the architectural legacy of social responsibility of such nineteenth-century masters as A. W. N. Pugin, John Ruskin and William Morris.50 Additionally, architecture and architects are obligated to prevent violent social revolution through the reconciliation of man’s mode of living with emerging conditions of life in the machine age.
Maisons en Série: Maison Citrohan

We can see Le Corbusier’s Tayloristic approach to standardization and efficiency in two early housing types that first appeared in 1920: Maison Monol and Maison Citrohan. These construction systems were meant to be modular and easily reproducible in the interest of rapidly rebuilding the war-torn North. In this spirit, Le Corbusier named these maisons en série, or “mass-produced houses”. They would figure prominently in Le Corbusier’s early career, forming a significant portion of the first volume of his Œuvre complète (1937). Nearly every project hearkened back to the issues of standardization and reproducibility exemplified by these housing types.

The most significant maison en série was the Maison Citrohan [fig. 20]. Named in a homophonic tribute to the French automaker André Citroën, Citrohan was a further refinement of Dom-ino and underwent continuous modification throughout the early 1920s. It was designed as a complete house, expanding on the structural and construction techniques proposed by Dom-ino. Supposedly inspired by the layout of a Parisian café, a traditional and typical “French” form, the interior organization of the house consisted of a two-story room with a sleeping balcony over the kitchen and service areas at the rear, and marked an early manifestation of the toit-jardin, or garden terrace, in Le Corbusier’s

Fig. 20. Scale model of Maison Citrohan.
The horizontal orientation of Dom-ino’s floor slabs is here modified and rotated to a vertical arrangement of parallel load-bearing walls, leaving the narrow ends free of structural load. This allows the placement of large glass windows in the front façade which flood the two-story living space with natural light. Recalling the monasteries at Ema and Mount Athos, Citrohan was similar to Dom-ino in its conception as a modular system. Like Dom-ino, Citrohan could be free-standing or conjoined, even stacked, with other units to form large apartment blocks.

Citrohan expressed Le Corbusier’s Tayloristic beliefs through its conception and design as a machine for living in, and its goal of economy, which would enable people of modest incomes to afford their own homes, thereby investing the working classes in the prevailing economic structure. Indeed, he saw the typical houses of the day as having too much unusable space—large, inefficient and expensive—and cited the engineer and industry as the salvation of the housing problem:

The price of a building has quadrupled, it is necessary to at least halve the size of houses; it is henceforth a problem of the technician; one appeals to the discoveries of industry; one totally modifies his spirit.52

While Le Corbusier lauded the engineer’s mastery of reason, he believed that architecture went beyond the simple functionalism of engineered structures. While the engineer was lauded for his rational solution of design problems through the harmonious application of natural laws such as mathematics, metallurgy and physics, Le Corbusier realized that functionalism could not be the only defining aspect of architecture. Architecture
differentiated itself from engineering in its spiritual dimension: ‘Architecture only exists when there is a poetic emotion. Architecture is a plastic thing.’

Indeed, Le Corbusier felt that functionalism and poetry should be equal partners in the architecture of the machine age. This would allow people not only to live efficiently, but to live joyfully, declaring themselves rational and noble human beings possessed of a moral and radiant communal spirit appropriate to the age of the machine:

The technical and the emotional are an indivisible synchronism. It is human labor (the fruit of reason) and it is propulsion, the direction of the assigned goal (the fruit of passion). Because each human act has a reason for existing: the attainment of a goal. This goal: to radiate. To radiate is to say ‘I exist,’ a claim which only (apparently) stops at death.

This poetic dimension of his architectural work would find expression in his built projects of the 1920s. Le Corbusier would develop a series of five architectural motifs, his ‘five points.’ For Le Corbusier, these elements, though derived from Tayloristic concepts of standardization and mass production, were integral to the poetic expression that differentiated architecture from engineering, while the application of Taylorism’s social mission of moral reinforcement of the working classes to the cities would ensure the preservation of the existing social order.
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CHAPTER TWO:
TOWARDS A TAYLORIZED ARCHITECTURE

Summary

Having developed the maisons en série construction systems using Taylor's principles of industrial management, by the early 1920s Le Corbusier was ready to begin building in earnest. The importance Le Corbusier placed on these systems of construction is apparent in his self-published architectural portfolio. The first volume of his Œuvre complète features no fewer than twenty lotissements, unbuilt housing developments based on the maisons en série concept of standardized and reproducible housing. Even his villa projects of the 1920s owe a considerable debt to the constructive systems elaborated in Domino and Citrohan. In short, all of Le Corbusier's design projects of the period are in some fashion derived from the maisons en série concept.

Le Corbusier's architectural projects of the 1920s can be characterized as his "white period". These buildings were all derivations of the Tayloristic maisons en série projects, most notably Maison Citrohan. Often, but not always painted white, these houses, apartment buildings and office buildings were characterized by a series of design motifs, known as his "five points of architecture". The development of these Tayloristic elements can be seen in both Le Corbusier's houses at Weissenhof, Stuttgart, and the Villa Savoye, Poissy.

In 1922, at age thirty-five, Le Corbusier was a rising star among the Paris avant-garde, but had not yet built a significant number of projects. His first major postwar commissions, the Villas La Roche-Jeanneret, were still a year away from completion. Le Corbusier was mainly known as an advocate of machine-age design through his writings in
L'Esprit Nouveau. It was at this time Le Corbusier was asked to participate to the urban art section of the 1922 Paris Salon d'Automne.

Meanwhile, Le Corbusier's growing fame brought him more commissions. Between the publication of Après le Cubisme in 1918 to the completion of the Villas La Roche-Jeanneret in 1923, Le Corbusier built only three houses, one being a house and studio for Ozenfant. After La Roche, he found much more work: four projects in 1923 and five in 1924. In 1927, Le Corbusier's lofty status as a Modernist leader was confirmed when he was invited to participate in the Bauhaus-dominated Weissenhof housing exhibition at Stuttgart. Le Corbusier would remain a very active designer until 1930, when the Wall Street crash and subsequent economic depression devastated the construction industry.

The Weissenhofsiedlung and Taylorism

The problems posed by postwar reconstruction were not limited to France. Germany, had also suffered considerable economic loss, mainly resulting from the unfavorable peace terms imposed by the Treaty of Versailles in 1919. Like France, Germany was facing severe postwar inflation, housing shortages, and the general collapse of the construction industry. In 1927, the Deutscher Werkbund opened a housing exhibition on the Weissenhof hill overlooking Stuttgart. The press release outlined the exhibition's goals and objectives:

This is an experimental Siedlung to establish the principles of modern mass-production building. The fundamental principle is the determination of new living arrangements with the use of new materials. Therefore the Siedlung itself cannot demonstrate the method of rational mass production, but only a preliminary model for it.¹
Showcasing houses by such internationally-prominent architects as Mies van der Rohe, Gropius, J. J. P. Oud and Behrens, the *siedlung* (housing exhibition) features some of the most respected names of the European *avant-garde*.

Le Corbusier was selected for inclusion in the German exhibition upon the recommendation of De Stijl architect J. J. P. Oud, despite reservations about Le Corbusier’s sense of *Maschinenromantik*, or romanticism of the machine, and implied lack of objectivity. Yet both Oud and Ludwig Mies van der Rohe, the chief planner of the exhibition, admired Le Corbusier’s discussions of mass housing, and both respected his now-prominent role as the international hero of the modernists.² By this point in his career, Le Corbusier had largely succeeded in cultivating this messianic persona, prompting Mies van der Rohe to invite him to the exhibition and give him one of the most prominent sites, a bluff on the southeast corner of the site overlooking the city of Stuttgart.

Le Corbusier designed two houses at Weissenhof [fig. 22]. The first was a single-family dwelling and a further refinement of the Citrohan model. The second home, a duplex, was quite different and was horizontally oriented. By modeling this home on the sleeping and dining cars of Wagons-Lits railway line, Le Corbusier attempted to convey the mechanized and speedy aesthetic of the *machine à habiter*.³ His houses at Weissenhof
differed from the rest of the exhibition through their use of the concrete frame. This contrasted with the designs of the German architects who dominated the exhibition, and promoted the use of steel framing. 4

The duplex itself [fig. 22-24] consisted of a long, narrow space that could be divided nightly by moveable partitions to form individual bedrooms. The bedrooms were connected by a narrow corridor exactly as wide as a typical passageway of a railroad sleeping car – a mere seventy centimeters. Service and circulation areas such as the laundry and the staircases were relegated to the rear of the house, where they extended perpendicularly from the long facade of the dwelling areas.

The moveable partitions at Weissenhof reflected Le Corbusier's early interest in the "transformable house." 5 He proposed that living areas should be large and airy, while sleeping areas and service areas, where people spend relatively little time, could be smaller. 6 Since living areas could only be used in the daytime, and sleeping areas could only be used in the nighttime, having both was an inefficient use of space. By combining the two uses into a
single, transformable space through the manipulation of moveable partitions, every square foot of floor area could be perpetually in use.

One of the major goals of Weissenhof was to explore new, cost-effective methods of construction. Le Corbusier acknowledges this fact, and points to Taylorism as the means of attaining this goal:

I said that our aim is to attain the affordable. And the affordable can only be attained by standardization, industrialization, and Taylorization.

Standardization means researching and fixing type-elements that conform to and fulfill precise functions, such as, for example, column elements, beam elements, window elements, stair elements, etc.

Industrialization: once constant dimensions have been established, it is possible to equip machines which will reduce hand labor.

Taylorization: this workmanship is specialized in the fabrication of standard elements; the worker always executes the same piece of work and a considerable amount of time is saved; more is produced and of better quality.

Ironically, Le Corbusier’s houses at Weissenhof both ran significantly over budget. Denying responsibility, he attributed the project’s costliness to the incompetence and inexperience of German builders with reinforced concrete construction techniques:

...Here I must loyally declare that the prices of our houses in Stuttgart were extremely high; they were that way because the contractors were so impressed by the large pile of exact plans that they received that they assumed that these houses were complicated to build. They even admitted to me that they were not used to reinforced concrete, and this admission makes it unnecessary for me to analyze the high price of their contracts, completely out of proportion with those we have in France...

The design principles exhibited at Weissenhof marked the first manifestation of the International Style, later formalized by the Congrès International d’Architecture Moderne
(CIAM). Organized by Le Corbusier in 1928, this organization of European avant-garde architects was concerned with the role of architecture as an economic and political tool that could be used to improve society through the design of buildings and urban projects. The group would profoundly influence the direction of Modern architecture until it disbanded in 1959. Le Corbusier's prominent position in CIAM guaranteed his influence as the prophetic father of Modern architecture.

"Five Points of a New Architecture" and Villa Savoye

By the time of construction of Villa Savoye in 1928, Le Corbusier had finalized his “Five Points,” design motifs he would employ faithfully throughout his early career. These points were: One, the use of pilotis; Two, the plan libre, or free plan; Three, The façade libre, or free façade; Four, fenêtres en longeur, or ribbon windows; and Five, the toit-jardin, or roof terrace.

Pilotis were slender columns used to raise the living spaces of the house into the air. By doing so, Le Corbusier increased not only the useful area of the property, but also of the house as well. He located the service areas of the house, such as the garage, kitchen, and servants’ quarters, in the space created beneath the elevated home. Additionally, consistent with the period's fascination with the morality of hygiene and sanitation, the living and sleeping spaces of the house were located higher, in the supposedly cleaner air.

The plan libre was achieved by liberating the wall from the column. Instead of the standard residential practice of using load-bearing walls to support the roof, Le Corbusier utilized a gridded post-and-beam system of columns. Partition walls could then be located anywhere the client or architect desired to place them, allowing for greater flexibility in room
design, spatial flow and circulation. This was directly descended from the Domino system, which also set the columns back from the building envelope.

Similarly, the façade libre was achieved by moving the columns inward, where they would not interrupt the continuity of the façade. Le Corbusier could thus place windows anywhere he felt necessary, without the need for coordination with structural columns. Aesthetically, this allowed for the visual lightening of the mass of the façade, which now became a thin, lightweight, elegant membrane, rather than the heavy masonry construction that characterized the traditional academic architecture of the day.

The façade libre also made possible the fenêtre en longeur, or ribbon window, a departure from traditional French residential architecture, which typically utilized large, vertical, hinged windows, spaced at even intervals on the façade. Taking visual cues from the architectural language of the factory, the fenêtres en longeur were to be mass-produced, sliding windows running the entire length of the façade. According to Le Corbusier, this window arrangement allowed light to penetrate further into the building than the traditional vertical window. Additionally, he felt the long, continuous, horizontal strip of windows was more appropriate to the machine age and gave the building a horizontal thrust, implying motion and speed.

Le Corbusier felt the roof could be used for the health and moral edification of the home’s occupants. New technologies and building techniques had recently made the flat roof practical. For Le Corbusier, it became additional usable space for the occupants. The toit-jardin, or roof garden concept he developed became an outdoor recreation space, complete with plantings; a kind of personal sanitarium, high in the clean air and sunshine, where man could maintain his physical health and fitness.
The most notable application of Le Corbusier’s “Five Points” was the residential masterpiece of his “white” period, Villa Savoye (1928-1929) [fig. 24]. Built as a week-end home for wealthy clients in the village of Poissy, on the outskirts of Paris, its large, open site sits on a hill overlooking the Seine valley. The house is square in plan, with a structural grid of five by five bays. Consistent with the concept of plan libre, Le Corbusier separated the walls from the columns. The structural system itself is even liberated from its own grid. While the exterior suggests a regularized structural grid, Le Corbusier often shifts interior columns from the grid in order to accommodate such features as the ramp which spirals up through the center of the house.

This structural grid is reinforced by pilotis, which push the main level, a low rectangular solid, into the air. The walls of the ground floor are set back from the exterior building envelope and painted dark green on three of the
house's four elevations. Through this use of color and shadow, Le Corbusier begins to obscure the existence of the ground floor in order to convey lightness and the illusion that the main level miraculously hovers above the ground.

In contrast to the dark green of the ground floor, each of the four façades of the main level is whitewashed, with ribbon windows running their entire length, made possible by the concept of the façade libre. The windows are approximately one-third the height of the façade, and located about halfway up the wall, dividing each side into three equal bands, reinforcing the horizontal thrust of the house.

The design of Villa Savoye is very much about approach, arrival and circulation. Le Corbusier was an automobile enthusiast, and dimensioned the structural bays in order to accommodate the turning radius of the Savoyes' limousine. Le Corbusier had always envisioned arrival by automobile, and the collapse of distance and time at Poissy is described by historian Tim Benton as the rational connection of the individual with the exterior world and the purity of nature:
...Le Corbusier pursued his search for an ideal expression of circulation unifying car and man, city and country... The villa is linked to the Savoye town apartment at 105, rue de Courcelles, by a 30 km car drive, and this link is manifestly expressed in the plan. Furthermore, the scale of the house derives not only from Vitruvian man, but from what one must call the Vitruvian automobile: the ground-floor dimensions match the turning circle of a large car. Car circulation and human circulation meet in the hall. 9

In this description of the nature of arrival to Villa Savoye, the automobile serves as the driving force behind Le Corbusier’s conception and design of the house. A long gravel drive leads from the road, penetrating the exterior envelope of the house through a U-shaped car park underneath the main living space, where the chauffeur would drop off his passengers at the main entry before continuing around the curve to the garages and the ground-level servants’ quarters. From the main entry, the automobile-based arrival is continued through the interior of the house. One ascends to the main living floor via a long ramp that doubles back upon itself, to the main living area of the house. On the main level are the living room, kitchen and bedrooms, as well as an indoor-outdoor terrace. The ramp then continues to the roof garden above.

Villa Savoye was the logical result of the application of Tayloristic principles to building design: standardized building elements and the development and employment of the Five Points, rules of design that would help bring the house into the twentieth century. However, if society was truly to be reconciled with the new realities of the machine age, it would also be necessary remake the city according to the principles of Taylorism. Le Corbusier would attempt this through two urban schemes of the 1920s, the Contemporary City for Three Million (1922), and the Plan Voisin (1925).
Taylorization of the Modern City

In the early twentieth century, architects and engineers had only begun to confront the problems of the modern city. The logical extension of architecture, the young discipline of urbanism was often poorly defined, but as the basic unit of human society, the design of the city was perceived as vital. Increasing numbers of utopian schemes were developed by engineers and architects in an effort to reconcile humanity with the age of the machine. Two schemes in particular were highly influential on the urbanism of Le Corbusier.

Garnier’s Cité Industrielle (Industrial City) (1904) [fig. 28] categorized and separated zones of the Industrial City by function: residence, commerce and industry. The residential districts featured large public spaces between houses, allowing pedestrians to travel independently of the gridded street system. Le Corbusier’s reaction to the scheme was one of

![Fig. 28 (above). Garnier, Passenger Railway Station, Cité Industrielle, 1904.](image1)

![Fig. 29 (right). Sant’Elia, Central Railway Station, La Città Nuova, 1913.](image2)
admiration: "one experiences here the beneficent results of order. Where order reigns, well-being begins." Garnier employed reinforced concrete exclusively, and the geometric purity of his buildings presaged the Purist forms of Le Corbusier and the International Style.

Another major urbanist influence was Futurist Antonio Sant'Elia's (1888-1916) Citta Nuova (New City) (1913) [fig. 29]. This scheme was created as an extension of his entry for the design competition for a new railway terminal in Milan, and emphasized various engineered transportation works: rail, highways, airports, bridges. With the advent of speed, the Futurists claimed that humanity had entered a new phase of development: "We must invent and rebuild ex novo our Modern city like an immense and tumultuous shipyard, active, mobile and everywhere dynamic, and the modern building like a gigantic machine."

Le Corbusier's urban schemes of the 1920s fused Sant'Elia's emphasis on transportation and speed with the separation of functional zones and provision of green space in Garnier's Industrial City. This would be augmented by Le Corbusier's own belief in the technocratic organization of society. For Le Corbusier, the city was the ultimate poetic expression of man's technological mastery of nature:

A City! It is the grip of man on nature. It is a human operation directed against nature, a human organism both for protection and for work. It is a creation. Poetry also is a human act—the harmonious relationships between perceived images. All the poetry we find in nature is but the creation of our own spirit. A town is a mighty image which stirs our minds. Why should not the town be, even today, a source of poetry?

Le Corbusier completed his first major urban scheme in 1922 for the urban art section of the Salon d'Automne. At the time, urbanism was still a poorly-defined discipline. When asked to prepare the scheme, Le Corbusier asked the section coordinator to define "urban
art," the coordinator responded, "Urban art is the shop, the wrought iron sign, the door of the house, the fountain in the street, all that our eyes see on the road, etc. So make a beautiful fountain or something similar!"\textsuperscript{13}

Le Corbusier submitted his Contemporary City of Three Million [fig. 30, 31], a city where the arts existed alongside industry. This scheme reorganized the city from the inside out, focusing on the efficient circulation and distribution of goods and people through its streets. Although this emphasis on speed and circulation recalled the scheme of Sant'Elia, Le Corbusier was keen on dissociating himself from Futurism. He viewed his city as belonging not to the future, but to the present, the logical result of the application of present technology to a current problem. Moreover, the Futurists advocated a cycle of obsolescence, destruction and reconstruction of the physical environment, while Le Corbusier believed that like the Parthenon, Architecture had a power of permanence when built according to the universal principles of reason.\textsuperscript{14} "It is the city's business to make itself permanent, and this depends on considerations other than those of calculation. It is only Architecture which can give all the things which go beyond calculation."\textsuperscript{15}

Le Corbusier loosely based the Contemporary City on the demographics of Paris, which in 1910 had a population of three million. He claimed that circulation, particularly in the center of modern Paris, was vital to its overall economic well-being which in turn increased the city's power and prestige. He attributed this to the profound modifications that the railroad had made to the nature of arrival within a city. No longer was entry made through a semi-porous peripheral wall. On the contrary, most arrivals to the city now took place at the railroad station, usually located near its center. Le Corbusier saw the pressing need to facilitate the free circulation of traffic through the heart of the city, which at the time
was a congested labyrinth of narrow and winding streets. Just as the Futurists had been a decade before, Le Corbusier was fascinated with the speed and imagery of the automobile, and proposed that its speed was best suited to wide, straight boulevards, capable of carrying a high volume of vehicular traffic.

But Paris was a pre-modern city, where the form of the street had long been determined by the construction of buildings along narrow and winding “donkey-paths” to the markets. Little, if any thought was given to the design of the street itself, certainly not with
the automobile in mind. Le Corbusier sought to remedy this, seeing automotive circulation as most vital to the ability of the city to project its own political and economic power into the world through the rapid and efficient movement of goods: "The city that achieves speed achieves success." Just as the house was a *machine à habiter*, the street was "...a traffic machine; it is in reality a sort of factory for producing speed traffic.... We must create a type of street which shall be as well equipped in its way as a factory."18

This problem had been previously addressed by Baron Eugène-Georges Haussmann (1809-1891) whose autocratic planning dramatically changed the landscape of Paris under the Second Empire. Le Corbusier envied the authority given to Haussmann in the execution of such a bold plan:

> Haussmann cut immense gaps right through Paris, and carried out the most startling operations. It seemed as if Paris would never endure his surgical experiments.... And yet to-day does it not *exist* merely as a consequence of his daring and courage?19

Le Corbusier would impose a symmetrical grid of wide boulevards in lieu of the existing webs of twisted, narrow streets and alleys. Two multilevel superhighways ran the length and breadth of the city, categorizing and separating traffic by length of trip, function and destination. They symbolically crossed at the very center of the city and extended to the four horizons, emphasizing the importance Le Corbusier placed on speed and circulation as extensions of prosperity and commerce. Local traffic would travel on ground level, while express traffic, mainly trucks carrying freight from the railroad stations to the factories at the periphery of the city would follow subterranean expressways to their destinations. Predicting the widespread use of aviation for personal travel, Le Corbusier also proposed an elevated
third level, providing numerous landing strips for personal aircraft and air taxis throughout the city.

Le Corbusier's adoption of the symmetrical gridded street plan is also an important symbolic gesture, and recalled the plan of his boyhood home of La Chaux. Rejecting the haphazard and accidental layout of the existing urban fabric of Paris, as well as the picturesque qualities of the English garden city, the grid imposed reason and order upon the Contemporary City. Cities such as Paris had, for most of history, grown organically, following important market roads and filling in the intermediate spaces with winding and narrow streets formed by the spaces left over from the random parceling of land. The grid was a clear indication of a planned social order imposed from above. No longer would the form of cities represent anarchic individualism, but an authoritarian social order.²⁰

The Contemporary City was organized along hierarchical lines of social class, the administrative dominance of the technocratic elite, and the separation of social classes in healthy, modular housing. Le Corbusier himself advocated an extremely hierarchical society, organized from the top down. He made this all too clear in his diagram for a Regional-Syndicalist government (fig. 32), which arranged the society from the technocratic elite at the top to bottom toward an ever-widening base of the less skilled. A worker's position in the pyramid was solely based on his technical ability and know-how.²¹ In other words, the production potential of each citizen determined his or her place within society.
This was a direct adaptation of Taylor’s Scientific Management, which delegated increasingly specific and limited authority downward from a centralized planning office. In the 1920s, this belief in a corporatist organization of society mirrored that of the Maurrasians. As the inheritors of the Bonapartists, these authoritarians believed in the superiority of the intellectual and political elite, who had a responsibility to govern society justly by virtue of their own merit and to serve as moral examples to the “lesser” classes.

The development of a technocratic state would require a large bureaucracy, and Le Corbusier literally placed administration at the heart of the city. Le Corbusier placed twenty-four Cartesian “gratte-ciels,” or geometric skyscrapers of glass and concrete, in the center of the Contemporary City, set back from the gridded system of boulevards in vast park-like green spaces. In these veritable temples of capitalism, Le Corbusier located the offices of major civic planners, industrialists and big businessmen. By elevating them above the rest of the city, Le Corbusier provided the elite with a position of surveillance over the rest of the city, a Benthamesque panopticon from which they could maintain social and economic order:

> From its offices come the commands that put the world in order. In fact, the skyscrapers are the brain of the City, the brain of the whole country. They embody the work of elaboration and command on which all activities depend. Everything is concentrated there: the tools that conquer time and space—telephones, telegraphs, radios; the banks, trading houses, the organs of decision for the factories: finance, technology, commerce.²²

It is important to note that the Contemporary City differed fundamentally from most utopian urban schemes of the day, which symbolically featured a temple or civic structure, symbols of spiritual or secular power, at their highly symbolic centers. Le Corbusier’s decision to arrange the commercial office towers in the city center, around the interchange of
the two major highways points to his technocratic faith in the administrative ability of industrialists, engineers and businessmen to plan and administer the complex technocratic state.

By setting the skyscrapers back from the street, Le Corbusier hoped to increase the population density of the city while decreasing the area of real estate dedicated to buildings. He believed he could increase the average density of Paris (360 people per hectare) to 800; 1,200; even 2,000 people per hectare. This would help minimize the area of the city, further aiding traffic circulation. By enforcing a minimum of 250 meters between towers, the planted area of the city was increased from practically zero in Paris to ninety-five percent in the Contemporary City. The open space would be planted as parkland, “lungs” to help the city breathe. The health benefits of so much open space were not just metaphorical. Community athletic fields and playgrounds would provide the city’s inhabitants with recreational opportunities.

Just as Le Corbusier believed the Taylorized house to be the means of improving the condition of its inhabitants, the multiplication of the standardized house could rationalize the city, and even society itself. “The details are the whole city; a detail in a city means a house multiplied a hundred thousand times; therefore it is the city. The condition of the whole city lies in the condition of each of its cells.” In his mind, nothing was more vital to the health of the city than the application of Taylorism.

Surrounding the central city are mid-rise apartment blocks reserved for bourgeois professionals, the foremen of the factories and the managers of corporate offices. These blocks, based on the Dom-ino and Maison Citrohan modules, would surround central courtyards, and could achieve a variety of forms, and thus visual interest, while maintaining
aesthetic and social unity, through the flexibility of the modular organization and the maintenance of a common architectural vocabulary.

The working classes, who had previously inhabited the central cities, would be marginalized and displaced into garden cities surrounding the central city. These garden cities, a concept popularized by Ebenezer Howard and implemented by Haussmann in late-nineteenth-century Paris, would be located near the factories, separated from the periphery of the city proper by a greenbelt of parkland. Comprised entirely of detached housing, duplexes and row-houses, these workers’ cities reinforced Le Corbusier’s vision of the hierarchical organization of society, and discouraged class-based rebellion. Once highly concentrated in the tight quarters of the city centers, where unrest could be more easily agitated, organized and executed, the working class was now spread thinly through the suburban areas, isolated from their employers in the central city, by large areas of open space.

The Plan Voisin [fig. 33, 34], proposed at the 1925 Paris Exhibition in Le Corbusier’s Pavilion de l’Esprit Nouveau, was so named for Le Corbusier’s own beloved Voisin automobile. It reinforced the displacement of the working class in order to strengthen the capitalistic economic order. By placing the skyscrapers of the Contemporary City over the existing urban fabric of Paris, Le Corbusier hoped that the scheme would seem more relevant, not a “promise in the desert”, as he characterized his 1922 scheme.

As in the Contemporary City, the rationalized street played a prominent role in the overall plan of Plan Voisin. Again Le Corbusier argued for the abolition of the narrow street designed for the leisurely pace of horse-drawn carts and pedestrian traffic, wholly unsuitable to the speed of the automobile. “We must have roadways of ample dimensions and a proper division of their surface as between motor-transport and foot-passengers.” As streets were
This sort of planning power was not without precedent, as Le Corbusier noted in *The City of To-morrow and Its Planning* (1925). By paying homage to, even idolizing, such autocratic planners as Colbert and Haussmann, Le Corbusier makes clear his technocratic
belief and disdain for the “romantic” notions of democracy and the property rights of small shopkeepers and proprietors in the face of the autocratic city planner.

This massive undertaking required the creation of an autocratic and technocratic society to achieve. In order to overcome private property rights, and gain a free hand to widen streets, the planner of the new city (who undoubtedly would have been Le Corbusier) must have absolute power to seize property in order to impose his vision upon the city. “It must be a man of strength, charged with the mandate of solving the question of the city. A man equipped with discretionary powers, a Colbert. One demands a Colbert!”

Le Corbusier’s reference to Louis XIV’s minister of finance is significant. His mercantilist tax system maintained financial solvency of the French state under the Sun King’s extravagance by placing a heavy burden on the peasantry while exempting the clergy, landed gentry and nobility from fiscal obligation. Colbert’s trade policy encouraged and subsidized the production of luxury export items, such as wine, crystal and

Fig. 35. Louis XIV commanding the building of the Invalides. This engraving appears on the last page of The City of To-morrow and Its Planning with the words “Homage to a great town planner.”
tapestries, at the expense of agriculture. These policies transformed land-use patterns to the point that areas of France began to experience food shortages, a major factor leading to the Revolution of 1789.

Once again, in Plan Voisin, Le Corbusier placed control of the city in the hands of a technocratic bureaucracy, working within the twenty skyscrapers that formed the business center:

In the new business centre office work will be performed, not in the persistent dimness of joyless streets, but in the fullness of daylight and an abundance of fresh air.

Do not smile incredulously. Its 400,000 clerks will be able to scan a landscape such as that one looks down on from the lofty crests above the Seine near Rouen and behold a serried mass of trees swaying beneath them. The stillness is absolute, for whence can noise proceed?\(^{29}\)

Le Corbusier asked his readers to imagine themselves in the new city, painting an idyllic picture of life in the Paris of Plan Voisin:

You are under the shade of trees, vast lawns spread all round you. The air is clear and pure; there is hardly any noise. What, you cannot see where the buildings are? Look through the charmingly diapered arabesques of branches out into the sky towards those widely spaced crystal towers which soar higher than any pinnacle on earth. These translucent prisms that seem to float in the air without anchorage to the ground – flashing in summer sunshine, softly gleaming under grey winter skies, magically glittering at nightfall – are huge blocks of offices. Beneath each is an underground station (which gives the measure of the interval between them). Since this city has three or four times the density of our existing cities, the distances to be transversed [sic] in it (as also the resultant fatigue) are three or four times less. For only 5-10 percent of the surface area of its business centre is built over. That is why you find yourselves walking among spacious parks remote from the busy hum of the autostrada.\(^{30}\)
In Plan Voisin, Le Corbusier proposed to profoundly transform the economy of the central city. The formerly working-class and Jewish neighborhoods that occupied the potentially valuable real estate of the Right Bank and the Marais would be cleared to make way for the skyscrapers of the Contemporary City. The homes of the area’s former occupants would be seized by the State. Le Corbusier addresses this fact, mentioning that the redevelopment of the land of central Paris would result in an:

enormous increase of land-values that [must yield] a profit to the state running into the billions of francs – for to acquire the central part of Paris and redevelop it in accordance with a coordinated plan means the creation of an immense fresh source of wealth.  

Under Haussmann, as land values increased, poorer city dwellers were no longer be able to afford to live within the city, and were often forced to move from the city to its peripheral faubourgs, where land values were lower. Likewise, under Le Corbusier’s scheme, the poor would be forced out of the central city, with wealthy technocrats taking their place.

By removing the poor to the outskirts of Paris, Le Corbusier had decreased their ability to organize uprisings against their wealthy masters in the central city. He realized that the removal of the working class from the city would not be enough to prevent violent proletarian revolution, despite their decentralization and isolation from their capitalist employers. In order to preserve the existing economic order, it would be necessary to invest the working class with a real stake in its preservation. By providing them with the opportunity to purchase affordable housing in the garden cities, Le Corbusier allowed them to literally buy into the capitalist economy. Once invested with an interest in the preservation of the system, the working class would find rebellion much more difficult to justify.
Neither the Contemporary City nor the Plan Voisin was built. Both were to remain on paper, making a thorough post-occupancy analysis of Le Corbusier's early urban theory impossible. It is possible, however, to catch a glimpse of life in a portion of the Corbusian city from his one built urban project of the 1920s, the workers' garden city at Pessac.

**The Quartiers Modernes Frugès at Pessac**

Pessac is an intriguing application of Le Corbusier's urban theory. The vision of urban design outlined in Contemporary City and Plan Voisin appealed to progressive industrialists like sugar manufacturer Henry Frugès, who commissioned Le Corbusier to build a neighborhood for the workers at his factory – the Quartiers Modernes Frugès, Pessac [fig. 36]. This concept promised social stability by emphasizing the traditional French nuclear family, which served as a balance to the supposedly corrupting effect of labor.

Henry Frugès had ambitious and unorthodox plans to construct some 130 houses for his workers in the fast-growing commune of Pessac, near Bordeaux (Frugès's worsening financial situation in the late 1920s would later limit the number actually built to fifty-one). Frugès, a self-styled "seeker, multivalent artist, architect, painter, sculptor, pianist and composer, member of the S.A.C.E.M." of Paris, author, art critic, historian and so on..., considered himself less a businessman than the sum of his various artistic and commercial pursuits. His passion for all things modern prompted Le Corbusier to call him "a natural phenomenon," and his Ford-like paternalism for his employees and the residents of Pessac earned their admiration and respect.32

* Société des Auteurs Compositeurs et Editeurs de Musique.
Quartiers modernes Fruges à Pessac-Bordeaux
Frugès, too, greatly respected Le Corbusier. Having become familiar with the social theories of the architect from his articles in L'Esprit Nouveau, Frugès contacted the rising architectural star to build Pessac. Upon his initial commission in 1924, Frugès gave Le Corbusier the autocratic control he desired in the implementation of Tayloristic theories to the project:

M. Frugès told us: 'I authorize you to put into practice your theories, to their most extreme consequences: I want to attain conclusive results in the reform of working-class housing: Pessac should be a laboratory. I fully authorize you to break with all convention, to abandon the traditional methods. In a word, I ask you to confront the problem of the plan of the house, to find standardization in it, to employ walls, floors, roofs, conforming to the most rigorous strength and efficiency, giving rise to true Taylorization through the use of machines
that I authorize you to buy. You will equip these houses with interior equipment and devices that restore easy and agreeable living. And the aesthetic that can result from your innovations, it will not anymore be that of traditional houses, expensive to build and expensive to maintain, but that of the modern-day. Purity of proportions will be the true eloquence.34

In their initial meetings, Le Corbusier and Frugès had differing visions of the final form the development would assume. Frugès desired it to be completely composed of single-family dwellings, whereas Le Corbusier, as Frugès put it, had “already started to think on a grand scale and was dreaming of skyscrapers.”

Le Corbusier insisted in the elimination of ornament, which he argued would be more economical and reflect more accurately a modern sensibility: “we are tired of décor, what we need is a good visual laxative! Bare walls, total simplicity, that is how to restore our visual sense!”35 This troubled Frugès, who believed that potential buyers would be turned off by the unadorned and box-like houses: “It was in vain that I asked him to put himself in the place of the prospective purchasers, whose eyes are accustomed to decorative effects, even though they may be of the most discrete kind…”36

Le Corbusier managed to win over Frugès on many of these points. However, rather than the large housing blocks endorsed by the architect, they compromised on a mixture of detached single-family homes and row-houses. Variety and curb appeal would be achieved through differing combinations of a single, standardized module, as well as through the arrangement of the houses themselves on the site.

The variety of forms, based on the standardized Citrohan module, was exactly what Le Corbusier had argued for. By applying standardization to basic module at Pessac, he was able to create four unique prototypes: the Z-form type, the staggered type, the gratte-ciel
(skyscraper) type, and the arcaded row-house type. Not only did standardization allow for economical construction, it gave each prototype its own identity and character. Through the manipulation and arrangement of the standardized modules in relation to one another, he was able to fulfill his promise: “Rational construction based on the use of component blocks does not destroy individual initiative.”

The Z-form prototype consists of three such modules, rotated ninety degrees from and set against one another. Le Corbusier’s interest in segregation by function can be seen here. The plan arrangement of the Z-form type unit recalls Dom-ino, with similar functions in adjacent modules being “matched” against one another. Terrace adjoins terrace, and bedroom adjoins bedroom. The main facade of strip and standard windows, along with the entry to the dwelling, is located on the long elevation.

The staggered prototype is similarly organized, with the main facade of each unit now located on the narrow end of the module. The houses alternate direction, allowing for both visual and spatial isolation of each unit, as well as protecting each dwelling from anonymity. Visual isolation is achieved in the overall elevation of the prototype—each fenestrated facade alternates with the void of its neighbors’ terrace/entry facade. Spatial isolation is achieved through the minimization of party walls between interior spaces.

Perhaps the most iconic image of Pessac is that of the skyscraper, or grante-ciel, prototype [fig. 37], located on the west side of the rue Le Corbusier. This prototype is the only vertically-organized type and features an additional level—a roof garden with pergola occupying the entire roof, which is accessible from an unusual exterior stair. The stair and the guardrails on the terrace level are streamlined and reminiscent of the ocean liner imagery seen in Le Corbusier’s Towards a New Architecture. The symmetrical main facade is located
on the narrow elevation, and two levels of strip windows and the corresponding guardrail above accent the height of the prototype.

Located at the southwestern corner of the site, between the appropriately named rue des Arcades and a forest delineating the boundary of the development, the arcade prototype [fig. 38] is the most horizontally oriented prototype. This prototype places the main facade, with strongly horizontal fenestration, on the long elevation of the base unit. The units are separated by a ground-level terrace covered by a shallow "arch" connecting each unit, revealing the forest beyond. This horizontal solid-void-solid arrangement effectively makes porous the wooded boundary of the development, an otherwise abrupt border between city and forest.38

One of the most notable features at Pessac is the use of polychromy. It was determined early in the design stages of the project that the exterior walls would be painted, although it is less clear whose idea it originally was. Frugès claimed in 1967 that the idea had been his:

At that moment the Muse of Painting... came to my aid. She gave me the idea of painting the facades of the villas in different colours, properly thought out and carefully chosen so that they would harmonize with one another and also be visible, depending on the distance, from the other side of the green areas. My tenacity found a powerful ally in my adversary [Le Corbusier]: he too was a painter with a penchant for color harmonies; and so... we reached agreement.39

Le Corbusier claimed that the decision to apply color to the exterior walls was his all along, having earlier experimented with polychromy in the interior of Villa La Roche. He asserted that the polychromatic walls were an important functional element of his design at Pessac, breaking up the mass of the densely-packed houses, while increasing the vitality and
individuality of each dwelling: “The Pessac development is very compact. Gray concrete houses would make for an unbearable compressed heap, void of air.... The color brings us space.”

While Le Corbusier used polychromy and variation to break up the mass of the densely-packed concrete houses, especially on the skyscraper prototype, the use of color served an additional purpose at Pessac: visual extension, as seen in the arcade prototype. By applying burnt sienna to the elevations (front and rear) parallel to the street and by painting the transverse walls and underside of each “arch” white, Le Corbusier emphasized the horizontality of the type, reinforcing the notion of boundary.

Colour was the solution to generating space. How? By establishing a number of fixed points: some wall surfaces are painted in burnt sienna, while clear ultramarine blue makes entire rows of houses recede. Elsewhere, pale green facades fuse with the foliage of the gardens and trees. White surfaces were set as the yardstick. When the rows of houses created an opaque mass we decided to camouflage them: front-facing facades, painted alternately brown and white.

One white lateral facade, the other pale green. The corner is the meeting point between pale green and white, while dark brown suppresses the mass (weight) and amplifies the use of surfaces (extension). This polychromy is completely new. It is fundamentally rational and introduces an extremely powerful physiological element into the overall architectural symphony. The united orchestration of physiological sensations elicited by volumes, surfaces, contours and colours can create an intense lyricism.

Once designed, Frugès and Le Corbusier had to overcome numerous obstacles in order to actually get the development built. One of these was the inexperience of the local contractor with new concrete construction techniques. By order of the architect, construction was halted at the Pessac site in April 1925. The contractor, a small local builder from Bordeaux named Poncet was replaced by Mr. Summer, the Paris foreman from Le Corbusier’s earlier Pavilion de l’Esprit Nouveau. Le Corbusier described the
"incompetence" of the local builder, among the other events of the construction process, in
his Œuvre complète:

Pessac is a bit of a Balzacian novel. A generous man
wants to show to his country that one may resolve the question
of housing. Opinions stir; jealousies awaken in the project
team, from the small local contractor, worried about new
methods that upset their acquired habits, towards the architects.
So, little by little, an atmosphere of hostility emerged. The
village of Pessac had been built in less than one year by a
Parisian contractor that replaced the failing local company.\textsuperscript{44}

Local building officials were not any help either. Although construction was finished
and the development was inaugurated in 1926, bureaucratic complications within both the
local building department and a private water company meant that the site was not
immediately provided with basic utilities, and that the first units were unable to be sold until
1929. Public confidence and the development itself began to erode. This, combined with
Frugès's bankruptcy in 1929, was discouraging for Le Corbusier. Eventually it became
necessary to enlist the aid of his old technocratic ally Loucheur, now the Minister of Labor,
to have the water pipes finally installed and the project approved for occupancy:

In 1926, at the end of work, a murmur of opposition
was born in the administrative services that should have moved
the documents towards the acceptance of the plan and
consequently ordered the installation of water-pipes to the
village so only the authorization to rent or sell should have
been needed. \textit{Three years later, in spring 1929, the documents
were not signed and for those three years the village was
uninhabited}.\textsuperscript{45}

Once services were connected, and the first occupants began to move in, it quickly
became apparent that Le Corbusier had not adequately considered the living customs of the
development's future occupants. Many of the new owners eventually modified and repainted
their homes. After visiting Pessac in 1931, Le Corbusier was shocked to see what had
become of his masterpiece. His anger and contempt for the working class is evident in a
letter to Frugès’s representative Vrinat: “I would have thought that after all the blood that
was shed for Pessac, some effort would have been made to prevent people from tampering
with it and degrading it through their fatal incompetence.”

The stripped-down aesthetic of the project, and the flat roofs, which drastically
contrasted with the traditional lean-to houses of the conservative Gironde region, prompted
the opposition of the local design community. This gave birth to derisive nicknames for the
development such as “the Moroccan Quarter” and “Frugès’s sugar cubes”. The project’s
marketing prospectus does nothing to reassure prospective buyers in the Purist aesthetic of
Pessac on its first page. Underneath a photograph of one of the houses, the caption reads:
“the new look of this villa may perhaps raise doubts in your mind…”

Opposition to Pessac was not limited to the Bordeaux region. The international press
blasted the project, not only due to its lack of basic utilities, but on a conceptual level as well:
“...after three years, the press of several countries wrote that Pessac is uninhabitable,
because it is constructed on erroneous principles.”

Le Corbusier did not adequately consider the individual tastes of prospective buyers
in his design at Pessac. Additionally, the low overall demand for the houses meant that
Vrinat was not able to impose any aesthetic covenants or restrictions on the new owners.
Working-class families, unaccustomed to his Purist aesthetic, freely modified his designs
according to their own taste, subdividing and filling the ribbon windows, building gabled
roofs over the roof terraces, and adding flower boxes to the architect’s pure forms. The
residents of the quarter generally did not have the financial means for maintaining the
unorthodox dwellings to Le Corbusier’s high standards, so instead they often substituted more affordable replacement materials.

As Conrad Jameson has argued, Le Corbusier’s insistence on imposing his own values on the working class of the Bordeaux region exemplifies his own technocratic view that he, as an “expert”, knew better how workers should conduct their private lives. This was formulated a priori, without any consideration for the customary home life of the workers themselves. Jameson contends that, “as an [aesthetic] anti-traditionalist, he [was] so busy showing people how they should live, he [did not have] time to discover how they do live in fact.”

Pessac gives considerable insight into Le Corbusier’s practical application of Tayloristic concepts to his architecture and urbanism. His “expert” imposition of a completely foreign system onto a populace accustomed to living in the manner of their Gironde parents and grandparents reveals his autocratic and technocratic personality. Believing himself more capable of dictating the workers’ manner of living, Le Corbusier again presented himself as the autocratic planner, a paternalistic figure who imposed his vision of society upon others, considering their values inferior to and less rational than his own.
References

1 Pommer and Otto, p. 56.
2 Pommer and Otto, p. 53.
3 Pommer and Otto, p. 86.
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5 Pommer and Otto, p. 86.
13 Le Corbusier, *Œuvre complète*, p. 34.
14 Evenson, p. 18.
20 Fishman, p. 190.
21 Walden, p. 210-211.
23 Le Corbusier. *Œuvre complète*, p. 35.
33 Goldfinger, p. xix.
34 Le Corbusier. *Œuvre complète*, p. 78.
38 For a more detailed description of each type, see Fondation Le Corbusier, p. 90-104.
40 Le Corbusier, *Œuvre complète*, p. 86.
41 Fondation Le Corbusier, p. 102.
42 Fondation Le Corbusier, p. 129-130.
43 Fondation Le Corbusier, p. 108.
44 Le Corbusier, *Œuvre complète*, p. 78.
45 Le Corbusier, *Œuvre complète*, p. 78.
46 Fondation Le Corbusier, p. 112.
48 Le Corbusier, *Œuvre complète*, p. 78.
49 Jameson, p. 51.
CONCLUSIONS

This project was begun with the expectation that Le Corbusier would be proven a disciple of free enterprise capitalism, at least during the period preceding the Wall Street crash of 1929. It stood to follow that this justified his avid interest in the Taylorization of architecture as a means of preventing proletarian revolution. Yet this was not at all the case; Le Corbusier was not interested in preserving capitalism, at least not for its own sake. Le Corbusier certainly had as many reasons to distrust capitalism as he did to praise it.

These reasons originated in Le Corbusier’s childhood. The economic decline of his birthplace and the hardships suffered by his watch engraver father exposed him at an early age to some of the most brutal effects of capitalism. These were hastened by the eighteenth-century trend of industry away from handcrafted goods toward mechanization, standardization and mass production, but Le Corbusier instead seemed resigned to the Darwinian view that new modes of production would prove themselves superior, and would inevitably replace their less efficient predecessors.

His architectural practice aside, Le Corbusier’s few forays into business could not have improved his opinion of capitalism. His various managerial responsibilities and investments under SEIE were all catastrophic failures. Although interested in the accumulation of wealth, this was always as a means to an end. Le Corbusier hoped that through his industrial ventures he could amass a fortune that would allow him a comfortable living as a painter. His casual interest in business nearly bankrupted him, leaving him with huge debts. Le Corbusier finally gave up in 1920, acknowledging in a letter to his parents
that he did not have the ability or economic savvy to succeed in the coldly rational world of business.

A further argument against viewing Le Corbusier as a free-market capitalist is reflected is the criticism directed at him from both the radical Right and Left. Upon his initial move to Paris in 1917, Le Corbusier took great pains not to align himself with any one political party. Symbolically, the center of his urban utopias of the 1920s was not a Hall of the People or of the Nation, but a highway interchange, surrounded by commercial and administrative towers of glass and concrete. In fact, association with radical politics did not at all frighten Le Corbusier, as evidenced by his courting of the Soviet Union in the late 1920s, the syndicalists in the 1930s, and his attempted collaboration with Vichy after 1940. More likely, he was alarmed by the potential of violent proletarian revolution against the ruling “elite,” who in the 1920s would have been the “captains of industry” who held the purse-strings that provided architects like Le Corbusier with opportunities to advance their own aesthetic values.

If Le Corbusier was not a strict capitalist, why did Taylorism hold such interest for him? In spite of Scientific Management’s origins in the liberal American business world, the French flavor of Taylorism was not in fact the product of laissez-faire capitalism. Increased military demands on French industrial production during World War I led to cooperation between the Republic, business and labor in the union sacré. The government took a more active role in the affairs of industry, with such ministers as Thomas and Loucheur advocating the implementation of Taylorism in meeting production quotas. This cooperation would continue after the Armistice of 1918 with the goal of rebuilding the devastated areas of the North.
Through the war and postwar reconstruction, the concept of the state-planned economy became another tool to be utilized by the French state, ensuring continued national security against possible German aggression in the future. This technocratic view of the economy fell in line with Le Corbusier’s belief in an expertly-administered government, which could exercise discretionary powers to refashion society in any manner it saw fit. Such an administration of experts would have appealed to Le Corbusier, who was constantly searching for an alliance with a regime strong enough to grant him discretionary powers to realize his radical urban schemes.

Le Corbusier’s interest in capitalism was simply its position as the dominant economic system of the Third Republic. From the failure of his business enterprises under SEIE until the disillusionment of the 1929 Wall Street crash, Le Corbusier gained an appreciation for the cold reason of the “captains of industry”, and greatly admired their authoritarian leadership qualities. He saw in them the new meritocracy, the technocratic elite who could hold enough power to forcibly reconcile society with the age of the machine, much in the autocratic manner of Colbert or Louis XIV almost three hundred years before. More recently, Haussmann had wielded considerable power in his “surgical” renovation of Paris. Such a visionary figure, Le Corbusier argued in The City of To-morrow, would be necessary to implement an architectural vision capable of remaking society.

Le Corbusier believed himself to be such a man. His belief in the moral obligation of architects to improve society stemmed from his education under L’Eplattenier. L’Eplattenier exposed him to this theory through such writers as Ruskin, Blanc and Provensal. Ideologically, Le Corbusier belonged to the Maurassian camp, a socially-conservative movement that held fast to the Bonapartist current of traditional, hierarchically-organized
society, directed from the top down by elites who were free to dictate the direction society would take. As planners of livable space, architects would virtually be guaranteed of their own importance.

Under such a system, Le Corbusier aspired to become the most important of all architects, and cultivated his own ego with such a goal in mind. He fancied himself a self-made prophet, a heroic and messianic figure in the tradition of Nietzsche and Renan, whose architecture would lead humanity to happiness and contentment through a new morality appropriate to the machine age. His adoption of the name Le Corbusier in 1920 attests to this constant self-revision of his persona as a messianic figure.

To a large extent, he was successful. By the time of the Weissenhof exhibition in 1927, Le Corbusier had become one of the leading figures in the European avant-garde, and his statements on housing received acclaim from the most prominent of the Modernist architects. Henry Frugès so respected his plans for the preservation of the social order through architecture and urban planning, that he was given carte-blanche in the design of workers’ housing at Pessac, though in the end the project was an abysmal failure. Cost overruns and application of technologies too far advanced beyond the capabilities of the builders of the day hindered the project from its inception, while his disregard for the individual tastes of the development’s future residents resulted later in drastic alterations to the unadorned “sugar cubes”.

To Le Corbusier, this merely demonstrated the working classes’ inferiority to their intellectual “superiors”. According to him, the masses needed architects and architecture to educate them in the proper fashion of living. The relevance and importance he acquired at a critical juncture in the history of Modern architecture would dictate the direction the
movement would take. In this sense, Le Corbusier had succeeded in becoming “Père Corbu”, the prophet whose Purist aesthetic of unadorned geometry formed the basis of the International Style.

The International Style’s disregard for individual taste would be its undoing. The Parthenon “made itself permanent” through its adherence to universal principles of geometric purity and logic. The International Style was equally based on Taylorism, which Le Corbusier felt to be as universal as the Platonic geometry of the Greeks. Unlike the Parthenon, it would not last. Le Corbusier later abandoned the streamlined and mechanized aesthetic of Villa Savoye, and his later work became more sensual and sculpturally expressive.

Despite this, the influence of Taylorism on Modern architecture can still be felt. Principles of standardization and mass production derived from Taylorism were responsible for the invention of entirely new methods of construction. One can see traces of the Dom-ino system in construction practices to this day. For better or worse, Le Corbusier’s urban theories, especially of designing the city for the automobile, have profoundly altered the form of today’s cities. In this respect, Le Corbusier’s self-assumed role as the prophet of Modern architecture has been realized.
References

1 Jencks, p. 141-142.
BIBLIOGRAPHY


BIOGRAPHICAL SKETCH

Ian Jacob Guenther was born February 8, 1977 in Spencer, Iowa. He received the Bachelor of Architecture from the University of Kansas in 2000. He was selected a National Merit Achievement Scholar in 1995 and was a four-year recipient of the University of Kansas Chancellor's Club Scholarship from 1995 to 1999. From 1999 to 2005, he has been employed as a designer in architectural and engineering firms in Kansas and Iowa.