

# **Constructing a Mechanized Modern Architecture in Post World War I Europe**

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If, as L. Hilbesheimer suggests, “the nineteenth century was a search for a new style,”<sup>1</sup> then the early part of the twentieth century was a rejection of those styles. Twentieth century architects sought to embrace modernity rather than the past, and doing so meant embracing new technology.

New machines allowed modern materials to be reproduced quickly and economically. The question in the early twentieth century was not if it could be done, but how could one do it. Machinery seemed the solution to every architectural problem, from affordable housing to what constituted a modern aesthetic. However, this enthusiasm for modernity was not to last.

With the outbreak of war in 1914, the civilized world was forced to face the wrath of the new technology that had served them in the past. Machines controlled the battlefield as cavalries became armored divisions, and artillery shells brought widespread destruction. Airplanes and automobiles, which had once brought promise, now brought death.

When the war ended in late 1918, people were left to reconsider what role the machine was to play in their lives. Was it the tool that offered unlimited possibilities, or a weapon that promised devastation? Artists and architects took myriad positions, ranging from complete rejection of the machine to complete acceptance of it. There were those who saw architectural forms in mysticism and nature, and those who saw machines as the solution to the post-war ruin and poverty. The most prominent architects of their generation set themselves to solve these problems, and in doing so, found many solutions.

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<sup>1</sup> L. Hilberseimer, *Contemporary Architecture: Its Roots and Trends* (Chicago: Paul Theobald and Company, 1964) 16

## *Rejection of the Machine*

Expressionist architects were among the most vocal post-war critics of the celebration of technology in architecture. While “Expressionism” was first applied to pictorial art in 1911, it did not take on architectural significance until several years later.<sup>2</sup> Adolf Behne was the first to use the term ‘expressionist architecture’ in 1915, but by the end of the First World War it was a well established term. The term itself is a difficult one, as the more one looks at a collection of Expressionist works, the hazier the definition of Expressionism becomes. There are no architectural elements that one can call strictly ‘Expressionist’, rather a collection of works that are similar enough to one another and different from others too, that they can fall under the Expressionist umbrella. As the art historian Wolfgang Pehnt points out,

“‘Expressionism’ can still be validly used to refer specifically to a particular phenomenon that occurred within a particular area over a certain period of time. The features which characterize a style are not, taken individually, confined exclusively to that style; but the frequency with which such features occur and the way in which they are related to one another can justify us in marking off a particular stretch of the continuum of development and giving it a stylistic label.”<sup>3</sup>

There were few artists from this period who represent all the Expressionist ideals.

The members of the Crystal Chain group<sup>4</sup> were great supporters of, and arguably the creators of, the Expressionist mantra. Formed by Bruno Taut, famed creator of the Glass Pavilion in Germany’s Werkbund Exhibition of 1914 (Image 1.1), the group began as a correspondence among architects in the early months of 1919. The group’s ideals were drastically different from those that promoted a modern architecture based on mass

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<sup>2</sup> Wolfgang Pehnt, *Expressionist Architecture*, (London: Thames and Hudson, 1973) 9

<sup>3</sup> Pehnt, *Expressionist Architecture*, 8

<sup>4</sup> In German the Glasserne Kette. I’m using Whyte’s translation from *The Crystal Chain Letters* though it can also be translated as the Glass Chain, as it was by Pehnt and Hanno-Walter Kruft in his *A History of Architectural Theory*.

production or modern methods. They found inspiration in nature and in Northern mysticism. Taut explained the new architecture towards which they strove in the opening letter to the group:

The relation of stars to plants etc. Tancred! Yes? Spiritualization! Where clarity still (or already) exists: world-building, world construction, interpreting the earth, astrology, the horoscope. The highest happiness: transfiguration ... Moving from dream to clarity ... The “New Architecture”: floating, impracticable models: stars and absolute fantasy. Purely festive things. To charm through their mere existence. Probably the most important starting-point for the new architecture.<sup>5</sup>

Taut emphasized three elements that would become essential to the group’s ethos: religious mysticism, nature, and place. He sets a tone of creationism, be it by God (the world, the stars) or by man, and overall there is a sense of mysticism: of aggressively anti-rationalist thought. Nature is evoked in the mention of stars and plants. The letter makes mention of Tancred, a Norman soldier in the first Crusade. This, in addition to the religious tone of the piece, speaks towards the exclusively Western European membership of the group. Place is the final element, and perhaps the least conscientious of the group’s designs. The Crystal Chain, and Expressionism as a whole, was an exclusively German creation. Taut’s landmark work of the period was the book *Alpine Architecture* of 1919 (Image 1.2) – another critical indication that this was entirely a Germanic movement.

This sense of Germanic identity severely limits those who can be called Expressionist architects. Another impediment to classification is that many architects who built or imagined Expressionist architecture had adopted completely different style within five to ten years. Artists of this time of great intellectual upheaval varied greatly

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<sup>5</sup> Bruno Taut as quoted by Iain Boyd Whyte ed., *The Crystal Chain Letters: Architectural Fantasies by Bruno Taut and His Circle*. (Cambridge MA: MIT Press, 1985) 25

in their tastes. Expressionism became a term applied to architecture almost retrospectively, as artists after the war tried to connect various architectural examples. Some individuals, while celebrated by Expressionism, refused to be classified in any particular style. Hans Poelzig, for example, saw himself more as an innovator than as a member of any particular style.

Despite problems with classification, there is today a firmly defined group of artists and art works that are classified as belonging to the Expressionist movement. While these artists may not have worked in this style for their entire careers, it is perhaps enough to say that they did at one moment. Landmarks of Expressionism exist, whether or not they represent the everlasting ideals of their architects. They include Poelzig's Grosses Schauspielhaus of 1918-1919, Mendelsohn's Einstein Tower of 1919, and Gropius and Meyer's Sommerfeld House of 1922. Each of these landmarks display the critical elements of Expressionism, as defined by art historian L. Hilberseimer:

Expressionism aimed at deepening and intensification. Its exponents were men unable to ace the dreadfulness they saw around them. They tried to forget themselves and so became mystical. They took refuge in fantasy and imagination in their flight from technology and machine civilization with all its social and cultural implications.<sup>6</sup>

These works embody this movement towards spiritualism and away from technology, even if their particular artists did not continue to hold these views.

### *Hans Poelzig and the Grosses Schauspielhaus*

Hans Poelzig's early professional career reflected the changing styles of the pre-war period in Germany. After graduating from the architecture program at the Technische Hochschule in Berlin-Charlottenburg he taught there until 1899 when he

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<sup>6</sup> L. Hilberseimer, 122

moved to Breslau to become a professor at the Academy and eventually its director.

Architecture in Germany was experiencing a shift away from the Arts and Crafts inspired Jugendstil, and that movement can be seen in Poelzig's ideological affiliations. He rejected the Jugendstil aesthetic as well as historicism, which he linked to it. Art historian Julius Posener describes the problem of the Jugendstil and historicism:

Both had in common, [Poelzig] said, the fact that they were looking for *the* style; both believed what distinguished a work of architecture from a simple building was that it was decorated, that it wore ornaments and architectural paraphernalia, be it pilasters or cornices, niches or windows with pointed arches, or finally the new curved forms of the Art Nouveau.<sup>7</sup>

Instead of applied style, he gravitated towards the Werkbund, of which Posener says, "The intention was to abolish the difference between a work of architecture and a building."<sup>8</sup>

The Werkbund seemed to satisfy Poelzig's desire to match art with affordability, an ideal that was made possible through the use of modern machinery. While they adopted some of William Morris' arts and crafts ideals, namely that the artist should be a craftsman who took pride in his work, they rejected the exclusivity that hand production created – that only wealthy people could afford to buy. Morris himself noted, "I am making a chair with the sweat of my brow – a perfectly simple chair which will be so expensive that only the richest people will be able to afford it."<sup>9</sup> The Werkbund introduced machine production to open their products to a wider range of people who could not have afforded a hand-made work of art. Poelzig was not as animated an

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<sup>7</sup> Julius Posener, *Hans Poelzig: Reflections on His Life and Work*, ed. Kristin Feireiss (Cambridge, MA: MIT Press, 1992) 6-7

<sup>8</sup> Posener, 7

<sup>9</sup> William Morris as quoted by Posener, 8

advocate of machine as some of his contemporaries in the Werkbund. Posener explains Poelzig's position at the time:

Poelzig was quite definitely a Werkbund man, but his interest was not in the machine that produced objects. What is known as "industrial design" was alien to him. For him the new age, the industrial age, was about construction methods. Yet he never joined in the call to "bring industry to the building site." He never used prefabricated elements; he found them unpleasant. One could perhaps express his attitude as follows: *Let us take the new means of construction for granted, let us use them alongside craft methods, in conjunction with craft methods, so that they open up new possibilities for craftsmanship and in that sense change it.*<sup>10</sup>

So even in this group with which he seemed to fit, Poelzig remained somewhat of a unique case. He preferred maintaining an artist's close connection with the work, but wanted the production to be inexpensive enough to reach a wide audience. Machinery, for him, could still be a tool for creation, but not the reason for creation. As he said, "Let us beware of any effort to emphasize iron and concrete constructions unless the dimensions of the building actually compel their use in determining the form."<sup>11</sup> Iron and concrete could help to realize his designs, but he did not wish to make them the focus, as others in the group were doing. While Peter Behrens designed a factory, Hans Poelzig designed a church, as he did at Maltsch in 1906. This would seem to show the differing views of the role of machinery in architecture among the Werkbund's members.

The break of war in 1914 shattered the optimistic reform led by the Werkbund, which had just established an important exhibition in Cologne in July of that year. The war led to an era of German design dominated by the Expressionists who had taken inspiration from Taut's Glass Pavilion in the Cologne Werkbund Exhibition. The structure of glass was both introspective and mystical. The group strove to transform

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<sup>10</sup> Posener, 8

<sup>11</sup> Hans Poelzig, "On Hans Poelzig by Hans Poelzig," *The American Architect* 78 (1925) 254



“the surrounding world ... into symbolic shapes denoting ... inner meaning.”<sup>12</sup> This was a time when architects, hampered by the lack of materials and perhaps also the impracticality of their forms, designed works that were never meant to be built as an idealistic exercise. During the war Taut sketched his *Alpine Architecture*, Mendelsohn was sketching designs for large, organic buildings, and Poelzig was creating designs such as his “House of Friendship” of 1916 for Constantinople.

But perhaps the clearest example of his fully realized Expressionist works is a project he received for a theatre in Berlin in 1918. After Poelzig’s career at Breslau had ended, and while he was still in Dresden, where he had served as city architect, he received a commission from famous stage director Max Reinhardt to convert an existing building into a theater. The building had originally been a market hall before being converted into a circus when it was bought by Reinhardt in an attempt to create a theatre for the people of the new German republic. The theatre was to bring the spectators into the action, as Reinhardt said, “to bring the actor and the spectator together – as close together as possible.”<sup>13</sup>

What resulted was a theatrical space in many senses. Poelzig, working with the existing iron framework of the circus, created a large open space capped by a hanging dome onto which he affixed small plaster stalactites designed to lessen the negative acoustic effects of a dome. These became the leading motif for the interior where they appeared on all the supports and created a space that was to be popularly known as the “Stalactite Grotto.”<sup>14</sup> (Image 2.1) Heightening the building’s ties to nature, Poelzig put a

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<sup>12</sup> Posener, 10

<sup>13</sup> Max Reinhardt as quoted by J. L. Styan, *Max Reinhardt* (Cambridge: Cambridge University Press, 1982)110

<sup>14</sup> Posener, 122

light bulb at the tip of each stalactite on the dome which would mimic the stars, arranged in various constellations. The structure of the auditorium seemed to grow downwards, with the large dome leading down to small stalactite encrusted pillars which grew thinner as they reached the ground. Certainly the space was one of artifice.

The entire structure was meant to be an expressionist show. The exterior of the building (Image 2.2), which most people neglect in favor of the elaborate decorations on the interior, was seen by Mendelsohn to embody the new architecture's tendency towards towers as representations of mountains in *Alpine Architecture*, "Here we no longer have storeys stacked up one on top of another like steps but the individual components of the architectural mass hurled against one another and thrusting upwards to form a tower."<sup>15</sup> Inside, the foyers were supported by mushroom columns, which, in conjunction with the squat proportions and indirect lighting, gave the audience the feeling they were walking through some underground tunnel instead of in a theatre building.<sup>16</sup>

These elements of nature and of theatricality reflect expressionist ideals. The interiors were reminiscent of caves, which coincides with the Crystal Chain's emphasis on nature. Bruno Taut's *Glass Pavilion* was, for example, referred to as a 'tectonic cave'.<sup>17</sup> Poelzig's imitation of the constellations goes to the very core of the Crystal Chain's goals, as expressed by Wassili Luckhardt in his correspondence to the group: "[Our goal is to evoke] an image of the cosmos in architecture that is more direct, more immediate, and more comprehensive than previously achieved."<sup>18</sup> Poelzig's conceptualization of this building as a total work of art – as an entire experience for the

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<sup>15</sup> Erich Mendelsohn as quoted by Pehnt, *Expressionist Architecture*, 18-19

<sup>16</sup> Pehnt, *Expressionist Architecture*, 17

<sup>17</sup> Pehnt, *Expressionist Architecture*, 18

<sup>18</sup> Wassili Luckhardt as quoted by Whyte, 31

viewer, is also undeniably linked to Expressionism. The Expressionists sought, as Poelzig wrote in one of his papers, to “remodel the earth’s surface sculpturally.”<sup>19</sup> Poelzig’s environmental creation certainly had an effect on theatergoers. In addition to the readily apparent aesthetic qualities of the building, the auditorium’s shape, with an extended proscenium, allowed the audience to surround the actors and to see one another. The audience was therefore made a participant in the space, both seeing and being seen. An additional benefit of the theatre’s large capacity was that ticket prices were low, and there was less stratification of seating based on cost. This project was in every respect “food for the hungry”<sup>20</sup>, as Pehnt calls it – giving popular theatre an outlet and allowing regular people to interact with a work of art that they could understand emotionally, rather than intellectually. As Pehnt says, “the addressee [of this type of architecture were] the people as a whole. In [their] most subjective creations, it was in the name of this concept of the people that Expressionist architects believed themselves to be acting.”<sup>21</sup>

Poelzig’s affiliation with Taut and the Expressionists grew stronger in the late 1910s and early 1920s. At the time of the Grosses Schauspielhaus, he still considered himself part of the Werkbund, although he did not completely share their ideals.<sup>22</sup> The theatre project in Berlin, however, secured his place in the Expressionist movement. The Grosses Schauspielhaus was his total work of art, his act of genius. Herman Scheffauer, a contemporary reviewer, saw him as the genius creator:

From every building that emerges under his hand there breathes a kind of architectonic sermon. His buildings ... seem to preach a new

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<sup>19</sup> Hans Poelzig as quoted by Pehnt, *Expressionist Architecture*, 19

<sup>20</sup> Pehnt, *Expressionist Architecture*, 16

<sup>21</sup> Pehnt, *Expressionist Architecture*, 22

<sup>22</sup> Posener, 126

reconciliation between architecture and religion ... The sculptural is so strong a feature of Poelzig's genius that there remains about most of his creations the impression of having been cast in one molten throw, or hewn with boldest strokes with a modeling tool out of some plastic material ... The effect, to be sure, is in its way more theatrical than architectural.<sup>23</sup>

The theatricality of his buildings shows him to be an Expressionist, as he was more concerned with atmosphere than functionality. But it was the idea of genius creator that really tied him to the Expressionists, who promoted themselves as high thinkers and world creators. Pehnt describes this as, "the last time when the members of a profession felt themselves to be a community of the chosen, probably the last time when they surrendered themselves to the cult of genius with a clear conscious."<sup>24</sup> Poelzig himself seemed to promote the idea of himself as an individual genius who held an almost mystical role as creator: "Today it is especially difficult to be an artist and a prophet ... I am endeavoring, on the basis of present day building methods, to arrive at rhythmically musical expression."<sup>25</sup> His poetic description of his work and his linking artist and prophet show his propensity to elevate the artist, as the other Expressionists did. Poelzig created, in the Grosses Schauspielhaus in Berlin, one of the monuments of Expressionist, and anti-mechanical architecture.

### *Erich Mendelsohn and the Einstein Tower*

Unlike Poelzig, Mendelsohn built virtually nothing before the war, and so the Expressionist phase of his career was not an interim stage, but the first.<sup>26</sup> As a soldier, he also felt a far greater impact from the war than Poelzig who was teaching throughout the

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<sup>23</sup> Herman George Scheffauer, "Hans Poelzig," *Architectural Review* 54 (1923) 122-27

<sup>24</sup> Pehnt, *Expressionist Architecture*, 34

<sup>25</sup> Poelzig, 253-55

<sup>26</sup> Pehnt, *Expressionist Architecture*, 117

war. Mendelsohn's works through the 1910s are closely linked to the war, and they seem to quite clearly reject the war and its machines.

From 1914 through the end of the war, Mendelsohn served in the German army, first along the Eastern (Russian) front, and then moving in 1918 to the Western Front for the remainder of the fighting. It was during this time, while being bombarded daily by enemy fire, that Mendelsohn had a vision of a new world; one without war. In a letter to a friend he wrote,

The horror of the Fate which is daily ready to fall upon us, the fact that lives are constantly so subject to limitation, must ever and anon bring an agitation, a longing to get behind the things which are, or understand this delirium, or at least to record it, and to take some part in this murderous and monstrous fate.... But the law of self-preservation demands that one hold fast. Here contingencies of death celebrate Dionysian festivals, but the law of life demands the utmost .... Out of contrast Harmony alone can come; out of despair the finale's mystical embracing of the adagio. The binding of life with its form. Law of tension in matter and spirit.<sup>27</sup>

During his time in the trenches, Mendelsohn made sketches of buildings he imagined would constitute the new world, after war. (Image 3.1) These were almost always industrial buildings, but they did not resemble any that existed at the time. They are sinuous and bulging masses almost always shown at an angle; and from this vantage they seem full of movement and vitality. His buildings seem to have a personality. These buildings consist of shadow and light, and are far from linear plans. They are impressions of buildings that existed, fully formed, in Mendelsohn's mind and were thus recorded.

Mendelsohn wrote of these sketches,

My sketches are only notes, outlines of sudden visions, although they are all in the nature of buildings. It is very important to record these visions on paper as they flash through the mind, because every new creation

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<sup>27</sup> Erich Mendelsohn as quoted by Arnold Whittick, *Eric Mendelsohn* (London: Faber & Faber Ltd., 1940) 49-50

carries with it the seed of potential growth, and, following a process of evolution, becomes a human being.<sup>28</sup>

As Mendelsohn biographer Bruno Zevi points out, “It was impossible for Mendelsohn to split up the architectural object into plans, sections, and facades. A building contains dynamic human activity, and is convincing only in its expression of this activity.”<sup>29</sup> In other words, it was to the person, not to the machine that these buildings belonged. A building could not exist in just three dimensions or possess just one definite form. As Zevi wrote:

Albert Einstein has taught us, “objects do not exist in space, although they are spatially extensive,” and this revolutionary principle is embodied in Mendelsohn’s works. To be ‘spatially extensive’ means to lack prior form, and to acquire this form spontaneously in time. In the end, one does not even wish for a definite form. A building is nurtured in the moment of its construction, and is always available to any sort of change.<sup>30</sup>

That buildings are ever changing, ever evolving, makes them take on human characteristics. Mendelsohn’s building for human beings separates him from the functionalist movement, which seemed content to remove humans from the architectural equation. As he said, “function without sensibility remains mere construction.”<sup>31</sup> This sense of humanity also linked him to the Expressionist movement.

He was, in fact, somewhere between the poles of architecture: the functionalists and the dynamists. Of the struggle between these two, he wrote in 1919:

If the rationalist’s blood does not freeze, and mere imagination goes a step further towards ratio, then all may unite. Otherwise both will be destroyed – the functionalist by a deadly chill in his veins, the dynamicist by the heat of his own fire. Thus, function plus dynamics is the challenge.”<sup>32</sup>

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<sup>28</sup> Erich Mendelsohn as quoted by Bruno Zevi, *Erich Mendelsohn* (New York: Rizzoli, 1985) 24

<sup>29</sup> Zevi, 26

<sup>30</sup> Zevi, 26

<sup>31</sup> Erich Mendelsohn as quoted by Wolf von Eckardt, *Eric Mendelsohn* (New York: George Braziller, Inc., 1960) 11

<sup>32</sup> Erich Mendelsohn as quoted by Eckardt, 11

Mendelsohn's first major project was to incorporate his wartime sketches with his interest in Einstein's theory of General Relativity. It would also attempt to bridge the gap between function and dynamism.

In 1919 the German government ordered a tower built in Potsdam to further the research of Albert Einstein, whose Theory of Relativity had made its mark on the scientific community. This building was to house an observatory and astro-physical laboratory for the investigation of spectro-analytical phenomena.<sup>33</sup> Mendelsohn had, before the war, become friends with a professor of astronomy and collaborator of Albert Einstein, Finlay-Freundlich. This friendship had caused Mendelsohn to make experimental sketches for observatories as part of his series of wartime sketches. After the war, these sketches made their way back to Freundlich who proved instrumental in convincing Einstein and the authorities of the Potsdam Observatory to hire Mendelsohn for the project.<sup>34</sup>

Mendelsohn created an undulating building whose form seems dictated by a need for plasticity. (Image 3.2) Wolfgang Pehnt says of it:

The Einstein Tower is one of the most impressive of German Expressionist buildings. It looks as though it was kneaded by some godlike hand, to create a dramatic play of light and shade – the light modulated by the curved surfaces, and the shade cutting deep into the mass of the building, forcing it open. No other building of the period invites such anthropomorphic epithets – grim, threatening, defiant ... It crouches on the ground like a sphinx, with paws flexed ready to spring.<sup>35</sup>

This is a building of movement and light and is certainly related to those projects

Mendelsohn had sketched during the war. This building was the realization of those

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<sup>33</sup> Whittick, 63

<sup>34</sup> Whittick, 63

<sup>35</sup> Pehnt, *Expressionist Architecture*, 121

drawings and in many ways the apotheosis of the Expressionist movement. In 1923 Herman George Scheffauer, a contemporary critic, viewed the building as a place of almost mystical quality:

It is in part observatory, laboratory, scientific cloister and academy, a temple for the most abstruse and ethereal experiments, an underground retreat and study for the master of the Theory of Relativity and his disciples. The building, mysterious even in its outward aspects, attains to something of an esoteric scientific uncanniness within. We are in the brilliant crypt of the modern alchemists and sorcerers, in an arcanum of subtle discovery, one of the radiant poles where the ultimate mysteries of the cosmos, of time, of space, and of the eternal forces are being weighed, analysed, and interpreted.<sup>36</sup>

From the outset, this was more than a laboratory building, it was a monument to the man who gave order to the cosmos. It is not surprising that this building was immediately considered one of the monuments of Expressionism.

But Mendelsohn's own thoughts about the building suggest that it was meant more as a compromise than as a pillar of idealism. He had always envisioned this to be a monument to science and to a new world order. He envisioned that the post-war period would be dedicated to science, not war, and that the monuments of this period would therefore be dedicated to those scientists. His solution was to build a monument to Einstein and relativity. He anticipated that his use of concrete and the technical nature of the instruments inside would counteract the undulating, expressive quality of the architecture outside. He wanted a building both of mass and of light.<sup>37</sup>

As built, however, the building takes on a much more anti-machine appearance than Mendelsohn may have wanted. The sinuous curves of the tower's vertebrae, the modular sections that bulge in the spine of the tower, seem so human and so far removed

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<sup>36</sup> Herman George Scheffauer, "Erich Mendelsohn," *Architectural Review* 53 (1923) 158

<sup>37</sup> Kathleen James, *Erich Mendelsohn and the Architecture of German Modernism* (Cambridge: Cambridge University Press, 1997) 31



from the machine architecture of the functionalists that the building seems far more Expressionist than Functionalist. The exterior architecture dwarfs the interior purpose. Even the monument to science, as Mendelsohn envisioned it, seemed more a temple to a strange and mystical theory. The tower fit into the Expressionist's alpine architecture program, which celebrated the form of the tower. On viewing the building, Einstein's one word description was, "Organic."<sup>38</sup> Essentially, the building that was meant to be a compromise of new forms turned into a monument of Expressionism and the rejection of the machine.

#### *Walter Gropius and the Adolf Sommerfeld House*

Walter Gropius presents an interesting comparison to the architects examined thus far. Like Poelzig, he was closely related to the Expressionist movement. He was, in fact, a member of the radical Crystal Chain group. Like Mendelsohn, he participated in the war, and was actually in a plane that was shot down.<sup>39</sup> Unlike Poelzig or Mendelsohn, Gropius was already a well known architect in Germany when he entered the war. Whereas Poelzig's notoriety was mostly restricted to his factories in Breslau, Gropius' works had made him the preeminent young architect nationwide.

Gropius' first major architectural success was his design for the Fagus Works at Alfeld an der Leine in 1911. (Image 4.1) This design conceptualized space in a new way.<sup>40</sup> Instead of the building being massive, it was now volumetric. Glass opened up the walls, and the exterior became little more than a skin to keep the elements out. This

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<sup>38</sup> Whittick, 64

<sup>39</sup> Siegfried Gidion, *Walter Gropius: Work and Teamwork* (New York: Reinhold Publishing Corporation, 1954) 9

<sup>40</sup> Alberto Busignani, *Gropius, Twentieth Century Masters* (London: Hamlyn, 1972) 16

reduction of forms, of conceiving the building in terms of its elements, can be traced back to Gropius time working for Behrens. Behrens', in his AEG Factory of 1909 reduced the building to its essence, essentially what Gropius did for the Fagus Company.

Gropius' next major work came in conjunction with Adolf Meyer (his partner in the firm, Gropius and Meyer), in the Werkbund exhibition in Cologne of 1914. Here his work showed a continuing move towards volumetric and stripped down, essential architecture. His buildings also showed a move towards modern, in some cases prefabricated materials. There was, as art historian Alberto Busignani points out, still a connection to nature:

The Werkbund building has an open link with the reality around it, which is considered and valued as a natural one; the space, created by the action of the people using it, is seen in relation to an organic space that exists around it; these two kinds of space, the outer and the inner, interpenetrate each other in a way that is characteristic of [Frank Lloyd] Wright's work as well.<sup>41</sup>

Gropius, as could be seen in the Fagus factory, was interested in the relation of space, that of interiors and exteriors, and the interaction of the two. This idea would resurface in his later International Style buildings. It is also worth noting Gropius' connections to Frank Lloyd Wright, which would become more obvious in his next work, the first of his post-war career.

Walter Gropius' first building after the war shows a distinct departure from his pre-war works. If they were about modern materials and volumetric space, the Adolf Sommerfeld House of 1921 (Image 4.2) was about natural materials as part of a massive structure. The building is symmetrical about a large, accentuated front entrance, and sits on a solid stone foundation. To look at it, one would assume that Gropius' experiences in

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<sup>41</sup> Busignani, 19

the war had soured him on modern construction and materials. Indeed, Pehnt suggests that “[Gropius’] war experiences had completely shaken his confidence in the positive effects of technology and industry.”<sup>42</sup> Pehnt describes the rejection of technology in the building’s primitive nature:

The deliberate primitiveness of the building goes hand in hand with a number of studied artistic effects. The stepped treatment of the wall surface, the entrance with angular projections, the projecting timber balks and the horizontal and vertical movements of the eaves, that cast deep shadows, all serve to break up the volume of the building visually.<sup>43</sup>

The horizontality and play of light and dark can certainly be related to Wright’s Prairie Style homes from the turn of the century. Wright’s style had come from the pioneering spirit of America, no doubt a desirable spirit for a post-war Germany.<sup>44</sup> The most striking lesson Gropius learned from Wright, and which is most evident in the construction of the Sommerfeld House concerns its material.

Whereas Gropius’ earlier works were of glass and steel, this first post-war construction was of wood. Granted, Adolf Sommerfeld was in the timber business, for which the house could be considered an advertisement, but the choice of materials runs deeper than that. Gropius saw the Sommerfeld House to be an expression of the “idea which I have been pursuing for many years: the unification of all the arts in the service of building.”<sup>45</sup> In 1919, he penned the Bauhaus manifesto, creating a new school for the creation of art for the “New Man” of the post-war period. Pehnt describes this manifesto in terms of its position on architecture, “Sculpture, painting, applied art, and handiwork had to be developed separately before they could unite in the ‘great building’ that would

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<sup>42</sup> Wolfgang Pehnt, “Gropius the Romantic,” *Art Bulletin* 53.3 (1971) 392

<sup>43</sup> Pehnt, *Expressionist Architecture*, 111

<sup>44</sup> Busignani, 24

<sup>45</sup> Gropius as quoted by Pehnt, “Gropius the Romantic,” 384

house the New Man.”<sup>46</sup> This new school and especially its focus on handiwork directly play into the choice of wood as a medium. Its ability to be carved and made into any form, as well as its distance from pre-production make it the material of choice for this new line of thinking. Gropius even goes so far as to name it *the* medium of the new age:

A new era also needs a new form. We must re-experience wood, rediscover it, re-form it, according to our own spirit and without imitating old forms that no longer suit us. It is no accident that precisely the youngest artists like to carve their ideas in wooden logs and tree trunks; they are the ones who instinctively maintain connection with modern life. Every material has its beauty, its possibilities, and its time. Wood is the building material of the present.”<sup>47</sup>

That “present” was brief, however, and Gropius distanced himself from wood only one year later with his entry into the Chicago Tribune competition of 1922. The idea of craftsmanship remained, however, even though wood would no longer be the material of choice. Classes at the Bauhaus would continue to emphasize the artists’ relation to their work, even if the architecture was moving more towards pre-fabrication and modernity.

The Adolf Sommerfeld House represents the moment in the career of Walter Gropius where he veered away from the modern projection his later career followed. Its form and function both suggest a rebellion against the machine. While his earlier works were factories, this was a private house. Whereas the other buildings were of glass and steel, this was of wood. This was, as Busignani suggests, “an ‘object’ for dwelling in”.<sup>48</sup> One could view this statement as a direct parallel to Corbusier’s ‘machines for living in’. If Corbusier made machines, Gropius made an object. Though this moment was to pass quickly, the Sommerfeld House remains an object of anti-machine design from the post-war period.

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<sup>46</sup> Pehnt, “Gropius the Romantic,” 383

<sup>47</sup> Walter Gropius as quoted by Pehnt, “Gropius the Romantic”, 384

<sup>48</sup> Busignani, 24

It is only natural that after such a debilitating war, where machines served as means of destruction for homes and men, that some people were reticent to accept new technology. Architecture was no different as architects, many of whom had fought in the war, needed time to return to the new technology that, although used in the pre-war period, now seemed too closely linked to the war itself.

The Expressionists gave direction to this sentiment, pushing for an architecture that served the human soul, rather than the machine. Bruno Taut and others formed the Crystal Chain as an anti-machine movement that strove to return architecture to a mystical, divine realm. Taut wrote, “A house should be nothing other than beautiful. The visitor will be filled with the joy of architecture, which will drain all human elements from his soul and make it a receptacle for the divine.”<sup>49</sup> They believed that architecture had the power to connect to the viewer and create a connection to the soul which would help to heal the scars of war.

This type of architecture could no longer be produced by a factory director, but by a genius creator. The Expressionists saw themselves as almost God-like, with Taut molding mountains in his book *Alpine Architecture*, and Poelzig creating a stalactite grotto for the Grosses Schauspielhaus. Mendelsohn’s tower follows this monumental trend in architecture, creating a monument to the cosmological theory of Albert Einstein. These were buildings that were crafted by ‘God-like hands’, as Pehnt calls them. They attempted to tackle the forms of the universe.

Gropius’ Sommerfeld House is representative of the other trend in the anti-machine movement. Gropius, a noted pre-war designer of factory buildings did a

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<sup>49</sup> Bruno Taut as quoted by Henry van de Velde as quoted by Hanno-Walter Kruft, *A History of Architectural Theory: From Vitruvius to the Present*, Trans. Ronald Taylor, Elsie Callander and Antony Wood (Princeton NJ: Princeton Architectural Press, 1994) 374

complete about-face after the war and built a log cabin for his client. This was a clear rejection of the machine for more primitive and solid forms of architecture.

These three buildings: the Grosses Schauspielhaus, the Einstein Tower and the Sommerfeld House are buildings that rejected the machine in the period immediately following the war. The architects did not always see their buildings as clearly as the public did (Mendelsohn claimed his building to be a balance of modern materials and expressive forms), but the buildings speak for themselves. They represent a distinct time in the several years immediately following the war, before architects turned back to machines as a means for modernity.

### *The Machine as Means to an End*

Another group of architects active in the post World War I period neither rejected nor wholeheartedly accepted the machine as an architectural model. This group recognized the machine as a means to an architectural end, but not the end itself. They would use industrial elements like prefabricated components and factory-made pieces, but they did not embrace the machine as an aesthetic.

This is perhaps the most difficult group to define, and yet the easiest for which to find examples. Architects like Erich Mendelsohn, whose Einstein Tower is considered a monument of Expressionistic architecture, wrote as if he belonged to this group. Some artists who initially rejected the machine eventually fell into this category. This is a group that distanced itself from the machines of war both temporally (with about five years passing from the end of the war before the first examples of this type of architecture appear) and ideologically. Henry van de Velde, whose works could be considered to blend the artistic and industrial, wrote:

It is clear that machines will eventually have to make good all the misery they have caused, and atone for the atrocities they have committed ... They produce beautiful things and ugly things indiscriminately. But the mighty power of their iron arms will produce beautiful things as soon as they are governed by beauty.<sup>50</sup>

Here we see both apprehension and optimism surrounding the machine that comes from witnessing both their potential to destroy and their potential to build.

This type of optimism about the building capability of the machine echoes back to the early 1900s when Behrens and Gropius designed factories that presented themselves as art. Behrens created a temple to the machine in his AEG factory of 1909, while Gropius gave a whole new aesthetic to his factory buildings at Alfeld an der Leine and

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<sup>50</sup> Henry van de Velde as quoted by Kruft, 382

Cologne in 1911 and 1914 respectively. To say that the creative force of the machine was a post-war phenomenon would be blatantly false. In fact, as we have already seen, the war tempered many architects' earlier enthusiasm for the machine, spawning Expressionism, which searched for the humanistic rather than the mechanical element of architecture.

As time wore on, however, it seemed that architects who once rejected the machine found themselves returning to it. Poelzig and Taut, who were leading architects of the anti-machine movement, eventually became more reliant on mechanized construction methods. But perhaps Walter Gropius returned to the machine with the most vigor of them all.

Gropius had been a leading proponent of an industrial architecture before the war only to move towards a more human-oriented architecture directly following it. As time passed Gropius began to move back towards the impulse that shaped his design for the Fagus Factory and the Werkbund exhibition model factory buildings. Working at the Bauhaus, he became concerned with efficiency and cost-effective methods of construction. Hand-crafted wood houses were no longer a model for the Bauhaus. The factory became the new paradigm of design.

With this in mind, Gropius set about implementing his new architecture, and at the same time rebuilding Germany. The machines that had destroyed buildings in war could now be used to build them. The most complete model for this new machine-driven architecture was the new Bauhaus building he designed in 1925 in Dessau. Housed in a factory-like setting, students learned to create art in a new machine age. Gropius also put his theories for production and social outreach in practice when he designed large-scale



housing projects like the Toerten-Dessau project. Here he was able not only to implement his new methods, but also to create low cost housing. This social design theory was not restricted to Gropius, however. Social responsibility and modern design methods found numerous supporters. Architects of the time followed the guidelines of the style that was to become known as the International Style, which followed many of the same goals that Gropius had established. This style was showcased in the 1927 Weissenhof exhibition in Stuttgart, where the mechanical building style shaped almost all of that workers' housing demonstration.

This style of machine-driven architecture rose from the ashes of the post-war humanist movement. Where Expressionism became impractical, the new style, made possible by industrial building methods became the ideal.

### *The Bauhaus*

The new architecture was to be manufactured by the machine process and designed by a new group of architects. Gropius, having moved past his Expressionist phase in the early 1920s, became increasingly interested in the capabilities of machines to transform architecture. He also looked towards the new breed of architects who would create such machine architecture. What came of his search was the Bauhaus, a school that sought to give the artist complete control over every aspect of art. Gropius said of this concept, "By depriving handicrafts and industry of the informing services of the artist the academies drained them of their vitality."<sup>51</sup> The artist was a part of his art, even with

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<sup>51</sup> Walter Gropius, *New Architecture and the Bauhaus*, Trans. P. Morton Shand (Cambridge MA: MIT Press, 1965) 58

the introduction of the machine. Certainly this school represented a bold new direction for architecture, but the school was not always so focused on the mechanical aspect.

When it was created in the late 1910s the Bauhaus did not place the same emphasis on industrial production as it would later. Springing from the School of Arts and Crafts in Weimar, the early history of the Bauhaus seems closer to mysticism than mechanisms. This early Bauhaus was largely responsible for the design and execution of the Sommerfeld House in Berlin, the noted Expressionist structure. The humanness of the structure can be traced, in large part, to the beliefs and teachings of Johannes Itten, who was a prominent faculty member of the early Bauhaus. Itten believed that art was a highly spiritual undertaking, and should be treated as such; it was not simply a matter for machines. Itten wrote of this belief:

The terrible losses and horrible events of World War I ... made me realize that we had reached a crucial point in our scientific-technological civilization ... I reached the conclusion that we must counter-balance our externally-oriented scientific research and technological speculation with inner-directed thought and practice.<sup>52</sup>

If the war was about machines, then art should be about something different. It should be about the soul. Itten's philosophy left a direct impression on the Bauhaus, as Wolfgang Pehnt explains:

Itten believed in an original state of creativity within every single individual. The relaxation and concentration exercises, and even the morning songs and chants ... were integral parts of his teaching method. Itten not only wanted to explore the objective laws governing formal and structural means: he wanted also to free the creative powers of the individual and to guide him towards an experience of things that was mystical.<sup>53</sup>

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<sup>52</sup> Johannes Itten as quoted by Kenneth Frampton, *Modern Architecture: A Critical History*, 3<sup>rd</sup> Ed. (London: Thames and Hudson, 1992) 125

<sup>53</sup> Pehnt, *Expressionist Architecture*, 110

Itten was, in both theory and practice, something of a mystic – a position that did not seem well suited for the upcoming period of the Bauhaus. As it turned out the Bauhaus, and Gropius in particular, shifted away from Itten and his philosophy. Gropius wrote, “The teaching of craft is meant to prepare for designing for mass production.”<sup>54</sup> The school was moving in a distinctly different direction, and in 1923, Itten was replaced.

László Maholy-Nagy joined the Bauhaus faculty that year, and soon took Itten’s position as Gropius’ most influential faculty member. Maholy-Nagy represented the change towards industrial production that Gropius and the Bauhaus wished to pursue. His inclinations towards machine production are evident in his writings:

In 1922 I ordered by telephone from a sign factory five paintings in porcelain enamel. I had the factory’s color chart before me and I sketched my paintings on graph paper. At the other end of the telephone the factory supervisor had the same kind of paper, divided into squares. He took down the dictated shapes in the correct position.<sup>55</sup>

It is clear that Maholy-Nagy was not concerned with an ‘individual state of creativity’ as Itten had been. For him, art seemed to be the result of design and execution, rather than conception and creation.

The industrial process seemed to be a means to an end for Maholy-Nagy and for the Bauhaus of this time. Gropius later wrote of the school’s aims:

I insisted on manual instruction not as an end in itself, or with any idea of turning it to incidental account by actually producing handicrafts, but as providing a good all-round training for hand and eye, and being a practical first step in mastering industrial processes. The Bauhaus workshops were really laboratories for working out practical new designs for present-day articles and improving models for mass-production.<sup>56</sup>

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<sup>54</sup> Walter Gropius as quoted by Frampton, 126

<sup>55</sup> László Maholy-Nagy as quoted by Frampton, 126

<sup>56</sup> Gropius, *New Architecture and the Bauhaus*, 52-53

Gropius leaves no doubt as to the role of the machine in the Bauhaus programme. The students were being trained to design a new art that could be mass-produced through industrial processes.

If this new art was to be manufactured, it makes sense that it would be taught in a factory; and this is exactly what Gropius designed for the school upon its move to Dessau in 1925. (Image 5.1) The building itself would be a dynamic fulfillment of a complex set of requirements. In addition to the school itself, with its various classrooms and educational spaces there was need for student residences, an auditorium with a stage, a dining hall, administration offices, and a studio for Gropius himself. Siegfried Giedion describes Gropius' approach towards including these diverse functions in one structure, "Gropius' chief aim was to demarcate each of these elements quite distinctly without isolating one from another, and at the same time to give architectural unity to the whole."<sup>57</sup> That these diverse functions were brought under one roof seems fitting for a school whose goal was to unify the various arts and crafts under the heading of architecture. (Image 5.2) That it could be reasonably accomplished speaks to Gropius' achievement in Dessau.

The building appears in many respects to be a factory. It is made of three relatively large sections connected by arms which pull the complex together. The workshop building, what can be called the main building<sup>58</sup>, stands in the center of a plan that spirals out from it. To the east are the student residences, to the north the Technical School. Connecting the residences to the workshops is a long, one story building that

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<sup>57</sup> Giedion

<sup>58</sup> This is the most prominent building when approaching from the town to the South. In addition to being in the center of the plan, it is also labeled with the famous Bauhaus sign on the Southern façade. It is almost always the building of the complex that gets photographed.

housed the stage and the dining room. Connecting the Technical School to the Workshop building is a two story bridge, over the roadway, which contained the administrative offices. This building is an assemblage of these diverse pieces very much in the spirit of a factory-assembled object.

The building's connections to industry go beyond its plan, however. The most striking feature of the Bauhaus is the three-story glass curtain wall that envelopes the Workshop building. This is a direct advertisement of the structural system of the building. Certainly such a wall could not be load bearing, suggesting that in fact it was a concrete structure that allowed for such a structurally insignificant wall. The Bauhaus makes additional, less apparent suggestions about its connection with machinery. Firstly, the administrative bridge over the road allows the relatively new technology of the automobile to enter and pass through the architectural space. Such an element would not have been built even ten years earlier, when there were few cars to venture through. This acceptance, and perhaps invitation of, modern machinery is noteworthy. Secondly, we must consider the letters on the Southern façade of the Workshop building in the light of Maholy-Nagy's earlier wonderment over the possibilities of the design process. This sign seems to bear comparison to the enamel signs he ordered over the telephone. The letters are industrially produced and act as industrial packaging for the school itself.

The Bauhaus aligned itself with the machine in every way. From the faculty, to the curriculum, to the school house itself, the Bauhaus saw industry and the factory as signs of modernity. Gropius wrote of the Bauhaus' goals, "The Bauhaus was anything but a school of arts and crafts, if only because a deliberate return to something of that kind would have meant simply putting back the clock. For now as ever, man goes on

improving his tools in order to spare himself more and more physical toil and increase his leisure proportionately.”<sup>59</sup> Gropius saw the machine as a rational tool for the betterment of humanity, a lesson he taught at the Bauhaus, and at a model he would build several miles away, at Toerten.

### *Gropius at Toerten-Dessau*<sup>60</sup>

The pursuit of a machine-made architecture was powerfully linked to the contemporary movement to build large scale housing projects. The ability to build numbers of dwellings efficiently and economically had to seem like the perfect solution to the post-war housing crisis.

World War I’s impact on housing in Germany was two-fold. First the war was responsible for wide-spread destruction around the major urban areas. Rebuilding these urban centers was to become a priority in the 1920s. Secondly, post-war penalties put on the German government sent the country’s economy spiraling downwards. Money was scarce, and “low-cost” would become the watchword of the decade. A cost-effective way of creating large-scale housing projects seemed the ideal solution to both problems.

Gropius recognized the opportunity to rationalize and mend the effects of war via his mechanical designs. Machines which had destroyed Germany could, with the help of reasonable artistic guidance, rebuild it. He had already, in the Bauhaus and his factories before the war, shown a penchant for machine architecture. Now was his opportunity to apply his processes to housing. Gropius believed that society’s problems could be fixed with reason and rationality: “If we succeed in carrying out the process of

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<sup>59</sup> Gropius, *New Architecture and the Bauhaus*, 76

<sup>60</sup> Gilbert Herbert, in his book *Dream of a Factory-Made House* calls the settlement Toerten-Dessau, as does Siegfried Giedion. Another spelling appears to be Törten, which seems to be from German.

industrialization, our social, economic, technological and even artistic problems will be easy to solve.”<sup>61</sup> That Gropius compares industrialization to society is no surprise, as building and society were tightly linked: “The art of building is contingent on the coordinated team-work of a band of active collaborators whose orchestral cooperation symbolizes the cooperative organism we call society.”<sup>62</sup> These collaborators could be men, working side by side, but they could also be the relationship between man and machine; artist and tool. It was with this idea of an artist wielding an industrial tool that Gropius designed the Toerten-Dessau housing system. (Image 6.1)

In Gropius’ modern building system, the mechanistic, industrial process was integral. He wrote, “We are approaching a state of technical proficiency when it will become possible to rationalize buildings and mass produce them in factories by resolving their structure into a number of component parts. Like boxes of toy bricks, these will be assembled in various formal compositions in a dry state,”<sup>63</sup> and more to the point, “Building is a technical, not an aesthetic process, and time and again the artistic composition of a house has contradicted its practical function. Planned in ideal and basic terms, our house will become a piece of machinery.”<sup>64</sup> These statements reveal an architect who in 1926 was ready to create not just a house, but a machine. His solution was to create an efficient system of building at Toerten-Dessau that he would attempt, for the first time, to put his theoretical design ideals into practice.<sup>65</sup>

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<sup>61</sup> Kruff, 387

<sup>62</sup> Gropius, *New Architecture and the Bauhaus*, 57

<sup>63</sup> Gropius, *New Architecture and the Bauhaus*, 39

<sup>64</sup> Kruff, 386

<sup>65</sup> Gilbert Herbert, *Dream of the Factory-Made House: Walter Gropius and Konrad Wachsmann* (Cambridge MA: MIT Press, 1984) 43

The result was notable for the construction methods the exercise produced. To speed the construction process, building components were constructed and moved to the site via trolleys on train tracks which ran along the main roads of the development. (Image 6.2) Cranes would then place the standardized beams, walls, floors and roofs into position. Gropius saw the design process as almost a mathematical equation, with each piece a variable to be controlled through careful planning:

The principle of work at the site was to reuse the same man for the same phase of the construction in each block of houses and thereby increase output ... In order to insure the interlocking of the individual construction phases from the start of the rough construction and interior work, an accurate timetable was worked out, similar to the ones used by railroads.<sup>66</sup>

Men and machines became the variables controlled in order to reach a higher output. Efficiency was increased as variation was decreased. Rational planning reduced variation as accuracy and repetition, two benefits of factory production, were accentuated.

This, however, leads to an interesting dilemma: does the introduction of standardization into art create the potential for the dissolution of artistic endeavor? Does industrial-style repetition reduce the need for artists? Gropius recognized that this could be a concern, but shrugged it off, arguing that while standard parts would be recognizable, artists would still be able to choose among these parts and accent them in personal ways:

The repetition of standardized parts, and the use of identical materials in different buildings, will have the same sort of coordinating and sobering effect on the aspect of our towns as uniformity of type in modern attire has in social life. But that will in no sense restrict the architect's freedom of design. For although every house and block of flats will bear the unmistakable impress of our age, there will always remain, as in the clothes we wear, sufficient scope for the individual to find expression for

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<sup>66</sup> Herbert, 44



his own personality. The net result should be a happy architectonic combination of maximum standardization and maximum variety.<sup>67</sup>

Gropius saw towns made up of standard buildings where the art, he felt, came from the differentiation of these standard buildings – how an architect differentiated his building from the rest.

The housing development at Toerten-Dessau seems to be only a step in the right direction toward Gropius' goal of a pre-fabricated house. As he explains, "A pre-fabricated house can be loaded on to a couple of lorries at the factory – walls, floors, roof, fittings and all – conveyed to the site, and put together in next to no time regardless of the season of the year."<sup>68</sup> This 'dry' construction method was not realized at Toerten-Dessau. Most of the concrete was mixed on site, and the building operations resembled well-established ones that had been in place for years. Gilbert Herbert says of the situation, "This project cannot be considered as prefabrication, nor did Gropius so consider it. All work was carried out on the site, much of it by traditional means. Yet it is a form of industrialized building, with the organization of site operations as a whole work process analogous to the factory."<sup>69</sup> Here was a great step forward in the implementation of the industrial process in the field of architecture, but it was not yet a complete vision.

### *The International Style at Weissenhof*

Other architects were also working toward a modern architecture of the machine during this period. Ludwig Mies van der Rohe, working in Germany, was regarded as

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<sup>67</sup> Gropius, *New Architecture and the Bauhaus*, 40

<sup>68</sup> Gropius, *New Architecture and the Bauhaus*, 43

<sup>69</sup> Herbert, 44

one of the masters of the young Modernist movement. Le Corbusier, in France, was also developing his own brand of modern architecture. And outside of Europe too, young architects like Richard Neutra in the United States were experimenting with machine architecture. Modernism, at this point, was not yet an established entity, although architects throughout the world were arriving at some similar conclusions. Modernity and the machine were driving forces, and in 1927 they drove the greatest European Modernists to southwest Germany.

Mies, by this time the head of the Deutscher Werkbund, appointed a year earlier, prepared an exhibition of modern architecture in the Weissenhof part of Stuttgart. (Image 7.1) This would be the group's second exhibition, the first having given Gropius a chance to show the potential of mechanical architecture in Cologne a decade earlier. This exhibition would aim to perform a similar task: to demonstrate both the achievement of modern architecture, and to point where it was going. Mies seized the opportunity to show the widespread trend in architecture towards a mechanistic modernity by selecting a diverse group of architects, the best in Europe, to present their ideas of a modern building. Of this ambitious plan, Mies explained:

I have refrained from laying down a rigid program in order to leave each individual as free as possible to carry out his ideas. In drawing up the general plan I felt it important to avoid regulations that might interfere with free expression ... In spite of its technical and economic aspects, the problem of the modern dwelling is primarily one of building-art ... It is a complex problem of planning and can therefore be solved only by creative minds, not by calculation or organization. Therefore, I felt it imperative, in spite of current talk about 'rationalization' and 'standardization,' to keep the project from being one-sided or doctrinaire. I have therefore invited leading representatives of the modern movement to make their contribution.<sup>70</sup>

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<sup>70</sup> Mies van der Rohe as quoted by Peter Blake, *The Master Builders: Le Corbusier, Mies van der Rohe, Frank Lloyd Wright*, 1960 (New York: W.W. Norton & Company, Inc., 1996) 201-202

Inherent in this statement are two facts: that the Modern movement had many followers and that they did not all completely agree on what constituted modern architecture. Indeed, among the fifteen architects who exhibited and the thirty-three different designs, one could see a wide variety of modern ideals.

Walter Gropius used the Weissenhofsiedlung to represent his particular idea of Modernity. He was allowed to build two houses at the exhibition, one of which was widely publicized for its prefabrication.<sup>71</sup> (Image 7.2) Each piece of this house was delivered from a factory, as Gilbert Herbert explains:

Each steel section, wall lining, floor board, and insulation slab is a separate industrially produced item. All have to be assembled on the site. There is no concept yet of subassemblies of entire building elements, such as wall panels or inner partitions, arriving ready-made from the factory. In other words, the system remains a primary one, with no clearly defined subsystems. It is essentially an open system, not dependent on the integrated output of a single production belt but incorporating a large variety of industrial products of diverse origins.<sup>72</sup>

Gropius' construction, while not ultimately meeting his goal of a fully-assembled house shipped to the site, was the first successful realization of his 'dry' construction method (except for the concrete foundation which had to be poured at the site).<sup>73</sup> This method avoids the need for plastering and extensive masonry, allowing for substantial savings in both cost and construction time. Gropius' factory-produced house shows that his conception of modernity embraced the possibilities of industrial production.

By contrast, Mies' building found more potential in the possibilities of an industrial structure. Mies' long apartment building (Image 8.1) made from a steel frame and finished with a white stucco exterior, cut by long thin bands of glass which ran

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<sup>71</sup> Herbert, 55

<sup>72</sup> Herbert, 56-57

<sup>73</sup> Herbert, 56

horizontally across the exterior. Rather than focusing on construction methods, Mies focused on the design of the building:

Today the factor of economy makes rationalization and standardization imperative in rental housing. On the other hand, the increased complexity of our requirements demands flexibility. The future will have to reckon with both. For this purpose skeleton construction is the most suitable system. It makes possible rationalized building methods and allows the interior to be freely divided. If we regard kitchens and bathrooms, because of their plumbing as a fixed core, then all other space may be partitioned by means of moveable walls.<sup>74</sup>

For Mies the machine offered the flexibility to create any number of interior designs, as he wished, and he exhibited that possibility by creating 24 different arrangements for the apartments in his building. His apartment building also possessed the ability to be extended infinitely. It's made from the repetition a single module, based around the stairwell. One could, should the need arise, extend the number of modules from four to infinity. This would no doubt be a considerable benefit to a project that was aimed at large-scale, low-cost housing.

The Weissenhof exhibition showcased prominent architects' visions of modern housing, but it also showed that there was some dispute as to what that was. Was the modern solution a single apartment building, as Mies suggested, or was it a series of smaller homes, efficiently placed next to one another with small yards, as the Dutch architect J.J.P. Oud suggested? Was the most important objective economy in the construction process or flexibility in design? Although the solutions were different, the problem that the architects faced was the same: what style represents modernity?

Five years later, looking back at the Stuttgart exhibition as part of their own exhibition at the Museum of Modern Art in New York City, Henry Russell Hitchcock

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<sup>74</sup> Mies van der Rohe as quoted by Blake, 164

and Philip Johnson found the similarities of the buildings at Weissenhof: the adherence to a new style. The Weissenhof architects agreed that the new style was based on machine technology, be it in the building process or as a constructed building. Hitchcock and Johnson, remarking on the widespread belief in this machine style, called it the International Style. In their 1932 book of that name, they attempted to define the buildings' aesthetic:

There is, first, a new conception of architecture as volume rather than as mass. Secondly, regularity rather than axial symmetry serves as the chief means of ordering design. These two principles, with a third proscribing arbitrary applied decoration, mark the productions of the international style.<sup>75</sup>

These defining guidelines represent an aesthetic understanding of a set of buildings, but they also get at the technological achievements of these buildings. As Hitchcock and Johnson point out, "The development of simple forms of standardized detail suitable to mechanical production is thus an aesthetic as well as an economic desideratum."<sup>76</sup> The aesthetic qualities of the new style were directly related to the machines that constructed the buildings. The first rule describes a principle that dates back to Gropius' work at the Fagus Factory: a focus on volumetric space rather than mass. This is essentially the difference between a thin exterior, which suggests the space within, and massive walls that express themselves and nothing else. The second principle concerns the regular grid-work support systems that support Modern buildings. The focus on regularity versus axial symmetry suggests that architecture should be true to its support system, in this case a grid of steel or concrete, rather than focusing on arbitrary symmetry for the sake of symmetry. The third principle follows this line of thinking, and

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<sup>75</sup> Henry-Russell Hitchcock and Philip Johnson, *The International Style*, 1932 (New York: W.W. Norton & Company, Inc., 1966) 20

<sup>76</sup> Hitchcock and Johnson, 71

rejects applied decoration. The modern movement was one away from stylistic definitions of the past, particularly those of the nineteenth century where applied ornament defined what type of building it was. New machine production allowed for an aesthetic which was not based upon stylistic markers like arched windows or columns. In the Modern period buildings did not belong to a style, they were true to themselves. Machines were becoming their own aesthetic, and thus freed the architects to build based on need.

The International Style rejected the old, welcomed the new, and sought a solution to the problems of both. *The International Style* and the Exhibition at Stuttgart were conscientious attempts on the parts of the architects to realize the potential of modernity through all the technological devices of that modernity.

Modern technology and technological processes were a means to an end, for this group of architects, but not the end itself. Machines allowed architects to create the structures they wanted, although they stopped short of an architecture based completely upon them. Gropius agreed with this assessment, writing:

Were mechanization an end in itself it would be an unmitigated calamity, robbing life of half its fullness and variety by stunting men and women into sub-human, robot-like automatons. (Here we touch the deeper causality of the dogged resistance of the old civilization of handicrafts to the new world-order of the machine.) But in the last resort mechanization can have only one object: to abolish the individual's physical toil of providing himself with the necessities of existence in order that hand and brain may be set free for some higher order of activity.<sup>77</sup>

Architects worldwide saw the benefits of using technology. They recognized their role in a modern setting, and they built accordingly. They saw the machine as a part of the

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<sup>77</sup> Gropius, *New Architecture and the Bauhaus*, 33

modern world, but not the entire world. As Gropius says, machines allowed men to pursue higher purposes but are not suited for men themselves. He recognized that a symbiotic relationship between man and machine characterized much of his period. From the Bauhaus, which addressed the machine's role in art, to Weissenhofsiedlung which sampled the machine's ability, to the Weissenhofsiedlung which proved there was no single role for the machine, it is clear that the 1920s was a decade in which the machine had unlimited possibilities but, in the eyes of some, a limited architectural role.

### *The Machine as End in Itself*

Throughout his professional career, and especially in the villas of the 1920s, Le Corbusier displayed an interest that approached infatuation for the machine. He stands apart from his contemporaries of this period in the degree to which he embraced mechanical and industrial methods and appearances.

In his landmark work, *Vers une Architecture* or *Towards a New Architecture* of 1923 he boldly proclaimed, “A house is a machine for living in.”<sup>78</sup> Such a statement thrusts Corbusier to the forefront of the machine movement in architecture. He was certainly the most outspoken of architects working at the time in calling for an architecture based on machine models and methods. That is not to say that others neglected the machine, but rather that Le Corbusier pursued their possibilities and their place in architecture with special vehemence. The machine for living suggested an architectural programme with the inhabitants becoming just another variable in the creation of a machine. A man making mechanical lathes had to make sure they would be able to function according to their task. To make a house a machine suggested a similar usefulness of the house but a similar need of the house as well. While other architects saw the role of the machine as a production device, or a structural member, Corbusier saw an ongoing, rational relationship between the home and the occupant.

Le Corbusier’s approach to architecture evinces an enthusiasm for industrial design. In 1926 he released a list of the five points of a new architecture. These five points were 1) pilotis, or thin columns, elevating the building space from the ground; 2) the free plan, achieved via the support system which removed reliance on structural

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<sup>78</sup> Le Corbusier, *Towards a New Architecture*, Trans. Frederick Etchells, 1931 (New York: Dover Publications, Inc., 1986) 95



walls; 3) the free façade, the corollary of the free plan in the vertical plane; 4) the long, horizontal ribbon window; 5) and the roof garden which restored the ground that was occupied by the building's footprint. This list reads almost like a checklist for architects, reducing architecture to a prescription of elements of a modern building.

These five points reflect a passion for the machine not only as a tool, but as an aesthetic agent as well. The machine was not just a means for creating architecture. It was the end to which architecture strove. Efficiency, rationality and pure platonic geometry were qualities of the machine that he saw lacking in architecture. To pursue these qualities would result in modernity, and remove the past from art. Le Corbusier writes disparagingly of the past in architecture, saying "Alas, how timid we are, how firmly we are chained, like slaves. The past has ensnared us, whereas its law is to cry to us, 'carry on – why don't you progress and move forward?' We are cowardly and timorous, lazy and without imagination."<sup>79</sup> His five points established a direction for architecture – a simple plan for modernity.

While his contemporaries seemed concerned about the potential for the machines of war to return, Corbusier seemed to embrace such a notion. For him, the war seemed more of a testing ground than a battle ground:

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.<sup>80</sup>

Comparing the Parthenon, a model of architectural prowess, to the machines of war certainly would pique the attention of the reader in 1923, as it does now. The war, to

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<sup>79</sup> Le Corbusier, "Architecture, The Expression of the Materials and Methods of our Times," *Architectural Record* 66 (1929) 126

<sup>80</sup> Le Corbusier, *Towards a New Architecture*, 109

him, was a source of inspiration and innovation. The machines that came out of the war were time tested, and they evolved based on their effectiveness. Le Corbusier's architecture would follow the same evolutionary progression. Reason and efficiency, along with a powerful propensity for the single geometry that was the "language of man"<sup>81</sup> were the positive qualities of the machine and Le Corbusier sought to make them the governing principles of the architecture of the age:

There is no beginning and no end, and only one answer – architecture and planning ... If this statement is clear and categorical, nevertheless it can still be said that planning to-day languishes in complete obscurity; there is nobody capable of serving its interests. We are speaking here of planning as 'evidence of the activity of a civilization' or as 'evidence of the activity of a society'. And this is a machine civilization and a machine society.<sup>82</sup>

### *Architecture with the Machine*

Like his contemporaries, Le Corbusier saw the value both of modern production practices and of a modern support system. Unlike his contemporaries, he seemed completely fixated on them. It was not enough that a house was built by machines, it had to conform to rules of reason, rationality, and mathematical purity.

In his *Towards a New Architecture*, Le Corbusier makes a strong argument for the industrial process to take its place in architecture. He suggests that architecture has waited long enough to use modern materials, and it was now time to do so:

In every branch of building, Industry, as formidable as a natural force and overrunning everything like a flood that rolls on to its destined end, tends more and more to transform natural raw materials and to produce what we call 'new materials.' They are legion: cements and limes, steel girders, sanitary fittings, insulating materials, piping, ironmongery, water-proofing

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<sup>81</sup> Le Corbusier, *Towards a New Architecture*, 72

<sup>82</sup> Le Corbusier, *Creation is a Patient Search*, Trans. James Palmes (New York: Frederick A. Praeger, Publishers, 1960) 253

compositions, etc., etc. All this stuff is dumped in bulk into buildings in course of construction, and is worked into the job on the spot; this involves enormous costs in labor and leads to half-and-half solutions. The reason is that the various objects have not been standardized. As the necessary state of mind does not exist, attention has never been given to the serious study of the various units, and still less to that of the construction itself; the mass-production state of mind is hateful to architects and to the ordinary man (by infection and persuasion).<sup>83</sup>

Modern materials were there to be used, but a predisposition against modern technology caused architects to neglect them. Le Corbusier recognized these materials' value in 1923, and he put them to use in his villas throughout the 1920s.

The paradigm of Le Corbusier's villas can be found in the small town of Poissy-sur-Seine, about 30km west of Paris. Here at the Villa Savoye (Image 8.2), so named for the Savoye family who commissioned it, one can see the full implementation of Corbusier's architectural ideals, including his use of industrial materials. In particular, it is worth noting the reinforced concrete structure. As one recalls, one of the five points of Corbusier's new architecture was the structure of pilotis that supported the building. From this structure came the second point: the free plan. Modern structures allowed for interior walls to become irrelevant, structurally speaking and allowed for their placement wherever necessity or inspiration placed them. The structure also allowed the exterior walls to be freed from the support scheme and made possible the inclusion of the third point of architecture, the ribbon window. Le Corbusier notes of the Villa Savoye, "The house is a box in the air, pierced all around, without interruption, by a long window."<sup>84</sup> This long window, carrying no weight, can run the entire length of the façade and still the building will stand. The substructure of pilotis was essential to the creation of buildings in the Corbusian model.

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<sup>83</sup> Le Corbusier, *Towards a New Architecture*, 229-232

<sup>84</sup> Le Corbusier as quoted by Jacques Sbriglio, *The Villa Savoye* (Paris: Fondation Le Corbusier, 1999) 40

More important to Corbusier than the structural side of the machine, however, was its capacity for reason and rationality. Geometry and mathematics, with their reliance on precision and purity, were the guiding principles of this architectural ideal. Le Corbusier's villas all relied on strong, geometric forms for their formal precision. That the façade of the Villa Savoye was a rectangle, a pure Geometric form, was an essential component of its design. Of his preference for geometric forms, he wrote:

A hundred years of a mechanical era have brought forth an entirely new spectacle. Geometry is supreme. Precision is everywhere. The right angle prevails. There no longer exists any object that does not tend to severity ... Science, mathematics, analysis and hypothesis, have all created an authentic machinery of thought. An imperative need of clarity, the search for the *solution*. It is for that which the mathematicians term the '*elegant solution*.'<sup>85</sup>

Architecture, he argued, was in need of this 'elegant solution', this rationality, to govern its forms. Perfect architecture would be governed by principles that were already available. "The means are at hand," he argued, "science, mathematics, industry, organization." These means, would all work in unison to create modern architecture. While machinery would do the labor, the architect would create under the influence of scientific reason. The result of such reason would be precise buildings. They would be in simple, geometric forms, and their forms would be perfect. The Villa Savoye, for example, would have perfectly planar façades. Art historian Peter Blake writes of the villa's façades:

The Villa Savoye's exterior surfaces are a tautly stretched skin of stucco and glass, absolutely flush and finished as smoothly as Corbu knew how. The effect was that of a precise membrane stretched over a skeleton of concrete ... it looked wonderfully machine-made."<sup>86</sup>

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<sup>85</sup> Le Corbusier, "Architecture, The Expression of the Materials and Methods of our Times," 125

<sup>86</sup> Peter Blake, *Le Corbusier* (Baltimore MD: Pelican Books Inc., 1960) 67

The precision of machines made ideal forms possible. Man made objects were fallible, machine made objects were not.

### *Architecture after the Machine*

Le Corbusier not only used machines in the building process, but in the design process as well. The buildings were not just built with machine parts, but with machines in mind. Modern houses had to accommodate man and his machines and the designs would reflect this need.

The Villa Savoye was built as a summer house for the Savoye family in the relatively remote town of Poissy-sur-Seine. The site was an ideal getaway, as it was in the middle of the country, but it was also at a considerable distance from the family's Paris home. The only modes of access were the train that ran from Paris and the automobile. The latter proves to be a supremely important factor in the building's conception.

The automobile was a machine which fascinated Corbusier. In *Vers une Architecture* he presents it as a model for modern design, writing:

The motor-car is an object with a simple function (to travel) and complicated aims (comfort, resistance, appearance), which has forced on big industry the absolute necessity of standardization. All motor-cars have the same essential arrangements. But, by reason of the unceasing competition between the innumerable firms who make them, every maker has found himself obliged to get to the top of this competition and, over and above the standard of practical realization, to prosecute the search for perfection and a harmony beyond the mere practical side, a manifestation not only of perfection and harmony, but of beauty.<sup>87</sup>

Corbusier would go on to argue that the same pursuit of beauty through evolution of design would prove necessary to the progression of architecture. In 1928 he even

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<sup>87</sup> Le Corbusier, *Towards a New Architecture*, 137-138

designed his own automobile which he entitled *The Maximum*, as in the maximum in efficiency, comfort, etc.<sup>88</sup> (Image 9.1) Such thought devoted to a machine would manifest itself in his architecture at the Villa Savoye.

He not only made the building accessible by the automobile, he built around it too. The site is in the middle of an open field with a long driveway approaching the building. The driveway provides sole access to the building via the automobile. The driveway fits snugly within the footprint of the house, and was designed to do so. The house was designed with the turning radius of a large automobile in mind so as to accommodate a car's turning in the driveway beneath it. The driveway then continues beneath the raised house and around it to a three-car garage on the ground floor. One of the original requirements of Mme Savoye was that the building have space for three large automobiles. As art historian Tim Benton points out, "The scale of the house derives not only from Vitruvian man, but from what one must call the Vitruvian automobile."<sup>89</sup> Indeed the automobile was integral to the design of the Villa Savoye, as much so as the geometric forms that governed its façades or the people that lived within.

It has already been stated that Corbusier saw the house as a 'machine for living'. This, as any other machine, would have to evolve in its design in order to maximize an efficient and comfortable design. Machines would prove useful in determining this design, creating the very scale on which the buildings were conceived. It was no longer enough that a building fit human beings. Le Corbusier believed that it must accommodate their machines as well.

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<sup>88</sup> Le Corbusier, *Creation is a Patient Search*, 94

<sup>89</sup> Tim Benton, "Villa Savoye and the Architect's Practice," *Architectural Design* 55 (1985) 11

## *Architecture of the Machine*

The machine served as the means and the motif for Le Corbusier, but it is its role as model for his architecture that is perhaps the most striking. Corbusier was *the* architect of the period who, in addition to using machines as tools, used them as an aesthetic. It is possible to read parts of various buildings as direct references to the machines he revered. Three such buildings are his duplex at Weissenhof, the Villa Savoye, and the Villa Cook.

The Weissenhof presented Corbusier an opportunity to design an ideal solution to the post-war housing problem. The building he submitted shows a reliance on machine predecessors for their architectonic solutions. The plan of his building, for example, is modeled after a railroad car.<sup>90</sup> The second floor plans show a resemblance to train compartments opening onto a long thin hall. Such a design shows an appreciation for a train's efficient use of space. In plan, the separate homes of the duplex also resemble cars of a train. The roof garden provided another reference to a modern machine. Atop the building, Corbusier created a reference to one of the machines he most appreciated: the steamship. With its perch representing a ship's bridge and the long, uninterrupted viewing areas, the roof of the Weissenhof is meant to remind the viewer of the deck of a steamship. The steamship proved to be a theme he would repeat at other sites.

The Villa Savoye is another site in which the imagery of the steamship contributes to the building's aesthetic. Ship-like railings adorn the ramp that leads to the solarium at the very top of the building. (Image 9.2) Here, large curved wind screens reinforce the image, serving as representational smokestacks. The overall building, too,

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<sup>90</sup> Thomas Fisher, "Low Cost, High Design," *Progressive Architecture* 69 (1988) 108

seems to have a maritime feel in the way it sits on its site, almost like a ship at sea.

Hanno-Walter Kruft makes a similar observation:

“The ocean liner is frequently illustrated in [*Vers un Architecture*], and he adopted ship motifs in some of his buildings, such as the Villa Savoye at Poissy (1929-31) ... It is a tradition of thought that ... led to a whole ‘aesthetics of the liner’ and to the designing of houses that looked like ships at anchor, devoid of all relationship to their surroundings.”<sup>91</sup>

Along with that idea, of a ship at anchor, the silhouette of the building vaguely resembles a ship’s body, with the upper levels perched upon the thinner ground level. If one looks at the building in elevation, disregarding the pilotis, it has the triangular outline, reminiscent of a ship. This illusion is further heightened by the mock smokestacks on top. These, however, have been rather vague and abstracted examples.

The Villa Cook makes a very specific reference to a modern device. On the ground level of the villa is a porter’s lodge that resembles the nose of a Farman “Goliath” airplane; a type of plane that Corbusier cited often in his *Vers une Architecture*. (Images 10.1, 10.2)) The airplane, as he explained, was forced to evolve technologically in order to perform its mission. He suggested the same would be true for housing designs. To emphasize the connection between the evolution of machines and architecture, he literally transformed part of the house into part of a plane.

Corbusier’s appreciation of the machine was expressed in his buildings, which often cited them as an aesthetic. He built houses that resembled steamships, trains, and airplanes as a way of emphasizing the qualities of the machine which he wanted to convey in architecture. Qualities such as design evolution, rationalization, and standardization represented those he wished to pursue in architecture. The designs for these machines had to evolve in order to succeed, as did those for his buildings. As

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<sup>91</sup> Kruft, 398-399



Corbusier wrote, “Culture is the flowering of the effort to select. Selection means rejection, pruning, cleansing; the clear and naked emergence of the essential.”<sup>92</sup>

Corbusier’s feelings towards machines resembled infatuation. Machines, to him, were the ultimate expression of reason and design. He wrote, “Machinery, a new factor in human affairs, has aroused a new spirit. An epoch creates its own architecture, and this is the clear image of a system of thought.”<sup>93</sup> It is natural, therefore, in this age of invention, to connect the inventions with a means of artistic expression: architecture. This association does lead to some questions, however. For example, when one adopts the aesthetics of the machine, would that not make the machine a style – the very thing the machine architecture was meant to avoid? Also, does the wholesale adoption of the machine work with or against nature, for which Corbusier also expressed keen interest.

Corbusier’s writing suggested that the machines would bring an end to styles as we knew them, but his adoption of the machine as an aesthetic seems to have just created another stylistic device. As he wrote, “Now ... forms seem to be developed mainly in accordance with function.”<sup>94</sup> However, his practice seems to contradict his theory. There is no rationale for placing a piece of an airplane in a house. The two have different objectives, and should have different forms. His books praise machines for their cold reason and rationale and while that may be true for the machines as they were designed, it does not necessarily hold true for machines used as aesthetic devices on homes.

The issue of nature also seems to create a contradiction in the works of Corbusier. One of his points of architecture calls for roof gardens atop his buildings so as to replace

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<sup>92</sup> Le Corbusier, *Towards a New Architecture*, 138

<sup>93</sup> Le Corbusier, *Towards a New Architecture*, 90

<sup>94</sup> Le Corbusier, *Towards a New Architecture*, vi

the natural space that was taken by the building's foundations. His works, however, seem at odds with the nature. As Peter Blake wrote of the Villa Savoye, "The precise, geometric silhouette of the Villa Savoye permitted no confusion of architecture with nature."<sup>95</sup> Certainly no viewer of any of Corbusier's white, boxy villas would associate them with anything natural. The buildings themselves seem reticent even to touch the ground, and seem almost to float above the earth upon stilts. Corbusier views nature as something to be controlled. His views from the roof garden are almost always sifted through a concrete frame. His rooftop gardens are always very regulated, so as to preserve order. Peter Blake tells a story that serves as an evocative expression of Corbusier's feelings towards nature:

Corbu's [Villa Savoye] is the symbol of Mediterranean man's conquest of nature – the determination of sophisticated builders to shape their own habitat.

Corbu made this point even more clearly in ... the penthouse apartment for Charles de Beistegui, on the Champs-Élysées [1929]. Here ... the 'natural environment' consisted of neatly clipped boxwood hedges in classic, geometric forms and carefully planted in rectangular boxes so placed as to enclose the roof terraces and screen them against the Paris skyline. Should M. de Beistegui wish to take a quick look at that skyline – well, then, all he had to do was push a button and one entire section of boxwood hedge would disappear on an electric elevator. 'The complicated electrical installations required in this apartment,' Corby remarked at the time ... 'required 4,000 metres of cable.' It is not likely that ... anyone except a Frenchman in love with modern machinery would ever describe a landscaping project in terms of the length of electric cable required to make it function."<sup>96</sup>

It seems a telling metaphor of his feelings towards nature that Corbusier built an elevator that would conceal it when so desired. The machine existed to rationalize nature, which is, itself, unnatural. The machine allowed Corbusier to revise nature on his terms. Corbusier seemed to try to fuse the two sides, but the results seem incongruous.

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<sup>95</sup> Blake, *Le Corbusier*, 64

<sup>96</sup> Peter Blake, *Le Corbusier*, 65-66

Corbusier respected the precision and reason of the machine; two qualities that are lacking in nature.

The degree to which Le Corbusier accepted the machine is what separates him from his peers. Gropius had written that the machine could not be an end to itself. Corbusier made it that end. Machines dominated every aspect of the design process. They would be the models for houses that would take their shape from industrial methods. Architecture, according to Corbusier, would be governed entirely by the machine, and any hesitation to do so would be a rejection of the new age; the new spirit. The post-war period represented an opportunity for the machine to finally dictate with its reason and order, the details of modern life.

Europe emerged from the First World War completely transformed. The human warrior had become a victim of, and a slave to, the machinery that had reinvented warfare. The effect of the soulless machine is echoed in the art of the period; from the literature of the Lost Generation to the Dada paintings depicting soldiers returning from battle scarred and hollow. Architecture was also affected, as architects were forced to confront the physical and emotional remnants of battle in the war-torn cities of Europe.

The destruction and ruin of war was soon given over to efforts to rebuild. Machine that had destroyed cities were then expected to modernize them. Everyone seemed to recognize the link between machinery and modernity, though some were less willing to face it than others.

Such a response came from the German Expressionists, specifically the Crystal Chain group of architects. Bruno Taut, its founder, wanted Crystal Chain architecture to be based on beauty, not industry:

What we urgently need in present-day architecture is to be liberated from the perpetual depressing clichés of monumentalism. The only thing that can bring this about is a flowing quality, a sense of artistic lightness.<sup>97</sup>

Taut and his followers wanted an architecture that “[had] no other purpose than to be beautiful.”<sup>98</sup> They wanted buildings made from light and mysticism, which evoked an emotional response from the viewer.

This romantic vision is in direct conflict with the architecture of Walter Gropius and Ludwig Mies van der Rohe, following in the footsteps of Henry Van de Velde, who wrote:

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<sup>97</sup> Bruno Taut as quoted by Kruft, 373

<sup>98</sup> Bruno Taut as quoted by Kruft, 373

My ideal would be to be able to reproduce my works a thousand times over ... I would not be a man of my time if I did not endeavor to adapt to modern mechanical and industrial methods of production in the ways in which objects used to be produced by craftsmen using only their hands.<sup>99</sup>

They strove for machine production techniques translated into architecture. They saw machinery as the embodiment of economy and reason. These architects would form the Bauhaus and the International Style based on these principles of industry.

There was also the movement, spearheaded by Le Corbusier, which adopted machine examples as an aesthetic of its own. He adopted the forms of machines which had evolved into models of rationality and purpose; each piece of the machine filled a need. He would end up building houses, his 'machines for living in', with this in mind – drawing specifically from the machines with which he was infatuated.

The architectural obsession with the machine was short-lived, however. As the 1920s ended and the 1930s began, new matters began to concern architects. With the rise of fascism in Germany and Italy, nationality and historicism began to replace machines as the driving forces in architecture. Ironically, modernity became an antiquated notion.

The immediate post-war period, however, represented a time when machines were at the forefront of architectural discussion. Their role, both in the construction and the aesthetic of new buildings, was a matter for debate, as architects saw a range of possible functions for the machine. From an outright denial of the benefits of mechanical architecture, to an acceptance of the machine as a tool, to wholly embracing the machine as architectural end unto itself, architects after World War I were shaped by the introduction of the machine into the artistic world.

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<sup>99</sup> Henry van de Velde as quoted by Krufit, 383

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## Images



**Image 1.1: Bruno Taut, Glass Pavilion (Cologne Werkbund Exhibition), 1914, Cologne**  
**Image Courtesy of University of Pennsylvania Library Online Image Collections**

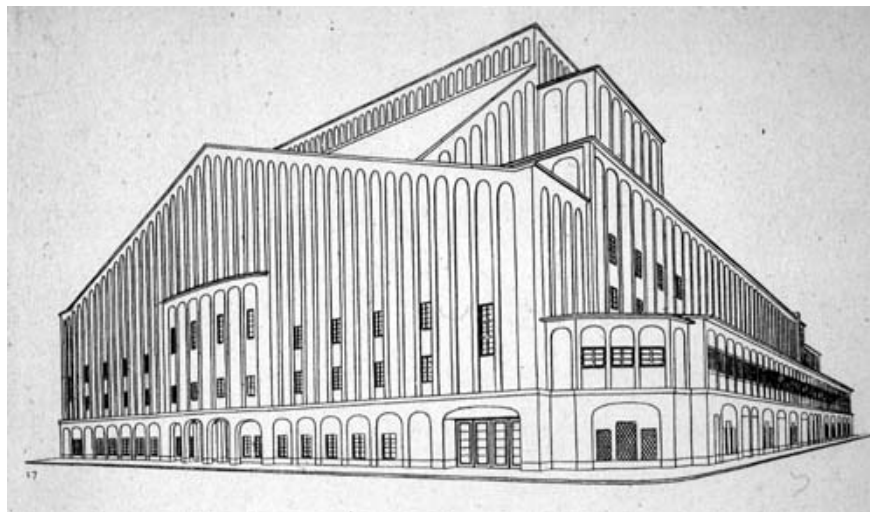


**Image 1.2: Bruno Taut, Pl. 12 from *Alpine Architecture*, 1919**  
**Shows the Expressionist desire to make buildings from mountains**  
**Image Courtesy of University of Pennsylvania Library Online Image Collections**

## Images



**Image 2.1: Hans Poelzig, Grosses Schauspielhaus, 1918-1919, Berlin**  
**Interior View, Note the stalactite forms around the ceiling**  
Image Courtesy of University of Pennsylvania Library Online Image Collections



**Image 2.2: Hans Poelzig, Grosses Schauspielhaus, 1918-1919, Berlin**  
**Isometric View of the Exterior**  
Image Courtesy of University of Pennsylvania Library Online Image Collections

## Images



**Image 3.1: Erich Mendelsohn, Sketch for the Einstein Tower, 1919**  
Representative of Mendelsohn's sketches during the war  
Image Courtesy of University of Pennsylvania Library Online Image Collections



**Image 3.2: Erich Mendelsohn, Einstein Tower, 1919, Potsdam**  
Photograph by author

## Images



**Image 4.1: Walter Gropius, Fagus Works, 1911, Alfeld an der Leine**  
Image Courtesy of University of Pennsylvania Library Online Image Collections



**Image 4.2: Walter Gropius, Adolf Sommerfeld House, 1922, Berlin**  
Image Courtesy of University of Pennsylvania Library Online Image Collections



## Images

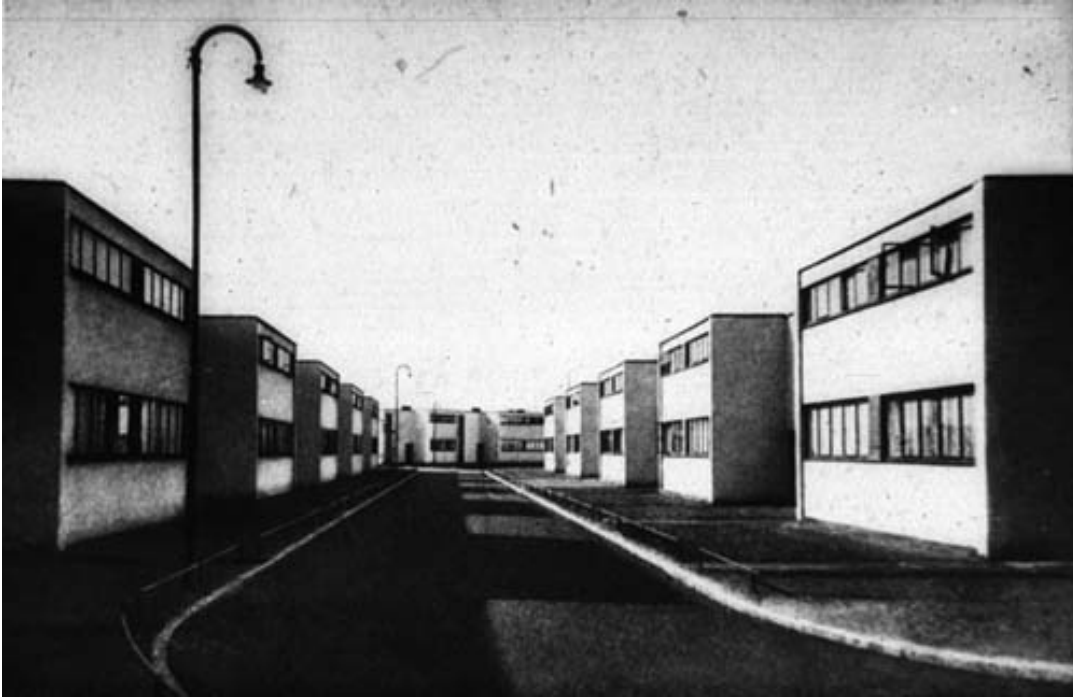


**Image 5.1: Walter Gropius, Bauhaus Building, 1925, Dessau  
Workshop Building, with Technical School and Student Residences visible in the background  
Photograph by author**

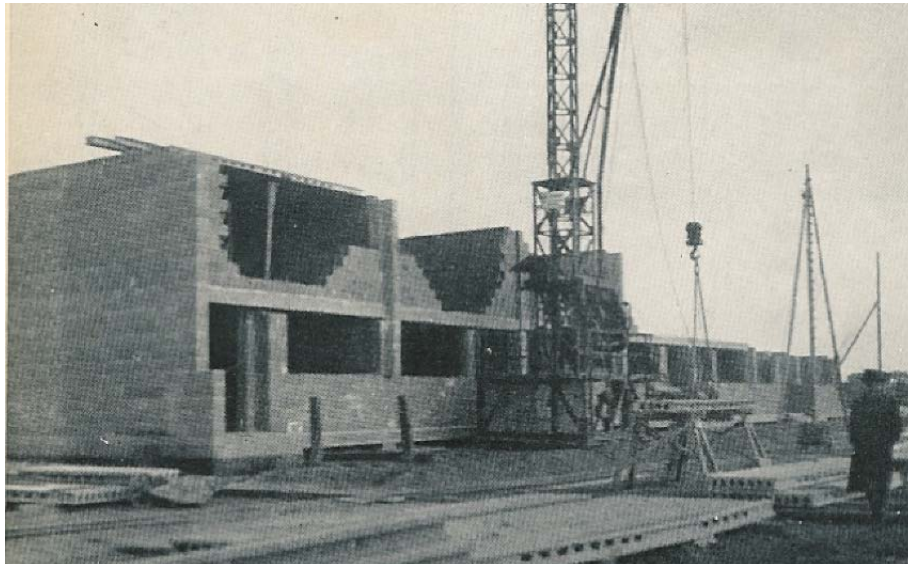


**Image 5.2: Walter Gropius, Bauhaus Building, 1925, Dessau  
Aerial Photograph  
Image Courtesy of University of Pennsylvania Library Online Image Collections**

## Images



**Image 6.1: Walter Gropius, Toerten-Dessau, 1926, Dessau**  
Image Courtesy of University of Pennsylvania Library Online Image Collections



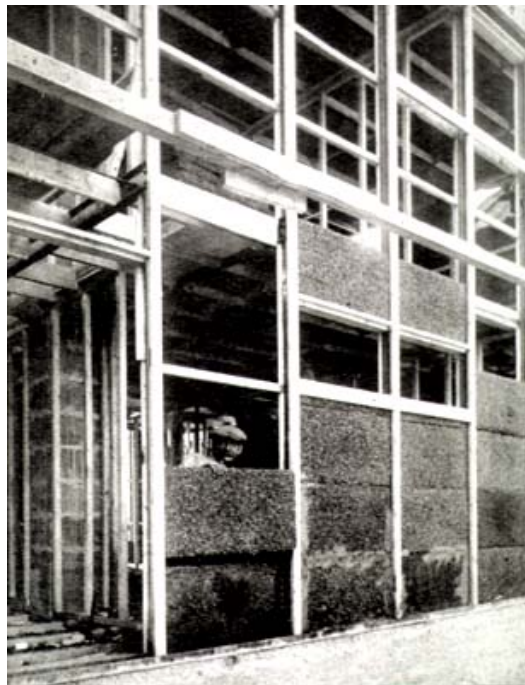
**Image 6.2: Walter Gropius, Toerten-Dessau, 1926, Dessau**  
Note the train tracks in the bottom right corner  
Image Courtesy of Siegfried Giedion, *Walter Gropius*, pg. 194

## Images



**Image 7.1: Weissenhofsiedlung, 1927, Stuttgart**  
**Aerial view from North**

Image Courtesy of University of Pennsylvania Library Online Image Collections



**Image 7.2: Walter Gropius, Prefabricated House (Weissenhofsiedlung), 1927, Stuttgart**  
**Image Courtesy of University of Pennsylvania Library Online Image Collections**



## Images



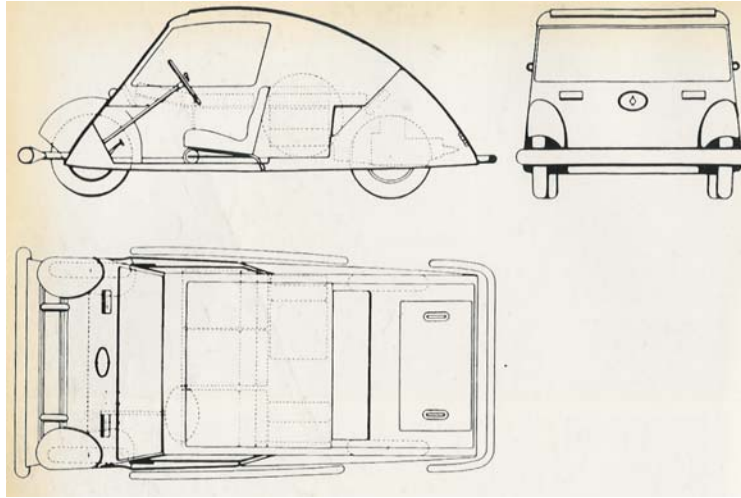
**Image 8.1: Ludwig Mies van der Rohe, Apartment Building (Weissenhofsiedlung), 1927, Stuttgart**  
Photograph by author



**Image 8.2: Le Corbusier, Villa Savoye, 1929, Poissy-sur-Seine**  
Photograph by author



## Images

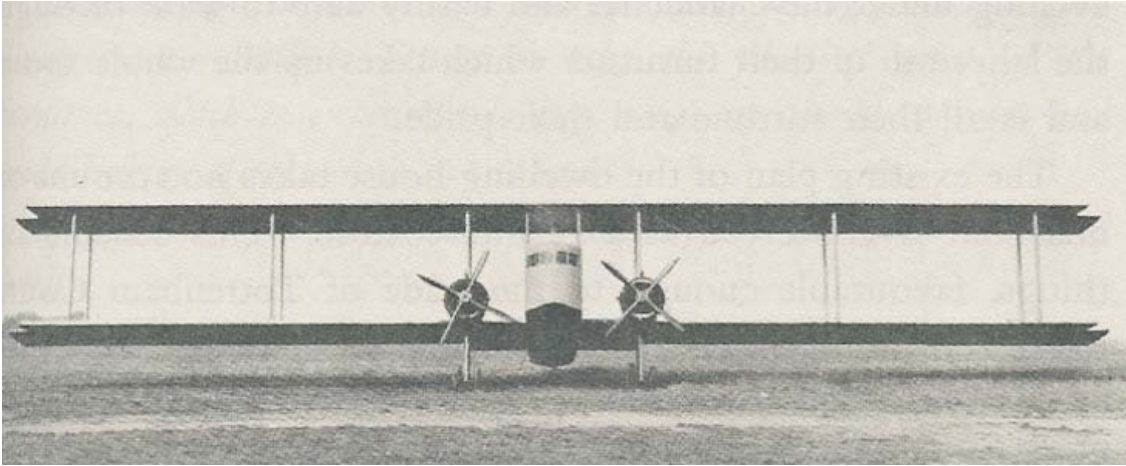


**Image 9.1: Le Corbusier, Design for “The Maximum”, 1928**  
**Image Courtesy of Le Corbusier, *Creation is a Patient Search*, pg. 94**



**Image 9.2: Le Corbusier, Villa Savoye, 1929, Poissy-sur-Seine**  
**View from the roof garden, Note the railings and the wind screen at top left which resembles a steam ship smokestack**  
**Photograph by author**

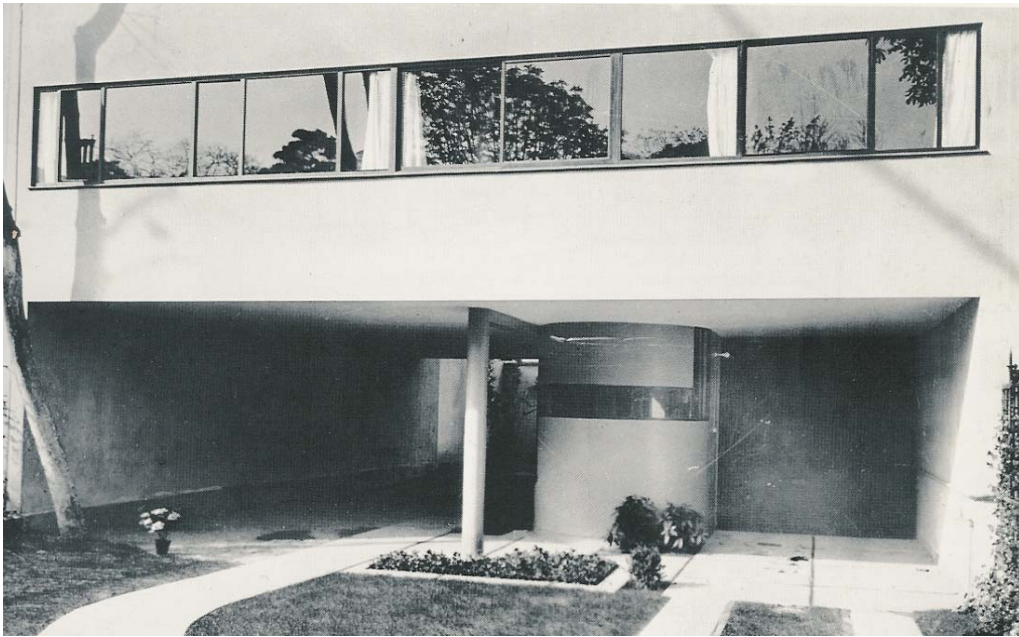
## Images



**Image 10.1: Farman “Goliath”**

**Note, in particular, the form of the nose**

**Image Courtesy of Le Corbusier, *Towards a New Architecture*, pg. 121**



**Image 10.2: Le Corbusier, Villa Cook, 1926-1927, Boulogne-sur-Seine**

**Note the porter’s lodge near center**

**Image Courtesy of Timothy Benton, *Villas of Le Corbusier: 1920-1930*, pg. 163**