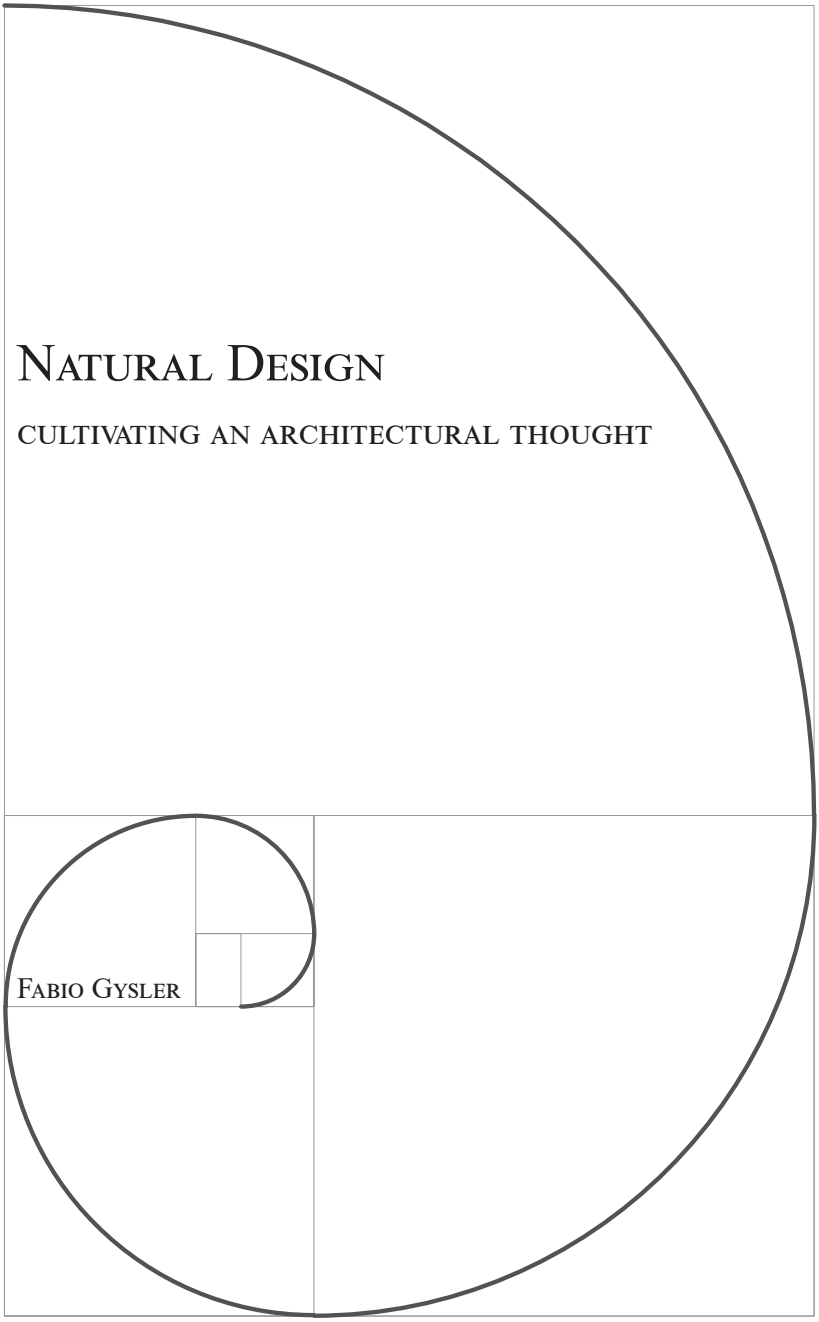
# Natural Design

## cultivating an architectural thought



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# Premises

# The Nature of Nature

Although being one of the most common terms in any vocabulary, nature may be one of most difficult to define because it encompasses different notions. The prevalent use of this word is in relation to the natural world and its features. In this sense, it encompasses anything that is native to the earth, like the mountains, the rivers, the oceans, the plants, or the animals. On a bigger scale, it also describes the phenomena seen throughout the universe like the planets, the stars, or the galaxies. Even though it could be argued that in this view, everything would be natural, there is often a certain distinction between the latter and what has been created by man. Despite mankind itself being a part of the natural world, its own creations don't necessarily fit in this description since they don't correspond to purely natural processes. They are equally the result of primordial behaviors as of other cultural, social, intellectual and many more influences which are specific to human beings. Therefrom comes the popular distinction between man and nature.

Nevertheless, it is almost impossible to draw a clear line between « man's creation » and « nature's creation », since there are various interactions between the two. For instance, some of the plants and animals housing the planet today are the fruit of the cultivation and the breeding by humankind. And the built environment resulting from our civilization, even though it can be argued that it is harmful to its surroundings, still is in close relationship with its habitat. Human activity strongly influences the surface of the earth with all its territories. Is it possible to harmonize this impact with the rest of creation? To answer this, a look at another meaning of the word nature may grant some insights.

Along with its use as a reference to the natural world as it has been described above, nature also points out to the inherent, essential characteristics of a thing or a being, the way something behaves or functions in a normal way. For instance, it is in the nature of trees to grow roots into the soil but to rise the trunk, the branches, and the leaves out of it towards the light, which is the result of purely functional, organic, and metabolic factors. It is the very basis of the relationship of form and function in any natural element, everything is designed to achieve its specific purpose. This is one of the reasons for the presence of our distinction between man and nature, since our designs do not merely correspond to practical considerations, they are the fruit of a wide range of influences, not all of them being exclusively functional. Nonetheless it doesn't seem inconceivable that it would be possible to narrow this gap, to reinscribe our creations, especially architecture, in a wider, more complex but more subtle order called nature.

# The Nature of Architecture

The word « architecture » comes from the Ancient Greek *arkhitéktōn*, meaning chief (*arkhi*) builder (*téktōn*), thus referring to the act of constructing. From its origins as a profession, it specifically indicates this action of building as it is done by humans. Therefrom, and keeping in mind the differentiation between « man's creation » and « nature's creation », it can be considered that architectural design is not necessarily something natural. It does not subscribe to the same set of rules as constructions performed by animals, like a beaver's dam, a bird's nest or a beehive which correspond to instinctive and purely functional and vital approaches. Nevertheless, there has always been a close relationship between architectural theory and nature. For instance Vitruvius, a roman architect and engineer from the 1st century BC who produced one of the most influential architectural treatises ever written, placed man's observation and use of nature and its elements at the very heart of the birth of architecture.

« Therefore it was the discovery of fire that originally gave rise to the coming together of men, to the deliberative assembly, and to social intercourse. And so, as they kept coming together in greater numbers into one place, finding themselves naturally gifted beyond the other animals in not being obliged to walk with faces to the ground, but upright and gazing upon the splendour of the starry firmament, and also in being able to do with ease whatever they chose with their hands and fingers, they began in that first assembly to construct shelters. Some made them of green boughs, others dug caves on mountain sides, and some, in imitation of the nests of swallows and the way they built, made places of refuge out of mud and twigs. Next, by observing the shelters of others and adding new details to their own inceptions, they constructed better and better kinds of huts as time went on. »[1]

This attempt to incorporate nature in the creation of architecture can be seen throughout the ages, by means of diverse methods. For instance, the orders in ancient Greek architecture are deeply inseminated by natural motives, proportions, and harmonies which in itself could be the object of an entire essay. Yet, this approach is far from being the sole example of the attempt of architects to root their creation in nature. The natural environment can also provide inspiration for the more technical aspects of the design process. For instance, bubbles and honeycombs gave the initial vision for the structure of the Eden Project greenhouse by Grimshaw and Hunt. This quest for answers in the organic world and the attempt to inscribe architecture in it can be seen in numerous theories and projects ;it is probably best reflected in its technical vocabulary, borrowing various terms from nature like skeleton, skin, morphology, tectonics and many more.

However, the aim of this work is not to establish an atlas of the innumerable different ways architects have incorporated nature in their conceptions, since it couldn't possibly be exhaustive without running the risk of being excessively long and boring. The intention is rather to explore how the observation and a deeper understanding of our natural environment can give keys for a design process which is in harmony with our surroundings and our true nature. Meanwhile, it isn't just about a better way of building, it is equally about a better way of living. In an age where comfort is created with the press of a button, where the cycle of day and night is neutralized by artificial lighting, where climatic variations are compensated with air conditioners, it is more important than ever to bring back our sensitivity to our habitat. For these reasons, this work will try to bring answers to a simple question with yet a broad set of implications:

*How can the study of nature foster the cultivation of an architectural thought?*

## The Nature of the Study

In order to facilitate the comprehension of the problematic, a few terms and their use have to be specified. According to the Oxford Dictionary, the verb *to foster* is employed in its sense of « promote growth of; encourage or harbour; be favourable to », similar to its synonym *to encourage*.[2] It is specifically used because of its organic connotation, meaning that the study of nature is the fertilizer for the growth of the architectural thought. Secondly, the word *cultivation* derives from the verb *to cultivate*, which can be employed in three different contexts according to the same dictionary, all of them being applicable to the starting question of this work. First of all, it is used in relation to agriculture, meaning to prepare and to use the soil in order to grow crops.[3] In a metaphorical way, this illustrates the appropriation of nature by man. Just like it is done in farming, the idea of the fostering of an architectural thought through the study of nature isn't about producing a mere copy or a symbolic exaltation of its elements. It has to be done by way of a thorough understanding and application of its principles. Furthermore, *cultivation* can be attributed to the improvement and development of a person, the mind and manners as well as the act of paying attention and cherishing a faculty and an art.[4] Finally, the *architectural thought* refers not only to the art of building; it comes with a broader sense of developing an idea, an intellectual foundation on which the construction, the expression, the functioning and the relations of an edifice to its inhabitants and its environment are conceived.

The study is based on the analysis of three different architects who developed and divulged their own philosophy on how the architects can benefit from nature in their design process and who implemented these ideas in their own projects. As it is stated earlier, this study is not of an exhaustive character, it rather aims to expose the multiplicity of approaches through a representative selection of theories and constructed works. The postulations of each of these three architects are confronted to one selected house they built, in order to highlight the materialization of such ideas.

The first protagonist of the analysis is Frank Lloyd Wright, one of the most influential American architects of the last century. Having grown up in a rural environment, his visions of architecture are indissociable with his early experiences with nature. This is best exposed in his book *The Natural House*, where he expresses the principles he applies in his own design process. *Fallingwater*, one of the architect's most extraordinary buildings, reveals how he manages to apply his ideas to the construction. Together they manifest Wright's intuitive approach to nature; from the study of patterns he extracts principles like *simplicity*, *plasticity* and *organic growth* which he integrates into his architecture.

The second intervenor is Le Corbusier, who still today marks the minds of most architects through the quantity of texts and works he left behind. During his studies in the school of decorative arts in La Chaux-de-Fonds, he is exposed to the natural elements in the quest to extract ornamental principles from them. Therefrom, a fundamental questioning about the relationship between man and nature arises. Founded in Hermetic beliefs and alchemy, he develops a language of duality between body and mind seeking for unification; a discourse which is underlying in many of his theories and buildings. In the *Villa le Lac*, the house he builds for his parents on the shores of the Léman, the ideas of Le Corbusier come to their crystallization. Through the application of principles he extracts from nature and through the im-

plementation of multiple devices, he attempts to unify the inhabitants with the environment.

The Japanese architect Kiyonori Kikutake completes the trinity with the ideas he exposes as a part of the *Metabolism Movement* he is mostly famous for. From his childhood in the rural lands of the island of Kyushu and a deep fascination for its traditional and sacred architecture, he develops the philosophy of a living architecture, capable to adapt to different situations. To achieve it, he derives a scientific methodology from quantum physics and adjusts it to architecture. The so-called *ka – kata – katachi* process aims to give the vision a physical consistency, resulting in an ultimate form. He uses his own home, the *Sky House*, to experiment with his ideas. Both theory and building are extremely intertwined, as the Kikutake translates his experiences in the house into an architectural thought.

The three approaches are finally compared to investigate the similar underlying principles that govern them but result in an astonishing diversity.

Altogether, they manifest how the study of nature can foster the cultivation of an architectural thought.

# Frank Lloyd Wright

*AN INTUITIVE APPROACH*

## An Organic Architecture

Child of a preacher and a teacher, Frank Lloyd Wright is born in 1869 in the state of Wisconsin. His father, William Carey Wright holds quite a distant relationship with his children, nevertheless he transmits some of his traits to his son, like his love for music, especially the piano, and his talent as an orator. Arguably the greatest gift he receives from his mother is her *Froebelian* education methods. The influence of *Froebel's Gifts*, geometric wooden toys designed to enhance the children's creativity, can be seen during the architect's entire career.[5] His family being the owners of several farmlands throughout rural America, he travels a lot in his childhood, spending the summers working at his uncle's farm at Spring Green. There, he is not only taught to work, he also develops a profound fascination for the natural environment and its order. From the observation of the prairie, he learns to see the beauty and simplicity of growing things.[6] This quest for organic simplicity constitutes the foundation of his architectural approach and he would go as far as to state that nature should be the basis of human creation:

> « Not merely is architecture made at the drafting board, but architecture in all of its aspects is to be studied as environment, as the nature of materials to be used, as the forms and proportions of Nature herself in all her forms - sequences and consequences. Nature is the great teacher - man can only receive and respond to her teaching. »[7]

In nature, he finds beauty which comes from deep within; it is the expression of how the plants and animals are built, how they grow and how they function. After a brief stay at the University of Wisconsin where he attends engineering courses, he moves to Chicago following the appeal of its great buildings. He joins the office of Dankmar Adler and Louis Sullivan, where he quickly climbs to the position as chief assistant of the latter. Being known for his particular approach to ornamentation, he introduces Frank Lloyd Wright to his world. He argues that no material is really inorganic, as stone or metal are commonly considered. He asserts that the spiritual power of man can breathe life into them. His ornamental motives, mostly applied on the terra cotta cladding he is famous for, often reveal a floral spirit. They are the result of a mathematic, almost algorithmic design process; their lines and symmetries animate them. As it is further discussed, Sullivan's ideas deeply impact Wright, and they appear recurrently in his discourse. He looks at this method of creation as a parallel with nature, an underlying order forms their beauty.

> « The first feeling was hunger for reality, for sincerity. A desire for simplicity that would yield a broader, deeper comfort was natural, too, to this first feeling. A growing idea of simplicity as organic, as I had been born into it and trained in it, was new as a quality of thought, able to strengthen and refresh the spirit in any circumstances. Organic simplicity might everywhere be seen producing significant character in the ruthless but harmonious order I was taught to call nature.»[8]

Some years after having joined Sullivan's office, Wright takes a step forward and opens his own practice. He rapidly becomes known for his prairie style; low-lying houses characterized by the use of mass-produced materials and generous living spaces. Although this brings him to a relative fame throughout the United States, the path of his career is far from being traced. The earlier decades of his work as an architect are marked by setbacks due to his eccentric lifestyle that make it difficult for him to find clients. He also experiences major tragedies in his personal life, as his lover and her children are murdered in his own home, Taliesin, he built in Wisconsin. The perpetrator of the crime, one of his servants, then sets the house on fire. Although Wright rebuilds it afterwards, a disaster occurs again as a lightning strikes the house and it burns down.

His career finally takes a turn in the late twenties, when he regains fame through the development of the usonian house, low-cost buildings based on a rational and standardized construction. The turning point happens some years later, with the house Fallingwater he builds for Mr. Kaufmann, an influential salesman from Pittsburgh. It leads him to national and international fame again, as it is widely publicized. In parallel, he produces a series of writings like *An Autobiography* and *An Organic Architecture*, making his architectural philosophy accessible to the large public. His ideas come from a wide range of influences like the use of « new » materials like steel and glass. Despite the diversity of his motives, his conception of the practice is deeply rooted in what he calls organic architecture. He conceives his buildings as living beings, they are based on principles Wright observes in nature.

This approach is probably best exposed in his book *The Natural House*. The text which was published in 1954 retraces the origins of his motivations and lays the foundation of his philosophy, illustrating it with a variety of his projects. Fundamental elements of his practice are clarified, like the recurring notions of *simplicity*, *plasticity* and

*organic growth* that are the object of the examination in the following section. Interestingly, *Fallingwater* doesn't appear in the book despite the fact that it is considered the most explicit example of his organic approach. Therefore, the ideas put forth in the book are confronted to this project to investigate the nature of the philosophy, as well as its materialization in the house.

## Simplicity

As it is stated earlier, the ideas put forth in The Natural House can be categorized in a triad of complementary principles. Although there is no hierarchy since all of them are a part of each other, the central aspect is discussed in this first part since it poses the foundation for the two others. *Simplicity* as it is seen by Frank Lloyd Wright is a difficult notion to apprehend. To really understand this concept, we must look at it as it can be found in nature. A flower for instance is constituted from many different parts like the roots, the stem or the petals. Even though these elements are distinct one from another in their appearance and in their purpose, together they form a unity - aesthetically and functionally. It is this very construction and expression he aims to achieve in his work. Thus, in architecture, elimination « may just be as meaningless as elaboration » as Wright states.[9] It is not just simplification or abstraction, it is the expression of the very nature of the building, of its functions and of the materials of which it is built. Every part of the edifice, be it constructively or programmatically, should not only reveal its own nature but also its relation to the whole in order to achieve unity.

> « One of the essential characteristics of organic architecture is a natural simplicity. I don't mean the side of a barn door. Plainness, although simple, is not what I mean by simplicity. Simplicity is a clean, direct expression of that essential quality of the thing which is in the nature of the thing itself. The innate or organic pattern of the form of anything is that form which is thus truly simple. »[10]

One of the core aspects of this quest for *simplicity* is the right use of the right material. Under the mentorship of Louis Sullivan, who was very fond of the use of ornamental terracotta cladding on steel structures, he learned to see the materials according to their nature. Each building substance having its own structural possibilities, its intrinsic physical properties and its own spirit, creating specific atmospheres. Through this philosophy of the use of materials, he aims to go back to an architecture, learning from « the natural source of all natural things », which has been long lost according to him.[11] This criticism is specifically aimed towards classical architecture and its latter influence as he states in The Natural House:

> « In order to get organic architecture born, intelligent architects will be forced to turn their backs on the antique rubbish heaps with which classic eclecticism has encumbered our new ground. »[12]

In this way of thinking, expressing wooden elements through an architecture made out of stone is absolutely inconceivable. Nevertheless, this approach isn't solely an attempt to free today's architects from ancient building and expression systems. It is also a gate towards new potential through the use of new materials such as glass, steel, or reinforced concrete. As it is explicated further in this work, it is not only about using and expressing them according to their nature; their properties also allow to enhance multiple aspects like the *plasticity* of Frank Lloyd Wright's organic architecture.

« I began to learn to see brick as brick. I learned to see wood as wood and learned to see concrete or glass or metal each for itself and all as themselves. Strange to say this required uncommon sustained concentration of uncommon imagination (we call it vision), demanded not only a new conscious approach to building but opened a new world of thought that would certainly tear down the old world completely. Each different material required a different handling, and, each different handling as well as the material itself had new possibilities of use peculiar to the nature of each. Appropriate designs for one material would not be at all appropriate for any other material. »[13]

One of the fundamental materials in Frank Lloyd Wright's philosophy is glass. Even though it is not as new as he claims it to be, it is certainly a novelty in its industrial use with all of its applications and implications. One of the main principles of his organic architecture is the conception of the house as a part of the environment, and the new opportunities industrial glass reveals serve exactly that purpose. The building isn't defined by walls with punched holes anymore. Walls become transparent through the use of glass. The interior expands outwards and the exterior infiltrates inwards. The living room becomes the garden, and the garden grows into the living room.

This connection of the interior spaces with the environment which is so dear to Frank Lloyd Wright doesn't only consist of the visual, panoramic aspect. He also makes use of glass for the lighting through multiple devices like the clerestory windows, openings in the ceiling or even textile blocks. With this natural light of the sun, the house lives according to the cycle of night and day, in harmony with the passage of the seasons and in close relationship with the climatic conditions. This reinforces the use of glass as a material employed to qualify interior spaces in accordance with the exterior environment. The reality within the house is composed of the visual, colorimetric, luminous, and atmospheric reality outside.

> «A resource to liberate this new sense of interior space as reality is this new qualification called glass: a supermaterial qualified to qualify us; qualify us not only to escape from the prettified cavern of our present domestic life as also from the cave of our past, but competent actually to awaken in us the desire for such far-reaching simplicities of life as we may see in the clear countenance of nature. Good building must ever be seen as in the nature of good construction, but a higher development of this 'seeing' will be construction seen as nature pattern. That seeing, only, is inspired architecture. »[14]

Having been around Louis Sullivan for some years, Frank Lloyd Wright also learned a great deal about steel structures and their spatial and constructive potential. Not only do they allow him to create wider spaces, they help him to achieve the constructive continuity he is looking for. With the use of steel as a structure, systems like post and beam become irrelevant for him, as they represent an aggregation of different elements instead of unity. For him, walls and ceiling have to become one, like a tree with its trunk and branches.

The cantilever enabled by steel structures grants a more economical construction, concentrating the materials where they are needed. In addition, it enables the elimination of vertical structural elements, creating spatial continuity; between interior spaces as well as with the exterior environment. Most importantly, welding and the use of meshes eliminates unnecessary fixtures in his architecture. In his quest for *plasticity*, the house becoming a whole constructively, structurally, but also aesthetically represents an essential point as he states in *The Natural House*:

> « Steel in tension enters now by way of mesh and welding to arrive at actual, total plasticity if and when desired by the architect. And to prove the philosophy of organic architecture, form and function are one, it now enters architecture as the aesthetic countenance of physical reality. »[15]

« Where the beam leaves off and the post begins is no longer important nor need it be seen at all because it no longer actually is. Steel in tension enables the support to slide into the supported, or the supported to grow into the support somewhat as a tree branch glides out of its tree trunk. Therefrom arises the new series of interior physical reactions I am calling ‘continuity’. »[16]

## Plasticity

The second aspect of Frank Lloyd Wright's *organic architecture* is once again a concept he takes up from Louis Sullivan. Lieber Meister, as he uses to call his mentor, employs the word *plastic* in relation to his ornamentation. In the intellectual approach that form follows function, the ornament plays an expressive role in the design process. However, Wright doesn't just take over this notion of *plasticity* as it is seen by Sullivan, since his view of form and function is different. In his opinion, form doesn't just follow function, they are more part of each other. In this sense, ornamentation or aesthetic expression have to convey the same sense of unity and reveal the intrinsic essence of the construction, like it would be in any natural element as he states in *The Natural House*:

> « You may see the appearance of the thing in the surface of your hand as contrasted with the articulation of the bony skeleton itself. »[17]

In essence, *plasticity* as promoted by Frank Lloyd Wright is the conception and expression of the building as a whole, programmatically and constructively. He sees the building like something which belongs to the realm of the living, hence the definition as *organic architecture*. It means that its conception has to be made on the same basis as nature's creation, through a vision of unity, of a whole rather than an aggregation of different elements:

> « Any building should be complete, including all within itself. Instead of many things, one thing.
>
> The folded plane enters here with the merging lines, walls and ceilings made one. Let walls, ceilings, floors now become not only party to each other but part of each other, reacting upon and within one another; continuity in all, eliminating any merely constructed features as such, or any fixture or appliance whatsoever as such. »[18]

This notion of not having a hierarchy between the form and the function of architecture, not having one dictating the other, is not only applied on the general scale of Wright's architecture. It also affects the construction in relation to the materials and their nature. The shape and properties of the stone constitute not only its form, they directly impact its function in the masonry; an idea that can directly be applied to glass and steel, or every other building substance. This appears to be the main reason for Wright's disdain for applied elements of classical architecture. Their function, be it structurally or symbolically, strongly influence their form. They express themselves as fixtures and emphasize the differentiation with the other parts of the construction.

Not only is there an association of distinct elements, the joints are highlighted and celebrated which goes against his philosophy of organic architecture:

> « Have no beams or columns piling up as 'joinery'. Nor any cornices. Nor any 'features' as fixtures. No. Have no appliances of any kind at all, such as pilasters, entablatures, and cornices. Nor put into the building any fixtures whatsoever as 'fixtures'. Eliminate the separations and separate joints. Classic architecture was all fixation-of-the-fixture. Yes, entirely so. Now why not let walls, ceilings, floors become seen as component parts of each other, their surfaces flowing into each other. To get continuity in the whole, eliminating all constructed features just as Louis Sullivan had eliminated background in his ornament in favor of an integral sense of the whole. »[19]

> « Here the promotion of an idea from the material to the spiritual plane began to have consequences. Conceive now that an entire building might grow up out of conditions as a plant grows up out of soil and yet be free to be itself, to 'live its own life according to Man's Nature'. Dignified as a tree in the midst of nature but a child of the spirit of man. »[20]

In this quest for *plasticity*; the building conceived as a whole, everything has to be designed in accordance with the rest. Therefore, all of the elements from the constructive ones to the planting, the furnishings and the paintings have to be created towards the same goal. Even though this vision is in perfect alignment with the idea of *organic architecture* as conceived by Wright, it reveals an even more difficult challenge. Either the whole has to be designed by the same mind or it has to be the fruit of perfect collaboration, of an absolute symbiosis.

Despite the latter's apparent appeal, it is evident that it is a complex task to achieve it, especially in a domain like architecture where multiple actors play their part. This may be the reason why for the most part of his works, Wright chooses to be the main figure behind the design; which sometimes generates tension with the clients, the engineers and his collaborators. Notoriously, the students working with him face harsh consequences if their decisions are not in alignment with the general plan.[21] This difficulty to work with others is certainly the result of a certain stubbornness as well as a sign of his genius and can be felt through his own sayings:

> « [...] I found musicians, painters, and sculptors were unable to rise at that time to any such synthesis. Only in a grudging and dim way did most of them even understand it as an idea. So I made the designs for all to harmonize with the architecture, crude as any sketch is crude, incomplete as to execution, but in effect sufficiently complete to show the immense importance of any such attempt on any architect's part and show, indeed, that only so does architecture completely live. »[22]

In the continuity of the thought of integral design of architecture, the ornamentation also has to correspond to the intrinsic nature of the building. In Wright's philosophy, the ornament shouldn't be the sole creation of imagination, the expression of an aesthetic idea. It has to be in close relationship with the essence of the building, with its structure. The role of the architect's vision is to give beautiful, harmonious and natural pattern to the surfaces expressing the true nature of the

building. This act of making « poetry », of giving a certain intensity and meaning to the constructive elements as a pattern true to their material nature, couldn't be described as a sole structural intervention. It is more a gesture to create an emotional bond between the house and its inhabitants, as he expresses through this allegory:

> « If you have a loaf of bread break the loaf in two and give the half of it for some flowers of the Narcissus, for the bread feeds the body indeed but the flowers feed the soul. »[23]

Wright relates this creative process to the one of composing music. To him « integral ornament is founded upon the same organic simplicities as Beethoven's fifth Symphony. »[24] It is the capacity of imagining harmony through simple tones, rhythms, and patterns:

> « This resource - Integral Ornament - is new in the architecture of the world, at least insofar not only as imagination qualifying a surface - a valuable resource - but as greater means than that: imagination giving natural pattern to structure itself. Here we have new significance, indeed! Long ago this significance was lost to the scholarly architect. A man of taste. He, too soon, became content with symbols. »[25]

## Organic Growth

The last element of Wright's philosophy in *The Natural House* can be seen as the result of the two precedent. Despite its name, o*rganic growth* as he describes it, it is not a physical phenomenon. It is rather a quality of the mind, where the architecture is conceived. Although the result of it is material, it is about the thought that is behind. According to him, a building has to slowly come up from the ground, meaning that there has to be a seed from which to grow. He is not too fond of the « style » as an architectural language. For him, every building has its own character; it corresponds to its own situation. The seed is this intrinsic attribute, the nature of the house. This means every project has to be regarded individually, the construction, the structure but also the expression come from its identity. The idea isn't just about making better architecture for him, it is also to create better conditions for the inhabitants:

> « A chasm exists between the usual profession and performance, because growth, where the quality we now call organic is concerned, must be slow growth. Eclecticism may take place overnight but organic architecture must come from the ground up into the light by gradual growth. It will itself be the ground of a better way of life; it is not only the beautifier of the building, it is, as a circumstance in itself, becoming the blessing of the occupants. »[26]

The site plays an important role in this notion of organic growth. As Frank Lloyd Wright says, every building should grow out of the ground into the light.[27] The environment has to be considered as the seed in this thought. The house responds and adapts to the present conditions, what defines its character. This is the basis for any of its elements, from the spatial organization to its constructive expression. It is also a critique of eclecticism or what he calls « the petty agglomerations miscalled civilization. » and a response for a « culturally confused » society.[28] Instead of being a cluster of ideas and influences, a house should be the manifestation of its character that grew out of its conditions. For him, this approach confers integrity to the building, it has a spirit that comes from within:

> « In speaking of integrity in architecture, I mean much the same thing that you would mean were you speaking of an individual. Integrity is not something to be put on and taken off like a garment. Integrity is a quality within and of the man himself. So it is in a building. It cannot be changed by any other person either nor by the exterior pressures of any outward circumstances; integrity cannot change except from within because it is that in you which is you- and due to which you will try to live your life (as you would build your building) in the best possible way. To build a man or a building from within is always difficult to do because deeper is not so easy as shallow. »[29]

More importantly, this quality from within does not only grow from the exterior conditions, it comes from the inhabitants. Wright argues that a good house confers a consciousness, and one doesn't have to be concerned about it anymore. It is also a reflection of the person within and « has a salutary effect morally. »[30] In essence, the building has to be the result of the site and its inhabitants; it poses the

foundation for man's interaction with nature. He describes the house through the metaphor of clothing:

> « I have always believed in being careful about my clothes; getting well dressed because I could then forget all about them. That is what should happen to you with a good house that is a home. When you are conscious that the house is right and is honestly becoming to you, and feel you are living in it beautifully, you need no longer be concerned about it. »[31]

Frank Lloyd Wright repeatedly claims what he builds does not correspond to a style, it is more every projects character that confers it style. Nevertheless, there is still a certain architectural language uniting several of his projects; notably the horizontal line is prominent in his buildings. He associates this figure with the idea of freedom; it is the horizon of the flat plane of the Chicago Prairie. The American identity is symbolized by its landscape. But for him it goes further than that, the horizontal line is the expression of human life on earth:

> « The proper use of these new resources demands that we use them all together with integrity for mankind if we are to realize the finer significance of life. The finer significance, prophesied if not realized by organic architecture. It is reasonable to believe that life in our country will be lived in full enjoyment of this new freedom of the extended horizontal line because the horizontal line now becomes the great architectural highway. The flat plane becomes 'the sound of the Usonian heart.' I see this extended horizontal line as the true earth line of human life, indicative of freedom. Always. The broad expanded plane is the horizontal plane infinitely extended. In that lies such freedom for man on this earth as he may call his. »[32]

Although *The Natural House* is certainly not representative of the depth of Frank Lloyd Wright's approach to architecture, it is indicative of principles he applied throughout the body of his work. This idea of architecture as an organic creation however is not translated into a certain language or style. It is in the nature of these principles not to tend towards a certain expression; they come from within. Despite the individuality of each resulting project, it is translated into characteristic elements of Wright's architecture like the prominence of the horizontal line, underlined by the cantilevers. Or his trademark clerestory and corner windows, as well as a distinctive rusticity in the use of the materials.

*Simplicity*, *plasticity* and *organic growth*, the three aspects of Wright's philosophy that are the object of this study can't be translated into a specific procedure. They lay the foundation on which he builds but it is rather a set of underlying principles like what he observes in nature. Therefore, to be understood as what they are intended to be, his buildings have to be considered as a whole. The key to their apprehension is their character; through *organic growth* they achieve *simplicity* as Wright conceives it, which is manifested in their *plasticity*.

# The Unfolded Boulder

Fig. 1 Fallingwater from below

Although it is not mentioned in *The Natural House*, *Fallingwater* is an extraordinary example of Frank Lloyd Wright's organic approach to architecture. He builds it in 1935 for the Kaufmanns, an important family in Pittsburgh's retail sector. Their son studies in Wright's Taliesin Fellowship, a workshop he entertains for young architecture students in his home in Wisconsin. Two years earlier, Edgar Kaufmann had bought a parcel along the Bear Run river in Pennsylvania, in order to build a weekend retreat.[33] This site, which lies about one hundred kilometers from the city they live in, is characterized by a dense vegetation and rocky formations along the water course.

Kaufmann intends to have his house along the river, below a small waterfall. But the orientation wouldn't be ideal since it would face north. Furthermore, Wright doesn't want to limit the interaction of the environment with his architecture to a visual aspect, it should also be a hearing experience. Therefore, he suggests to build above it; the house should be a part of the cascade.[34] This location Kaufmann finally agrees to corresponds to the family's earlier picnic place. In the conception of the project, Wright sees the features of this environment as the foundation of the building. The first elements he draws are three concrete piers set perpendicularly to the stream of the river. With this orientation, a diagonal perspective of the house opens itself from the road and from below the waterfall. From the piers, a series of parallel supports and walls rise up as if they had grown out of the boulders. The western wall expands higher as its neighbors, and a series of horizontal planes develop at different heights around it.

With the point of view that a house should grow out of its site, the boulders represent the core of Wright's design. From some distance the building is almost not perceptible, its shapes and colors merge with the environment. The stone walls mark its solid foundation arising into the light, while the light shaded concrete cantilevers seem to float around them. The boulder unfolded itself, giving life to the house as if a tree sprouted from it. The notion of unfolding nature is central to Wright's idea here, meaning that through this operation he liberates the potential of a shelter that is inherent in nature.

Fig. 2 Corner window in the kitchen

Despite the presence of the stone walls, it is the horizontality of the concrete roofs and terraces that define the house's exterior and interior character. From the outside, the overlay of these planes show Wright's use of the horizontal line as expression of freedom. However, it is done in a more complex manner than what characterizes his *Prairie Houses*. The superimposition of the horizontal planes reflects the constitution of the stones the house is made of. And their disposition around the central wall can be seen as a manifestation of Wright's idea of the house « dignified as a tree in the midst of nature. »[35]

Its trunk, the central stone wall, expresses its nature not only towards the exterior, it dictates the spatial organization of the house. Built

on the large preserved boulder the Kaufmanns used for their picnics , it is the heart of the house. Being the fireplace of the living room, of the master bedroom and of Mr. Kaufmann's study, it is the core element of every floor. Upon entry into the building a diagonal perspective is opened through the living room. On the right, it is framed by the wall with its fireplace on the natural stone. The hall being three steps lower than the main space, the view is marked by the horizontality of the dark flagstone floor and the light plastered ceiling. It attracts the eye towards the light flowing through the three open sides of the living room. Invited through the large glazed surfaces, the trees become the background of the scene.

The perceived immersion in nature is enhanced by the materials used in the construction. The stones of the floor reflect the light on their uneven but smooth surface, creating an illusion of water. And those making up the walls, having been quarried a few miles away, express their nature through their rough stonework and surfaces. The whole perspective is opened through the absence of structural elements towards the windows, warranted by the cantilever of the reinforced concrete slabs. As Wright expresses in The Natural House, it enables « the support to slide into the supported, or the supported to grow into the support somewhat as a tree branch glides out of its tree trunk. »[36]

The only visible element between the interior and the exterior are the subtle frames of the windows, painted in a dark red tone. They can be opened on all three sides, including the corners, immersing the space in the rustling of the river. The interior becomes qualified by the exterior through the use of glass as Wright argues in *The Natural House*.[37] Altogether, the materials employed in the construction enhance the experience of communion with the environment, and they are used in accordance with their own nature. This expresses Frank Lloyd Wright's view of *plasticity*, every element of the construction speaks of its own essence, as well as the character of the whole building.

## An Integral Design

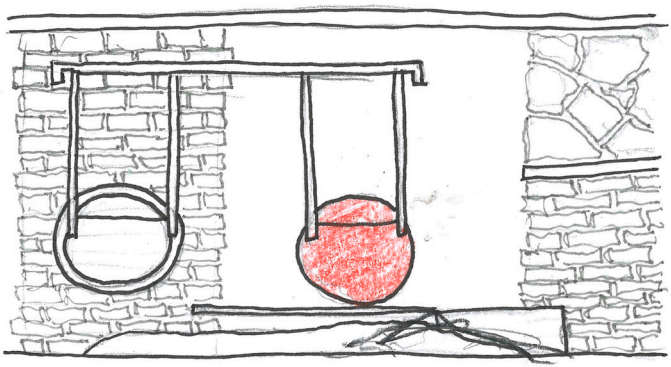

Fig. 3 Fireplace and its kettle

A defining characteristic of *Fallingwater* is the integration of preexisting elements in the conception of the house. As it is described earlier, the boulder formerly used by the Kaufmanns for their picnics is a prominent feature of the living room. To Wright's delight, Edgar Kaufmann asks him to leave the stone apparent instead of cutting and sealing it like the rest of the flagstone floor.[38] The resulting image is that of a stone emerging from a stream of water. The fireplace itself makes up almost the entirety of the central wall. Above the fire, a red kettle hangs from its metallic arm and can be rotated outwards, into the cavity in the wall it is destined for. The place has retained its former spirit, it just gained a shelter. A similar approach can be outside the entry, where concrete beams cover the driveway. They emerge from a preexisting rock into the house, holding them visually together as if they were a part of each other. In two places, the beams deviate from their path to let a tree pass through. The same operation is repeated in the western terrace of the first floor, where the trees are accommodated by openings framed in the slab.

However, the building isn't just integrated into its environment, it has its own integrity. Coming from a vision of the house as a tree in the midst of nature, its character is visible in the appearance and the details. In line with Wright's idea of *plasticity* as the continuity in the expression of the nature of the house, *Fallingwater* conveys its identity from the large scale up to its smallest features. Throughout the rooms, cupboards, shelves, desks and even seats are integrated into the walls. These wooden elements are inserted into the stonework as if they had grown out of it. Long ledges adorn the higher parts of the walls. Sometimes a piece of pottery is exposed on them; in other places a diffuse light emanates from them. It perfectly illustrates Wright's conception of plasticity, as well as Sullivan's influence:

> « It is the first principle of any growth that the thing grown be no mere aggregation. Integration as entity is first essential. And integration means that no part of anything is of any great value in itself except as it be integrate part of the harmonious whole. Even my great old master designed for materials all alike. All were grist for his rich imagination and he lived completely as artist, all to the contrary notwithstanding, only with his sentient ornament. »[39]

The resulting « integral ornament » is present throughout the house. But the most significant elements of this expression are the fireplaces in the central wall. As discussed earlier, the one of the living room integrates the existing boulder as well as the kettle in its design. On the first floor, the stones of the wall cantilever around the hearth, as it was a mise en abyme of the entire house. Through a vertical incision in the wall the stonework of the fireplace in Mr. Kaufmann's. study goes straight through the adjacent windows, expanding the space outwards. In the same room, a quarter of a circle is cut out of the desk so that the window can be opened; the environment is invited inside. All of these

different details in the house speak the same language. They convey a sense of unity, not only with its site but also in its own expression. It exemplifies Wright's approach of the house as being the result of an integral design. It expressed through its « grammar » as he states in The Natural House:

> « Every house worth considering as a work of art must have a grammar of its own. 'Grammar,' in this sense, means the same thing in any construction - whether it be of words or of stone or wood. It is the shape-relationship between the various elements that enter into the constitution of the thing. The 'grammar' of the house is its manifest articulation of all its parts. This will be the 'speech' it uses. To be achieved, construction must be grammatical. »[40]

However, *Fallingwater* is also an example of the difficulty of such an enterprise. As discussed earlier, integral design necessitates a perfect collaboration between the different protagonists. Although Wright entertains a good relationship with Edgar Kaufmann, the latter hires independent engineers to survey of the structural elements. The waffle slabs used for the cantilevers come from the architect's intuition of the elements like branches on a tree.; they are designed with a minimal use of material. Reinforced concrete still being a novelty at that time, the engineers are skeptical of the design and secretly add a pillar below the cantilever of the large terrace. Wright responds in the same way, removing the top part of the element; proving that the structure holds from itself. Nevertheless, the engineers don't stop here and put additional steel in the frame. It later translates into numerous cracks in the concrete, due to the excessive weight. It is the manifestation of the difficulty in the collaboration on a work, which by its nature demands a perfect symbiosis.

Nevertheless, *Fallingwater* remains a significative example of Wright's philosophy. The house demonstrates an incredible unity between its own elements and the environment. It organically grows out of the site, unfolding its inherent potential. Amongst its peers it stands « Dignified as a tree in the midst of nature but a child of the spirit of man. »[41] This character is translated into its *plasticity*; all the elements show a consistent expression of its very nature. Spatially, it is organized around its hearth, the heart of the building. The border between the inside and the outside becomes lighter through the large windows and the open corners. It finally reaches true *simplicity*, as it is defined by Frank Lloyd Wright:

> « This is, I believe, the single secret of simplicity : that we may truly regard nothing at all as simple in itself. I believe that no one thing in itself is ever so, but must achieve simplicity – as an artist should use the term – as a perfectly realized part of some organic whole. Only as a feature or any part becomes harmonious element in the harmonious whole does it arrive at the state of simplicity. »[42]

# Le Corbusier

*A SPIRITUAL APPROACH*

# A Quest for Universal Order

Charles-Edouard Jeanneret-Gris sees the light in 1885 in La Chaux-de-Fonds. As a son of a watchmaker, Edouard Jeanneret specialized on the painting of dials, he is introduced to the world of ornamentation of daily objects from a young age on. Like his confrère Frank Lloyd Wright, his education is influenced by the methods of Friedrich Froebel. The young man visits one of the kindergartens built around the philosophy of the German pedagogue, promoting a more creative bringing up of the children, immersed in the natural environment. Along with the frequent excursions in the mountains with his father and siblings, it may be the earliest indicators of the reasons behind his fascination for nature.[43]

At the age of 13, he follows the footsteps of his father and joins the school of decorative arts in La Chaux-de-Fonds, which among others is specialized in the ornamentation of watches. Charles l'Eplattenier, a painter, sculptor and architect from Neuchâtel becomes his professor and tutor, having a lasting impact on the future architect's approach. The philosophy instilled in the academy is based on the works of a set of artists, philosophers, and architects from the nineteenth century like John Ruskin, Owen Jones or Eugène Grasset. They all have in common this interest for the natural elements and incorporate them in their

ideology of the ornament. For instance, in his autobiography Ruskin mentions how the observation and redrawing of wood and clouds opened his eyes for the laws that dictated them and which every living thing had in common.[44] Moreover, works like *The Grammar of Ornament* by Owen Jones and *Plants and their application to Ornament* by Eugène Grasset are fundamental in l'Eplattenier's doctrine. Thus, it is not a coincidence that the study of nature as starting point to the design process is at the heart of the education, as Le Corbusier later states in his book The Decorative Arts of Today:

> « My master had said: 'Only nature can give us inspiration, can be true, can provide a basis for the work of mankind. But don't treat nature like the landscapists who only show us its appearance. Study its causes, forms and vital development, and synthesize them in the creation of ornaments. ' He had an exalted conception of ornament, which he saw as a kind of microcosm. »[45]

The exposure to the elements plays an important role in the learning structure, in order to allow the students to comprehend not only the aesthetics of the vegetation and the animals but also how they function. This operation of observing and redrawing entire landscapes up to the minute details of its protagonists allows Charles-Edouard to grasp the order and the laws that dictate the natural environment:

> « Our childhood was illuminated by the miracles of nature. Our hours of study were pent hunched over a thousand flowers and insects. Trees, clouds and birds were the field of our research; we tried to understand their life-curve, and concluded that only nature was beautiful and that we could be no more than humble imitators of her forms and wonderful materials. »[46]

Through a stylization process of the landscape in his drawings, the young artist looks to understand its composition and translate it into a grammar that can be applied as ornamentation. However, his sight doesn't allow him to pursue a career in the watchmaking industry, so he has to turn to something else. L'Eplattenier grants him the opportunity to work on the *Villa Fallet* under the supervision of René Chapallaz, a young architect from the region. Jeanneret seizes it in the search to find new applications for his germinating language.

He draws fir trees, a symbol of Jura's forests and the school's identity. He looks for geometries that can be repeated and transformed into ornament. Playing with the inclination of the branches, he creates a geometric grammar that would become the regulatory outline of the composition. Built in the midst of the trees, the villa incorporates their spirit in its nature. The conifers are not only covering the surfaces of their shapes, their essence emanates from the building and the structure is designed according to their geometry. Having received no real education as an architect thus not being able to rely on a set of prin-

ciples, Jeanneret focuses on the use of natural patterns in his design process. The plan itself is derived from the shape of the rock on which the house stands.

This project for the *Villa Fallet* is certainly a remarkable testimony of the education Le Corbusier received at the school in La Chaux-de-Fonds and could be the subject of a study in itself. It speaks of the foundation on which his consequent beliefs rest. As he is growing as an architect, he expands the range of influences he absorbs. Nevertheless, finding inspiration in the natural world remains central in his creative approach, which he also preaches to his confrères.

> « How are we to enrich our creative powers? Not by subscribing to architectural reviews, but by undertaking voyages of discovery into the inexhaustible domain of Nature! 'Beauty first!' is the true lesson of architecture. We find it in her adaptability, her precision, in the convincing reality of the spectacle of her harmonious combinations and creations which she offers us in everything: a serenity even in the perfect harmony of natural catastrophes, geologic cataclysms, etc… »[47]

Some of the principles that govern the *Villa Fallet* continue to be apparent throughout his artistic career. For instance, the ornamental plays he performs continue to be underlying in latter explorations of geometric nature. Along with fellow painter Amédée Ozenfant, he creates a movement called *Purism*, deeply rooted in the laws he found in the study of nature throughout his education. Shapes, proportions, and colors form what he calls the invariants; the fundamental rules of the composition which becomes a scientific approach as they claim in their collective work After Cubism, dedicated to their *purist* ideology:

> « What do art and pure science share? How can the spirit of one serve the other? Only their technical instruments differ, their goal is the same: the goal of pure science is the expression of natural laws through a search for constants. / Likewise, the goal of serious art is the search for the Invariable. »[48]

Nevertheless as he grows as an architect, he diversifies his influences and the pure, almost innocent exaltation of nature that can be seen in the *Villa Fallet* remains singular in his body of work. The period of time after his studies he spends working for Auguste Perret in Paris leaves a great mark on his architectural approach. The French architect and engineer is one of the pioneers of the use of reinforced concrete. The structural and spatial possibilities this new material brings open new doors in Jeanneret's approach. His compositions attain more abstraction and allow the passage of the ornamentation to the space. The more elements are incorporated into his philosophy, the less the early obsession for nature appears dominant in his architectural thought.

This primordial fascination for the natural world forms a set of underlying principles in Le Corbusier's philosophy. However, this

thought quickly gets contaminated by other ideas and often gets political. For instance the movement of *Purism* is in itself quite a radical answer to *Cubism*. Throughout the extensive literature about architecture he later produces in his career, this early influence becomes less apparent although remaining visible. The book where his conception of what nature means is probably the most revealing is *The Poem of the Right Angle*.

This series of lithographs, a composition of texts and drawings was initially designed as for exposition in Moscow. Although it holds the most emblematic figure of Le Corbusier's architecture in its title, it is about his fundamental beliefs on a broader scale. It is the artistic translation of his view of the natural world and mankind's place in it. Interestingly, the built house which reflects arguably the most quintessential materialization of this philosophy is also one of the humblest. *The Villa le Lac* he builds in 1923 for his parents incorporates the proportions of the landscape rendered human and architectural devices are put into place to immerge the inhabitants in it. Although not being representative of the broadness of Le Corbusier's ideology and its implications in his body of work, the two above examples form a perfect pair to dive into his quest of appropriating nature.

In order to have a better grasp of the fundamental meaning behind the cryptic symbolic of *The Poem of the Right Angle*, a little background is necessary. As Le Corbusier is leaving La Chaux-de-Fonds for Paris in 1907, he gives him a book called *The Great Initiates* by Edouard Schuré. In there, the French philosopher discusses the eight major religions and the protagonists behind their existence. He paints a picture of the polar relationship between the Church and Science, corresponding respectively to the needs of the heart and of the mind.[49] Through the study of what he calls the « exterior » and the « interior » history of religions, on one hand their public doctrine and on the other the occult science of the initiates, he argues their primordial implication in the split between religion and science.[50]

The central idea of the text is that there is a common ground, unifying everything in an « eternal and universal religion. »[51] In line with its Hermetic nature, the point is made that there is a fundamental theosophy given by God to the first humans and that it is at the core of all wisdom, be it religious or scientific. There are universal laws that govern everything, from above to below.

Considering Jeanneret's search for answers in the natural world, these ideas leave a deep imprint in his philosophy. *The Poem of the Right Angle* has to be seen as the fruit of Le Corbusier's career-long exploration of the world of the occult. The composition of the initial exposition of the work is in itself the key to understand its mystery. The arrangement consists of seven uneven numbered rows of drawings, each corresponding to a poem. These horizontal chapters are vertically aligned in the center, forming their vertical connection. He conceives the structure as being the addition of the three divine powers, the *Tria Prima* of alchemy and of four, the number of solid matter or the four elements; together they result in fulfillment. Every section has its title and is coded with a letter from A to G. In a chronological order they represent :

A – Environment
B – Spirit
C – Flesh
D – Fusion
E – Character
F – Offer
G – Tool

But the work can't just be regarded in this order, as the different elements interact with each other in various ways. This is made clear through the color Le Corbusier attributes to every chapter. The three primary colors of alchemy, blue, yellow and red respectively corres-

pond to the principles of the physical, the mental and the spiritual principles of the universe. They are attributed to the letters B, D and F, subdividing the piece evenly, and together they manifest the central point of his story. It is about the union of these three fundamental constituents, resulting in their Fusion, as the title of the central chapter indicates. This theme of the reconciliation of opposites is underlying in the whole work, as every row is organized symmetrically around its central poem. Symbolically, the latter are all given the number three and together they merge into the ideological backbone of the piece.

The ideas put forth by Le Corbusier in this book have to be discussed with a regard to the complex nature of their mutual implications. The study of the first three chapters gives an interesting insight into his conception of the primordial relationship between man and nature. The three last ones speak of the appropriation through the mind of these principles. Finally, this results in their alchemical fusion at the center of the book, the spirit, the section which for this sake is discussed at last.

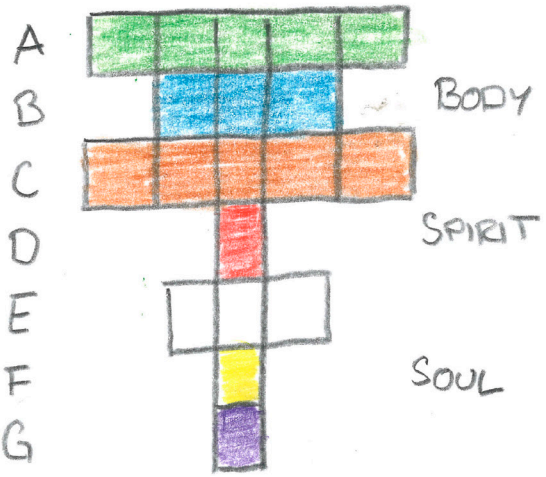


Fig. 4 Interpretation of the iconostase of the poem

Fig. 5 Interpretation of the illustration of poem A 1

## A – Environment

The first set of poems stand for his vision of the fundamental elements that govern our world. They are characterized by the color of green, symbolizing the primal forces of the universe. The first text is dedicated to the sun where it is presented as a « visitor » and a « Lord. » It rules through the day and leaves at night, it gives a measure of time through the nuances it creates. But suddenly, it interrupts the visit and leaves, leaving the world in the dark. Le Corbusier underlines the polarity of its cyclical but still alternative nature in the last painting of the poem. The passage of the sun is illustrated with a white sinuous line crossing the horizon, but the background marks a strong fission between day and night with its abrupt changes in color.[52]

« The sun master of our lives
indifferent far away
He is the visitor – a Lord –
he enters our home.
Going to bed goodnight he says
to these moulds (oh trees)
to these puddles that are everywhere
(oh seas) and our haughty
wrinkles (Alps Andes and our
Himalayas). And the lamps
are lit.
Punctual rotating machine
from time immemorial he gives
birth at any time of the
twenty-four hours to the gradation
the nuance the imperceptible
almost providing them
a measure. But he breaks it
twice brutally in the
morning and the evening. The continuous
belongs to him while he
imposes on us the alternative –
the night and the day – the two times
that regulate our destiny :
A sun rises
A sun sets
A sun rises again »[53]

The second poem of the series is a depiction of the cycle of water, as the first sentence defines the seas as « daughter of droplets and mother of vapours » and the horizontal line indicates the limits of its « liquid countenance. »[54] Through the action of the sun, mist arises and transforms into clouds and with the agitation, particles collide and energy is released; a storm breaks out. It bursts the water which falls from the sky and spreads on the earth.[55] The idea of the encounter of the two elements as the genesis of a new cycle is significant of Le Corbusier's philosophy, deeply rooted in alchemy. In this perspective, it can also be seen as the creation of life through the fusion of mind and matter. The fourth part of this series is in the continuity of the portrayal of the cyclical of nature. It describes how the water penetrates the ground through its cracks and how it moves on its surfaces and materials. The metaphorical use of moving animals like the snake and the worm for the depiction of this "primary propulsion" can also be related to the symbol of the Ouroboros, a snake eating its own tail, reinforcing the image of the cycle.[56] On the last illustration of this part, a woman lies on the floor, meandering figures of water emanate from her head; she appears to be dreaming.

The fifth and last element of the first chapter reveals the true place of water in Le Corbusier's philosophy. It is what reigns between the poles, where accounts are settled and incompatibles are united.[57] In an allegorical sense, it is the state between mind and matter he already introduced, the flow of water holds everything together. He chooses the image of two hands with their fingers interlaced as a symbol, which he depicts in the last illustration of the section.[58] The whole composition is enhanced by the black and white background, which shows a strong vertical separation throughout the middle of the painting, but it inversed at the place of the hands. Moreover, the blue element on the bottom indicating the water also creates a discontinuity in the border between black and white, exalting its status as bond between the physical and the mental state.

« Between poles reigns the tension
of the fluids operate the
liquidations of accounts of
contraries is proposed a
end to the hatred of
the irreconcilables ripens the union
fruit of the confrontation
The current passes through and solves
passed through solved
I thought that two hands
and their fingers interlaced
express this right and
this left ruthlessly
solidary and so necessary
to reconcile.
Only possibility of survival
offered to life »[59]

Finally, the symbol of this merging of two opposite forces is revealed in the third and central part of the chapter, where it takes the shape of the right angle. The material world where the eyes rest is characterized by the plane of the horizon; looking up into the space opens the realm of the non-physical. But lying down on the ground represents death, in order to live man has to stand up and take action. The resulting figure is the right angle, the connection between the upright human and the horizon. The main painting of this parts illustrates this picture, characterizing the body of the man with two opposite red triangles; the two opposites are joined in an alchemical fusion as the color indicates. The physical and mental worlds are joined in the human body.[60]

« The universe of our eyes rests
on a plane bordered by horizon
The face turned to the sky
Let's consider the inconceivable space
until now unseized.
Rest lie down sleep
- die
The back on the ground…
But I stood up!
Since you are straight
you are fit for action.
Right on the terrestrial plane
of elusive things you
contract with nature a
pact of solidarity : it is the right angle
Upright in front of the sea vertical
here you are on your legs. »[61]

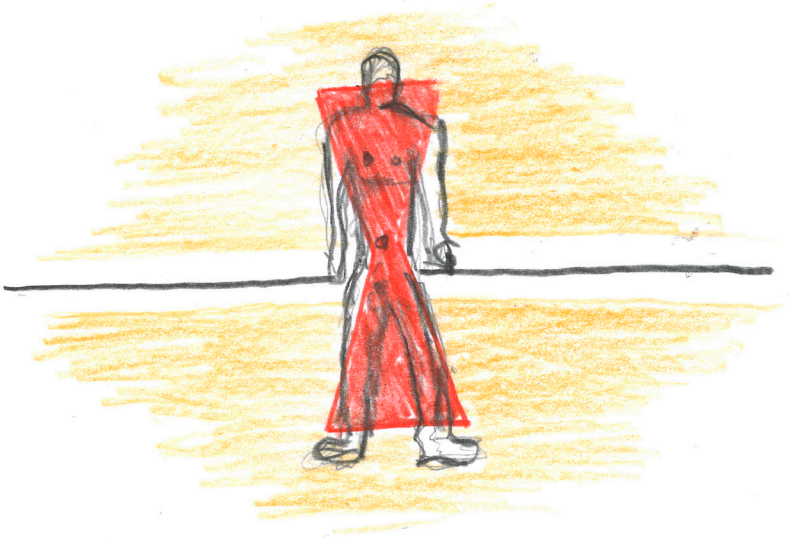

Fig. 6 Interpretation of the illustration of poem A 3

## C - Flesh

The structure of the third chapter can be seen in parallel to the first. Similarly it explores polarities and how they form a unity, this time in the body as the title indicates. Le Corbusier enters the subject through the figure of the animal, where he depicts its primal instincts. Hunting, its senses are wide awake, ready to detect and to kill which is illustrated by a large animal standing in front of a lying woman.[62] But then, in the images and the text a transformation becomes evident. Through Le Corbusier's constant redrawing, an ox becomes a dog. Although the narration is quite cryptic, it can be understood that the animal slowly becomes domesticated by man.

In the following section, a woman appears at the crossroads. She is here for something that can only be achieved as a pair at the crossing of two paths. But in order to see this, one has to open his eyes, which Le Corbusier describes with the following allegory :

Fig. 7 Interpretation of the illustration of poem C 1

« They are here innumerable who
sleep but others know
to open the eye.
Because the profound lodge is
in the great cavern of
sleep this other side of
life in the night.
How the night is alive rich in
the warehouses the collections the
library the museums of
sleep! Passes the woman.
Oh I was sleeping excuse-me!
With the hope to seize
the chance I held out my hand…
Love is a word without
border. It is also it is again
a human creation a trial
an enterprise. »[63]

The sleeping woman of the part A-4 appears again. Through this, Le Corbusier hints towards the fact that « opening the eye » means to look into the realm he described through the water, between the poles of physical and mental reality. In the last part, we understand the nature of the crossroads that was mentioned in the beginning. It is about love, the union of woman and man, which is also found in this world between mind and matter. The fourth and symmetrical of the second part underlines it with the apparition of male figure, telling stories about the woman in his art. He is only a half without her, as an « eternal tear from top to bottom » at his side indicates.[64]

The fifth and last element is at the same time the end of the story told in the chapter and the key to understand the nature of its symmetry. A galley sails on the sea and voices sing on board. On one hand, it could indicate the outcome of the love story. However its true meaning is in regard to the balance of the chapter. The scene takes place in what is called « the plane of joy » the horizontal realm of the physical. This time it is man which is surrounded by nature, as opposed to the animal in the first part.[65] Finally, they come together in the third and central element of the chapter, where a hand caresses a seashell. They love each other, which is « the accord of time the penetration of the forms the proportions. »[66] The resulting harmony is the union of nature and man but as Le Corbusier indicates in the end, to experience it he has to be « at home in the bag of his skin, make his own business and say thanks to the Creator. »[67]

B-SPIRIT

When the first and the third chapter of the book are seen together, their dialogue becomes apparent. The human is put in relation to his environment. In himself he incorporates the principles of mind and matter, which are also seen in the relationship between man and woman. Finally, in the symmetrical fashion the whole work is created, the

second chapter unveils the fruit of this encounter. In its first element the idea is suggested of a tool which allows to enhance the « harvest of the invention » giving man liberty in his creation.[68] It is in the numbers and in the proportions:

« Its value is in
this : the human body
chosen as support
admissible of numbers…
… here is the proportion!
the proportion that brings
order to our
relationship with
the surroundings. »[69]

It is the apparition of le Corbusier's *Modulor*. Its intrinsic nature is to join opposites, the metric and the foot-inch measurement systems. The idea is to « unite, co-ordinate, bring into harmony the work which is at present divided and disjointed by reason of the existence of two virtually incompatible systems » with this tool.[70] It is based on the proportions of the human body and the Fibonacci series, as he describes it in his book on the subject:

> « This time, it was a simple matter to give a description : the 'Modulor' is a measuring tool based on the human body and on mathematics. A man-with-arm-upraised provides, at the determining points of his occupation of space-foot, solar plexus, head, tips of fingers of the upraised arm – three intervals which give rise to a series of golden sections, called Fibonacci series. On the other hand, mathematics offers the simplest and also the most powerful variation of value : the single unit, the double unit and the three golden sections. »[71]

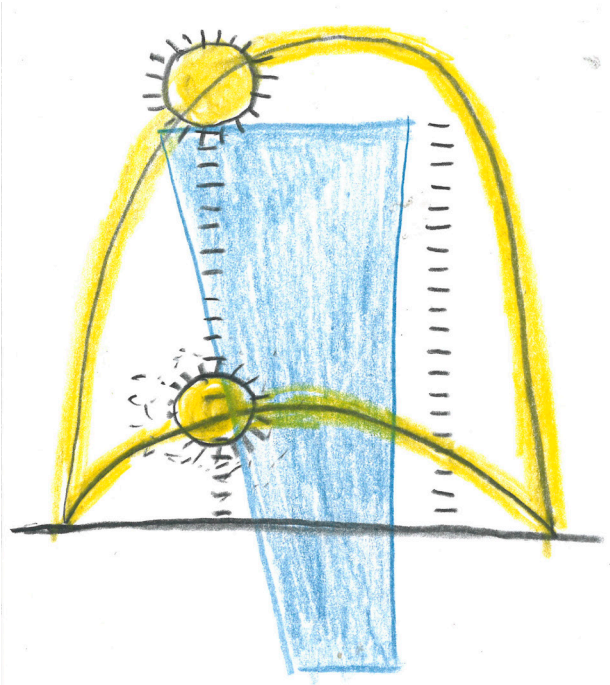

Fig. 8 Interpretation of the illustration of poem B 4

The notion of measurement reappears in the last part of the chapter, where the sun is once more portrayed as the clock regulating the life on earth. But here, for the first time in the work, architectural elements are introduced. The sunlight has given architecture the « brise soleil », creating « the house daughter of the sun. »[72] This is illustrated with a painting, showing its path in the sky, and from the horizontal plane of the ground emerges a vertical scale, measuring it.

Once more, the outcome of the chapter occurs in its central part, where the house is now complete, she is the « the master of her shape » and « installed in nature. » She is now one with the environment and her inhabitants, and « open to the four horizons. »[73] This indicates that she is the fruit of the earlier reflections, she has now united her physical reality with the immaterial thanks to the new-found tool. The last illustration shows a building, it is characterized like a section that can be read as representation of Le Corbusier's Plan Libre. Three slabs are highlighted with a red color, embodying their alchemical force of action, and the freedom of the space. An owl, a symbol of wisdom landed in front of it, affirming that the architecture is constructed upon a higher knowledge. This concludes the first three chapters of the book, where through the union of the *environment* and the *flesh* a *spirit* has now emerged and can be used for creation with the help of its tool.

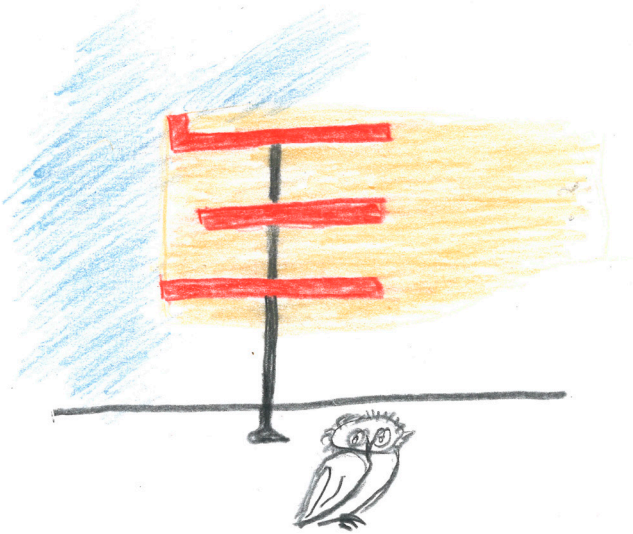

Fig. 9 Interpretation of the illustration of poem B 3

# Soul

## E – Character

The last three chapters have to be looked in analogy to the first triad. However, where the emphasis was put on the physical realm in the beginning it is now in the immaterial, the spiritual. They form a balance and a dialogue throughout the work. The fifth chapter, which is about the character opens once more in the realm of the animals, comparably to its counterpart in the third one. It is about fishes, horses and amazons, bringing forward their bestial nature. In response to that Le Corbusier appears in his role as architect in the last part of the chapter. In contrast to the instincts of the animals, he has the intellectual task of building for the people. But « making an architecture is making a creature »[74] so he has to find answers in the realm of the living. He describes this process in the end:

« The modern cathedrals
will be built on this
alignment of the fish
the horses the amazons
the constancy the uprightness the
patience the wait the desire
and the vigilance. »[75]

The unveiling of the chapter happens as usual in its core, where the right angle appears again. It is the crossing of the heart and the spirit, which he describes in the adjacent parts through the animals and himself. Finally, the right angle is unveiled as being nature, the union of everything. In the illustration, this can be read as the being the female figure enveloping the scene from the sky. She feeds a human figure with her breast, which can be seen as the metaphorical giving of life. The man stands vertically in front of the horizon, creating the ever-present figure of the right angle, contrasted by the red and blue colors but joined through the drawing of two interlaced hands. In essence, this can be read as the allegory of nature, holding everything together and nourishing humankind with her wisdom.

« Categorical
right angle of the character
of the spirit of the heart.
I mirrored myself in this character
and found myself
found my home
found
Horizontal look ahead,
arrows
It is her who is right reigns
She holds the height
doesn't know it
Who made her like this where
does she come from?
She is the child righteousness with
a clear heart present on earth
close to me. Acts humble and
daily are warrant
of her greatness. »[76]

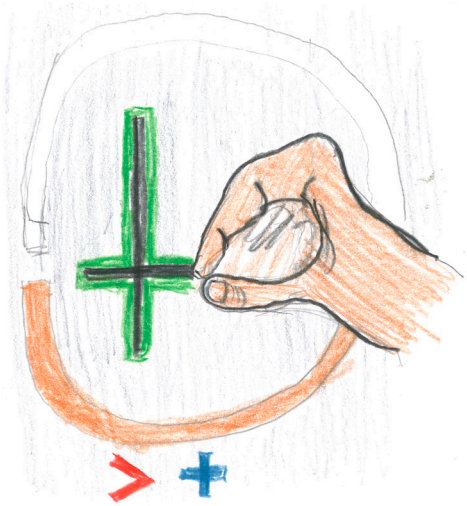

Fig. 10 Interpretation of the illustration of poem G 3

## G – Tool

Opposite of the chapter about character stands the last of the book about the tool. The right angle which was introduced earlier as a metaphor for the crossing of two opposite but complementary forces now attains a physical consistency. It is drawn by a piece of coal, which brings an insight into the nature of this last part of the work. This element is connected with the principle of combustibility in alchemy. This is linked to the soul, which is the theme of the last triad of *The Poem of the Right Angle*. Le Corbusier admits that the relativity of its rigor may be a subject of discussion amongst scientists. But its true essence lies in its symbolism, it is the sign of his ideology. The illustration accompanying the only text of this last chapter portrays the picture of a hand drawing the sign of a right angle. A brown and white circle surrounds the scene, in allusion the chapters about the flesh and the character. It is the result of the union of matter and mind.

## F-Offer (the open hand)

The central chapter of this last triad about the soul can be interpreted as the climax of the work. As the title and the subtitle indicate, it is about the open hand and offering. It is open because everything is « present » « available » and « graspable. »[77] In the following text, all the subjects that have been present throughout the work reappear; water, sun and the hand which at the same time caresses and uses tools.[78] It joins the physical and the mental realm, as well as the sentimental and the intellectual. Through this it is ready to receive, and to give. All the elements of the long spiritual journey are now reunited in the open hand that is illustrated, enhanced with its red strips, indicating that it is now ready to take action.[79]

Fig. 11 Interpretation of the illustration of poem F 3

# Spirit

## D-Fusion

Finally, the central chapter of the book reveals its alchemical nature. It is about the *fusion*, the union of polar elements that occur throughout the work. Le Corbusier uses it as a sort of plaidoyer in favor of his proposal. It rapidly becomes clear that this approach isn't unanimously supported and that he often encounters resistance.[80] He tells the people to let the one who wants to take his part of the risks do what he does. He reveals that for him it is about alchemy, as he says « Let the metals fusion » and « tolerate the alchemies which moreover leave you blameless. »[81] Finally, the chapter ends as the sea has come down to rise again in time. This not only marks the conclusion of the story, it also indicates that it is a cycle, just like the sun and the water.[82]

In essence, *The Poem of the Right Angle* is quite representative of Le Corbusier's approach to nature. His aim is to find in its creation the principles that help him to create as a man. Additionally, he tries to discover the place humans have in all of this. For him, we are the result of the fusion of mind and matter, therefore we can find in ourselves the answers to these questions. The physical outcome of this research is the « tool » as he describes the *Modulor*. However it is by far not the sole manifestation in his architecture of the life-long quest for answers in nature. Alike the object of his studies his buildings are based on underlying principles, only apparent to the eye that sees. Furthermore, the intention isn't merely to find the keys for his own creations. Like the open hand ready to receive and to give, his architecture is meant to immerge its inhabitants in their environment. It is the union of man and nature, through constructive but also symbolic devices.

Fig. 12 Interpretation of the illustration of poem D 3

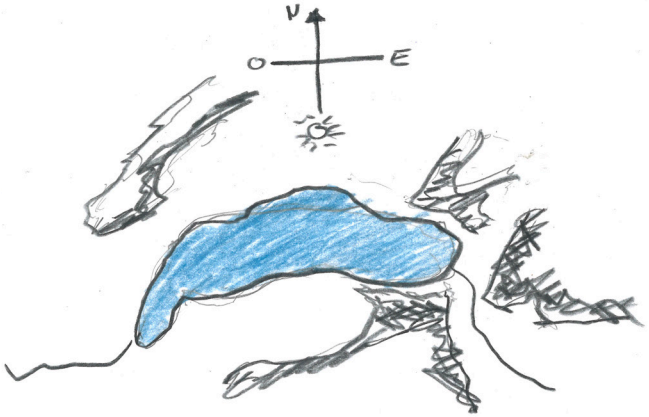


Fig. 13 Interpretation of Le Corbusier's search of the territory

Being one of the humblest works of Le Corbusier's career, the *Villa le Lac* is still considered one of the most expressive of his architectural thought. He builds it in 1923 for his parents as they can't afford the house he built them in La Chaux-de-Fonds anymore. Although it is very small in its dimensions it offers an insight into his philosophy, rich in its details. It also demonstrates his passion for nature and how he integrated her in his approach to architecture. However, it has to be stated that the building was constructed more than two decades before the initial exposition of *The Poem of the Right Angle*. The house can't be interpreted as the direct materialization of the ideas put forth in the book. However the poem is the fruit of a life-long research, in which the *Villa le Lac* also played its role. As it will be demonstrated, both reveal elements of each other. Together, they form the union of body and soul Le Corbusier portrays in the text.

Interestingly, the project for the house grows on paper without having any parcel to build on. Le Corbusier is looking for the perfect place to materialize his ideas. The plan has its pair of rules to follow and the land for the construction is scouted according to them. The first one concerns the environment; the sun has to be in the south and it has to be in front of the lake.[83] Already here, two of the main themes of *The Poem of the Right Angle* appear. In A small house, the book he later writes on the project, he completes the explanation with the addition of a drawing, showing the lake, the sun and a compass, a figure he often connects to his idea of the right angle.[84] Although this can be interpreted as a purely functional choice, it already indicates the very essence of the house. It is about the union he portrays in his poem, between man and nature and between body and soul. The second principle is the one of the machine à habiter, everything is proportioned in order to achieve the most out of a useful minimum. With these ideas in mind, he begins the search for the ideal place to execute them and finds it in a little parcel on the shores of the Léman. The parcel is situated in Corsier, a small town on the outskirts of Vevey, and corresponds perfectly to the natural elements and the dimensions he is looking for.

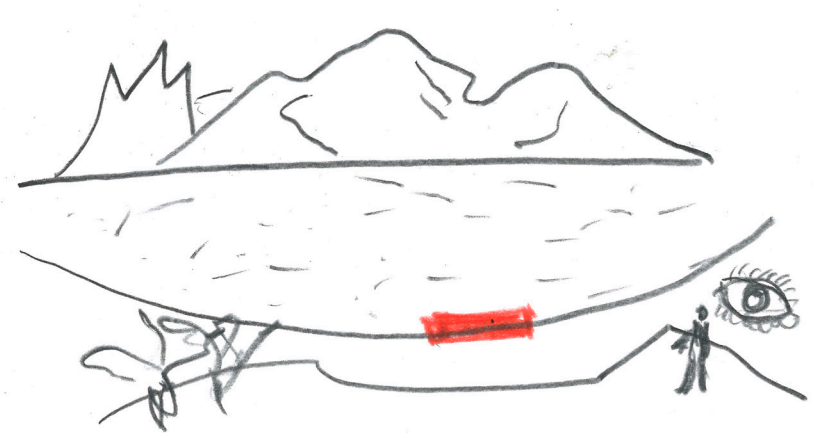

Fig. 14 Interpretation of Le Corbusier's search of the site

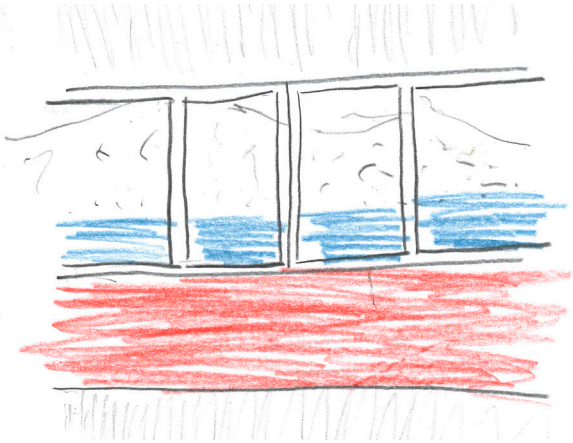

Fig. 15 Color contrast between the wall and the lake

The house is destined to live according to the cycle of the sun. In A small house, the first plan indicates a building that appears to be floating in water. A circuit is drawn throughout the garden and the rooms, similar to the one of the sun on the bottom. The spatial organization is done with regard to the passing of the day. On the east side of the house where the sun rises, a clerestory window lets it shine into the living room. The « Visitor and Lord » of *The Poem of the Right Angle* acts as a clock and regulates the life inside the house through the great window. This opening which makes up almost the entire length of the south façade acts as an hourglass, the inhabitants sense the passing of time through the subtle changes of the atmosphere. And in the west where the sun sets, the people go to sleep with it. This long window is a forerunner of its type and is representative of Le Corbusier's work with reinforced concrete. However its origin is not constructive, it is spiritual. It projects the encounter of the sun with the water into the house which now becomes their daughter.

As it is indicated earlier, the building is designed to make the most out of a minimal space. In order to achieve this, Le Corbusier uses the tool he designed for the proportions; the *Modulor*. In the plan of the house, it can be seen everywhere. First of all, the house is separated into two equal parts like the man is divided through his naval in his drawings.[85] The large window is also divided at its half, which serves its expression as the union of two polarities. Therefrom arises the spatial and the temporal organization of the house. The eastern part is dedicated to the living room where the inhabitants live throughout the day, as opposed to the western part comprising the bedroom and the kitchen.

Furthermore, the plan reveals a series of golden section relationships, the second subdivision of the *Modulor*. First of all, when compared to the total length of the façade, the large window corresponds to the Fibonacci series. Even in its own composition it follows this principle, as it consists of four identical elements, each of them having a small central pan surrounded by two larger ones. The width of the smaller is at the same proportion of the large as their height is to their combined length. In an analog fashion, the opening in the south façade leaves two blind sides at each end, equal to the golden section of the window. Inside the house this division corresponds to the separation between the living room and the small salon, as well as the wall between the bedroom and wardrobe. The tool Le Corbusier develops through the study of the human body now receives an application. In an underlying manner, it shapes the house and puts its inhabitants in relation to its environment. In other words, it brings the panorama to a human scale.

The dialectic Le Corbusier puts forth in *The Poem of the Right Angle* also dictates the colorimetry of the interior of the house. The walls are painted in a range of tones ranging from dark blue to a light red. They correspond to the chromatic expression of the duality between body and spirit, which is recurrent throughout his work. The

dark blue of the east side transforms into a lighter shade in the living room, ending in a pale red in the bedroom. These tones can be seen as the equivalent of the exterior atmosphere through the passing of the sun. The duality between the colors is the most expressive at the large window, where the blue of the lake is contrasted by the dark red tone of the wall. Together, they form a composition very similar to Le Corbusier's drawings in The Poem of the Right Angle. The color is also indicative of the essence of this window; it is the alchemical fusion of man with nature. The same play is performed outside of the house, where the red color appears on the underside of the shelter. It is the opposite reflection of the lake's blue color.

The roof which extends outwards and creates a space between inside and outside is an expression of the house's spirit. Just like the sun and the lake are invited inside through the large window, the garden is thought as an interior space in the midst of nature. The boundaries between inside and outside become very fragile although the whole construction is characterized by its sharp limits. In the spirit of the first plan shown in A small house where it is portrayed as an island, the garden is enclosed by walls on three of its sides, creating an opening towards the south. The aim is to frame the environment, so that it can be experienced through the eye as Le Corbusier argues:

> « The purpose of the boundary wall seen here is to close off the view to the north, to the east, partly to the south, to the west; the omnipresent landscape on all sides, omnipotent, becomes tiresome. Have you noticed that under such conditions, 'people' no longer 'look' at it? If the landscape is to count, it must be limited, it must be sized by a radical decision: blocking the horizons by raising walls and revealing them, by interrupting the walls, only at strategic points. »[86]

The most iconic scene of this enclosure takes place in the south, where a wall is erected in front of the eastern part of the garden. A rectangular hole pierces it in the middle and a table is placed underneath. Once again, the view is brought to the human scale, framing the lake and the mountains like a window, or a painting. The device becomes an interior space under the shade of the tree, a « room of greenery. »[87] The only place where the wall is interrupted is in front of the house, its façade becoming the boundary. And at the western end of the garden a narrow staircase leads to the roof, where the last part of it is hidden.

A patch of grass grows here, it « lives by itself, depending on the sun, rain, wind and seed-bearing birds. »[88] Not only does it extend the limited space for the garden, it also brings a new perspective to the view as if it was seen from a boat. It is if it was saying that the house is a part of the ground; it is in unity with its environment. Finally, it has to be noted that this garden is not only meant to be experienced by human beings, the animals are also taken into consideration. The dog gets a small window in the wall facing the street, where he can bark at the people on the sidewalk. And the cat has her own walk leading to a platform, offering a view only she can get. This is not only indicative of Le Corbusier's love for the animals, it is also a mise en abyme of the entire project. The house as the union of its inhabitants with nature.

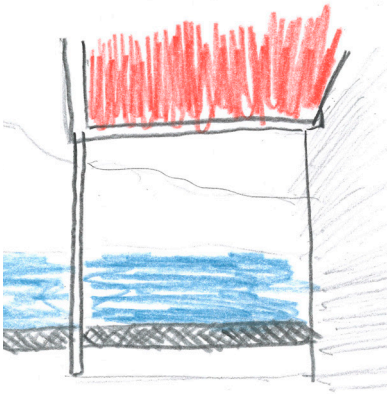

Fig. 16 Color contrast between the shelter and the lake

## A Living Oxymoron

Although many years separate their creation, the *Villa le Lac* and *The Poem of the Right Angle* present the same spirit. They are the fruit of Le Corbusier's life-long quest to find answers in nature and to unify man with her. Maybe because of this, the house experienced its own share of encounters with her. In fact, the lake that is so crucial in the idea of the project proved also to be its biggest adversary. The seasonal level changes of the Léman pushed the cave against the western part of the house. This force from below finally led to a crack through the middle of the house. The creature Le Corbusier gave birth to became sick, as he refers to in *A small house*.[89] The illustration he uses to show the infiltration of the water through the ground is almost identical to its counterpart in *The Poem of the Right Angle*.[90] It could be an indicator of the difficult relationship Le Corbusier entertains with water throughout his career. In fact, the incident of the *Villa le Lac* is not unique in its type, he regularly encounters difficulties with the infiltration of water. It may very well be the reason he describes its movement as reptant and vermiculating in the poem.[91]

Furthermore, another illness hit the garden. The numerous trees: pine, poplar, weeping willow, acacia and paulownia grew to be hostile to each other and to the house through time. The pine stole the light from the poplar, the acacia threw shade on the neighbors' salads, they both were cut. The poplar's roots reached the foundations of the house and created infiltration problems. The weeping willow took the light from the bedroom. They too were removed. In the end, it is a quite poetic expression of the duality Le Corbusier's philosophy is based on. The elements that are fundamental to its conception also present the most adversity. This polarity can also be read in the expression of the house. Although it is a device to unify nature with man, it is coated

in the expression of a machine; the machine à habiter. Covered in galvanized sheet metal, it reminds of an airplane. And the entire house is conceived as a cruise ship, as Le Corbusier hints towards in *A small House*.[92]

Despite these apparent contradictions, the *Villa le Lac* remains a remarkable expression of his philosophy. In a similar fashion the poem expresses his ideas in a cryptic way, the house incorporates the resulting principles in an underlying manner. Standing in the living room, one can't help to feel immersed in nature's greatness, even without knowing about the spiritual path that lead to its conception. In this sense, Le Corbusier manages to translate his observations of the natural environment into his architecture. A set of principles guides its creation, leads to its beauty without revealing its fundamental essence. The house that now acts as a museum has found its destiny; it puts into relation the marvels of human creation with that of nature.

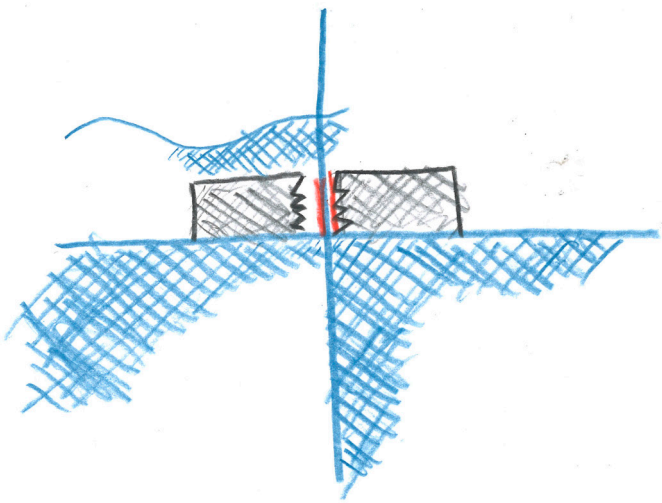

Fig. 17 Interpretation of the Villa's infiltration problems

# Kiyonori Kikutake

*A SCIENTIFIC APPROACH*

# Metabolism

Kiyonori Kikutake grows up on Kyushu, the most southernly island of Japan. He lives in a place called Tsukushi Plain; a territory marked by a changing climate, favorable for the cultivation of rice. In the beginning of summer when the lands get flooded, the rice is planted in the wet soil. After the harvest in autumn the cultivation is substituted for beans, buckwheat and colza.[93] Through this method of double cropping, the local farmers are able to increase the return of their land. This adaptation to the passing of the seasons and of the time is also characteristic of the sacred architecture. On one hand, the solid stone structures of the shrines allow them to withstand the flood, on the other their wooden elements are designed to be removed and replaced over time.[94]

Being from a large landowning family, Kikutake is raised and educated in this system. They lease the parcels of their land to the farmers and at the same time, they are responsible for the maintenance of the shrines. Being a talented drawer and fascinated by science, he decides to become an architect. After his studies at the Waseda University in Tokyo, he spends a few years rebuilding and relocating wooden structures. He learns to exploit the flexibility of this material and builds a thought around it, as he explains in From Tradition to Utopia, a book dedicated to his major realizations:

> « I began to seriously consider methods that utilize natural resources without waste, that reuse materials by dismantlement and reassembly and allow for reconstruction. One of the primary considerations on the 'Metabolism Movement' was the evolution of this thought and its application to 'Modern Architecture.' After the first intuition I then considered situations where the application of this ingenious reconstruction can occur. Architectural space was categorized into two types : one that will eventually need reconstruction, and the other whose utilization will be permanent. The part which requires reconstruction was to be designed to actively allow dismantling, reassembling and rebuilding. The most important part was to be placed in the core of the structure. »[95]

He begins to experiment with these ideas in several of his projects, notably in the *Sky House* that is the object of the study. However the concept gains only physical consistency in 1960, when the *Metabolism* movement is launched through a manifesto at the World Design Conference in Tokyo. He writes this text with his fellow architects Kisho Kurokawa and Fumihiko Maki. In there, they discuss proposals for the city of the future, a radical response to Japan's contemporary problems. The country has been devastated at the end of the Second

World War, and now that it is rebuilding difficulties arise. The large cities like Tokyo are increasingly becoming suffocated by their own growth and land becomes scarce. The first part of the text, written by Kikutake, is dedicated to his explorations of alternative cities, as a response to these problems. For instance in his *Tower Shape Community*, he seeks to circumvent the scarcity of land by redesigning the city vertically:

> « The design of city must be the property of the tomorrow. It should be originated by the wish and expression for the tomorrow.
>
> Tokyo, a huge city, is worn out with bad sickness. She has lost the proper control of city, because of her mammoth like scale. On the contrary, she is even trying to conceal her illness and to justify the present situation by depending on the adaptability of inhabitants.
>
> The limitation of the horizontal city has far passed over from the ability of function of transportation and the living standard. The new harmful tissue like cancer is spreading over the city. The transposition called "Bed Town" has already started…
>
> The design of city should not overlook such actual situation that the city is coming to the climax of her confusion. The design of city should bring new light to the city which now has list its direction, has broken its balance, and has given up its hope. »[96]

The proposal is characterized by its 300-meter-high cylindrical towers, each of them having 1250 capsules attached to them. These living units are designed to enable their removal and replacement. The idea is to create structures that can adapt to the passing of time and to the needs of their inhabitants. The title of the movement becomes

clear, metabolic process begin to enable the architecture to maintain its life like in a living organism. The capsules containing the homes live in the same spirit as the towers. They are built in a steel structure, which durability of 50 years is the « most suitable to serve the man's life » according to Kikutake.[97] A unit is designed for a couple and two children, but its elements are movable to accommodate different situations. The bathrooms and the kitchens are built as what he calls « movenettes » they can be placed in different parts of the home and they can be replaced by newer models. The rooms for the children follow the same principles as they can be plugged into the living unit according to their inhabitants needs.[98]

The second project chosen by Kikutake to illustrate the idea of Metabolism is the *Marine City*. It is equally a response to the use of land as the first project. This time, the city is moved onto the ocean as a radio concentric organization of smaller circular units based on the shape of a jellyfish. It also grows vertically upwards as well as downwards. The lower elements are installed to give the building a necessary buoyancy as well as for the cultivation of aquatic vegetation. Besides its verticality, the city is also characterized by a horizontal propagation, based on the idea of cell division.[100] This time, the vision of urban space integrates the principles of a metabolism as a whole, as it can be sunk when it becomes redundant:

> « The Industrial Revolution gave man the first important chance to turn his eyes hopefully to the ocean and to feel emancipated from the bondage of the land, with its inherent conflicts.
>
> If a city – a unit of human society – were to be built and developed on the sea and then made to disappear under the water when it becomes unnecessary, it would become something that would save the life of the corrupted, gasping land civilization. »[101]

During the development of his ideas, Kikutake realizes that the approach needs a methodology. This view of architecture as something that can adapt over time to meet the inhabitants needs demands order, like the organisms it is based on. In the quest for these principles he discovers the works of Mitsuo Taketani, a contemporary physicist. The scientist had elaborated the Doctrine of the Three Stages of Scientific Development to prove the existence of a yet undetected nuclear particle called meson.

The system is based on Hegel's dialectics, a method of argument developed by the German philosopher. The approach consists of a first thesis, a thought or reflection that is in itself unsatisfying, it needs to be tested. It is confronted to the antithesis which tries to negate it, and if it proves inadequate it legitimizes the thesis. Hegel argues that this platonic method leads to nothing if the antithesis shows to be right. Therefore he adds a third step which can be called as synthesis, incorporating the principles of the first two arguments. Adapting the methodology to his scientific needs, Dr. Taketani comes up with his three stages of scientific development: the phenomenon, the condition and the substance. Through the confrontation of the phenomenon and the condition of the supposed meson, he manages to prove the existence of the substance. In his turn, Kikutake takes up the method, adapting it to his own needs.

« At that time, there were three physicists in the Kyoto University, doctors Yukawa, Sakata and Taketani who proposed a theory on meson. Doctor Taketani proposed a methodology and from it, he determined the existence of meson. I received an extremely strong incentive from this theory and began to reflect deeply on it as a possible methodology. He had mentioned that in thinking, there are three stages: the stage of phenomenon, the stage of the actual condition, and the stage of substance. When considering the structure of an object, its essence can be determined through these three stages. When these stages are applied to design stages, I believe the 'Katachi' step is analogous to the phenomenon stage, the actual condition stage or the technical step is the 'Kata' step, and the substance stage is the vision and image or the 'Ka' stage. With this reflection, the three stage methodology for my architecture was completed. »[102]

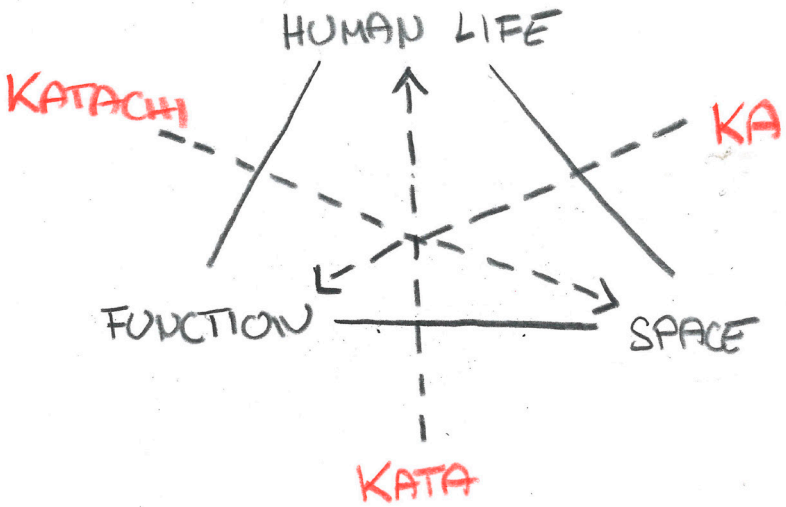


Fig. 18 Principle of the ka - kata - katachi

# Ka

The first element of the methodology Kikutake extracts from the scientific world is the visual approach, or *ka* as he calls it. It is the substance of the project, the vision that creates it. In the *Marine City* and the *Tower Shaped Community*, this can be identified as the vision of a city freed from the land. The two projects are also born of the image of a living organism or of cellular division. In Hegel's dialectic, this corresponds to the stage of the thesis; it is the starting point of Kikutake's design process in the shape of an ideal, a vision of the project. These are communicated through a number of sketches and often have the spirit of the rural and sacred architecture Kikutake experienced in his youth, as Fred Thompson who formerly worked for his practice recalls:

> « Kikutake did not speak English well, but was so fluent with sketching that the poetry of his thoughts reached me with ease. With Kikutake, I was given the opportunity to work with someone who had come from a rural background and respected 'roots' in both theory and practice; for he was a discoverer, someone deeply interested in his antecedents and in those of Japanese architecture, which were a manifestation of the rural lifestyle. »[103]

In establishing this methodology, Kikutake aims to find a way to materialize ideas and visions. There lays the fundamental reason why an identical structure to the theories by Taketani and Hegel is employed. The latter are of the realm of the mental, they are a way to structure cognition while architecture is a fruit of it. Therefore, a method based on the human intellect is applied to a vision to give it a physical consistency. Kikutake explains the role of this fundamental image through the analogy of aviation:

> « I regard the process of practice to be the opposite of the process of cognition; that is, I regard it as a three-step process starting from ka, then leading to kata, and finally arriving at katachi by applying the kata in actuality. In this case, ka is not merely an Order attained as a result. Ka means the conceiving of an Image. It is the process in which new functions are discovered from the contradictions of real life, and these new functions are projected into the unknown world of the future.
>
> It has often been said that an airplane does not fly because of the resistance of air. First of all, it was necessary for man to grasp the new function of flying from the contradiction arising from the fact that man wished to fly through the air. If this new function had not been discovered, it would have been impossible for the airplane to be realized in actual practice. »[104]

The comparison of the *ka* with the aviation reveals the technology as a crucial point in Kikutake's approach to architecture. To achieve a physical consistency, the vision of the Metabolist city necessitates technological means. Only through this, the architecture can adapt to the changing needs of the people. For him, the future lies in the industrialization, it is the way to translate the visions from the *Metabolism* Movement into his architecture.

## Kata

The second step of Kikutake's approach is the *kata*, corresponding to the condition in Dr. Taketani's methodology. In scientific terms, it is the state of a particular substance. In relation to architecture, Kikutake uses it to describe the materialization of the idea. In the Japanese language, *kata* signifies form, and it is used in various cultural domains like flower arrangements and the patterns of choreographed martial arts.[105] Thus, in architecture kata represents the condition of the idea, how a project is actually built. It is the technology he needs to realize the vision of *Metabolism*, that will enable the construction of movable parts and floating cities. Kikutake describes it in line with the *ka*, through the comparison with the aviation industry:

> « Kata come into being when the ka are realized in concrete form through the medium of techniques. In the case of an airplane, the invention of the engine as well as technical achievements such as light alloys and other new materials, hydrodynamic theory, and other techniques were unearthed by Image. When backed up by the techniques discovered in this way, the kata of the airplane came into being. »[106]

When looked at in parallel to Hegel's dialectics, the synergy between the *ka* and the *kata* become analogous to the thesis and the antithesis. It is the physical counterpart of the vision, without it, the image can't exist. In this sense, the methodology reveals a nature very close to Le Corbusier's philosophy of the opposition of body and

mind. As it has been stated earlier, technology plays an important role in Kikutake's approach; he realizes his visions through the technological aspect, their *kata*. In it, he finds the solutions to the problems he is facing whilst imagining new ways of life:

> « The direction for the coming new architecture will be the importance placed in the idea the artificial environment will be created through the repetition of much accumulated social experience, obtained from the usage of artificial materials and industrialized mechanical technologies. This idea is the theme for system buildings as well as for macro-engineering of megastructures. Subsequently, subjects such as ultra highrise buildings, floating linear cities and enormous domes were considered. »[107]

Although representative of the role of technology as the *kata*, these lines reveal the deep underlying duality in Kikutake's approach. Based on the study of the nature's creation, the condition of the architecture is attained through the implementation of technology, man's creation. And through its application, he also aims to liberate human life from the limitations of the natural environment:

> « For the primitive life of human being, the earth and environment of the nature could have its significance of the existence, and man had satisfied his life. But, for the life of human being of this day, it is impossible to held his life with the conditions of the earth alone.
>
> In addition to hold the weight and to have the location and expansion, the living facilities such as gas, city water, electricity, and drainage must be prepared. Furthermore, the life-environment such as meeting and transportation must be provided with. »[108]

# Katachi

The final element of the methodology is the *katachi*, the ultimate form of the design. It corresponds to the last stage in Dr. Taketani's approach; a substance in a certain condition results in the phenomenon. Or in Hegel's dialectic, the opposition between the thesis and the antithesis result in their synthesis, what the philosopher calls the *sublation*. The contradiction is overcome, the two opposing parts are united into a bigger entity. In the architect's approach, it is the result of the confrontation of the *ka* and the *kata*; the materialization of a vision through a physical process. Kikutake argues that any object has its own *katachi*, including in architecture; it is the spirit which connects the building to those who experience it. This can only be done through the senses, as it is what connects the physical experiences with one's cognition:

> « A certain form – katachi – is always inherent in design. There can be no design without form, no design that is inaccessible to cognition through the senses; nothing that lacks form can under no circumstances be called design. The word 'design' can only be applied to something that has some sort of ultimate form, or katachi.

> Architecture also has its katachi, and the katachi is the final fruit of architecture. There can be no architecture that lacks katachi. Consequently, in order to understand architecture, our first step should be to examine its katachi.
>
> It is necessary to approach the katachi with all of our senses.
>
> From the katachi itself we can sense directly and instinctively whether the katachi is good or bad, superior or mistaken. It is possible to decide whether the katachi is correct or not, whether it is beautiful or not. Design belongs to people and has a social character precisely because this katachi is inherent in design. »[109]

The search for such a methodology enabling the materialization of a vision is certainly motivated by a sense of incompletion projects like the *Marine City* or the T*ower Shape Community* leave in the architect. Although they are characterized by a vivid imagination of a future city, they lack the physical consistency. And for Kikutake an idea needs a *katachi*, otherwise it is only a formal logic:

> « There are, it is true, many different theories of design. However, any theory that possesses no process for actual practice is nothing more than formal logic. Formal logic can play no effective role at all in promoting actual design activities. When a theory of practice has been faithfully carried out, one must evaluate whether the theory was correct or incorrect by the katachi obtained as a result. Theory is cultivated and developed by this constant process of evaluation. »[110]

## A House Liberated from the Land

One of the realizations that express the best Kikutake's idea of *Metabolism* and his three stepped approach is also, paradoxically, one he built before the elaboration of his theories. Together with his wife Norie Sasaki, they design their own home: the *Sky House*. It is constructed in 1958, two years before the World Design Conference in Tokyo and the birth of *Metabolism*. However, the ideas of a changeable, adaptable architecture accompany Kikutake since the rebuilding of wooden structures at the beginning of his career. He sees the project as an opportunity to explore possible solutions for a house that adapts to evolving needs. He compares his approach and the nature of his future house to the behavior of weeds:

> « I have heard that Le Corbusier once grew a garden of weeds, and I imagine that he learned a great deal from them. Weeds are wonderful things, for they are an expression of pure vitality. They don't try to put forth flowers or fruit; they simply thrust their roots into the ground and attempt to stay alive. If they are lacking in what is ordinarily considered comeliness, they nevertheless have energy.
>
> When I started to build my house, the principal question I asked myself was how I would live in it, not how beautiful I could make it. My attitude was something like that of the weed. »[111]

The *ka* of the house is characterized by two main elements. The first is the above-mentioned architecture that is able to adapt to evolving needs. The second is an aspect other projects like the *Marine City*

and the *Tower Shaped Community* also reveal; the action of liberating the construction from the constraints of land. This act is as already discussed an attempt to bring a response to the scarcity of land. In fact, *Sky House* is built in Bunkyo City, a central district of Tokyo particularly affected by the problem. However, the emancipation of the architecture from its territory also comes from an ecological and political motivation. On one hand, it incorporates the image of the shrine in its ka. Like a stone structure it stands on its solid legs, allowing it to resist the floods and the earthquakes. Moreover, as Kikutake reveals in a discussion with Rem Koolhaas this action also comes as a protest to the land reforms operated by the Americans after the Second World War.[112] They have confiscated the properties of the landowning families, claiming to redistribute it democratically. He is directly affected by it, as his inheritance is taken from him. Thus, the project has also to be seen as a way of claiming that he transcended their measures. In line with this thought, the house stands on its four pillars; the roof and the suspended slab float above the ground. The only connection with the land happens at the bottom of the vertical elements, situated at the center of each side of the square plan. The disposition of these structural elements defines the space, characterized by great openings at the corners. The general scheme is not without resemblance with Le Corbusier's ideas like the *Plan Libre* and the *Maison Dom-ino*, with a great spatial freedom achieved through a concrete structure. This is probably not a coincidence since Kikutake was well aware of the Swiss architect. However, it is also the fruit of his exploration on the replaceable wooden structures he does after his studies. Now the system is applied to the concrete structure, forming the part of the house which will be permanent. Standing one a slope, an intermediary platform is placed below the main floor. Standing on small piers, it brushes the ground at the upper part of the terrain. With the floating main floor and its paraboloid concrete shell roof it stands as an image of a shrine, claiming that it is of the realm of the sky.

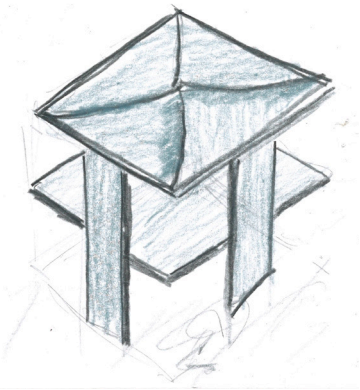

Fig. 19 Concrete structure of the Sky House

The solid and open structure of concrete opens the potential for a flexible use of the spaces. The most important element of the house is its core, a 16 mat-tatami parlor designed as a reflection of Kikutake's childhood home. The tatami is used as a measure unit of houses in Japan, based on the standard size of a straw mat of 90cm by 180 cm. The idea of this large central space is to enable the implementation of different functions throughout the year, without affecting the standard use of the house. As Kikutake states in *From Tradition to Utopia*, this open space is defined through folding fixtures along its perimeter, allowing to regulate the relations to the exterior:

> « In short, the flexibility of the house was given the utmost consideration while planning the 'Sky House'. A large space that can be utilized for a myriad of functions throughout the year, without restricting the lifestyle, was realized. In association with nature, many folding fixtures were used in order to control the relationship with the surrounding environment. »[113]

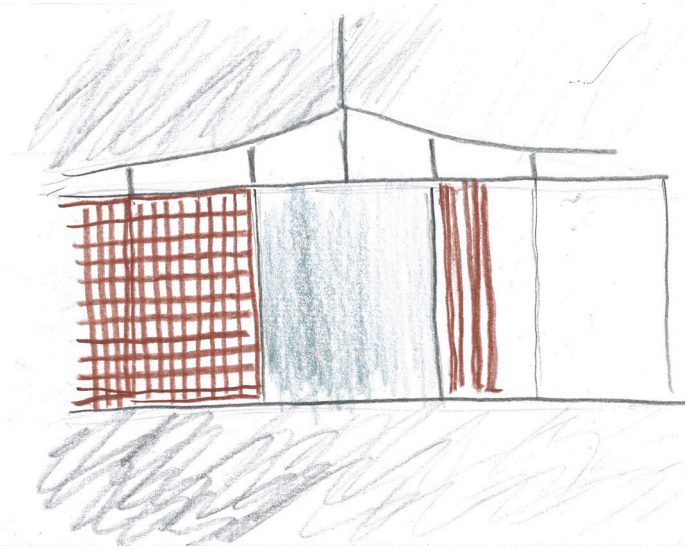

Fig. 20 Shoji screens and interior of the house

These wooden elements, the so-called *shoji screens* can be deployed to close off the corners, giving some intimacy and filtering the light. When stored, they are folded up against the central pillars. The mechanism does not only allow the house to respond to different interior situations, it also enables the adaptation to the outside conditions. However, they are not the sole metabolic elements put into place to make the house live. It is designed for a couple to live in, Kikutake and his wife, but the possibility is left open to welcome new family members. In 1962, four years after the completion of the building, a capsule is attached underneath the main floor to house the children's room. The capsule which hangs from the slab and is only accessible through a ladder reminds the designs Kikutake proposes for the living units in the *Tower Shape Community*.

Besides the children's room, two further elements are created to be responsive to changes of the use of the house. The kitchen and the bathroom are designed as modules he calls *movenettes*. They are the parts of the construction containing the most technological elements; therefore they have to be replaceable as well as movable. They are intended to be located at the outside of the central space, in the with of the peripheral veranda. For Kikutake, it is important to have these components as flexible as possible, since it is the *kata* which allows the *ka* to become a *katachi*. Therefore, the technological parts have to be able to be updated along with the advances of the industry:

> « The best solution for a livable house, I believe, lies in movable units and movable furniture. Consequently, I designed this house with only one large room and used movable partitions and fixtures everywhere possible. These can, I think, be made to back up my way of life at any given time.
>
> There is still plenty of room for industrial designers to improve the movable furnishings available, to make them more beautiful, more useful, and more comfortable. When mass production of items of this sort develops, new designs should call forth still newer designs, in a sort of chain reaction. When this has happened, I shall exchange my movables for others I like better. »[114]

When regarded analogously with the three stepped theory he elaborates later in his career, these different movable elements already reveal what would later become the *kata*. For Kikutake, they are the means necessary to achieve his vision (*ka*) of a house that is able to adapt and to evolve. As for the image of a shrine the project evokes when seen in its entirety, the *kata* is the concrete structure enabling the vision and the free disposition of the spaces.

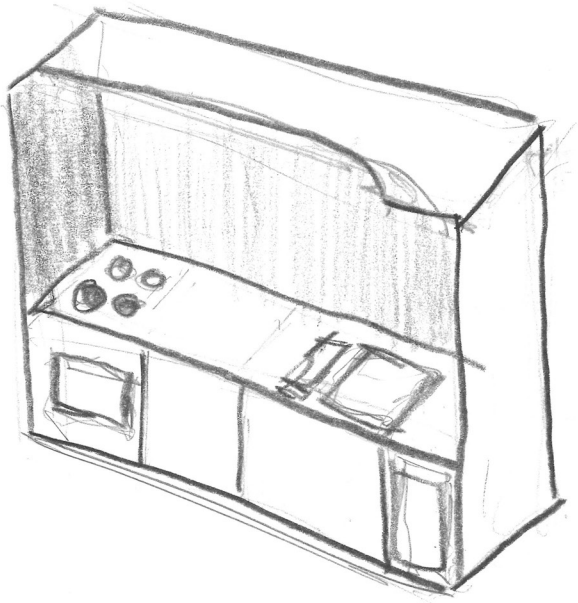

Fig. 21 Kitchen movenette

## An Evolving Organism

Finally, the house realizes the vision giving it a condition through its technical means; it now has a *katachi*. It evades from the ground standing on its four pillars and overlooks its neighbors from the crowded Bunkyo district. It is almost inciting its peers to do the same, to grow towards the sky to liberate themselves from the land. Through its different devices like the folding fixtures, the children's capsule as well as the movable bath and kitchen, it is now able to adapt to different situations. As the climate changes, the *shoji screens* are disposed accordingly, regulating the light, the air and the temperature. As the family changes its habits, the spatial organization is modified through the moving of the functions. As time goes by, the technical elements can be replaced by newer ones. And as needs arise, new functions can be implemented through the dockage of capsules.

In line with his intention to use the house as an experimentation, Kikutake undertakes several changes in the organization. As already stated, a children's room is installed in 1962 to welcome the newest member of the family. Fifteen years later, the intermediary floor is expanded to convert the entire main space into a living room. The capsule is replaced by bedrooms, as the kitchen and the bathroom are moved to the entrance and a sunroom is installed on the middle floor. In 1985, Kikutake converts the latter into the main living room and

converts the superfluous bedrooms into private rooms.[115] But the best illustration of the architect's intertwinement of the private life and the professional explorations is his early use of the intermediary floor. As his practice hasn't gained much attention before the publication of the *Metabolism* manifesto, the office is installed below the *Sky House* in a measure of economy of means. The house becomes the place of both the private and the professional life. Being exposed to the weathering, the working conditions are quite harsh as his former colleague Fred Thompson recalls:

> « The office was small and struggling; we worked in a corridor-like space under the Sky House, Kikutake's innovative design for his own home. There were no holidays, though once a year the office arranged a group outing to a hot spring. Two oil burners kept the office warm in the winter. The practice was so poor that we had to extract leads from wooden pencils with a razor blade to use them in our mechanical pencils. »[116]

Despite all the modifications the house undergoes through the years, it still stands here reflecting its *ka*. As a daughter of the fascination for Japanese traditions and for scientific research, the *Sky House* affirms its identity as the temple of Kikutake's explorations. Some minor diseases have plagued it like the children's capsule which proved to be too small. But overall, it is a beautiful expression of his ideas like *Metabolism* and *ka – kata – katachi*. Having been built before their elaboration, it is not the direct manifestation of the theories, however it certainly had an important role in the germination of Kikutake's philosophy. Probably, it is at the origin of his claim that theory needs practice to be relevant. Without the construction of the *Sky House*, he wouldn't have been able to examine the ideas; only the building's *katachi* obtained as a result of the *ka* and the *kata* can be evaluated.[117]

# Insights

# The Seed

Every living thing grows from a seed. If architecture is to be alive, it also needs to sprout from one. Whether in a plant, an animal or in a human, the seed is the basic unit of reproduction; it is the origin of the creation of a new being. What unites Frank Lloyd Wright, Le Corbusier and Kiyonori Kikutake is the architectural thought they cultivate, giving them principles to build on. In this sense, their philosophy is the seed of their creations. It contains in it the ideological blueprint; the buildings grow from it and conform to the underlying order. However, their true beautifier is the fact their principles are extracted from nature. And despite the different approaches, the resulting ideologies reveal striking resemblances.

Frank Lloyd Wright comes up with a very intuitive implementation of natural principles into his architecture. The visual aspect has a great importance, the hours he spent at his uncle's farm during his childhood become tangible through the detailed descriptions in *The*

*Natural House*. The observations and the influence of Louis Sullivan lead him to a grammar of ornamentation that is true to the nature of the material. He sees architecture as something that must achieve *simplicity* as it can be found in a flower or a tree. Every part of the building has its own function, but they have to live and to express their unity.

Le Corbusier's approach is also marked by a quest towards unity. However, he has a more symbolic attitude as his ideology is rooted in Hermetic beliefs and alchemy. It is marked by the fundamental duality between mind and matter, which he expresses through metaphors and drawings in *The Poem of the Right Angle*. For him, it seems to go beyond the boundaries of architecture as the philosophy reveals its spiritual nature. Through the union of body, soul and spirit, he aims to reunite man with nature. To achieve it he creates tools like the *Modulor* based on the proportions of man and the Fibonacci series. The whole narration is marked by this balance between the opposition and the union of two entities.

As for Kiyonori Kikutake the philosophy reveals the same elements, coming yet from another background. His childhood experiences in the family's farmlands expose him to important seasonal climatic changes and he sees how the shrines and temples are able to adapt to them. To achieve the resulting vision of *Metabolism*, an architecture capable of evolving, he needs a methodology. The three steps for scientific development proposed by the Dr. Taketani he uses as basis for his approach also incorporates an underlying sense of unity. Through the measure of a phenomenon and the hypothesis of a condition, the scientist succeeds to prove the existence of a substance, the meson. Taking over the spirit of the method, Kikutake adapts it to his needs, giving birth to the *ka – kata – katachi* theory. In there, he describes the complementarity of a vision and the physical means applied to achieve it. Only through the combination of both, architecture can have a *katachi*, its ultimate form and the only means to judge if it is good or bad.

In this sense, Kiyonori Kikutake and Le Corbusier have the same idea of the fundamental duality between mind and matter. They have quite a different approach however; as one is rooted in a spiritual quest and alchemy, and the other is of a scientific nature. Frank Lloyd Wright's philosophy is yet of another origin. Although he takes up terms like *simplicity* and *plasticity* used by his mentor Louis Sullivan, he makes them his own in a very intuitive way. For all of them, the framework of principles they establish through a fascination for nature help the cultivation of their architectural thought. It constitutes the very basis of their works, forming the underlying order of their architecture. It is the seed of their creation.

In a society becoming more and more self-centered, it has fallen into oblivion that our species has lived in a close relationship with its environment for almost its entire existence. The conditions we experience presently don't nearly reflect our real nature; surrounded with our own inventions, we run the risk to forget about the true miracle of creation. If we are to create something meaningful it is there we find the answers; like Frank Lloyd Wright, Le Corbusier, Kiyonori Kikutake and innumerable others did. Natural laws will always be above human laws, as it is them who create life. And if architecture is to be in accordance with its true nature, those who profess it have to cultivate it through an intellectual and spiritual work. Only when it is possesses true meaning, architecture is to reveal its real importance. Like Frank Lloyd Wright asserts in *The Natural House*, integrity is not something to be put on or removed off a person or a building; it is an intrinsic quality that can only change from within.[118] This means the nature of a house has to be contained in its own principles, which have to be present from the beginning of the design process. And as it is the case with the seed, the architectural thought is at the same time the foundation of the practice and the harvest of previous experiences.

# The Body

As Kikutake states in *Between Land and Sea*, a vision needs to achieve a physical consistency in order to be judged.[119] In order to attain cognition, an idea has to be felt through the senses. We wouldn't be able to apprehend nature, if we didn't have physical phenomena to experience. The building is to architecture what the body is to any living thing. Be it a flower, a bee or a human, their existence is defined by their physical presence in this world. The philosophies of the three architects couldn't be fully grasped without their material manifestation. As in the theoretical approach, it quickly becomes clear that there is no absolute way to incorporate ideas into a construction. It is rather about the consideration of the underlying principles of the philosophy, which can be of different natures, during the design process.

Frank Lloyd Wright applies his theory as naturally as he creates his fundamental ideas. *Fallingwater* is regarded as an extension of its site. It has its own integrity, but it comes from its site and its inhabitants. The house hovers above the waterfall as if it had grown out of the boulders lying in the river. With the cantilevered terraces around

its central wall, it adopts the principles of the trees around it. With the use of materials according to their nature, Wright expresses his idea of *plasticity*. The house forms a unity of all of its elements and those from the site; it attains *simplicity* as he describes it in *The Natural House*. It stands « dignified as a tree in the midst of nature » blurring the boundaries between itself and the environment.[120]

The *Villa le Lac* presents some of the same characteristics, as it is also an attempt to unify man with nature. The long horizontal window invites the landscape inside the house, and the garden or the so called « room of greenery » is an extension of the interior spaces.[121] The whole house is organized according to the cycle of the sun, and the painting reflects the exterior atmosphere. And with the *Modulor*, he produces a tool based on the human proportions to unify the architecture with him and nature. However, Le Corbusier's approach reveals a fundamental difference to Wright's ideas. Like in *The Poem of the Right Angle*, the house underlines the quest for unity through the expression of its two primordial opposites. As in the theory the houses develops a strong dialectic, sometimes even unexpectedly.

As for the *Sky House* it also incorporates a sense of duality, but this time it is the origin of the theory. The vision of an adaptable architecture is manifested through the implementation of folding fixtures, capsules and *movenettes* in a solid concrete structure. It is Kikutake's physical experiences in the house that lead him to the elaboration of the *ka – kata – katachi* methodology. In line with his scientific theoretical approach, the vision is materialized through the rational means of technology. For the architect, the way to the architecture of the future lies in the industrialization of construction elements, so that they can easily be replaced and updated. As with Le Corbusier's ideas, this leads him to a certain duality, which could also be interpreted as contradiction. Despite its underlying natural principles, the house tries to emancipate itself from its environment so that it can withstand nature's destructive forces.

In essence, the three houses reveal a strong continuity with their architect's philosophy. Although this can be seen as an evidence, it is the very foundation of the practice. As the origin of the word architecture indicates, the profession is about the act of building. If an idea exists only in the mind it can't exist in our physical world; it has to be confronted to reality. Like in a plant, the principles have to be manifested in the physical world to be experienced by the senses. And in order to be in line with its own nature, a house needs to be a translation of the underlying philosophy. Only through this can *Fallingwater* grow out of its site as the unfolded boulder or the *Villa le Lac* become a place of the union between man and nature. And as Kikutake Kiyonori demonstrates through the *Sky House*, the idea is as important to the act of building as the actual construction is to the elaboration of a vision. The seed is at the origin of any living creation, but it needs a body to exist.

# The Soul

From the development of the seed into the body a new condition arises; the soul. It is the fruit of the unification of mind and matter and characteristic of any conscious being. Architecture is not to be considered as such in a literal sense, however, it can very well have a soul. In Kiyonori Kikutake's words, it would be the *katachi* born of from confrontation of the *ka* with the *kata*. For Frank Lloyd Wright it could be defined as the *simplicity* achieved through the *plasticity* and the *organic growth* of the building. Le Corbusier also inscribes his architectural philosophy in the fundamental duality of *mind* and *matter* resulting as the *soul* through their union. This fascination is not an invention of any of the architects and even less of this present

work. Probably, it has accompanied humankind from the beginning as man has tried to understand his own existence. It is what defines our own nature; we are to act accordingly if we are to create something truly meaningful.

It is the reason why the three architect's philosophies and realizations are still as relevant today. One hundred years after the completion of the *Villa le Lac*, a little less for the two others, the houses still stand as a testimony of the universal principles they incorporate. They correspond to laws we originate from and which will definitely outlast us. They bear a much-needed timelessness for a society where sustainability is confounded with the depleting of limited resources to create alternative sources of power. Our primordial relationship with nature is beginning to dissolute into abstract notions like green surfaces; ignoring their fundamental principles. If our entanglement with the environment is to be cultivated, it is to be done intellectually, spiritually, and through action; as the three architects did. This does not suggest that the response to a better life exclusively lies in architecture. However it certainly bears an important responsibility, being an essential part of our everyday life and one of our main interfaces with nature.

It is in each and everyone's own hands to find his or her place in the world and to cultivate their relationship with it. And there is no right or wrong approach since we are all different from one another. But if we are blinded by our own creations, we risk to miss out on the true miracle of life. As architects, we have the responsibility to create living conditions for others. Therefore, it is of an even greater importance to confront ourselves with fundamental questions about our existence. Only through its soul, what the inhabitants feel through their senses, can a house communicate with them and establish a healthy relationship. And as Frank Lloyd Wright, Le Corbusier and Kiyonori Kikutake demonstrate through their own work, the soul can only exist if there is a thought and its physical manifestation.

A house should be the expression of its principles and not of its creator; in here lies the true lesson of nature to the architects.

She demonstrates it through her infinite beauty, raising the eternal question about her origins. It is a lesson of humility, as it would be an illusion to think we could equal the magnificence of her creation. Le Corbusier illustrates it perfectly in his book about the *Modulor* :

« ‘The gods are beyond the wall…’. I have no means of doing as they do, by definition, being a man. »[122]

However we can learn from her, and try to adapt her principles to our needs. Only through this, we can open the door to harmonious and unifying design. It is humankind’s greatest gift to be able to feel and to think in order to receive her infinite wisdom. As Frank Lloyd Wright says :

« Nature is the great teacher – man can only receive and respond to her teaching. »[123]

As the hand is open to receive, it is now able to give back.

« It is open since
everything is present available seizable
Open to receive
Open also for everyone
to come and take
The waters flow
the sun illuminates
the complexities have woven
their frame
the fluids are everywhere.
The tools in the hand
the strokes of the hand
the life that we taste through
the kneading of the hands
the sight that is in the
palpation
……..
Full hand I received
full hand I give. »[124]

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