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## Paul Rudolph, Expression of Living Environments

The American architect Paul Rudolph (1918-1997) contributed to introduce architecture in a phase of criticism and maturity. His interest for overcoming the international style was based on a way of understanding architecture that he synthesized into six determining factors: location, natural conditions, materials, function, psychology of space and spirit of the times.

With these paradigms, he sought personal responses to new environmental, spatial and social demands, giving drawing a central role in the creative process.

The purpose of this article is to analyze, through drawing, the relationship of his residential architecture with the natural environment as a factor of well-being, as well as the phenomenological character of the inhabited space, in which the physical, social and emotional connection with the landscape takes on special importance.

A research on Rudolph's career is made, from his

first single-family houses in the late 1940s in Sarasota, to the modular aggregations of horizontal development that he built in the northern United States during the 1960s. The methodology consists of analyzing the spatial vision and intellectual restlessness he shows in representing his architecture in natural settings, with special attention to graphic resources.

The connection of architecture with natural and forest spaces is constantly represented, as a means to bring physical and mental health to the human kind, and to strengthen the feeling of community. Therefore, it is not only conceived for the improvement of individual welfare, but also as a factor with a positive impact on social and environmental dynamics.

Rudolph's drawing is a field for experimentation and an objective in itself, a place to expand the interrelation of architecture with the natural environment and its benefits for the inhabitant.

Keywords:  
Paul Rudolph; Drawing; Habitat; Environment; Nature

## INTRODUCTION

The American architect Paul Rudolph (1918-1997), together with the Third Generation of modern architects, recovered the interrelation between mankind and nature, typical of traditional civilizations. Rationalist ideology had objectified nature in a new conception that proposed its separation from humans. The founders of the Modern Movement started from this stage, with an interpretation of urban space in which, as Le Corbusier stated, architecture emerges: “[...] skyscrapers rise, but the city remains green. Trees are kings; people, under their cover, live in the realm of proportion; the nature-human bond is re-established” (Drew, 1972, p. 11).

During the 1960s, a return to the origin as a legitimization of architecture was a priority. Ancestral archetypes were recovered claiming a natural and human dimension, to propose an empirical, versatile and highbrow architecture, in dialectical relationship with the landscape, the historical context and the social structure (Ferrer, Cervero, 2018, pp. 2-5). The link to nature with challenges for the project in living environments close to the forest therapy was fundamental to this new mentality driven by Team 10, in a revision of modern architecture that aspired to respond to the needs and concerns of its time, and advanced issues relevant to the present day.

Rudolph contributed to introduce architecture in this phase of criticism and maturity. His innate capacity for innovation led him to adopt successful formulas, praised by critics as the ‘avant-garde of architecture’ (Scarpa, 2009, p. 4). His desire to go beyond the international style was based on a way of understanding architecture that he synthesized in six determining factors (Rudolph, 1956, p. 183): location, natural conditions, materials, function, psychology of space and spirit of the times. With these paradigms, he sought the new environmental and spatial expression of an architecture rooted in place and in constant dialogue with nature as a factor of social welfare and human health, giving drawing a central role in the creative process (Rudolph, 2009, p. 97).

For Rudolph the quality and excellence of architecture are consubstantial to the architect’s creative act, to the “exhilarating, awesome moment when he takes pencil in hand” (Rudolph, 1963, p. 40). He studied at Harvard’s Graduate School of Design in the 1940s, with a deliberate reduction of the practice of drawing by Gropius in favor of more scientific methods of analysis, and developed in the early projects his own highly graphic form of representation, which allowed him to formalize ideas and had an impact on architecture.

In his work, representation is the most direct line between his imagination and the tangible, “It is a means of assessing what comes directly from the brain to the hand” (Porter, 1993, p. 42). The first sketches, which he made obsessively (Bruegmann, 1986, pp. 27-28), evolve towards detailed perspectives (Rudolph, 1981), with great attention to the line, where he recovers techniques related to engraving and sgraffito, which he consulted in technical treatises (Rohan, 2000, p. 89). Using different thicknesses of pen, he worked the surfaces with chiaroscuro by means of crossed patterns of parallel lines that evoke the sensation of different materials and provide atmospheric quality and spatial depth. This method did not only anticipate the modern technical pen, but also allowed the photomechanical reproduction and scale change with minimal loss of detail, which made possible the diffusion.

The purpose of this article is to analyze, through Paul Rudolph’s drawings, the relationship of his residential architecture with the place and the natural conditions of the environment, as well as the phenomenological character of the inhabited space, in which the physical, social and emotional connection with the forests, green areas and water sources takes on special importance.

His trajectory is traced from the first single-family houses of the late forties in Sarasota, to the modular aggregations of horizontal development that he projected in the North of the United States during the sixties. Beyond its conveyor function, Rudolph’s expressive and often dramatic drawing constitutes throughout the project process an idealized version of his expectations.

The line assumes a special authority as a reminder of the initial intention and research towards the formal definition of the spaces. Therefore, the methodology of this research consists of observing the spatial vision and intellectual main that Rudolph shows in representing his architecture in natural environments, sometimes imagined, with special attention to graphic resources, for the definition of each of the aspects treated.

## HOUSE IN NATURE

In the single-family houses of the first stage in Sarasota, Florida, during the period between 1948 and 1957, Rudolph developed a ‘critical regionalism’ (Chasin, 1998, p. 316) that paid attention to the natural conditions of the environment and harmony with the landscape. His drawings show a great sensitivity and spatial vision to imagine scenes, capable of transporting the observer to ideal places, where architecture and nature interrelate in a perfect balance.

The transparency and openness of the domestic project to the immediate environment is reflected in perspectives that combine the necessary intimacy of the domestic experience with modern dilation and expansion. These are scenes of projects published prior to their construction, anticipating the perception that would later be reflected in photography, as we can see in the Miller Residence (Sarasota, Florida, 1947), Healey Guest House (Sarasota, Florida, 1948-1949) and Leavenworth Residence (St. Petersburg, Florida, 1951) (figure 1).

The drawings show a new way of inhabiting, in poetic visions of architectures for the playful life and contact with nature of the new American inhabitant. As Rudolph recounts in the ‘Perspecta’ journal (1952, p. 21), Gropius had clarified for him the “new concept of space”, alluding to the book ‘Space, Time and Architecture’ by Sigfried Giedion, which he considers “the most influential book in his professional life” (Marlin, 1973, pp. 46-53). His concern for the psychological component of domestic space leads him to accentuate continu-

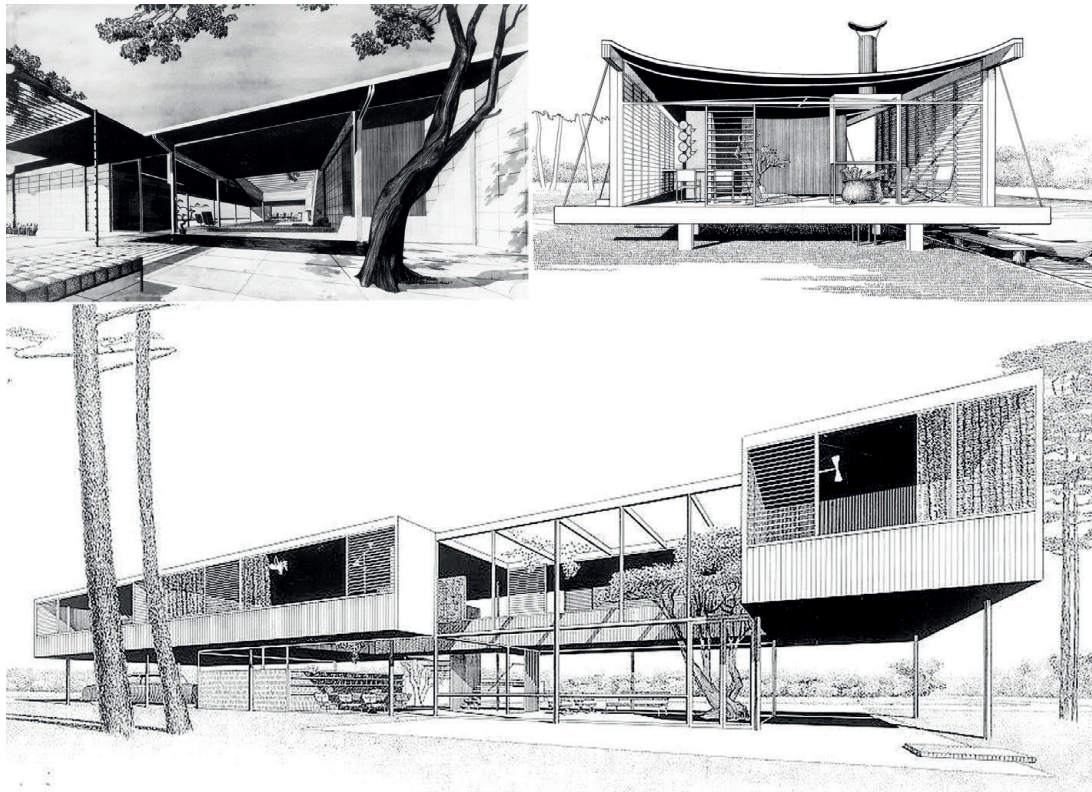


Fig. 1 - Miller Residence (Sarasota, Florida, 1947); Healey Guest House (Sarasota, Florida, 1948-1949); Leavenhood Residence (St. Petersburg, Florida, 1951).

ity through frontal or slightly rotated scenes, in which the effects of light and the constant presence of nature are emphasized. He proposes a territory controlled by mankind, in which the built structures are lightly posed, and the natural elements are present, both in the background, with trees and water planes that extend and are visualized through the architecture; as well as indoors and in the close surroundings, with shrubs, plants and creeping vegetation in the courtyards and interiors, and the presence of water, offering reflec-

tion effects; and in the foreground, with occasional trees that are placed before the architecture, emphasizing the depth and importance of this dialogue necessary for the well-being of mankind. The representation of these situations, which establish links at different levels, makes it possible to maximize the psychological and physiological mechanisms underlying the direct contact of the house with nature.

The viewpoint, at the user's eye height, makes the observer a participant in the scene. Sometimes,

as in the Miller Residence, the viewpoint is lower than usual in order to capture the concatenation of exterior, covered and interior spaces. The floor and roof planes move out of the scene and bring the viewer into the frame, in relation to sculptural plant elements. The extreme emphasis on the game of light and shadow typical of sunny Florida is evident in the darkening of the lower planes of the slabs and the projection of dense shadows, which add a certain drama to the compositions. The aim is to attract the viewer by enhancing the sensation of depth, transparency and spatial continuity of the domestic project. For this purpose, beams of lines are superimposed to define the direction of each plane, the scale of the material quartering, the incidence of light with shadows and reflections, and the configuration of small trees and trellises that graduate their presence with freer stippling.

These deep perspectives from innovative angles that emphasize the differences between dark and light to convey emotion show the great attention to the spatial possibilities of the façade and the connection between interior and exterior space. In contrast to the Modern Movement, Rudolph was interested in sequence and moving, in a multivalent and significance-rich approach, which he described as 'balanced tension'. This tension would simultaneously create a dynamic and silent space. Dynamism attended to its possibility of expansion: "Space must simultaneously escape while allowing light to flow within and through elements such as water" (Scarpa, 2009, p. 7).

Silence was understood to be linked to the possibility of observing nature, erecting architecture as a place of cognoscence and contemplation. In reference to the Farnsworth House (1945-1950), Mies van der Rohe stated (Neumeyer, 2000, p. 353): "This vision of the environment's perception from the building and of the building from the environment is proof of the transforming effect that one exerts on the other" (Neumeyer, 2000, p. 353). Humans engage in a silent dialogue with the objective order of nature which, far from disturbing it, "acquires a deeper meaning than it has when one is outside, in the open air. Nature is enhanced

by being part of a great whole”, which makes it possible to achieve the greatest harmony between the human being, the house and the landscape. Through architecture, reciprocity between people and nature, sensory connection and immersion in the atmosphere of the woodland, which is inhabited from within in a practice close to forest therapy, is thus encouraged.

The performance of these works as ‘panoramic shelters’ (Domin, 2002, p. 15), is illustrated in aerial views that suggest the strategies to provide optimal conditions: the relationship with the terrain, the contact with the horizon, the reflection in the water and the proximity of vegetation (Rudolph, 1958, p. 5). The ability to respond to the conditioning factors of the site allows him to participate actively in the definition of each work (Galván et al., 2018) and to be part of its essence, an aspect that Rudolph admires in the architecture of Frank Lloyd Wright: “I regard him as the greatest American architect. [...] It is easy to just dismiss him as someone who completely understood architectural space and light, but he was very much interested in responding to site [...], he often got to the essence of the man-made site” (Rudolph, 1986, p. 105).

Rudolph shares with Wright those approaches that he considers fundamental for a building to connect with the land and the sky (Rudolph, 1958): the podium, which gives the building a privileged position by physically separating it from the ground; the reflection or mirroring in the water, through manipulations of the surface that is drained in some areas and flooded in others until the houses lean out or perch on its shore; and nature, which has a constant presence, with masses of trees strategically arranged to provide optimal conditions for the site. These principles are present in his panoramic views from the air, in which Rudolph manipulates the vanishing point to accentuate the drama and poetics of the building, and provides an atmospheric effect whereby the architecture appears to ‘float’ in the landscape, as we can observe in the drawings of Miller Residence (Sarasota, Florida, 1947) and Healey Guest House (Sarasota, Florida, 1948-1949) (figure 2).

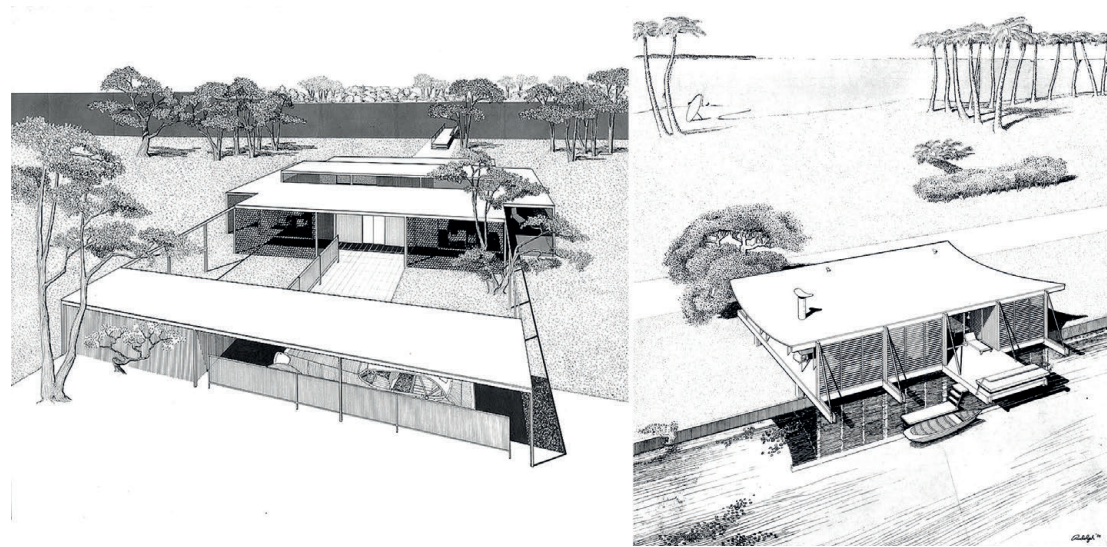


Fig. 2 - Miller Residence (Sarasota, Florida, 1947); Healey Guest House (Sarasota, Florida, 1948-1949).

The immaterial condition that shrouds the environment, a legacy of Wright’s representation, inspired by Ukiyo-e xylography, or ‘images of the floating world’ according to its literal translation (Sancho et al., 2013, p. 206), is intensified in later projects such as the Millam Residence (Jacksonville, Florida, 1965) and the Callahan Residence (Birmingham, Alabama, 1965) (figure 3).

These are frontal compositions, in which the dialogue with the place takes center stage, with the presence of vegetation in the foreground and the architecture acting as a window, through which the depth of the natural environment can be contemplated.

The composition, with the important presence of the house, intensified with dense shadows, in the upper half of the frame, generates a tension and a sense of lightness, which refers to the fragment of a larger emotional totality. This point of view also conveys a sensitivity to the ephemeral character of this natural environment, the effect of capturing

an instant, in an experimentation that refers to an intermediate state between thought and the world of the senses.

As we can deduce from these drawings charged with delicacy and subjectivity, the main ingredient present in all of Rudolph’s work is the setting of architecture in the environment, the perception of architecture from nature and of nature framing the landscape. The sense of home protection is accompanied by this transforming capacity that it brings to the natural medium: “Yes, the architect’s main responsibility is to visually delight and the treatment of space is the main determinant. An architect should be concerned with a building’s looks in the rain, or on a summer’s day, its profile on a mist day [...] with angles of vision, symbolism, and content. We are in a transition stage and our ideals of beauty are in a state of flux. We cannot agree on this or that specific treatment but each can study and relate his efforts to principles, which do not change” (Rudolph, 1956, pp. 183-190).

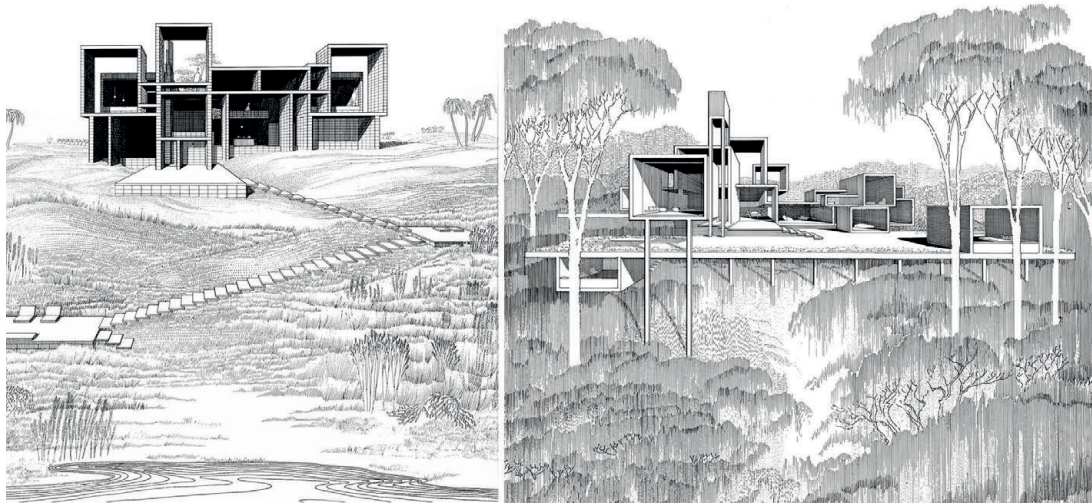


Fig. 3 - Millam Residence (Jacksonville, Florida, 1965); Callahan Residence (Birmingham, Alabama, 1965).

### SOCIAL AGGREGATION AS A NATURAL ENVIRONMENT

In the collective residential field, Rudolph transferred the experience of these first projects to the urban dimension, through flexible compositions of modular units that extend into the territory. Nature enters into connection with architecture in a concatenation of exterior spaces, in which social and psychological components take precedence. This additive architecture, as Jørn Utzon called it (Drew, 1973, pp. 38-39), has its origin in spontaneously generated vernacular compositions, which are obtained through the repetition of standard units, whose fortuitous addition or subtraction does not affect the ensemble. Paul Rudolph recovered a reference to the vernacular architecture of aggregation, linked to the place, which the first modern architects overlooked. There are exceptions such as Rudolph Schindler, who in 1915 studied the villages of the

Pueblo Indians, or Le Corbusier, who in the 1930s flew over the Mz'ab oasis village and valued its primary forms as 'fundamental'. However, it was not until the 1950s that there was an attention to regionalism, which reached its peak in 1965 with Bernad Rudofsky's photographic exhibition 'Architecture without Architects' at MoMA in New York. In the 1960s, in parallel with his work as Dean of the Yale School of Architecture, Paul Rudolph developed a series of collective housing projects in New Haven and Washington, which take up the primitive archetype of the village. The profound effect of his visit to Europe after the war, particularly the Italian cities and towns, led him to the conviction of the importance of the urban fabric and its adaptation to the landscape, which Gropius delegated to the planners, to establish interactions between both. The social commitment that Rudolph shows in his projects is linked to a vision of architecture as a discipline capable of improving people's lives

(Barrière, 1989, pp. 29-10). He aspired to overcome modernity from the environmental quality of urban areas that he defined in the 'Perspecta' journal as dynamic and human (Rudolph, 1957, p. 13): "I fear that we have forgotten many of the basic principles of architecture such as scale, proportion, the relationship between parts, and most important of all, how to create living, breathing dynamic spaces of varying character, capable of helping man forget something of his troubles". The great sensitivity towards people and the landscape gives his architecture a lasting human richness, in an incomplete environment that the occupants can expand and modify.

The first project for the Married Students Housing complex (Yale University, New Haven, Connecticut, 1960-1961) is a continuation of regional adaptations from these patterns of association and interconnection (Figure 4).

It is a dense modular aggregation, formally aligned with English Brutalism and represented in plan and in a cavalier perspective. In plan, the different uses are codified by a system of patterns, overlaid with cast shadows, which allow the identification of the built volumes and the spaces in between, producing a relief effect. In cavalier axonometry, the assembly of volumes and their conception from three dimensions is more evident.

The striping of the vertical planes of the built volumes, which simulates their texture and position, as well as the weaving of the vegetation-covered courtyards and the position of the trees that dot the complex, facilitate its reading. This natural component adds interest by balancing the pressure of the built space, allowing community life to develop, and providing adequate levels of habitability, acting as passive regulators of the urban environment. Their integrating function, as described by Virginio Bettini (1998, p. 341), is determined by the capacity to stimulate social interaction and contribute to the continuity of site-specific biodiversity. The optimal function of these interblock spaces is to provide urban sustainability, ensuring the habitability of the public space based on adequate conditions of comfort, accessibility, health and safety.

As we can see in the longitudinal section, this is an innovative urban development, in which the clusters of modular units integrate living spaces with terraces, stairways and streets at different levels, promoting collective community interaction. Its representation is unified, applying the same treatment to all these spaces, which shows the social aspect and the continuity with the exterior spaces. The interaction between architecture and nature is experienced with greater intensity in the elevation, through the effect of overlapping or superimposition of planes.

The gradation with the distancing of the patterns and shadows on the walls and in the definition of the trees that are interspersed with them, contributes to provide an atmospheric sensation and to perceive the imposing presence of the trees to the point of giving the sensation of living in a forest. The idealized representation of this biophilic environment is indicative of the positive experience it has on the inhabitants of the complex, with the consequent capacity to improve their mental and physical health, and to contribute to the development of positive attitudes and behaviors.

The Oriental Masonic Gardens project (New Haven, Connecticut, 1968-1971), is analyzed with elevated, vanishing or isometric perspectives, in which the treatment of textures and shadows conveys the materiality of the components, the form of aggregation between modules and the proportion of the exterior spaces (Rudolph, 1957, p. 13) (Figure 5).

They reflect Rudolph's concern for the visual perception of the ensemble and its intermediate spaces, as well as for the human dimension. Using these concepts, together with the formalization of the modules, which was the focus of much effort over the years, he included the idea of a private garden space for the expansion and enjoyment of each family, in which nature extends and connects with the interior space of the home.

In the aerial perspective with one vanishing point, the vertical planes parallel to the picture plane, by maintaining their real proportions, contribute to understand the volumetry and the horizontal planes, with perpendicular direction, emphasize

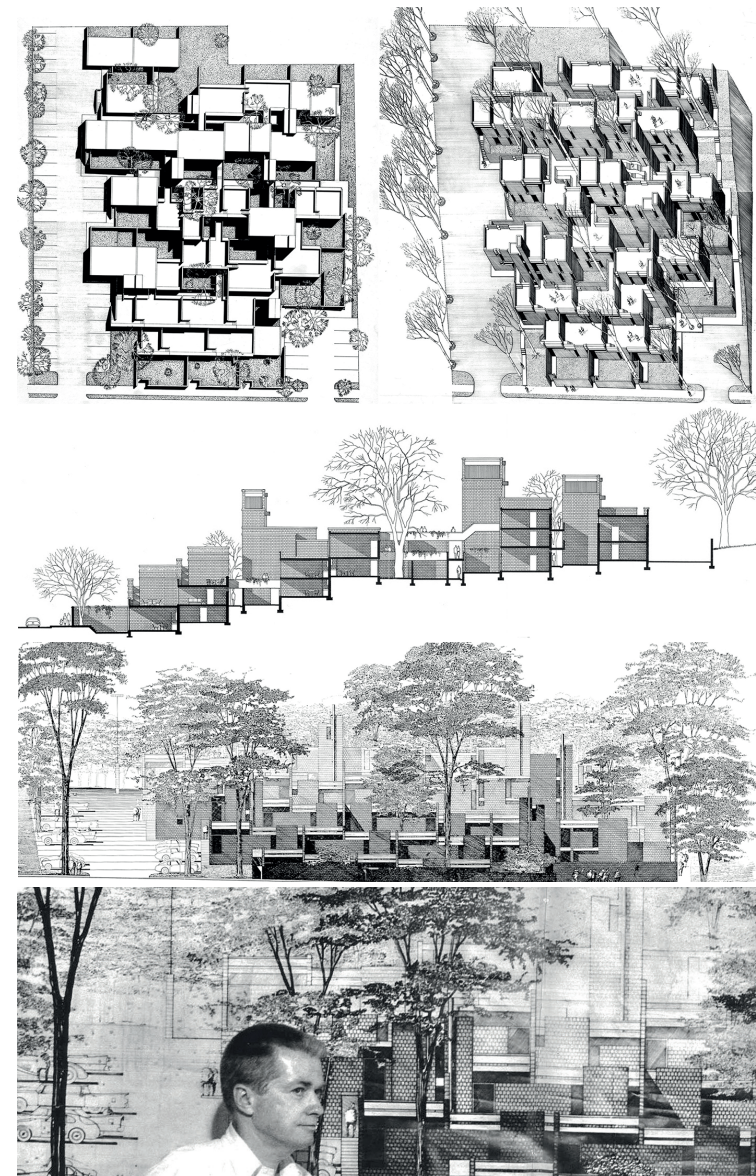


Fig. 4 - Married Students Housing, Yale University (New Haven, Connecticut, 1960-1961).

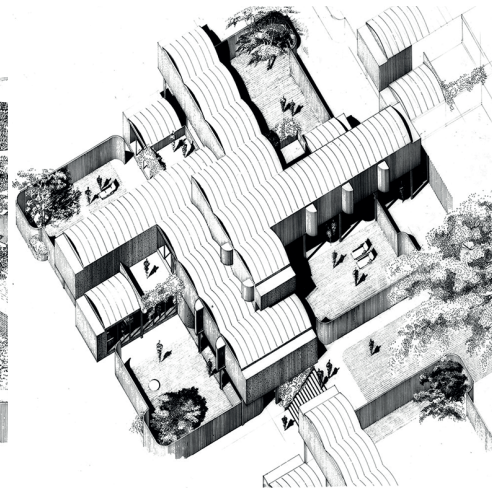
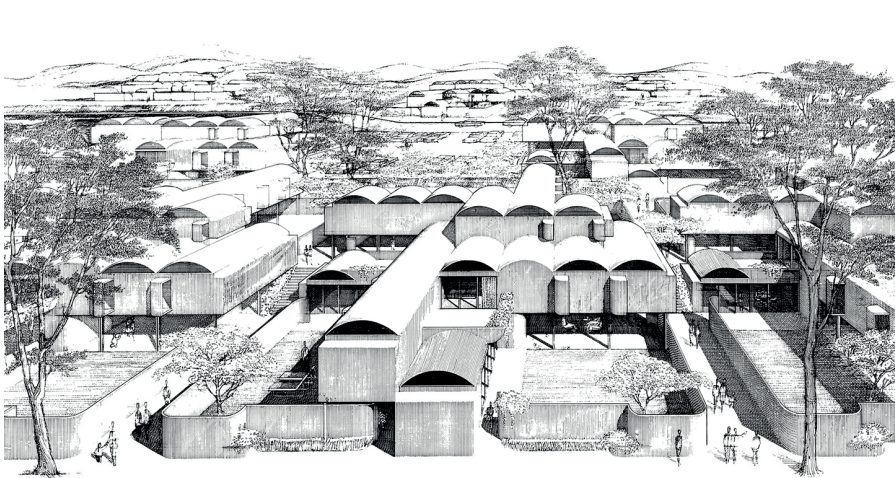


Fig. 5 - Oriental Masonic Gardens (New Haven, Connecticut, 1968).

the depth. The treatment of these planes with a progressive loss of detail and a gradation of the tonal scales in the patterns until they practically disappear, create an effect of fading or 'atmospheric haze', which simulates depth and distance (Porter, 1993). The materiality of the walls and floors, the treatment of the natural elements and the effect of the shadows evoke the perceptions in the spaces of transit and relationship, of users who are present in the image, signifying their condition and showing the relevance of contact with the natural environment, due to its effect on human health and social wellbeing.

The interest in the visual perception of the residential units and their intermediate spaces from a human dimension is shown in Fort Lincoln (Washington, 1968) through partial perspectives, with a delicate treatment and a high degree of detail that, taking the human viewpoint, evoke a sequential route through platforms located at different levels (figure 6).

The project constitutes a synthesis of issues that the Third Generation of modern architects reconsidered, such as great importance for the human

factor, through the rediscovery of mankind (Giedion, 1962, p. 642), and open planning, or incorporation of changing conditions related to the environment. The reaffirmation of architectural humanism and urban ecology, responds to the popular and anonymous form, with a recovery of social and natural interactions.

This psychological and symbolic conception of architecture attends to Geoffrey Scott's position of stimulating physical and emotional responses from aesthetics (Rohan, 2014, p. 57), and again approaches Wright's spatial aspects, connected to the needs of the human being from a sensitive point of view. The inclusion of the inhabitants is recurrent in Rudolph's drawing, and therefore cannot be absent in the representation of these spaces, intended to encourage social connection (Rudolph, 1961, p. 164): "We need desperately to relearn the art of disposing our buildings to create different kinds of space... We need sequences of space which arouse one's curiosity, gives a sense of anticipation, which beckons and impels us to rush forward to find that releasing space which dominates, acts as a climax and magnet and gives

direction. Most important of all, we need those outer spaces which encourage social contact". Rudolph hoped to improve modernity by 'humanizing' it, through socially integrating spaces, formed by a network of pedestrian routes and green areas, which contribute to the social and ecological development of the housing complex.

If the social role is taken into account, their integration into the recreational spaces achieves a permeability in the urban fabric that favors the proper use, the adequate development of the community and its physical and emotional well-being. In terms of ecological development, the environment and urban variety allow a permeability of specific biodiversity with the inclusion of low-maintenance native species, the attraction of birdlife, and the compensation of soil sealing and waterproofing derived from urbanization processes. Open space thus meets the needs of the population and contributes to their health and well-being, becoming an indispensable element for increasing the integration and stability of the estate and helping the physical and psychological improvement of the inhabitants.

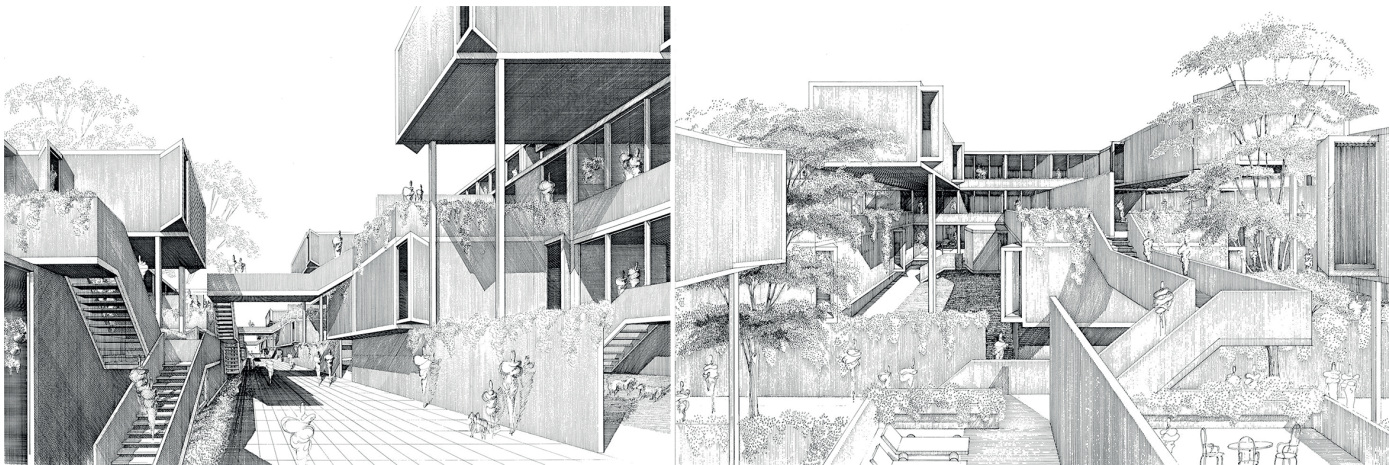


Fig. 6 - Fort Lincoln Housing (Washington, 1966-1968).

## FINAL REFLECTIONS

Rudolph sought, through drawing, personal responses to the dialogue between architecture and the changing conditions of the environment. In his graphic definition, the projects address the active relationship with the environment, enhancing the interaction with the territory and nature and the integration with the social reality and the memory of the place, in an experimentation towards the definition of a habitat capable of welcoming new ways of life. The conception of an open architecture, which leads to changing the idea of space for the idea of place, is completely valid in the current search for healthy and sustainable living environments.

Rudolph relied on the unitary development of his graphic representation to give personal answers to the architectural problems of the American city and society. The common point to all of them responds to his conception of architecture as a 'highly emotional matter' (Rudolph, 1986, p. 106), and therefore capable of visual delight. For him, the architectural space in continuity with the natu-

ral environment is the main determinant that, with drawing, can be illustrated from different points of view and analyzed until its invariant principles are discovered.

The single-family houses are shown in scenes of great sensitivity, located in ideal places, in perfect balance with nature, which constitutes a means of well-being and contemplation.

The collective housing projects, which refer to vernacular villages, are based on a social commitment capable of stimulating community interaction and contributing to the biodiversity of the place, through coexistence with a natural environment in which the trees and vegetation of the intermediate spaces form an active part of the neighborhood.

Consequently, exposure to natural spaces and biophilic environments is understood as a means to bring physical and mental health to people, and as a relational space that strengthens the connection of the community.

The integration of natural elements in residential environments is not only conceived for the improvement of individual well-being, but also as a

factor that has a positive impact on social and environmental dynamics.

Rudolph's distinctive drawing is therefore a field for experimentation, but also a goal in itself, a place to expand the capabilities of architecture and its interrelationship with the natural environment. The graphic development of these projects serves as a replicable model for similar initiatives, showing the potential of forest therapy applied to architecture to promote social integration and global health.



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Figure 2. Library of Congress, Prints & Photographs, Paul Rudolph Archive. Signatures: LC-DIG-ppmsca-03525; LC-DIG-ppmsca-39713.

Figure 3. Rudolph 1981, pp. 36, 38.

Figure 4. Library of Congress, Prints & Photographs, Paul Rudolph Archive. Signatures: LC-DIG-ppmsca-13680, LC-DIG-ppmsca-13677, LC-DIG-ppmsca-13676, LC-DIG-ppmsca-03543. Rudolph 1981, p. 12.

Figure 5. Library of Congress, Prints & Photographs, Paul Rudolph Archive. Signatures: LC-DIG-ppmsca-13681, LC-DIG-ppmsca-19131.

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