Handbook of Research on Emerging Digital Tools for Architectural Surveying, Modeling, and Representation

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Technological revolutions have changed the field of architecture exponentially. The advent of new technologies and digital tools will continue to advance the work of architects globally, aiding in architectural design, planning, implementation, and restoration.

The **Handbook of Research on Emerging Digital Tools for Architectural Surveying, Modeling, and Representation** presents expansive coverage on the latest trends and digital solutions being applied to architectural heritage. Spanning two volumes of research-based content, this publication is an all-encompassing reference source for scholars, IT professionals, engineers, architects, and business managers interested in current methodologies, concepts, and instruments being used in the field of architecture.

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Female Architecture:
Unbuilt Digital Archive

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ABSTRACT

The objective of this study is that one, starting from the initial considerations, to give back to the history of architecture, through drawing as a critical means of inquiry, the thought and work of some women-architect who, between 1926 and 1962, have designed and/or built buildings of fine architectural quality. The critical re-drawing, which in this case is mimetic to the construction of the project, wants to make manifest the thought of some figures of the Modern Movement often relegated to an unknown fate; in particular it analyses a part of the activity of Lilly Reich, Helena Niemirowska Syrkus and Charlotte Perriand. The study aims to build a graphic inedited and exhaustive repertory of some unrealized projects, carried out by these women that can be defined "pioneer" of modern architecture, giving back a female thought of the project's construction. The drawing of architecture, as ambit of critical analysis, in this study assumes a substantial role when it investigates the project which is the central place of its true expression.

INTRODUCTION

For a long time the architectural profession has been considered typically male. About this distance of the woman from the architecture has been a strong supporter also Benito Mussolini when in 1927 stated "The woman must obey (...). She is analytic, not synthetic. Has she ever done architecture during all these centuries? Tell her to build a hut, I don't say a temple! She can't do it. She is foreign to architecture, which is a synthesis of all the arts and that is the symbol of her destiny".

But has it been like that? Who were the first ones, the pioneers? Where do they come from?

How did they move? These ones are the questions, very simple, which are at the origin of the study that is proposed. We will remembered below some "mothers of modern architecture", the historical period in which they have placed, their work, their thoughts and themes that characterize them. In this way you can get an idea, although brief, about the richness and originality of their contributions.

In Germany, at the beginning of the century works Lilly Reich (1885-1947) who is the first woman, in 1920, to be elected in the guidance of the Deutscher Werkbund, becoming responsible for the preparation of the important exhibition promoted by it. She works with Ludwig Mies van der Rohe with whom shares an intense and lasting experience. She also invented the discipline of exhibition design. Since 1923, Helena Niemerowska-Syrkus works in Poland, she graduates at the Warsaw University of Technology. Designer and politic militant, she is part of the group "Praesens", and embodies totally the instances of Polish Constructivism. In France there are many designers that study at the École des Beaux-Arts. The most famous are, no doubt, Eileen Gray and Charlotte Perriand. The first one, of Irish origin but French by adoption, has been an independent and reserved figure; her work is opposed to the excesses of a certain design culture by herself considered "too rational and intellectual", the second one, Charlotte Perriand (1903-1999), is known for her collaboration with Le Corbusier and much less for her important contribution to the history of interior design, the design of the use's object and for the continuous dialogue that she has been able to create between East and West, starting from her mission in Japan, in 1940. During the Twenties and Thirties the names of women become more relatively numerous, if you consider that the architecture stays in the belief of the vast majority of society: "a male profession".

The drawing, such as proper place of the architectural criticism, is the tool that allows, more than any other way of the criticism itself, to get mostly closer to the recognizable consistency of the design process for its continuous "coming and going" that is characteristic of both the drawing and the form's construction, which, without it, cannot take "body". If this proposition is true, then the drawing, conceived as analysis and so as a critical tool, is the medium between words and things and, when these latter are "drawn", is the only survey instrument capable of retracing the critical points of the project, certainly the hidden ones, which the word often cannot identify if not in an obviously different way.

To reconstruct the thought of the three authors, through the reconstruction of some unrealized projects, it is necessary to rely on digital representation, as it allows multiple hermeneutics manifestations.

The construction of the digital model is the logical consequence for the verification of the project's intentions, not only because the model contains, within itself, the expressions of the "translator", in this case those who re-draw, but above all for the fact that it allows you to view all the problems that would arise if those representations were materialized in a true, real, architectural "body".

The digital model is thus to be understood as a "starting point" for the graphical analysis of the architecture and not the final outcome; in fact, are associated with other graphics, sometimes not derived from the model, useful for understanding/translation of the architecture. The construction of the model is not an action of putting into the form a simple image, that is an operation which is often carried out for the representation of the project, but it is the hermeneutic and critical result of the drawing substantially tending to the analysis of the shape.

Vincenzo Fasolo, at the end of the 50s of the twentieth century, in a collection of his lectures at the Faculty of Architecture of the University of Rome, proposing the graphical analysis as a method of study the architecture[1], hoped "a history of architecture drawn, rather than spoken [...]

the study method that we propose tends to arouse a self-examination of the architectural values in which in them is permanent, shared, so much for the ancient as for the modern. It is precisely a study about the ancient fact in function of the modern that will purchase a greater validity insofar as within it cross the experience and the nobility of ages of architects of high secular civilization. What now we are proposing doesn't go at the expense of the modern critical method; rather complements it, and it arouses the interest. Because this drawing is observing and then a thinking" (Fasolo, 1956).

We believe that, within the indissoluble relationship between drawing and design, the 'digital' representation can provide the history and architectural criticism additional inedited files of images of unrealized architectures: the goal is ultimately to shed light and re-building episodes of the history of architecture that 'mute/silent' in their writing, have found place only in the drawers of the archives or in the uncoated pages of books and magazines.

BACKGROUND

The attention to women's contribution to the architecture of the Modern Movement is fairly recent; in Italy this interest has begun to emerge in 1990, the year of the institution, within the Faculty of Architecture of the Polytechnic in Milan, of the Vanda group which has begun to focus on the research and study of theories and works of women in architecture and urban planning. From that moment on, little by little, it is well established, although within a small group, the curiosity toward a female architecture. Women groups interested into to the activity of those who have been relegated, from the modern historiography, to an unknown fate; and cannot be considered an alibi the fact that the pregnancy of the architect woman has been slow to emerge as she has always shown such a muse or right-hand man, always in the shade, of colleagues or partners. In Europe, after the death of Eileen Gray in 1976, the women activity has begun to arouse a special interest; in this sense can be possible to consider as beginning of this "new" curiosity toward female architecture, the exhibition, edited by Caroline Constant and Wilfried Wang in Frankfurt in 1996, entitled "An Architecture for all senses. The Work of Eileen Gray". From that moment all others initiatives have contributed to the knowledge of figures such as Lilly Reich, Margarete Schütte-Lihotzky and Charlotte Perriand, certainly important characters in the same way as Helena Niemirowska, Aino Marsio, Martha Blornstedt, Elsi Borg, Barbara Sokolowska, Lotte Cohn, Adrienne Gorska, Valentine Harding, Hana kucerova-Zàveskà, Lisbet Sachs, Alison Gill, Lina Bo Bardi and more. In the United States, in 1985, was founded the "International Archive of Women in Architecture" (IAWA) as a result of a joint program between the College of Architecture and Urban Studies and the University Libraries at Virginia Tech; the IAWA is to be considered, to date, the most important archives relating to the architectural "female" thought and the most important database on the subject.

You can certainly say that the knowledge of the project designed by women has begun and has started to take shape and systematic; but, as it happens at the beginning of a research aimed at outcomes to catalog and spread, state of the art has been materialized in critical e/o descriptive interventions of the projects designed by women and almost never on the graphical analysis of unrealized projects; substantially the written word has been associated to archive drawings with particular reference to the built architecture. Just think of the large literature on the E1027 by Eileen Gray and the "silence" suffered by her emblematic unrealized projects, such as the "House for an engineer" or "The House on Boulevard des Madeleines"; and into oblivion have fallen, in the same way, many unrealized projects of "architect

women" of the Modern Movement as it is certainly "easier" talking about an architecture that one can visit and watch rather than on the enigma of an expression sign.

Indeed, the work aimed at understanding the contribution of women to the architecture of Modern Movement is quite complex because, in the early years of the twentieth century, they often worked in collaboration with men who have blurred their visibility (Charlotte Perriand with Le Corbusier, Lilly Reich with Mies van der Rohe, Margarete Schütte-Lihotzky with Adolf Loos, Aino and Alvar Aalto Marsio, Barbara Sokolowska with Stanislaw Brukalski). Fortunately, the scenario, is no longer punctuated by the same obstacles of that time; advertising frequently shows us the work of Zaha Hadid, Odil Decq, Plant Ruchat Roncati, Elsa Prochazka, Carme Pinós, Benedetta Tagliabue, and many more. This "change of course" was evidently due to the social change that has seen the woman emancipate herself in the western world, just after the Second World War.

The analyzes of unrealized architecture, remained "into the drawers" and imbued with the fullness of the expression of an idea, or of those ones demolished, are a missing piece in the publications related to the activity of women who can be considered real "teachers" of the Modern Movement. Instead, the never realized projects are those ones that better define the theories of a designer; just think of the knowledge "graphical" work by Alberto Sartoris, who has built little and designed a lot, whose international fame is mainly due to those design drawings that have never materialized in the building. Currently, about the unrealized "female architecture", architectural criticism stops at verbal descriptions of the few existing drawings ignoring the will to investigate the interstices of those projects that can be given back, with more completeness, a real "feminine" architectural thinking.

THREE CASE STUDIES[2]

Architecture Digital Interpretation

In the '80s, in a masterly essay titled "Il triangolo del disegno", Franco Purini stated that the 'place' of the Drawing, metaphorically symbolized as a deformable triangle, was constituted by the Representation, Cataloging and Imagination, finally conceived, as actions of thought interacting with each other in different ways: "The drawing concept in architecture can be figured by a triangle which vertices consist respectively on representation, cataloging and imagination. Representing means to manifest a design intention; cataloging means to operate a recognition in the objects world; imaging means to express an intention shift, an its own going on. Only by moving in the internal area of triangle you hold the drawing in its own shape extension otherwise it is reduced to a dismembered body which separated limbs would be unable to move" (Purini, 1979).

These were the years during which, in Italy, was already widely spread that phenomenon which took the name of 'architettura disegnata' in which converged the 'architecture idea' of many architects in extraordinary representations of strong expressive and ideological charge; the phenomenon started when the architects did not have the opportunity to build and manifest their own ideas on sheets of paper intended, now, as utopia places. In these 'utopian' supports you find the thought of Franz Prati, Giangiacomo D'Ardia, Franco Purini, Massimo Scolari, Aldo Rossi, Bruno Minardi, Franco Pierluisi, Arduino Cantafora and others that, in their own imaginative expressions, have produced works of art made with pencils, ink, pastel, acrylic and oil.

At the dawn of drawn architecture, Ivan Sutherland experienced the first CAD software that, over time, will constitute an additional tool for ideas expressions in architecture. From that moment on, the constant evolution of processors,

graphics cards, 'memories' and other components of 'artificial intelligence' has abled an increasingly effective and sophisticated software production which allow the shape control faster; this evolution fits into the representation elements history which takes its origin from the Sumerians and the Assyrian-Babylonian who utilized a simple metallic, or even in stone, tool, engraving on clay tablets and that developing over time finding, in 1564, its own apical moment in the discovery of pencil.

To extraordinary graphics interpretations, pencil-drawn, of unbuilt architecture, such as the study "Le tracce dell'invenzione. Il progetto per il convento delle Domenicane a Media di L. I. Kahn" (Dotto, 1997), add, today, hermeneutic digital practices related to unbuilt architecture that surely do not go beyond, before their final outcome, from 'traditional' tools use.

In this sense are extremely clarifying the words of Gabriele Pierluisi who, describing his own experience of research on the Danteum of Terragni, states that "A preliminary consideration must be made about the role that the drawing plays in this knowledge process and on about what type of drawing you uses. Indeed with the word 'drawing' we intend a wide range of representations that go from the sketch to the final immersive visualization. These representations, though in their own diversity, have the important role of functioning as support to the theoretical speculation on space shapes: without them, indeed, the spatial thought would not be specific and disciplinary one and would not allow the knowledge growth.

On the contrary the use of different representations, the use of a mixed technique of production, makes the efficiency a continuous verifying of previous assumptions through another technic aesthetic and cognitive medium and the process, the series of produced images, is more important of single graphic or digital model. The drawing conceived as a mixed technique process, among new digital medium and ancient matters: the drawing as cognitive process that make itself making itself" (Pierluisi, 2006).

The interpretation of architecture is certainly not linked to the digital dimension, it is an its explicative modality; the terms of the issue are hermeneutics – in the ontological direction of Martin Heidegger – because they are related to the comprehension of the 'thing' for which the present existence is influenced by a series of stratified knowledge that Hans Georg Gadamer defines "pre-understandings" (*Vorverständnisse*) or, more simply, "prejudices".

The digital interpretation is not, therefore, a mechanic action but assumes the shape of research based on a cultural and methodological large device that penetrates deep in philological analysis territories, of architectonical critic, of the 'Representation Science' and of the aesthetic one; digital re-drawing intended also as an "artistic 'experience', conceived, first of all, as creative experience [that] now falls in a larger perspective that involves the science field such as those ones of literature and technology, as well as the art and architecture, [in which] from the confluence, or contamination, of the different knowledge are undertaken more interesting and prolific research routes" (Quici, 2006).

The interpretation of architecture implies, indeed, the assumption of a personal point of view based on principles and on the statute of the drawing discipline, without concessions to distractions and graphics virtuosisms ends in themselves.

Unbuilt Digital Archive

The construction of a digital archive related to the interpretation of those projects 'remained into the drawers' appears like one of the logical consequences of a graphic reconstruction work of what has never existed or that, over time, has been demolished. The questions, however, certainly appear more complex because the first issues to investigate are the 'what' and the 'how' of archiving data. Beyond the matters related to the real digital archiving (which covers issues like the digitalization of documents of the past,

the problem of the support, the constant evolution of software and formats, and other thorny issues), must be tracing a methodological hypothesis for the construction of a digital drawings archive related to the interpretation of representations of the past executed with techniques 'of the past'.

The issues is not at all simple. Indeed the web, which you can conceive as an unlimited archive, as far as digital re-drawing of architecture of the past, has very often inaccurate and misleading even ridiculous information; such as, for example, digitized representations of the Le Corbusier's Villa Savoye to find hilarious renderings, improbable perspective views, and even unreliable constructive details. It is evident that all these web representations do not have, nor do they want to have, a scientific character but they are in the network only to speed up the work of someone who has no intention of deepening a subject of study. But this is an easily ephemeral fact as certainly without any specialized aspect. The main issues, however, are related to the concepts of translation and interpretation of the original and all the problems that they pose. Walter Benjamin has dealt, with extreme lucidity 'the task of the translator' highlighting the significance of the action to translate: "The respect for the viewer does not prove never fruitful for the understanding of a work or an art form. Not only in the sense that the reference to a specific audience or its representatives takes out of the way, but even in the sense that the concept of 'ideal' user is dangerous for every debate on the art theory, which is required to simply assume the essence and the existence of man in general. The art itself is limited to only assuming the body and spiritual essence - but never the attention, in none of its works. Indeed, no poetry is for the reader, no picture for the observer, no symphony for the listener. [...] Translatability essentially inheres in certain works. This does not mean that their translation is essential for themselves, but that in their translatability is expressed a specific meaning, inherent to the originals. It is clear that, no matter how good it is, the transla-

tion can never meaning anything to the original. And nevertheless it is intimately connected with the original by virtue of its translatability, even in the more intimate relationship as less it means for the original one. It may be defined as a natural relationship, or rather a relationship of life. [...] Far from being the deaf equation of two dead languages, the translation has to be careful to the post-maturity of the foreign word and the throes of its own" (Benjamin, 1920). It is clear that the translation, as well as the interpretation, has those characters of the subjectivity which belong to who investigates the object and, therefore, the drawing. In this sense, the construction of a digital archive of digital drawings is complex due to the relationship between the translator and the investigated work because there is the risk that the translation could become decisive relegating the original to its mere essence. The Unbuilt digital archive must be a container in which digital drawings are critically fathomed by a group of experts from various fields (representation, history, design, critics, aesthetics, archiving), because of the interdisciplinary nature of the archive itself, and then, subsequently selected; in the case of the construction of a female architecture archive, it is necessary the presence of the originals of investigated architectures and interpretative drawings to make the basic comparisons that every operation involves. Therefore, it is an organized by author archive, made of all those studies related to never built and/or demolished architecture and interpretations/translations of them. After assigning an 'archive value' to the digital interpretative drawing, there is the question of its possible modification, that is a further hermeneutical process conducted through the software with which it was created; this question emerges when is given a major importance to the potentialities of the 'machine' rather than to the work itself. The answer lies in the value of the interpretative drawing; when it becomes the *alter ego* of its original is, itself, 'an original one', an archive document that allows the development of further subjective studies and therefore it cannot be

modifiable as well as the original one, from which it comes. The ever built projects, designed by women during the Three Decades, very often appear, in the form of little detailed studies, however, with a few explanatory drawings of the project; on the contrary, their character, compared to those related with built architectures, almost reaches the value of anonymity. This same value must be assumed by the interpretative drawing in support with the original that is a work. In this sense are of use the words of Massimo Bontempelli: "Saying the poetry (or art in general) as architecture, meaning art as a modification of the habitable world... The main consequence of the particular nature of the architectural work is the absolute separation of the work itself by its author. This work is a true and real alteration of the Earth's crust... This estrangement of the work by the author, this perfect cancellation of the umbilical cord in the literature is the creation of myths, fairy tales, characters... This has to be our supreme ideal, fellow writers: to become anonymous" (Bontempelli, 1938).

Charlotte Perriand

"All I could do was to offer you an opinion upon one minor point - a woman must have money and a room of her own if she is to write fiction" (Woolf, 1929, cap. 1).

While Virginia Woolf destabilized the young minds of the students of the female universities Newham and Girton, at the end of the '20s, Charlotte Perriand was building her "room of herself".

Recently graduated at the School of the Central Union of Decorative Arts in Paris, Charlotte Perriand got married in 1926 "for a challenge": "yet, at the time marriage was the only way for the chrisalis I was to turn into a butterfly, and a butterfly is a creature that takes flight" (Perriand, 2003, p. 20).

She had rented, with her husband, an unusual apartment, a former photo studio, in Place St. Sulpice, and had begun to furnish it in an equally non-traditional way. At the entrance, a bar corner in anodized aluminum and nickel-plated copper, introduced to her atelier showered with light from a large window, the fulcrum of the home.

Shortly after, in 1927, she presented at the Salon d'Automne, her "Bar sous le toit", a polished metal and glass wet bar enclosed under the wing of a mansard roof. The environment was consisting of a high balcony covered with nickel, three stools made with tubular aluminum, a glass small cocktail table, leather sofa and a shelf corner covered with nickel equipped with a record player. The "Bar sous le toit" attracted the attention of visitors for its distinctly modern spirit: it was located in an attic, a place usually reserved for the servants; it was constituted by furniture items that did not recall at all French tradition of decorative arts; it shone in its almost "machinist" essentiality and suggested, due to the presence of the record player, a new way of living the domestic space. And, last but not least, it was designed by a woman. Despite the prevailing academicism in France at the end of the '20s, it was welcomed by critics, and earned Charlotte Perriand the entrance at the atelier of Le Corbusier and Pierre Jeanneret in Rue des Sèrvres, laboratory within which the chrysalis became professionally butterfly and from which flew away, fortified, in 1937.

At this point, despite initially the study Corbu - Jeanneret not earned a lot of money (Perriand, 2003), Perriand had procured an own room, and a support (also because she always worked even with independent job orders, as well in the period during which worked at the atelier, and in any case she was also supported by her husband (Mc Leod, 2003): her woman designer path could begin.

Charlotte Perriand was born in 1903 into a relatively modest family (Mc Leod, 1987). A single child of two tailors, she grows up in a family context rather common at the time in the middle class, fancying outings in the neighboring country of his grandfather Des Moulins, and maneuvering without much success in the city and school life. Her reference model female, the mother, is a concrete and decisive woman, who

educated her strictly to an healty ethic of autonomy and work: "work is freedom!" her mother used to say to the little Charlotte (Perriand, 2003, p. 16). When, in 1926 Charlotte got married, as already mentioned, she does it as a fundamental rite of passage for a woman of that era: the marriage is to her the independence, the enfranchisement from the family of origin, the conquest of her own space. Perriand immediately set her married life in the name of autonomy and enhancement of their profession, in a way, however, not usual in the late '20s. Certainly should not be many women at that time, to have the opportunity to choose a home with a large atelier for their work.

The years '26-'33 can be considered as the true smithy where she forges her personality: these years are the years of the world discovery, of mountain climbing, and diving in the deep southern sea, of uninterrupted night work illuminated by the certainty of utopia[3].

Since 1927, she is associated of the Le Corbusier - Jeanneret atelier, with the task of interior design, and then, together with Jeanneret, head of the renewal program of home furnishings that Corbusier had developed[4]. Perriand immediately understand the strong link between architecture and interior design and in her autobiographical stories insists on her desire to measure in terms of space in a total way, and to learn the craft of architecture. The projects studied here, both unrealized, belonging to this "incubation" period of Charlotte Perriand's genius: they are two works that she developed independently from the Corbu-Jeanneret atelier, and in which she put herself to the test for the first time as an architect and not just as an interior designer.

The former, in chronological order, is *Travail et Sport*, a project published between '28 and '29 in "Repertoire du gout moderne"[5]. *Travail et Sport* is a kind of exhibition pavilion. It is a large space divided into five areas: sport room, kitchen and dining room, work room, sleeping area, rest and recreation area. The sleeping area and the sport area consist of a double height compared to the other areas, and all areas are separated from others only by fixed furniture and never by partition walls (Figure 1).

The drawings published on *Repertoire*, the only known with respect to this project are:

- A ground level plan;
- An isometric cross-section of the whole;
- An isometric cross-section in detail of the kitchen and work room;
- Two freehand perspectives of the whole;
- A table of axonometric drawings of some of the furniture in detail.

Since it is not mentioned in the autobiography of Perriand, we cannot be sure of the exact period in which it was conceived. Despite this, some elements, as below illustrated, we suggest that it has been drawn up around the end of 1928. It is interesting that this project is set in the first work period of Perriand at the atelier of Rue of Sèvres, and therefore is just after at "Bar sous le toit" though still immature compared to the successive collaboration with Le Corbusier and Jeanneret.

From the architectural point of view, isometric cross-section realizes design logic subtended: a large single container is populated by objects of different sizes that, at appropriate scales, create specific places within the space originally undifferentiated (Figure 2).

The sport area, in continuity with the sleeping area (including bunk beds and showers), is the main space of the environment, and is dotted with all the tools that characterize the life of sports man or woman. The *salle de travail*, separated from the rest by a "two-faced" furniture, on one hand cupboard and on the other place for storing sports equipment, is characterized by a small table and four "pivoting" chairs (i.e. rotating, with metal tubular and leather) and a table and a chair for typewriter, symbols of the "domesticated" machine age. The kitchen is a more regular edition of the "Bar sous le toit" (same stools, same glass shelves). The rest and recreation area is a sort of

Figure 1. Graphical analysis, plans, sections

graphic analysis

second level plan

ground level plan

C-C

B-B

A-A
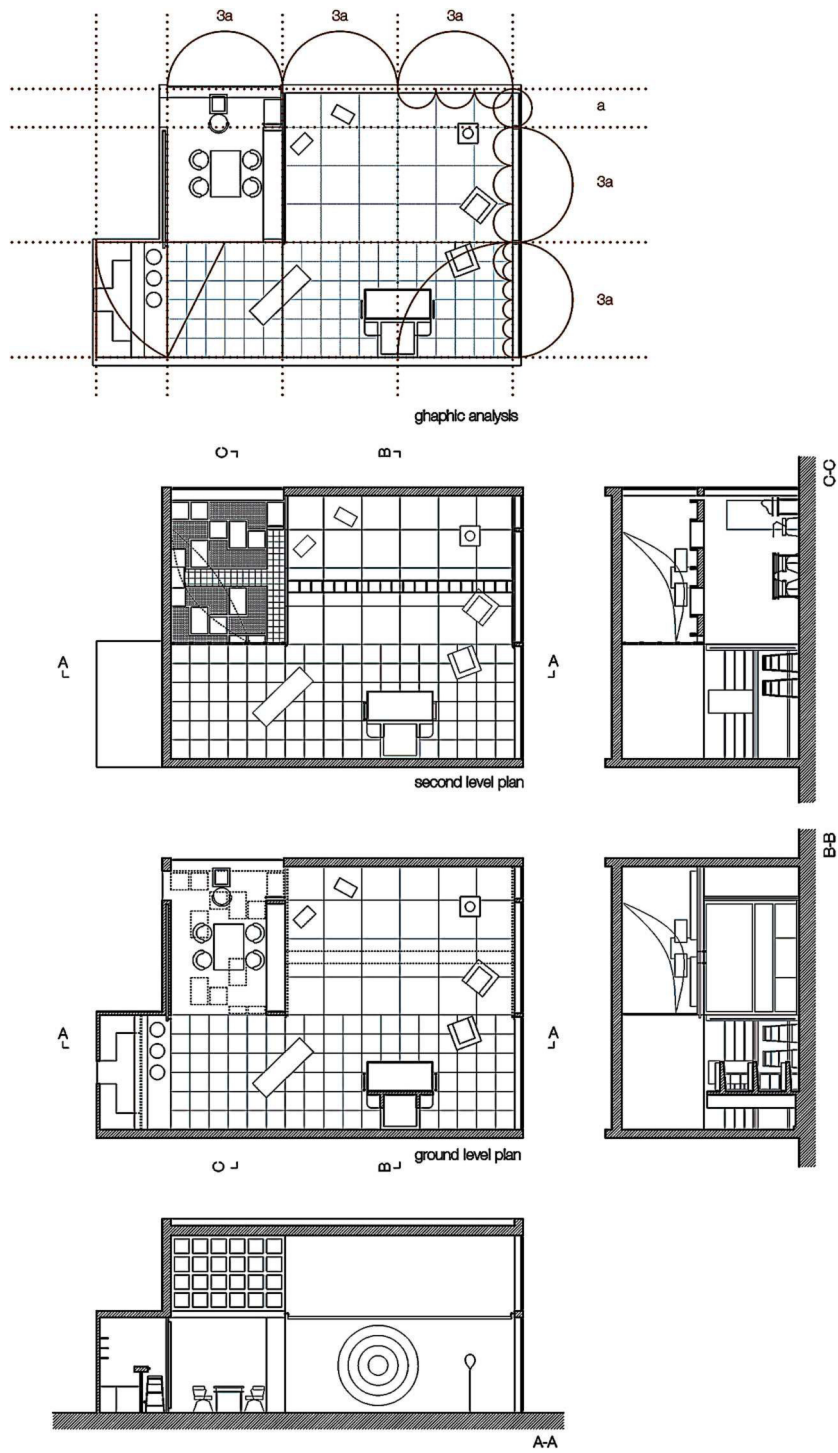
Figure 2. Axonometric cross-section and section in perspective
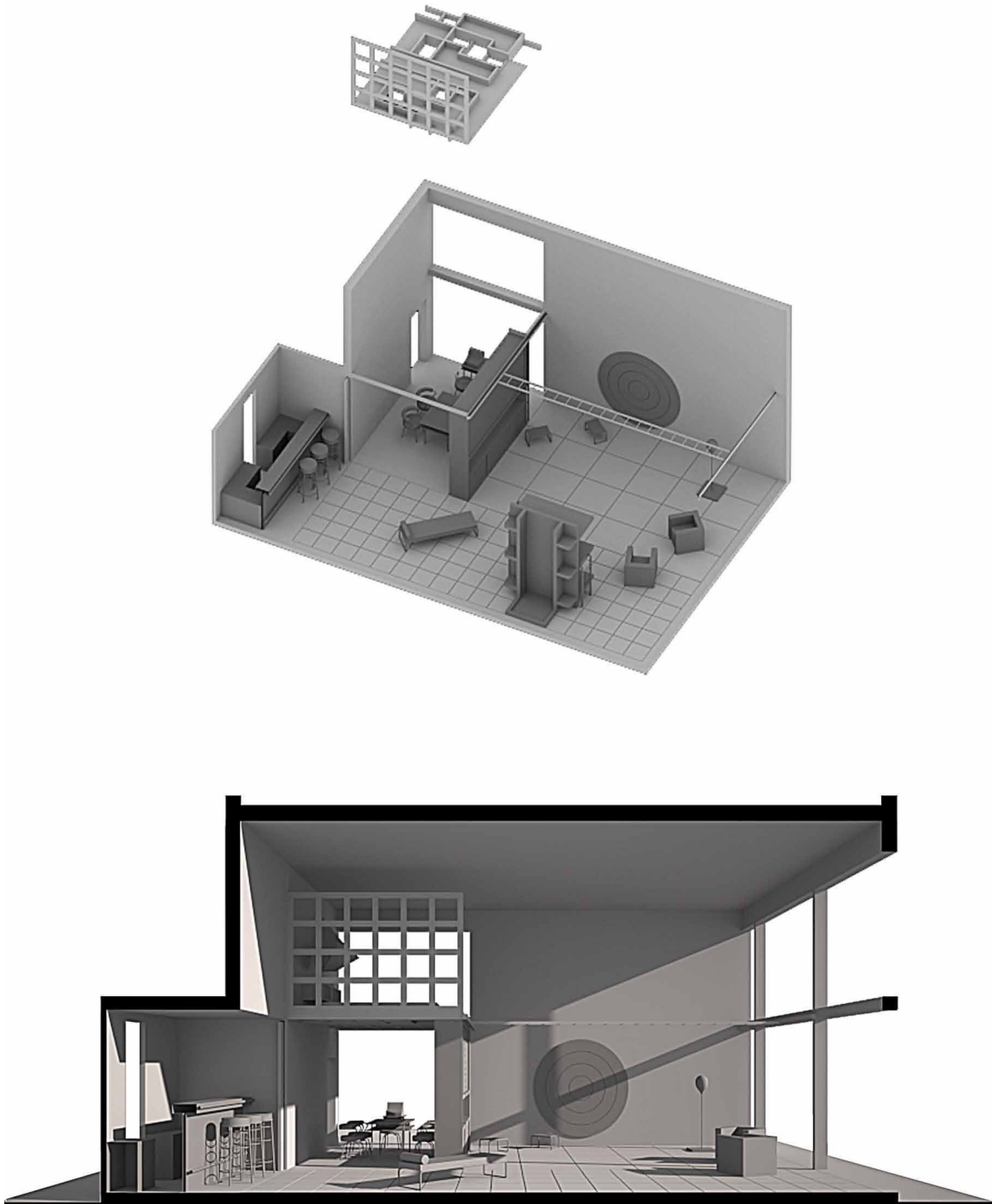
hanging flowered garden, drilled in the ceiling, a small modern eden with hammock and phonograph, leaning over the work room and connected to it only through a tiny ladder.

Some furniture are drawn in more detail in a specific layout, where there are *le mobile phonographique*, *le table machine à écrire et siège*, a sort of bench-bed with pillow, a small stool and a small bench. We can trace models of those furniture designed for the *Travail et Sport* area and used in the 1928 exhibition at the *Salon des artistes decorateurs* in which, with only the name of Perriand (Mc Leod, 2003), was exposed a dining room, where appear the *siège pivotante*, low stools and benches.

The feature of this small pavilion is that it is a place evidently thought from the inside to the outside: the plan and prospective give information on the connotation of the walls to the outside, and on the possibility that there are two terraces on which to lean, but it is surely a centripetal logic that pervades the space. The volume of the kitchen, juxtaposed to the space of the main hall, is thought as a place to see and experiencing inside (since the balcony seems fixed it is not clear how access in it), because indeed its external configuration has volumetrically never represented. It is evident in this project the designer hand that confront herself not only with the drawing of the furniture but with the relationship of the spaces between them, in a logic centered on the inside.

The graphical analysis shows an essential plan, based on a modular repetition.

The second project is the *Maison de week-end* of 1936.

It is a project whose genesis is related to the social changes taking place in France in the mid-'30s. As Perriand remind (2003), in 1936 the socialist government of Leon Blum votes for laws on collective labor agreements, approving coveted "English" week of 40 hours and paid holidays: the rural suburban fill up on weekends and during holidays of a multitude of workers who enjoy

vacationing out of the chaotic cities well-deserved rest with their family; it is the triumph of *loisir*.

The magazine *L'Architecture d'aujourd'hui*, at the *Exposition de l'Habitation*, calls in 1936, a contest that has as object the house for the holidays. The project themes are a shed for the weekend on a river bank, a holiday houses complex, a chalet at 2000 meters above sea level. Perriand participates independently of the Corbu-Jeanneret atelier, with three projects. Of these ones only the first one is currently published, the *Maison de week-end*. The known works consist of:

- A plan;
- Six sections/elevations;
- An axonometric view corresponding to the plan and sections;
- An axonometric view and a freehand perspective, probably related to a previous version of the same project with some variations[6];
- A typed undated report on the architectural parts, in french.

The system that Perriand conceives is a kind of tent mounted on piles: a wooden platform resting on stone walls houses two huts that open on the long sides towards a central open space and facing the river, the "*terrasse*". The huts internal fronts are tilting panels that, opening in various positions, arrange in a different way both the possibility of central space use and the amount of light and air in the huts (Figure 3).

The two wooden spaces respectively house two bedrooms, a maid's room and a kitchen-dining room. The bathroom is a small separate volume clinging on the opposite side with respect to the river. The lower part, at the dry walls level, of variable height with respect to the configuration of the ground, has different intended use depending on the needs of the tenants, it can be a garage or a cellar (Perriand even proposes atelier!).

The *Maison de weekend* is conceived to be built in wood panels, and with metal frame, ac-

Figure 3. Graphical analysis, plan, elevations

graphic analysis

B-B

plan

A-A
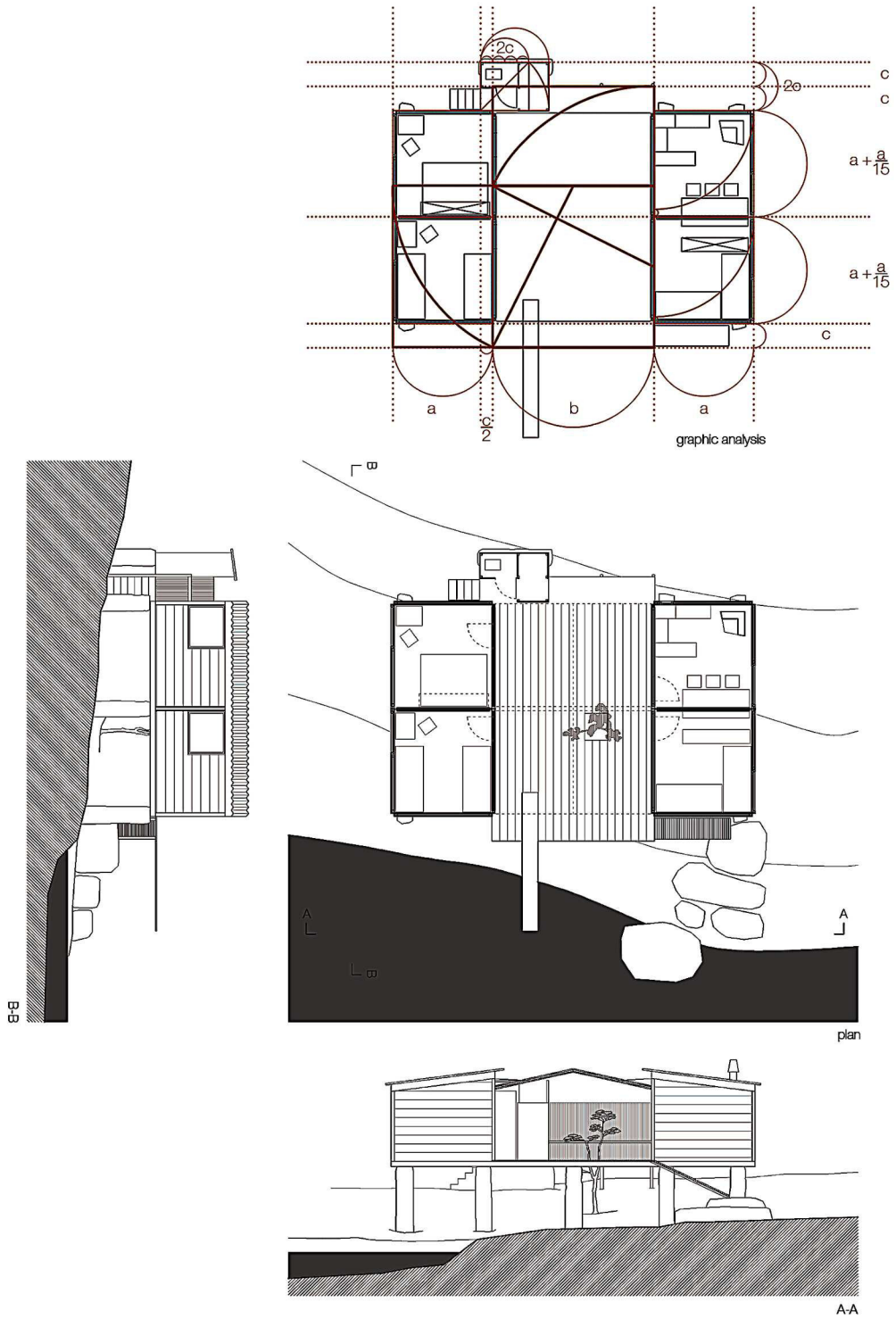
Figure 4. Exploded axonometric view
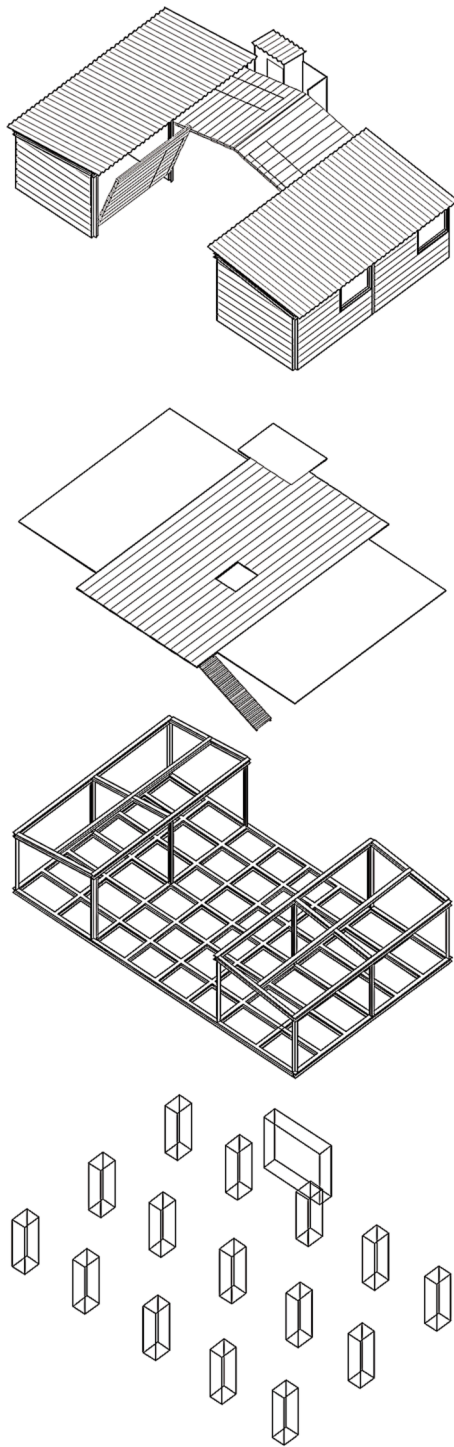
cording to the tent archetype, of which she retains the easiness of assembly and disassembly, and the essentiality of the organization (Figure 4).

Compared to *Travail et Sport* project one can notice in this an obvious maturity in project design that, even for the admittedly architectural theme, goes beyond the boundaries of interior design. In this case it is not a project thought from the inside to the outside, but rather a device drawn to operate in its relations inside-out in an organic way.

What is evident is the concept of the whole hut as a single object that, with gears and pulleys, meets the different needs of living. The *Maison de week-end* looks like a mediterranean and basic translation of the concept of a *machine for living*: a rudimentary machine born before the machine age. In truth it, to remain in the metaphor, was born after the machine age. The first projects of Perriand indeed are based on a blind faith in technological progress and on a general "machinist" aesthetic that pervades all of the '20s and '30s. Perriand herself had publicly supported (Perriand, 2003) the primacy of metal on wood: the metal was the new frontier for both furniture and architecture, it retrieved the accuracy of engineering construction and promised precision and mass production. The wood, on the contrary, changed its configuration over time, swelled, restricted and was part of the repertoire of most passed academic tradition. Neverthless, around the the mid-thirties, Perriand began to explore all materials, without ideological prejudices, and she manifests it in 1935 by designing and realizing the wooden and straw chair for the *Maison de jeune homme* at the *Exposition international de Bruxelles*.

Another interesting thing in this pre-industrial machine that is the *Maison de week-end*, is that it is thought in constantly changing not in a static way, though built with prefabricated elements (Figure 5).

In this regard it may be interesting to recall an episode remembered by Perriand, regarding the

Figure 5. Sections perpective
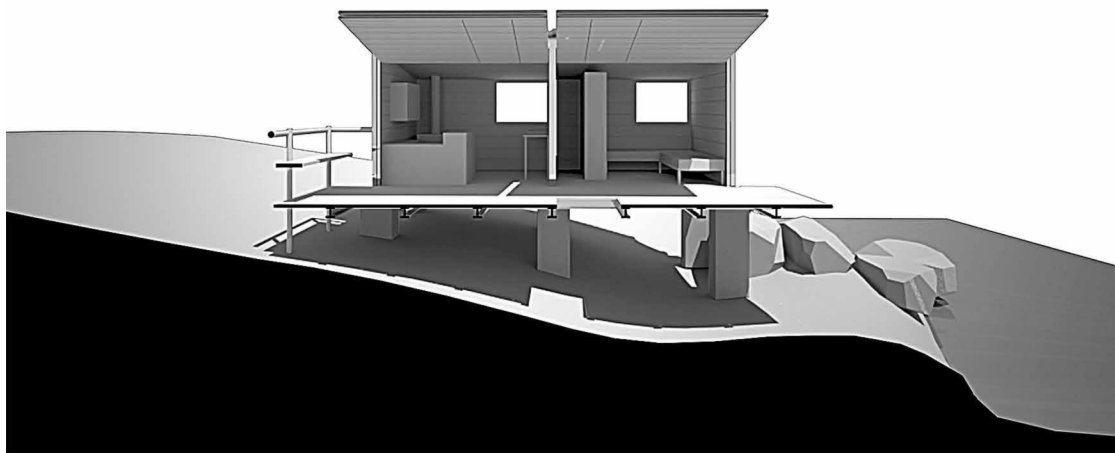
design of a prefabricated pavilion allocated to her by Le Corbusier around 1930: "I came up with a little gem. […] standardized components, carefully interlocked, to be set up on site. I awaited Corbu's verdict on his return, my heart beating excitedly. […] Instead, I received a volley of clipped abuse. The sculptural effect wasn't right. […] "Life needs play, just as concrete needs expansion joints and the eye's pupil closes under the effect of the light" he said. "Every structure must contain an overriding element of play". I had to start all over again" (Perriand, 2003, p. 28).

This episode is representative of the change of approach to the project of Perriand after the meeting with Le Corbusier. What it originates is a reasoning on the role of the movement in the interior design as in that one of the architecture. Imagine any object or item not in its size but in its dynamic logic with respect to other objects near it and in its interaction with man, is the significant shift that rises from the Perriand-Corbu-Jeanneret collaboration.

Even in the case of the chairs, the main evolution of the already undertaken research by Perriand on the use of metal tubular, is the introduction of the movement: the *siège pivotante,* the *siège à dossier basculante,* the *chaise longue*, are all objects that live on the interaction with man and welcome his movements.

Perriand in 1936 seems to have deeply learned the lesson. The *Maison de week-end* is a high variability device, easy to assemble and disassemble, consisting of a few elements, and inexpensive.

The graphical analysis of the plan has identified some relationships between the parts mainly based on the golden section: the central space of the "terrasse" is a golden rectangle and the relationship between its width and the width of the two huts follows the same rule[7].

The 1936 is the last year of collaboration between Perriand and the atelier in the Rue des Sevres, since in 1937, after a brief not without tension conversation and (maybe?) of mutual misunderstandings, Perriand will leave the study.

Le Corbusier had sent a letter to her and Pierre Jeanneret in which reproached them a little consideration of the value of teamwork and an excessive complicity that damaged the atelier. Considering unacceptable Corbu assumptions, Perriand immediately left the atelier, with great determination, but certainly not without difficulties. Jeanneret, with his mild introverted and less prone to violent confrontation, will remain a member of his cousin but he will continue to maintain the same relationship with her, that is that of a *sui generis* couple[8]. They will separate only in 1939, when Perriand left for Japan under the worst auspices of a coming war, and will meet both changed a lot, in 1946.

After the breaking up with Le Corbusier, Perriand's career continues with vitality and variety, and it is especially marked by the persistence (prolonged for war reasons, but not organized) in Japan, pivotal experience for the development of her poetics of space. Even the after war, with her marriage with Jacques Martin, the motherhood [9], and finally her return to Europe, it will be a fertile period that will take her in Congo (1952), again in Japan (1955), then in London and Geneva (1957), in Brasilia (1959). The '60s and '70s will see her returning to the top of the mountains, designing a chalet and two ski resorts (Meribel-les-Allues, 1961, *Arcs 1660* e *Arcs 1800*, 1969-1975). Finally, the '80s - '90s will be more focused on intimacy projects, such as the House of Tea for Unesco (1993) and the extension of her own home.

Here, the analysis of her work was limited to the two independent works of architecture in the years of the Modern Movement, but it is clear that in the case of Perriand (such us for other prolific architect women from the design point of view) it is hoped a study that enter into the folds of her entire work for the research of the palimpsest from which originates its complexity.

Studying architecture through the drawing, indeed, makes it possible, in the re-drawing and tridimensional digital construction moment to deal with the project retracing the steps, from

the genesis to the development, also highlighting inconsistencies and second thoughts. In this, the researcher subjectivity plays a decisive role: our analysis and representations are always interpretations, and never mere reconstructions. What interests us is to study the project "from its inside", and then investigating it through its proper tools. The production of digital models, in addition, allows the production of unpublished images of these projects, remained at the idea stage, and therefore contributes to the construction of a sort of history of architecture of the possible.

Finally, also in the brevity of this essay, it is worth making a few observations on how to be a woman in the craft of Charlotte Perriand. It is very interesting that she never makes specific reference to gender issues, for example in her autobiography. The only case in which she talks about women's issues is a reference to the nascent Domestic Arts in France: "After World War I, women demanded the right to work. They had uncomplainingly replaced man in factories and, consequently, had begun to gain their freedom. They would not give it up, despite the responsibilities involved: running the home, going to work and earning the daily bread, looking afret the children in the evenings, and then, utterly exhausted, entertaining the warrior back from the battlefield. Three eight-hour shifts, three women in one - a hight price to pay for freedom" (Perriand, 2003, p. 74).

But the change to which her refers does not put into question the position of woman into the home, in a logic of redistribution of relationships and family responsibilities, for example: the conquest is that women can work universally, and in this, technology, with the introduction of appliances, helps them to reduce the time of the housework, but always confirming as main female role the domestic one (Wilson, 2006).

Yet in her life certainly Perriand chooses a quite unconventional behavior compared to her peers. When she speaks about the condition of women in France, it seems almost she does not talking of her contemporaries; her words have

the air of an aloof historian, not with the involvement of the narrator in the first person. Why does Perriand look at the women of her time as if she didn't belong to the category? The answer could be that she lives her individual woman dimension in a modern way, rather than the collective one, indeed, she never does not participate to feminist movements, but instead she participates actively to the battles of the Communist Party. However, even without proclamations, Perriand, in our opinion, embodies the spirit of the famous feminist slogan "the personal is political". She does not make of her chooses the torch of "good practice", simply and effectively leads her life by pursuing her own goals and putting herself in the first person to achieve them.

In this sense seems to resound the words of Virginia Woolf, who in the same essay *A Room of One's Own* concluded that "is fatal for anyone who writes to think of their sex. It is fatal to be a man or woman pure and simple; one must be woman-manly or man-womanly. […] for anything written with that conscious bias is doomed to death. It ceases to be fertilized. […] it cannot grow in the minds of others" (Woolf, 1929, cap. 6).

Woolf was referring to literature and to the need that women wouldn't write with the grudge towards men who had kept her poor and ignorant for centuries, and that men wouldn't write with anger toward women that threatened their domain, but that both women and men, would write aspiring to the beauty in literature and to the pleasure of the reader.

The figure of Charlotte Perriand seems to perform the hope of Woolf: her work, in contrast to some feminist interpretations that are often reduced to a fierce demonstration of the subordinate women position in history[10], takes the form in the overcoming of gender logic in setting her own life and her own work. She, graduated in a school of decorative arts, field that at the time seemed more suited to the inclinations of women, for building her own path crosses boundaries of her discipline without revenge spirit against men,

but rather with a constructive desire to expand her knowledge and make her skills integrated with those ones of other artists.

Her work never appears marked by the claim of her female identity, because what is driving her is the tension toward beauty and harmony, values that are neither male nor female, but human.

In this sense Perriand does not seem to think about the problem of gender because, as advocated Woolf, "she doesn't think about her own sex" as didn't thought also Shakespeare while he wrote Othello; which does not mean to circumvent the issue of women or reduce the importance of the struggle for women's rights: it means stretching to a mature version of the relationship between genders in the arts, in literature as in architecture. Not forgetting the unavoidable premise: "Give her another hundred years, I concluded, reading the last chapter […] give her a room of her own and five hundred a year, let her speak her mind and leave out half that she now puts in, and she will write a better book one of these days. She will be a poet, […] in another hundred years'time" (Woolf, 1929, cap. 5).

Lilly Reich

"The problems of the new housing have their roots in the changed material, social and spiritual structure of our time: only starting from here one can understand these issues.

The degree of structural change determines the feature and scale of the problems. They refuse any arbitrariness. They cannot be solved by slogans, so much as being eliminated by slogans. Rationalization and typing are only a part of the problem. They are only the tools, they should never be the end. The problem of the new dwelling is fundamentally a spiritual problem, and the battle for new housing is only one aspect of the great struggle for the new forms of life" (Mies, 1947). With these words, Ludwig Mies van der Rohe opens, in July 1927, in Stuttgart, the Exhibition *Die Wohnung* (The house) of which Lilly Reich

will edit both the organization and the exposure to which will follow other curatorships and artistic directions that will constitute, together with the five previous ones[11], that fil rouge which has constantly kept chained the salient aspects of her own work. In the same exhibition it has shown the work of another woman, Margarete Schütte-Lihotzky, famous for the well-known *Frankfürter Küche* that it is exposed here together with other products of modern industry: heating equipment, kitchen accessories, bathroom fixtures and appliances.

These are the years in which in Germany there is a very strong political and cultural fervor triggered by the progress and the charm of the new technologies that stimulate architects and artists to actively contribute to the design of a new national style in which are salient aspects regarding the new ways of living. With the Exposition of 1931, *Die Wohnung Unserer Zeit* (The dwelling of our time), we are witnessing a kind of consecration of the Lilly Reich work because the artist not only focus on showing the exhibition but also designs a house, the *Erdgeschosshaus* (House on the ground floor) and two small apartments on the second floor of a hotel pavilion, the *Boardinghaus* (Rented houses); in the same year plans, in Berlin, the Modlinger House, which may be considered her unique non-temporary built architecture.

Lilly Reich was born in Berlin in 1885 and she moves to Vienna in 1908 where she works at the Wiener Werkstätte by Joseph Hoffmann. In 1910, back home, she studies with Else-Oppler-Legband at *Die Hohere Fachschule Dekorationskunst* (high school for decorative arts) and in 1911 she takes contact with Hermann Muthesius who, along with Friedrich Neumann and Henry van de Velde, was one of the pioneers of the Deutsche Werbund, an artistic movement that tried to raise the level, in the field of applied arts, through the cooperation between crafts and progressive levels of the industry in order to create a new national style both harmonious and in line with the Modern Movement. In 1914 she takes part in one of the sections, the *Haus der Frau* (House

of Woman), of the Cologne Exhibition in which she takes care of a living room furnishing and of the arrangement of two showcases; Lilly Reich in 1920, is the first woman to be elected to the Steering Committee of the German Werkbund and in 1924 meets Ludwig Mies van der Rohe who in that year had assumed the director position. From this moment begins a partnership that will cover most of the professional activity of Lilly Reich, during which she will participate, among others, to the International Exposition in Barcelona in 1929, in which she intervenes with the design of twenty-five exhibits, and to the furnishing design of Tugendhat House in Brno between 1928 and 1930. In 1931, designs and realizes Modlinger House in the Wanssee neighborhood in Berlin. Between 1932 and 1933, directs the workshops of weaving and interior finishing at the Bauhaus. In 1937 she designs the exhibition of the German textile industry products at the *Exposition Inter-nationale des Arts et tecniques appliqués à la vie moderne* (International exhibition of arts and techniques applied to modern life) and, with Mies van der Rohe, that one of the *Reichausstellung der Deutschen Textil-und-Bekleidungs-Wirtsschaff* (Imperial exposition of the German industry of fabric and garment); this will be her last work before to fell into a long period of cultural isola-tion and poverty. In 1946, soon after the end of World War II, she takes part in the reconstruction of the Werkbund along with Max Taut and Hans Scharoun and, in the same year, she teaches at the *Hochschüle für bildende Künste* (School of Fine Arts) in Berlin from which she resigns for the appearance of a serious illness. She prematurely died in Berlin on 11st of December 1947, at the age of sixty-two.

It is the Exhibition of 1931, which represents, the culmination of the career of Lilly Reich because it is the time when her work moves at the same time, and with absolute easiness, between the exhibition and the design of the dwelling. Paola Bellani synthesizes the spirit of design of Lilly Reich when she says: "Creating ex novo a universe

that has rhythmic allusions with the industry, in order to give the visitor the observation of a geometrically intact reality, indeed, corresponds to a specific operation of abstraction from the metropolitan chaos, while the planned structure of the exhibition paths, becomes a metaphor for the future city. In this sense, Reich invents an alternate universe in which it is presented an anticipation of the future that is both experimental and also significantly programmed.

Therefore, there is a clear will to questioning formal and behavioral codes become by now obsolete, to launch a new aesthetic that is the interpreter of the industrialized city, represented by the naked synchrony of its functions. Thus, the visitor is induced not only to the observation of the single product, but also to the synthetic vision of a set of prototypes which suggest an ideal model.

The object presented by Reich acquires then the value of a symbol of the modern lifestyle, with its own autonomy, and that speaks of itself without the possibility of misunderstandings. Abolished all sorts of decorative frame, it is therefore an objective aspect of the industrial product to be emphasized, aiming to get out of an emotional relationship with things" (Bellani, 2005).

The exhibited works at the Berlin Exhibition of 1931, because Lilly Reich designs both the "container" and the "content", offer a broader reading of the design attitude of the German architect since she opposes a promenade archi-tecturale, conceived for an in motion spectator, an architectural setting where the user is also spectator. Architecture is 'work of art overall' according an "all-female" though that unites the work of Lilly Reich, Eileen Gray, Charlotte Perriand, Margarete Schütte-Lihotzky, Sophia Hayden, Emilie Winkelmann and other women often marginalized by architecture history because, very often, wives, partners or collaborators of men whose fame had been acclaimed. It is significant, in this sense, the oblivion into which the work of Aino Maria Marsio, first wife of Alvar Aalto, whose production is still very often attributed to

the husband, is finished; as also the attribution of the famous Chaise Longue to Le Corbusier, essentially designed by Charlotte Perriand even though controlled by the "supervision" of the Swiss teacher, her employer, but certainly not with honors.

The cultural exclusion, in Italy, of the design activity of European women is manifested in the Piero Bottoni article appeared in the September 1931 in "Review of Architecture" titled Berlin 1931 in the fourteen pages dedicated to the Exhibition, where the Milanese architect describes very precisely the contents of the exhibition, highlighting the contributions of the various participating nations, he does not mention, when he focuses in the description of the *Die Wohnung Unserer Zeit* (The dwelling of our time) section, the contribution of Lilly Reich both as exhibition designer and participant architect.

If on one hand this omission is certainly due to an alignment to the ideas of Mussolini's regime, for which the woman could not be able to practice the profession of architect, on the other hand it seems appropriate to point out that the Italian culture has been excluded, for more than twenty years, from the knowledge of women's contribution to the development of modern architecture; probably for this reason the Italian architectural historiography has omitted, from its own critical pages, the activity of some figures that today can be considered true pioneers of modern architecture.

One of the photos published in the article by Piero Bottoni is the view from the top of the Hall II, which exhibition was edited by Lilly Reich; the caption of the image indicates the "house on the ground floor" of Mies and the "two-story house" of Haesler and Völker-Cell omitting the intervention of Reich visible in the background and designed in close relationship, clearly visible in the plan, with the Mies pavilion, to witness the cultural union between the two architects.

The Berlin Exhibition was made up of eight exhibition halls. Lilly Reich was responsible for different installations: "Material Show", "Apart-

ment for a married couple", Apartment for one person", "House on the ground floor" and "Stare and Exhibition" which concerned the interior design of an apartment for A. Wertheim.

Regarding to the "Material Show" critics have observed, as Matilda McQuaid states, "the new singular way of the houses and apartments layout and the original organization of the materials. Twenty-four groups, divided into twelve categories of interior finishing materials, including marble, wood, metal, floor coverings, carpets, textiles, clocks, mass production furniture and glass, are set up by Reich" (McQuaid, 1996).

The "House on the ground floor" designed by Lilly Reich has to be studied in close relation to the Mies van der Rohe pavilion; that statement, though seemingly trivial, wants to emphasize not only the compositional relationship between the two artifacts, but highlighting both the compositional uniqueness and the issues that the architectural design deals with some issues regarding: in this case, that central one, of "modern" living.

The Lilly Reich's work is well described in the "Lilly Reich: Designer and Architect" exhibition catalog, edited in 1996 by Matilda McQuaid, of the Department of Architecture and Design at the Museum of Modern Art (MOMA) in New York; the volume, as often happens in the exhibition catalogs, contains a critical apparatus supported by a photographic and iconographic repertoire of the time.

The re-drawing, carried out from the base of the edited drawings, intends to add other words to criticism and especially giving new representations to the architectural knowledge. The Mies and Reich pavilions related to the "house on the ground floor", indeed, cannot be read separately and even be linked only by the evidence of the wall sign; that wall is not just an architectural "body", it is the element of a scanning of architectural "episodes" of different ways and, at the same time, present in a character of uniqueness; the wall underlines the transparent living spaces, both in the Mies pavilion and in the Reich one and at

Figure 6. Graphical analysis, plans and elevation
(D. Migliore)
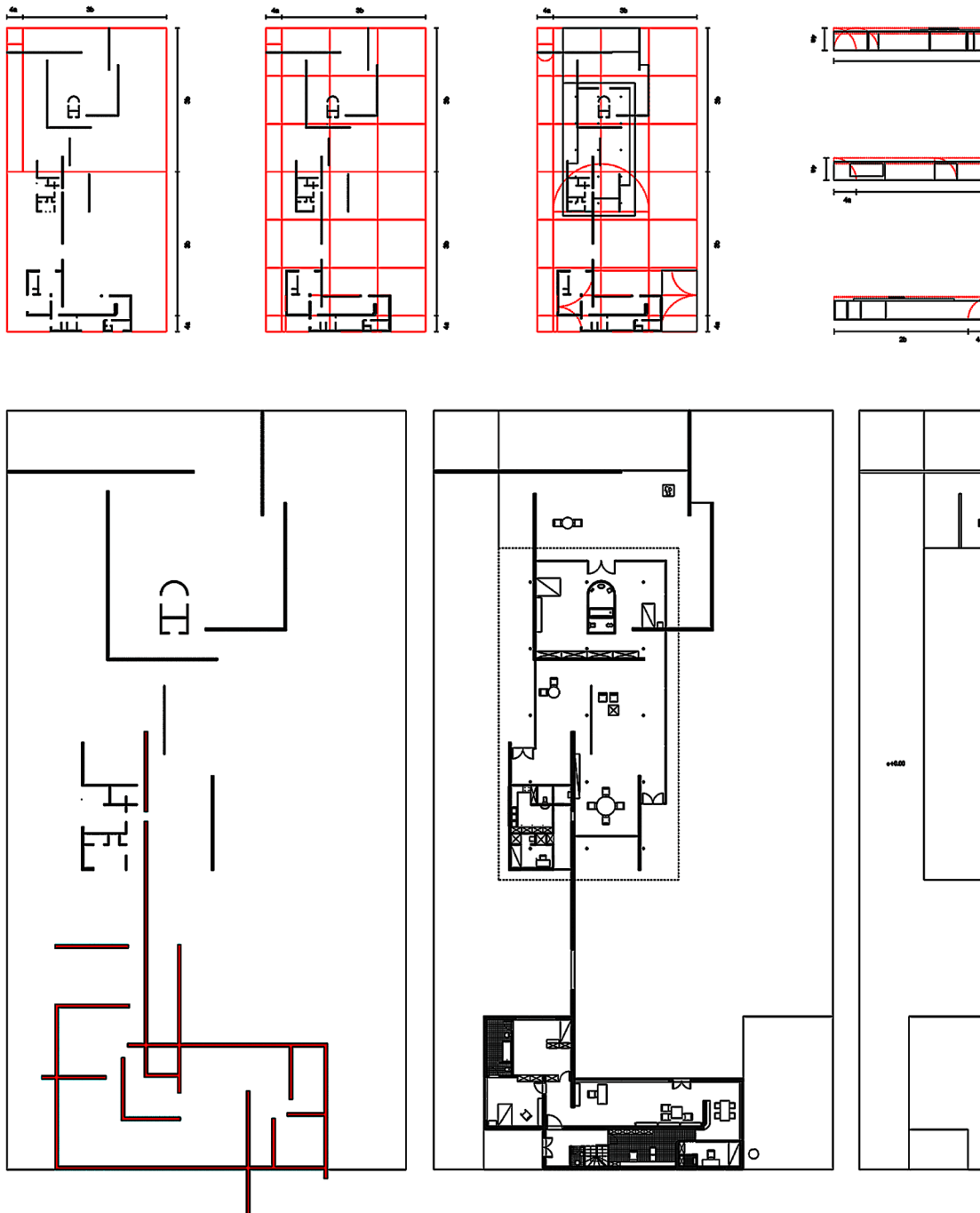
the same time hides the other domestic functions. The whole composition is inscribed in a strict geometrical figure consisting of two squares whose sides adds a part of a width equal to 1/9 of the square side; in turn, in the entire figure it can be traced sub-modules that identify the major septa that give rhythm to the architectural space. The same geometric rigor can be traced in the evidence of a sophisticated "measure" of the project; the wall, as you can see in the re-drawing of the plan and in the unedited representations of elevations and sections, trace the lines of a new story, that one of modern living (Figure 6).

Taken as starting points the few drawings published in the "Lilly Reich: Designer and Architect" exhibition catalog and using the photos of the time, it has rebuilt the compositional process to arrive at new representations that provide additional inspirations for the study of the German artist. The drawing, therefore, takes not only a documentary value but it becomes also tool of the architectural and knowledge criticism; to the only existing drawings, a plan sketch and the drawing of the plan, both held at the MOMA at the "Lilly Reich Collection, Mies van der Rohe Archive," are added, with this study, the graphical analysis representations, four elevations, six sections, an exploded isometric, six perspective sections and one perspective that highlight the spatial qualities of both the Mies pavilion and that Reich one (Figure 7).

These new interpretative drawings are the result of the digital model construction (Figure 8).

"The digital models of architecture that have appeared until now have brought a change that we could define something like the 'typographic revolution' introduced when Sebastiano Serlio and Palladio thought of communicating architecture through the printed pages of a book" (Carpo, 2008).

"The crucial aspect of this revolution lies not so much in a more effective construction of three-dimensional illusions with respect to those ones of the past, as in the transformation of the three-dimensional representation of a building

from image to cognitive system, that is a spatial, dimensional and well-defined relational information database" (Gaiani, 2011).

The reading of a work such as that of Lilly Reich introduces the need for new notations: not only an experimental verification of important spatial connotations, or of elements such as the quality and quantity of light, but also the perceptive verification of the space as it had presented to the visitors of the Exhibition.

In this direction, the illustrations make extensive use of perspective sections, the only form of representation that combines the metric scanning of the section with the iconicity of the central projection, and next to them also of impersonal axonometric projections. And this is possible by exploiting the peculiarities of the digital model that allows, from the same base, to derive ways of perceptually and conceptually representing the world, simply by changing the attributes of the scene. "In this sense, they are much more powerful and versatile than the traditional sense with which they are usually employed - tools to build a single final image, useful for all kind of reading and synthetic of each interpretation - allowing different representations, each with a specific purpose" (Gaiani, 2011).

Virtual models, Richard Migliari says, "are very useful for at least three good reasons deal with the study of architecture: the former concerns the simulation of a visit of an architecture to realize, the second the 'construction' of never realized projects, the last is the simulation of a visit to a monument that time has deeply altered in order to trigger the correct restorative processes" (Migliari, 2008).

The drawing, as true place of architectural criticism, it is the tool that allows more than any other modus of the criticism itself to get closer to the recognizable coherence of the design process for its continued 'comings and goings' that is characteristic of the drawing and construction of the form, that without it cannot take 'body'. If this sentence is true, then the drawing, conceived

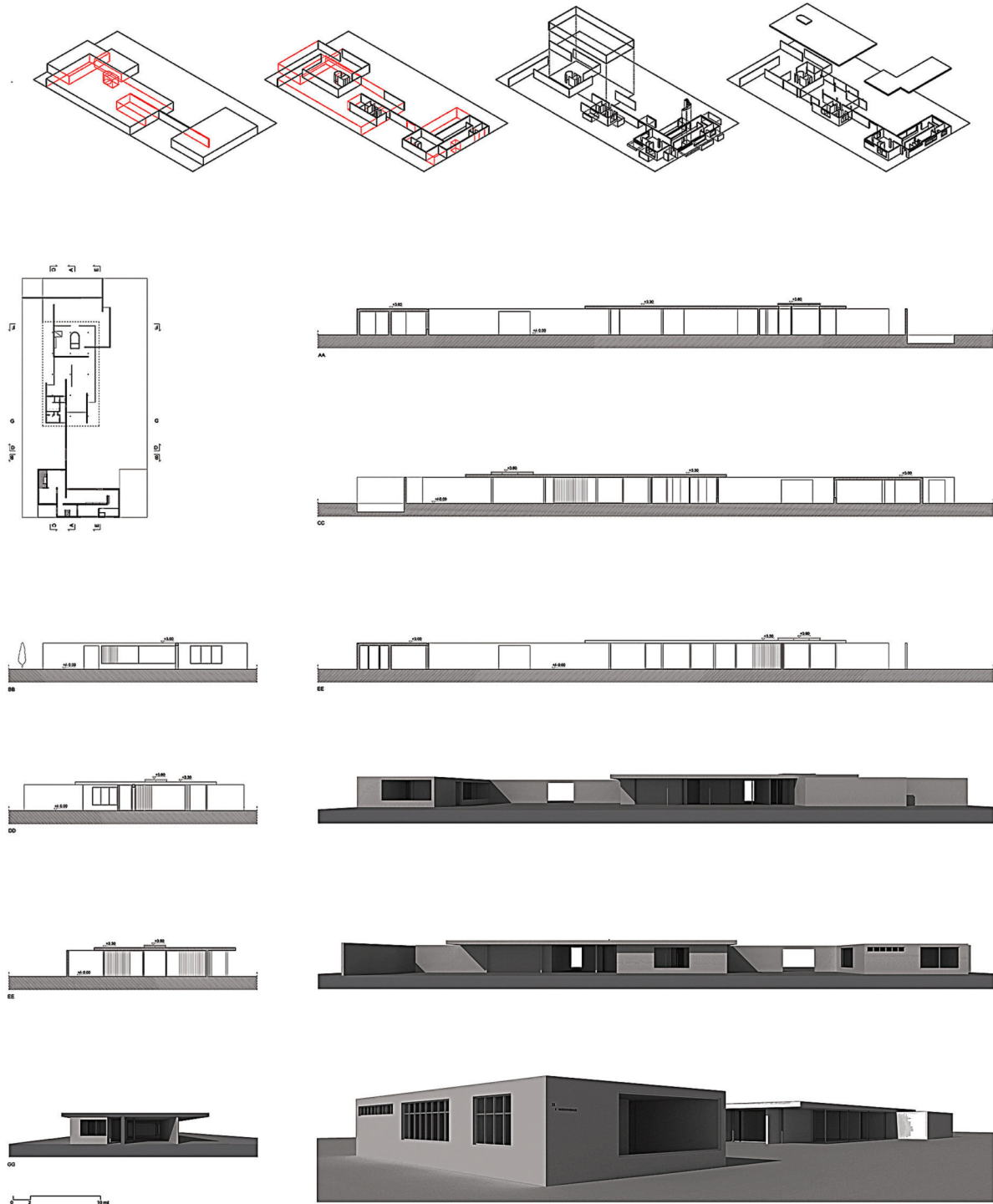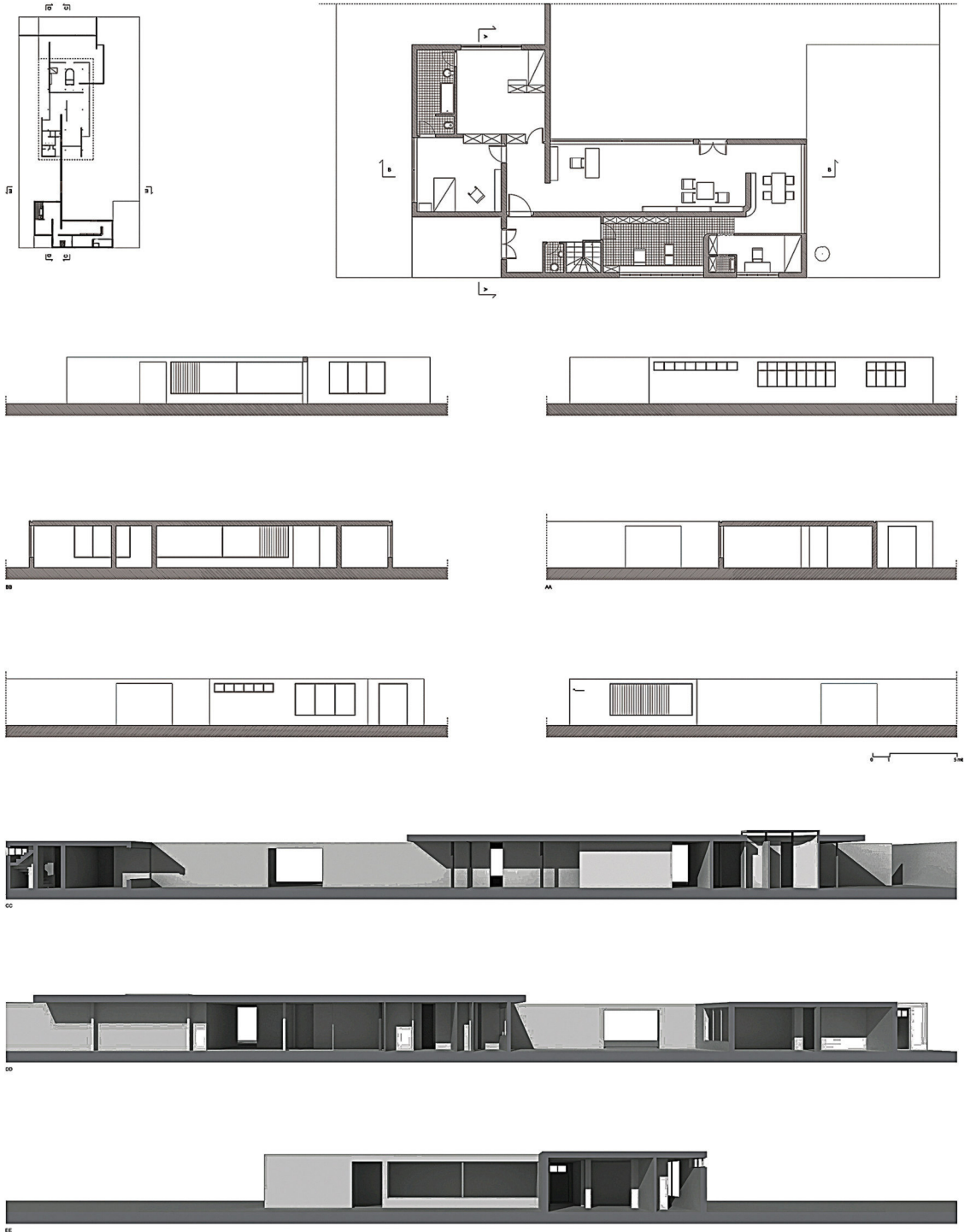*Figure 7. Axonometric view, sections, elevations and perspective*
(D. Migliore).

Figure 8. Plan, elevations, sections and sections in perspective
(D. Migliore).

as the analysis of the shape and then as a critical tool, is the medium between words and things, and when the latter are 'drawn', is the only survey tool capable to trace the critical points of the project, certainly those ones that are hidden, that the word cannot locate.

The digital drawing because of its versatility, it is a very useful tool for graphical analysis of architectural projects that have remained into the drawer or demolished that, because of their being 'uncontaminated, have a greater expressiveness than to the realized projects often debased by compromises due to external factors such as the client or the economic aspect.

But the digital drawing is not the only tool, it is one among many; it is a companion of the sketch, diagram, written annotation, quit note, all necessary handwritings to achieve the purpose.

The digital model is thus to be conceived as a 'starting point' for the graphical analysis of the architecture and not the final outcome; to it, indeed, are associated other graphs, sometimes not 'derived' from the model, useful for the understanding/translation of architecture. The construction of the model it isn't the construction of a simple image, operation that is very often carried out for the representation of the project, but is the hermeneutic and critical result of the drawing aiming essentially to the analysis of the shape, the true object of imitation.

The drawing, therefore, assumes the character of a real text that is added to another text which is that of the investigated architectural body that, in this case, it doesn't exists because demolished.

The construction exploded axonometric, for example, occurs through the subtraction of volumes to the base housing, mimetic operation of the design proceed, almost to highlight the not descriptive value of the representation, but, instead, its merely conceptual appearance.

The same graphical operation used for the study of "home on the ground floor" has been conducted for the study of two of the nine apartments in the *Boardinghaus* (Rented Houses) of which Reich

has also designed the furnishings that give rhythm to the spaces; in particular the German architect has designed two apartments, one of 35 square meters and the other one of 53 square meters, respectively, for a single person and a couple; the other apartments in the pavilion have been though by Walther Schmidt, Josef Albers, Robert Vorhoelzer, Hermann Gerson, Max Wiederanders. The existing drawings, from "Lilly Reich Collection" and published in the exhibition catalog of 1996, are the horizontal section with the indicated location of the furniture and the perspective of the kitchen designed by the same Reich.

In order to re-drawing the intervention of the Reich within the *Boardinghaus* it has been necessary to return the perception of the pavilion in its entirety, both to provide the architectural historiography new representations for knowledge/description of the project, of which don't exist exhaustive drawings, and to put in relationship the part with the whole, since, as it happens for the "house on the ground floor", the architecture cannot be explored for parts even if an exhibition, as such, leads to such a reading (Figure 9).

From the photos and the plan drawing it has carried out in a reading of the project trying to get their own compositional principles and, finally, the completed form (Figure 10).

The apartments designed by Reich have after graphically been analyzed at "small-scale representation" to highlight both the relationships among the spaces (container) and the furniture (content) that define a way of proceeding of the architect in which nothing is left to the case, where everything is designed in detail.

New representations in their fixity, want to tell a thought, a new way of the idea of living - which, as Martin Heidegger said, exist before to build - that Lilly Reich has expressed with perfectly compositional clear and with lucid intellectual rigor.

The new representations[12], in support of this text, not only attempt to provide new possible interpretations for the reading of the work of Reich but want especially to make a tribute to

Figure 9. Axonometric views, plan, elevations, sections and perspective
(D. Migliore)
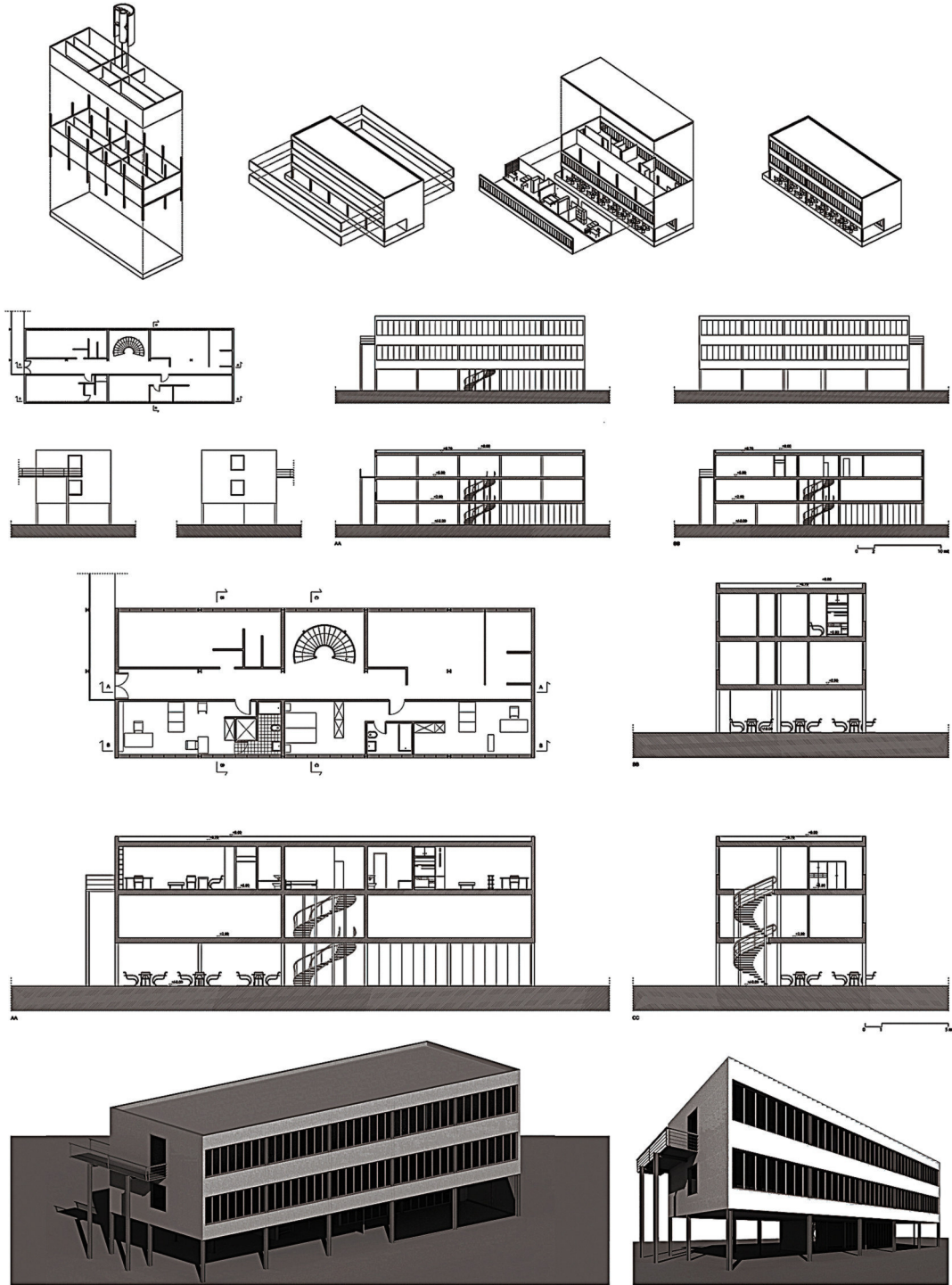
Figure 10. Axonometric views, perspectives and orthogonal projections
(D. Migliore).

an artist whose professional career has for a long time been blurred.

Helena Niemirowska Syrkus

While in the twenties and thirties, the Polish capital was becoming one of the hubs of propagation of the new architecture, thanks to the geographical contiguity with the Weimar Republic, which allowed the formation of young minds aiming to the admixture of architecture, art and music, a young Helena Niemirowska Syrkus was carrying out, in her cultural context of the Warsaw, the idea that urban planning and architecture, such as art forms, had to consciously aim to define a language capable o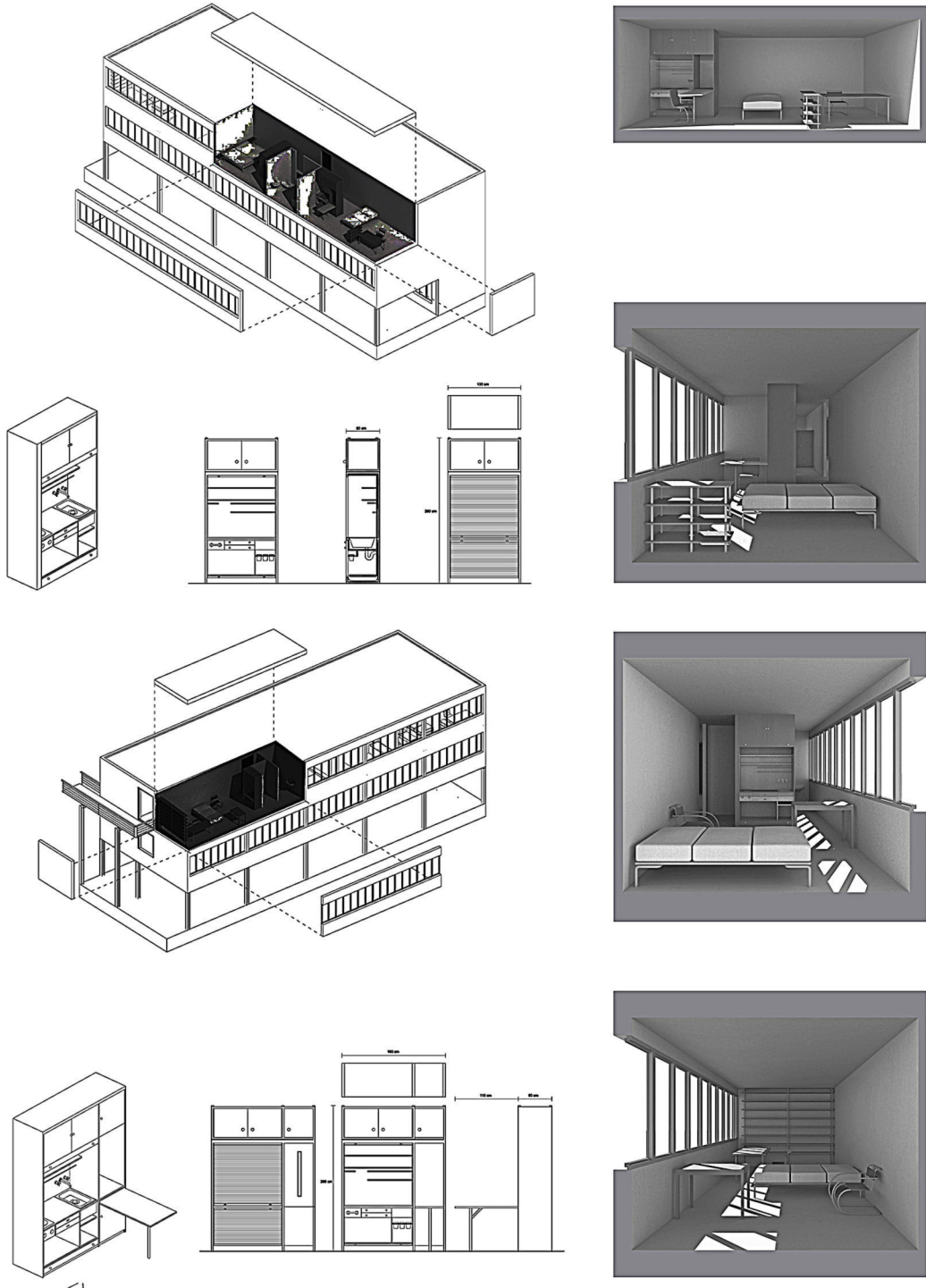f expressing, through new configurations, the great revolutionary step accomplished in that social, economic and political era. Helena Niemirowska Syrkus shared the avant-garde thesis according to which the modern architect, to become an artist, had to rise such basic element of social organization, defining also the modern architecture as a synthesis of all the arts, thus pointing toward to the creation a new space and a new aesthetic for the "New Man".

Helena Niemirowska Syrkus was born the 14th of May 1900 in Warsaw, architect and urban planner, was considered one of the protagonists of the architectural modernist vanguards and also emblematic figure in the Poland art and architecture. In the years 1918-1925, intellectual horizons and interests of Helena, spurred on by her relationships with artists and writers of Warsaw, led her to combine architectural studies, at Technical Academy of Warsaw, with the lessons of Roman Kramsztyk[13] about drawing and some studies of philosophy, University of Warsaw, also in different languages, often working as a translator, as she had had the opportunity to work at an international level (Boscolo, 2005).

It was with this type of education, toward the commingling between philosophy and architecture, that Helena had formulated her architectural and urban projects, in line with the first Polish avant-garde, basing on the concepts of painting and sculpture such as the roots of her architectural thoughts. Indeed, she conceived painting as the source of the functional architecture, surely even under the influence of Le Corbusier, from which she took the concept of balanced harmony between architecture and painting. Helena began to shyly "drawing" the path of her multiple languages in the field of shape modeling always remaining fascinated by the Cubists and especially by Suprematists Malevich and El Lissitzkij and interpreting their principles through a process of sublimation of pure architectural and spatial elements (Klosiewicz, 2005). The ideas brought forward by Helena Niemirowska definitely related to the inseparability of the art problems from the social ones and freely recognized themselves into the architectural issues, as will be evident in the "Symultanicnzy Theatre" project, architectural example of simultaneous theater, never realized, that hides within its own conjectural spaces, the synthesis of the philosophical/artistic/architectural attitude, aimed at creating a place for discussion, involvement and full participation of the spectator/actor to social issues (Figure 11).

In this project, her cultural attitude towards the modeling of space, seems to be that one of a theater actor that reveals the fictions of reality and tells the story of contemporary life without the need to identify and separate the functions performed inside the theater: actor and spectator thus became the main subject of that space.

In 1924 she co-founded, with her husband, Szymon Syrkus, the first Warsaw avant-garde, the "Blok" (Block of Constructivists and Suprematists Poland Artists), but in 1926, the will to put the architecture into the center of the research and creation activity, in addition to some internal disputes, brought the majority of the "Block" members to join in creation of a new artistic and cultural group by Helena and her husband: the "Praesens"[14]. The manifest of the neo-avant-garde Polish group, was developed through the following equation:

Figure 11. Exploded view, ground floor plan, 3d model, sections
(E. Sabella).
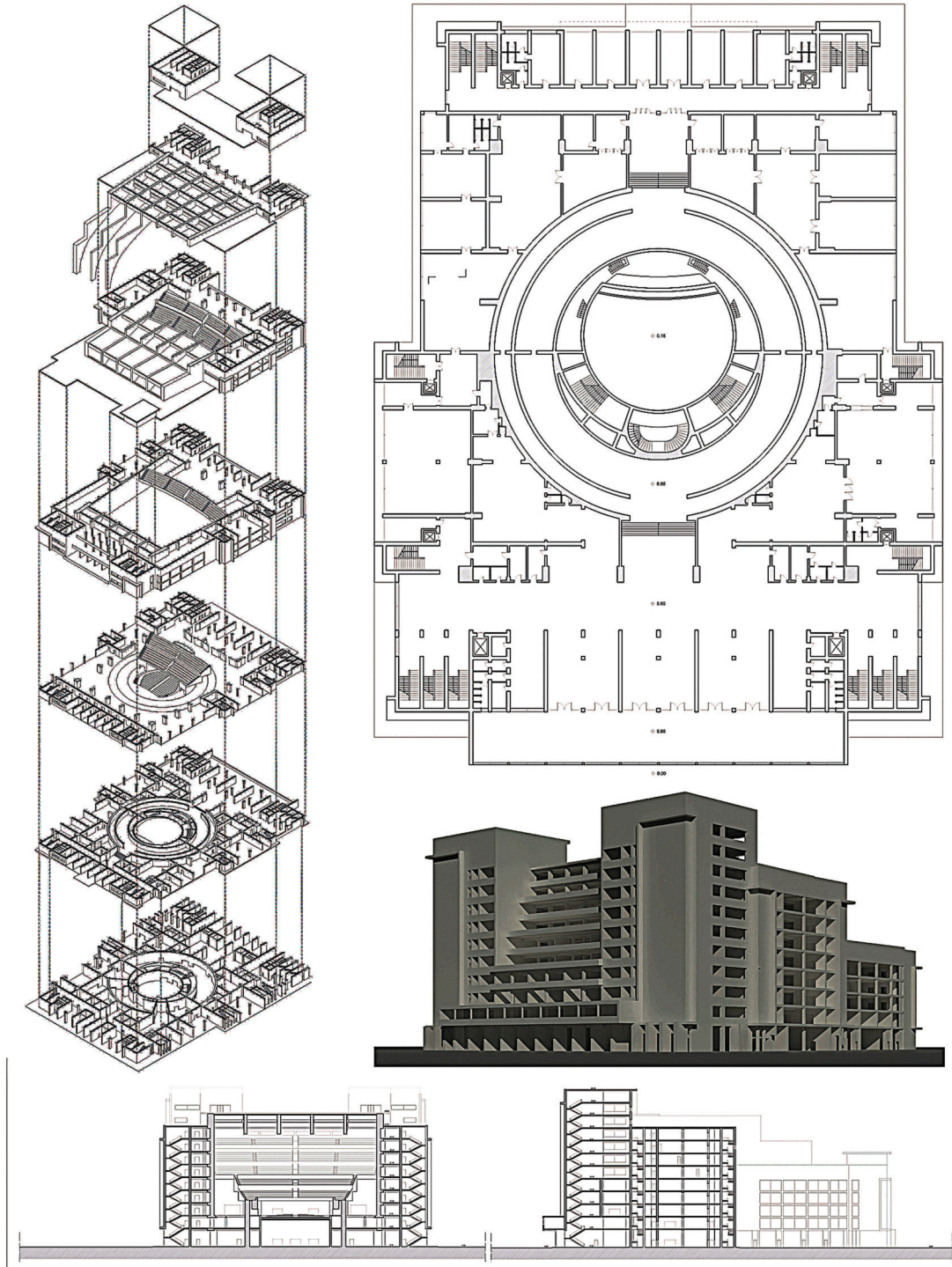
architecture + sculpture + painting

=

A new composition

Residential housing layouts

New systems for the collective life

As result of this equation, the choice to unify three ways of conceiving space, through the synergy among the material, color and spatial modeling of proposed by "Praesens", turned into necessity in the idea that Helena had about the field of architecture, through a synthesis of these three kind of art.

But experiences like those of "Blok" and "Praesens" were not the only ones to show the change that occurred within the architectural scene of the Polish capital. Indeed, in the same year, arose another organization, the "S.A.P." (Stowarzyszenie Architektow Polskich, that is the Association of Polish Architects), which gathered the younger architects who had refused to join the "Kolo Architektow", the Circle of Architects. Helena Niemirowska was among the participants in this protest moment, along with, among others, Bohdan Pniewski, Brukalski, Lech Niemojewski, Wladyslaw Czerny, Maksymilian Goldberg.

In 1927, Helena went back to Stuttgart, where had took place the international exhibition on residence, "The contemporary apartment" (*wohnung der Neuzeit*). There she visited the Weissenhof residential neighborhood, designed by the German Werkbund and conceived as an exhibition of new trends in architecture.

To this situation were added the topics deal with the quarterly modernist "Praesens" on the social functions of the new architecture. Indeed, with her husband, she led the project, with the "Praesens" group, of the summer residence type of Warsaw in Rakowiec between 1930 and 1939, suggesting the steel structure for the modulariza-

tion of the spaces. In 1929, during her participation at the first C.I.R.P.A.C. Congress (*Comité International pour la Réalisation des Problèmes d'Architecture Contemporaine*) hold in Basel, she was able to exhibit the features of an extremely happy artistic and cultural situation, in Poland, since the "Praesens" had already found an institution, the "W.S.M." (Residential Varsaviana Cooperative), with which to start the construction of popular housing (Chionne, 2005). The participation of Helena Niemirowska was particularly active in the meetings of C.I.A.M., starting from the second Congress hold in Frankfurt in 1929, organized in line with the topics on the compact apartments, until becoming, between 1948 and 1954, vice-president of C.I.A.M., fighting for the establishment of functionalist principles in Stalinist Poland (Belgioioso, 2007).

In 1949 she has been called by the Institute of Architecture and Design of Warsaw and in 1955 became professor at the Warsaw University of Technology, obtaining in 1979 the title of Emeritus Professor. She was also an active representative of the Jewish women of Poland, so that, after World War II became the first president of the Jewish Women League, aiding in hiding to flee to Israel many Polish children.

The project here is taken into account in order to deepen the socio-architectural attitude of Helena Niemirowska is the most emblematic, though, it has silently remained on the paper of her own architectural thinking, the "Symultaniczy Theatre", of 1927, also called the "Theatre of the Future": a simultaneous theater, so in motion, that would allow to respond to the different issues of the theatrical scene, through advanced technologies and new kinetic effects. The main objectives pursued by Helena were that of flexibility, freedom of movement and union between the audience and the theater scene: the theater structure had been conceived as a whole with the public area, thus derogating from the traditional separation stage/audience. The project was developed together with Andrzej Pronaszko[15] and has been designed

according to the theoretical principles of the Total Theatre by Walter Gropius of 1927[16].

The idea of a space with separated areas of activities, where you can perform various actions, was at that time an especially innovative architectural concept. In 1933, adapting the theater project in the district of Żoliborz, Helena tried to achieve what would have remained only the idea of "Symultaniczny Theatre". The theater was deprived of the stage, the performance for the spectators were defined through a free configuration of the space consisted of a circular structure that led to a rotary motion. Thus, the stage of this scenic and architectural machine was able to rotate and have different configurations depending on the arrangement that it had to be carried out (Figure 12).

The walls, which were also changeable and arranged to screenings, were a flexible scenic device, which would offer the public a surprising effect of convertible space. By the displacement of the action from a scenic location to another one, during the theatric representation and through a system of projections and cinematographic machines placed in various positions, the walls and the covering could become figurative scenes in motion too. In this project, Helena thought to change the relationship between the audience and the stage, offering a drawing of the theater that aimed to integrate as much as possible this relationship, hoping to get a complete focus on both the audience and the actors and eliminating any disturbance. The main objective was to harmonize the stage and the auditorium combining them in such a way as to drive viewers to the area where the show has moved, thus creating a theater structure conceived to obtain quick changes of scene and avoid breaks due to the use of the curtain. The entire building was constituted by three-dimensional means, that replaced the two-dimensional figurative effects of traditional theater. In this way, the place itself of the performance, resolved in the changing and illusory space of imagination, was transformed into the scenic space in which the thoughts and imagination of the director, melted with the spirit of the audience in a unison story that edified the body, transforming it into an element of which the art would be served. One can deduce that the "Symultaniczny Theatre" project deal both with architecture issues and the possibility of transforming the stage on the basis of the latest technological innovations of performance (Figure 13).

The reading of the drawings that have defined the project in this study and the analysis of the re-drawn spaces for graphical interpretation, have led to the virtual modeling phase of theatric environments that becomes the ending point and the starting one for a new understanding of the project. Two plants (ground floor and second floor), on which are identified the spaces through a numerical progression (1 to 58) and a section (in which the numerical progression ends with the number 79, in correspondence of the covering) show the unique three-dimensionality which the imagination can use for the knowledge of those spaces that have been identified in plan representations, through the process of graphical interpretation, with the development of further horizontal sections and the study of the geometrical relationships from which, probably, it would have been developed the project. The aim is to show the development of the audience and its relationship with the curved roof. The vertical section has been supplemented by additional sections that show the dynamic-theatric relationship created between the spectators and the actors; indeed, two large rotating discs (identified by the numbers 54 and 55) are the only real edge/ contact between the moving action and the stage structure. The large covering structure, consisting of a system of "blades", which probably takes up the idea of theater in motion by Gropius, is left exposed in its rhythmic scanning, interrupted only by the arrangement of beams of secondary frame and incorporated, in the lower part, by a curved wall, right where it corresponds with the scene, as to emphasize the need to create an open dialogue between a rotating stage (probably as metaphor of a constantly changing society) and a curved "hat", emptied from fictions (metaphor

Figure 12. Elevations, perspective sections, views of the inside and plan of sixth floor
(E. Sabella).
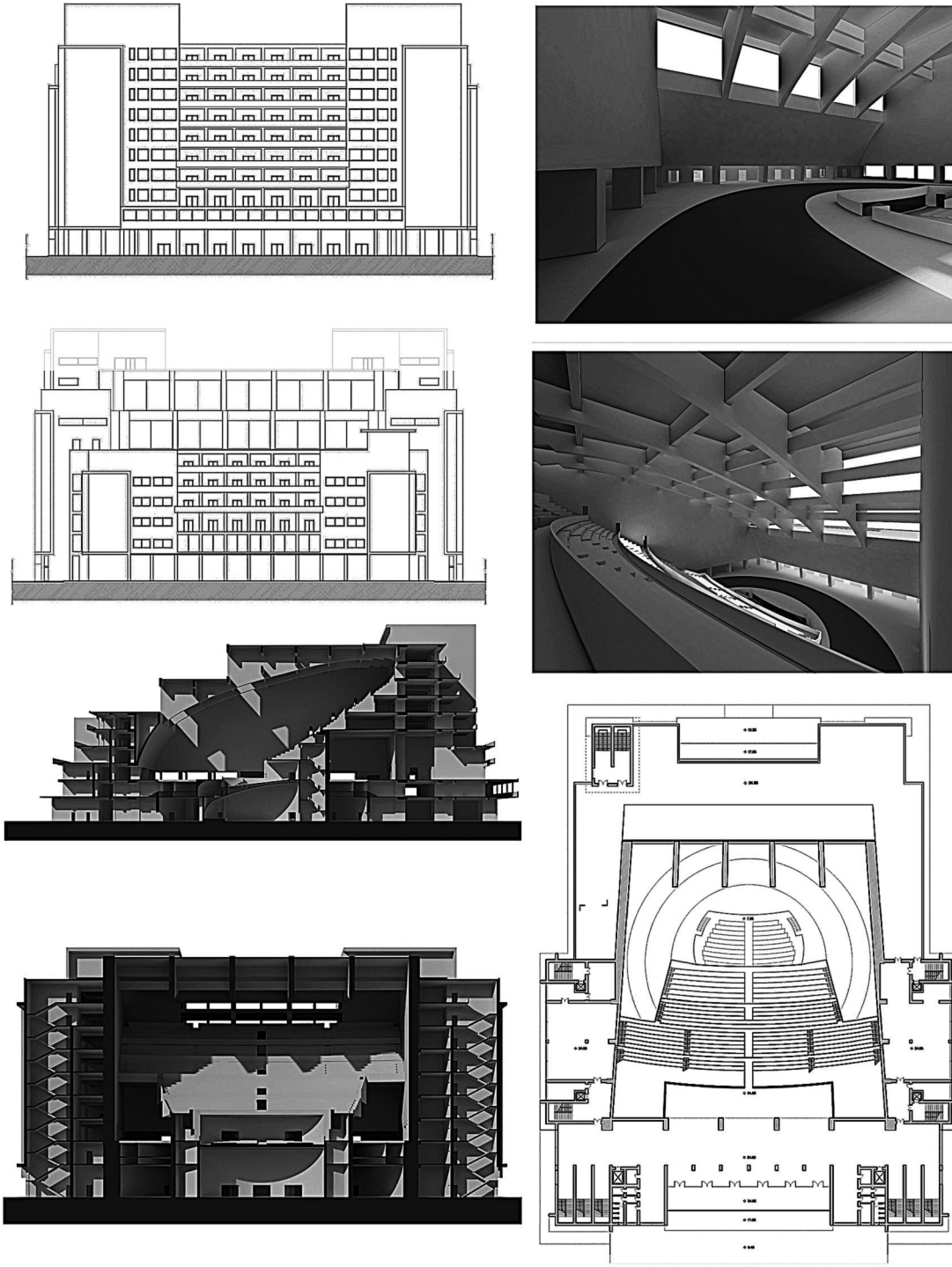
*Figure 13. Graphical analysis of the plan of ground floor, longitudinal section and 3d model
(E. Sabella).*
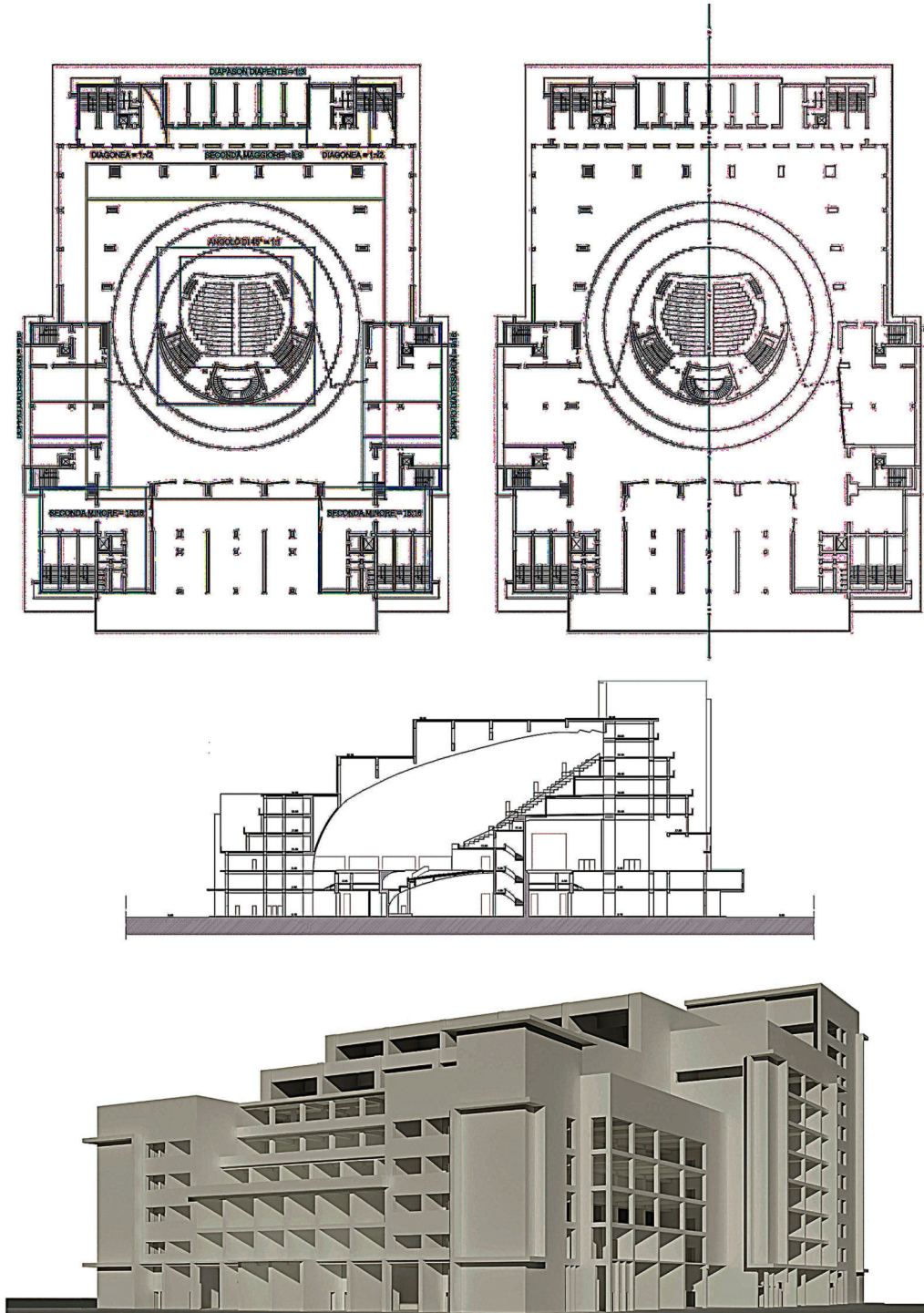
of the social reality told through the play). The covering structure develops from a pentagonal base-figure, traced on the geometry of the plan, which inscribes the outer towers of vertical connections and entrances.

The "Symultaniczny Theatre" project would assumed enormous dimensions, especially relative to the auditorium area, which had 3000 seats, thanks to the absence of fixed stage and the curtain one, but especially the inclusion of a mobile circular stage which gave to the entire project a modern architectural shape and the maximum functionality of the building. The idea had been certainly influenced both by the works of Leon Schiller[17] and the architectural reform of Le Corbusier, but particularly by the "Total Theatre" of Walter Gropius, from which she drew inspiration, however, changing the solution and bringing back to the idea of an in-motion stage designed by Oskar Strand[18].

The "Symultaniczny Theatre" project was an emblematic example of architecture based on the modern concept of spatial unity of the theater, finally breaking the relationship with the traditional independent structure of the auditorium in favor of sharing space between actors and audience, through the construction of two coaxial rings that moved around the entire auditorium. The modernity of this solution was in the technological innovation of common spaces, covered with a vaulted roof, whose curvature was designed according to the methods of acoustic design of Gustave Lyon[19]: the mobile stage, electronically managed and the lighting system, became the basic elements of the set.

Helena, according to her project idea, conceived the stage divided into two parts: one fixed and the other one in motion. The former, consisting of the main stage (also called "thrust stage") and the proscenium, where playing traditional configurations of the theater; the second, in motion, deduced from Gropius' idea of a circular stage that literally surrounds the auditorium, consisting of two rings that could turn around

the auditorium at different speeds and in every direction; furthermore, to avoid the noise due to the rotation of the stage, the rings would be wetted with a special liquid. At the stage, have been placed trap doors that gave the possibility to rotate the stage in a multi-directional way: circular (through the rings of the stage), rotary (via the mobile stage) and vertical (through the trap doors). The auditorium at the center of the space and the stage, around it, followed the principles based on the unity space of the theatre: entrance to the scene from the auditorium and flexibility of stage. Two-thirds of both rings of the stage were visible by spectators while a third one remained hidden beneath the amphitheater auditorium. Each area dedicated to the scenography and laboratories had to be located below the amphitheater, the purpose was to prepare the scene in the area under the amphitheater and then organizing theatric objects above the mobile rings. The stage was designed so that each area was visible in the same way and the inclined surface of the ceiling constructed so that the sound waves echo would have created the effect of higher actors voices than the real ones. The directors, actors and other people involved in the management of the theater, which allowed to use dedicated entrances to make the distribution spaces more flexible, giving the whole system of the building of separate dressing rooms, ticket office and stairs (Figure 14).

The "Symultaniczny Theatre" had thought as a large theater for shows based on the Polish romantic drama, which is why the inside of the theater, ultimately rejected the tradition of the stage as a separated space from the audience, in favor of a repositioning of the spectators who, perceiving the space in its simplicity, they were guided to the spaces that told them new stories of a new life.

The theatre machine of Helena Niemirowska can definitely be considered one of the experiences that have given the start to the creation of multimedia environments and have started the process of immersion in the theater scene (Figure 15).

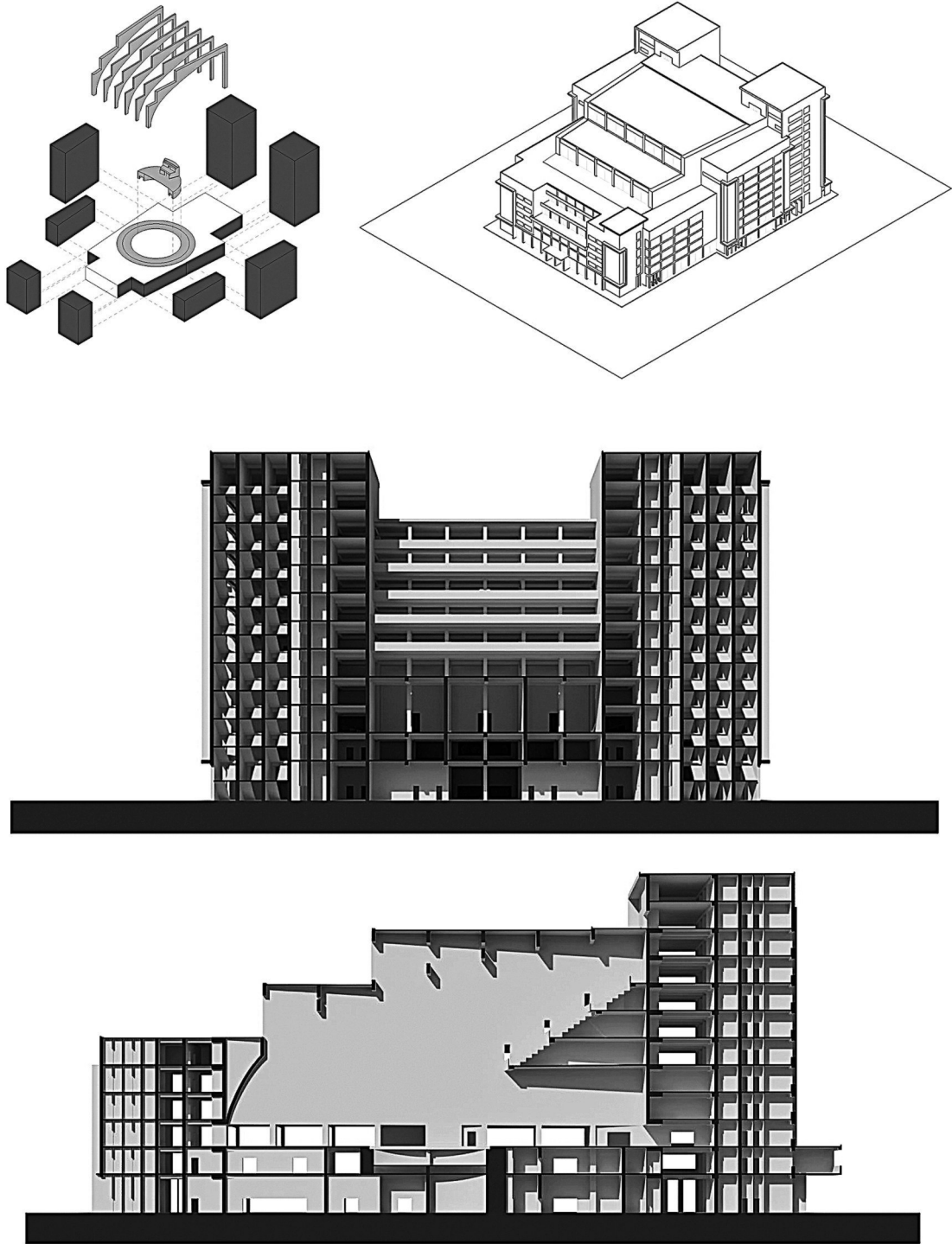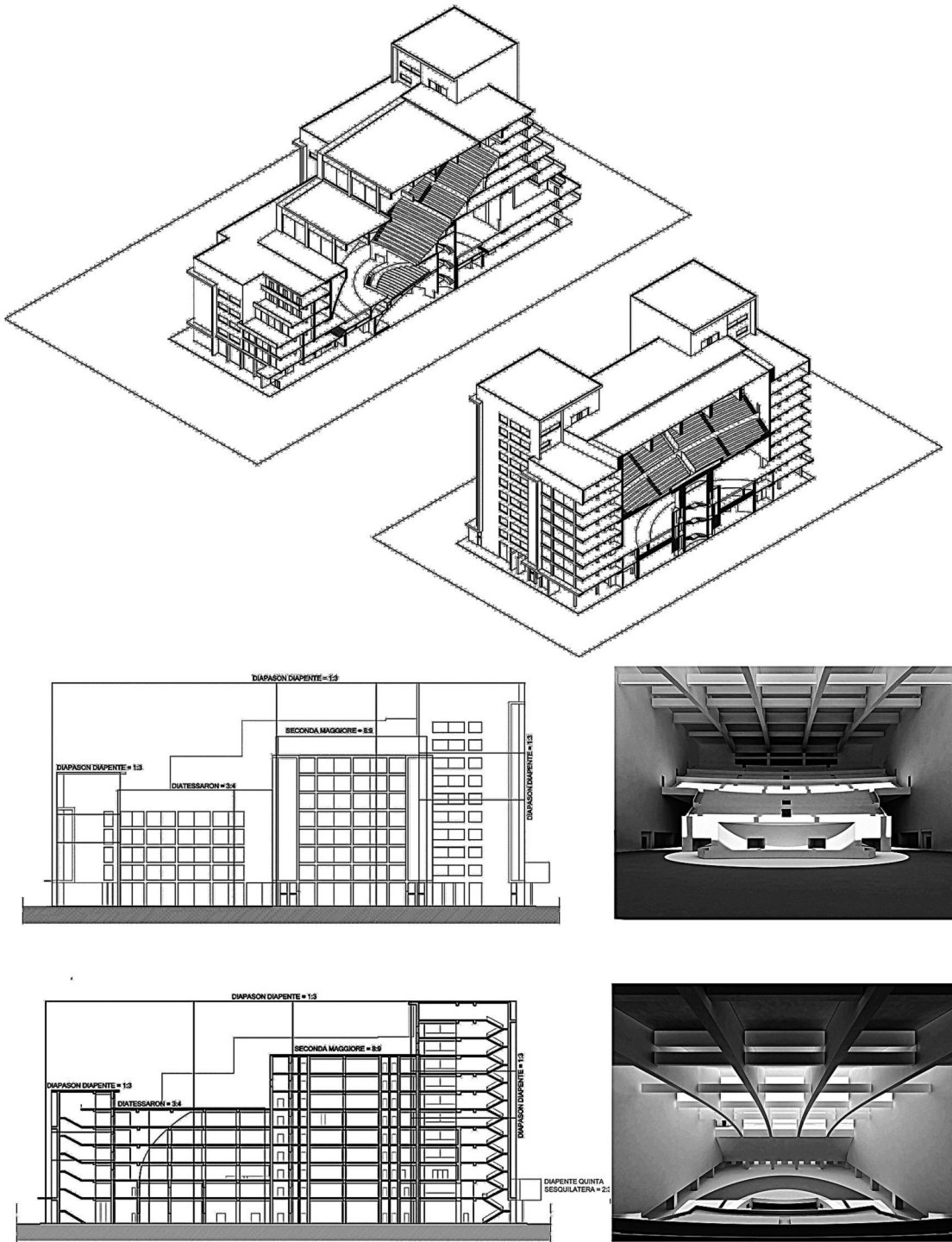*Figure 14. Exploded view, axonometric and perspective sections*
(E. Sabella).

Figure 15. Isometric cross-section, views of the inside and analysis of harmonic geometric relationships of the two elevations
(E. Sabella).

Her experimental design represents a new chapter of modern Warsaw architecture, through which the young and avant-garde pioneer of the Modern Movement, expressed the strength of plastic volumes and spaces designed according to the most innovative technologies for the "avant-garde theaters". The conjectural equation proposed by Helena, along with "Praesens", on the supremacy of the community than the individualistic practice and that until that time had defined the traditional Polish architecture profile, it was the mix of all the principles of Russian avant-garde within the neo-modern Warsaw architecture. Her project for a "simultaneous theater" had involved the avant-garde painting and sculpture issues, in favor of theatrical dialogue between the stage and the rotating auditorium, definitely reflecting innovations in theater-audience relationship and the development of artistic avant-garde movements, to then being translated into an changeable entertainment. In addition, the spatial organization of this project, responded to social functions, along with a genuine form of political theater, as it was happening in post-revolutionary Russia and the Weimar Republic.

The main objective had been that to establish the structure of the theater created in order to achieve quick changes of scenery avoiding the breaks of the shows due to the use of the curtain and leading spectators to the area where the entertainment moved. Probably the will, together with the fundamental need to conceive the theater as sacred space, it can be realized through the rigorous abolition of the closed shelves and the adoption of an auditorium capable of guaranteeing the egalitarian conditions available through the public arrangement in different relationship with the scene.

Moreover, the idea contained within the theater, of the social transformation of that time, given through the circular motion of the two rings that eliminate the hierarchical separations to get to the "New Man" proposed by "Praesens", might find correspondence in the dream of Zarathustra, told

by Nietzsche, which represents the awakening of man from the circularity of time, through the cyclical repetition of what has already been, for the birth of the "Űbermensch" (The Overman).

The re-drawing process, hand in hand with the study of the life of Helena Niemirowska and her cultural and architectural influences, has provided a further key to understanding this emblematic figure of the cultural ferment in Poland, a Polish avant-garde woman and pioneer of modern theories on social architecture. Helena had ranged from proposals for the urban proposals on Warsaw Planning to housing designed in detail; from working-class neighborhoods of Tegal Baru to a simultaneous theatre. Through her architectural thinking, what another piece of the history of modern architecture, remained hidden into the scenes of a not-existing theater, she had proposed an idea of architectural organization toward the kinetic effect of the avant-garde theater, putting in the middle of a scene new space, that of a unison movement and of the scene no longer separated from the other functional areas of the theater building: indeed it became element of social organization and synthesis of all the arts.

CONCLUSION

The representation allows the "verification" of architectural design and add a few words, even shyly, in what has been already written. The critical drawing is a necessary tool to the knowledge of the architectural heritage that is not made up only of what has been realized but is made by all that allows the reading and analysis of a figurative thinking.

"Privileged instrument of architectural criticism is the drawing of graphical analysis that provides contributions of knowledge that cannot provide the only original graphics, the old pictures, project reports and critical essays. An architecture can detect a large proportion of its meaning if subjected to specific analysis techniques that the

drawing can execute in accordance with the formal, constructive and language characteristics. This is not a "reading" of the architectonic text but of graphics operations of re-drawing and of revival of figurative reasons of its visible conformation. The graphical operations don't intended to substitute to the critical processing, made with the use of verbal language, but intend to bring contributions for understanding shapes that are analyzed with the same language - the drawing - which serves to communicate the forms of space. Graphical digital analysis doesn't replace but assists verbal criticism, it is extraordinarily useful in the interpretation of missing buildings or ever built. for which it's not possible any direct verification in order to understand the formal and spatial values. The three-dimensional model built in digital model is not only a virtual image of the building, is the only possible image and the only existential reality. Digital models return to the unrealized architecture a form of existence that make them becoming verifiable objects the same way as those built; the graphical interpretation could, ultimately, lead to their eventual rebuilding, as is the case of other temporary constructions of large exhibition (first of all the Barcelona Pavilion by Mies), but without reaching to this end it is above all for the identification of figurative matrices of the project which is carried out the operational and critical value of graphical analysis" (Pagnano, 2008).

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KEY TERMS AND DEFINITIONS

Critical Analysis: Architectural text reading operation through the decomposition of the shapes and recognition of their meanings.

Digital Archive: The set of selected interpretive digital representations of drawings in the archives.

Female Architecture: Architectural production of designer preferably not team performed.

Graphical Analysis: Architectural text reading operation with redrawing operations and figurative reasons revival of its visible structure.

Interpretation: Representations that have the key role to act as a theoretical speculation support on the space shapes.

Redrawing: Scientific knowledge of an architecture and its meaning.

Translation: Not impersonal operation of transition from one language to another one.

ENDNOTES

[1] Further studies of graphical analysis have had their continuation in the Roman academic culture, in the Mario Docci research work, subsequently reaching refined research of Piero Albisinni.

[2] The paragraph about Charlotte Perriand is written by Alice Franchina; the paragraphs Architecture digital interpretation, Unbuilt digital archive and Lilly Reich is written by Francesco Maggio with Introduction, Background and Conclusion; the paragraph about Helena Niemerowska-Syrkus is written by Starlight Vattano.

[3] Furthermore, in this period, Perriand is very close to the Communist Party and in this adhesion occurs a convergence with professional field with political convictions: the construction of Centrosoyuz of Le Corbusier in Moscow was the real possibility of carrying out many of the ideas that germinated

in the atelier of Rue des Sèvres. Perriand's visit in Moscow in 1930 will contribute to her intellectual growth in a decisive way: "I had quite naturally moved from my "bar sous le toit" to architecture, enriched by Le Corbusier's thinking and vision of the golden age that we believed was within reach, provided we devoted ourselves to the cause. However, my trip to the Soviet Union brutally opened my eyes to what was simmering beneath the world's surface: the shadow of Hitlerism on one hand and the aftermath of the Communist Revolution in the Soviet Union on the other. I was unable to process all the information, but had input everything - that was already quite a lot" (Perriand, 2003, p. 45).

[4] Le Corbusier, as Mary Mc Leod observes (2003), among other reasons, chose not by chance a woman to take care of the interior: he needed someone who was familiar with domestic problems, the logistic issues related to the management of the house and needs of those ones who lived the house longer, i.e. women.

[5] *Répertoire du goût moderne,* (1928-1929). Paris, France: Éditions Albert Lévy. Some layouts, among which those ones of Perriand, are given in Schleuning & Aynsley, 2007.

[6] The previous version consisted of a similar system: the built structure was a C, and the idea of the tent was materialized by a large tarp stretched in the inner court, which conveyed rainwater to a central point with a tank below. To this project refer a perspective and axonometric.

[7] The fact that Perriand frequently referred to the golden ratios in the composition, is witnessed by herself in a passage of autobiography: "Architecture is musical. Le Corbusier created the "Modulor", that harmonic mathematical measure based on the Golden Mean. I use it and feel comfortable with it. Systematically reapiting a numer has never

genereted a proportion" (Perriand, 2003, p. 27).

[8] Perriand had divorced in 1932.

[9] Perriand met Jacques Martin, High Commissioner of the French Navy, in French Indochina in 1943, and had, in the same year, the daughter Pernette.

[10] At this regard, Mary Mc Leod (2004) refers the think of Perriand (collected during an interview in June 1997) compared to some theses advanced by Beatriz Colomina (Colomina, 1992).

[11] Lilly Reich had previously edited the following exhibitions: Haus der Frau (House of Woman) in 1914, Kunsthandwerke in der Mode (Handicraft manufacture fashion) in 1920, Die Forms (The Shape) in 1924, Von der Faser zum Gewebe (From the fiber to the fabric) in 1926 and Die Wohnung (The house) in 1927.

[12] The drawings attached the text have been made by Domenico Migliore.

[13] Polish painter of Jewish origin, was born in 1855. He lived and worked in Paris since 1922. He was one of the pioneers of the *New Classicist Movement* of the twenties and thirties. In 1922 he settled in Paris, coming back in Poland every year. In the same year co-founded the *Rythm* (*RYTM*) *Association of Polish Artist*, which members spread the classical style in Polish art of twenties. His paintings were exhibit at the *Art and Technology International Exhibition* in Paris in 1937 and at the *World Expo* in New York in 1939. He died in the Warsaw ghetto in 1942.

[14] Katarzyna kobro, Jozef Szanajca e Bohdan Lachert were among the first to join at *Praesens* group, in the last years would be added, coming from different experiences, Barbara Brukalska, Stanislaw Brukalski, Andrzej Pronaszko, Marian Jerzy Malicki.

[15] Andrzej Pronaszko (1888 - 1961) was a Polish painter and scenographer, one of the main exponents of the *Young Poland Movement* ad

of the Polishes vanguards of the twenties and thirties. During Poland occupation he was member of Polish Resistence and director of the *Department of Microphotography* at *Bureau of Information and Propaganda* of Armia Krajowa. After the war Pronaszko became teacher at the Academy of Theatre of Warvaw (*Akademia Teatralna*).

[16] The *Total Theatre* idea arose in 1927 from the collaboration between Walter Gropius and Erwin Piscator with the aim to develop a project to create a theatre that overcame the traditional fixed structure of the stage and drawn a space that unified the whole parts of the theatre: scenography deep, proscenium and central area of the scene.

[17] Leon Jerzy de Schildenfeld Schiller (1887 - 1954) was a Polish producer, scholar of theatre, actor, singer, and exhibition designer since he was young. He was particularly attracted by the fascination of primitive popular and religious theatre.

[18] Oskar Strnad (1879 - 1935) was Austrian architect, designer, scenography designer and sculptor. Together with the Austrian architect Josef Frank created the *Wiener Schule der Architektur* (Viennese School of Architecture). Strnad was particularly interested in the interior design and in the painting used in theatre and film objects. In 1918 drawn the project for the *Rundtheater* (the rotating theatre) with his student Margarete Schütte-Lihotzky. In 1923 Strnad designed the *Drei-Szenen-Theater* (three scenes theatre), consisting of a stage divided into three parts with a circular auditorium.

[19] Gustave Lyon was an acoustics architecture pioneer. He specialized in the orthophony of concert and conference halls and was often called by architects to correct the acoustic of some spaces. He worked on the upgrading of acustic at the *Palais de Chaillot* in Paris and of others halls in France, Algeria, Belgium, Switzerland and Chile. His studies allowed him to identify fundamentals laws of echo, resonance of the sound reinforcement and noise suppression. Since 1925 to 1927, he also worked in the inside of *Salle Pleyel* in rue du Faubourg-Saint-Honoré in Paris, upgrading its acoustics, decoration and configuration, such as it was considered revolutionary during the inauguration in 1927.