Innovation in research
The challenge and activities in progress
L'innovazione nella ricerca
La sfida e l'attività in corso

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Massimo Perriccioli[1]

The Metamorphoses of Dwelling. New Models of Dwelling, New Paradigms of Design

Over the course of the last decades the idea of dwelling, which has always been an expression of mankind's connections with and habit of relating to a given place and space, has progressively changed: mobility has begun to modify the traditionally stationary aspect of our culture and the very idea of dwelling has become one of the many variables of the consumer society in which we now live. The phenomena of urban nomadism, the temporal instability of daily life, the flexibility of the working environment, the hybridisation of forms of living and mutated relationship with nature and the environment have generated new needs of settlement and new concepts of the spatiality of dwelling that impose significant changes in the built, physical and perceptive environment.

The "codified" models of dwelling that were part of modern architectural thinking, based on the temporal and functional separation of human existence (dwelling, working, free time, etc.) are now both insufficient and inadequate for interpreting the changes that have and are taking place in our methods of dwelling; they no longer seem capable of responding to the continuous changes in the needs of their users. If this modern approach included a degree of correspondence between temporal and spatial division and standardisation, reducing dwelling to a "factor" that could be placed in an "interval" that existed between work and free time, at present the fragmentation of the idea of dwelling, of the idea of work and the idea of space

[1] Università degli Studi di Camerino.

into so many styles and methods means that each is recomposed in a different manner within the dwelling: activities overlap one another and are concentrated in the same space, creating a hybrid space that embraces the private realm, the place of work and often that of free time and leisure.

In light of these new spatial and existential conditions, the house no longer constitutes, as in the past, merely a space of protection and shelter, but

> opens up to communication, to a new *public* component that is defined by the irruption of information and communication and a new idea of privacy that is no longer subject to any rules or limitations, whether substantial or formal[2].

Contemporary dwelling reclaims the "willingness" of space to adapt itself, without physical trauma, to the variability of the user's needs in order to favour the simultaneous presence of different activities. The concepts of *permanence* and *stability* that have characterised our culture of dwelling for centuries are replaced by new paradigms of reference in the design of spaces of dwelling: *mobility, temporality, flexibility,* and *lightness*.

Notre nature est dans le mouvement*: Mobility and New Forms of Nomadism*

In a recent essay entitled *L'uomo nomade* (Spirali, Milan, 2004), Jacques Attali attempted to re-read human history based on the opposition between nomads and settlers, proposing the idea of nomadism as an essential characteristic of human nature. According to this French philosopher we are witnessing the diffusion of new and important forms of nomadism that affect a growing number of people.

> There are, for example, the new rich nomads, at least some fifty million people who, for pleasure or for work, travel around the planet armed with cellular phones, credit cards and personal computers. At the extreme opposite, two to three billion people are continually on the move solely to survive… Between these two extremes there is a vast category of people who, while they

[2] M. Zardini, *Case, casali, loft*, in M. Perriccioli (ed.), *Abitare, Costruire, Tempo,* Clup, Milan, 2004.

> remain settled, experience all possible forms of virtual nomadism through television, video games and new technologies[3]

The issue of movement in all of its various manifestations becomes the central theme of any design-based reflection on contemporary dwelling; today

> we require an architecture that is physically mobile, capable of changing its geometry and functions (against a presumably eternal immobility). The articulation of an authentically modern society, that consumes time more and more rapidly, which needs to satisfy in succession different needs and thus functions that tend to be variable; thus architecture must face up to the problem of mobility: the mobility of values, physical mobility and the mobility of functions"[4].

The mobility of architecture translates into the design of spaces whose design is based on an organic approach that is sufficient for guaranteeing changes and choice, the relationship between stability and instability, between invariance and variability.

Pascal's statement *notre nature est dans le mouvement* well represents this new existential condition in which movement and nomadic wandering appear to prevail over the genetic and emotional need to be rooted to one place. Dwelling is progressively reduced to the action of "preparing a space", rather than "building a home", with the concept of "preparation" marking the relationship between the new transitory condition of dwelling and the indeterminate nature of spatial and building solutions that are proposed. It is an extreme concept that takes us back to the very origins of mankind and to a nomadic condition that reduces the needs of dwelling to the "supply" of essential elements that are lightweight and with scarce symbolic value.

This essential condition appears to be confirmed by contemporary technology and its proposed return to a "primitive" relationship with the body and the space of dwelling based on self-sufficiency and guaranteed by the introduction within our everyday lives of progressively smaller, lighter, more sophisticated and more redundant technologies.

[3] From the interview by Fabio Gambaro with Jacques Attali, published in La Repubblica on February 2, 2004.

[4] F. Donato, G. Guazzo, M. Platania, *Abitazioni per l'emergenza: ricerca per un sistema residenziale trasferibile,* Veutro Editori, Rome, 1983.

It is a condition based on the new relationship with the time and space of dwelling that leads us to consider the home as a skin that must be as ductile and stratified as possible, allowing for a comfortable and simultaneously temporary existence.

How Long is a House Built to Last? The Temporary Nature of Dwelling

The introduction of industrial techniques and products within processes related to the construction of spaces of dwelling is accompanied by new concepts, such as those of the expiration and substitution of building elements, placing time at the centre of processes of design, manufacturing and construction. New questions now seem to characterise a reflection on design: for how long is a home required? what is its "period of use"? what is its time limit? The idea of conceiving of a home as an "industrial product" has exposed the paradigm shift that has taken place in recent years, witness to the passage from an idea of time, understood as an aspiration for "long-lasting" architecture, to the concept of *temporariness*, understood as a characteristic of a new type of architecture designed to last for a "limited period of time" and able to modify itself "over time".

This shifting in perspective has transformed the traditional concept of *duration* (an object or a building is designed to last as long as possible) into one of *programmed durability* (an object or a building is designed to last as long as it is needed). Programming the period of use of a dwelling introduces new paradigms: *reversibility*, the possibility of overcoming the mono-directionality of building process and returning to the starting point armed with "know-how" and *flexibility*, understood as the ability to produce different environments, spaces and objects that change with the needs of their users or in relationship to their use over time. As a result, even the relationship dwelling/dweller must be defined according to different levels of required temporariness: the house that moves (the mobility of the building and the inalterability of space); the user who moves from one house to another (the variability of the user and the inalterability of space); the dwelling that is modified (the adaptability and flexibility of space to meet the needs of its users).

The necessity of modifying the space of dwelling based on possible changes in the needs of its users, progressively more difficult to define and programme, also has an effect on the choice of building materials and components. They now tend to be lightweight, easy to assemble,

disassemble and substitute. Lightweight technologies and systems, used in combination with "dry assembly" techniques are capable of guaranteeing the necessary *flexibility* of interior spaces, the *manoeuvrability* of building components, the *evolution* of systems of growth, the *modifiability* of space in relationship to the needs of living and working and the *reversibility* of the entire building process. Constructing spaces that can be reconfigured using systems and lightweight technologies contributes to the definition of spaces of dwelling diversified by typology, dimension and use and capable of offering coherent responses to variations in their use and the needs of their inhabitants.

The paradigm of *flexibility* requires the *structuring* of domestic space using screens, internal partitions and furnishings designed as elements of transformable architecture, as hybrid forms within which the dwelling and its parts are united into a single entity that we could call *furnitecture*[5]. The research into systems of dwelling based on the *mobility* of components and users rather than that of the house itself attempts to identify operative strategies that allow for the passage from a static conception of the production of from to a more dynamic and versatile one. This research often takes place in the liminal space between architecture and industrial design based on the presupposition that it is no longer possible to separate the two traditionally opposed conditions of dwelling – *stationariness* and *nomadism*; in many recent experimental proposals "domesticity" is redefined as a tool or piece of equipment for the body of its inhabitants.

The Search for Lightness

The search for *lightness* in architecture is currently a culturally shared value that offers a paradigm of reference for the definition of new spatial conditions and a way of looking at built objects presented in opposition to concepts of heaviness and the massive resistance of large structures. If *gravity* has always been considered as a "metaphor of certainty" then *lightness* becomes a metaphor of fragility, uncertainty and dynamism that characterises post-industrial society so clearly visible in the aesthetic canons of rarefied masses and the transparency of building envelopes typical of contemporary architecture.

[5] S.C. Mathias (ed.), *Living in Motion. Design and architecture for flexible dwelling*, Vitra Museum, Berlin 2002.

The concept of lightness has found an original and important declination in the technological culture of design. The branches of experimental research that are most aware of our contemporary ecosystem and the creative potential of innovative building techniques move beyond the perceptive and sensorial issues tied primarily to new spatial conditions and new forms of expression to propose a systemic and evolutionary approach to design that focuses on uniting the principles of temporariness, adaptability, mobility and reversibility aimed at the overall sustainability of dwelling and construction.

It thus appears evident that the term *lightness* does not simply refer to a generic principle of lightening structures or rarefying forms, but rather to a design paradigm focused on optimising the use of available materials, resources and energies, substituting the weight of structures with the strategic intelligence of building systems in order to intercept, interpret and provide performance-based responses to the changing needs of contemporary dwelling.

According to this type of approach architecture is no longer understood as static and unchanging. It is not the result of a process of evolution in which formal simplification and the reduction of weight constitute a starting point, but an objective to be reached through an attentive and profound search for *precision* and *clarity* focused on defining the elements of construction in terms of their performance and relationships. *Building with lightness* does not generically refer to the thoughtless design of weightless structures without objectives but, as stated by Calvino, it speaks of a *plan that has been calculated and defined through a search for a precise language*; and if, as Paul Valery tells us, *we are as light as birds and not as feathers*, the search for lightness is not only related to the specific weight of elements, but based on a systematic vision that focuses, other than on the use of specific materials, methods and forms, on optimising spatial, geometric and functional relations between the various components[6].

Lightness is proposed as a paradigm of an approach to design focused on defining building systems characterized by the reduced weight of elements, the extreme articulation of components and the use of recurring technical and functional instruments that define a new tectonic

[6] Lightness depends not only on the choice of lightweight materials, but also on the definition of precise structural strategies that, since ancient times, have focused on differentiating and functionally separating constituent parts. A. Beukers, E. Van Hinte (2005).

approach: the adoption of low-impact and reversible *foundation systems*; the *layering of building envelopes* conceived of as an "environmental filter" or as active "skins" capable of regulating and defining reactions with the exterior environment; the *functional development of roofs* as a passive element of micro-climatic regulation and as a structure that integrate systems that capture and make use of alternative and renewable energies; a *concentration of building systems* that privileges the creation of large spaces that can be organised to meet the needs of their users; the use of *horizontal and vertical partitions* to divide internal spaces using removable systems that are easy to inspect, integrate and reconfigure; the *highlighting of the relationship between the permanent and the temporary* in a composition of parts that is based on the opposition between light/heavy, continuous/discontinuous, opaque/transparent.

Dwelling and Industry: Prefabrication and Assembly as Design Strategies

The continuous changes in dwelling and the transformations taking place in technical-manufacturing conditions favour the affirmation of new relationships between dwelling and industry; the ancient vision, both pragmatic and austere, of residential standardisation associated with the repetition of serial prefabricated structures produced in significant quantities and for an "abstract" user, is now opposed by a new approach to manufacturing and design that is more sensible to quality and the changing needs and desires of users. This is favoured by more open processes of construction based on the use of diversified and flexible systems that propose, in lieu of specialised solutions, components that can be adapted and personalised, high standards of quality, the surprising optimisation of environmental parameters and energetic performance and decidedly competitive costs with respect to traditional buildings.

The idea of a universal dwelling model, designed a-topically for a standard family, is now making way for the introduction of the "product-house", conceived of for strategic sectors of the population, primarily young, middle income families sensitive to ecological questions and a more contemporary industrial aesthetic, seeking a non-standardised product that can be personalised and offered at a reasonable cost. This may lead to the creation of dwellings based on new projects or high-quality *bricolage* that will allow for the "personalisation" of serial industrial products. For this reason we must develop simple modules and off-the-shelf products that optimise performance and materials and building kits that facilitate the assembly of numerous components in

the factory, requiring only a few, simple operations of in situ assembly that allow for the most efficient disposal of by-products and reduce environmental costs.

Within this context the concept of *prefabrication*, stripped of those elements that can be traced back to the merely technological and procedural aspects that have characterized their use in policies of building industrialisation in the 1960s and 70s, assume a new meaning and a new significance. Prefabrication, in fact, can now be understood not only as an industrial method of production, but above all as a design and operative strategy capable of prefiguring and predicting the different spatial and functional articulations that an architectural structure may assume during its lifespan based on the identification of relationships between the morphology of its parts and the functioning of the whole. In this sense, prefabrication constitutes a *particular way in which man deals with technique*[7], representing not only an evolution of building technique, but also a new possibility of prefiguration. While not without its utopian overtones, it introduces the quality of incompleteness and temporality that forces designers to contemplate, since the early stages, the transformative and evolutionary possibilities of inhabitable space. Within this logic of design, open, reversible and in a constant state of perfection, the elements of construction can be continuously modified, accepting variations that ensure significant levels of flexibility and adaptability of the spaces that they contribute to realising.

The enormous variety of off-the-shelf industrial products available, the result of the ever more widespread use of open systems, partially or entirely pre-fabricated, contributes to modifying the very logic and methods of assembly. The techniques of assemblage[8], above all those

[7] G. Nardi, *Tecnologie dell'architettura. Teorie e storia*, Clup, Milan, 2001.

[8] The term "assemblage" is derived from the French world *assemblage* which defines an artistic technique used by the avant-garde of the past century that combined three-dimensional found objects – *objects trouvès* – with the objective of creating works of art, as well as a composition of objects fixed to a support that represents a specific spatial condition. It also indicates a construction in general, and a mechanical one in particular, or the final phases of installing a structure or a machine that brings combines individual parts based on a precise logic of construction. Assemblage has assumed significant importance in industrial methods of production; in fact, with respect to traditional techniques of jointing that combine elements through the co-penetration of pieces that have been properly cut and modified, modern methods of production, based on the use of finished industrial components, make use of connections that do not require cutting or adaptations that alter in any way the original form and dimensions of the pieces.

that use "dry" connections, shed the mechanical connotations that have characterized their meaning and importance to industrial manufacturing methods in the recent past; they are transformed into design strategies and methodological instruments that allow for combinations of simple and complex building components that are formally defined, protecting the technological richness and performance qualities that they lead us to intend[9]. Within this process of assembly, semi-worked and industrial products, even while presenting both technical and functional autonomy, assume the *archaeological naturalness inherent to ancient building materials* and thus require a process of interpretation and modernisation in order to be *bent* to the specific needs of building[10].

As it becomes more difficult to transfer operations of *adjusting* and *modelling* parts to be installed to the phases of construction, so typical of pre-industrial methods, it becomes equally necessary, since the initial phases of design, that we study methods of assembling prefabricated elements, developing different possibilities for their installation that allow us to perfect definitive solutions based on contributions from all figures involved in the construction of the work and, in the end, programming, in the most specific manner possible, the periods and phases of construction on site. Within this perspective of reconnecting the act of design with that of building, assembly must be understood as *developing design*: an essentially creative technique, a synthesis of design and industrial culture, capable of determining relationships between the tangible and intangible elements of building, from materials to products to techniques as well as know-how, skills, specific issues and possibilities[11].

[9] "Dry assembly has often been limited to its operative dimension: for supporters of prefabrication dry assembly has generally meant designing and building a limited number of large components to be installed on site in a limited number of operations. On the contrary, the technique of dry assembly now represents an operative strategy and a possible technical logic to be used to identify new relationships between building components that were once held to be incompatible". A. Campioli, *Assemblato a secco: una reinterpretazione del muro*, in "Costruire in laterizio", n. 24/1991.

[10] According to Vittorio Gregotti "when design ceased to be the creation of form using materials and primarily the coordination of products, we can not underestimate the fact that the nature of different methods of production related to construction offers us pre-formed materials with their own separate meaning, a meaning that is only scarcely a result of the experience of building and primarily dictated by the rules of manufacturing and competition in the market of industrial manufacturing" (Gregotti, 1991).

[11] E. Vittoria, "*Il Costruttivismo progettante*" by Konrad Wachsmann, in Anna Maria Zorgno (ed.), *Holzhausbau. Costruzioni in legno*, Guerini Studio, Milan, 1992.

Prefabrication and 'dry' assembly define a cultural and strategic attitude, even before speaking of technique and operations, focused on overcoming the rigidity of traditional structures of dwelling that are unable to keep pace with the dynamic and biological development of the events, desires and habits of mankind, putting into play open and flexible construction procedures that include the realisation of construction systems available for a wide range of different functions that can vary over time and in space and useful as part of continuous interventions, programmed within open and constantly mutating grids that take into consideration the quantity and quality of spaces, various types of uses and characteristics of expression.

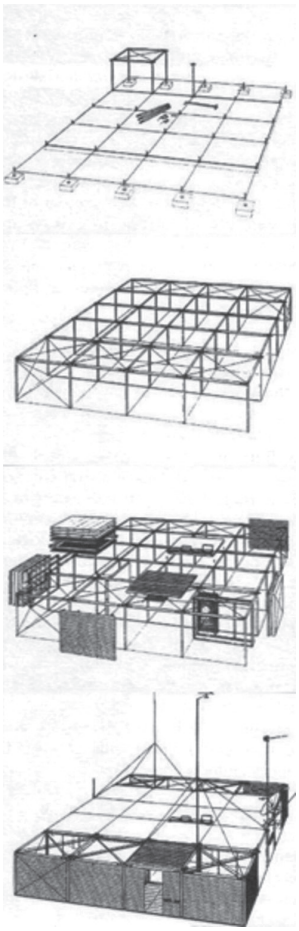
Shigeru Ban, *Naked House*, Kawagoe, Saitama, Giappone, 2000.

Anne Lacaton & Philippe Vassal, *Maison Latapie*, Floirac, France, 1993.

Anne Lacaton & Philippe Vassal, Logement HLM, Cité Manifeste, Mulhouse, 2005.

Shigeru Ban, Logement HLM, Cité Manifeste, Mulhouse, 2005.

Charles Eames, *Eames House*, Los Angeles, 1949.



Richard Horden, *Yacht House*, Poole– Dorset, 1983.