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Tectonics for an architectural pedagogy.
The One Person House project and new theoretical paradigms

Abstract

This paper presents the methodological assumptions and the results of an educational path developed during the Covid-19 *lockdown*. Starting from a reflection on the construction of a minimum living space, the design theme developed was the concept of a *one-person house* (OPH) to cope with additional lockdowns and social distancing in the future. A process of research by design pursued through four propaedeutic exercises, anthropomorphically inspired and conceptually linked by ideal and progressive actions of assembly and control of measurement. A pedagogy of design based on the material nature of architecture, following a construction philosophy that focuses on one of its founding principles, tectonics, or the art of assembly.

Keywords

One Person House — Research by design — Tectonics

I. The bamboo hut in the Crystal Palace

One of the many paradoxes that a period such as spring 2020 allows us to experience is that of teaching the intrinsic tangibility of the construction process, using tools that are conceptually based on intangibility¹. The school has grown from being a physical place of exchange and debate to an ethereal container of remote teaching. Students and teachers, guided respectively by their task and their profession, finding themselves reflecting at a distance, thanks to a double object/two-dimensional tool (the screen and the keyboard), on the architectural project, understood here as a pragmatic systematization of creative intentions in three-dimensional built forms.

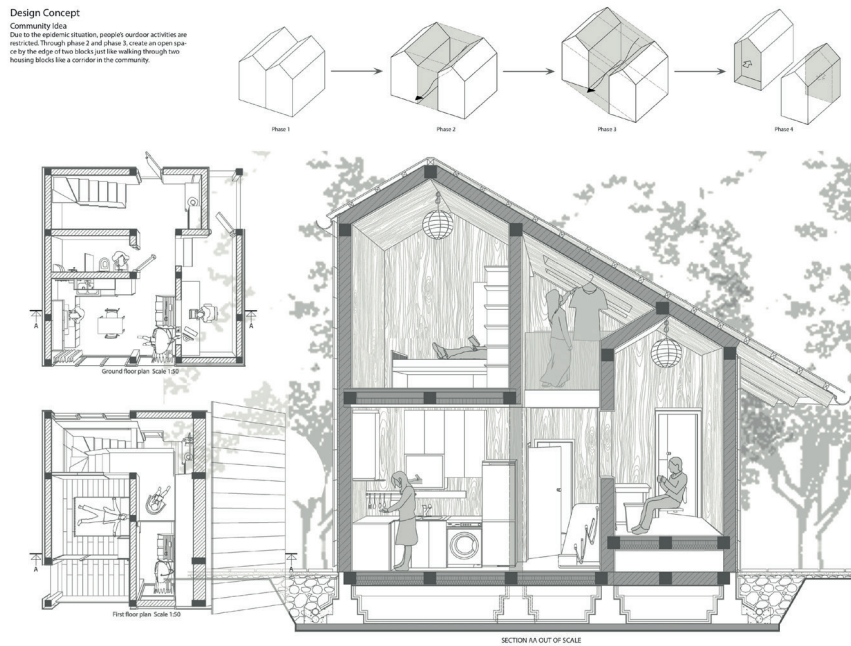
It was crucial to conceive a pedagogy of design based on the tangibility of architecture, of its being a space studied and derived from actions of assembly of elements with different functions and compositional hierarchies, according to a veritable construction poetics that looks at one of the founding principles of architecture, tectonics, the art of assembly. Starting with the same etymology as the Greek word *tékton* and the corresponding verb *tektaínomai*, a pedagogical approach has been developed on the basis of the intrinsic characteristics of the traded of the carpenter who, according to the Sapphic meaning, also takes on the role of poet (Frampton 1995, pp. 3-7).

The theme of the project was the concept of a one-person house (OPH) to cope with further periods of lockdown and social distancing in the future and to provide an effective low-cost housing response, to be placed into the urban morphology and the natural landscape.

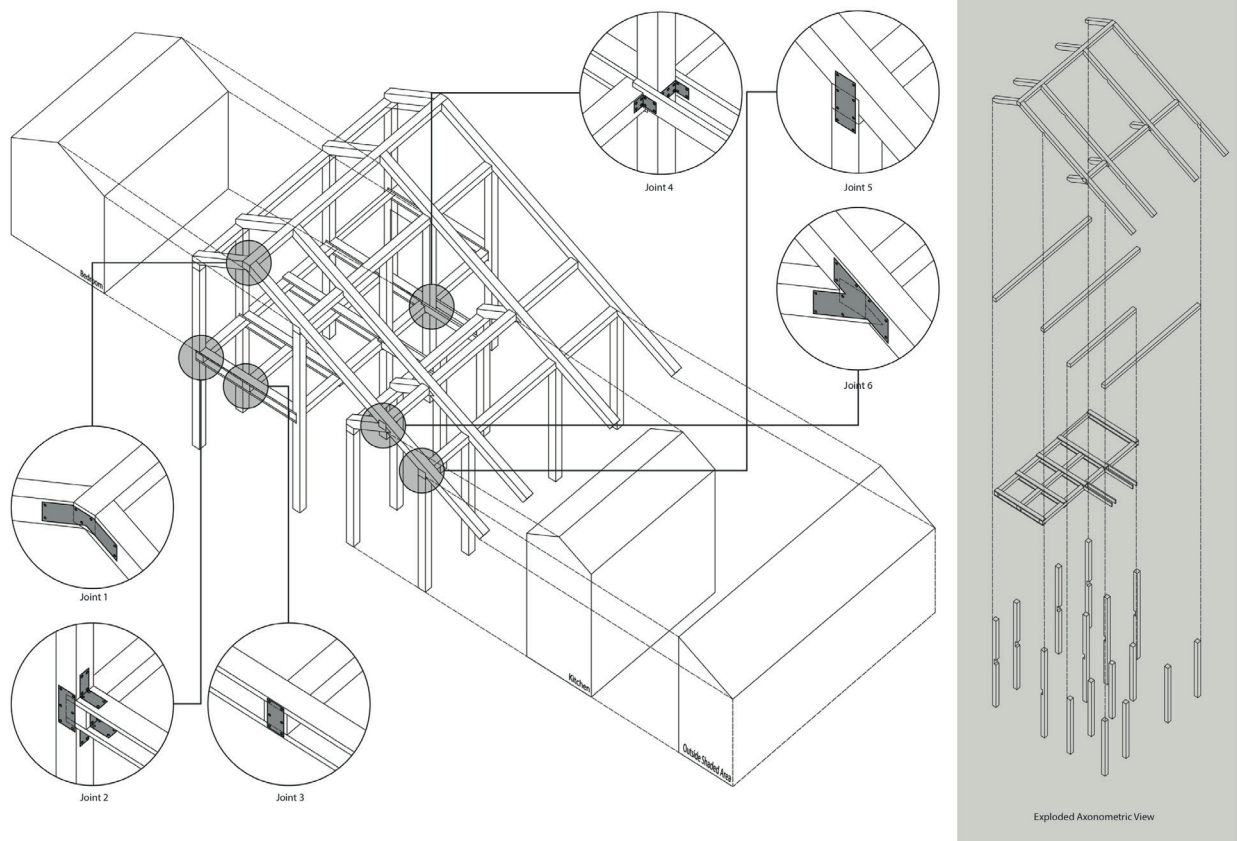
It was the lockdown itself that pushed each student, forced to work alone

Fig. 1

The One Person House in its relationship with the human body (drawing by Yuan Bing).

**Fig. 2**

The One Person House and its structural frame (drawing by Yuan Bing).



in their own home, to reflect on the construction of a minimum living space: the definition of space through the movements of the human body, the use of a structural frame, the conception of an epidermis that acts as an envelope and the compositional role of articulations identified in the technological systems and connections between the various parts. This topic triggered a process of research by design carried out through four propaedeutic exercises, anthropomorphically inspired and conceptually linked by ideal and progressive actions of assembly and measurement control. The compositional readings of four buildings considered to

be iconic in terms of the themes of the four preparatory exercises for the conception of the OPH placed architecture at the centre of each student's attention, in that it is a synthesis of space, form and construction. Initially conceived as an object without context, the OPH eventually took on the same physical and symbolic value as the Caribbean hut that inspired Semper's theories, assembled as a small tectonic unicum offered to thousands of visitors within the framework of a conceptually ethereal environment, like the Crystal Palace at the Great Exhibition in London in 1851. Just like Paxton's colossus, the web at the time of Covid-19 takes on the role of an immense intangible container, while being a vehicle for the transmission of a small architectural object and its physicality.

II. The body

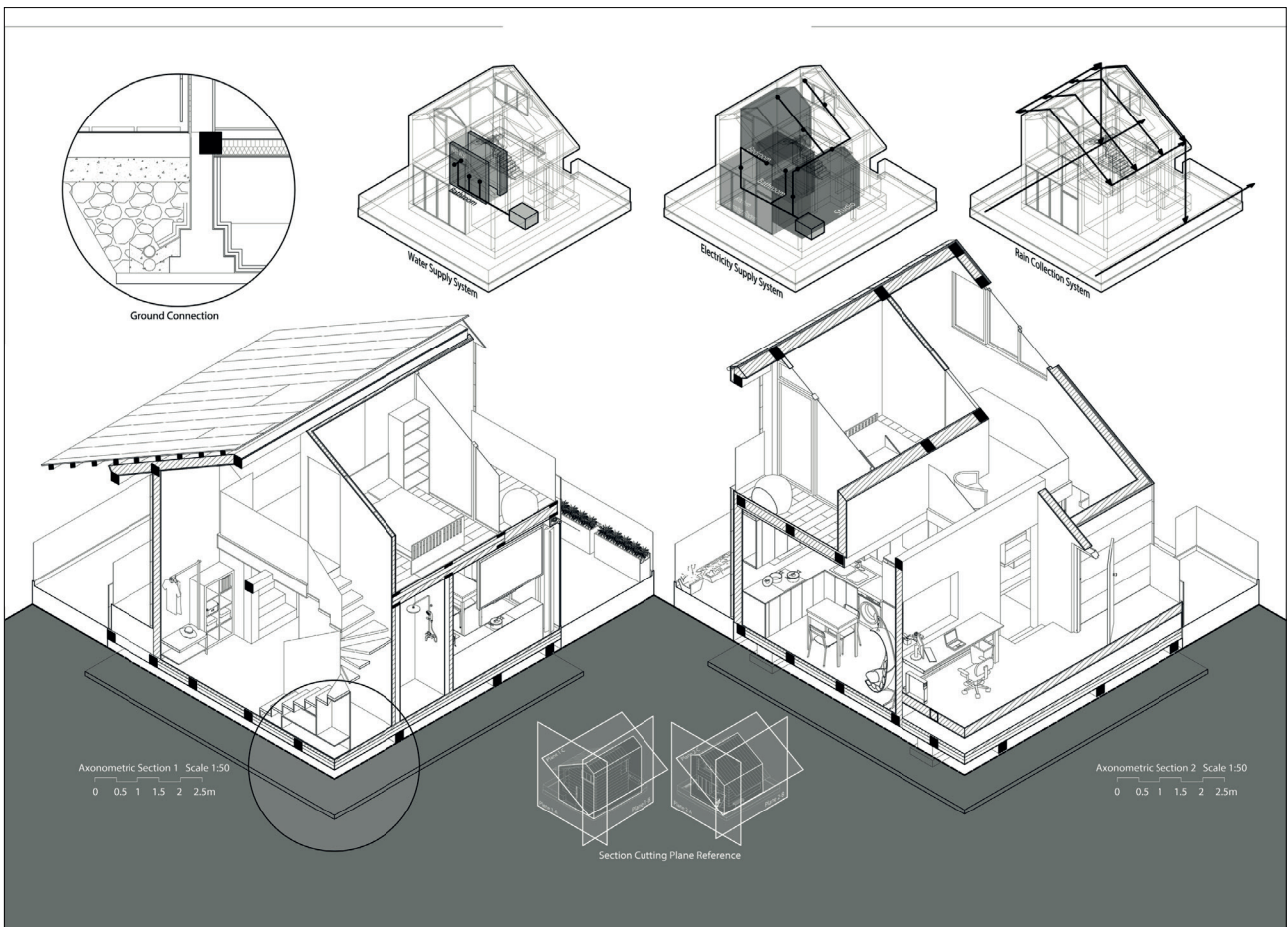
The measurement of your body, its redesign on a scale of 1:20 and its transformation into a rotating physical shape (made of cardboard) capable of generating an ideal cube, corresponding to the three-dimensional space required for the movement of a single person, marks the beginning of the experience of research by design: a sought-after methodological assonance with the pedagogical creed professed by Riccardo Blumer, according to which the body represents the main reference for the architect throughout the entire design process (Neri 2018, p. 13). The assembly of four cubes generates a minimum living space according to the typological archetype identified in Le Corbusier's petit cabanon and an approach to planimetric and functional definition inspired by the spatial concept based on the use of tatami.

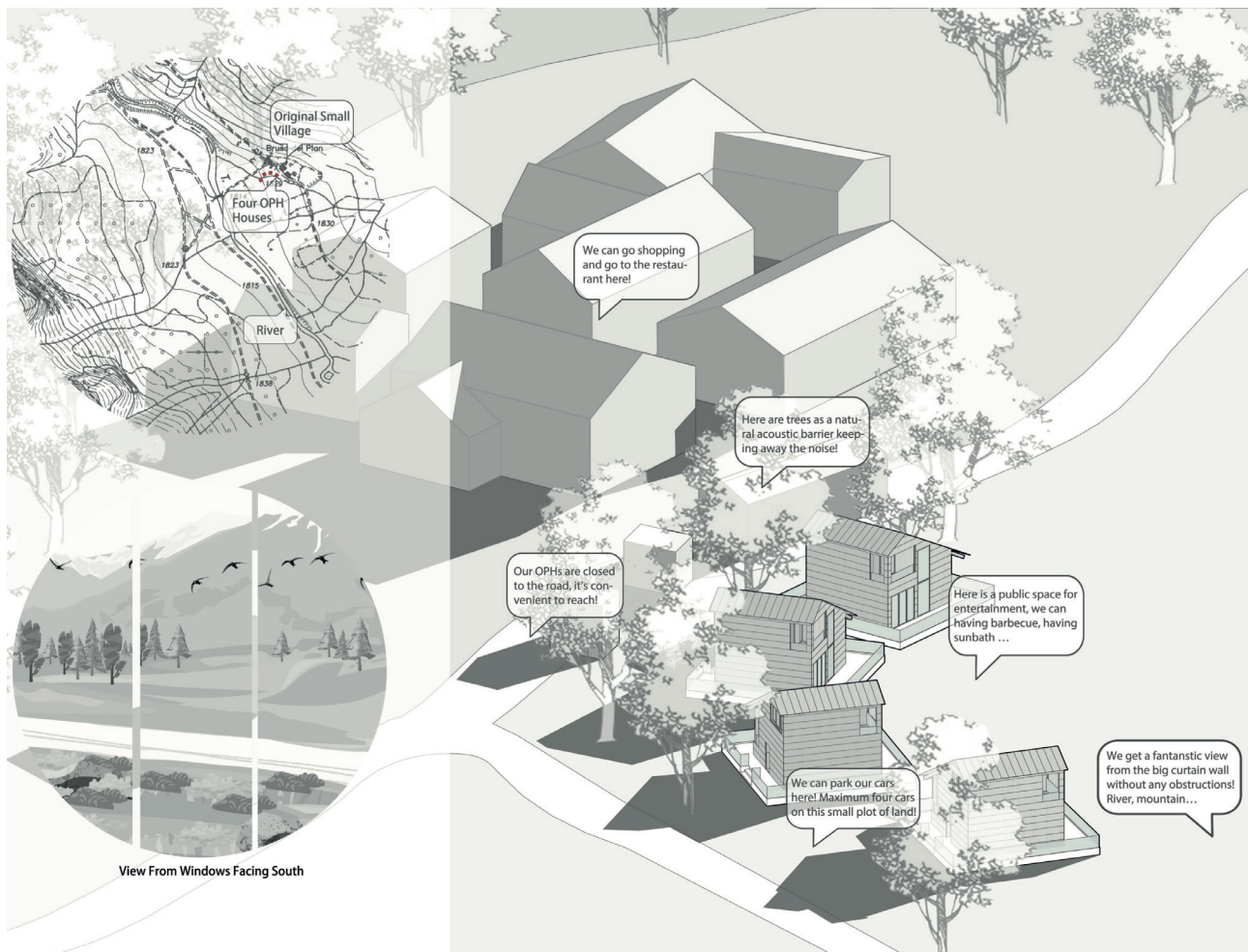
III. The frame

The different forms of primitive shelter designed to serve as a living space presented by Filarete in the *Trattato di Architettura*, Cesare Cesariano in *De Architectura*, Marc-Antoine Laugier in his *Essai* and Semper himself in *Der Stil*, which depicts the famous Caribbean hut, are based on the idea of a wooden structural frame that is independent of the infillings. It is this construction concept, which also lies at the basis of the construction of Robinson Crusoe's home, described by Daniel Defoe, which has generated the most significant effects on the composition and form of architecture over the last two centuries: think of Herzog&De Meuron's building in *Tavole*, Glenn Murcutt's Marika-Alderton house or Snøhetta's *The 7th Room* pile-dwelling. The progressive development of a design sensitivity aimed at defining the living space in relation to its construction instances takes place via the drafting of an assembling scheme for the ideal frame for the dwelling of a shipwrecked man, located on a beach and built using materials available on site and with makeshift work tools.

IV. The skin

The design sensitivity towards the ornamental component of architecture is cultivated through an analytical operation carried out by means of a space-time short circuit, capable of making us reflect on the potential interaction between the design cultures professed by Leon Battista Alberti and Frank O. Gehry. The observation, analysis, measurement and graphic drafting of the façade of Palazzo Rucellai allow the exploration of a notable architectural episode, capable of clarifying the role of assembly between parts in the conceptual definition of ornament, understood here as the epidermal outcome of an assembly process that contributes to defining the character of architecture. At the same time, starting from the



**Fig. 3**

The One Person House and its skin, intended as an envelope and ornamental component of the architecture (drawing by Yuan Bing).

Fig. 4-5

The One Person House and its joints: connections and the circulatory plant system of the architectural organism (drawing by Yuan Bing).

Serie of four One Person House ideally assembled in an alpine valley near Sauze di Cesana (drawing by Yuan Bing).

compositional reading of the Gehry House in Santa Monica, capable of explaining the relationships between the material essence of the envelope and the visual and tactile sensations generated by it, the design exercise consisted in the creation of a new entrance to be applied to the façade of Palazzo Rucellai: the juxtaposition of panels to form walls, the result of interweaving or assemblies of components experimented with starting from rudimentary physical models.

V. The connections

The compositional potential expressed by essential technological systems and equipment, such as guttering, drainpipes or chimneys for the ventilation of the rooms in the OPH, is explored once again through the ideal dismantling of exemplary architectural experiments that make the concept of technological innovation a genuine compositional paradigm: Jacques Lagrange's Villa Arpel and the prototype for the Diogene housing module designed by Renzo Piano become the starting point for a new exercise on the theme of the anchor of the building to the ground and the connections of the technological systems and equipment to the sub-services. Inside the plot of Villa Arpel two Diogene modules must be fitted adjacent to each other to form an OPH and raised by means of a structural frame under which a car can be parked. The compositional integration of the frame, the descents of the technological systems and equipment and the external stairs, with the formal result obtained by assembling the two Diogene modules, becomes the main theme in relation to its architectural, structural and technological implications.

VI. The OPH project as the outcome of an ideal assembly in a real site

The effectiveness of the distributive, formal, spatial and constructive choices of an OPH is tested with a project developed in phases that respond to the specific research questions posed by the student during the exercises. The project develops with a view to defining a standard housing type capable of guaranteeing both ordinary housing functions and adequate spaces for working from home or for sport, in the case of further lockdowns in the future. The OPH is designed by a dry-assembling process made by prefabricated components (a structural frame and an infilling system of panels): construction elements capable of contributing to a resignification of both the notions of *esistenza minima* and sustainability, and the concepts of architectural character and ornament.

Two different configurations of a series of four OPHs to be placed in two very different sites in terms of context and topography (the first is a small alpine valley near Sauze di Cesana and the second in an urban gap along the River Dora in Turin) lead to the drafting of pilot projects for small agglomerations which can guarantee both social inclusion and distancing, in the private space and the public space connected to it.

Notes

¹ This reflection is the result of the teaching experience carried out by the Authors as owners of the Architectural Composition module in the Building Construction Studio in the 2nd year of the three-year BA degree study course in “Architettura/Architettura” at the Politecnico di Torino, held online, in English, in the spring semester of the 2019-2020 academic year and attended by 106 students from 30 countries. The Authors consider their individual contribution to the writing of this paper as 50%, being the result of constant debate and joint effort. For the sole purpose of academic evaluations, it should be noted that paragraphs I, III and V were drafted by A. Bologna and revised by M. Trisciuglio and paragraphs II, IV and VI were drafted by M. Trisciuglio and revised by A. Bologna.

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Marco Trisciuglio (Turin, 1966), architect, graduated with honours from the Faculty of Architecture of the Politecnico di Torino with Emanuele Levi Montalcini and the archaeologist Giorgio Gullini. He is a Ph.D. in Methods problems in architectural design at the University of Genoa, gaining the title in 1997. He is currently a full professor in Architectural and Urban Design at the Department of Architecture and Design of the Politecnico di Torino and at the SEU-Arch in Nanjing (China). Among his publications: *Scatola di montaggio. L'architettura, gli elementi della composizione e le ragioni costruttive della forma* (Carocci, Roma 2008); *I paesaggi culturali. Costruzione, promozione, gestione* (Egea, Milano 2013, con Michela Barosio), *Typological Permanencies and Urban Permutations* (SEU Press, Nanjing 2017, with Bao Li and other), *L'architetto nel paesaggio. Archeologia di un'idea* (Olschki, Firenze 2018).