

The Lastingness of the Ephemeral. The Presence of Textiles in Contemporary Architecture

Beatrice-Gabriela Jöger

PhD Habil., Professor, "Ion Mincu" University of Architecture and Urbanism, Bucharest, Romania
beatrice.joer@gmail.com

Keywords: textiles; architextiles; nomad; technological smart textiles

Some two decades ago, the link between architecture and textiles was more a study topic for art historians than for architects and architectural historians. With very few exceptions — Semper being the most important one — professional literature at the time was referring to textiles mostly as adornments of buildings and spaces, usually investigated as such in the departments of decorative arts, crafts, manufacturing, and presenting little to no interest for architectural theory and history. This is probably linked to the historically limited capabilities of textiles to embody architectural objects *per se* (although known examples can be found throughout architectural history).

The 21st century brought a paradigm shift following the technological progress that led to a new diversity and scale of the use of textiles in all major fields of production. This coincided with the increasing use of computer programs for design in general, and in particular for architectural design. The literature of the last twenty years is also considerably richer, another groundbreaking point being the special issue of the *Architectural Design* magazine from December 2006, dedicated to "Architextiles," a term coined on the occasion by the guest editor, Marc Garcia.

This paper seeks to explore the ephemerality of textiles in the contemporary, by looking at major writings and examples of the intersection and reunion of architecture and textiles. I will look at points of view pertaining to aesthetics and semiotics of textile and textile-inspired architecture, but also at the structural effect of textiles in architecture. The analysis deliberately excludes textile art, even related to architecture, because in my opinion it deserves a separate study.

For the purpose of this paper the term "textile(s)" refers to any type and kind of fabric, be it woven, knitted, felted or otherwise obtained from fibers and primary materials of any source (vegetal, animal, mineral). Likewise, the term "architecture" generically encompasses all types of space production, be it architecture itself, interior architecture, urban or landscape design.

Gottfried Semper — A Lasting Reference

No professional writer approached the relation between architecture and textiles as profoundly as Semper. As the son of a wool manufacturer, Semper had an early exposure to textiles and probably a closer understanding of textiles and fabrics, even though in recognizing his own limits he often left the more detailed descriptions to specialists.¹ In *The Four Elements of Architecture*, Semper considers that of the four — fireplace / hearth, roof, enclosure and mound — it is from the enclosure that the primitive technique of the *wall fitter* [*Wandbereiter*] evolved.² From weaving enclosures, one passed on to the braiding and weaving of mats and covers, and from the raw materials available, to the most sophisticated textile fibers that required complex processing. Thus, the primary enclosure might be the *carpet wall*, as we still encounter in some

1 Gottfried Semper, *The Four Elements of Architecture and Other Writings* (Cambridge: Cambridge University Press, 1989), 215.

2 Ibid. 102-103.

Asian civilizations. This insight and interpretation of the built world leads him to state that “it remains certain that *the beginning of the building coincides with the beginning of textiles.*”³

This lineage is also supported by the etymological base and root of a whole family of words that comes from the proto-Indo-European *teks* (lat. *texere*), which, passing through Latin and ancient Greek, gave us architecture, tectonic, technology, but also tissue and text.⁴ The very act of *texere* is characteristic today for a variety of materials that are carrying further the idea of weaving, of giving texture.

Semper's tenet could only be realized as architecture if “we architects shall find architectural expressions for them” [the new ideas].⁵ He considered dressing [*Bekleidung*]⁶ more important in defining the interior (because it is the element that is seen) than the structural elements, which, over time, remained hidden behind the finishes or decorative elements. But as long as the construction materials and techniques are (almost) those used for centuries and millennia, a real new architecture cannot emerge. Textiles will continue to be present as ephemeral objects like tents and pavilions, or as decorative, second skin objects inside and outside the buildings, or as mere inspiration for decorative motifs and textures.

Le Corbusier, an artist and a visionary of modern architecture, worked with textiles in many ways. One of the first tense structures he created was the *Pavilion des Temps Nouveaux* he presented at the Paris Exhibition in 1937, made only of steel poles, cables, and canvas. Only after the Second World War will this direction be more thoroughly explored by others as well. The inspiration of textiles' flexibility can be traced in the volumes of his expressionist creation at Ronchamp. Le Corbusier was also the one who coined the term “muralnomad”⁷ designating modern tapestry, while also actively supporting the renewal of this art. His notion of “muralnomad” resonates with Semper's *Bekleidung*,⁸ as tapestries are a second skin with a decorative, and occasionally functional role, which can be rolled up and moved according to the wanderings of the owner. A similar approach to that of the Middle Ages, the flourishing age of the tapestry, when kings and aristocracy were periodically changing residence and tapestries were among the precious belongings carried along to their new living quarters.

Le Corbusier also used textiles for their soundproofing qualities in Chandigarh, India, at the scale of two important administrative buildings for the new city he was called to design in the 1950s. In designing the Capitol Complex,⁹ due to the low budget and scarcity of construction materials, concrete and glass were the main materials used for the Punjab and Haryana High Court (Justice Palace) and the Palace of Assembly big halls, resulting in the poor acoustics of these vast interior spaces. Le Corbusier addressed this issue by using local materials and workforce, with Indian wool and weavers, realizing 656 square meters of tapestries allocated to the nine courts of justice from the Justice Palace¹⁰ and 455 square meters for the General Assembly Hall, the Council Hall and the foyer of the Palace of Assembly.¹¹

3 Ibid. 254.

4 For all the words listed: *Online Indo-European Lexicon*, Linguistics Research Center, University of Texas at Austin, <https://irc.la.utexas.edu/lex/master>, accessed October 16, 2022, and *Webster's Encyclopedic Unabridged Dictionary of the English Language* (New York/Avenel: Gramercy Books, 1994).

5 Semper, *The Four Elements*, 128.

6 Ibid., 6.

7 Le Corbusier, “Tapisseries Muralnomad,” *Zodiac* 7 (1960): 57-63.

8 Romy Golan, *Muralnomad. The Paradox of Wall Painting, Europe (1927-1957)* (New Haven: Yale University Press, 2009), 241.

9 The complex was included in the Le Corbusier list of monuments on UNESCO World Heritage Site since 2016. <https://lecorbusier-worldheritage.org/en/>, accessed May 5, 2021.

10 W. Boesiger, *Le Corbusier. Oeuvre complète*, vol. 6 (1952-1957) (Zurich: Les Editions d-Architecture 1967), 50.

11 Rajnish Wattas, “Colourful enigmas of Corbusier's Capitol. An exploration of enigmas, symbols and colours of Le Corbusier's Capitol in the 125th year of his birth reveals interesting facets,” *Tribune India* (June 9, 2013), <https://www.tribuneindia.com/2013/20130609/spectrum/main1.htm>, accessed on May 15, 2022 and in Gupta Jit, Kumar & Sharma, Chitrangda, *Defining Role of Art in Promoting Chandigarh*



Fig. 1: National Museum of African American History and Culture in Washington, DC, USA. Arch. David Adjaye.

The art of the tapestry further advanced in the 1960s and 1970s, embracing new artistic expressions but still conforming to and illustrating Semper's *Bekleidung* — a second skin to the structural wall. Romania also had artists of importance in this field, who could express themselves fully due to state orders of that time,

From this perspective, the building of the National Theater in Bucharest illustrates how in a communist country valued artists could find ways to advance artistic expressions when conforming with state's orders. The walls of the theater's foyer are covered in three recently restored monumental tapestries by Virgil Almășanu, Gheorghe and Viorica Iacob, Ion and Ariana Nicodim, and Florin Ciubotaru with Șerban Gabrea, tapestries that contribute to the overall expressivity of the surrounding space and also improve the acoustics of the foyer.

References to Semper and his theories flourished since the translation into English, in 1989, by Harry F. Mallgrave and Wolfgang Herrmann, of several texts united under the title of *The Four Elements of Architecture and Other Writings*. This publication widened the access to this groundbreaking theory in a moment when the technological means were suitable for the use of textiles in architecture in a totally different way than ever before.

The real change only came when architects in close collaboration with engineers started to apply in planning the tensile properties of textiles. Among them, Frei Otto, a German architect and engineer, began experimenting with tensile structures for temporary and rapid building shelters in the 1950s. His specialized research in lightweight tensile and membrane structures led to realizing landmark buildings, like the West German Pavilion at the Montreal Expo 67 and the Olympic Complex in Munich in 1972. However, these structures are not using textile materials *per se*; the presence of cables, the use of their tensile properties and even the form itself represented a basis for the later tensile structures using fabrics. This was indeed a highly technical accomplishment that was possible only with the technologies available at that time. Since then, a whole new world emerged, a world to which the technological development in the textile field contributed considerably. A relatively recent architectural achievement is the Smithsonian's National Museum of African American History and Culture in Washington, DC, USA. (Fig. 1)

It has three reversed pyramid tiers above the ground level: "Adjaye called it the corona, and explained that it was inspired by the shape of crowns found in the Yoruban art of Nigeria."¹² The otherwise massive geometrical volume gains transparency through a metal lacework made of aluminum panels coated with polyvinylidene fluoride (PVDF). The panels have patterns based on decorative ironwork by black 19th century US artisans. Having Ghanaian roots, Adjaye "describes the incorporation of these varied backgrounds into his art as a type of weaving, synthesizing distinctive elements in a way that creates a new sort of singular whole."¹³ The apparent textures of his buildings are often inspired by those of textiles, and his interest in textiles went on further as testified by his implication in curating the "Selects," an exhibition of West African textiles from the Cooper-Hewitt Smithsonian Design in 2015.¹⁴

On Lastingness and Textiles. Contemporary Interpretations

Intrinsically linked to human desire and presence, architecture owes its longevity to the materials used for its construction. Among these, perhaps the most ephemeral are textiles. Nevertheless, textile architecture is one of the oldest forms of architecture to have been documented, its typology having survived for millennia. At the same time, while we are all enveloped in various forms of textile constructions, textiles represent an unacknowledged element from the point of view of architectural theory. Semper's theory of the primacy of textile architecture over other materials is perfectly justified, despite it lacking material traces, a fact due to the ephemeral nature of the materials themselves. Today, textiles are reconsidered not only for interiors but as a model for building envelopes, skins that can tightly envelop any shape. Beyond the material itself, the meaning of the textile — the essence of a woven fabric and the gesture of weaving — is what is appropriated in contemporary architecture, following and realizing what Semper theorized 160 years ago.

Architects often used terms related to textiles in describing or commenting their works or details thereof: stone lacework, architectural canvases, architectural sails, membrane, weave, pattern, smooth space, urban fabric, city fabric, urban textures and so on. The philosopher Gilles Deleuze developed a whole theory of the fold,¹⁵ not as an architectural technical tool but as an ontology of knowledge, valid for all ages and ensuring their continuity. Textile terms became even more convenient with the development and spread of parametric design, thus allowing designers to conceive spaces in textile related terms: knot, intertwining, braiding, wrapping, folding, entangling — are all describing the construct of architecture today.

Present for millennia in traditional architectures, in parts of the world where archaic ways of life are still preserved nomadic textile architecture can also be found in contemporary practices either for certain architectural programs designed to be used only for short periods of time or in cases where ephemerality is a consequence of socio-economic considerations. The Z and Alpha generations are responsible for the former. Their exceptional appetite for experience and an innate freedom of movement in space have led to changes in the approach of architectural programs and to an extreme flexibility of interior spaces. The fast pace of societal and economical changes is responsible for the latter, an important factor that favors the use of textiles as a construction material in architecture being the attitude towards the built object. In big cities like New York,

12 Amanda Kolson Hurley, "Design Evolution of the National Museum of African American History and Culture," published September 15, 2016, https://washingtoncitypaper.com/article/194734/the-design-evolution-of-the-national-museum-of-african-american-history-and-culture/?gclid=Cj0KCQjwqPGUBhDwARIsANNwjV44KBrSMl8vRDsX0CnngKmHAQmhzbhettTTgaVJTn1uQYGNuJFC0JsaAmz1EALw_wcB, accessed May 17, 2022.

13 Alex Palmer, "Is Architecture Actually a Form of Weaving?", published June 29, 2015, <https://www.smithsonianmag.com/smithsonian-institution/architecture-actually-form-weaving-180955698/>, accessed March 26, 2022.

14 Ibid.

15 Gilles Deleuze, *The Fold. Leibniz and the Baroque* (London: The Athlone Press, 1993).

Los Angeles, Tokyo, buildings are considered a commodity like any other, and their appearance and disappearance are only economically motivated. Thus, the traditional way of building may be too slow for the increasingly fast pace of change, and textiles may be a solution. Nomadism is thus transposed into the ephemeral, into the increasingly shorter life of the building.

In a thesis dedicated to ephemeral architecture with an accent on Japanese philosophy, Jacqueline Armada states that:

“An ephemeral architecture is one that is designed to exist for a short period of time and then disappear, providing a fleeting experience and leaving behind a memory.”¹⁶

She is contrasting construction materials that are by their materiality already expressing lasting life or permanence versus flexibility or transience. In her approach, ephemerality does not depend on the duration of the building’s actual existence but on the qualities of the materials: translucent, flexible, lightweight, light transmitting, recyclable, texture that weathers etc.¹⁷ Focusing on these qualities, rather than on the materials themselves, Armada explains how contemporary Japanese architecture uses textiles as a substitute for the classic lightweight rice paper panels, despite the fact that traditionally textiles were not used in construction.

The fall of 2006

It seems that the fall of 2006 was auspicious in producing a collection of theoretical texts on architecture and textiles, with two important publications in these fields — *Architectural Design* and *Textile* — each dedicating an issue to this topic.¹⁸ Was it a coincidence or had the subject become so present that a sudden need to approach it theoretically, to examine it scientifically became apparent? The approach to the subject(s) from both sides — from the point of view of architecture, and from that of textiles — showed that the relation between them was closer than imagined or officially stated and acknowledged until then.

In December 2006, Marc Garcia was the editor of a special issue of the prestigious *Architectural Design* magazine, issue called “Architextiles”:¹⁹

“A hybrid of ‘architectures’ and ‘textiles,’ the word ‘architextiles’ refers to this body of projects and the ways of thinking and making that join the two.”²⁰

The issue provided a number of practitioners and theorists in architecture with the opportunity to express their thoughts on the subject. It was revealed that many of them were influenced or even drawn to the textile world as a source of inspiration and the reference to Semper was recurrent. Garcia proposed four types of Architextiles with which architects are operating:²¹ (1) used as metaphor from textiles or textile-based processes in architecture; (2) a textile-like spatial structure or form is produced in architecture; (3) textiles as such, or composites and hybrids are used in the actual construction; (4) architecture engages with textile through texts. As Garcia says, architects are operating in their projects or research with one or a combination of several of these Architextiles, in a more or less visible manner.

¹⁶ Jacqueline Armada, “Sustainable Ephemeral: Temporary Spaces with Lasting Impact,” *Honors Capstone Projects - All 111* (2012), 15.

¹⁷ Ibid., 37.

¹⁸ The author of this paper defended her doctoral thesis “Textile in arredamento” in May 2006. This appears to coincide with the international interest in the combined field of textiles and architecture.

¹⁹ Mark Garcia is a researcher, writer, curator, photographer and academic. He is Senior Lecturer for Histories/Theories/Futures MArch at the University of Greenwich, London. He has worked for Branson Coates Architecture and Skidmore, Owings and Merrill. Mark has held academic posts at Oxford University and at the Royal College of Art, London, where he was Head of Research in the Department of Architecture for 9 years. He has lectured in Japan, Switzerland, Ireland, Germany and across the US. He is currently researching the “21st Century Posthuman Spaceships and Astroarchitectures” for his PhD thesis. <https://www.ucl.ac.uk/bartlett/architecture/mark-garcia>, accessed May 31, 2022.

²⁰ Marc Garcia, “Architecture + Textiles = Architextiles,” *AD* 76, no. 6 (2006): 7.

²¹ Ibid., 8.



Fig. 2: Olympic Complex, Munich, 1972. Arch Frei Otto.

Fig. 3: Holon Design Museum, Israel, 2010. Arch. Ron Arad Associates.



The special issue of *Textile* journal from the fall of 2006 invited Janis Jeffries and Diana Wood Conroy as guest editors. Under the title “Shaping Space: Textiles and Architecture,” they reunited theoretical contributions from art historians, textile designers and researchers, and academics. Semper was often referenced for his theory of weaving as a primary expression of architecture and of textiles as a malleable matter.

Architextiles as metaphors and textile-like spatial structures

This subchapter presents examples of architecture that are showing striking resemblances to textiles spatial structures and / or are either inspired by such structures, or they resort to textiles as metaphors for their composition or appearance. In all cases the author has had the opportunity to directly analyze the works on site, to walk through them, to take the time to experience them and all the elements involved in their materialization with all her senses.

The Olympic Complex, Munich, Germany, 1972

Completed for the Olympic Games of that year, the Olympic complex includes several architectural components that have double-curved surfaces, tensioned, and fixed with poles and cables, which from afar resemble tents, traditionally made of textiles. Only after approaching the complex and going through it, is the durable character of the constituent materials revealed. They emulate textiles only in their elegant arching, the fiber tension and (semi)transparency, which they transmit to an ensemble that has recently turned 50 years old. The architect-engineer Frei Otto transposed into steel and translucent Plexiglass an archetypal structure that offered, for that occasion, physical and symbolic lightness and transparency, desired in order to effusively dissociate the sports event from the Olympic Games previously held in Nazi Germany in 1936. The complex is a unique achievement that has been enthusiastically received by the architectural world, its apparent fragility being contradicted by its long afterlife and continuous use following the Games. (Fig. 2)

Holon Design Museum, Israel, 2010

Thought to be a vital and dynamic point for designers and other representatives of the creative industries, the Holon Design Museum is itself an exhibit. Ron Arad's first architectural achievement has an envelope with a dynamic image with double (textile) interpretation. Arad describes the appearance of the museum as

“shrouded by five dominant ribbons of Corten steel that undulate and meander their way in, out and around the building’s internal volume, at times in unison, at others apart; at times enclosing space, and at times notionally defining it. The ribbons act as a spine for the building, both supporting it structurally and dictating its posture in relation to its surroundings.”²²

Although a heavy material, steel borrows here the lightness of textiles gracefully describing curves floating in the air — a true architectural oxymoron. Corten steel is appreciated in the architectural world for its quality of “aging” (contrary to what we usually want from metals), to transform with the accumulation of years, a quality that brings it closer to the classic building materials. Aging until extinction is one of the defining properties of textiles. (Fig. 3)

Library of Birmingham, UK, 2013

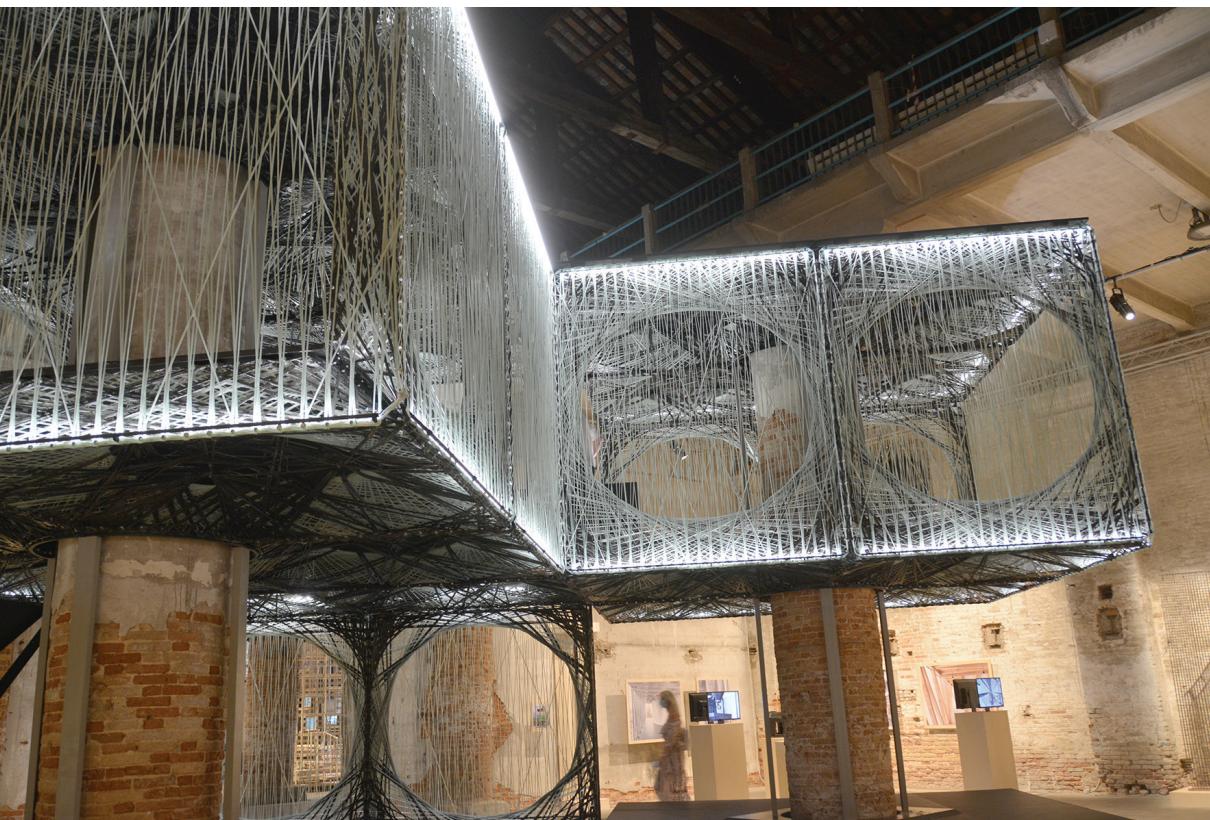
An award-winning building by Netherlands based architectural firm Mecanoo, the Library of Birmingham has a wireframe envelope that hides a complex architectural program. Although Mecanoo’s declared inspiration is the city’s metalwork tradition, the outer skin of the main volume has the delicacy of a lace, from which it borrows the network structure, the transparencies, the lights, and the shadows that it casts. Mecanoo’s description uses other words which one could link to the specific vocabulary of textiles:

22 Ron Arad, “Holon Design Museum, Israel,” *AD* 76, no. 6 (2006): 50.



Fig. 4: The Library of Birmingham, UK, 2013. Arch. Mecanoo.

Fig. 5: Maison Fibre, Venice Architectural Biennale, 2021. Arch. Achim Menges, Jan Knippers and teams from ICD Institute of Computational Design and Construction and ITKE Institute of Building Structures and Structural Design, Cluster of Excellence IntCDC, University of Stuttgart.



"Visitors move from one floor to the next through interconnected and overlapping rotundas that provide natural light and ventilation. Ever-changing vistas unfold through the delicate filigree skin of interlocking circles, inspired by the tradition of metalwork in this former industrial city."²³

Navigating through the building, however, one can find the historical heart of this construction relocated (for the second time) and then, perhaps, the decorative reference of the envelope can become the Elizabethan style architecture of the Shakespeare Memorial Room built by John Henri Chamberlain in 1882. (Fig. 4)

Maison Fibre, Venice, Italy, 2021

The last Venice Architecture Biennale seems to have housed a multitude of textile related objects, pavilions, partitions or displays. Under the general question "How will we live together?" a variety of approaches, theoretical or more material ones have found their place, starting with the reinterpretation of the traditional tent, up to the most recent research recurring to properties of textiles without really making one. Or making one for the future.

A team led by Achim Menges and Jan Knippers from Stuttgart that reunited specialists from several countries and two institutes of excellence²⁴ presented the project intitled "Material culture. Rethinking the physical substrate for living together," a project especially realized for the Biennale. The project presented the "Maison Fibre," a structure reinterpreting the act of entangling three materials: glass fibers, carbon fibers and epoxy resin. Taking example from nature, where "almost all biological, load-bearing structures are made from fiber composites"²⁵ the structure "constitutes a radical model of a novel materials culture in architecture."²⁶ The impressive result is the actual lightness of this self-supporting structure that, although not ephemeral, with its semi-transparent appearance gives the viewer the impression of ephemerality. In numbers, this is expressed by a weight of the load-bearing elements of only 9 kg/sqm. (Fig. 5)

The conceptual architecture of Flavian Berar

A UK based and educated architect of Romanian origin, Flavian Berar's projects work with complex digital tools using textiles as such, for their flexibility and malleability properties, or as a concept, for tensile structures between two Switzerland mountains, for example. Asked if the concept was conceived in relation with specific materials or just the fruit of imagination, his answer was precise, referring to the textiles as "a material that offers more freedom than the traditional ones."²⁷ In fact even if his projects are only conceptual, Berar questioned the materials to be used in his projects. One would be ETFE (Ethylene tetrafluoroethylene), a fluorine-based plastic that has a good sustainability score. Berar believes that "the future is in Bioplastics" but for the moment they are indeed ephemeral and have a short expiration date, which makes this parameter — temporality, material reincarnation, regeneration — not only fascinating, but also an inescapable matter. Based on the creations of Daan Roosegaarde who imagined installations for filtering air impurities, Berar thinks that obtaining bioplastic by extracting carbon dioxide from the atmosphere — a resource harmful to the environment — is a valuable resource for the future.

²³ From the description of the project on the official site of the Mecanoo office. <https://www.mecanoo.nl/Projects/project/57/Library-of-Birmingham?d=1&t=1>, accessed May 24, 2022.

²⁴ Achim Menges (German, b.1975) with Niccolò Dambrosio (Italian, b.1988), Rebeca Duque Estrada (Brazilian, b.1989), Fabian Kannenberg (German, b.1991), Katja Rinderspacher (German, b.1978), Christoph Schlopschnat (German, b.1988), and Christoph Zechmeister (Austrian, b.1985) of ICD Institute of Computational Design and Construction (Germany, est.2008), Cluster of Excellence IntCDC at the University of Stuttgart, and Jan Knippers (German, b.1972) with Nikolas Früh (German, b.1987), Marta Gil Pérez (Spanish, b.1986), Riccardo La Magna (Italian, b.1982) at ITKE Institute of Building Structures and Structural Design (Germany, est.1950), Cluster of Excellence IntCDC, University of Stuttgart. Data from the exhibition panels at the Venice Architecture Biennale 2021.

²⁵ From the explanatory texts on the exhibition panels, Venice Architecture Biennale 2021.

²⁶ Ibid.

²⁷ Personal communication with arch. Flavian Berar, via e-mail correspondence, May 2022.

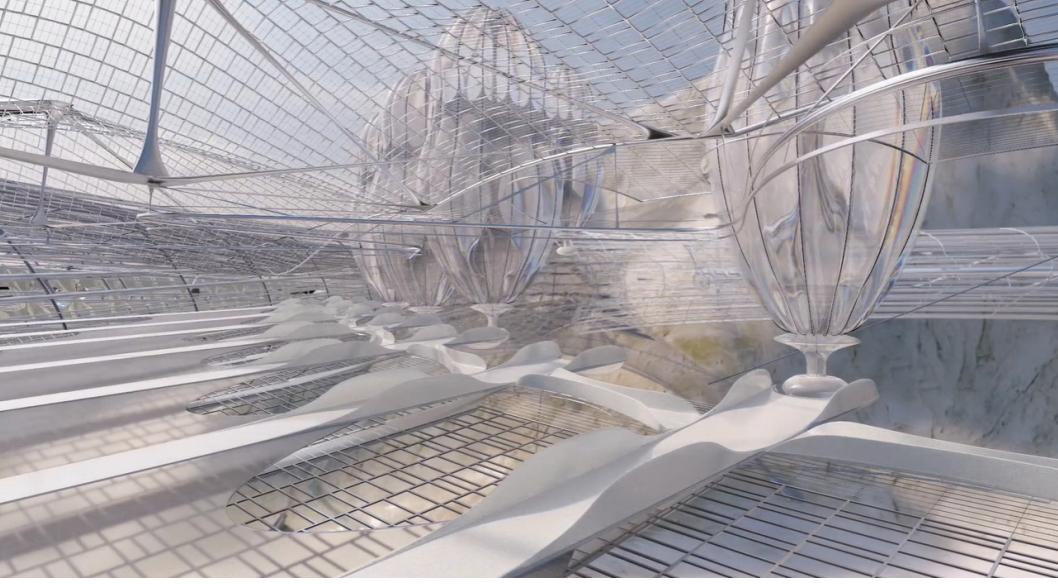


Fig. 6: Engines of Creation - In response to existential threats posed by climate change, artificial intelligence and nanotechnology, *Engines of Creation* explores potential new directions that architecture might take, reacting to and against these potent forces.



Fig. 7: Market place on Avenue de Saxe, Brocante on Avenue de Breteuil and Pharmacy tent, Paris, France.

Fig. 8: Venice Architecture Biennale 2012. Central Pavilion interiors with the sequence of moving curtains that change the space's configuration and opacity/transparency.



He also refers to another new type of material being under research in recent years, electricity generating textiles. Research conducted at several universities are exploring the facets of electricity generating textiles, from sunlight and movement, through piezoelectric fibers, to using the wind, or through stretching the materials.²⁸ Already used in textile technology for years, Berar thinks that nanotechnology has potential for the construction of tense structures in environments that we have not been able to reach by using drones, robots or fiberbots. (Fig. 6)²⁹

Ephemeral, Nomad, Smart

Regarding the concrete use of textile materials in contemporary architecture, two main directions can be found: that of a formal, traditional use (often resorting to the latest technical and material means), and where advanced interdisciplinary research on smart textiles / materials is carried out, seeking to instill new life into their future.

The interest of this relatively new material for the architectural world, beyond a low weight per unit area and innate flexibility (which is sometimes stiffened for structural reasons) is precisely the possibility of its unique use. The newer use of textiles in architecture is still in its infancy, the research in the field focusing on the particular properties that can be impregnated, interwoven, applied etc. to textiles with the help of different technologies.

Contemporary ephemeral

A fabric stretched between three or four poles and the tent, to delineate an enclosure are the oldest surviving constructive typologies. Contemporary typologies are of course using various qualities of tarpaulins and engineered fabrics that are complying with all the technical regulations in force today, among which waterproof, and fire retardant are only the most common ones. Popular examples here could be seasonal markets or occasional events, both a familiar sight in contemporary cities, which thus perpetuates this tradition and constructive typology, symbolically transforming the ephemeral into perennial.

The examples I shall be using here are taken from Paris, a city with sound urban planning regulations, where a temporary market was transformed into a well-planned and scheduled event. The grand avenues, with a generous profile are the adequate place to be appropriated by ephemeral structures. On the Avenue de Saxe, for example, such a market takes place on Thursdays and Saturdays. The central sidewalk (about 18 meters wide) includes the bearings for fixing the metal poles that will support the tarpaulins that cover the market. Everything above ground is erected in the early hours of the morning and then torn down by night, so that the next day the street can regain its undisturbed appearance until the following market day.

What can be more ephemeral than an occasional event? Avenue de Breteuil, with a central lawn of about 50 meters wide, occasionally hosts the famous *brocantes*, a word elegantly describing the flavor of the past, evoked by antiques on sale. The camp-like arrangement and even the volume of the tents protecting valuable artefacts earned them the name of “Bayezid tents.”³⁰

²⁸ Research carried on respectively by Georgia Tech (USA) and Chongqing University (China), Swedish School of Textiles and Research Institute, Swerea IVF (Sweden) and Chalmers University of Technology (Sweden). <https://futurism.com/electricity-generating-clothing-is-officially-a-reality>, <https://www.eit.edu.au/electricity-generating-textiles-on-the-rise/>, <https://www.springwise.com/new-fabric-can-generate-electricity/>, accessed May 2022.

²⁹ Photo courtesy of arch. Flavian Berar. The description of the project by the author: “Located in the heart of Europe, within the neutral, yet hostile territories of the Swiss Alps, the project begins as an alternative Future of Humanity Institute. The building is anchored to Mount Titlis or The Hill of Angels as William Wordsworth called it 300 years ago in a poem with the same name, programmatically reconciling the religious and monastic past of the site with the present condition of the Alps, a landscape host of various research and technological testing ground.” <https://www.flavianberar.com/engines-of-creation>, accessed May 17, 2022.

³⁰ Personal communication with arch. Mona Collins, Paris, France, May 18, 2022.



Fig. 9: "Sleeperoo" accommodation unit.

An extremely recent example, whose existence is due to the Covid-19 pandemic, has seen tents installed as a filter at the entrances to Parisian pharmacies. These were able to perform tests, administered by pharmacy assistants. To provide shelter, conventional tent structures of waterproof materials were installed on the sidewalks, in front of these pharmacies. (Fig. 7)

A temporary exhibition is by definition ephemeral, limited in time, a space conceived and erected from the beginning without claims to permanence or long duration. However, several types of cases contradict this condition. One type is illustrated by the case of the Eiffel Tower in Paris, where something erected for a season turned out to become one of the most cherished emblems of the city. Another case may be that of the various fair grounds of the world, where the continuity of events transforms an occasional activity into a lasting one. In Venice, the permanent spaces of the national pavilions undergo transformations meant to last for several months, the time of a biennial of art or architecture often using textiles — the ideal material in terms of flexibility but also in terms of economy? Space enclosures and delineation, interior allocations, etc. can be made by drapes or textile screens, by overlapping layers with different transparencies, by their movement. The spaces become fluid, their experience tactile, an experience requiring all our senses to be fully appreciated. (Fig. 8)

The new type of nomad

In other situations, what was nomadic in the traditional cultures of some areas becomes static. Such is the case of the Mina, or better known as “City of tents,” located near Mecca, in Saudi Arabia. Here, the archetypal tent is equipped with water supply, electricity and, of course, air conditioning, making a city of more than 100,000 tents with a capacity of 3 million people on 20 hectares. Once ephemeral constructions, along with comfort facilities, they now meet fire safety standards, with cotton fabric being replaced in 1997 by Teflon-protected fiberglass fabric. An ephemeral city that has a life of its own for two weeks a year, during the ritual pilgrimage, existing as a ghost-town the rest of the time.

On the other hand, nomadism is manifested today in the Western civilization itself: the aspirations of the Z and Alpha generations³¹ are different from those of the previous ones. Some behavioral trends of generation Z influence not only the attitude towards family and personal life but also towards work: human first; work / life balance is not binary; social conscience is key.³² But this does not prevent them from wanting to experiment and have experiences as diverse as possible, which usually can only be offered by moving from their place of origin. Their aspiration to experience new things in new places, does not exclude the desire for comfort. The traditional tent has been transformed today into a mobile cube-bedroom called “Sleeperoo”³³ that can be installed (and has already been), in the most surprising places: a church, on the pontoon of a lake, in an orchard or on a glacier. Conceived as an escape place where it is usually impossible to spend the night, it has views on five sides, all the materials used – mostly textiles - are ecological and folded it fits in a minivan. (Fig. 9)

Considered to be the first digital generation, adapting to the recent Covid-19 pandemic, in which remote work was a solution mostly for the “white-collar workers,” was extremely easy and returning to more restrictive conditions maybe more difficult. Even before the pandemic, in the organization of office spaces, the typology was changed, the variable flows in different organizational areas allowing a flexibility of the space and its arrangement. A universe as close as possible to the familiar one, a relaxed atmosphere and the possibility for variable teamwork were already pre-pandemic requirements. Ensuring flexibility of space and providing a welcoming

³¹ Generation Z is born between 1997-2010 and Generation Alpha between 2010-2025. As found in Amrit Khumar Jha, “Understanding Generation Alpha,” <https://www.researchgate.net/publication/342347030>, accessed June 2, 2022.

³² Adam Gibson, “Preparing for Generation Alpha,” <https://www.careerteachers.co.uk/career-advice/blog/preparing-for-generation-alpha>, accessed May 31, 2022.

³³ Ronny Eckert, “Fiber Starters’: Exotic Nights in the Cube,” published December 20, 2018, <https://www.techtextil-blog.com/en/fiber-starters-exotic-nights-in-the-cube/>, accessed September 29, 2020.

atmosphere are possible by using various textile elements and objects. The elements (besides the flexible compartmentalization of the space) are useful for the improvement of the acoustic comfort in these open spaces, acting as local enclosures or mini-spaces, maybe not always woven but certainly made of textiles.

Contemporary technological smart

In parallel with the use of textiles according to traditional, millennial typologies, new textiles are present in the creation of objects that seemed until recently utopian. Today's technologies allow the combination of textiles with glass, ceramics, metal, or carbon resulting in materials with a special strength. The introduction of electronic components allows the creation of smart textiles, which can respond in real time to parameters recorded by implanted sensors. Smart materials can become components of the IoT (Internet of Things), communicating, reacting and acting in combination with other elements of IoT.

Along with human's desire to travel in space, textiles have been present since the beginning of research in this field. The enormous advantage of their low weight and their flexibility were indispensable primary qualities that were enriched by further research. Today we benefit in the domestic field from many of the qualities acquired by textiles thanks to this research field. Advanced technology today allows us to achieve, at low cost, what a few decades ago was only intended for the military and aviation fields. In a similar way, future generations will benefit from today's focused research. Until then, super-technological textiles end up gravitating above the earth, being the ideal material for the arms or for the foldable antennas of artificial satellites. The foldable arms are made of CFRP (carbon fiber reinforced with plastic) and the reflector is made of gold-plated tungsten or molybdenum, the resulting threads being thinner than a hair.³⁴

Returning to the earth and directing research towards the sustainability of the built environment, textiles can play an important role in this field as well. In search of a textile-envelope with additional functions, Jan Serode from the University of Aachen together with ECE Europa Bau- und Projektmanager in Hamburg has created a façade material that is purifying the air.³⁵ The polyester fabric is coated with a layer of titanium nano oxide, which turns the pollutants into neutral salts that can be washed away by rain. In today's overcrowded and polluted metropolises, it can become an ideal material for building envelopes.

Conclusions

Neglected by architectural theorists for a long time, textiles are at the forefront of the theorizing of architectural space by Gottfried Semper at the mid-19th century. But "Semper argued for a concept of dressing through which the architect could wrap the structure, the core-form, in an art-form that might even deny the material basis of the former."³⁶ This only became possible in the 20th and 21st centuries, when the technical-structural innovations allowed the detachment of the envelope from the structure, and especially with the use of the computer and the realization of parametric architecture. The textile envelope, which can be molded on sculptural forms, is the ideal material for the resulting parametric-organic forms, and the technical possibilities have brought textiles able to withstand the complex requirements of a building. Thus, from the fine material, often ethereal and ephemeral, textiles have been transformed into a material with technological complexity that can have a lifespan that rivals other construction materials. After being used for millennia as an ephemeral part of construction, having been appreciated for their

34 Ronny Eckert, "Textile Antennas For Use In Space," published June 8, 2020, <https://www.techtextil-blog.com/en/textile-antennas-for-use-in-space/>, accessed July 3, 2020.

35 Ronny Eckert, "Textile Façade Soaks Up Pollutants from the Air," published March 11, 2020, <https://www.techtextil-blog.com/en/textile-facade-soaks-up-pollutants-from-the-air/>, accessed July 3, 2020.

36 Gevork Hartoonian, "The Fabric of Fabrication," *Textile* 4, no. 3 (2006): 277.

flexibility and malleability, through advances in technology, textiles have also recently acquired a fortunate physical durability. Combining delicacy, fragility, an apparent ephemerality with surprising resilience, textiles shelter us more and more intelligently, comfort us and fulfill our dreams of going further than we ever thought possible.

REFERENCE LIST:

- Arad, Ron. "Holon Design Museum, Israel." *Architectural Design* 76, no. 6 (2006): 50.
- Armada, Jacqueline. "Sustainable Ephemeral: Temporary Spaces with Lasting Impact." *Honors Capstone Projects - All*. 111 (2012). https://surface.syr.edu/honors_capstone/111. Accessed May 15, 2022.
- Berar, Flavian. Personal website. <https://www.flavianberar.com/>. Accessed May 18, 2022.
- Boesiger, Willy. *Le Corbusier Œuvre complete, vol. 6 1952-1957*. Zürich: Les Editions d'Architecture Zürich, 1967.
- Le Corbusier. "Tapisseries Muralnomad." *Zodiac* 7 (1960): 57-63.
- Deleuze, Gilles. *The Fold. Leibniz and the Baroque*. London: The Athlone Press, 1993.
- Eckert, Ronny. "Fiber Starters': Exotic Nights in the Cube." Published December 20, 2018. <https://www.techtextil-blog.com/en/fiber-starters-exotic-nights-in-the-cube/>. Accessed September 29, 2020.
- Eckert, Ronny. "Textile Façade Soaks Up Pollutants from the Air." Published March 11, 2020. <https://www.techtextil-blog.com/en/textile-facade-soaks-up-pollutants-from-the-air/>. Accessed July 3, 2020.
- Eckert, Ronny. "Textile Antennas For Use In Space." Published June 8 2020. <https://www.techtextil-blog.com/en/textile-antennas-for-use-in-space/>. Accessed July 3, 2020.
- Gallego, Jelor. "Electricity-Generating Clothing is Officially a Reality." Published March 10, 2016. <https://futurism.com/electricity-generating-clothing-is-officially-a-reality>. Accessed May 18, 2022.
- Garcia, Marc. "Architecture + Textiles = Architextiles." *Architectural Design* 76, no. 6 (2006): 6-20.
- Gibson, Adam. "Preparing for Generation Alpha." Published February 12, 2021. <https://www.careerteachers.co.uk/career-advice/blog/preparing-for-generation-alpha>. Accessed May 2022.
- Golan, Romy. *Muralnomad. The Paradox of Wall Painting, Europe (1927-1957)*. New Haven: Yale University Press, 2009.
- Hartoorian, Gevork. "The fabric of fabrication." *Textile* 4, no. 3 (2006): 270-291.
- Jefferies, Janis, and Diana Wood Conroy. "Shaping Space: Textiles and Architecture--an introduction." *Textile* 4, no. 3 (2006): 233.
- Jha, Amrit Khumar . "Understanding Generation Alpha." DOI: 10.31219/osf.io/d2e8g. https://www.researchgate.net/publication/342347030_Understanding_Generation_Alpha. Accessed June 2, 2022.
- Jit, Gupta, Kumar & Sharma, Chitrangda. "Defining Role of Art in Promoting Chandigarh Architecture." Published August 11, 2018. <https://www.linkedin.com/pulse/defining-role-art-promoting-chandigarh-architecture-jit-gupta/>. Accessed May 15, 2022.
- Kolson Hurley, Amanda. "Design Evolution of the National Museum of African American History and Culture." Published September 15, 2016. https://washingtoncitypaper.com/article/194734/the-design-evolution-of-the-national-museum-of-african-american-history-and-culture/?gclid=Cj0KCQjwqPGUBhDwARI-sANNwJV44KBrSMI8vRDsX0CncgKmHAQmhzbhTTgaVJTn1uQYGNuJfVC0JsaAmz1EALw_wcb. Accessed May 17, 2022.
- Lund, Anja. "New Fabric Can Generate Electricity." Published April 9, 2018. <https://www.springwise.com/new-fabric-can-generate-electricity/>. Accessed May 18, 2022.
- Mackay, Steve, "Electricity generating textiles on the rise." Published July 5, 2018. <https://www.eit.edu.au/electricity-generating-textiles-on-the-rise/>. Accessed May 18, 2022.
- Mecanoo. Library of Birmingham project. <https://www.mecanoo.nl/Projects/project/57/Library-of-Birmingham?d=1&t=1>. Accessed May 24, 2022.
- Palmer, Alexis, "Is Architecture Actually a Form of Weaving?" Published June 29, 2015. <https://www.smithsonianmag.com smithsonian-institution/architecture-actually-form-weaving-180955698/>. Accessed March 26, 2022.
- Semper, Gottfried, *The Four Elements of Architecture and Other Writings*. Cambridge: Cambridge University Press, 1989.
- Wattas, Rajnish. "Colourful enigmas of Corbusier's Capitol. An exploration of enigmas, symbols and colours of Le Corbusier's Capitol in the 125th year of his birth reveals interesting facets." *Tribune India* (June 9, 2013). <https://www.tribuneindia.com/2013/20130609/spectrum/main1.htm>. Accessed on May 15, 2022
- ***. *Webster's Encyclopedic Unabridged Dictionary of the English Language*. New York/Avenel: Gramercy Books, 1994.

ILLUSTRATION CREDITS:

Fig. 1: Photo by Simona Lidulli.

Fig. 2, 3, 4, 6, 8: Photos by the author.

Fig. 6: Photo courtesy of arch. Flavian Berar. <https://www.flavianberar.com/engines-of-creation>, accessed May 17, 2022.

Fig. 7: Photo by arch. Mona Collins.

Fig. 9: <https://www.techtextil-blog.com/en/fiber-starters-exotic-nights-in-the-cube/>, accessed October 2, 2020 and <https://www.sleeperoo.de/>, accessed October 2, 2020.