Florian Nepravishta
Andrea Maliqari

MODERNISATION AND GLOBALIZATION

NEW PARADIGMS IN ARCHITECTURE, CITY, TERRITORY

La Scuola di Pitagora editrice

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Serie founded and directed by Florian Nepravishta

Forum for Architecture and Urbanism (FAU) series of scientific publications has the purpose of disseminating the results of national and international research and project carried out by the Faculty of Architecture and Urbanism (FAU) of the Polytechnic University of Tirana (UPT). The volumes are subject to a qualitative process of acceptance and evaluation based on peer review, which is entrusted to the Scientific Publications Committee. Furthermore, all publications are available on an open-access basis on the Internet, which not only favors their diffusion, but also fosters an effective evaluation from the entire international scientific community. The Faculty of Architecture and Urbanism (FAU) of the Polytechnic University of Tirana (UPT) promotes and supports this series in order to offer a useful contribution to international research on architecture, urbanism and cultural heritage, both at the theoretico-critical and operative levels.

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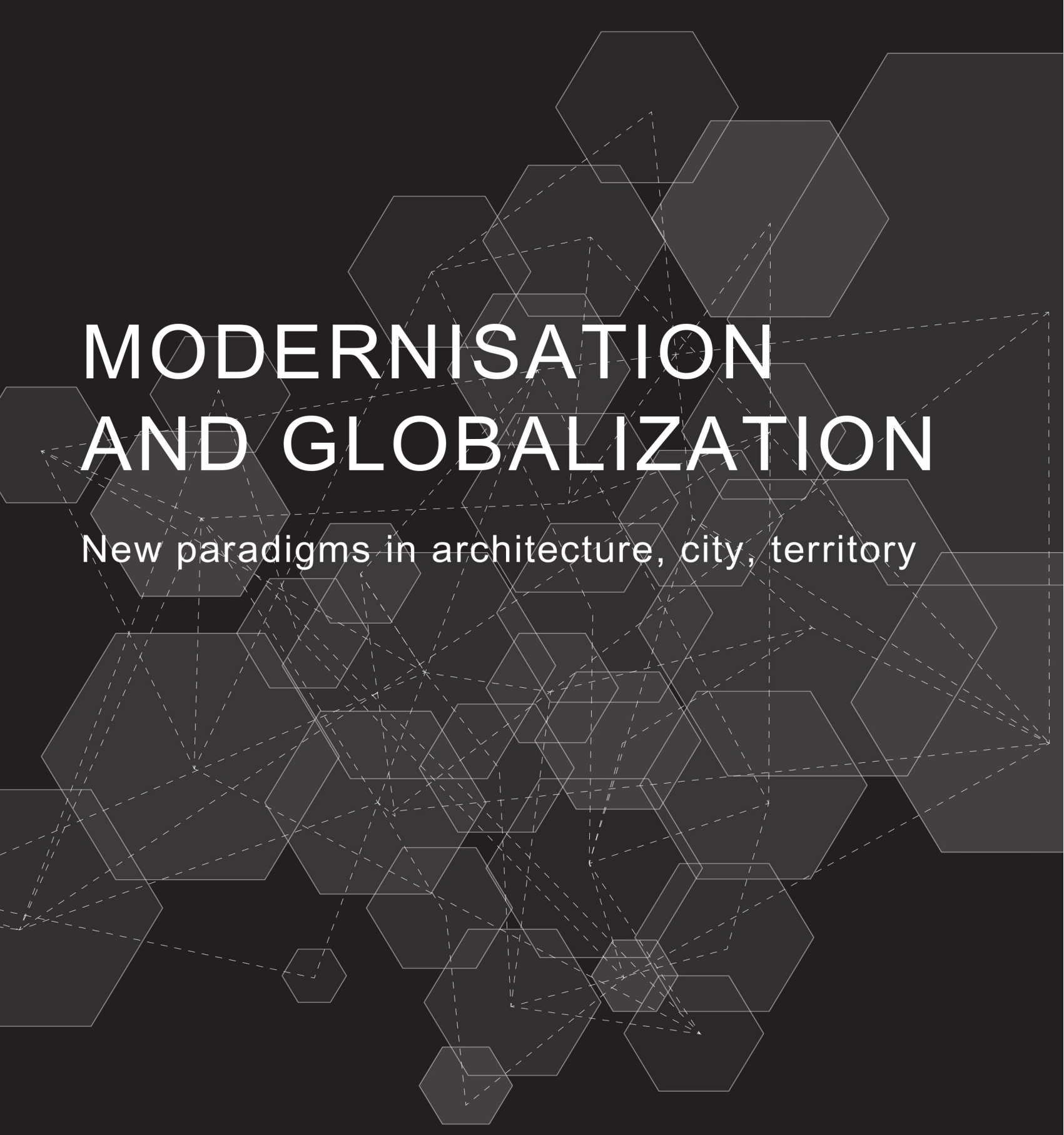

MODERNISATION AND GLOBALIZATION

New paradigms in architecture, city, territory

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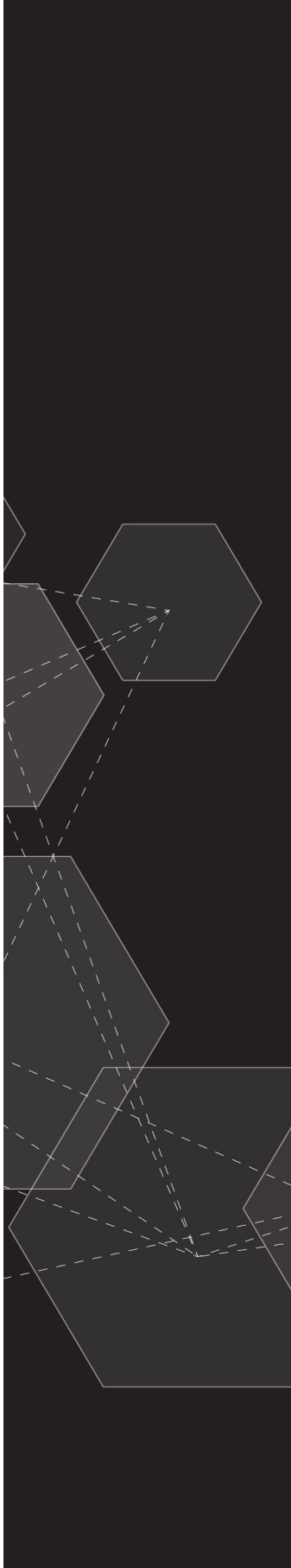

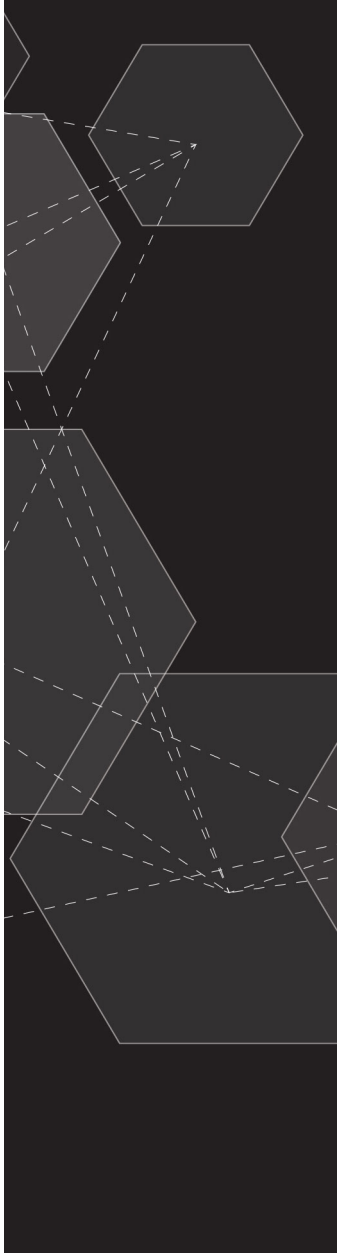

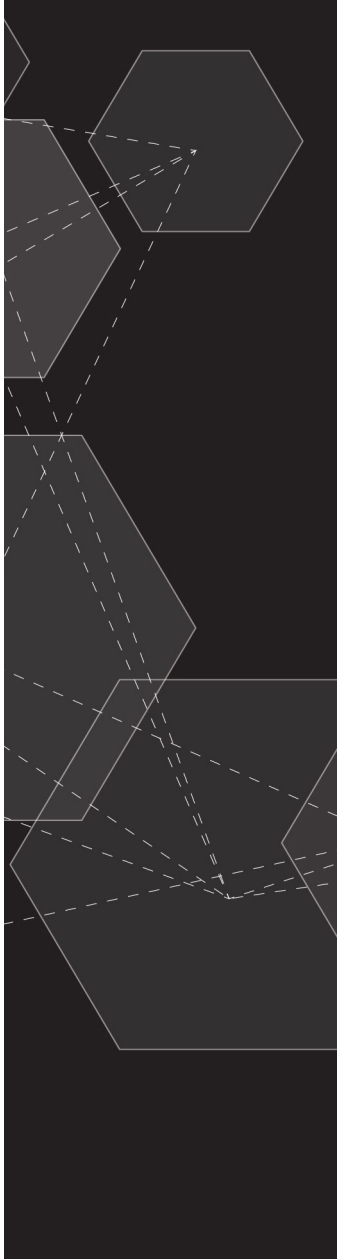

61 THE "HYLOCENE" MATERIAL LIBRARY: A NARRATIVE APPROACH FOR CONTEMPORARY MATERIAL

Sabrina Lucibello, Carmen Rotondi

Introduction

The material libraries were born at the end of the last century's nineties to give a concrete answer to the problem of over-choice (Manzini, 1986), collecting samples of materials according to criteria and interpretations at multiple levels. Their "mission" is to support designers in choosing the most suitable materials for their projects, being able to access research aimed at specific technical, productive and expressive-sensorial parameters. With careful awareness of the social implications that the choice of the wrong material could generate, all this. Significant responsibilities characterise the result of correct use of materials in the project concerning the world in which we live and has implications and consequences not only of an economic but also moral and social nature: in fact, materials are possible "drivers" of social change, with the potential to alter societies for better or worse (Ashby & Johnson, 2002).
Today, the entry into modernity has radically changed the extent of the issues to be addressed and, therefore, also the design and research on materials, elevating the role of material libraries to catalysts of interdisciplinarity and technology transfer (Wilkes, 2011). As Bauman (2000) affirms, the modernity in which we live is characterised by a condition of liquidity, in which the transformation processes take place at a speed that is difficult to catalyse and settle, and in which excessive freedom makes facing reality a decidedly more complex issue. Consequently, in many fields such as that of materials, arises the need to reorganise knowledge in a multiverse modality (Ferrara & Lucibello, 2012), which facilitates the mutual fertilisation of the disciplines and therefore allows to look at «both the performative and depicting character (of the materials) concerning the type of civilisation, both the symbolic values with which they are equipped» (Fiorani, 2000). Design with its characteristics of pervasiveness and flexibility, thus stands as a synthesis discipline, can combine through the project the technical approach of scientists with the aesthetic-intuitive one of creatives, restoring to matter the complexity and plurality of the aspects that constitute it: semantic, expressive, of user experience. In this sense, material libraries can represent an essential tool for designers and other figures, facilitating the encounter between sciences and other knowledge, practical experimentation on samples of materials and fruitful discussions in shared physical spaces, further enhancing interdisciplinarity also from a methodological point of view. The material libraries can also facilitate the fruitful meeting between manufacturers and designers (with the design acting as a mediator), overcoming communication problems (from the inaccessibility of the information about the processes to a lack of clarity in the technical and descriptive sheets of the materials) and fostering technology transfer and innovation (through meaningful applications or even through material improvement). Finally, they can favour the diffusion of the "social knowledge" of the materials, allowing any user to explore this world.
However, precisely because the condition of fluidity that characterises modern civilisation has made increasingly global and complex the challenges to be faced, more and more addressing the design activities, even in the materials libraries' organisation is necessary to plan changes. For example, new material classification systems based on design possibilities, not chemical similarities, can come to the fore, allowing users to search more freely, by associations and inspirations, guaranteeing them access to physical samples and their manipulation with different rules. Materials, a focal point of discussion on the way and the world we live in (Pedgley, 2014), capable of calling into question various contemporary knowledge and issues, can become a tool for raising awareness among designers and the whole of society on matters of particular relevance, such as sustainability (environmental, economic, ethical, social), which need to be addressed through an ethical redefinition of the built world.
From these considerations, "Hylocene" was born. It is a physical and virtual material library based at the SAPeri&Co interdepartmental centre of the Sapienza University of Rome, which focuses on promoting innovation and research in the largest university in Europe (Fig. 1).

Figure 1. *Hylocene - Physical and virtual material library based at the SAPeri&Co interdepartmental center of the Sapienza University of Rome, whose contents can be explored through a graphically presented exhibition itinerary. Source: Saperi&Co, 2020.*

It is imagined as a design tool within an open and coworking space in which to activate interdisciplinary co-design processes, and it collects a reasoned selection of materials, largely still experimental; production processes, largely creative; products and projects resulting from the collaboration between universities, companies, research centres and designers in general, to create innovation and technology transfer starting from the material.

The term "Hylocene" from the Greek *-hyle*: matter and -cene: recent, etymologically indicates "today's materials" but more generally underlines the strong differentiation and characterisation of the new material library compared to the existing ones. In fact, it does not concern solely facilitating the access to information related to nowadays materials and production processes to give producers visibility and support potential users in the search for ideal material solutions for their projects. Rather, it aims to immerse the user in the dense networks of contemporaneity, allowing him to explore the social, economic, and cultural trends that pull strings: making him aware of the most urgent contemporary emergencies; offering him an overview of the central role that designers are assuming in the complexity of the present and how through the same materials and their manipulation, they offer innovative and sustainable solutions for a better future. For these reasons, Hylocene goes beyond "deterministic" cataloguing that divides materials into limited categories relating to technical, applicative, and sometimes sensory aspects, but explores and interprets open and current themes - Eco Responsibility, Connectivity, Empathy - subdividing content in a fluid and flexible channels (through the use of tags and clouds) which, overlapping the classic filters, allow for exploration rather than research, inspiration or comparison rather than an "exact" material, innovation rather than finished objects.

This article, therefore, aims to provide a narration, which through the investigation of the three main themes of the material library, namely the three macro-categories into which the collected materials are divided (Fig. 2), wants to stimulate and inspire new synaesthetic thinkings and activate novel, hybrid and transdisciplinary connections able to approach the modern complexity.

Eco responsibility: Biocycle, Technocycle, Ecoactive

In recent years, the combination of design and research on materials has played an increasingly central role concerning sustainable innovation, not only because they represent the physical interface of production and therefore the burden in terms of resource consumption (Pellizzari & Genovesi, 2017), but also because they are tools through which to characterise the project, both in terms of new and better performances (not only technical and mechanical but also environmental and of production sustainability) and in semantic and perceptive regarding. Furthermore, the drive for sustainability reinforced by top-down initiatives by world governments leads not only designers but also academia, industry and research in other disciplines to develop alternative and eco-responsible material solutions. They see the involvement of design upstream, which reinvents and experiments through creativity with new forms of industrialisation and "disruptive" visions of materials and downstream, giving them identity through applications of meaning. In fact, if on the one hand, designers enter the phase of creating new materials favoured by bottom-up phenomena such as do-it-yourself (Atkinson, 2006) and material tinkering (Parisi et al., 2017), on the other, is fundamental their contribution in the requalification of the semiotic environment of a material and in the definition of its recognisability as well as its meaning (Ceppi, 2016).
In particular, the research and production of eco-responsible materials is evolving in two main directions, apparently opposite but which represent the two sides of the same coin.

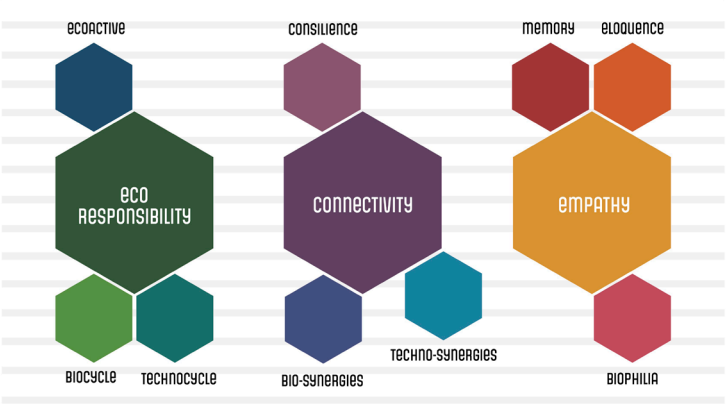

Figure 2. *Macro and micro cathegories - Hylocene divides the contents into three macro-themes – Eco Responsibility, Connectivity, Empathy – further divided into three micro-categories, offering a complete but precise overview of contemporary materials. Source: Saperi&Co, 2020.*

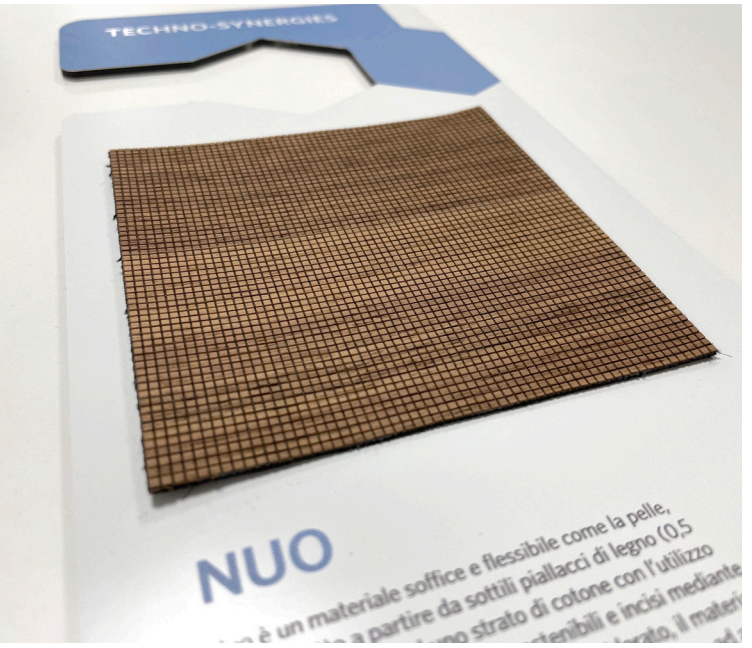

Figure 3. *MyMantra, Nuo, 2014 - Wood veneers engraved by laser cutting with microtextures that can vary its softness but also the final tactile experience. Source: Saperi&Co, 2020.*

The first, more artisan and self-sufficient, is that of circular materials deriving from waste from production, consumption and post-consumption of products, according to a systemic "cradle to cradle" approach which, by assimilating industrial models to nature, aims to transform them in a regenerative perspective (McDonough & Braugart, 2003). These materials, in turn, can derive from a process of re-evaluation and up-cycling of waste raw materials of natural origin, renewable and biodegradable (Biocycle), or from the regeneration and enhancement of synthetic, finite and limited waste (Technocyle). In the first case, the waste can derive from biobased and bio-sourced production processes, such as "Appleskin", an echo-sustainable leather and ethical alternative to the animal origin ones, obtained from the re-use of industrial waste from the industrial processing of organic apples in South Tyrol. Or, abundant resources in nature are re-evaluated, such as "Shiro Alga Carta" produced by Favini, which deals with the surplus of weed algae of the Venice Lagoon (harmful to the environment and difficult to dispose of) by re-using them in the creation of this paper which by the way, can become whiter over time due to the presence of chlorophyll. In the case of techno-cyclic materials, on the other hand, the waste is generally recovered from landfills and urban mining activities, which aim to give value and new usefulness to rejected materials because they are now ob-

solete. For example, in the "Rethinking materials" project, Ecopneus and Matrec have developed 15 new aesthetically renewed, sound-absorbing and anti-vibration materials derived from 100% recycled rubber from discarded, mixed and poly laminated tires, useful for different applications: from urban furniture to objects, to flooring.
The circular materials are contrasted by the high-performing ones, in which the most sophisticated technologies of today give voice to their usefulness, endowing the material with biological characteristics of autonomy and self-organisation, sensitivity and multifunctionality. We are talking about eco-active materials (Eco-active), which, thanks to their intrinsic characteristics, can activate themselves autonomously, produce a response to certain conditions, or undertake a phase change, usually reversible. This is how "living" materials are born which, like living organisms, are capable of self-cleaning such as "I.Active Biodynamic", the photocatalytic cement from Italcementi; but also to block UV radiation, to reduce pollutants, or to purify the water. For example, "Sunspace" is a bioinspired, porous and economical material, developed by the University of Brescia and still in the definition phase, capable of capturing atmospheric particulate and regenerating itself like a leaf, constituting a valid alternative to existing filters.

Connectivity: Consilience, Biosynergies, Technosynergies

The new holistic vision of the Universe that sees us part of a complex and interconnected system, in which the sharing of the individual parts affects the functioning of the entire system, stimulates us to rethink our way of acting in the world, towards a more open and collaborative vision, in which the connections not only between man and man but also man-nature and man-machine can provide a concrete answer to the global problems we face. Today, conscious that complex problems are best solved by working together, the collaboration between man and man has acquired more and more importance. The American biologist Edward O. Wilson defines with the term "consilience" today's transdisciplinary push that involves different branches of knowledge towards a common and shared goal (1998). A clear concept for contemporary design, which acts as a bridge between disciplines and as an interpreter of the progressive convergence of branches of knowledge, which under the sign of creativity increasingly fade the boundaries of their fields of action (Oxman, 2016). But even the geographical and cultural boundaries, between different knowledge and languages, between industrial sectors, local and global, innovation and tradition, today are blurring. These phenomena strongly influence the design revolution and material experimentation, resulting in innovative hybrid outputs and technological transfers, which see the participation of actors of different natures and social backgrounds (Consilience). "Pinatex" for example, is a new non-woven fabric obtained from the waste from pineapple plantations in the Philippines whose innovativeness also derives from the consilience of different knowledge and actors involved in the production process. It starts from the first phase of drying and processing pineapple leaves by the local population, who, by re-proposing ancient techniques, can separate the cellulose fibres from the remaining biomass and weave them to create semi-finished products similar to ribbons. The transformation is then completed in Spain, where the fibres are blended with PLA, coloured and transformed into fashion products.
However, thanks to advances in science, technology and culture, we cannot only interact and collaborate amongst ourselves but also with other protagonists of the Universe. Thus, cutting-edge materials and processes are born that make the biosphere its main collaborator (Bio-synergies). Taking advantage of today's possibilities of observing, controlling and manipulating nature right into its deepest fibres, they go beyond its emulation, aiming instead at the actual incorporation of living organisms into the project. These are sustainable materials with unexpected properties and aesthetics, which feed and grow in a controlled or uncontrolled way and prefigure a new world in which biological processes will progressively replace industrial and mechanical systems (Myers, 2012). This is the case, for example, of "Wooden Leather", a fragrant vegetable leather with a woody appearance that is the result of the experiments that designer Marlene Huissoud carried out in collaboration with bees and silkworms. Both are, in fact, able to produce adhesives, such as sericin and propolis, useful for joining different natural fibres into new material. Also, "Mogu" moves in this direction, a family of composite materials for indoor uses and with sound-absorbing properties, consisting of 80% vegetable fibres and 20% mycelium, vegetative state of mushrooms and natural biopolymer, engineered to obtain specific properties and monitored during growth according to strict protocols.
Similarly, the digital and computer revolution has created an artificial dimension that is equally varied, active, interconnected, capable of interacting with humans and the biosphere (Van Mensvoort & Grevink, 2010). This increasingly stimulates widespread creativity, leading designers to experiment with the material and manipulate it through

new, customised and controlled manufacturing techniques, free from the rigour of classical production and conditioned by human action (Techno-cycle). This leads to new materials which performative and expressive properties derive from the application of a creative and digital process, such as "Nuo", soft and flexible material like a fabric, but produced starting from thin wood veneers engraved by laser cutting with microtextures that can vary its softness but also the final tactile experience (Fig. 3).

Empathy: Eloquence, Memory, Biophilia

The communicative power of all these materials is an increasingly important aspect that involves research in design in order to give it equal dignity with respect to performative skills. However, some projects make values communicate their strength and the search for meaning the way to innovation. Through the materials, they try to convey an innovative message, be it critical, experiential or expressive, but still capable of stimulating the senses and going deeper (Eloquence). "Marm/More", conceived by the start-up Fili Pari for example, is innovative microfilm made from marble dust and spreadable on fabric, but alongside the performative aspects, the creators place the accent on the "softness of marble", which thus becomes warm, flexible and malleable enough to be worn (Fig. 4). Today the values to transmit are many, and the designers, immersing themselves in contemporary ethical, environmental and social problems; in the new holistic view of the Universe; as much as in the state of mind of the community, they try to reveal and communicate them, also stimulating through material experimentation new languages, attitudes and behaviours such as respect for biodiversity or cultural diversity; the re-evaluation of memory and the importance of the quality of life. For example, belong to this trend, some materials that, in spite of a globalised world, are made up of homologated aesthetics and products without personality, aim to safeguard local specificities, cultural models, customs and traditions, and make their semantic character the competitive element (Memory). "TipicoAtipico", for example, is a souvenir collection created by Lanificio Leo, which combines contemporary graphic expressions with an ancient handmade woodcut technique in rust on fabric, to reconstruct the iconographic imagery of the Italian regions. Along the same path move all those material experiments that investigate our very essence as human beings, the profound apprehension for survival and the imperceptible ties with the living, which translate into concretisations that best summarise the ultimate goal of design: to improve the quality of our interconnected essences (Biophilia).

Figure 4.*Fili Pari, Marm/More, 2018 - Innovative microfilm spreadable on natural and synthetic fabrics, obtained from the recycling of scraps from the processing of marble. The fabric is soft and waxy to the touch, thanks to the presence of calcium carbonate. Source: Saperi&Co, 2020.*

Conclusion: telling complexity with experience

The field of materials is in continuous and rapid evolution and today appears more stimulating than ever for the project. The new materials and design approaches, in which material choice becomes the very object of the design activity both upstream and downstream, offer multiple and surprising opportunities for the designer (Karana et al., 2019). Opportunities are aimed at rebalancing our relationship with the planet and, at best, reshaping society (Franklin & Till, 2018). Although many experiments are in a prototype phase or limited to small series, the results achieved are fundamental for material culture's evolution, encouraging designers to restore confidence in their ability to intervene on the matter and to act as catalysts of an environmentally and socially sustainable materiality. Even Hylocene, with its 80 (current) samples, collects materials and products on the market, but also research results not yet mature and known but highly innovative, which therefore require the involvement of designers in order to be qualitatively improved and/or applied in new products.

Figure 5. *Material sheets – Each material has a dedicated sheet in which are listed all the principal informations. The properties are communicated through scales of gradient. Source: Saperi&-Co, 2020.*

Like a museum itinerary, Hylocene thus offers a broad and articulated vision of how the most current contemporary scenario on material experimentation presents itself and allows the user to venture into real exploratory paths, which start from the general and delve into increasingly more articulated and specific themes, investigating very distant issues but without losing the overall picture. On a virtual level, through specific algorithms, each material will be "tagged" with one or more themes, which, if of interest to the user, can be explored. Selected, they can lead to a webpage wholly dedicated to the topic and explain it through descriptions, articles and materials, comparing them. On the physical level, a graphically presented exhibition itinerary immediately makes the three macro-themes clear; while going in deep, you can discover the ramifications of each. In this way, the user experience becomes experiential and interactive, allowing him to enjoy samples of the materials in person and explore their perceptual-sensory characteristics, as well as compare them with other materials, explanatory paperbacks, product prototypes, etc. Also, in this case, the user can explore and interpret the younger and more dynamic production reality that surrounds us rather than collect precise data and information like a scientist. This does not mean that the material library does not pay attention to the rest of the information: for each material will be listed physical, performative, sensorial, and sustainability properties (according to scales of gradient); category; applications and much more; both on a virtual level – through a classic system of filters that allow you to find a specific material – both on the physical level – presenting a sheet for each material with all the necessary information (Fig. 5).

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