rrow disciplinary-professional framework may push them to be facilitators of processes that escape their comprehension, instead of being critical interpreters of the tendencies at play and suggesters of goals and alternative routes."[13]

Therefore, architects' education and training must face the overlapping of the disciplines involved in the project-making process, thereby stimulating the approaches and the capacity for dialogue. A good practice for achieving this goal would be to incentivize contact with the collectivity, valuing the figure of the architect as a holder of knowledge that produces valuable short-circuits only if they are connected with outside contributions. Because, in a project that does not work, "these discomforts could be seen as the completely unhidden result of a lack of empathy, the work of architects who forgot to pay homage to the subtleties of the human mind, who allowed themselves to be seduced by a simplistic vision of what we can be, instead of paying attention to the labyrinth-like reality of what we are."[14]

CONCLUSIONS

In response to the questions posed at the beginning, I believe that architects, urbanists, and planners can successfully become active players in the important processes of creating identities, forms, and substances out of the architectural and urban spaces of the city of the future. Architects could create a convergence of forces that would otherwise remain dispersed and possibly unused. The inertias are forms of resistance that are opposed to modifications to the state, and therefore do not allow things to be seen from different, purposeful viewpoints, thereby allowing one to suppose that such junctures are unavoidable, with no viable alternatives. For architects, challenging the inertias would then be a series of actions to fulfill: personal, professional, and educational actions.

They would have to feel more personally committed to the important social role that the collectivity's organization bestows upon them. They could be more committed and aware, become the messengers of widespread interests, by knowing how to interpret the intentions of the interested parties and by facilitating an architecture belonging to everyone, by engaging in a new type of development.

Professionally, when trying to imagine some potential methods for architects to challenge the inertias of the project system, starting off with a complicated and chaotic situation such as the current state of things, characterized by complex socio-economic transformations, the panacea of a univocal, uniform, and immediate solution would be difficult to activate and achieve. They would be cross-cutting interventions within a variety of ambits, even those not directly linked to the project, those which could straighten out the course of architecture and urban planning. These actions are forces that could wield an effect on the inertias by halting processes repeated through conformity and triggering other valuable processes of individual and collective progress as well as the exchanging of information. Such operations would serve as punctual forces—urban and social acupuncture[15], so to speak.

Architects' education and training, to break with the inertias, must place people at the center of attention, in addition to reinitiating a discourse of research on the relationship between architecture, society, and its desires. At the same time, it should be geared towards the learning of architects in contact with civil society, encouraging experiences relating to every type of concrete transverse situation.

The critic Deyan Sudjic affirms that "in architecture power belongs above all to whoever has the ideas."[16] So perhaps all that is left to do is to virally spread good ideas and practices for power-sharing.

LO ARTESANAL / *DESIGN THRU MAKING*

NATURE: BETWEEN THE FUTURE AND A NEW TECTONIC DIMENSION

Wilfredo Méndez

The concept of that "to come" belongs to the trinity of states of time: past, present, and future of which the latter is the only one over which one can assume. Through personal development, every individual is able to construct a particular conception of the future. The idea of this state of time is, in most instances, adopted from commercial concepts. Thus, nowadays, Hollywood is the architect par excellence of those concepts that constitute the paradigm of the future for society. Therefore, that very idea is commonly associated with a time and space cut off from reality or from present control; an out-of-reach time belonging to a strange, quasi-fantastical space.

It is common for the future to be easily linked to science fiction topics. Nevertheless, theoretic stances regarding the science-fiction-based architecture to come are rarely argued. From an architectural dimension, it would be possible to define futuristic tectonic characteristics founded on the art of science fiction such as biomechanical structures, robotic forms, aerospace constructions, etc.; in short, a group of concepts that we dissociate from the constructive reality and practice of architecture (**Fig. 1**). Although generally science fiction is associated in an absolute fashion with an unreal state, this dimension certainly allows for exploring innovative

solutions and concepts capable of constructing ideal, boundless theoretic stances for the future.[1] By reflecting on a theoretic stance in science fiction sheltered in science fiction, we could come to the point of questioning the evolutionary direction of that architecture to come, and the development of the very paradigm of the discipline itself. Hence, what should the future of architecture be linked to? How should architecture change or evolve to adapt to the needs and expectations of the future? How should sustainability be necessary for the future? What should define beauty in the future?

There is currently an important debate regarding the future of humanity, cities, and global civilizations. Indeed, said debate significantly appeals to architects and designers of cities given that more sustainable ecological planning and cultural developments with important socio-economic implications depend on these disciplines. For these same reasons, the design paradigm has evolved toward a culture of sustainability. Renewable energy systems, alternative fuels, passive design, and even the color green form part of the new taxonomy of contemporary design. However, some studies indicate that this form of sustainability is not enough[2] to subvert the effects of the design paradigm that has been predominant since the Industrialization at the end of the 19th century.

The problem with contemporary sustainability is that it is designed on the same industrial perspective of a mechanical nature that has been pointed out as a main cause of the current environmental degeneration.[3] Even though we mark designs and products as "ecological" using certain conservation principles, the problem has not been able to be eradicated in a decisive manner,[4] but rather the process of environmental degeneration has only been able to be decelerated. Therefore, the problem essentially stems from the same paradigm of the mode of designing and conceptualizing architecture. A truly ecological future merits a paradigm of ideal sustainability that could be constructed from the utopian foundations of science fiction yet upheld by the pragmatism of emerging technologies. Based on this premise, it would be logical to argue a possible solution for the architecture to come: an entirely ecological future is that made up of built structures capable of behaving just as natural structures.

Nowadays two cycles that act within this context can be easily distinguished: the cycle of ecosystems and nature, and the industrial cycle to which artificial design, consumers, and users belong **(Fig. 2)**. Under the current paradigm, these cycles are counterpoised and incongruent with one another. The natural cycle operates within its parameters without interacting or relating with the industrial cycle that concerns the generation and consumption of products designed by and for society. That absence in congruity and among cycles continues to be the main cause of the environmental problem, even after the ecological efforts that have been made.

The design, architecture, and planning of cities have ignored the performance, flow, and importance of nature and ecosystems for humanity itself for years. As a consequence, this has managed to destabilize the system, and therefore, we now generate more carbon dioxide emissions than nature can absorb and we are able to eliminate. Society based the production of its utilities on energies generated with non-renewable fossil fuels. Even more critical is the fact that the implications of this behavior and paradigm bring about a process of degeneration that spans from pollution and its adverse effects on health, to Global Warming and an increase in the frequency of natural disasters.

The buildings that are currently being designed, just as at the end of the 19th century, functioning like machines independent from their environment. Nevertheless, it is clear that the buildings for the future should function in total congruency with their natural context and all other ecosystems. A series of research studies on materials, biotechnology, industrial design, engineering, and even medicine reveals that the development of emerging technologies that could cause artificial structures in the future to perhaps possess certain characteristics of living things.[5] Living things are part of a complex system governed by a wide array of unique processes that a machine simply cannot possess.

A truly ecological building should be capable of acting like nature, including being an extension of nature itself **(Fig. 3)**. How does nature work then? Nature is essentially a great system made up of more microsystems that, together, form the natural ecosystem. Evaluating the entire natural ecosystem would probably be as complex as evaluating an entire city. Certain parameters of these exist, however, that are easy to identify. One basic principle is that nature, its parts, and organisms are sensitive to context. For instance, biological forms respond and adapt, structurally and mechanically, to the environment as they grow.[6] Therefore, biological morphologies are products of the morphogenesis that results from the adaptation of the form to the context or environment, as occurs with the form of certain seashells which have evolved to withstand the pressures of the ocean or attacking predators. Moreover, nature is a resilient system. This means that it continuously adapts to maintain the balance among the various systems that it contains even in the face of sudden occurrences; in other words, nature recuperates without suffering drastic changes, it self-regulates. Nature produces energy for metabolism; it transforms types of energy, uses them, and shares them. Additionally, biological systems are multifunctional. The muscles of the body, for example, not only allow movement of the skeletal parts, but also serve to store energy for the body. Nature's ecosystems function and work in con-

junction, where the waste from one is the energy or nutrient of the other. **(Fig. 4)**

Many of these different design strategies have come to translate into the architectural design parameters enshrined in the philosophy of biomimesis. How much safer would structures be if, just like skeletons, they could interact with their context in a resilient manner? How much healthier would our living and working spaces be if, just like plants, they were capable of cleaning the air of carbon dioxide by transforming it into oxygen?[7] Biomimesis (bio implies life, mimesis implies imitation) is the design philosophy that promotes establishing analogies among nature's forms, processes, and parameters of adaptation to generate innovative solutions in the face of the problems afflicting humankind. This design philosophy seeks for, among other things, the tectonics of artificial or human-made things to possess nature-like characteristics with the aim of relating the natural cycle to the industrial cycle. The purpose of this particular proposal is to begin designing products that are sensitive to the natural context and its ecosystems; in other words, it seeks to interrelate both cycles in such a way that artificial designs are congruently integrated into the flows within ecosystems.

As a good example of the benefits of biomimesis, the creation of biodegradable plastics could be mentioned since a designed material such as plastic manages to degrade in a quasi-organic manner that the ecosystem recognizes in its metabolic cycle. Another example in biomimesis seeks to make it so that reinforced concrete structures are inspired by human bones to reduce the amount of cement used for building and increase their structural and ecological efficiency.8 This same structure, which was proposed and evaluated for the determinants of the Caribbean, managed to improve the structure's seismic response in the event of such an occurrence. This means, that by imitating the structure, morphology, and mechanics of bones, the concrete part used less material, reduced the carbon dioxide emissions in manufacturing, and managed to be more rigid and safer during a strong earthquake than conventional concrete structures **(Fig.5)**. Biomimesis implies a different angle of practicing architecture adapted to natural ecosystems to increase efficiency, not only in terms of design, but also in its relation to context.

Biomimesis also holds to more complex scientific dimensions for making architecture and design entirely sensitive to nature. The focus of synthetic biology is to design inert materials that at the same time possess biological characteristics, that is, materials without DNA but with organic behavior. Standing out in this practice is Dr. Rachel Armstrong of the Bartlett School of Architecture in England, who has managed, in a laboratory, to design inorganic material with the ability to grow as if it were alive and be as strong as some forms of concrete.9 This concept could in the future come to bring about an architecture capable of repairing itself without the need for additional resources, labor, or interventions. Likewise, other studies underway seek for built structures to resemble the efficiency of skeletons in terms of their performance, as is the case of semi-solid concretes that are able to dissipate energy and thereby avoid fractures. How much safer will these buildings be? Materials that are translucent, iridescent, and bioluminescent, CO2-absorbent, air-purifying, etc. also form part of that gamma of emerging technologies that have been inspired by nature itself as a means of managing to integrate the architectural design process into ecosystems **(Fig. 6)**.

Much of this technology has been being developed for years by the medical industry with materials and alloys that are capable of interacting with organic tissue for the development of better transplants, prostheses, and synthetic organs. From that viewpoint, the idea ceases to be science fiction and manages to shape out a potential future for architecture in which artificial creations may directly interact with the natural flows of the ecosystem and even contribute to their functions. This unusual concept is known as symbiosis. What sustainability should we pursue then?

The architecture to come has to be founded on another paradigm that replaces the current approach to design (top-down approach) where the structure is conceptualized from its overall form to the selection of the material with an approach in which the design of the material and its performance within the context define the form of the building (bottom-up approach).[10] The architecture of the future must manage to be sensitive to context, must be able to communicate with the natural ecosystem, and must even convert over to the ecosystem as an intrinsic part of its functions and infrastructure. Recently, a novel building concept was designed for the Caribbean that is inspired precisely by its dependence on its context. Through a study on the ecological performance of its site location, the structure manages to transform the site into part of its architecture and it makes it work intrinsically with that infrastructure. More than conserving the ecosystem as a natural habitat and being used as landscape, the rain runoff system of the ecosystem is integrated into the gray-water system of the design, and moreover, the land on the site serves to regulate the thermal load and thereby save energy among other factors **(Fig. 7)**. Instead of being an independent building, architecture becomes sensitive to its context in order to interact with it.

This architectural re-engineering should not be foreign to Caribbean development. At present, this region possesses a very restricted taxonomy of materials practically limited to metal, cement, stone, and their derivatives. Very rarely has there been any exploration of naturalized options such as bamboo,

which possesses genuine biological characteristics. Also the forms of buildings and their technological implications in congruence to the environment have evolved very little. Therefore, what the architecture of the future for the Caribbean should ask is: how is cement or concrete able to be environmentally sensitized? What architectural morphology is ideal for the ecology of this particular region?

The architecture to come is intimately related to the level of sustainability to which we aspire. Making architecture and design respond to the environment and ecosystems is a necessity in order to avoid compromising the possibilities of future generations to tend to their own needs. Society, culture, and civilization are evolving in a direction that entails technology and sustainability. Dr. Armstrong argues that any sufficiently advanced civilization is indistinguishable from its nature. This premise does not imply that in the future architecture will be camouflaged or confused with organic forms in nature, but rather that the performance of the building will emulate the behavior of ecosystems. Building's future does not belong to buildings, but rather it belongs to "Living Architecture" and it transforms it into part of a Second Nature.

P

THE FIBER OF TIME

Andrés Salas

The hybrid composition of the modern metropolis gives way to the convergence of elements that coexist in a state of dichotomy and contradiction. As part of this phenomenon, the concurrence of thousand-year-old artisan techniques with the continuous evolution of current technologies is manifested. This tendency is on display in various creative disciplines such as architecture and design. Its broad panorama allows for multiple possibilities for expression that form part of my creative exploration as a designer.

As part of my creative diversification, I produce works that integrate several disciplines into one same piece, such as furnishings, lighting, sculpture, and textile art. In these works, production processes and techniques separated by thousands of years of tradition are blended. In their execution, age-old methods and traditional materials coexist at play with high-tech modern materials such as metals and polymers. The techniques include traditional woodturning, the production of fiber through artisanal processes, high-tech welding, and cutting stainless steel and aluminum with laser and waterjet technologies. The possibilities within this expressive setting are wide-ranging and include several textile art methods.

Textile art is directly related to the development of diverse civilizations throughout the history of humankind. The first display of fibers was the rope, achieved by way of the twisting of natural fibers. Textiles have been developed accordingly to satisfy humans' needs by being used to make blankets, fishing nets, transport bags, sleeping mats, and clothing to replace the use of hides. By satisfying first needs, diverse techniques were developed for their production and to improve their quality, functionality, and esthetics. Later on, textiles expanded in terms of their uses and their decorative qualities were promoted by associating them to the political and religious hierarchy. The invention of the loom allowed for the successive evolution of textiles and industrialized their artisanal process to facilitate their circulation.

Nowadays textile art is recognized as an age-old traditional expression alongside the currents of contemporary art whose ample plastic expression integrates multiple disciplines such as graphics, low relief, sculpture, and design. My relationship with fibers as a medium began at an early age as part of my fascination with sailing. By visualizing the various fibers as structural vectors, I understood their virtues and their multiple applications. The meshing of glass and carbon fibers to create the organic form of a vessel, the production of a wide array of textiles that make up the sails, and the use of the ropes that allow for control in the art of navigation. With this knowledge, my interest in the creative application of fibers, ropes, and diverse knot-tying techniques was born. **(Fig. 1)**

Knots consist of the joining of two individual fibers lacking structure that are combined by way of a reciprocal system, thereby acquiring structural integrity. Knot-tying achieves a multiplicative effect where the joining of fibers constitutes a product greater than the sum of each fiber in its original state. Upon being consolidated under this principle, they establish a fixed point where the effort to separate them is greater than the effort to compose them. Knot-tying techniques are quite varied and are related to their diverse uses and their cultures of origin. The systematic repetition of a certain technique can generate the creation of a continuous fabric constituting an integral surface. **(Fig 2)**

The creation of a surface through textile art techniques bears a metaphorical relation to the discipline resulting from the organizing of chaos. The systematic organization of fibers through methodical knot-tying techniques and patterns establish a metaphorical parallelism that alludes to social organization processes and the creation of the urban fabric. The combination of diverse elements organized through a coherent system generates the integral union to coexist in a state of symbiosis. **(Fig. 3)**

The textile work "NUDOS DESNUDOS" and the "LEVITANTiS" end tables make up a scene-like combined composition. In this relationship, a conversation is established between the white Flowers of the