SUSTAINABLE ARCHITECTURE

Between Measurement and Meaning

Edited by

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FOREWORD

Walking the wire – sustainability + design in an uncertain ethos

Brian R. Sinclair

University of Calgary

"Smile
You don't have to spend your days in clouds
Hiding from the sun
Take a look around and see
It's not that easy for anyone"

Chris Rea, 1988.

Today we live in uncertain, unprecedented and unpredictable times. The world we knew – one characterized by reasonable levels of stability and a modicum of sureness – is now dramatically dissolving and disconcertingly dissipating, only to be replaced with a milieu all too commonly cast as chaotic, intense, polarized and improbable. For architects and environmental designers, recent times have proven particularly difficult, in part due to a longstanding subscription to the static, iconic and permanent, and in part due to an ever-increasing marginalization of the services they deliver to societies in flux. That said, the turbulence that has arrived so abruptly into our cities, communities and lives now offers opportunities for positive change through the vehicle of design and via our toolsets, our mindsets, our means and our methods. While architecture in a bricks and mortar age celebrated solidity and hardness, environmental design today finds itself in a place where agility, softness, responsivity and responsibility loom large.

Sustainability factors centrally into such musings. With decreasing resources, escalating climate change, growing tension and heightened risk, architecture finds itself in an interesting position. Undeniably part of the problem of environmental decay, buildings contribute in serious ways to our planet's demise. However, in light of rising greenhouse gas emissions, burgeoning landfill contributions, declining public health and other distressing developments, architecture and environmental design proffers hope. Design by its nature is well equipped to tackle highly complex challenges and penetratingly perplexing problems. Architects, landscape

architects, interior, industrial and urban designers, to name but a few vital players, all hold strategic keys to move us in the right directions. That said, many strategic adjustments and tactical maneuvers are required, including in realms political, to unleash the power of design within and to a world in need.

Carmela Cucuzzella and Sherif Goubran's new book, entitled "Sustainable Architecture – Between Measurement and Meaning" arrives at a significant point in time. Their edited volume challenges many of the assumptions that have developed in recent years concerning the concept of 'sustainability'. Sustainability is a term that has amplified in reach and expanded in meaning, being widely embraced by many sectors of society in an effort to turn a ship that is perceptibly careening towards disaster. However, with such a strong uptake comes confusion and, at times disarray. In many ways and in many corners we encounter jargon fatigue, sensing on one hand the imperative to act yet often unclear concerning which steps to take. One major obstacle to moving ahead with purpose and success is the West's obsession with metrics, facts and truths. Metrics can miss their mark. Facts can shift based on the efficacy of our instrumentation and the potency of our theories. Truths are regularly relative. An all too common mantra espoused by a wealth of players suggests, "If you can't count it, it doesn't count". However, not all that matters, or that might or should reckon in our equations, can be readily counted or easily characterized.

The new edited volume takes a crucial step forward in its direct challenge of conventional thinking on sustainability. Highlighting the proposition that sustainability must be cast beyond math and measurement, the various chapters serve to open our minds to new ways of seeing, thinking and acting. Beyond the easily quantified dimensions of an environmental design project, whether energy consumption, water usage or volatile organic compounds levels, resides aspects that inject substance and meaning into our journeys. The various invited authors, across their diverse and thoughtful chapters, reveal features of architecture and design that, at the end of the day, prove the most essential to a more sustainable world. Rather than merely discounting the value of evidence, research and matters empirical, the authors accept the power of contemporary science while moving beyond to capture more ethereal dimensions of inhabitation that are vital to realizing truly sustainable cities, neighborhoods, buildings, places and spaces.

Modern civilization has, on numerous counts, slipped into a milieu where dualistic thinking has obscured our ability to see with clarity and definition. We cast situations as polarities: art-science, poetic-pragmatic, soft-hard, intuitive-rational, analog-digital, heart-head, feeling-thinking, and so on. This clinical parsing of our world, and the accompanying pressures to then take sides, has been destructive and counter-productive. It has ushered in spheres of fragmentation, isolation, separation, disconnection and disenfranchisement. Further, and all too often, one side of the spectrum has been advantaged above the other, rendering

science, technology, engineering and math above other means of understanding. Considering my own world & self views, informed by my posturing as an architect and psychologist and influenced by my background spanning science and art, I see the present situation as dire and in need of numerous and concerted surgical strikes. At the center of the challenge is the need for balance, equilibrium and holism. In my holistic framework for design and planning, I underscore the need for harmonious interplay of agility, fitness, diversity and delight. This last quality, one that acknowledges beauty, pursues happiness and accepts things incomprehensible, has been controversial – in large part due to its inability to be empirically defined. That said, the notion of delight carries as much cache and worth as any components of a project that can be quickly counted, simply metered or methodically measured.

The present edited book is significant in many ways, but perhaps most vividly through its inclusion of an array of facets that make our sojourns interesting, satisfying and meaningful. Sustainability is far more than operational savings, water conservation and reduced embodied energy. Sustainability must be deeper and richer, accounting for more indeterminate and qualitative features such as social value, aesthetic wealth, amplified well-being, cultural vibrancy, and spiritual tilling. Cucuzzella and Goubran's timely volume serves to apply the brakes to our amplified techno-centric trajectory, affording the reader an opportunity to consider the richness of design and its capacity to provide more appropriate, more sensitive and more human environments for living, playing, working, surviving and thriving.

While the environmental design professions have made serious strides forward in the last several decades, with respect to reducing ecological footprints and increasing quality of life, much more work stands ahead. While initial building rating approaches were overly simplistic and too narrow, recent iterations and advancements have moved the needle towards individual health and societal well-being. Such progress is encouraging and essential. However given recent crises, including the arrival of a global pandemic, the rise of anti-racist movements, the growing political tensions apparent within and between nations, the growing wealth divide, to name but a few daunting challenges in our lives, there is an urgency for architects and allied professionals to act. Such action must consider the behavior of complex systems – we cannot continue with piecemeal gestures and partial steps that too often are uncoordinated, inappropriate and impotent. To my mind r/evolution will demand a far-reaching embrace that encircles science, the arts, the humanities, culture, context and spirituality. We must not be fearful on treading on ground unexplored and anticipating collisions unprecedented. We must also be willing to invest the time and resources required to tailor solutions to place and circumstance – in a new domain of sustainability one size does not fit all and

universal answers are unlikely. Fortunately, science and technology, wisely and humbly coupled with common sense and human-centric orientation, can generate place-based solutions that meet expectations, extend comfort and reduce impact. An era of smart cities, intelligent buildings and responsive spaces is possible, and should be efficacious if driven by both artificial intelligence and mortal compassion. As we confront unfathomable uncertainty we must learn to take greater risks, to accept that not everything is comprehensible and to grasp that steadiness, moderation and open-mindedness are central aspirations.

The arrival of *Sustainable Architecture – Between Measurement and Meaning* is a welcomed addition to our national and international conversations on the future of cities and societies. Through its varied and compelling chapters, the book calls for a reconsideration of design in light of rapidly shifting realities in our new millennium. The authors provide us with differing, thought-provoking yet complementary vantage points for evaluating our place, processes and progress as we dwell on an ever more distressed planet. Carmela Cucuzzella and Sherif Goubran are commended for their vision, efforts and success in confronting the status quo, and for shepherding a talented ensemble of authors to join them on this acute journey.

Dr. Brian R. Sinclair, PhD DrHC FRAIC AIA (Intl)

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INTRODUCTION
Caught between measurement and meaning

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INTRODUCTION

We often think about sustainable architecture as a way of designing and constructing buildings to exist in harmony with the environment around them. We think in terms of reducing negative impacts on flora, fauna, natural resources, our communities, and our economy. For many of these imperative objectives, measurement is key to designing sustainably. But how do sustainable buildings affect the interrelated qualities of our built environment, though, and how do they relate more generally to quality of life for all living species?

Philippe Boudon has stated that "measure[ment] in architectural design necessarily associates some qualitative and quantitative, but it is understandable that this follows the notion that it is not possible to have any measurement without meaning" (Boudon 1999a, p.9, translated by authors). If we agree that measurement consists of assigning a number to a characteristic of an object or event so that it can be compared with other objects or events, then the process inherently embeds the relevance of the qualities of its object or event. The practice of sustainable architecture involves an interminable list of measurements meant to enumerate environmental damages and optimizations of processes. These quantitative facts and figures proceed only because there is an intention to envision, understand and manage the harmful impacts of architecture and construction. Sustainable architecture has been overrun by measurements, but at what devastating architectural cost, and more importantly, to what concrete sustainable development outcomes?

Despite all that we know about the sustainability crisis today, despite the many sustainability parameters we measure or manage, and despite our adeptness at developing new eco-technologies, the rate of environmental

damages is still increasing across the planet (Venter et al., 2016). While population growth is one of the most well-known factors affecting the environment (Ehrlich, 1968), it alone does not explain this phenomenon. All sectors of development contribute a share of this destruction: i.e. transportation, food, building, and infrastructure, etc. But the prominent effects of buildings on the environment have been long established. On a global scale, buildings (during construction and operations) consume approximately 40% of the energy supply, 30% of the raw materials, 12% of the global freshwater, and to globally generate up to 20% of the global GHG, 40% of the total landfill waste, and 20% of the water effluents.

Indeed, energy and emissions reduction goals are not new; they were first propagated during the 1973 oil crisis (Peffer et al., 2011) and have been deeply embedded in the technical advancement of buildings since. In many cases, it is technology that is driving innovation in the built environment (De Dear, 2011). Similarly, the technological emphasis of resource efficiency for addressing environmental degradation systematically developed throughout the 1980s and 1990s began to reach its limitations around the turn of the century (Cucuzzella, 2009; Rossi, 2004; Papanek, 2000). In more recent years, energy infrastructure and grid limitation have pushed researchers to explore means of controlling energy demand – especially during peak hours (Zehir et al., 2019). When the strategy of eco-efficiency is adopted at the exclusion of other design approaches, it tends to subordinate central complex concerns of design to a stated mission (Rotor, 2014; Guy & Moore, 2005; Hansen & Knudstrup, 2005).

The strategy underlying eco-efficiency has as its goal the *prevention* of risks – the reduction of risks that are known and measurable. Such a goal is the product of a society where there is little tolerance for the occurrence of risks and significant effort put towards mitigating their outcomes (Cucuzzella, 2016a). Given the dual crises of climate change and environmental degradation, this is quite justified. However, research has shown that overuse of eco-efficiencies on their own may actually lead to increased environmental impacts. At times, this may be related to unintended outcomes of performance optimizations, and at other times, to unrelated secondary or tertiary activities or sectors (Alcott, 2008; Herring & Roy, 2007; Sorrell, 2007; Madlener & Alcott, 2006). Over 150 years ago, William Stanley Jevons discovered that gains in energy efficiency ultimately lead to greater energy consumption (Polimeni, Mayumi, Giampietro, & Alcott, 2008), and his paradox shows up in various aspects of life even today[1]. The phenomenon is clearly apparent in residential energy consumption.

[1] For example, the wider that designers build a given highway, the less traffic jams are

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