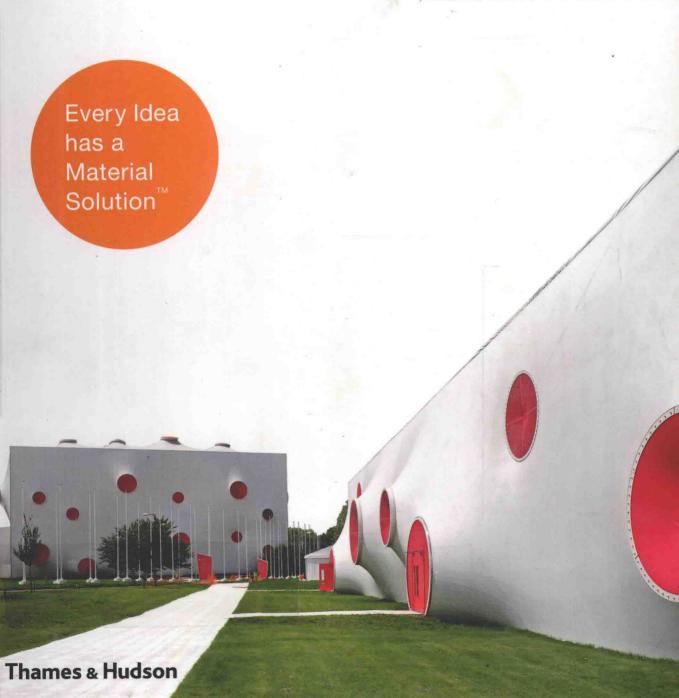
## ARCHITECTURE

Andrew H. Dent & Leslie Sherr



# MATERIAL INNOV. ARCHITECTURE

With 415 colour illustrations

常州大字山书師藏书章

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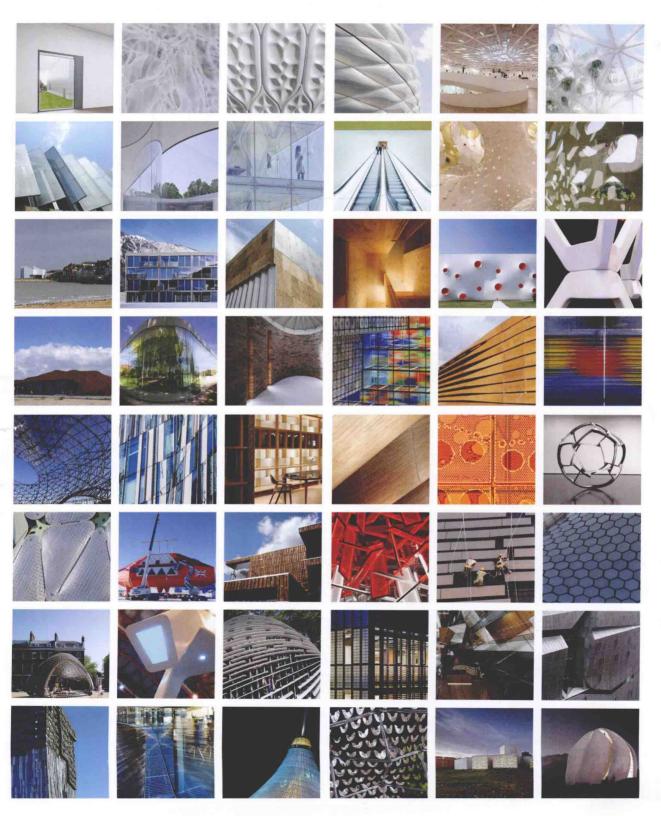
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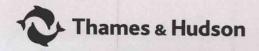
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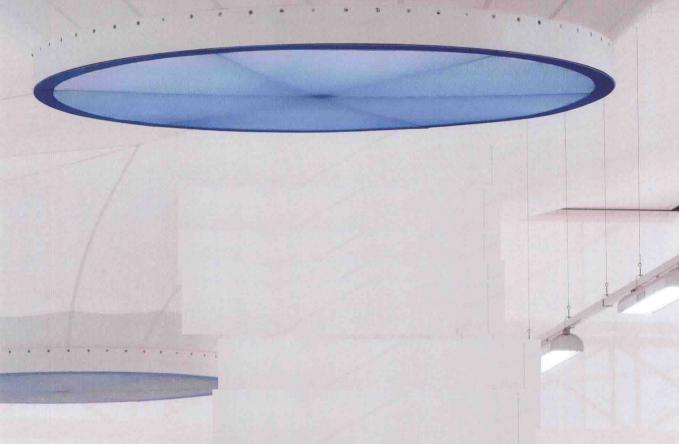
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MCX Material ConneXion



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### PREFACE

#### BY GEORGE M. BEYLERIAN

hen I founded Material ConneXion in 1997, the idea of a library of advanced, innovative materials where architects and designers could come in search of not merely materials but inspiration and innovation was unheard of. These days, access to and knowledge about materials is almost commonplace. But, back then, building a forum for exchange between creatives, engineers, and material manufacturers was something of a radical act.

No longer. Today, Material ConneXion offers a global resource for material research whose influence and expertise informs a wide range of corporate, cultural, and consumer sectors, and touches literally hundreds of thousands of people daily. Beyond the experience of visiting the library—now located in ten cities around the globe—publications, both print and digital, offer a meaningful way to share the library's vast material intelligence with professionals, educators, and students.

This first book in a ten-part series published by Thames & Hudson, which specializes in exceptional illustrated books, is, then, the synthesis of decades' worth of Material ConneXion knowledge that points the way toward the most original and daring visions driving architecture today. When we think about the future of materials, it is obvious to me that those who have recently contributed in

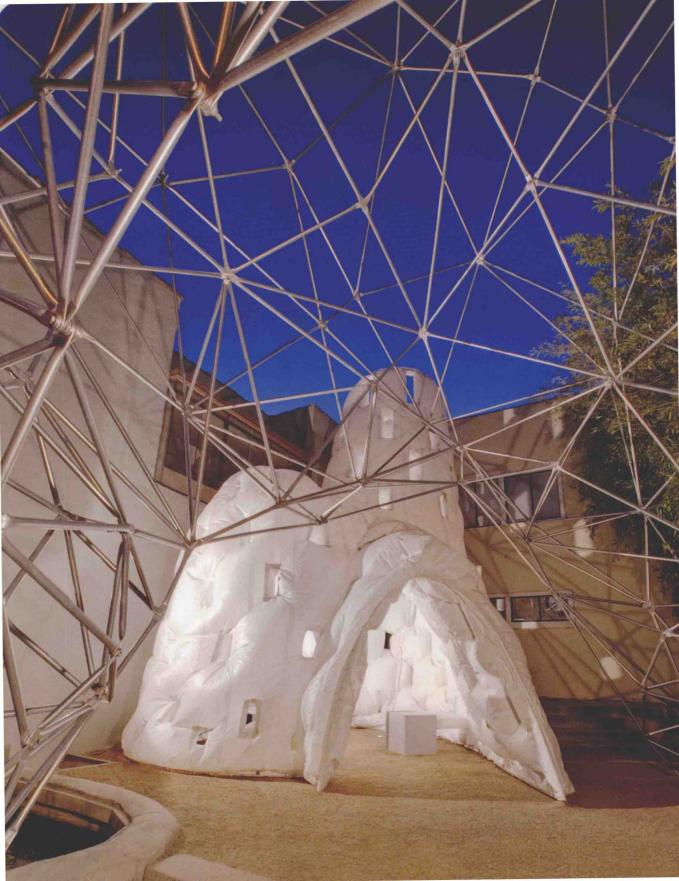
so many remarkable ways to our physical landscape should be celebrated for their contributions to the here, now, and tomorrow.

What sets this book, and all subsequent volumes in the series, apart is its focus on specific categories of materials that reflect the most rigorous, intellectually inquisitive questions being posed today by a given discipline. Whether it is architecture, fashion, or transportation, innovation is the driver that inspires creatives, scientists, engineers, and manufacturers to imagine and pursue the optimal material for each specific application so as to elevate the objects, spaces, and experiences with which we live and work.

This is an exciting time for design education to be forward-thinking and to capitalize on the unprecedented potential afforded by libraries such as that of Material ConneXion, especially as technology gives students greater opportunities for collective experimentation. Emerging practitioners are empowered not only by software but also by the knowledge made possible by such books as this, that are essential for learning by doing. Again and again, the same thrill I felt when I first started exploring materials, the sense of expectancy about what new ideas might be sparked, is as potent as ever. Every new introduction to the library recalibrates our imagination and sets the stage for that great collaboration when art and science come together to seize the moment and create something new.







### INTRODUCTION

#### BY GAIL PETER BORDEN, AIA BORDEN PARTNERSHIP

ateriality has re-established its essential role as the premise for the making of architecture. By confronting the question of what are shared current architectural interests among various practices and contemporary methods of teaching, a material discourse has emerged that fundamentally revolves around physical matter, material, and the process-based design decisions that emerge through making.

The essence of architectural making is found in material systems. "What" we make, and "how" we make, are essential to the definition and production of form, function, and perception. Materials are the essence of what architecture actually is.

The historical relationship between the material and the act of making was one of locality. Construction was rooted in tradition and provided both formal and technical solutions for how to build and what to build out of. The Industrial Revolution modified this localized relationship with the mass production of construction materials and the shifting of typologies, complexities and scales with which architecture needed to respond. Emerging networks of mass transportation and technological advancements, combined with large urban working populations, collectively permitted new scales of production able to provide an even blanket of availability, resulting in a seemingly appropriate universal applicability of new materials, tectonics, and associated forms. The architect was now

suddenly presented with a palette of materials allowing for selection based on diverse considerations such as cost, structural performance, durability, form, and effect. This began a detachment from material sources and a transition to application based upon intellectual desires. The composition of architecture became bound by the selection, application and detailing of materials, with locality no longer being the deciding factor.

Emerging fabrication and construction technologies along with innovation in material science have further expanded architectural flexibility and individuation.

Innate physical properties can now be overcome. Balanced by technological innovation, the expansion of potential application is ever increasing, fragmenting what had seemed to be stable traditions of use and application. Nostalgic perceptions of limits and abilities have been cast aside as the design application limits of a particular material are no longer seen as inherent within the material itself, but rather as functions of surrounding processes. Tools and materials have become inseparable and indistinct from one another. There is no material that is unmediated.

The new relationship established through the re-conceptualization of material roles has established a generation of architects operating along similar lines, grounded in an intense desire to make real things. Varied in technique and scale, method and intent, yet having a collective connection to the physical translation of

idea into matter, they are a generation fascinated with thinking through making. Challenging both technology and physicality to further the relationship of material to architecture, their convictions root the need for the actual physicality to engage the interrelations of material with space and experience. Their design method does not necessarily require a constructed result, but the physicality of the real is ingrained in their thinking and process. The method of working is ultra-real, demanding a physical response and challenging the thinking out of the abstract and into the bluntly real.

The foresight of this generation of emerging practitioners stems from their innately digitally savvy design methods, which allow for a seamlessly integrated engagement and permit their work to move beyond the formalist trapping of method and technique. The result is the derivation of new boundaries; techniques that engage craft and technology to hybridize architecture and making. This direct relationship allows for an interest in the material proper, the process of its manipulation and the assembly technique, all as issues to produce form and effect. As a result, the physical nature of materials and their interrelationship with tools has facilitated a new chapter in architectural thinking and practice. In an era of explosive technological advancements in both what we make things out of (matter) and also how we make, materials have led to a new discourse about process and product.

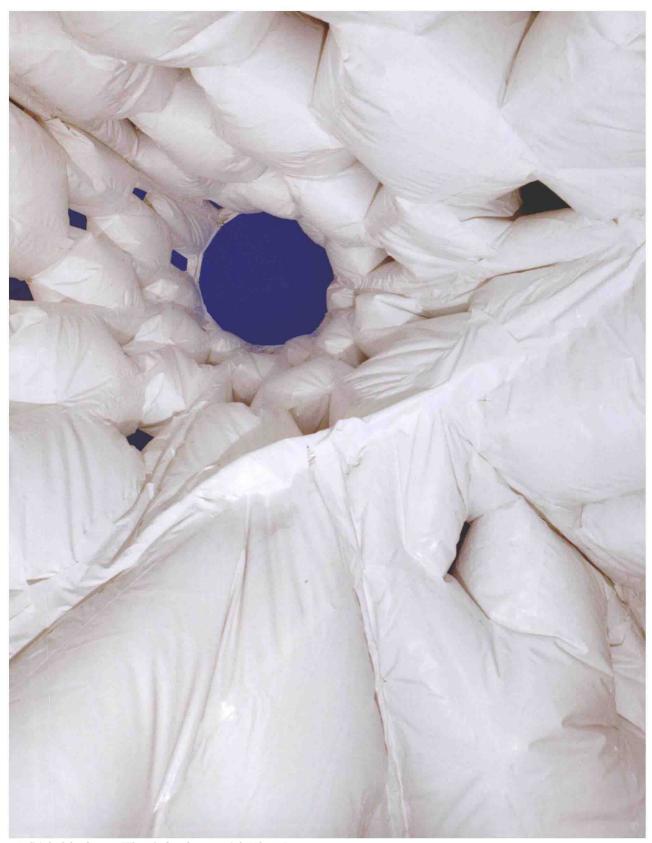
What something is to be made of is foundational to design thinking. The origins establish the result. Experimentation with tactile and physical properties has allowed the designer to reassert a connection to making long since divorced from the purview of architects. The confrontation of the "real," of the physical, the associative

and the intrinsic limitations and physical qualities of matter, positions the designer back in a direct dialogue with matter. In this conversation, architects now challenge expectations and battle with practical physicality. Matter as a form of resistance establishes an aggressive interface: cutting, shearing, bending, rolling, extruding, milling, punching, crimping, drilling . . . all allow for and establish the parameters of engagement. Tools become the mediator. Their collaboration establishes process through the interface of tool and material, allowing for the production, transposition and realization of new forms. These allow for reconsideration of performative qualities from the material to the assembly, and relate to the newness of perceptory and technical results alike. As a result evolutions have happened at four key scales.

#### MATERIAL PRODUCT

In the late twentieth century, the notion of material was aligned with a humanist tradition associated with the craftsperson. It was neither considered "avant-garde" nor recognized as a part of a conceptual project. Instead it was relegated to a technical discourse. This position is no longer tenable. The connection between the idea and the material is essential. Craft is not a base consideration, but the connection between the mind and the body through material.

The last decade has witnessed a shift toward a more practical model of architecture. The discipline of architecture has engaged a new literalism of architectural technique and production that focuses on material performance, to work through the real instead of ignoring it. As the architectural discipline begins what we can again term a more direct relationship with materiality, our disciplinary



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