

ISSUE 4:2

Matter

FALL 2020

TECHNOLOGY | ARCHITECTURE + DESIGN

Materials – and their alchemical transformations through construction – have long been the subject of intense study and thoughtful deliberation by practitioners and researchers. When carefully considered, materials can perform specific functions, contribute to human well-being, and attune our perceptions of the world around us. When poorly considered, materials can contribute feelings of discomfort and alienation; in aggregate, they can be significant contributors to climate change and other human-made calamities. It is self-evident that materials *matter*. Yet, materials are never isolated; they are experienced through phenomena such as light and sound and they exist in the context of other materials and technologies, within economic and political structures, and in forms that afford new possibilities. *Matter* intends to explore a range of socio-cultural, political, historical, and technological questions concerning the nature of materials in architecture and design.

Materials articulate architecture and profoundly influenced the form and content of the built environment. In the early nineteenth century, avant-garde architects struggled to emancipate architecture from the tyranny of two fundamental historical modes: *the trabeated mode*, bound to the physical characteristics of timber, and *the arcuated mode*, bound to the physical characteristics of masonry. Advances in the production of inexpensive structural-grade iron precipitated a revolution as new forms and proportions were increasingly possible. At the turn of the twentieth century, structural steel provided the catalyst for another architectural revolution, further heightened by developments in reinforced concrete. And now, in the early decades of the twenty-first century, mass timber, utilizing the only major renewable structural material, holds the promise for another architectural revolution

in the struggle to combat climate change. A holistic understanding of *Matter* includes an examination of social, cultural, and historical uses of materials. *What does an analysis of material industries reveal about our evolving culture of building? Are there new understandings of the relationship between material and human experience? How are material innovations responding to the challenges of our time?*

Contemporary advancements in material exploration are, on several orders of magnitude, more rapid and divergent than ever before. As society increasingly reckons with the consequences of a petroleum-based economy, researchers are looking for opportunities to construct our built environment with materials that are beneficial to the natural world, from carbon-sequestration to habitat management and creation. At the same time, researchers are exploring ways to reduce energy demands with smarter materials and assemblies. From phase-changing materials to nanomaterials to robotic fabrication, technology is opening new frontiers. Biological materials, such as fungi and algae, are expanding the range of organic and renewable materials beyond timber and grasses; and biological processes, including microorganic activity, are contributing to this transformation. Even seemingly-anachronistic materials, such as raw earth, are being reconsidered. *How are current material investigations responding to rapid climate change and the imperative for sustainability? What methodologies are researchers using to explore and test materials? How are designers, material scientists, and others engaging in material innovation, developing patents, and influencing business practices? How are emergent materials and cyber-physical processes altering the arc of architecture and design?*

Deadline: January 15, 2020
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