Designing Material Materialising Design

Paul Nicholas

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Content

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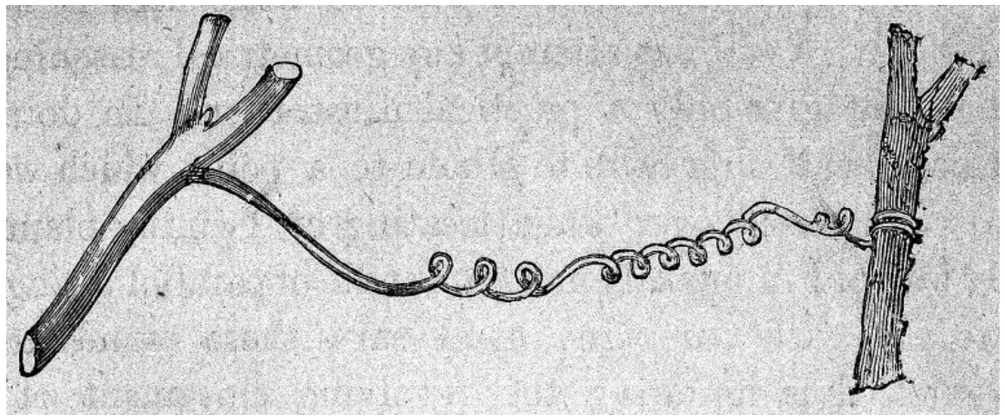

Tailored materials that encode programmed relationships between matter and energy often treat material distribution as a function of stress.
Charles Darwin's 1891 engraving of Bryonia Dioica, from The Movements and Habits of Climbing Plants, illustrates an alternate possibility that links the variation of material properties to macro scale formal variation.

Our material culture has begun to change. Emerging technologies around new and traditional synthetic materials have made the precise specification of materials and their properties a possibility. In their capacity for specification, the behaviour of these materials can be designed and embedded with design intent. Just as digital fabrication extended architectural control and design information into the manufacturing process, the tailoring of designed materials allows digital design data and simulation into the process of materialisation. Replacing long material familiarities and processes of selection and manipulation, this new practice draws us into the navigation of a less known space, and a new scale of material operations.

Designing Material | Materialising Design examines one aspect of this new practice. Focussing on fibre-reinforced composites, it explores programmed relationships between matter and energy as a means for orchestrating material formations. It proposes an architecture oriented towards anticipation and calibration, that move beyond optimization, and structures in which material properties are an important addition to geometry in the definition of form. But in shifting from a passive given to an active variable, material properties add significant complexities to the design process. This book explores novel concepts and operational models by which we might productively engage with them.

Designing Material | Materialising Design presents three projects developed at the Centre for IT and Architecture at the Royal Danish Academy of Fine Arts, School of Architecture (CITA). These projects sustain an exploration into the design and making of elastically tailored architectural structures, using computational design to predict sensitive interdependencies between geometry and behaviour. Developing information about material performance within digital models, for the purpose of specifying causal relationships between configuration and transformation, these investigations reveal a new locus for architectural instruction that requires new kinds of design information, new representational models and different modes of design control.

The book maps this emerging territory from a 'hands on' perspective by pairing three essays with the investigative projects. The essays introduce the underlying logics and traditions of composite thinking, seeking new connections to design practices developed around behavioural ranges in place of absolutes such as strength or weight. They examine the considerations that underlie the notion of material properties, as well as the relations that can underlie their encoding within digital models that nest behavioural understanding at multiple scales. The project-based investigations posit an extension to architectures traditions of form-finding through materially controlled deformation. They provide novel models and strategies for the computational specification, activation and realisation of self-forming composite material systems. At the core of each project is the interdependency between specification, activation and intention, and the abilities brought by new tools and working methods that allow these relations to be examined more closely.

Considered together, these perspectives offer a portrait into an evolving practice of designing material and materialising design.

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