THE MATERIAL TURN

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July 2011

Essay for the book **Working Full Scale**, Anzalone, Phillip; Columbia University, New York; 2012

America has entered a 'sleeping beauty' period of cultural amnesia where we are forgetting-- and gradually losing—the ability to make things. This is manifested at an ideological level, in manufacturing and in architecture. Yet in the present ascendancy of Internet architecture, the touch that might transform this situation may still reside suspended in the emergent materiality of *full scale*: the concepts, generative processes and material techniques that move the digital project to constructed reality.

In 1992, W. J. T. Mitchell argued for a "pictorial turn" in the humanities, to express a pivotal moment in the history of visual culture where the diversity and intensity of images could be contemplated—like languages--as cultural constructions produced not only by changes in technology, but also by societal and economic transformations. Today, we might speak of a *material turn* when the discipline of architecture is confronted by an almost overwhelming interest in materiality. At the very moment when digital materials and digitally formed or organized material prototypes are ascendant, disciplinary knowledge of materiality is limited. We do not often know where materials originate and move globally, how material history is to be understood, or what can be done with materials. How architecture engages the material world has always produced provocative *problems of translation*.

Slippages between concept and production across digital and material media are the locus of the most interesting and productive contemporary problems of material translation. Ironically, the parametric software and CAM tools that have enabled architects to consider questions of emergent digital materiality also have the potential to distance us from the conditions of practice. In order to develop the necessary fluency of media to navigate between material/ machine CAD CAM interface the architect must be adept at understanding, modeling and predicting material performance. Yet in the academy, the segregation of studio, classroom and workshop and the ready availability of 3-D printing are beginning to erode the architect's ability to make things, to understand the resistance of materials at full scale.

The materialization of the digital project in architecture creates a tension between digital exactitude and the approximation of materials, exacerbated by the larger political problem of the fit/mis fit of building materials--generally flat boards, sticks, and sheets-- that must be formed or conformed as the constitutive elements of digitally derived form. Contemporary techniques of translation from the digital project to its full scale materialization in architecture are still limited to a fairly narrow range of now familiar strategies: the mold/bendable deformation, the shingle or module array, the dense aggregation of multiple scribed surfaces approximating the digital surface.

The historical tension between the use of mass-manufactured building industry 'ready-made' materials and the one-off materialization of architecture re-emerges with digital fabrication today, and raises the question of what can be the agency of the architect --particularly for smaller agile and innovative practices working with few resources on projects with limited budgets. As 'low' and 'high' tech strategies for prototype production are de-antagonized by the ability to mass customize small runs in batch production, then the production of unique components of architecture moves closer to the

multiple or mass-produced paradigm of the product—aligning the architect's research as a vehicle for larger impact with market and industry forces and the massive global processes of rapid urbanization.

Or are these types of alignment precisely what the discipline should be working against? Yet if there is not advanced research in the discipline that can address the limitations of existing building industries and political economies, then how should knowledge generated by prototype production be generalized, disseminated and advanced? If architecture becomes so customized in its' material production that its techniques cannot be generalized, does this present a strategic form of protection for the architect, who can retain control of the generative project and of its translation into details for construction—but only in selective one-of-a kind projects? Can schools of architecture take on a new role to disseminate material knowledge, or will the role of the academy always be overshadowed, as it has been before in other times of technological advancement by the interests of military, energy or corporations? Or will online communities and interest groups grow dramatically to provide a more horizontal and aggregated network offering new means of rapidly sharing material knowledge, and generalizing, and advancing techniques of material translation?

While these questions remain, full scale materialization offers a direct force feedback that is essential for design. Full scale tactile and haptic material qualities suggest alternative trajectories to the still dominant visual modes of modernism. The full scale prototype can create a political bridge that serves as a very persuasive means to convince people and organizations to take risks, to do something new or different. A prototype at full scale is a powerful communication tool, with a 1-1 object 'language' that operates without words, and sometimes removes the need for words. At times prototypes render us speechless, in part by the very real power of the material artifact full scale, in part because we have lost the words or have not yet discovered language adequate to describe contemporary conditions of materiality where digital technology becomes material or where material is digitally organized or physically formed by automated digital production processes.