

Angela Lufkin, M. Arch I, 2021

Just as we picked up the wreckage from midterms to start anew, the "Daylighting Model" crept in, unwelcome, like a sunrise at the end of a long night in studio. A tradition of the third semester of the M.Arch I program, the half-inch scale room-of-our-choosing asked us to consider the interplay between environment, material, and form as never before. Many wondered how to contemplate such things about a project that didn't exist yet.

By Monday, we were already eyeing the weekend weather forecast. The review was a week away, but how much time did we really have to make this thing? How "partly" was partly cloudy? We downloaded sophisticated weather prediction apps.

By Wednesday, fast out of the gate, Louis was basically finished. We cursed him under our breaths. The weekend loomed, more partly cloudy than ever.

By Friday, Kate, Heather, and Christine had broken out into song so often that the entire south side of the fifth floor couldn't get Redbone by Childish Gambino out of their heads:

Daylight / I wake up feeling like you won't play right / I used to know, but now that shit don't feel right / It made me put away my pride / So long...

The ambitious had begun to photograph. An unnamed few had not started. Many shopped for materials on textures.com. I myself couldn't decide on an exterior ground cover—waffling between "Medieval," "Rounded Messy," and "Mixed Size Tiles." We took turns expressing our adoration for all of the tiny furniture suddenly appearing on desks. "OMG, it's sooooo cute, STOP IT."

Waking up to clear blue skies on Saturday, we rushed to school and strapped cellphones to foam core with duct tape. The seventh floor terrace filled with friends helping friends. Bodies, contorted in strange positions over the plastic patio furniture, maneuvering the gussied-up foam core into various sun positions. "A little to the left, up, down—perfect!" "Wait, what? fall and spring are the same.?"

Despite its name, Sunday was not sunny. Models cued up on seven as the test of us daylighters prayed for rays. Some considered jumping over the new blockade to gain access to the freshly forbidden upper terrace—anything to be closer to the sun. Daylight, I wake up—that damn song resonated from the rooftop.

With the Monday afternoon review upon us, we could finally marvel at our collective outcome. The paper version of "Mixed Size Tiles" was surprisingly convincing and, behind the mass of black mullions, Rudolph Hall could be spotted in entirely new contexts of unedited window backdrops. Many students expressed that this was the one review they stuck around the whole time for, with each project posing a new set of variables to consider and potentially adopt. It seemed that perhaps our professors weren't crazy after all—zooming in on the details really did to help reconceptualize our emerging designs.

The sun set a few minutes earlier that day. The tradition lives on.

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characters: 2926

words: 492

lines: 47

# FLATTENING THE PHYSICAL AND THE DIGITAL

Davis Richardson

Davis Richardson holds an M.Arch from the University of Texas at Austin School of Architecture and is the director of drooopi (davis richardson office of objects projects and images).

What meaning is there to be found in physical materiality, in our current digital paradigm? If materialism was elevated and honored through its honesty of expression during modernism, the "first digital turn" in architecture—Greg Lynn, Frank Gehry, etc.—represented a 180-degree turn by subjugating material to its formal will. While these practices sometimes stretched the possibility of what materials were thought to be capable of, they just as often fell flat, with material becoming nothing more than an afterthought (or cladding system) in the service of a desired form. How can a return to meaning in material be relevant in an era of hyper-data and increasing automation without regressing to modernist tropes?

When we think of materials, we usually think of their physical manifestation: a carpet swatch, a clay brick, a plank of wood, a steel beam. But materials can be defined by much more than their physical properties, tectonics, structural capacity, or surface applications. Beyond using technology to better understand material properties and optimizing manufacturing processes (as has been done in recent years with mass timber), we can actually open up completely new opportunities to redefine material, in order to more accurately match our contemporary condition—a life that is represented both physically and digitally simultaneously.

Digital processes in architecture are certainly nothing new and in the last twenty years, they've become relatively widespread and accessible within fabrication and construction; a CNC-cut screen or facade isn't novel anymore. But while the digital revolution in architecture has facilitated plenty of research around materials and their fabrication capacities, rarely have our definitions, sensibilities, or aesthetics of materiality itself been challenged. A new paradigm could await that broadens the definition and meaning of materiality beyond the limitations of the physical.

In 2016, Meredith Miller published "Views from the Plastisphere: Preface to Post-Rock Architecture," relating the 2014 discovery of "plastiglomerates"—sedimentary rocks with bits of plastic fused into them, an Anthropocene-quasi-terrazzo—to the way in which architecture blurs the boundary between "human-made" and "natural."<sup>2</sup> The plastiglomerates called into question if there is even such a thing as nature, pure and untouched by humans, or if the two are now so inextricably entwined that it's impossible to separate them.

In the same way that "human-made" and "natural" are no longer separate entities but inextricably linked, "physical" and "digital" can no longer be viewed as antonyms, but as a Venn Diagram whose overlapping area continues to slide toward concentricity. The work of T+E+A+M (Miller is represented by the "M") invokes both questions about the flattening of "human-made" and "natural" but also of "physical" and "digital." In projects like the Detroit Reassembly Plant, even the representation and imagery, a mix of model photography and digital drawings, encourage pause—wait, is this an image of the physical model that they've photoshopped a gradient background into? Or is it a digital drawing rendered to appear like a physical model? This is important, necessary even, because innocuous objects, such as rocks, bricks, milk jugs, tires, and pipe fittings—which T+E+A+M cycles through in our format—can be collected online or scanned at point blank to be indiscriminately used and estranged digitally.

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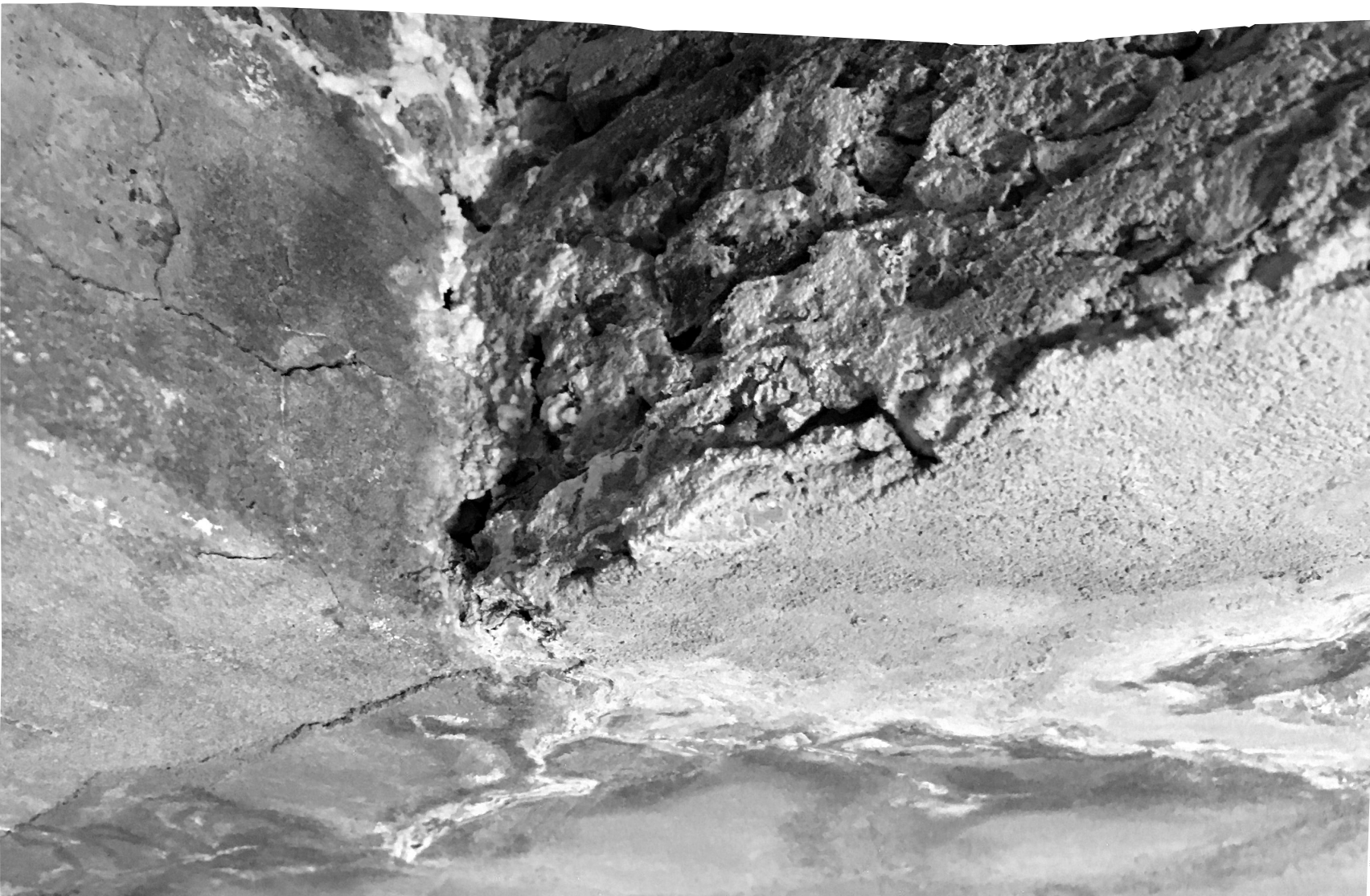
words: 984

lines: 92

A NOTE FROM THE EDITORS: Nearly four decades after the building hosted its first class of students, Timothy M. Rohan penned an analysis of Paul Rudolph's Yale Art & Architecture Building titled "Rendering the Surface." In this essay, Rohan studied the corrugated, hammered concrete surface of the building to speculate upon the material's purpose as a mitigation of scale, its origins in a style of hand drawing, and the material as a possible method for Rudolph to grapple with sexuality and gendered ornament in Cold War America.<sup>1</sup> Though many students, today, find the building's "heavily worked" surface to be welcoming and endearing, Rohan described a contrary prevailing sentiment, citing Vincent Scully's comparison of brushing against the surface of the building to the pernicious form of maritime punishment known as "keelhauling." Rohan and Scully's conclusions, while subjective, engaged deeply with material to reveal relationships, discover latent links, and draw conclusions about the material itself. Though materials are seemingly easy to identify, their ripple-effects (and affects) are more challenging to capture. With this issue of *Paprika!*, we have compiled a collection of observations, research, and meditations on materials that reveal new and forgotten connections between solid and void, physical and digital, time and space, or heavy rain and studio desks. As spatial thinkers and doers, it is our duty and privilege to intimately and rigorously engage with our world's building blocks, in whatever form they take. We are living in a material world.

1. McDonough, Tom. "The Surface as Stake: A Postscript to Timothy M. Rohan's 'Rendering the Surface.'" *Grey Room* 5 (2001): 102–11. <https://doi.org/10.1162/152638101317127831>.

AFTER you're finished with this *Paprika!* the paper may be useful for folding a paperplane, cleaning windows, shelf lining, cat litter box liners, barbecue cleaner, packing material, weed killer, papier-mâché, fire starter, shape keeper, fruit and vegetable drawer liner, ripen tomatoes, stain protection, car floor covers, fireplace logs, camping aid, table padding, shoe and boot mat, shoe deodoriser, gift wrapping, book covers, cheap rags, storing fruit, draught proofing, windscreen cover, carpet underlining, protect outdoor plants, clearing up broken glass, seedling pot, oven cleaner, unscrewing a broken light bulb, compost material, insect traps, car wheel traction, removing musty odors...don't just crumple it up.



## MATERIAL WORLD

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ISSUE EDITORS: Page Comeau and Rhea Schmid  
GRAPHIC DESIGN: Milo Bonacci and Jinu Hong  
COORDINATING EDITORS: Camille Chabrol, Deo Deiparine, Helen Farley and Michael Glassman  
PUBLISHER: Liwei Wang  
WEB EDITOR: Seth Thompson

CONTENTS: The Leak, The Olfactory Dimension, From Making to Institutionalizing Material, Advanced Studio Critics on Materials... Legacy of Lead, Foam Core, Sun-day, Flattening the Physical and the Digital

1. Or, beyond the buzzword of big data, Mario Carpo and Gilles Retsin have argued we are in the "Second Digital Turn" in architecture, based on the ability of searching, instead of sorting, massive amounts of discrete bits of data. See "The Second Digital Turn" by Carpo (MIT Press, 2017) and the "Discrete: Reappraising the Digital in Architecture" April 2019 Issue of *Architectural Design* by Retsin.

2. Meredith Miller, "Views from the Plastisphere," *The Avery Review*, No. 13, February 2016 <https://averyreview.com/issues/13/views-from-the-plastisphere>

# THE LEAK

Thomas Mahon, M. Arch I, 2020

Periodically I am visited by middle-aged men. They travel in a group of four or five, appearing to be on a somber tour. For the occasion they wear dull-hued button-ups, subdued plaids, reasonable shirts that might be from Nautica. One of them has an attache case, one has a binder with a blue Y. They don't speak; they are here to observe. When they arrive at my desk, they hem and haw and scratch their chins or furrow their brows. Some are placid. With little pencils they scratch notes into notepads and check boxes on clipboards.

The men come to observe my leak. It began at one corner of my desk. Beneath the drip, a small towel—now discolored—was thoughtfully placed to absorb the water. Since my arrival at this desk, a new drip has formed in the center of the table as well, leaving a ruddy inkblot on a couple unlucky site plans. When the first blot appeared I confused it with my studio partner's attempt to render the Tijuana River watershed.

Occasionally Richard comes by to sympathize with my life under the leak, and I take the opportunity to tell him about my recurring dreams. Every night I lie on a bed of bush-hammered concrete as the rusty liquid falls on my head. With every drip my skull trembles, and my teeth loosen and fall out. Paul Rudolph laughs from underneath an umbrella. Richard's dreams are similar, only Paul Rudolph's laughter reverberates in his head during the day as well. Because, in fact, the leak at my desk is not unique. Leaks have appeared throughout the school in interesting places. The brown liquid has targeted some first years' computers and found its way into the Center for Ecosystems and Architecture, giving new credence to the name. To battle this leak is to challenge the forces of nature, and I have seen enough movies to know that the odds are never in your favor.

Richard says the leak is not easily fixed because there is no way to know exactly where the water is coming in. There are countless previous surfaces and connections on the roof. The rain soaks into the very thickness of the porous concrete, percolating through aggregate, welling in tiny air bubbles, passing along rusty rebar. By the time it drips out the other side, it has gathered something essential about the slab. Ever since undergrad the word *materiality* has been a part of my life, and I've always had the suspicion that I didn't fully understand what it meant—but this experience is helping me get there. The drip's Umwelt gives it the special privilege to experience poché as humans never will. Just as there is a Worm's Eye View, I wonder about a Leak-View. Can you draw the water's mysterious diffusion? This is a good assignment for first-semester studio.

A certain view of monumental architecture like Rudolph Hall finds little things like leaks incommensurate with the building's vaunted status. Of course, considering this building's complexity of massing and dumbness of envelope, it is not such a surprise that it has these issues. And I think I would rather be in an interesting building that leaks than a boring one that doesn't. But I can make a statement like that because I don't have Richard's job. Nor do I belong to the traveling cabal of Leak Inspectors—though I do feel a tacit connection with them; without a doubt, they dream of drips as well.

After our shared period of silent reflection, the men shrug and move on. They leave my desk but there is no need for a goodbye, for we know we will see each other again.

lines: 50

words: 619

characters: 3066

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# THE OLFACTORY DIMENSION

Katie Colford, M.Arch 1 2022

There is thickness to smell. Small permeates, inscribing a space, defined by the material perimeter to which it clings. From Proust and his madeleines to the spicy intersection of Chapel and Orange Street neighboring Tikkaway, food is often the originator, a clear cause and effect from source to space.

But smell also emanates from unseen sources, coming through material, not just landing onto it. This is often caused by some unspeakable event—the death of a creature (imagine a butcher shop whose refrigerator just broke), the burning of electrical wires (fish at low tide), the molding over of drywall (an entire football team's wet socks).

In school, we eagerly subscribe to the fiction of the wall: that it is as it appears in a drawing—perhaps massive, a solid carved from a volume, à la Borromini; or perhaps nimble and thin, a Richard Serra-esque dancing surface.

But walls in the world are not solid black hatch—they are an approximation of *poché*, with empty space in the interstice between two surfaces. To take a typical interior wall detail, for example, there are approximately 16 inches of void space between two vertical framing members of a sheetrock wall, with just five-eighths of an inch of "solid" gypsum wallboard on either side.

Consider, for comparison, the Bohr radius—the distance in a hydrogen atom between the nucleus and the electron. If we scaled the nucleus of a hydrogen atom up to the size of a cantaloupe, the length of the Bohr radius would be equivalent to the distance from the Guggenheim Museum to Washington Square Park. Which is to say, 99.99% of an atom's volume is empty space. Indeed we humans, and the material world around us, are 99.99% empty space. Even that five-eighths of an inch of solidity we understand between ourselves and the void is itself an illusion.

While we cannot perceive this emptiness at scale—the order of magnitude of the Bohr radius is 10 to the negative 10<sup>th</sup> power—we can begin to call into question the solidity of the material around us through smell. And in particular, when an assessment of an unfamiliar smell leads to the conclusion that it is coming from inside the wall.

We are reminded, then, that the wall is itself a container—a vessel for other materials: electrical conduit and junction boxes, which may be burning; old newspapers (a common practice in the 20<sup>th</sup> century), which may be musty; perhaps a mysterious deceased mammal, which may be rotting. While the material world just barely coheres at the imperceptible atomic level, its emptiness becomes perceptible to us through smell.

The olfactory dimension sharply brings into focus the materiality of the wall and the emptiness it contains—masking an illusion of solidity, which we share in our very atomic composition.

# THE LEGACY OF LEAD

Rukshan Vathupola, M. Arch 1, 2020

On April 15<sup>th</sup>, 2019 the world looked on as smoke billowed over the Paris skyline. Notre-Dame was burning. The flames soon spread, resulting in the collapse of the upper sections of the Cathedral, including the central spire restored by Viollet-le-Duc, and the lead roof below.<sup>1</sup> In the wake of this tragedy many peoples and governments came together to mark the loss of an iconic monument in the history of western architecture. However, a select few, such as the environmentalist Robin des Bois, began to voice their concerns of a greater threat that would soon descend upon the city from the dark clouds emitted by the flames: the poisoning of the populace with over 460 tons of lead particles.<sup>2</sup>

The history of humanity is marked by our use and misuse of lead. Some of the earliest uses of lead are found in Anatolian sculptures and jewelry dating back to 6500 BCE. Ancient Egyptians used it as a key ingredient in their skincare and makeup.<sup>3</sup> A fifth of recipes found in cookbooks from the Roman Empire include the use of lead as a sweetener, especially in wine. Lead was even used as a staple material in construction for millennia due to its lightness and malleability as a metal, longevity of use, resistance to constant weathering and corrosion, as well as its capacity to be continuously recycled and reused for new projects.<sup>4</sup> Lead was present in projects ranging from the structural clamps joining the marbles on the Parthenon, and the pipes connecting the waterways of Rome, to the roof of Notre-Dame.<sup>5</sup>

Despite its prevalent use, lead remains an extremely deadly substance. It is a neurotoxin that can alter the biology of the human body down to the level of DNA, causing effects that last several generations, if it does not kill or sterilize you first. Children under 6 are especially vulnerable as lead can severely damage their physical, behavioral, and intellectual growth. These dangers are not new and were highlighted by writers such as Vitruvius as early as the 1<sup>st</sup> century BCE. In Book VIII of *On Architecture* he cautions against the use of lead pipes, which had a legacy of producing water that was "injurious to the human system." While lead has been looked upon with suspicion over the centuries, it is only thanks to recent advances in modern science that we are now able to analyze the effects lead and other materials have had on the human body and mind, via their presence in the built environment.

In 1924, after five workers at a Standard Oil Refinery first showed signs of fatigue and soon died while handling lead as a gasoline additive, the US Public Health Service started to investigate the safety of the material. Thomas Midgley, Jr., a General Motors scientist and the developer of the leaded gasoline method, dismissed any concerns and Standard Oil simply claimed that the workers had overworked themselves to death. However, the results of the investigation linked lead exposure to the worker's deaths; subsequently the New York State Legislature banned the use of all lead as well as any lead-based products. Large manufacturing companies, worrying about the effects of a nationwide ban on the gasoline market, petitioned the federal government to take over the investigation. When the US Surgeon General called for a conference in 1925, private corporations heavily invested in lead made sure to fill up the panels with scientists sympathetic to their interests.<sup>6</sup> As a result, the bans on lead in gasoline were reversed nationwide and lead in the atmosphere proceeded to skyrocket for the next 70 years.<sup>7</sup> Due to this, the levels of lead in the human body have been permanently and artificially elevated. Currently, global blood lead levels have stabilized at around 50–200 times the pre-industrial average, with the peak being nearly 750 times higher during the 1970s. While there are no safe levels for lead in the human body, these elevated levels are the new standard from which we must measure any further damage.<sup>8</sup>

# ADVANCED STUDIO CRITICS ON MATERIALS...

...AS MATERIAL  
Mark Foster Gage: There seem to be two approaches towards materials—architects that start with materials, and design according to their limitations and properties, and architects that design what they want first, and then work with collaborators to find the materials and techniques required to bring those ideas into reality. Both are entirely reasonable but I'm more aligned with the latter, as it's where architectural innovation tends to reside. I'm becoming skeptical of the former, as more often than not, it means you're starting with "products"—as in materials that are sold by companies—usually pre-formed into certain configurations (4x8 sheets of plywood, 1x2 marble tiles, with accompanying barcode etc.). If you design using one of the very few architectural software programs available, and then drag and drop easy building products into your digital/BIM model—you're only using ingredients imagined, for you, by corporate suppliers. Architecture, then, becomes about "product-picking" rather than what I would consider a more holistic idea about design. That doesn't, of course, mean we don't use "products" in architecture, only that we need to realize that the corporations that produce them have interests other than the quality and longevity of the built environment in mind, and that their goals are growth and profit. This leaves the world constructed with what are often the most profitable materials, rather than the right materials.

David Gissen: A colleague of mine once claimed that there are no materials in the way architects traditionally used the term; now we only have products. What this means is that brick—a material once tied to marshy production sites near cities—transformed through capitalization processes into something industrially produced, branded, and consumed. This extends to any number of materials. These two words—material and product—have become dangerously interchangeable in architecture.

Henry Squire: To me there is no separation between the poetic and the practical. If you do see a separation, then you are not using the material correctly. The poetry of brick is that it is a solid, load-bearing material, and when expressed as such, it demonstrates the practicality and poetry of that material. At Grundtvig's Church in Copenhagen, I believe brick is used as the only material. It is all made from one brick size, no cut bricks, no specials, all load bearing, and no concrete structure underneath. When used as a veneer or a rainscreen, the poetics of that material are lost.

...AS REPRESENTATIONAL  
Henry Squire: I find beautiful drawings can sometimes convey more about what you feel about the material than cut renders, however there is no substitute for the real thing. Asking someone to touch and look at the real material engages them more than cut renders, so we insist on doing site visits to see examples of where the material has been used in other buildings. The play of weather conditions on some materials can completely change them so seeing them in cloudy, sunny, light, dark and rainy conditions is really important.

Mark Foster Gage: In my recent monograph, I wrote, "My office spends an inordinate amount of time trying to make things look real before they actually are, or in spite of them never actually being. While this constitutes a form of representation—it is the genre of representation that comes closest to actual realism. It is a type of representation with the ambition to look as if it were a photo taken of an existing reality." That is to say, it's a type of representation that wishes it didn't have to exist. My goal would be the building, not the representation—and the only representations I use are ones that show the building after construction. I am worried about, even against, recent movements in architecture that turn the discipline into one of representations. This is why I can usually be found on juries complaining about cute axons with pastel backgrounds—as it turns architecture into a representational project that looks good hanging in an apartment rather than considering its aesthetic and cultural effects in the world—through representation. Turning architecture into the "Monument Valley" app may look good for reviews, but it doesn't do much for our collective built reality.

...AS IMMATERIAL  
Mark Foster Gage: I, surprising to most, have a very narrow definition of architecture. I think it's mostly about buildings (shocking and heretical). Fashionable discourse about the "expanded" definition of architecture is ultimately just a conceptual distinction. People don't want to do buildings—that's fine, it's not for everyone, no judgement—but why the need to maintain the architect label? If you look around the world today, the state of our architecture and cities is increasingly abominable, and I believe architecture is the discipline responsible for addressing that. If our greatest talent drifts off and considers web-design to be an "extension of architectural intelligence" (I've actually heard this said), then it just leaves us, but something that forms the very backdrop of our reality. If architects are doing web design, and web-design is architecture—then who's responsible for our built environment?

David Gissen: I used to think that pollution and other urbanized "subnatures" were resistant to commodification. This is one of the reasons I am so interested in abject externalities, because I thought it might mark a return to some more authentic materialism in architecture. But I've watched how various subnatures were transformed into products too. So, I suppose, today, even the effluvia of the city is a "material" in the product-sense. Maybe one day we will find materiality in architecture, but like everything else, that will involve a transformation in the larger structure that makes things tangible in the first place.

# FROM MAKING TO INSTITUTIONALIZING MATERIAL

Nikole Bouchard

Nikole Bouchard is an Assistant Professor at the University of Wisconsin-Milwaukee, and a critic at the Yale School of Architecture.

Maria Lisogorskaya is the founding director of the London-based design collective, Assemble. This piece is an excerpt from a longer interview, which will be featured in the upcoming book, WASTE MATTERS: Adaptive Reuse for Productive Landscapes (Routledge, 2020), edited by Nikole.

Nikole Bouchard (NB): Make, Don't Make Do (2012) is the title of a year-long research and strategic design project you did looking at the potential opportunities that might exist amongst the byproducts of urban development surrounding the Bow Interchange and Stratford High Street areas of London. But "Make, Don't Make Do," also seems like Assemble's *modus operandi*, and specifically, make or making, is critical in your creative production. Can you speak a bit about the role of "making" in your practice, and related to making, what is the importance of experimentation and play in your process, perhaps specifically as this relates to "waste" materials, objects, architectures, and environments?

Maria Lisogorskaya (ML): Our first project as the group of people, which now makes up Assemble, was all about trying to make something immediate, trying out new skills and techniques, and indulging in all the fun of running your own space in the summer with friends. Since then, our interest in making things—and the appreciation of the value this side of the design process can bring to a project—has grown and developed. It's not always that we work with waste, but it is often about trying to convert something, which previously had less value (economic and/or social) into something of value. Our projects often have tight budgets, and we sometimes enjoy the challenge of creating something beautiful in an economic way. This, in turn, is a good reason to experiment!

NB: I'm struck by the project "Granby Rock", a product created by Assemble's off-shoot, Granby Workshop, that uses building rubble (broken bricks, roofing slates and other found objects) to make a terrazzo-like material. You've literally transformed "trash into treasure." I wonder if you can speak a bit about the roles material collecting, researching and experimenting played in the production of this product, and also about Assemble's attitude towards aesthetics.

ML: Thank you so much! Yes, I think you are right—aesthetics are important to us. I think they are important to many people, and as designers it feels important to make something beautiful, especially if you are working on a socially motivated project, or trying to show that 'waste' is in fact valuable. If you transform waste into something that looked like waste it wouldn't be very convincing as an argument about value.

# FOAM CORE

Joshua Abramovich

Joshua Abramovich is the founder and manager of The Young Archs Instagram page.

One cut, two, three  
Change your blade, or the edge becomes ruffled  
With the next cut, there is no guarantee  
The board? The model? You're muddled

With all the order, precision, and concentration  
The 3D printer looms in your noggin  
As you look over at the scraps in desolation  
The foam core model is tonight's toxin

With a depth of 1/8 of an inch,  
those cherished details are diminished  
The assignment was supposed to be a cinch,  
but with foam core it is seldom finished

I'd rather draft, render, print, or sculpt  
Can someone please run to the store to buy some more  
Let's start a balsa wood and chipboard cult  
because by the time you get back I'll be out on the studio floor

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characters: 4080

words: 676

lines: 63

ink: 3.8139 in<sup>2</sup>

characters: 2780

words: 466

lines: 42

lines: 300

words: 1167

characters: 6959

ink: 9.6403 in<sup>2</sup>

lines: 22

words: 138

characters: 735

ink: 1.0317 in<sup>2</sup>

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