

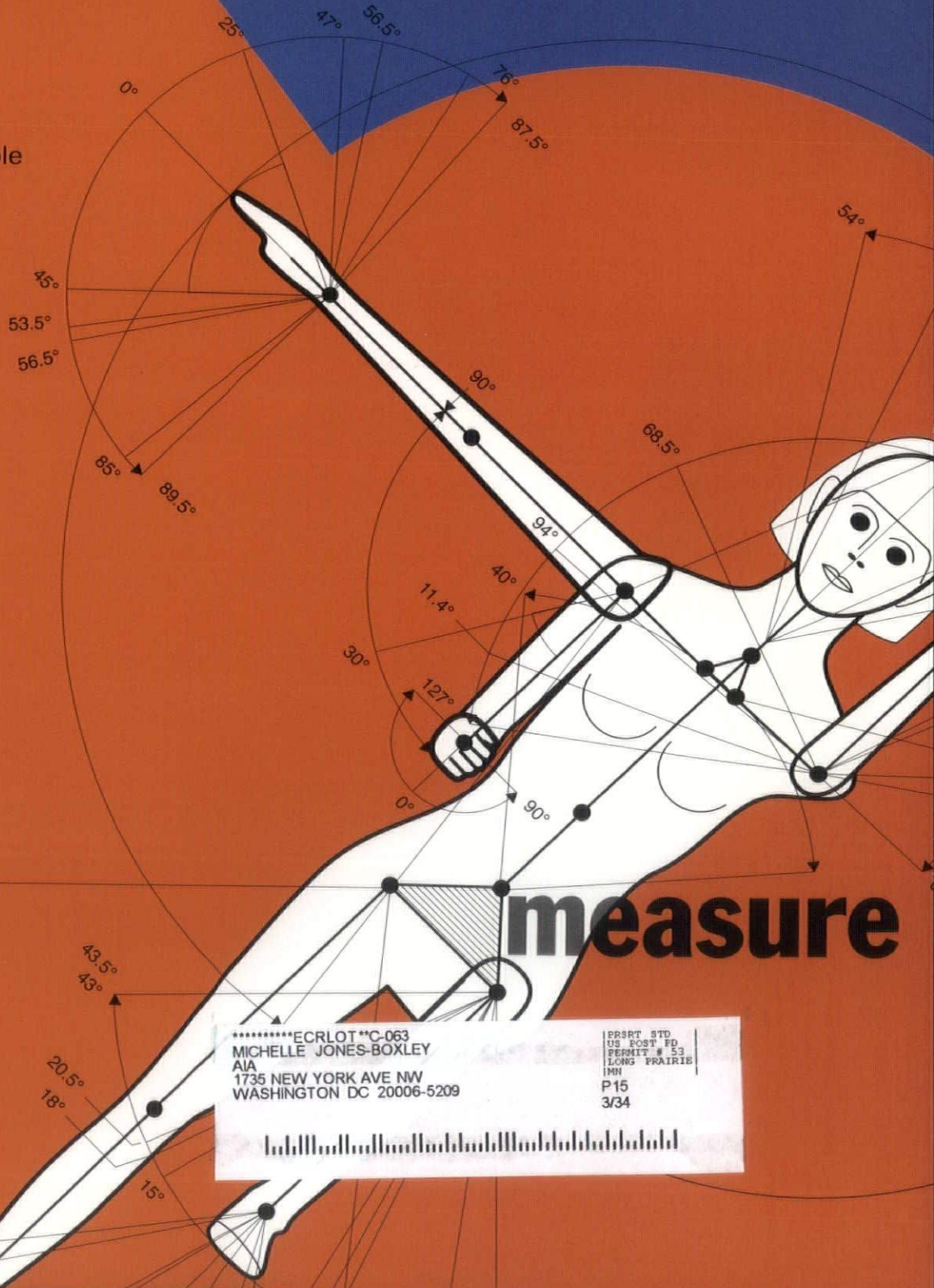
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ArchitectureBoston

Measuring Stata

Running the Numbers

Measuring the Immeasurable



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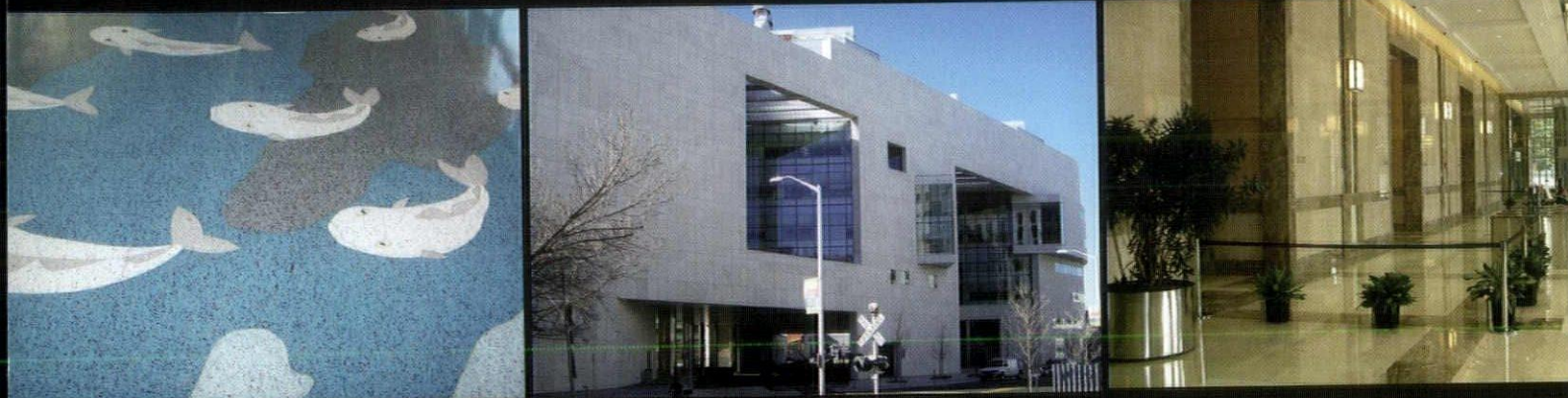
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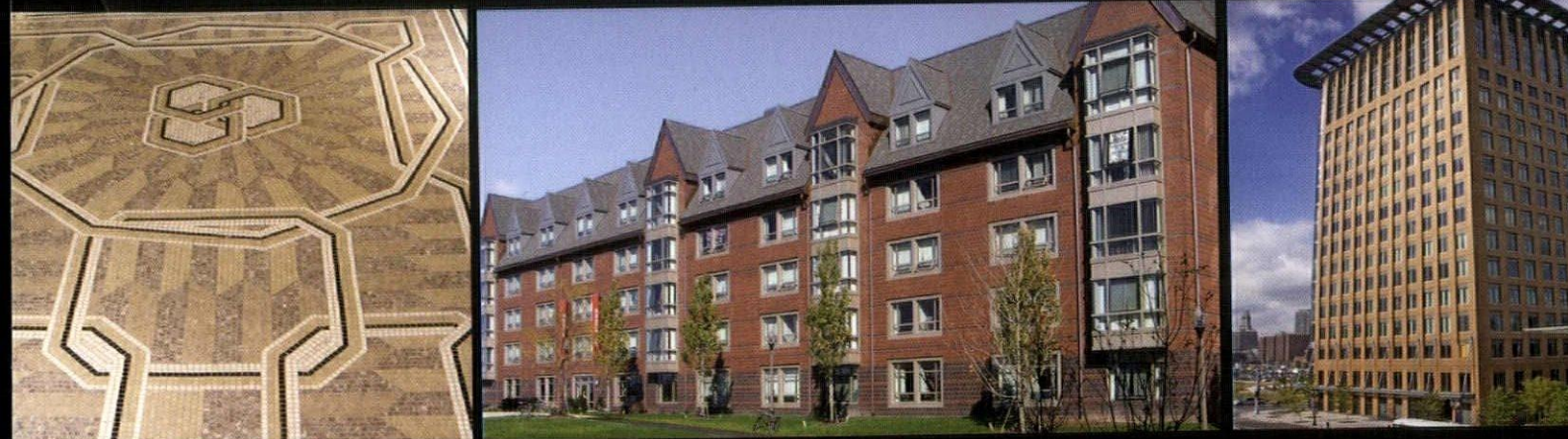


# First Impressions

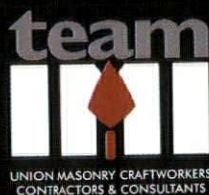


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## Features

### 16 Measuring Stata

Determining the success of a building is like an architectural *Rashomon* — it all depends on who's speaking.

*Interviews by David Silverman AIA*

### 26 It's All an Illusion

The perception that many things are immeasurable is common — it's also an illusion.

*By Douglas Hubbard*

### 30 Running the Numbers

An American Self-Portrait

*Photographs and text by Chris Jordan*

### 38 Taking the Measure of a School

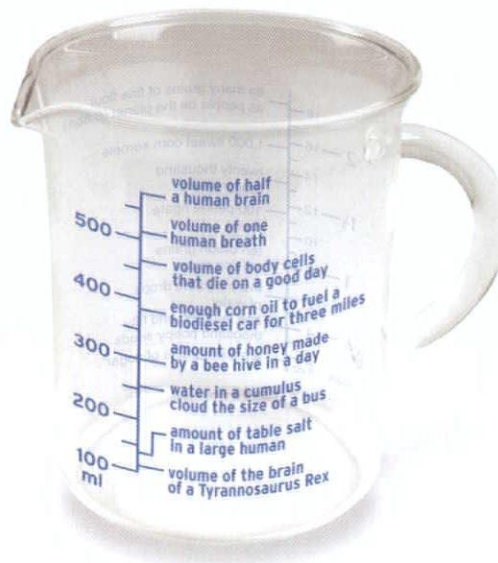
A visit from the National Architectural Accrediting Board is as much an assessment of the profession as it is of a design school.

*By Joan Wickersham*

### 42 What Do You Think You're Doing?

Thinking green isn't necessarily the same as being green.

*Alex Wilson talks with Jeff Stein AIA*



## Departments

3 From the Editor

5 Letters

9 Ephemera:

**Rococo: The Continuing Curve... Parti Wall, Hanging Green... MassImpact: Cities & Climate Change Symposium**

*Reviewed by Dominic Barth; Gretchen Schneider, Assoc. AIA; Tom Parks AIA*

13 The Lurker:

**Honey, I Hate It**

*By Joan Wickersham*

49 Books:

**Smoot's Ear: The Measure of Humanity**

*Reviewed by Conor MacDonald*

**Architecture of the Absurd**

*Reviewed by Matthew J. Kiefer*

**Taking Measures Across the American Landscape**

*Reviewed by Phyllis Andersen*

53 Index to Advertisers

Site Work

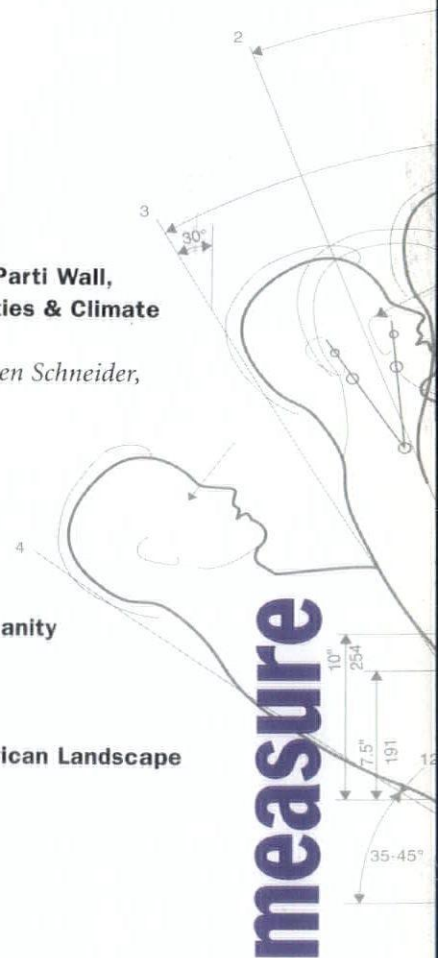
56 Other Voices:

**Earth and Air**

*By Lloyd Schwartz*

Cover image: adapted from "Angle Movements of Body Components" illustration, *The Measure of Man & Woman*. Original illustration courtesy Henry Dreyfuss Associates (5 Research Drive, Ann Arbor, Michigan).

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# It Figures

In the last few months, with gas prices hovering around \$4 a gallon, a lot of people have done a simple calculation. They've figured out what it costs to drive one mile. Suddenly, in addition to their daily commutes, they look at everyday car use in a different way: driving to the mall, to daycare, to the grocery store has a price tag. And, logically, they are limiting or combining some of those trips.

The familiar EPA miles-per-gallon statistics — a slightly different way at looking at fuel consumption — offer a terrific way to compare vehicles, but have little effect on consumer behavior. Not only are mpg ratings somewhat more abstract, but they also have a built-in bias: they assume that those miles will be driven. Introducing a different measure — cost per mile — more directly influences a key aspect of energy policy: consumer control of usage.

The questions of how, what, and why we measure have profound influence on how we make decisions and, consequently, on our ability to address some of the most pressing problems of our time. Public attitudes and policies — and ultimately laws, codes, and regulations — are often shaped by numbers.

And yet we live with a postmodern suspicion of numbers and measures and with the knowledge that the phrase “hard data” is often an oxymoron, that data are often shockingly fluid. Increasingly, we understand the subjectivity of *how* we measure: An election year reminds us that polls and survey questions can contain bias and assumptions. Local debates about public education focus on the usefulness of MCAS (Massachusetts Comprehensive Assessment System) scores as a measure of quality, with the accusation that schools “teach to the test.” The venerable College Board SAT exams have faced charges of class-based and ethnic bias. Similarly, new information and research constantly challenge the *what* and *why* of measurement: Concerned by obesity rates and an increase in the pre-diabetes condition known as metabolic syndrome, the Japanese government recently mandated annual waistline measurements to ensure that adults between the ages of 40 and 74 comply with national standards derived from guidelines from the International Diabetes Federation.

Perhaps no one is more aware of the value of good measurement and the dilemma of how, what, and why to measure than the design professionals and consumers who are committed to sustainability and green design. As Alex Wilson and Jeff Stein AIA discuss in this issue (see page 42), competing rating systems confuse as much as they illuminate. New thinking suggests the value of different kinds of measures. And in the meantime, skepticism grows when certification standards defy common sense — as when bloated McMansions claim to be green.

Architect Mark Bartos, commenting on Martin John Brown's story “Debunking the Green Building Myth” on *AlterNet.org*, notes that “the most green thing that someone can do is to live in a house that already exists and that is sized properly to the family.” He is right, but we have no means of measuring and rewarding the choice *not* to build. Bartos proposes that rating systems include a square-foot-per-occupant limitation before buildings can qualify for green

We live with a postmodern suspicion of numbers and measures and with the knowledge that the phrase “hard data” is often an oxymoron, that data are often shockingly fluid.

certification. Even more intriguing, because it more directly measures desired outcomes, is the suggestion that houses be rated on the basis of energy-use per occupant — both yearly energy use and the building's embodied energy (the energy used to build it). The appeal of this measure is that it aligns with our experience of the world: the frugal family living in a large older wood-framed house without significant appliances probably has a smaller carbon footprint than the family who builds a smaller concrete-and-steel, air-conditioned house filled with appliances and electronics.

We embrace measures because of their presumed objectivity. But behind the science of measurement lies a good deal of art — the instinct to challenge assumptions and the creativity to invent yardsticks that will tell us what we really need to know. ■

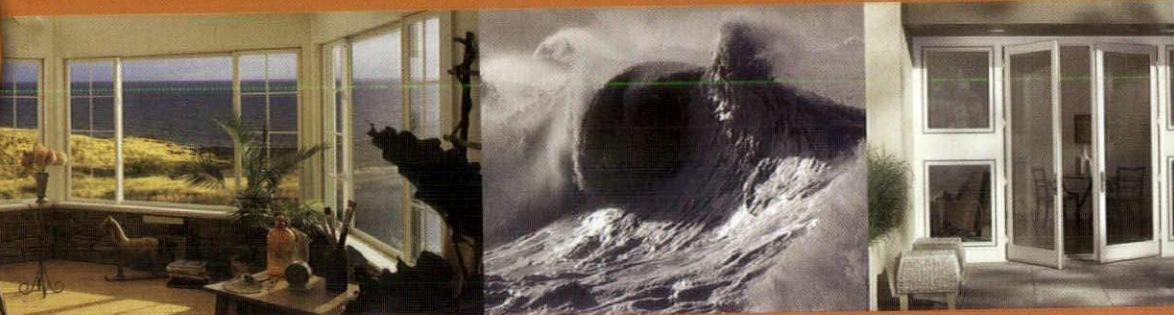
Elizabeth S. Padjen FAIA  
Editor

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# Letters Letters Letters

**We enjoyed the exploration** of perceptions and ideas about “small” in your July/August 2008 issue, and we were pleased to see attention to the small person in Dan Kennedy’s essay “The Kitchen Cupboard,” reflecting on the experience of design for his daughter Becky.

But Becky’s challenges in the family home mystified us. Cereal boxes on the floor? A stool to get to the phone or the freezer? In her own home? The design changes that would eliminate those barriers for Becky are not complicated. Move the cereal. Shift the phone jack lower. Consider a side-by-side refrigerator that everyone can access more comfortably.

We will never achieve perfect usability for everyone everywhere through legal requirements or even best practice in inclusive design. We can find a reasonable balance that anticipates a wide range of human diversity. It is fine to acknowledge that there will always be some gaps to bridge. We can aspire to make those gaps infrequent and small in the places that many people use. But at home? There we should be able to eliminate the disabling aspects of design.

Marie Trottier  
President

(and a small person with achondroplasia)

Valerie Fletcher

Executive Director

Adaptive Environments Center/  
The Institute for Human Centered Design

Boston

**When Crystal Carrington** on the ’80s TV show *Dynasty* picks up a then state-of-the-art cellphone that has the size and grace of a World War II walkie-talkie, we crack up. When Will Farrell, as a cooler-than-thou fashion dolt in a *Saturday Night Live* skit picks up a cellphone the size of an after-dinner mint, it kills us. Our reactions to the actual size of anything are not objective — they are exquisitely subjective.

The last decade saw housing consumers terrified that unless there was enough space around their lifestyles, they would be forever “pinched.” Houses in America grew

like Topsy during that time — and now heating and cooling costs, real estate taxes, and a few years of normal homeowners’ maintenance woes have opened the eyes of all those who bought a pre-bust bloated house to the reality that what was “right” is now “massive.”

When I wrote *The Small House* for McGraw-Hill in 1985, I “scooped” my friend Sarah Susanka by about a decade. While that book sold very well for what it was, its tiny fraction of sales in relationship to Sarah’s *Not So Big* ... juggernaut underscored not only my obvious deficiencies as a writer, but the fact that the word “right” not only applies to house size, but also to timing. Although I had just built myself an 1,100-square-foot, one-bedroom, one-bath house, the idea for the book was from a gifted editor at McGraw-Hill, not some forward-looking young architect.

As the New Age religion of Green sweeps the country, imposing upon us a checklist of moral judgments, the positive karma of “small,” or the negative aura of the “McMansion” should best be seen in the light of their context: houses are not so much “big” or “small” as they “fit” or don’t.

Duo Dickinson AIA  
Madison, Connecticut

**I relished the theme** of your “Small” issue. I appreciated the effort to reconcile eco-morality with scale through the justification of creativity (small is beautiful, practical, clever, innovative) and you made an interesting bridge to the creative with the feature “Solo.” I loved Deborah Weisgall’s exploration of this idea of working alone and its rewards. Although I would disagree with her that all creativity and “work involving the mind depends on inventing something from nothing,” I agree that it depends on “blank time and space for an idea — a concept, a vision — to coalesce.”

In my psychotherapy practice, I have been more aware than ever lately that without solitude for reflection, a depth of awareness and perception is entirely missed. Thought — like full vision, hearing, and

comprehension — requires multiple levels of personal attention. Distillation is the slower process to get to the essence of things. We are thrilled by flashes of brilliant insight and connection, but without the counterpart of extended contemplation and exploration, integration tends not to occur as fully, thereby foreclosing maximum creativity.

The common desire of the artists Deborah spoke with and of the people with whom I work is, as she says, “to maintain a consistency and thoroughness of thought and inquiry and an intensity that cannot be diluted.” I like the way she put that. It is also the essence of worthwhile psychotherapy and the true pleasure and ideal of psychoanalysis. As with creativity, it is precarious to sustain.

Oscillation between the control and contentment possible in the realm of privacy and intimacy and the excitement and stimulation derived from exposure and risk is a poetic balancing act. It may be “small,” but it seems convincingly essential.

Kyra Montagu  
Brookline, Massachusetts

**Thank you for drawing attention** to design’s contribution to the economy [“Design and the Reinvented City,” May/June 2008]. Massachusetts College of Art and Design was founded by 19th-century industrialists who realized that their business success depended on the availability of a local workforce of skilled designers. As the only publicly funded independent art college in the nation, MassArt is committed not only to educating young designers, but also to retaining them and their skills within the Commonwealth. Our students work with local companies on real-life design challenges and, in the process, educate local employers about the value that design can add to their products and companies.

With the recent appointment of a statewide Creative Economy Director and the passage of House legislation authorizing a Creative Economy Council, the time is right to promote design as a leading industry in Massachusetts. We all have

a part to play: young people need to be introduced at an early age to design education and careers; companies can make greater use of the wealth of local design talent and skills; and the public sector can integrate high-quality design into everything from schools and bridges to branding and marketing materials.

Through our "Designing an Industry" initiative, MassArt is working to advance all aspects of the design industry in Massachusetts. I believe that the opportunities are boundless. As a designer at one of our recent programs said, "Design isn't just an industry — it's a way of thinking."

Kay Sloan  
President  
Massachusetts College of Art and Design  
Boston

**The discussion of the creative economy** by your distinguished roundtable participants in "Design and the Reinvented City" was most informative.

Your readers might be interested in learning about the Creative Economy Initiative on the North Shore. The first state-wide conference on the creative economy — sponsored by The Salem Partnership, the Enterprise Center at Salem State College, the Massachusetts Technology Collaborative, and the Massachusetts Cultural Council — was held in Salem in May 2006. An action plan was the outcome of the conference, and the state legislature is using its recommendations to create a Creative Economy Council. This will be the first statewide initiative and is an important step for the Commonwealth.

In April 2008, a North Shore Creative Economy Market Analysis was commissioned (available at [www.salempartnership.org](http://www.salempartnership.org) or [www.enterprisectr.org](http://www.enterprisectr.org)). Design businesses are ranked first among creative-economy enterprises on the North Shore, representing almost 18 percent of all creative-economy establishments; architecture, considered a separate industry, was sixth, with almost 7 percent. Together, design and architecture represent close to 25 percent of the creative-economy establishments on the North Shore.

Other key findings were that over 2,200 creative-economy enterprises are located on the North Shore, employing close to 20,000 people. The creative economy

represents close to 12 percent of the North Shore's total private sector employment. And finally, the North Shore creative-economy enterprises conservatively contribute over \$3 billion in annual sales.

This state-funded report is a major breakthrough as it provides the information and the strategies needed to grow this economic sector on the North Shore. Furthermore, it is the intent of the stakeholders throughout the region to use the report's action plan as the prototype for the Commonwealth.

Patricia H. Zaido  
Executive Director  
The Salem Partnership  
Salem, Massachusetts

**As editor Elizabeth Padjen noted** in the November/December 2007 "Clients" issue, "It's (not) all about you" — nor is it always about architecture.

I loved seeing *ArchitectureBoston* begin to expand readers' thinking about clients and stakeholders — who are they and how they weigh in. Shepherding groups through an animated dialogue and disparate opinions can be the most rewarding and productive phase of any project, if done well.

Serving as midwife to the client's truth and vision can reveal a broad spectrum of possibilities. Giving voice to those who are often unheard and helping to define the client's objectives without a myopic rush into "architecture or building" as the only solution, or only objective, is where the true creative process can flourish.

The measure of success will be valued most by those who have helped enrich and advance the process and are witness to many new outcomes and interdependent relationships as a result.

John M. Rossi, Assoc. AIA  
John Rossi Company  
Medford, Massachusetts

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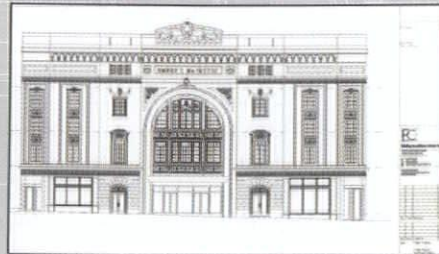
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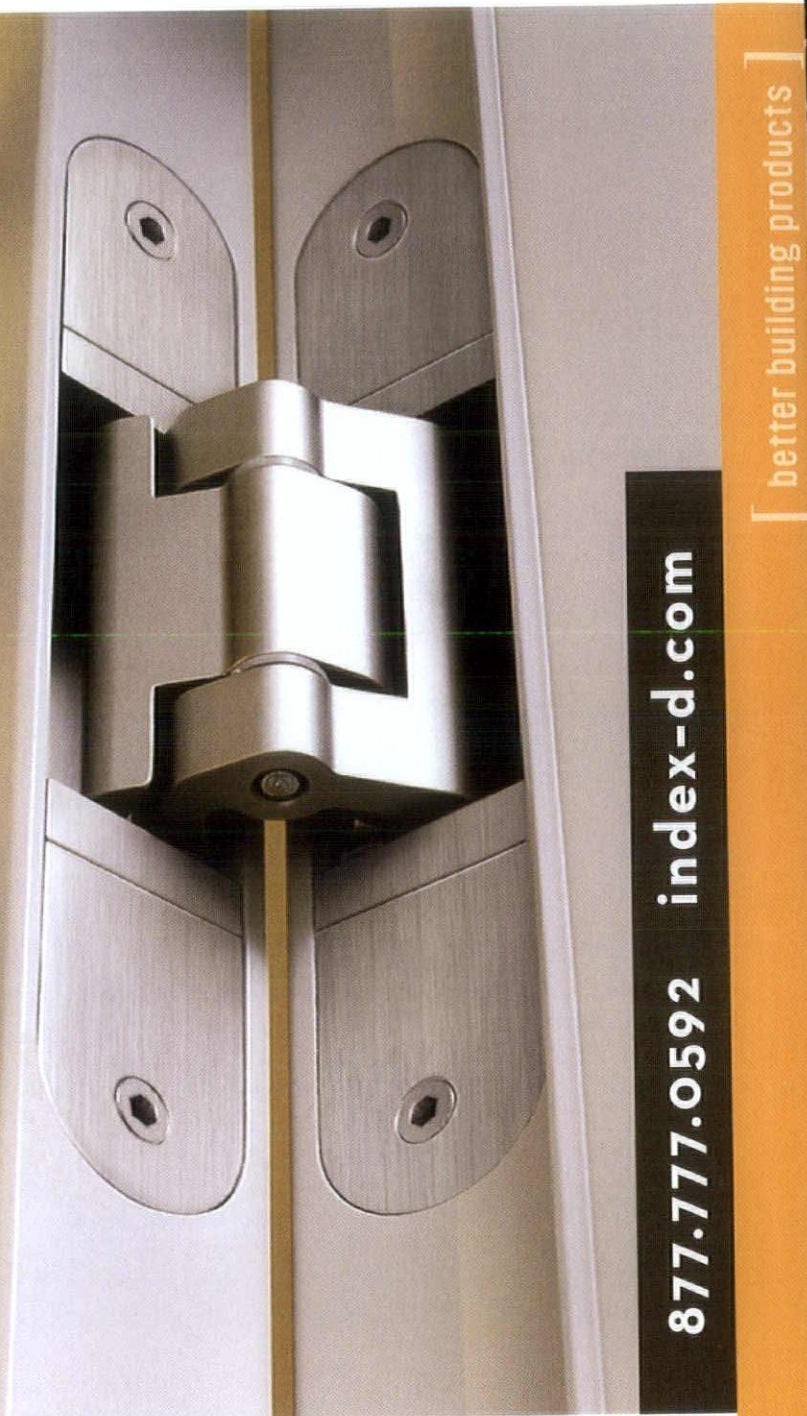
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Left: Savoy vase. Alvar Aalto, ca. 1936. Photo by John White. Right: Teakettle and stand. Joseph Richardson, Sr., 1745–55. Photo courtesy Yale University Art Gallery, Mabel Brady Garvan Collection.

## Rococo: The Continuing Curve, 1730–2008

Cooper-Hewitt, National Design Museum, New York City  
March 7–July 6, 2008

“Rococo design — exuberant, opulent, theatrical and sensuous...” begins the notes provided for *Rococo: The Continuing Curve*. If voluptuous liveliness, often expressed through whimsical asymmetry, was the essence of Rococo, the objects from its first flowering (roughly 1730–1780) succeed admirably. A Meissonnier tureen, a French console table, ironwork commissioned by Stanislaus for Nancy, a Ballin candelabrum, an Italian writing desk are triumphs.

Rococo fell out of favor during the Neoclassical revival and the birth of the Empire style, only to experience a renaissance in the 19th century in England, the United States, and France. Through the Arts and Crafts movement, it contributed to the development of Jugendstil/Art Nouveau, which shares a vocabulary of organic, sinuous, enfolding forms with Rococo, but also represents an evolution in expression and meaning.

The exhibition includes pieces from the last 50 years, striking for what nearly all of

them lack: the spirit that defined Rococo. Works by Cindy Sherman and Jeff Koons are statements, not celebrations. The furniture is an uneven mix, and a sconce by Dale Chihuly may appear organic, but in a biological sense of spermatozoa swarming.

The exception might be four concert posters from the psychedelic era by Wes Wilson and others. Had the exhibition organizers been interested in the evolution of styles, there might have been an interesting progression from Rococo to Art Nouveau to the psychedelic era. However, the modern pieces end up confusing the intention of the exhibition. Most of them either imitate Rococo forms directly or are so tenuously linked to Rococo that one begins to tire of justifying their presence. As the attentive visitor learns, Rococo was more than an “s” curve.

Dominic Barth, a former journalist and book editor, is a graduate student at Columbia University School of Architecture, Planning, and Preservation.

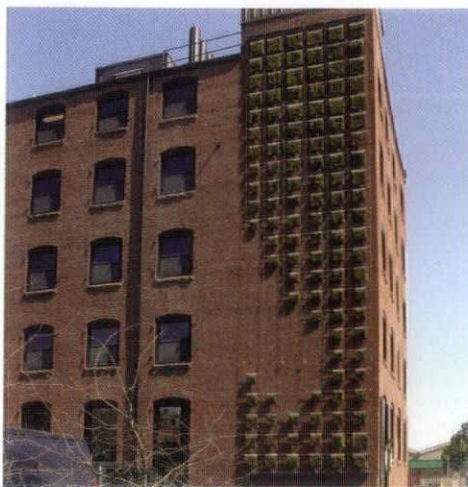
## Parti Wall, Hanging Green

90 Wareham Street, Boston  
May 16–July 8, 2008

On a brick wall in Boston’s South End hangs “Parti Wall, Hanging Green.” This temporary installation — like a green roof that’s been cut up to hang on its side — is promoted as an experiment into the viability of such vertical gardens in Boston. Artists and architects have proved that vertical gardens can thrive in Europe; can they do so in our environmental, economic, and cultural climate, too? “Why not?” asks the Young Architects Boston Group, the name given to the team of 10 young design firms that created this work — which served as a focal point for one of the AIA National Convention’s liveliest parties. Nearly two months after the convention left town and several weeks after it was slated to come down, “Parti Wall, Hanging Green” is still both hanging and green. Let’s hope this serves as a catalyst for more — more vertical gardens, more collaborations, more visibility for young firms, more innovative public art. (For more information: [www.pinkcomma.com](http://www.pinkcomma.com) and [www.yaboston.org](http://www.yaboston.org).)

Gretchen Schneider, Assoc. AIA, is the principal of Schneider Studio in Boston.

▼ Photo courtesy Young Architects Boston Group.



# massimpact

CITIES & CLIMATE CHANGE SYMPOSIUM

## Symposium II: June 9, 2008

The concluding session of this two-part symposium on climate change took place on an auspiciously hot and muggy day. Sponsored by the BSA and MIT, the program examined the role that cities play in the complex problem of climate change, with a goal of formulating a design and policy agenda for the Boston region. Symposium II, entitled *Energy and Mobility in the Green City*, focused on transportation impacts and possibilities.

Symposium II began in a cautiously optimistic tone, as representatives of cities including New York, Chicago, Winnipeg, Toronto, and London shared best practices that are making measurable differences. Keynote speaker Nicky Gavron, former deputy mayor of London, described recent measures implemented in London as examples of what is possible. Aggressive

policies under a Labour mayor, notably including "congestion pricing," which levies a charge on all vehicles entering central London, have cut carbon emissions significantly in the past six years. Initial public resistance has melted away; she noted that there are "pin-stripe suits on buses now." Noting the staggering rate of urbanization in the world — two-thirds of the planet's population will reside in cities by 2050 — she emphasized that urban sustainability can enhance quality of life and improve regional economies, too.

The economic value of sustainable urban development was a common theme. Several speakers urged a focus on economic benefits rather than moral or aesthetic ones to combat NIMBYism and "green fatigue" and to convince political leadership. The president of corporate sponsor Holcim noted that business interests are beating the sustainability

drum, waiting for political leadership to fall in step. He argued that businesses want clarity, and regulation can help.

Another theme: technological advances are very promising but political will and human behavioral patterns lag behind. Cleaner, more efficient modes of transportation, such as plug-in-hybrids, are available today; folding electric cars promise cleaner alternatives; hydrogen fuel cells are viable in buses and automobiles; and existing low-tech technologies like "work bikes" for short-distance/light-duty hauling can dramatically reduce energy consumption.

What happens next? Co-organizer (and former BSA president) Hubert Murray AIA, RIBA says the proceedings will be published and welcomes suggestions for next steps. Reaching the goal of transforming Boston into a leader in urban sustainability may ultimately be a test more of our civic leadership than of sustainability.

Tom Parks AIA is an architect in Boston and director of the Distance Master of Architecture program at the Boston Architectural College.



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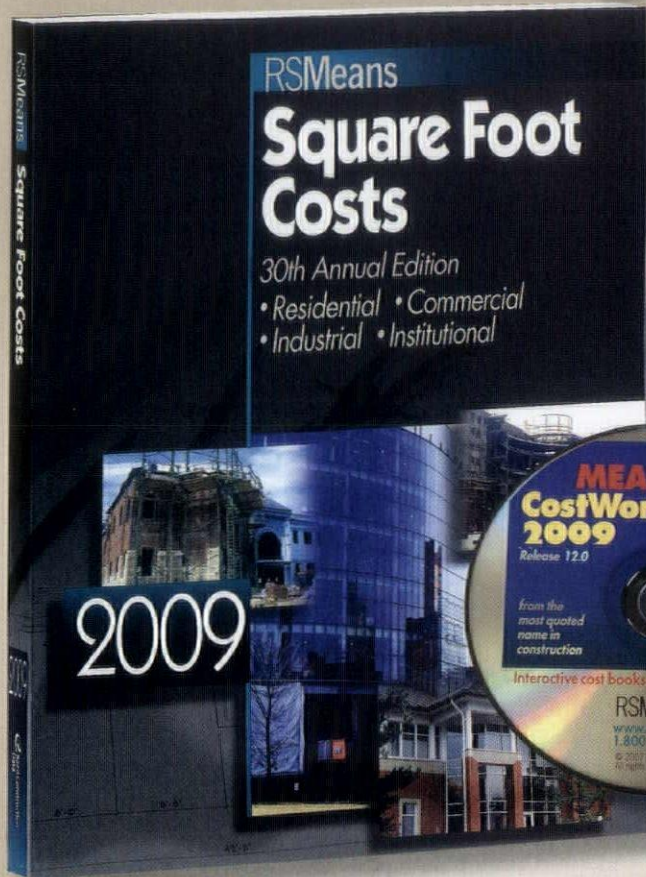
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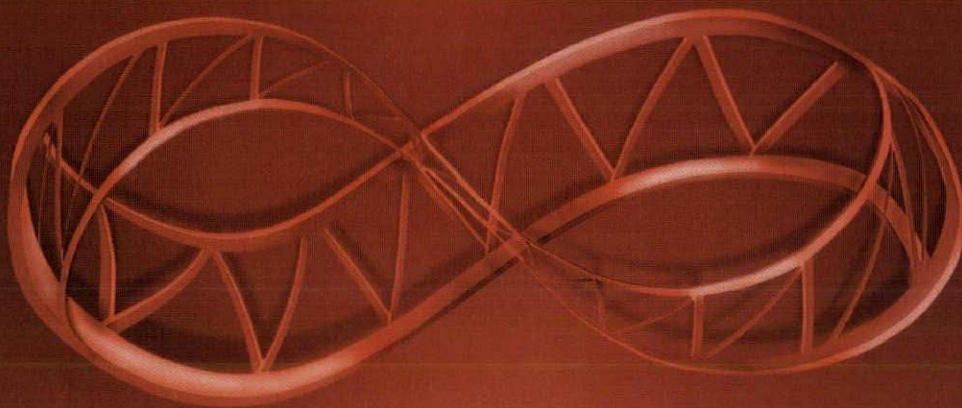
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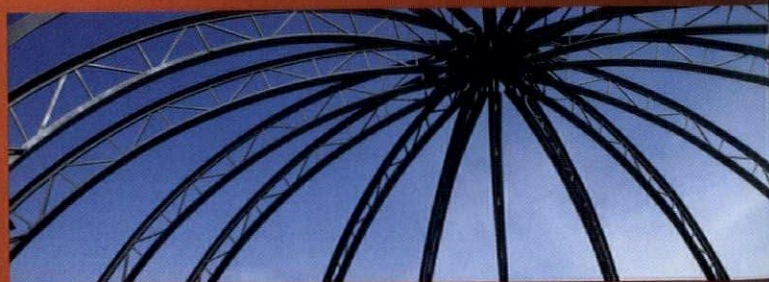
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# Honey, I Hate It

**The place:** The IKEA store in Stoughton, Massachusetts. No matter what preconception you have of how big it is, it's bigger. Its address is One Ikea Way; its phone number is 344-IKEA; it flies its own flags out front. It is not so much a retail store as it is a small, pleasant independent republic — one with humane social services, nicely designed recreational facilities, and a government founded on the principle that people like to buy stuff.

**10:01** Two parents with a baby and a toddler cast a wistful glance at Småland, the daycare center located just inside the store entrance. Småland's admission criteria — which these kids clearly don't meet — are spelled out on signs: "ALL CHILDREN BETWEEN 37" AND 54" ARE WELCOME TO PLAY HERE!" and "ONLY POTTY TRAINED CHILDREN ADMITTED TO SMÅLAND."

**10:04** Three women stand at the top of the escalator, puzzling over a store map and talking past one another. "We take a left and then we go down this way —"

"But what floor are we on?"

"Is the floor we came in on the ground floor?"

"So are we on two?"

"Because I want to go downstairs, eventually."

The map resembles a board game (the game of "Life," actually), with a circulation path curving back and forth within a square labyrinth. Despite a few shortcuts indicated on the floor plan, you have to journey past pretty much everything in the store in order to find your way out again.

**10:10** A couple in their 30s walk into a living-room vignette where a TV is playing an IKEA informational video in Spanish. The bookshelf is full of books in Swedish. It's cozy and small, and there's a price tag on everything. The man sits on a white couch, and the woman lies down,

puts her feet in his lap, and says, "What do you think?"

**10:11** The video is now offering helpful shopping hints in English. *Browse all you want. Try things out. Enjoy shopping on your own. No pressure.*

The woman's cell phone rings. She answers it and talks on the phone for a while, holding the man's hand and occasionally kissing it.

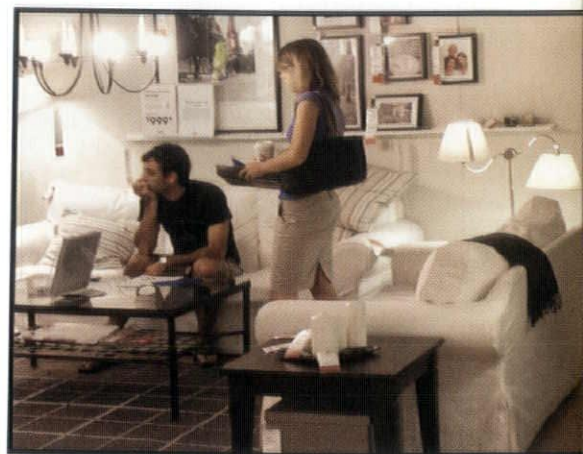
**10:17** Having finished her phone call and checked her messages, the woman takes her feet off the man's lap and stands up. They begin looking at the couch more critically, pulling off the cushions and peering at the construction. The man checks the price tag. "Three-ninety-nine."

"That's a steal," the woman says. "But we don't want white." She plucks a literature sheet from the display on the coffee table. "Oh, look, sweetie, it comes in other colors."

The video continues to play, with its soothing soundtrack: *It's OK to change your mind.*

**10:20** In the living-room vignette across the way, another couple has settled on a couch, the woman drinking coffee and the man typing with his thumbs on a BlackBerry.

**10:27** In a section devoted to chairs and couches, a woman and her pre-teen



A Photo by Joan Wickersham.

daughter are looking at cushion covers. "These are kind of nice," the mother says.

"They're boring," the daughter says coldly, walking away.

The mother looks after her. "They have to be interesting?"

**10:30** "I have a business and I'd be ordering a large number of these love-seats," a woman tells a store employee. "Is there a discount if you buy over a certain amount?"

"No," the salesperson says, polite but unapologetic.

**10:32** A large vignette, with "WELCOME TO MY HOME" lettered above the opening. Inside is a compressed simulacrum of a whole house: living room, kitchen with dining area, bathroom, and bedroom, including a baby's crib and changing table. Again, everything has a price tag, from the furniture and appliances to the towels in the bathroom and the hooks they hang from. A woman slumps on a leather sofa. "What do you think of the seat, hon?"

"Too long. Slippery," her husband answers.

Posted on the wall is a small sign specifying the paint color and the floor tiles.

Wandering shoppers peer around in a way that is at once dazed and frantic, like children beginning an Easter-egg hunt.

**10:44** Downstairs in housewares a woman pushing a cart that contains a rubber cutting mat, some wooden hangers, and a small desk lamp pauses and asks her husband: "You want dish towels?"

"No, I don't want dish towels."

**10:47** Two men with two small children are making their way through the kitchen section. "Eli, did I say you could push the cart in here?"

"No," the little boy says.

"Then don't push the cart, OK? We'll be out of the breakables section pretty soon, OK?"

Stopping in front of a display, the other man asks, "Can you think of any good reason why we'd need a rolling storage box?"

**11:10** In bedding, a mother with a teenage son is holding a packaged sheet and reading the label. "One Twin Top

Sheet.' Is that what we're assuming these beds are going to be? Regular twin? Or do we need 'Long'?"

"I don't know what a top sheet is," the boy says.

**11:16** An announcement over the store's PA system: "Carts are available at the foot of the stairs. Grab one there ... because you are going to need it."

**11:27** A man and woman fingering small bathroom rugs. "I'd rather just have carpet," he says.

"Carpet? What do you mean, carpet?"

He thinks, then says: "I don't know. I guess, just, carpet."

"In a bathroom?"

He's apparently made some sort of gaffe, but doesn't understand what it is. Valiantly, uncertainly, he sticks to his guns. "Yeah."

She shrugs. "Then *you* find it. *You* pick it out."

She walks away. He lingers, not sure whether he's won or lost.

**11:38** The aisles are more crowded now. Wandering shoppers, carrying big empty yellow bags from bins labeled "BORROW A BIG YELLOW BAG" peer around in a way that is at once dazed and frantic, like children beginning an Easter-egg hunt.

**11:50** The ladies' room is immaculate and enormous. Lots of stalls, and no line. At the end of a long row of sinks, a miniature washbowl is mounted about 18 inches from the floor, where a little girl slowly washes her hands while her mother diapers the baby on an adjacent changing table. "Go easy on the soap, Jenna."

"But I like soap."

**12:12** As in the rest of the store, the cafeteria's aesthetic is bright, unfancy, modern. The menu nods to the store's Scandinavian origin without belaboring it: along with some basic American choices, you can order Swedish meatballs with lingonberries. There's also a kids' menu,

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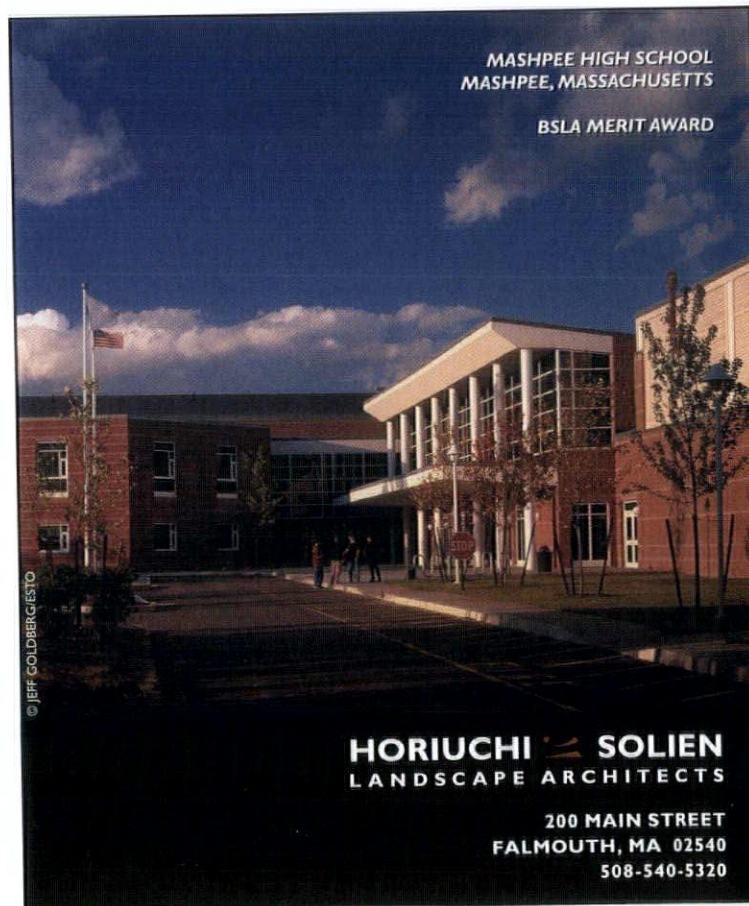


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play area, and baby food warming station, with a microwave, bibs, high chairs, and brightly colored plastic cups and dishes, all items for sale elsewhere in the store.

**1:15** The place is jammed with people speaking in many different languages.

**1:20** A series of loud, rhythmic bangs. A young boy whose parents are looking at a model kitchen is systematically opening and closing every single drawer in a pair of twelve-drawer sideboards.

**1:29** In another model kitchen, a woman opens cabinets and exclaims over the interior fittings. "I like this!"

"A rack," her husband says, willing to recognize a feature but drawing the line at expressing an opinion.

"Nice!" She goes on to the next cupboard. "And look — these slide out."

"A pantry," he says.

"I like it!"

**1:40** A middle-aged couple stands in a dark, glamorous model kitchen whose

sandblasted glass cabinet doors glow softly blue from within. "See, we could do this but have the stove over here and then put the sink over there," he says.

"And then this counter would be next to the door into the dining room," she says, sharing the same intent vision of this kitchen superimposed on what they currently have at home.

This particular vignette, with four small round tables, and plentiful racks for glassware and wine bottles, resembles a small café or bar. A sign on the counter reads: "SMALL BUSINESS OWNER! LET YOUR COMPANY SHINE WITH LIGHTING FROM IKEA!"

**2:05** People mill around an area featuring all the components of kitchen design — an array of cabinet interiors, doors, and legs; countertops; sinks; hoods; and appliances. There is also a bin of aprons, which some laughing teenagers are throwing at each other. Planning tables with computers allow shoppers to lay out a kitchen floor plan; convert it to a 3-D perspective; and then, in a kind of retail version of BIM,

price out the ramifications of various choices and changes. One couple stands at a computer working through the program with a saleswoman; but most people are just drifting through. A woman trails her hand along a piece of reddish granite countertop. "I think this is what Jane has."

**2:20** Lines of people wait for the elevators with full carts, bulging yellow bags, and restless children. Everyone is exhausted. They're headed downstairs to pick up flat-packed furniture from the massive warehouse, or to buy elderflower drink or herring or gingersnaps in the Swedish food market.

Two women collapse on a red leather sofa nearby. "So next let's see about replacing that chandelier. Have I told you how much I hate that chandelier?"

"Oh, yes," the other laughs. "You've told me." ■

Joan Wickersham is a writer in Cambridge, Massachusetts. Her new book is *The Suicide Index: Putting My Father's Death in Order* (Harcourt).

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# STATE OF STATA

Determining the success of a building is like an architectural *Rashomon* — it all depends on who's speaking.

## Stata Stats:

**Design:** 1989 (initial study) to 2004

**Construction:** 2000 to 2004

**Opened:** March 2004

720,000 square-foot complex

700-car parking garage

Office space for 1,000 occupants

7 classrooms

760 classroom seats

Childcare center for 70 children

Fitness center

Multiple food service areas

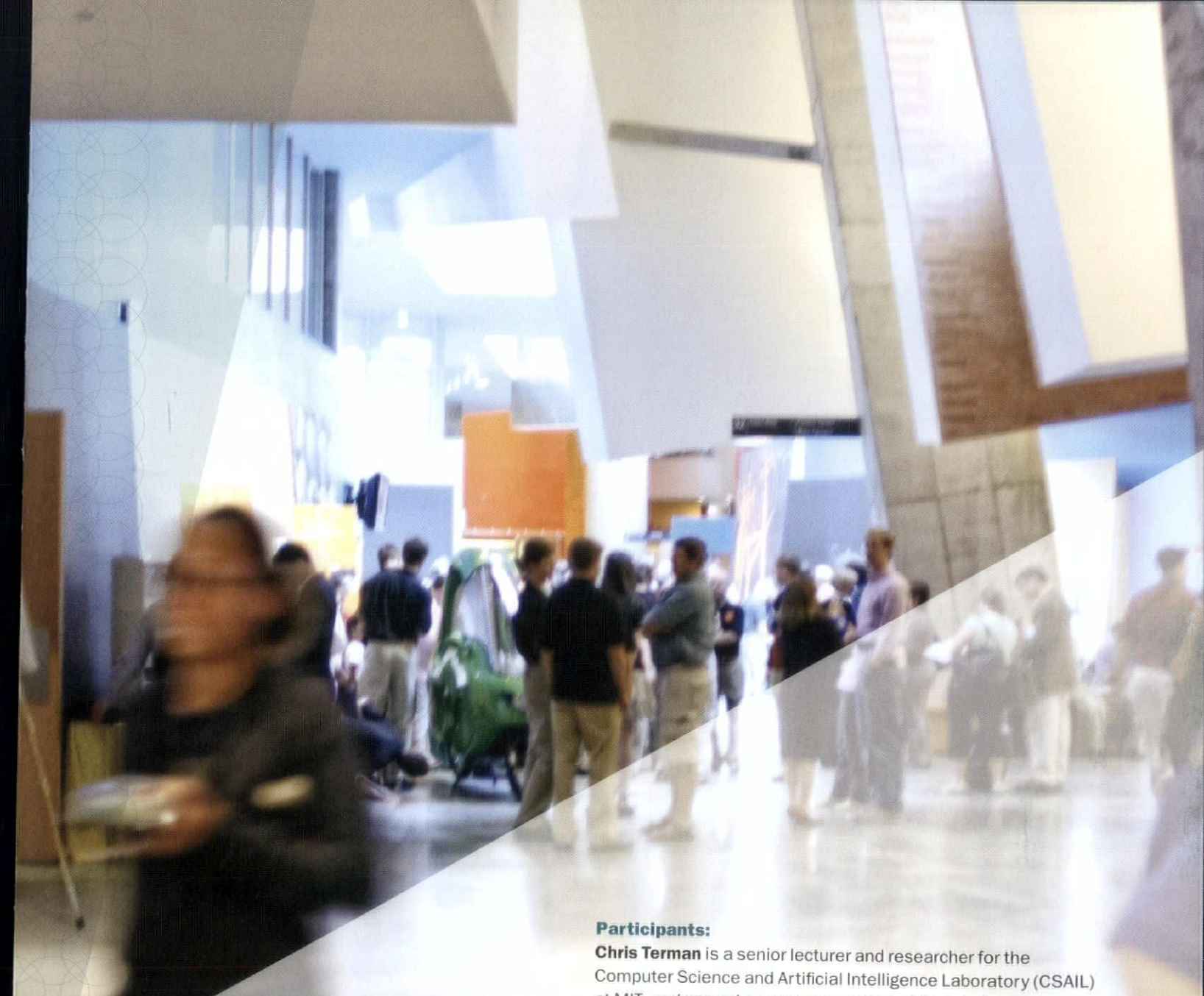
\$300 million project cost

## The Ray and Maria Stata Center for Computer, Information, and Intelligence Sciences at MIT is often misunderstood.

With Frank Gehry's unique aesthetic, the building has been described as both "liberating" and "a disaster" (from two very different people, obviously). MIT's initial goal of bringing the computer science faculty, staff, and students back onto campus evolved with Gehry's participation into a collaborative investigation of building community and social spaces that would enhance the innovative research taking place in the labs. The 700,000+ square-foot building contains a variety of spaces that support MIT's educational mission — from personal study spaces to group study areas to classrooms to the many amenities such as fitness facilities and food service.

As one of many project managers in the MIT Department of Facilities during the building's design and construction, I have firsthand knowledge of its development. The resulting familiarity with the building has made me unusually attentive to media coverage of Stata — from stories in the design press at its opening in 2004 to recent news reports of MIT's lawsuit naming Gehry Partners and contractor Skanska USA Building because of leaks, drainage, and snow-and-ice problems. But these extremes in coverage — from the aesthetic to the technical — can't tell the entire story of a building and offer a limited, if traditional, yardstick of success. Four years after the building's opening, it is high time to ask the people who know Stata Center best to get *their* take on the building. What is their perception of the building? What works? What doesn't? Measuring a building's success (or failure) is about more than the numbers and media coverage. It's most importantly about the experiences of the people who live with it.

— David Silverman AIA



#### Participants:

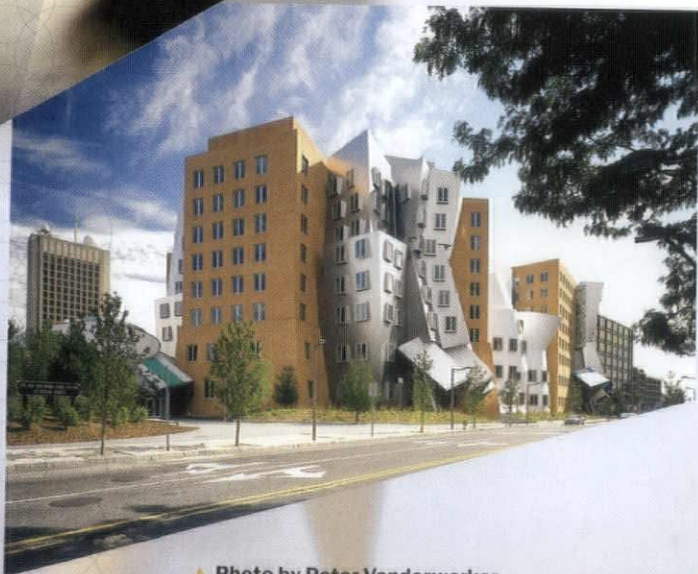
**Chris Terman** is a senior lecturer and researcher for the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT, and served as a representative of Stata's future occupants during the design and construction of the building.

**Gary Saffie** is the Stata Center building manager and worked with the MIT project management team during the building's construction.

**Debi Kedian** is the campus activity complex manager at the Stata Center and has managed all events in the public spaces since the building opened in 2004.

**Mitchell Peabody** is a PhD candidate at CSAIL and has worked in the Stata Center since its opening.

Interviews conducted by **David Silverman AIA**, principal of map-lab inc., an architecture, owner's rep, and project management firm in Boston ([www.map-lab.com](http://www.map-lab.com)). He was previously a senior project manager in the MIT Department of Facilities, where he served on the team overseeing the design of the Stata Center.



▲ Photo by Peter Vanderwarker.

Photos by Alex Budnitz unless labeled otherwise.

## THE ACADEMIC: Chris Terman

**David Silverman:** What is the perception of Stata from colleagues who visit you from other universities?

**Chris Terman:** I think a lot of people like a building that's not just another building. But there's a surprisingly large "John Silber contingent" who wonder "where the hell the adult supervision was," and how we were allowed to do this.

**David Silverman:** Do you think the building helps attract faculty and students?

**Chris Terman:** I find that a very hard question. MIT has not had a substantial recruiting problem. And I don't see a drastic change in the quality of the applicants as a result of having built this. You can put a print you purchased at Target up on your wall, or you can buy an original Matisse and put it up — has your life changed? Working here is like having a piece of art that you're living in, that represents you. I don't think MIT will be ill-served by this building. Inside, it works, and outside, it's a topic of conversation.

**David Silverman:** One of the reasons for building Stata was to bring the Laboratory for Computer Science, the Artificial Intelligence Laboratory, and other folks back onto the MIT central campus as part of the Electrical Engineering and Computer Science Department [EECS].

**Chris Terman:** That's working very successfully. Of course you could argue that any building would have done that. But I think EECS is much more obviously a combined department than it was. Connections used to be much more tenuous. Now there are a lot of joint seminars and lunches — things that certainly could have happened before, but now seem much more accessible.

**David Silverman:** Stata was built on the site of Building 20, a building that was famous for its flexibility, which was largely a byproduct of its lack of design intention — it was built in 1943 as a temporary wartime structure, but wasn't demolished until 1998. Stata of course is just the opposite — lots of design intention. Do you feel it offers the same flexibility? Have you done any office renovations yet?

**Chris Terman:** Conceptually we feel that we have the flexibility of Building 20 — it's just the execution that requires a little expertise. We've been in the building now for four years and we're about to start reshaping some spaces. We have done some very modest temporary build-out of some of the open-plan spaces. The open-plan spaces are a continuing experiment, because we're not really sure how best to use them.

**David Silverman:** How are the double-height spaces working out?

The idea was that by stacking work areas vertically around double-height spaces with stairs, you could create "neighborhoods."

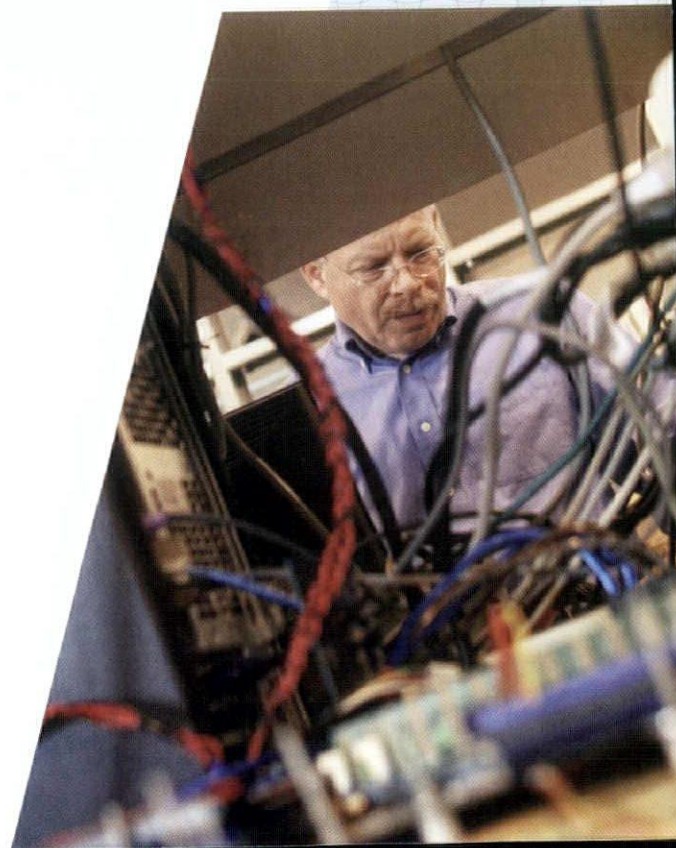
**Chris Terman:** I'm not sure that's worked. Whether for psychological reasons or whatever, people simply don't view upstairs and downstairs spaces as being closer together than spaces that are down the hall. Faculty think, "I'm here, and my students are upstairs" — most people would rather have them on the same floor, even if it means they're actually much farther away. For some reason, floors are still considered substantial barriers — even though there is a visual connection.

And then there's the question of actual use. Double-height is great above public spaces, because there is a feeling of spaciousness and connection between floors. But, for example, sometimes inappropriate things are said on the floor above a working space, because no one thinks to look down in the pit to see if their loud joke is being appreciated by more people than intended.

**David Silverman:** How are some of the other social aspects of the building working?

**Chris Terman:** Some people have complained that our attempt to build cozy environments for departmental work groups has led to more insularity. Previously, and in a more traditional building, we would have all been spread along a long hallway. Instead, a small

Working here is like having a piece of art that you're living in, that represents you.  
*Chris Terman*





A typical building might take a year or so to get the bugs out. A building like this takes longer — it certainly took at least a couple of years.

*Gary Saffie*

## THE BUILDING MANAGER: Gary Saffie

cadre of us is nestled into the South pod, and a different group is nestled into the East pod, and we have another set of groups that are nestled into the North pod. Somebody I would have seen in the hallway every day, I hardly see at all now, unless our schedules happen to bring us to the elevators at the same time. That's interesting because the building was meant to create a cozy environment, and I think it has. But maybe the cozier it is "at home," in your pod, the less you go out.

**David Silverman:** The building also includes other kinds of spaces to encourage people to connect — such as the study spaces and lounges on the upper research floors. Have they been successful?

**Chris Terman:** The success of the lounges is that they are nicely unallocated. I find that having a lot of desks that don't belong to anybody and aren't very far from everybody, works out well, particularly for the undergraduates who don't have assigned spaces in the building. You often find small groups of students in there working or socializing or meeting to work on group projects — of which we're having an increasingly large number.

**David Silverman:** What do you think of the public reaction to the building?

**Chris Terman:** I'm puzzled why some people want to make architecture like this into an albatross if they can. That puzzles me, and it wears on me — maybe because in some sense I had more to do with this than the average Joe, and so I feel vaguely responsible. But over time, I've decided that people who feel that way are just wrong. They're wrong on their evaluation of the facts. There's a big debate about whether a building like this should only be functional: you can put some Victorian decoration on it if you want, and that's acceptable. But we can't do anything big with the shape of the thing? There are so few buildings that are free to do this and do it effectively. This building actually encloses a huge amount of functionality within a fun envelope. And it really does fulfill its purpose pretty well.

**David Silverman:** Generally speaking, what's your analysis of the maintenance requirements of the building?

**Gary Saffie:** Overall? No more difficult than anywhere else. It requires maintenance, like any building. Provided you do your maintenance, and you do the right thing, you'll be OK. We understand the things that we are supposed to do from a preventative standpoint. A typical building might take a year or so to get the bugs out. A building like this takes longer — it certainly took at least a couple of years until we really felt comfortable with the building itself.

**David Silverman:** What have been some of the biggest maintenance or management headaches that were not anticipated?

**Gary Saffie:** The elevators were a huge issue when we moved in. One mistake was not bringing the elevators all the way up to the roof. In order to bring large equipment up there, everything has to be carried up the stairs. Eventually we will probably have to hire a crane and riggers to bring large equipment to the roof.

**David Silverman:** Stata has an innovative raised-floor system that is unique in the US — it includes floor boxes for HVAC distribution and is intended to give the building flexibility with respect to power, data, and air distribution needs. Has that been successful?

**Gary Saffie:** It's working very well. It is so easy to change locations of the air discharge in offices — in fact, we've done this hundreds of times to satisfy the occupants. It didn't work perfectly at the start and it took us a while to figure out the temperature settings for different seasons. For the most part, people are pretty happy with that part of it. Overall the spaces feel nicer without a two-by-four or two-by-two ceiling tile with overhead air.

**David Silverman:** An early concern was maintenance issues with spills or food in the floor boxes.



**Gary Saffie:** That hasn't been a huge problem. More so in areas like the childcare center, where little kids run around with food; it just has to be part of your maintenance program to keep those clean. The building custodians make it a point to vacuum those floor boxes out regularly.

**David Silverman:** Have you also had to reconfigure power and data under the floor?

**Gary Saffie:** All the plug-and-play is as advertised — it's that simple. In fact, in most cases my staff doesn't really get involved too much, because the occupants have their own facilities group that does most of this work. I know they're pleased with the flexibility.

**David Silverman:** The Stata Center has a higher ratio of exterior surface to interior space than most buildings. The upside is that the occupants get lots of windows in their offices — but the downside is that there is a lot more surface area to worry about in terms of maintenance.

**Gary Saffie:** Yes, we are not without leaks because there are so many different angles and different surfaces. This is a building that will probably always need attention to those issues. We know that with the change of seasons, things expand, things move, and the building moves. Every spring we wait to see what issues will present themselves. The first heavy rain storm of the spring will tell us what we have to deal with. As of this past December, we have been leak-free for the first time since the building opened. We have the right people in place now who understand the building.

**David Silverman:** I had a conversation with Rogelio Diaz, the facilities manager of the Guggenheim in Bilbao, a few years after that building opened. I asked him if the building leaked; he responded enthusiastically that it did, and that he knew where the two or three leaks were. He was proud that they knew where to put the buckets. He loved the building and felt that it was successful despite the leaks.

**Gary Saffie:** The occupants of the Stata Center were not initially happy at all. They did not expect a brand new building to leak. I

think we are probably in a good position to take care of problems more quickly, now that we understand what's going on.

**David Silverman:** One of the building's features that gets a lot of press is the storm-water retention system. I noticed some new signs explaining how this system is used for flushing toilets.

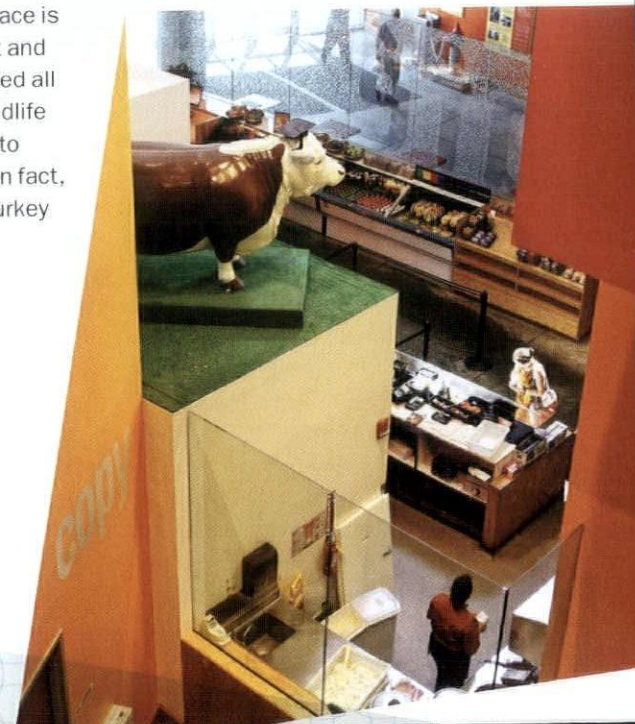
**Gary Saffie:** That system has been good but not great, because there is maintenance involved with it — filters, pumps, and sand filters. We rarely need to switch to city water because we are out of water, although it happened earlier this year, after a somewhat dry winter and spring. One issue we have is that the water regularly looks dirty. But those signs help — the occupants now understand why the water looks dirty and that this is a good system for the environment.

**David Silverman:** One of the design features of the building is the number of high spaces with high volumes. Maintaining those spaces, and especially the lighting, must be a challenge.

**Gary Saffie:** I think the lighting is dramatic and looks wonderful, but it's very difficult to maintain, especially in the Student Street. We are probably one of the few buildings that have a 40-foot lift so we can service the lighting. Generally I think the lighting is kind of poor from a maintenance point of view — we wind up changing lamps three or four times a year on the Student Street. We're looking at changing fixtures to increase the life of the lamps and cut down on our labor.

**David Silverman:** What do you think of the architecture?

**Gary Saffie:** The building really is stunning. It really is. You come down Vassar Street and you see these funky-looking awnings — everybody knows the building. This has to be the most photographed building on campus by far. If it was MIT's idea to make a statement to grab people's attention, I think they've done a good job. The third-floor outdoor space is really great and has attracted all sorts of wildlife from birds to squirrels. In fact, we had a turkey up there!



People are drawn to the Student Street because of the natural light and also the oddness. It's not just a corridor. It's not just a box. It's unique.

*Debi Kedian*

## THE ADMINISTRATOR: **Debi Kedian**

**David Silverman:** How would you describe your role at the Stata Center?

**Debi Kedian:** I manage all the activities that happen in common areas, including the first floor space that is called the Student Street.

**David Silverman:** What I've always found interesting about the Student Street is that it's got these really wide spots where it's not just a corridor — it's something more.

**Debi Kedian:** The Student Street is the only place on this side of campus where you can get food and beverage during the day Monday through Friday, and it offers dinner Monday through Thursday during the semester. The space is constantly being reconfigured to accommodate the various needs of the community. But a lot of what happens there is independent study — people are attracted to it because it's quiet. I'm quite surprised sometimes when it's not so quiet — especially outside the fitness center. There's something about that area of the Student Street that buffers the sound.

**David Silverman:** That area also has less natural light than some of the other areas.

**Debi Kedian:** Quite a bit less. And some of that has to do with the paint color on the wall — it's a green color. We have added light boxes and then put some art work in them, so they also function as outreach spaces for the Student Art Association, the hobby shop, and the MIT Museum.

**David Silverman:** The name "Student Street" was based on the

idea that the students would "own" the space. Do you think that the students feel they own it? That they can do things with it?

**Debi Kedian:** I'm not sure of that. There is ownership in the sense that it's available to them. It's a very welcoming space to stay in after they have class. They get their food and stay to eat or to work on projects. Students come to Stata at night to work on projects. There is a definite population that appreciates the Student Street.

**David Silverman:** It sounds like once they're exposed to Stata, they learn about the spaces and where they can hang out to study at night or off-hours.

**Debi Kedian:** Yes. The undergraduate students are most attracted to the Student Street. The graduate students have offices, so they're not the ones who are hanging out. And there are particular student groups that seek out the space — for example, the Association of Taiwanese Students loves having the *Straight to Taiwan* event there every year because they're actually able to recreate an Asian street market. Part of that is because of the design — you have the natural light, you have the concrete flooring which is like a street, and you have these alley-like spaces that come into it. It feels like a street market. People are drawn to the Student Street because of the natural light and also the oddness. It's not just a corridor. It's not just a box. It's unique. We've been able to accommodate a lot of different kinds of events in the Student Street from poster sessions, to professional events, to Earth Day.

## THE STUDENT: Mitchell Peabody

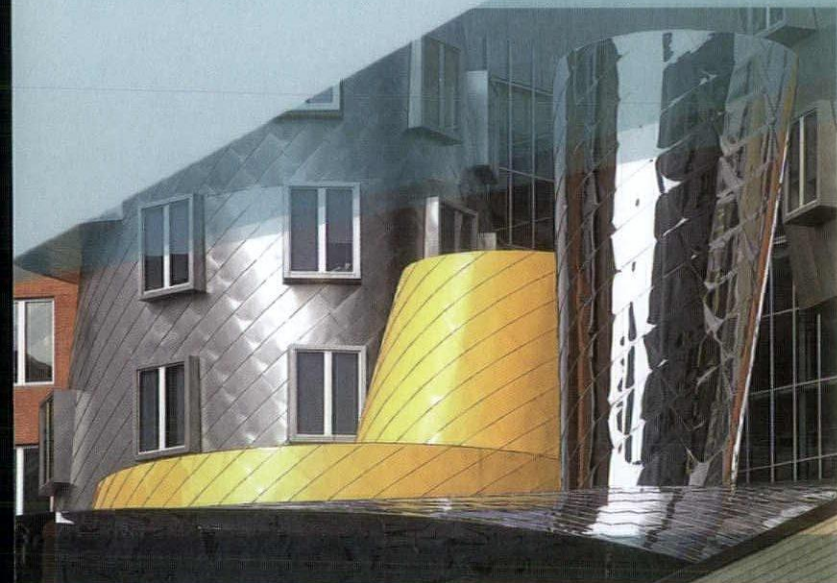


Photo by Peter Vanderwarker.

**David Silverman:** The building is almost like a small city — people can work there, study, eat, teach, probably even sleep there.

**Debi Kedian:** I've had days when there have been three or four different events happening on the Student Street. There is a great deal of community interaction that happens in Stata that doesn't happen at the MIT Student Center because that building is more segmented. But on the Student Street, you're in an environment where the areas outside the classrooms feel like you're hanging outside your house in your front yard. Interactions that might not happen in other locations on campus happen at Stata.

A good example is the MIT Enterprise Forum; it sponsored an event that included iRobot and other technology companies. A guy from iRobot brought a mine-finding robot that people passing by could operate. The little kids came out of the daycare, and he allowed them to try it. Of course, they didn't need to know it was for finding mines. A little boy picked up his lunchbox with it and drove it around, and then was trying to help the robot see his lunchbox. It's those kinds of interactions that are amazing. It's amazing for everyone.

**David Silverman:** How does Stata compare to your previous office in Building NE43?

**Mitchell Peabody:** It's a heck of a lot better. Stata has a confusing layout, but once you get used to it, it's a great building. NE43 was kind of claustrophobic in a lot of respects — there was so much stuff around and the offices were pretty cramped.

**David Silverman:** That was probably an accumulation of artifacts that had been researched and studied over the years.

**Mitchell Peabody:** Yes. And I'm sure the same thing will probably happen with the Stata Center. I shared my old office with four students and it was a fairly tight squeeze. We had a stack of data tapes in the office — not cartridge tapes, but reel-to-reel tapes from old lab experiments.

**David Silverman:** And of course you didn't want to throw them out.

**Mitchell Peabody:** I kept two of them for nostalgia purposes.

**David Silverman:** What else about Stata is different?

**Mitchell Peabody:** The positives of Stata are that it feels a lot more airy and it's very well lit. NE43 was kind of depressing because it has fluorescent lighting and it was a dreary place to work. Stata has a more lively feel to it. And the mix of offices and open space is nice. For our group, which has a large contingent of people who rotate through on a yearly basis, it's pretty nice.

There are two negatives I can point out. The first is the obvious one, which is always pointed out: the leaks. The other is some of the more technical mundane things; I remember one night after the building first opened up — a pipe containing some sort of green coolant burst open at two in the morning. But I think those problems have largely been addressed and fixed.

**David Silverman:** What about the aesthetic of the building?

**Mitchell Peabody:** One of the complaints when we first moved in was that it looked unfinished. Yet it was clear that this was intentional — it was supposed to have a warehouse feel.

**David Silverman:** The design of the building features a number of open spaces, including double-height spaces. What is your experience of them?

**Mitchell Peabody:** There are two issues. One is distraction. There

have been times, usually after hours, when there are many students around who can get pretty noisy. That's not a huge deal. It's just an annoyance. The other issue is where to secure belongings. The Stata Center currently provides a storage drawer in a communal cabinet for students. There are also lockers for students, but there is no regulation of the lockers, so it is first come, first served.

**David Silverman:** You probably weren't expecting many outside visitors at the Stata Center.

**Mitchell Peabody:** When the building first opened, a lot of tours came through. Not just the regular MIT campus tours — although I think a few of those came through — but architectural tours. Lots of architecture students. And those could be distracting. But it also made people here a little leery of leaving their stuff around. The lockers were added a couple of months after we moved in.

*The building suits the personalities.  
There are interesting people who decide  
to come to MIT and do research. The  
building reflects their spirit.  
Mitchell Peabody*

**David Silverman:** I've heard that a number of hacks [pranks] have happened in the Stata Center. But it was anticipated that hacks were going to happen. I know you're not at liberty to tell, even if you do know people that do those pranks.

**Mitchell Peabody:** I'll just say that there's better hacking going on.

**David Silverman:** Can you talk about the overall spirit of the place? The character of the building?

**Mitchell Peabody:** I think it suits the personalities. There are interesting people who decide to come to MIT and do research. The building reflects their spirit, especially of the more geeky computer science, electrical engineering crowd. I think people like working in a place that's distinguishable. When people come to visit me, I tell them to find the funky-looking building. People look at it and say "Wow, that's really weird and kind of cool."

**David Silverman:** There are plenty of naysayers, too. It's easy to be critical of Stata, because it's unusual.

**Mitchell Peabody:** Yes. It's not a traditional building. It looks odd. And if you're not used to it, it's difficult to navigate. I usually meet first-time visitors at the elevator, because if they're not familiar with the building, it takes them a while to find my office.

**David Silverman:** Do you take advantage of any of the amenities of the Stata Center? What's a typical day for you?

**Mitchell Peabody:** I walk to work, because I live pretty close by, so

I don't use the underground parking. I use the fitness center almost daily; I'm a huge fan of lifting weights. I get coffee and a bagel at the coffee shop pretty regularly. I know that the "book drop" book exchange exists — but I haven't really used it beyond donating a couple of books to it. The information kiosk sells movie tickets and other student-discounted items — it's pretty convenient. The daycare center is neat. If I had a kid, it would be awesome, although I've heard that the waiting list for it is extremely long.

**David Silverman:** The first floor of the building was dubbed the "Student Street" by the provost and senior administration. The thinking was that it would become a space that students "owned" and a place where they could study, eat, and get together to meet people. Do you think students feel ownership of it in any way?

**Mitchell Peabody:** I'm not so sure about the ownership aspect of it. It seems that the first floor got taken over pretty rapidly by the café and the cafeteria, which were planned, and the information kiosk. There's also the multitude of tours that pass through. I do see students studying and congregating there — so I guess from that point of view, they do own the Street. I don't know if there is any mechanism for making the Student Street reflective of student tastes. It now mostly features artwork that is provided by the Lab and, I think, the administration.

**David Silverman:** What's been your sense from other students — do they like the building?

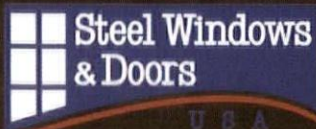


**Mitchell Peabody:** When we moved in, the students talked a lot about it — how odd it is and how neat it is. There were issues with the prox card readers, with people navigating their way around the building, and, of course, issues with all the leaks. But I've been at MIT for six years and in the Stata Center for four years; it just feels familiar to me. I now know all the nifty little shortcuts and stuff. It's worked out, and I think it's become a really, really nice building. ■

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The background of the page is a warm, golden-brown gradient. Overlaid on this are several faint, concentric circles and a network of thin lines connecting small dots, some of which are orange and others black, creating a complex, web-like geometric pattern.

# It's All an Illusion

by Douglas Hubbard

The perception that many things  
are immeasurable is common —  
it's also an illusion.

# Architects,

like many professionals, must find some measurements difficult or impossible. Many measurements they deal with seem straightforward enough, such as the dimensions of a room or the static load on a support. But can project risk, customer satisfaction, or the quality of a design be measured? Absolutely.

It is common to perceive many things as immeasurable, and all of the reasons for this perception fall into just three basic categories:

- **The concept of measurement:** The meaning of measurement, as it is used in most of the empirical sciences, is widely misunderstood.
- **The object of measurement:** The thing being measured is often ambiguously defined.
- **The methods of measurement:** Even basic empirical and statistical methods that would address a variety of common measurement problems are not widely understood.

Think of these collectively as the “.com” rule (concept, object, and method) of measurement. Once we understand why each of these objections to measurement is based on misconception and imprecise thinking, we will understand why nothing we thought was immeasurable really was immeasurable.

## The Concept of Measurement

*Although this may seem a paradox, all exact science is based on the idea of approximation.*

— BERTRAND RUSSELL, MATHEMATICIAN AND PHILOSOPHER

There is a good chance that what you think “measurement” means probably does not at all resemble its typical usage by scientists, statisticians, or actuaries. When I ask people what measurement means, I usually get answers like “to quantify something,” “to compute an exact value,” “to reduce to a single number,” or “to choose a representative amount.” Implicit or explicit in all of these answers is that measurement is certainty — an exact quantity with no room for error. If that were really what the term means, then, indeed, very few things would be measurable.

But when scientists, actuaries, or statisticians perform a measurement, they seem to be using a different *de facto* definition. For all practical purposes, the scientific crowd treats measurement as a set of *observations that reduce uncertainty where the result is expressed as a quantity*. A mere reduction, not necessarily elimination, of uncertainty will suffice for a measurement. All measurements start with some prior state of knowledge. You have *some* idea of the future occupancy of a proposed building, or you wouldn't have proposed it. You can put some reasonable range on it, say, 50 percent to 85 percent in the first year. But if you conduct a market survey that turns out to be favorable, you might be able to reduce the width of this range, and a statistician might calculate that the range is more like 65 percent to 80 percent.

Real scientific methods report numbers in “confidence intervals,” such as “the average yield of corn farms using this

new seed increased between 10 percent and 18 percent [95 percent confidence interval].” Depending on what decision you need to make, even marginal reductions in uncertainty can be useful as a measurement. If the investor's breakeven for the building above was an occupancy rate of 60 percent, then the new measurement would be sufficient to make the investment conclusive. If you find out more than you knew before, then you have performed a measurement in the strictest scientific sense.

## The Object of Measurement

*A problem well stated is a problem half solved.*

— CHARLES KETTERING, INVENTOR

Sometimes the obstacle to measuring an unknown is simply the lack of a specific definition. That is, we haven't clarified the object of measurement. If someone asks how to measure “strategic alignment” or “flexibility” or “customer satisfaction,” I simply ask: “What do you mean, exactly?” It is interesting how often people further refine their use of the term in a way that almost answers the measurement question by itself.

I often ask audiences at my seminars to challenge me with difficult or seemingly impossible measurements. In one case, a participant offered “mentorship” as something difficult to measure. I said, “Having mentors sounds like a good thing. I can see people investing in ways to improve it, so I can understand why someone might want to measure it. So, what do *you* mean by ‘mentorship’?” The person almost immediately responded, “I don't think I know,” to which I said, “Well, then maybe that's why it seems hard to measure to you. You have to figure out what it is first.”

When confronted with a similar ambiguity, I would ask the person to clarify the following questions:

- **What do you mean — exactly?** Can you describe any specific, observable consequences you would expect from increasing or decreasing this thing?
- **Why do you care?** What decisions would be different if this measurement turned out to be higher or lower than expected?
- **How much do you know about it now?** Is there any rational, finite range you could put on its possible values?

The clarification of the question and the precise definition of terms is the beginning of any scientific inquiry. Once you can figure out how to articulate what a proposed measure is all about in observable terms, you are half-way to measuring it.

## The Methods of Measurement

*It's amazing what you can see when you look.*

— YOGI BERRA

Finally, a measurement may seem impossible for no other reason than that the basic empirical methods for measuring that very item are obscure — at least to the person confronted with the measurement problem. But there is a great, documented history

of clever (and often simpler than expected) measurement methods applied to all sorts of problems. For example:

- In 1998, Emily Rosa, an 11-year-old girl, became the youngest person to be published in the *Journal of the American Medical Association* by devising a simple experiment to measure the effectiveness of a controversial health-care technique called "Therapeutic Touch." She effectively debunked it.
- In WWII, the War Economics Division of the American Embassy in London was able to infer an estimate of the German monthly tank production by analyzing serial numbers of captured tanks. The estimates were much closer than the reports from spies, which were off by an order of magnitude.
- Methods used to estimate the population of a species of fish, insect, or plant have also been used to estimate the size of the illegal drug trade, the number of design errors in computer code, or the extent of illegal immigration.
- Statistical methods of pattern analysis have been used to estimate the percentage of people who cheat on taxes or cheat on college exams.

In each of these cases we can imagine someone reacting with the question "How could they possibly measure *that*?" And yet they did. Success with these measures didn't always require

There is a great, documented history of clever (and often simpler than expected) measurement methods applied to all sorts of problems.

esoteric PhDs (Emily Rosa, of course, was in elementary school). What was required was a different approach to thinking about the problem — the people who performed these measurements seemed to lack the defeatist assumptions many other people might make on similar problems.

Let's take two of these common assumptions and reverse them. First, instead of assuming something has never been measured before, assume that your measurement problem is not as unique as you first thought. It's likely that what you are trying to measure has been measured many times, has been the subject of many dissertations, and may, in fact, be routinely solved by professionals in another industry. Spend some time on Google or with a research librarian to avoid reinventing the wheel.


Second, reverse another major assumption by assuming you have or can get all the data you need. The amount of data you need, what can be derived from a set of data, and even what type of data is needed are all discovered through specific statistical analysis calculations. If people tell you "we don't have sufficient data to measure that," it's a virtual

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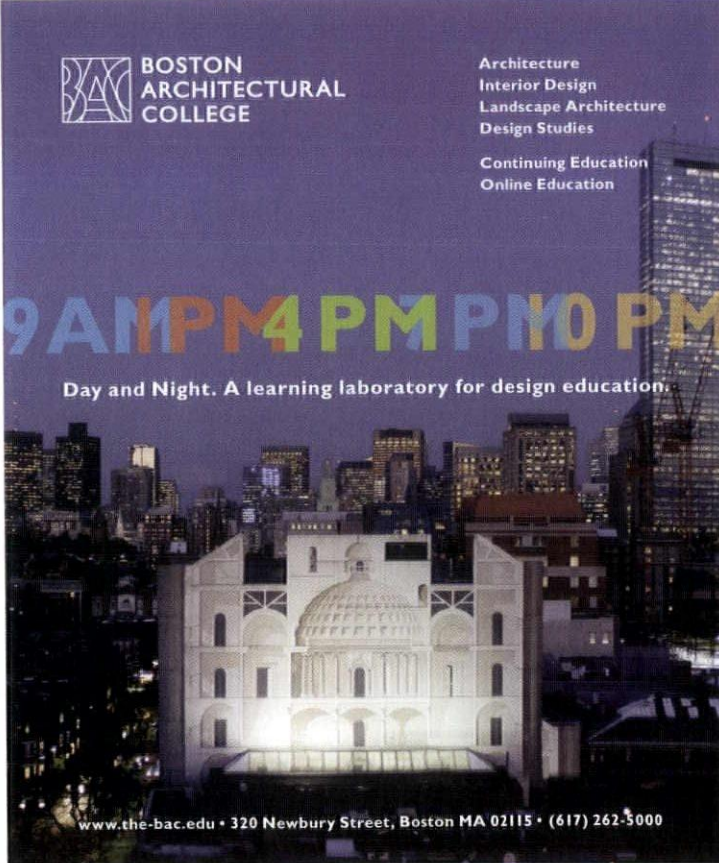


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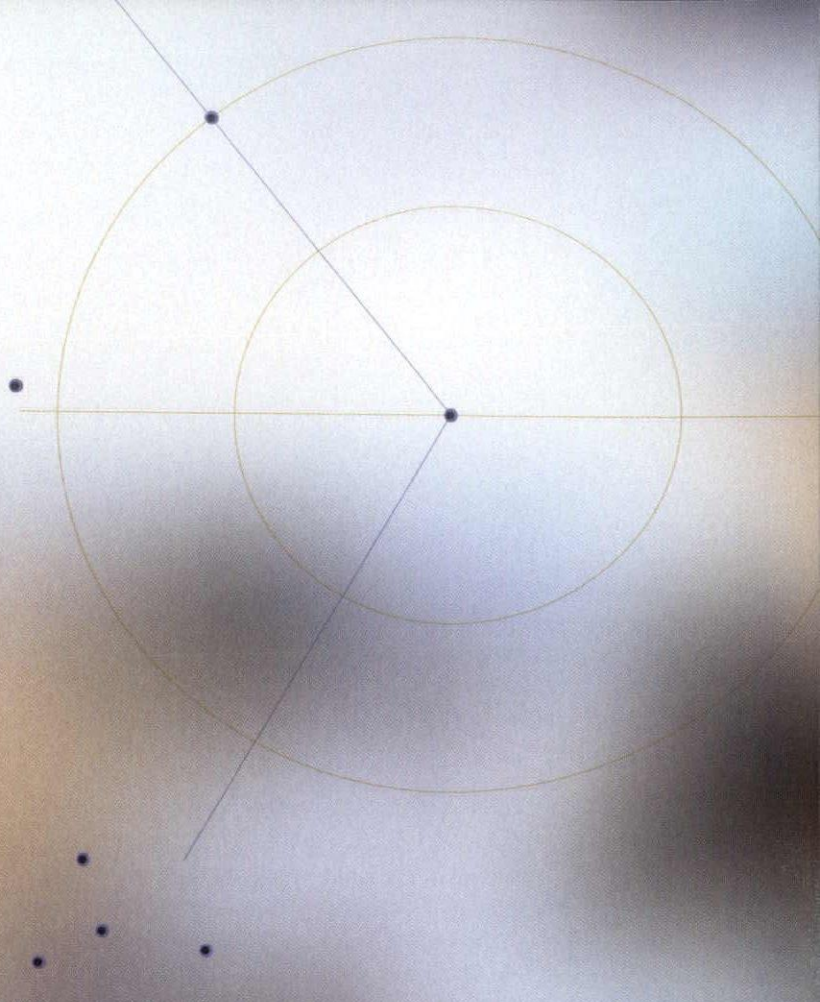
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certainty that their assertion was not based on any kind of mathematical calculation. The truth is they just don't know what data or how much data is needed. They also implicitly assume that you can't get the data. Most of the examples listed above involved *acquiring* the needed data with new empirical observations. And whenever I compute how much data I need to reduce uncertainty, most people are surprised at how little is required.

You can begin to measure anything by taking a simple step: ignore the naysayers (or demand they show you their math). Somewhere there is a relevant measurement method for your problem. ■

Douglas Hubbard is the author of *How to Measure Anything: Finding the Value of Intangibles in Business* (John Wiley, 2007), from which portions of this article were excerpted. He is the principal of Hubbard Decision Research in Glen Ellyn, Illinois and lectures widely on measurement systems.



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# RUNNING THE NUMBERS: AN AMERICAN SELF-PORTRAIT

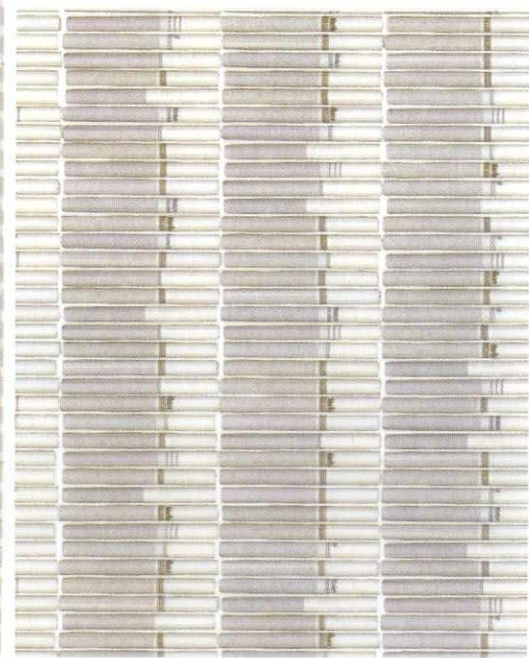
**Photographs and text by Chris Jordan**

The images in this series look at contemporary American culture through the austere lens of statistics. Each image portrays a specific quantity of something: 1.14 million paper supermarket bags (the number used every hour in the US); 106,000 aluminum cans (30 seconds of can consumption) and so on. My hope is that images representing these quantities might have a different effect than the raw numbers alone, such as we find daily in articles and books. Statistics can feel abstract and anesthetizing, making it difficult to connect with and make meaning of 3.6 million SUV sales in one year, for example, or 2.3 million Americans in prison, or 426,000 cellphones retired every day. This project visually examines these vast and bizarre measures of our society in large, intricately detailed prints assembled from thousands of smaller photographs.

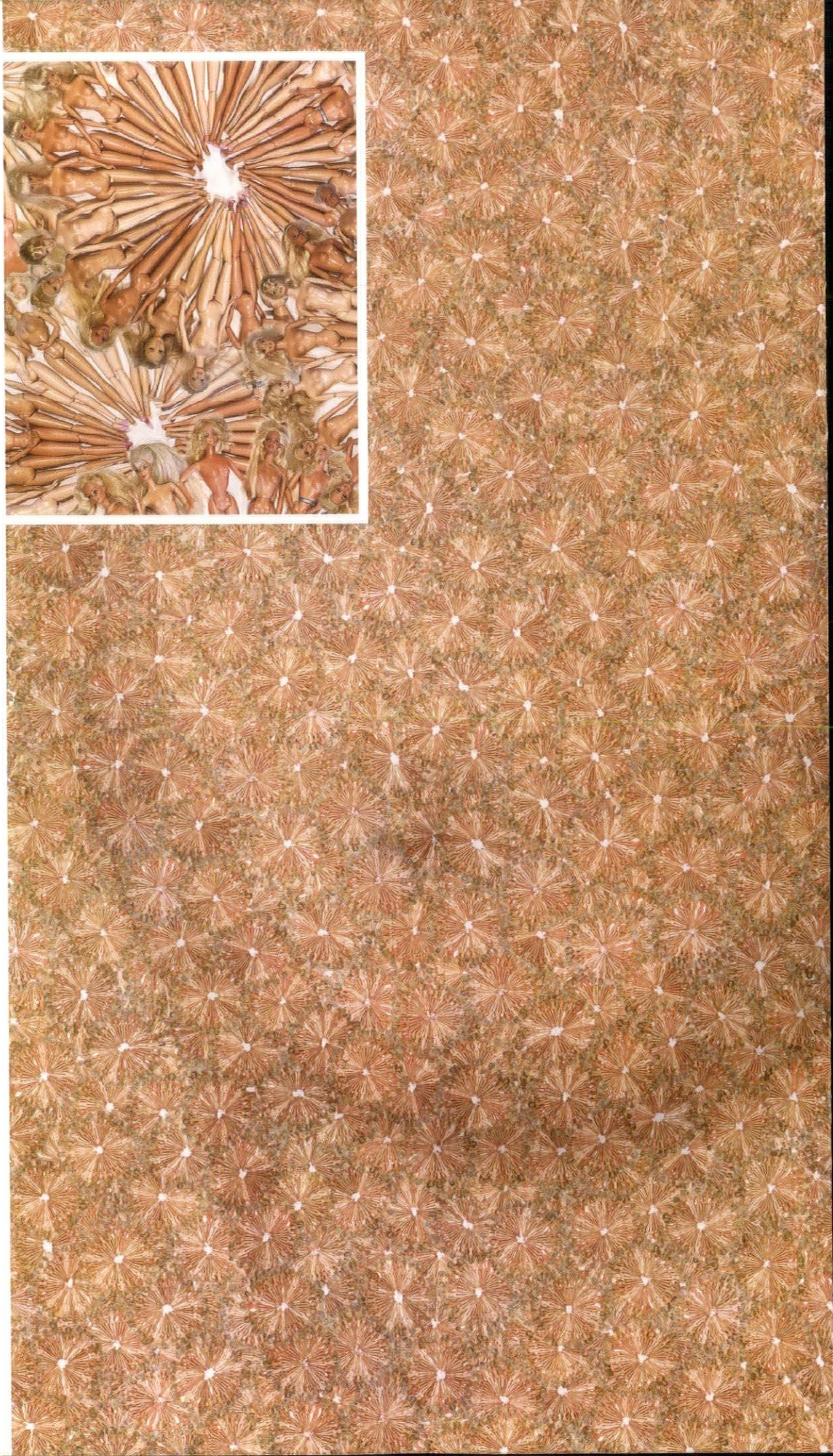
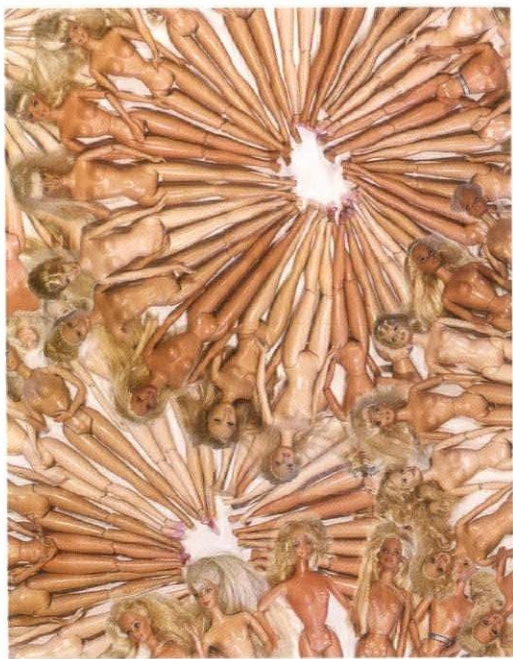
Chris Jordan is an internationally acclaimed photographic artist in Seattle, Washington ([www.chrisjordan.com](http://www.chrisjordan.com)).

**CIGARETTES** 2007, 60" x 82"

Depicts 65,000 cigarettes, equal to the number of American teenagers under age 18 who become addicted to cigarettes every month.



BARBIE DOLLS 2008, 60" X 80"  
Depicts 32,000 Barbies, equal to the number  
of elective breast augmentation surgeries  
performed monthly in the US in 2006.







PAPER BAGS 2007, 60" X 80"

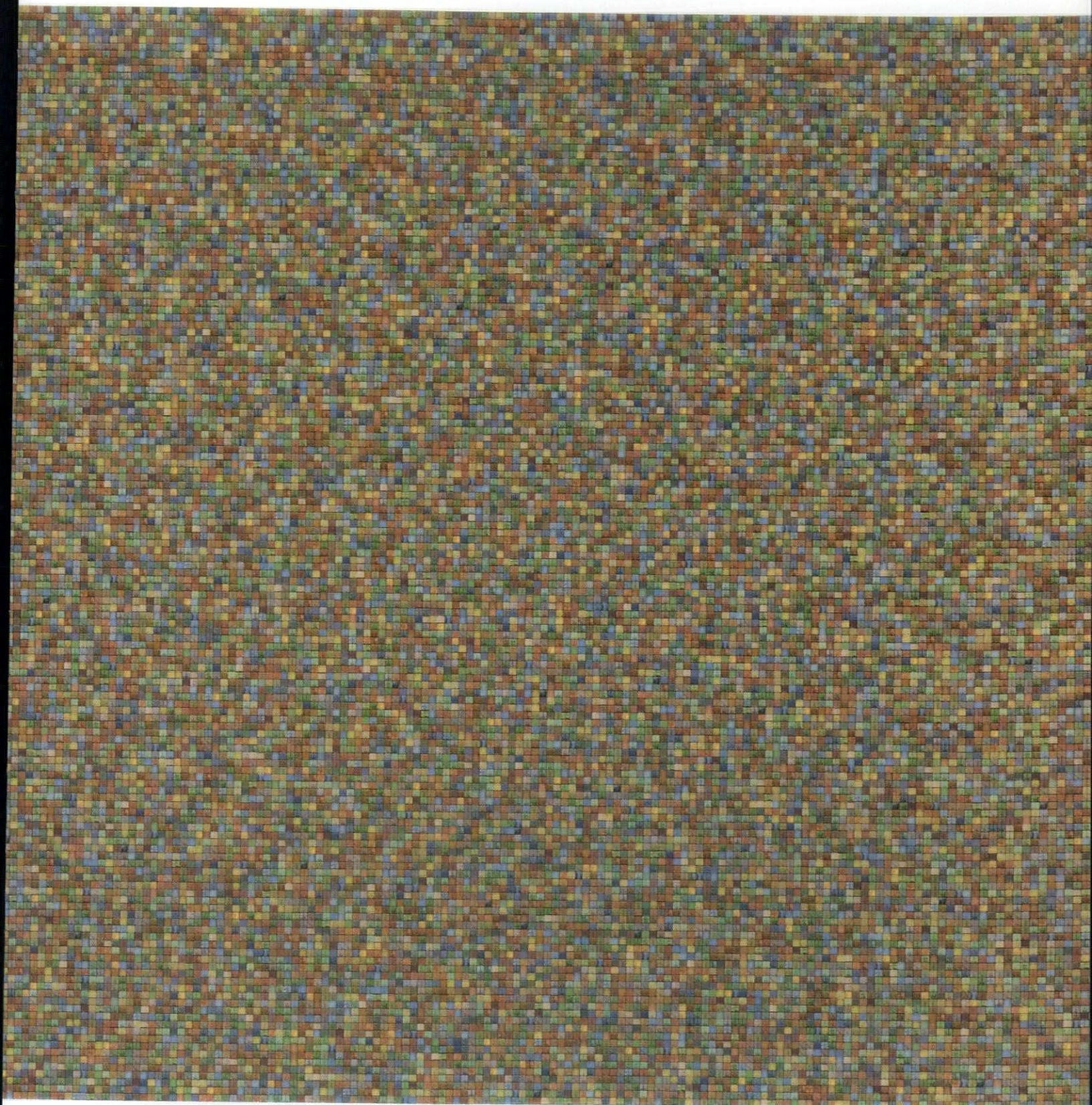
Depicts 1.14 million brown paper supermarket bags, the number used in the US every hour.



SHIPPING CONTAINERS 2007, 60" X 120"

Depicts 38,000 shipping containers, the number of containers processed through American ports every twelve hours.







1

# Taking the Measure of a School

2

A visit from the National Architectural Accrediting Board is as much an assessment of the profession as it is of a design school.

On a recent episode of *House*, television's addictively bratty medical drama, a patient was admitted to the hospital with a mysterious disease. No news there. But in addition to the usual plot points — toxins, delirium, misdiagnoses

leading to administration of the wrong drugs leading to the patient's near death — this episode featured another hazard: an accreditation visit. The accreditor (there was only one) was an annoying little stickler with a clipboard who had to be herded from one falsely calm venue to the next, like a suspicious great-aunt in a Feydeau farce, while the staff ran around saving lives.

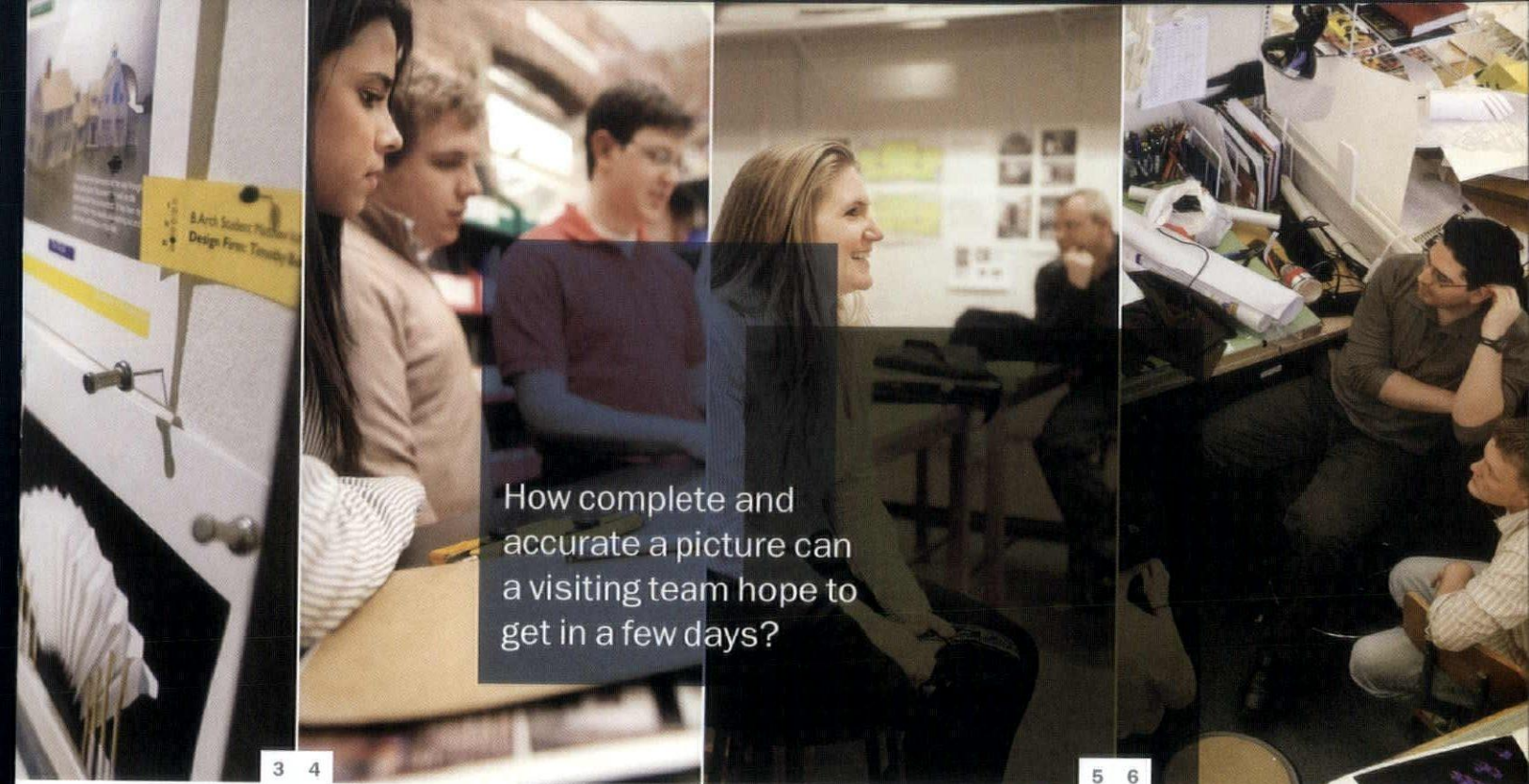
Nobody would claim that *House* is anything but an outlandish, if entertaining, caricature of medicine. But what about its portrayal of the accreditor as the enemy — a bean-counter who must be placated with evidence of compliance to meaningless regulations so the institution can continue to carry out its important mission? How does accreditation really work? Is it actually a useful measuring instrument? And when it comes to architecture, where graduating from an accredited program is a prerequisite for licensure, what exactly is accreditation seeking to measure?

First, a brief introduction to architectural accreditation. It's the purview of the National Architectural Accrediting Board (NAAB), an organization whose constituencies include: the AIA; the National Council of Architectural Registration Boards (NCARB), which also administers the IDP program and the Architectural Registration Exam; the Association of Collegiate Schools of Architecture (ACSA); the American Institute of Architecture Students (AIAS); and the public.

Every year the NAAB sends out visiting teams — in some

by Joan Wickersham

Photos 1 and 6 by Anita Kan; courtesy Harvard University Graduate School of Design. Photo 2 courtesy Wentworth Institute of Technology. Photos 3, 4, and 5 by Liz Linder; courtesy the Boston Architectural College.



How complete and accurate a picture can a visiting team hope to get in a few days?

years, as many as two dozen — to assess architecture schools seeking to earn or extend a term of accreditation. Between their arrival Saturday night and departure at noon on Wednesday, team members immerse themselves, with charrette-like focus and energy, in the school: its curriculum, its resources, its culture, and the work produced by its students. They meet formally and informally with students, administrators, faculty, staff, and alumni; they visit the studios; and they comb through syllabi and exhibits of student work.

By Wednesday morning, they've pulled together a draft of their report to present in a school-wide meeting, detailing which of NAAB's accreditation conditions have been met and which haven't. They've also already voted on a recommended term of accreditation (generally three or six years), but the school won't learn the result until after NAAB's summer meeting, when board members will discuss each report before voting to accept or modify the team's recommendation.

So how complete and accurate a picture can a visiting team hope to get in a few days?

"It's amazing how much you learn," says Marilyns Nepomechie FAIA, who as a faculty member and past graduate program director at Florida International University and also a frequent team chair for NAAB, has been on both ends of the accreditation process. "Schools spend at least a year and a half preparing for the visit, writing their self-assessment, and collecting the evidence to mount an exhibit that represents their program. So before you visit a school, you read their self-

Is it possible — or desirable — to quantify the quality of an education?

assessment very carefully. You're trying to get a sense of how this particular place educates

architects, and then when you arrive you're looking at the evidence. Everything is a comparison between what's claimed and what's actually there."

Such a system, which relies on both written data and eyewitness evaluation, is both objective and subjective, reflecting the current national debate about accreditation and higher education in general. Is it possible — or desirable — to quantify the quality of an education? It also reflects the nature of architecture itself. Is a "good" architect one who designs a beautiful building, or simply one whose building is structurally sound? And how deeply should accreditors be involved in deciding what goes into the education of a good architect? Should architectural accreditation reflect a prescriptive approach to pedagogy; or, as disciplines such as engineering do, should it focus on measuring student performance outcomes? In other words, do we look at what is taught, or at what is being learned, or both?

Ken Lambla AIA, who is dean of the College of Arts and Architecture at the University of North Carolina at Charlotte, and has also chaired many NAAB teams, believes accreditation addresses the need to measure student performance. "This is especially important in a public university: we are accountable to our public constituencies. We need to show that we are meeting qualitative standards in terms of student outcomes." At the same time, Lambla recognizes, "Architectural education isn't as quantifiable as other disciplines."

Stephen Schreiber FAIA, head of the newly accredited architecture program at the University of Massachusetts Amherst and also a veteran NAAB team chair, says "Accreditation assures the public, students, and future employers that there's a consistency among programs. It's proof that your school conforms to some agreed-upon rules, that what the school is doing isn't completely capricious. Beyond that, accreditation doesn't tie the hands of

programs; they have the flexibility to shape the kind of program they want. But it ensures there won't be big issues missing."

If the bottom-line reason we accredit architecture programs is to produce graduates qualified to take the licensing exam, then in theory accreditors could just make sure that schools are "teaching to the test." But many people take the position — reflected in NAAB's current conditions for accreditation — that accreditors have a more active role in advocating for certain unquantifiable values such as "studio culture," a recent addition to the conditions (lobbied for by architecture students) that requires a school to demonstrate that it is "a positive and respectful learning environment."

Changing ideas about architectural education will be aired in October 2008, when NAAB and its varied constituencies meet for the Accreditation Review Conference (ARC). Held every five years, the ARC will ultimately lead to a revised set of conditions and procedures. Issues such as globalization, climate change and sustainability, new technologies and practice models, and distance learning have become increasingly important since the last ARC was held in 2003. Such changes inevitably raise new questions about what — and how — accreditors should be measuring.

Whatever the results from the ARC, it is unlikely that architectural accreditation will ever turn into the adversarial, us-versus-them conflict that *House* caricatures. Each visit will still involve professionals on both sides who care deeply about architecture, in a relationship that is both respectful and tense.

The school will try to show itself at its best; and the accreditors, many of whom are educators who have prepared their own schools for visits, will probe deeply to assure themselves that the program meets the standards of the profession.

At UNC Charlotte, the faculty have already begun preparing for the program's next accreditation visit, which won't take place until 2010. Ken Lambla acknowledges that this preparation is "expensive in terms of money and time, especially now when the faculty labor market is so competitive and specialized faculty members have many amazing projects to work on in the private sector." Still, Lambla says, "the faculty find the accreditation process incredibly useful. We are alert to change, and respond within our context. At the same time, like all architecture programs, we protect our identity with great vigor."

Marilys Nepomechie also sees the accreditation cycle as a continuous process. "It's an ongoing story, a narrative. A team arrives and leaves at a certain point. But programs and contextual cultures are always changing, as is the profession. Accreditation is the external agent that forces self-examination and questioning. Where are we now and where are we going?" ■

For more information on architectural accreditation, go to [www.naab.org](http://www.naab.org).

Joan Wickersham, who writes "The Lurker" column for this magazine, is a public member of the NAAB board. Her new book is *The Suicide Index: Putting My Father's Death in Order* (Harcourt).

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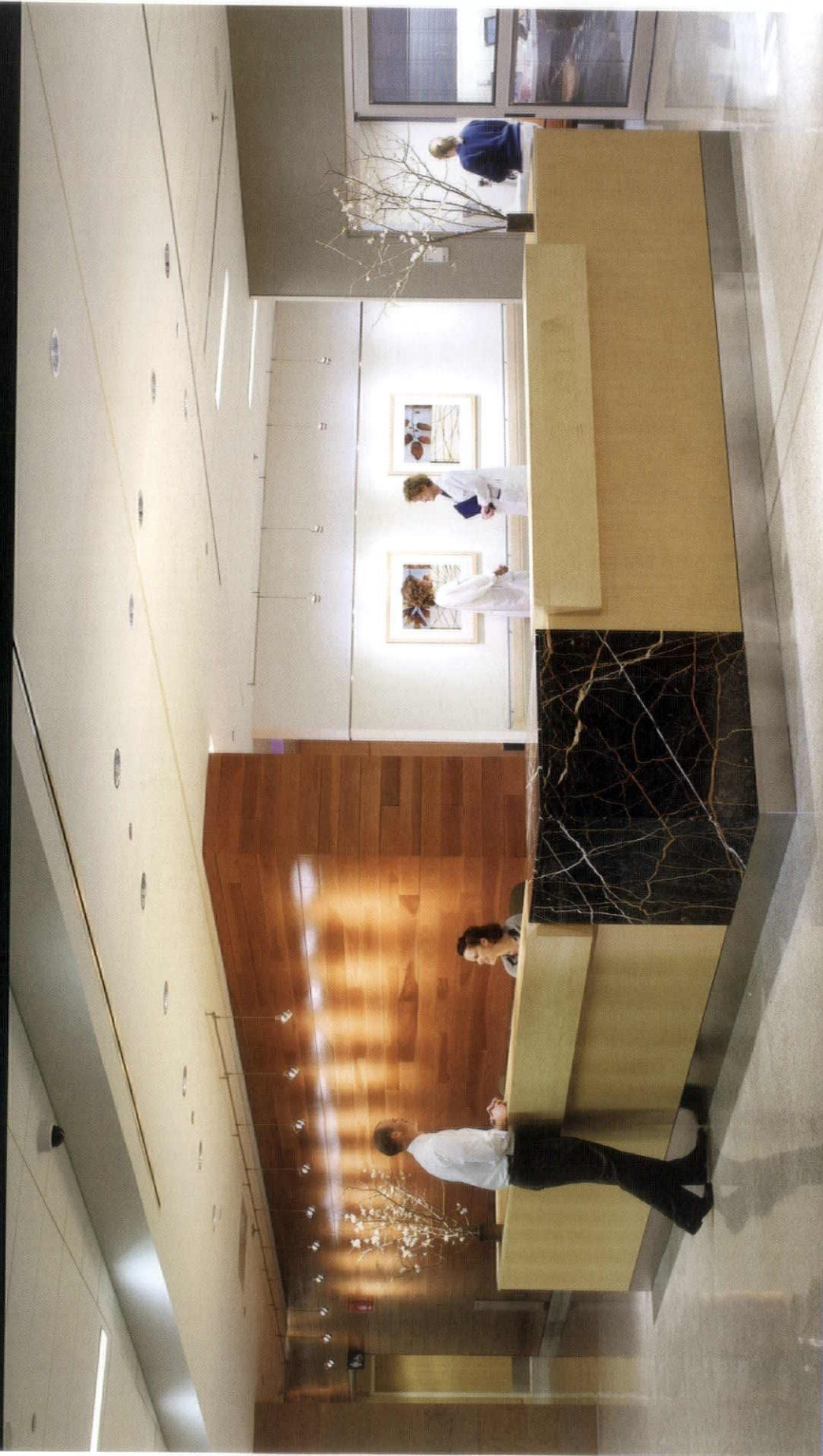
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**Project:** University of Massachusetts  
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**Architect:** Cannon Design  
**Contractor:** Turner Construction  
**Millwork:** Iaccarino

Situated on Lake Quinsigamond, UMass Memorial Lakeside creates the ambiance of a boathouse with the extensive use of wood throughout the building. Lyptus, a South American renewable LEED™ product with a natural finish, set the standard for all other wood finishes. It is used on the walls behind the maple, granite and stainless steel reception desk. The two-and-a-half-story atrium employed a wider board of fire-rated poplar that was stained to match the Lyptus. Here Iaccarino designed a special mounting system to accommodate anticipated changes in humidity. Additional work involved nursing stations, examining rooms, patient rooms, and public areas.

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Photo: Richard Mandelkern

**Iaccarino**

# What Do You Think You're Doing?

Thinking green isn't necessarily the same as being green.

## Alex Wilson talks with Jeff Stein AIA



**Alex Wilson** is president of BuildingGreen, Inc., the Brattleboro, Vermont publisher of *Environmental Building News (EBN)*; *GreenSpec Directory*; and *BuildingGreen Suite*, an integrated online resource ([www.buildinggreen.com](http://www.buildinggreen.com)). The executive editor of *EBN*, he is the author of *Your Green Home* (New Society Publishers, 2006); coauthor of *Green Development: Integrating*

*Ecology and Real Estate* (John Wiley & Sons, 1998); coauthor of *Consumer Guide to Home Energy Savings* (New Society Publishers, 9th Edition, 2007); and editor of *Greening Federal Facilities* (FEMP, 2001). He served on the board of the US Green Building Council from 2000 through 2005. BuildingGreen is a partner with the Boston Architectural College in the development of the BAC's Sustainable Design Certificate Program, the nation's first architecture school certificate program on sustainable design.

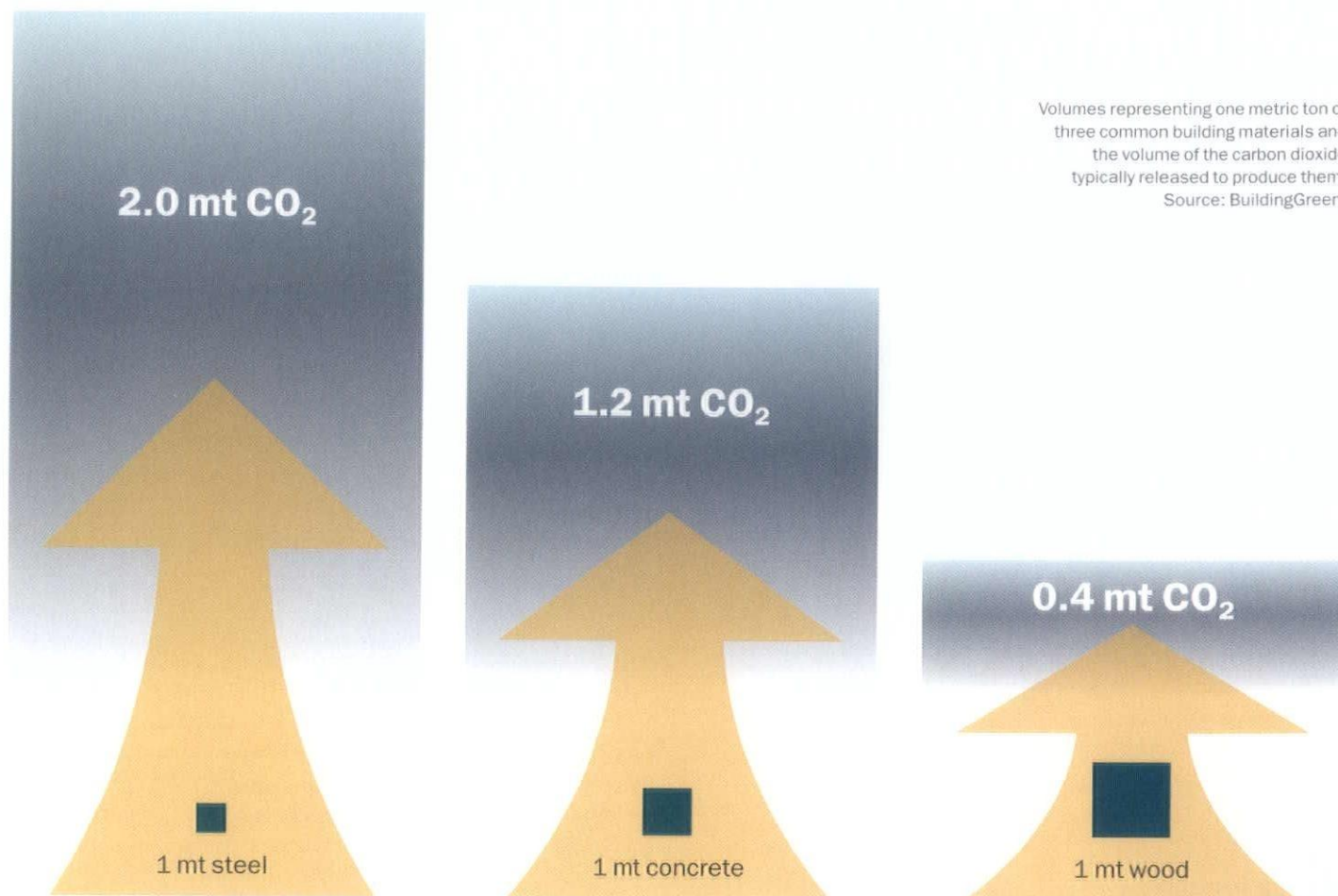


**Jeff Stein AIA** is head of the School of Architecture and dean of the Boston Architectural College and is the architecture critic for *Banker & Tradesman*.

**Jeff Stein:** Designers, builders, and clients increasingly want to know how green their building solutions really are; we all want to be able to measure the level to which green solutions are making a difference in our buildings and our lives. But how do you measure what is really green?

**Alex Wilson:** The key to green building is information. Designers and builders need to know how to achieve the low-energy, environmentally responsible buildings that clients are asking for. A big part of this is measurement of performance — that's what the US Green Building Council's LEED [Leadership in Energy and Environmental Design] rating system is all about. Rating systems for green buildings — and certification systems for green building products — are attempts to independently attest to performance. Our company tries to help architects and others in the building profession understand what green building is, figure out the priorities with green design, and sort out the hype from the reality.

**Jeff Stein:** Here's a snapshot of the current complexity of the situation: In the US, we have Energy Star ratings for appliances and the LEED standards for individual buildings, which will soon cover landscapes and neighborhood design, too. LEED is dominant but it's not the only one — the American Institute of Architects just released a study of three rating systems: LEED, Green Globes for New Construction, and SBTool 07. In Abu Dhabi, there is the Estidama Program. The UK has a Code for Sustainable Homes; there are also the Edinburgh Standards for Sustainable Building (ESSB) and BREEAM, the Building Research Establishment Environmental Assessment Method. And the European Union, through E-CORE, the European Construction Research Network, has developed various standards with acronyms like PeBBu (Performance Based Building Network), ENERBUILD (Energy in the Built Environment), CRISP (Construction and City Related Sustainability Indicators), and PRESCO (Practical Recommendations for Sustainable Construction).



**Alex Wilson:** There is tremendous confusion among manufacturers. They want to do the right thing and certify their products, just as building owners are increasingly interested in certifying their buildings, but there are so many different certifications that companies don't know what to do — which programs to go with. Our company, BuildingGreen, is trying to help solve this confusion by objectively explaining and comparing the many programs [see “Beyond the Logos: Understanding Green Product Certifications,” *EBN*, January 1, 2008]. Building certification seems to be a little less confusing, because LEED has been so dominant in the market, but it's certainly still an issue.

**Jeff Stein:** And of course, measuring greenness — energy use, material extraction, component manufacture, transportation requirements, what happens at the end of a building's or product's useful life — is extremely complicated. I know someone whose nephew works in Shanghai for a company that produces blades for wind turbines. That sounds as if it's a green job. But then, most of these Chinese-manufactured blades are shipped to California. What's more, they are made from an oil-based resin that is transported from Germany to China in the first place. Can this really make sense?

**Alex Wilson:** A lot of people worry about the embodied energy in the transportation of so-called green products. My feeling is that even though those products may be made far away, if demand grows adequately, then manufacturing will eventually move closer

to the point of use. As the price of energy goes up, the threshold at which local manufacturing becomes feasible is lowered. So I'm in favor of specifying green products, wherever they are made.

**Jeff Stein:** A new term has entered the vocabulary recently: greenwashing. How would you define it?

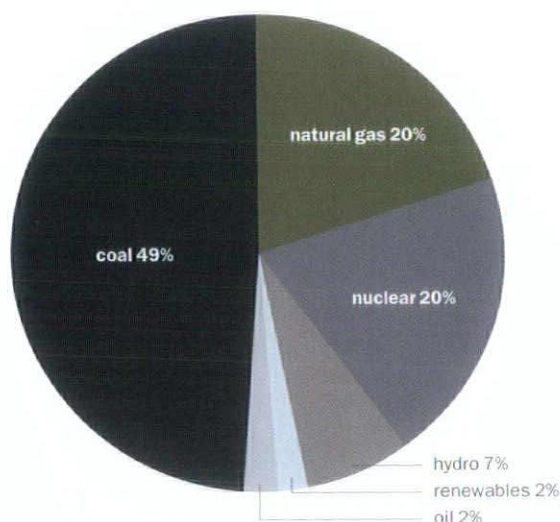
**Alex Wilson:** Greenwashing refers to the exaggeration of the environmental benefits of a particular product or service, and it's become a very significant issue in the green building movement. Green is popular, green is selling products today, and every manufacturing company out there is touting its products as green, whether they are or not. It really calls for third-party certification to verify claims.

**Jeff Stein:** But even when green building products are certified by a third party, what exactly does it mean to be green? Nothing is truly green — none of these buildings, for example, is actually producing oxygen.

**Alex Wilson:** When we started our newsletter, *Environmental Building News*, we debated what our subtitle should be. “Sustainable building” was an obvious option, but we decided against it, because there really is no such thing as a sustainable building. We don't actually know what a sustainable building would be, what it would look like, what it would do.

I think of “green building” as a general term that doesn't

## US National Average Fuel Mix for Generating Electricity



Source: BuildingGreen (from Energy Information Administration, US Department of Energy, 2006 data).

## Comparison of Transportation and Operating Energy Use for an Office Building

Average US commute distance (one way)	12.2 miles
US average vehicle fuel economy 2006	21.0 miles per gallon
Work days	235 days per year
Annual fuel consumption	273 gallons per year
Annual fuel consumption per automobile commuter	33,900 kBtu per year
Transportation energy use per employee	27,700 kBtu per year
Average office building occupancy	230 sf per person
Transportation energy use for average office building	121 kBtu per sf
Operating energy use for average office building	92.9 kBtu per sf per year
Operating energy use for code-compliant office building	51.0 kBtu per sf per year
Percent transportation energy use exceeds operation energy use for an average office building	30.2%
Percent transportation energy use exceeds operation energy use for an office building built to ASHRAE 90.1-2004 code	137%

Source: BuildingGreen.

necessarily imply that a building has no impacts on the environment — because every building has impacts on the environment — but that it's moving in the right direction. It may use less energy and less water; it may be healthier to occupy; it may have less impact during its life cycle and the life cycle of the materials going into it. But a green building isn't by definition sustainable. We have a long way to go before we're really able to call a building sustainable.

**Jeff Stein:** What are the steps we would have to take — both physically and politically — to get there?

**Alex Wilson:** I've actually been focusing a lot of my attention recently on that, looking at the big picture. One of the things I've been looking at is transportation, which has been a very under-represented issue in the green building community so far.

**Jeff Stein:** What do you mean by underrepresented? Transportation seems to be the only thing most people speak about when they talk about environmental issues. The fact that you can now buy a car that gets 35 miles per gallon instead of 25 seems to most people to be real progress. Yet we now know that about half of all the energy consumed in the US is used to construct and operate buildings, and only about a quarter of it is used by the entire transportation sector.

**Alex Wilson:** Yes, but if you look at what I've called the "transportation energy intensity" of buildings, we find some very interesting things. Simply getting to and from the average US office building uses roughly 30 percent more energy than the building itself uses. If instead of an average building you look at a code-compliant building — that is, a building that meets the ASHRAE 90.1-2004 energy code — the differential is of course even greater: the transportation energy associated with that building is more like 2.4 times the building energy use. This is significant because the LEED rating system that is most commonly used in the US to rate green buildings has 69 potential points, of which only a half-dozen specifically relate to location and transportation. Yet the energy use associated with getting to and from buildings is very high. So we need to look at these as part of a bigger picture and re-allocate points in the LEED rating system, as well as reorder priorities in the green building industry.

**Jeff Stein:** Is some of that about to happen with the new LEED neighborhood standards?

**Alex Wilson:** I think it is. Certainly LEED for neighborhoods addresses location very effectively. But there's also change going on within the LEED rating system that's going to result in a re-prioritization of points.

**Jeff Stein:** It sounds as if urban design will be increasingly important in the coming era.

**Alex Wilson:** It's absolutely critical, because that's how you get at the transportation energy intensity issue of buildings, by looking

at where we're building, how densely we're building — all the issues that fall under the rubric of urban planning.

Water is another important issue. There's been a tremendous focus on energy over the last few years, and a growing focus with the price of oil spiraling out of control. But water may be an even more significant issue in the coming decade or two.

**Jeff Stein:** It's not used very resourcefully in buildings now, in that all of the fresh water that comes into a building, regardless of how it's used, leaves as sewage and goes to a treatment plant where it's mixed with other wastewater and caustic chemicals, then put directly into wetlands or rivers or, in Boston's case, the Atlantic Ocean.

**Alex Wilson:** It's a pretty dumb process, and the wastewater management issue is a key part of it. In most of the country, we're using the same-quality water for drinking that we're using for flushing toilets and washing sidewalks; so there are tremendous opportunities for having two separate plumbing networks in buildings, one potable and one non-potable, and to allow alternative sources to supply the non-potable network, that could be used for toilet flushing, landscape irrigation, and refilling cooling-system water supplies.

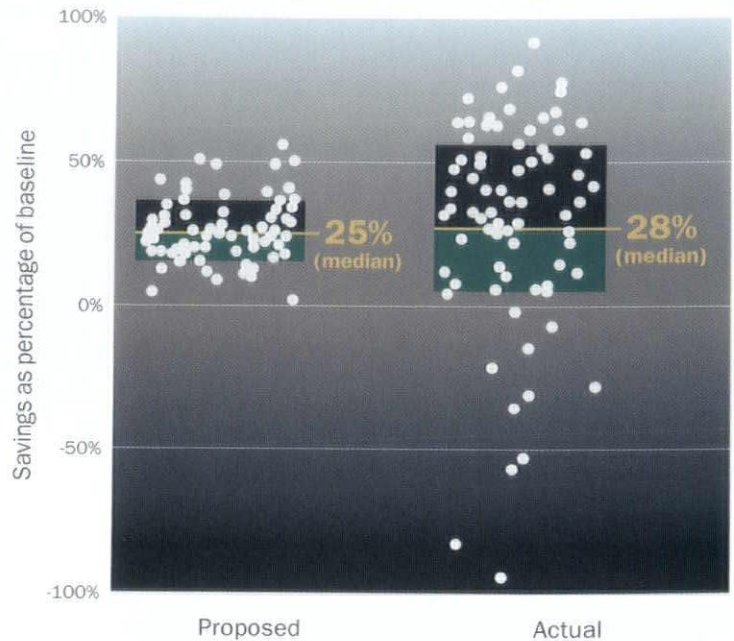
**Jeff Stein:** Are you optimistic about reversing, or at least mitigating, global climate change? It seems that we in the US are starting to recognize the impact of our development practices, and trying to make changes. But can one country make enough of a difference without there being some sort of global consensus and effort?

**Alex Wilson:** Global climate change is unquestionably one of the biggest challenges facing humanity. And I won't pretend that it's not going to be difficult to deal with these issues. But wherever there is a problem, there are opportunities. The need to dramatically change the way we are designing and building structures creates huge opportunities for smart architects and smart builders. The buildings that most of us have been creating for the last hundred years are going to be obsolete very quickly. They're going to need to be either significantly modified, retrofitted with a much higher level of insulation, or torn down and replaced. That affords opportunities for forward-thinking architects who can recognize what the needs are and learn how to address them.

**Jeff Stein:** The AIA is proposing as a professional standard that architects in practice must be able to offer green alternatives to their clients, which suggests that in three or four years, if you're not designing green buildings, you're not going to be designing buildings at all.

**Alex Wilson:** But we also need to start thinking more creatively about what those alternatives might be. One example is the concept of passive survivability. For several years now, the green building community has been talking in terms of incremental improvements in energy performance and the goal of halving the energy consumption of homes. But if we frame these issues as life-safety issues, we can interest code officials in incorporating these practices, essentially zero-net-energy design practices, into building codes. I

## Energy Savings in LEED Buildings



The actual savings vary much more widely than the proposed savings that were predicted in the LEED submissions — with some projects actually showing negative savings (usage that exceeds their base case). The boxes show the quartiles (25% of projects) above and below each median. Note that LEED assigns energy points for predicted energy cost savings, which do not always correspond to predicted energy savings. Source: BuildingGreen (from USGBC/NBI).

believe that climate change, risks of future terrorism, and potential energy-supply problems are going to argue for designing buildings, particularly homes and apartment buildings, that maintain livable conditions in the event of an extended loss of power, loss of heating fuel, or even loss of water. It's really a life-safety issue.

For example, imagine if there were a major heat wave coincident with a major drought, where water levels drop to the point that cooling water intakes for coal-fired and nuclear power plants fall too low, and those plants have to be turned off. There could be a massive power outage in the western US. People in Phoenix and Denver and Las Vegas may have trouble staying alive in a massive, widespread outage.

So we need to begin thinking about mandating that all new homes meet this design criterion of passive survivability. What would achieve that? A very well-insulated envelope — for a northern climate, that would mean R40 walls, R60 ceilings, triple-glazed windows. It would require cooling-load avoidance strategies, and natural-ventilation strategies. For many of these, we could go back and look at the vernacular architecture in hot climates. One hundred years ago, New Orleans homes all had wrap-around porches designed for natural ventilation. These are aspects of passive survivability that we need to begin building back into our homes. And we need to do that by mandating them in building codes.

**Jeff Stein:** It's interesting that passive survivability doesn't require exotic technologies, but rather a clear understanding of how we

used to do things, using building techniques that are available to us right now and aren't particularly expensive. It just requires us to ask more of architecture in terms of building performance.

**Alex Wilson:** There's also a great deal that we can draw from the tremendous advances that were made in design and building in the early '70s with the first fuel embargo — the whole passive solar movement, the super-insulation movement. Many architects became very familiar with the concepts and worked with them for a while, but then let them drop off the radar screen. Those need to come back. I was surprised to learn that Sweden's building code has required triple-glazed windows since 1976. In this country, if you ask manufacturers about triple-glazed windows, they look at you like you're from outer space.

**Jeff Stein:** How did you find your way into this field?

**Alex Wilson:** My training is in environmental biology. I first got the environmental bug back in the mid-'60s — I decided in junior high school to become an environmentalist and try to make the world a better place. I imagined myself as an ecologist, or maybe an aquatic biologist. But somewhere along the line, I decided that solving some of the environmental problems that were harming ecosystems around the world would be more rewarding, and to do that, I needed to focus on what was causing the problems. And because buildings are responsible for a huge percentage of our overall environmental burdens, I made a conscious decision to shift my focus from natural ecosystem studies to the built environment. I've stuck pretty close to that personal agenda, much to my surprise, and it translated into my business, BuildingGreen, which has a corporate mission to make the building industry more environmentally responsible.

**Jeff Stein:** You once said that at the very beginning, it was a struggle to make this business work, but now, years later, it's a struggle to keep up with how the rest of the culture is working with the notion of green building.

**Alex Wilson:** Yes, it's been exciting to see the growth in interest in the last five or ten years. I started the company in 1985, and launched our newsletter, *Environmental Building News*, in '92. We're often mistaken for a nonprofit entity, but we're a for-profit company — although a very mission-driven one. We used to have to knock down doors to get anyone to pay attention. Now we're trying to keep the door closed enough so that we can get our work done.

**Jeff Stein:** It always seemed to me that you were out ahead of the culture, which is a tough place for a for-profit company to be.

**Alex Wilson:** Maybe we should have been a nonprofit, in that a lot of what we do has come before a market for it has existed. But we went the route of being for-profit, and had some lean years. But we're doing well now.

**Jeff Stein:** Has your experience running a business affected the way you think about green solutions?

**Alex Wilson:** One problem we're facing as a culture is our failure to look at the long term. I think this is especially a failure in our business world, where we define success in publicly traded companies by the next quarter's performance. Similarly, we look at the economic performance of a building in terms of its payback three or four years out; when we're looking at energy improvements, we rarely look much beyond that. We need to be looking at the long term.

**Jeff Stein:** How long term?

**Alex Wilson:** Generations. The Native Americans consider the impacts of their actions seven generations forward. If you look at all of the oil that's been consumed since the dawn of the petroleum age in 1859, when it was first pumped in Pennsylvania, 94 percent of that has been consumed since I was born in 1955. There's a lot of debate today about whether we've reached a peak in oil consumption, but nobody really knows. There's some evidence that that's happening this year, but it might still be a decade or two away. The fact is that we're fairly close to the midway point in our consumption of the world's oil resources, and we've arrived there in the span of one person's lifetime. The human species has existed for tens of thousands of years, yet in this instant of geologic time we've taken a very concentrated energy resource that took hundreds of millions of years to accumulate and we've burned it up and released that carbon into the atmosphere as carbon dioxide, wreaking havoc in terms of climate change.

**Jeff Stein:** How smart does one have to be to make informed decisions in the green building arena?

**Alex Wilson:** One doesn't have to be smart, but one has to be wise enough to know where to turn for advice and information. There are a lot of very smart people involved in the life-cycle assessment of building materials and figuring out what the criteria for LEED and other building certifications should be. The better a job the developers of these standards do, the easier it is for us — architects, specifiers, builders, and developers — to use that information effectively in our decision-making. That said, staying up-to-date with green building is very important. Design firms should budget time for their employees to get up-to-speed about green building and stay there. Attending conferences, reading magazines, and monitoring green building listserves should not be relegated to employees' own time during evenings and weekends; it's a key part of doing business today.

**Jeff Stein:** Oil really makes us stupid, doesn't it? Not just because when you burn it and breathe the carbon monoxide it destroys brain cells. But the very use of it allows you to overlook other ways to deal with your relationship to your surroundings and to other people.

**Alex Wilson:** One of the tragedies, I think, is that those of us who were pushing these ideas 20 and 30 years ago were widely accused of being alarmist Chicken Littles. Now that we're faced with four-dollar-a-gallon gasoline, people are saying, why didn't we take action when we had the opportunity? ■



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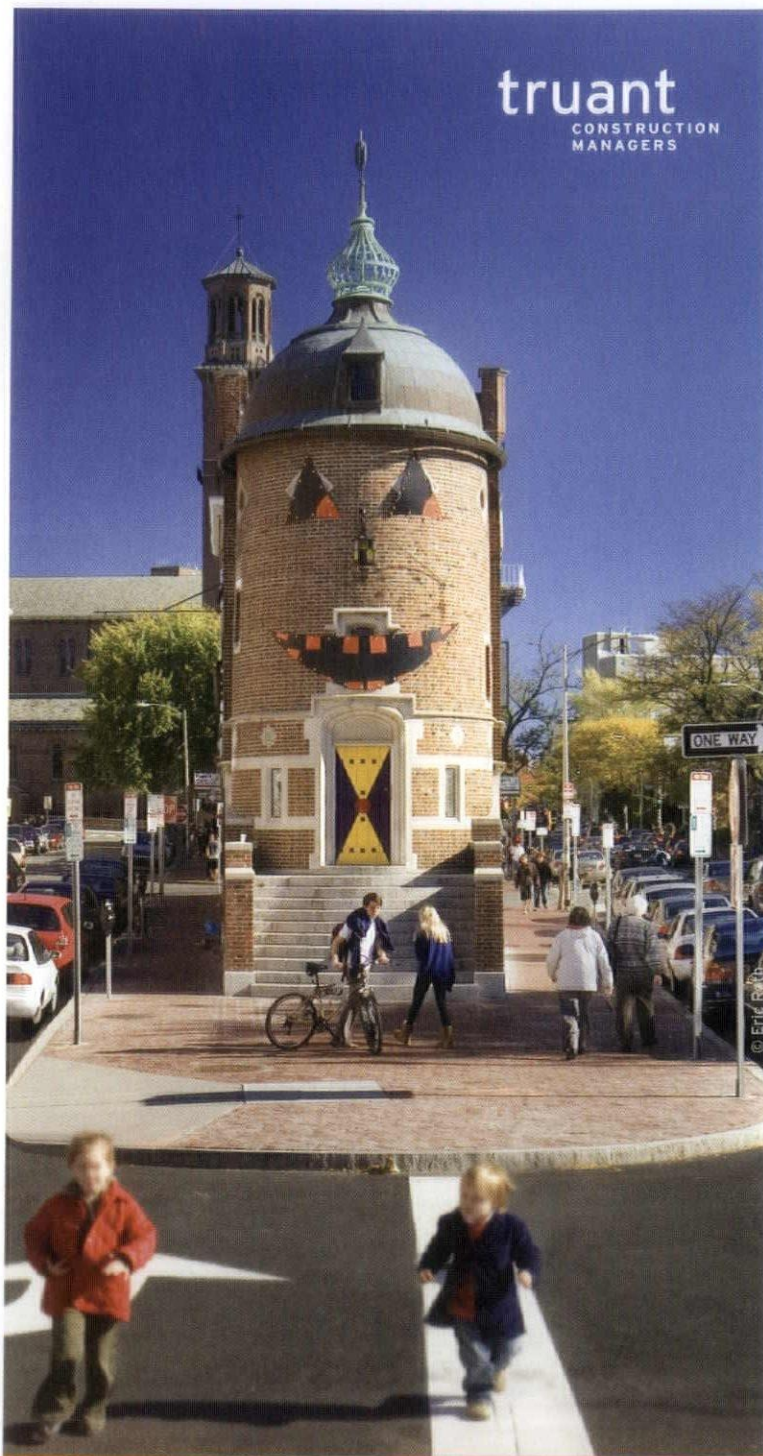
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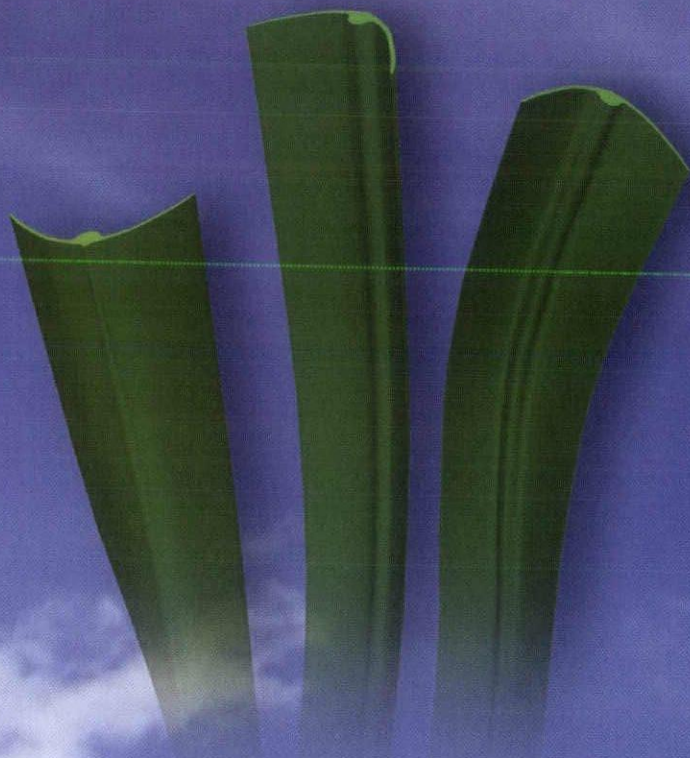
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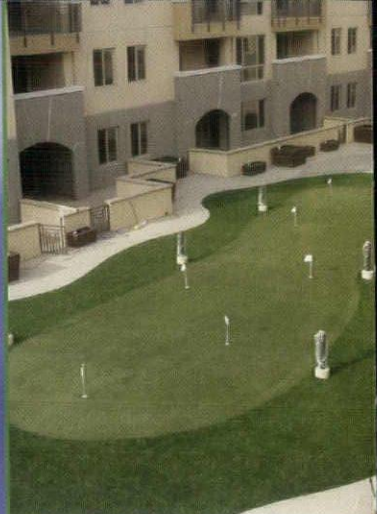
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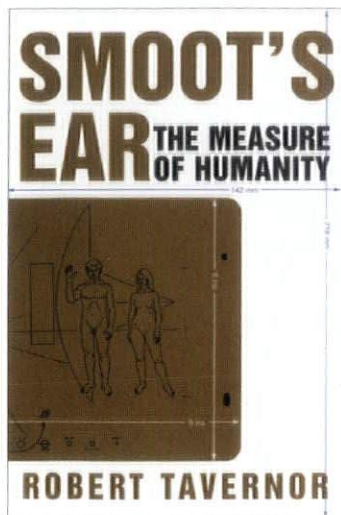


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**SMOOT'S EAR:  
THE MEASURE OF HUMANITY**

By Robert Tavernor  
Yale University Press, 2007

In the late 1700s, the streets of Paris filled with blood and riot as the Terror raged throughout France, gnashing its insatiable guillotine jaws while in distant Barcelona, Pierre Méchain, a French gentleman-scientist, prepared to take a secret to the grave: his measure of the earth's circumference was flawed by his own mechanical error, his life's work thus compromised and the great universal measure for all nations, the metric system, rendered arbitrary.

This is just a fraction of the trouble that plagued the metric system, as Robert Tavernor details in a lively 192 pages. It seems everyone has had an opinion on measure: Newton, Boullée, Pythagoras, Duchamp, ancient Egyptians, Heidegger, Le Corbusier, and Einstein have all weighed in. In a sense, this is the kind of book that is a joy *not* to read, each new page laced with references that send fingertips scuttling across keyboards, the kind of book that is responsible for server overloads at Wikipedia and revenue spikes at Google. The side reading is not essential, however, as the author provides clear summaries and insights. Tavernor investigates the very significance of mensural systems and

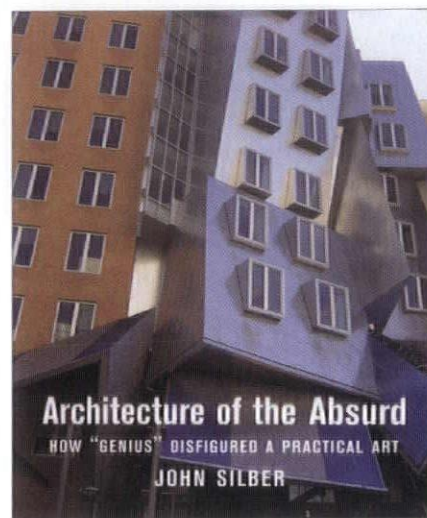
uncovers surprising meaning in the units we choose.

How can human activity be specified, the experience of space be quantified? Whether expressed in feet, meters, or modulos, measure is the linchpin between the amorphous, subjective experience of space and its quantified description—the Panama Canal between the twin oceans of mind and world. Measure is language, the fundamental tool of architecture.

Tavernor contrasts the unexpectedly uniform history of anthropomorphic measures (give or take a few inches) over the course of Western civilization with the convoluted birth of the meter, which was conceived as pure abstraction apart from any reference to any one human (read: king). We follow the sweaty-palmed grasping for universal certainty that characterized the search for a natural length on which to base the meter: past permutations of the seconds pendulum (whose full swing takes two seconds), and through poles, meridians, and latitudes (variously examined for their ease of measure and decimalization), each new candidate proving as flawed as the last, until we at last come to the aptly named Uncertainty Principle and the eventual adoption in 1983 of a standard based on the distance light travels in a vacuum.

The book is not about the smoots and ears that measure the Harvard Bridge spanning the Charles River (a calculation based on MIT student Oliver Smoot, determined to be 364.4 smoots, plus or minus an ear). Instead, it is about the triumph of obstinacy, the irrationality of reason, and the reason for irrationality. It is about the subjectivity and usefulness of measures, and even more so, about the humility of trying to know what we don't. If this book persuades you, you will be proud to measure your creativity in smoots and ears, draw your buildings in feet and inches, and revel in the fact that the US stands tall with Liberia and Myanmar in withstanding the onslaught of the metric system.

Conor MacDonald is a writer in Boston.



**ARCHITECTURE OF THE ABSURD: HOW  
"GENIUS" DISFIGURED A PRACTICAL ART**

By John Silber  
Quantuck Lane, 2007

Over the years, John Silber, who holds a doctorate in philosophy, has used his bully pulpit as president and chancellor of Boston University and as a candidate for Massachusetts governor to declaim on whatever subjects engage his withering attention. Most recently this has been architecture, a discipline he first absorbed at the knee of his father, a Beaux-Arts-trained architect, and then apparently mastered at BU, where he oversaw 13,729,143 square feet of new construction. (He evidently kept close track.)

Silber believes architecture has succumbed to the avant-garde fallacy that "all great art is shocking," which he believes is particularly unfortunate because it mistakes the practical art of architecture for a fine art. He ascribes this to the "genius worship" instigated by Siegfried Giedion, who suggested that certain seminal Modern architects have access to special shaman-like knowledge. Like Ayn Rand's fictional Howard Roark, such architects have come to believe they are above criticism and "owe nothing to their clients or the public beyond the gift of their genius."

Among those Silber singles out for

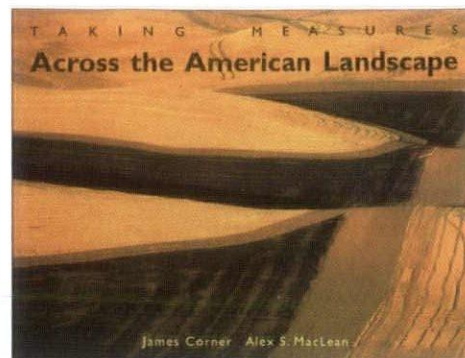
scorn are Le Corbusier, for his hubristic dictum that “the plan must rule”; Josep Lluís Sert, whose BU buildings Silber found repetitive and problematic to maintain; I.M. Pei, whose Louvre pyramid creates a “constant disturbing tension ... with the courtyard surrounding it”; Daniel Libeskind, whose Denver Art Museum resembles “a carcass of a crashed space shuttle”; and of course, Frank Gehry, whose Stata Center at MIT reflects “contempt for the interests of clients and ... narrow dedication to his sculptural conception.”

Silber has his favorites — Gaudí, Gropius, Calatrava, Utzon, and Fay Jones. And herein lies the problem: Silber’s screed is in search of an underlying theory. Much of the book simply proclaims his aesthetic judgments which, based on the unremarkable buildings built during his BU tenure, are not infallible. He does not probe the broader social or technological forces shaping contemporary architecture, nor does he attempt to address why the trend toward architectural astonishment has gained such cultural currency, preferring to belittle the practitioners and their clients

and champions instead. For a philosopher, Silber has written a surprisingly unreflective book. (One is tempted to conclude he actually favors genius worship as long as he can choose its subjects.)

It’s a shame this is not a more thoughtful book, because we could use one. Has “starchitecture” become too noisy, disorienting, and wasteful? Are we witnessing an episode of iconoclasm that presages a new order, or has architecture been permanently liberated from “style”? Will this profusion of experiments lead to breakthroughs for the next generation of architects to refine? Is it possible to sustain such profligate expressionism in the face of looming climate change and the resulting imperative toward resource efficiency? These questions seem worth examining. Let’s hope someone more insightful than John Silber will attempt to address them soon.

Matthew J. Kiefer is a land-use attorney at Goulston & Storrs in Boston. He teaches in the urban planning program at the Harvard Graduate School of Design.



## TAKING MEASURES ACROSS THE AMERICAN LANDSCAPE

By James Corner and Alex S. MacLean  
Yale University Press, 1996

**Decoding the landscape** to better understand American culture has long been in the cultural geographer’s province. But the tools of measure — maps, surveys, aerial views — are often disengaged from metaphorical meanings. Cultural geography entails enriched data but less sophisticated visual thinking than is called for by design professions. Yet, landscape architects are easily seduced

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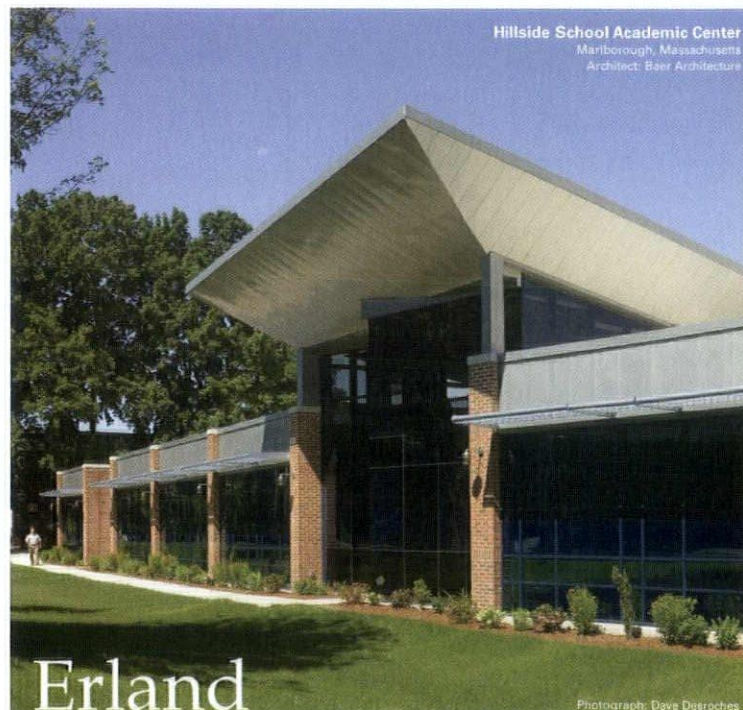
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into picture-making, dragging their 18th-century predecessors' views on romantic scenery into their work.

In this book, James Corner, a landscape architect and principal of the design firm Field Operations in New York City, and Alex MacLean, the Boston photographer celebrated for his aerial landscape images, propose fresh revelations through their interweaving of text, map-drawing, and aerial photography. Corner's narrative, juxtaposed with MacLean's images, examines the ironies and ambiguities that are idiosyncratic to the American landscape, especially when topographical lines meet and violate the authority of the grid. The authors are intrigued by the working landscape (the agrarian Midwest with its lines of contour plowing and the southwesterly irrigation designs) and by engineered landscapes (canals, dams, networks of rail lines, terminals, and highways) — a presentation of landscape as process rather than as pictures or, as Corner succinctly puts it, "landscape as a densely measured construction site."

This book includes a key essay by

Denis Cosgrove, the late British-trained cultural geographer based at UCLA. Having long been engaged in the cultural politics of the American landscape, Cosgrove reflects on the history of "taking measure" in American life. He pays homage to Thomas Jefferson and the National Land Survey that laid the anonymous, indifferent grid on the Midwest. He focuses as well on the United States Geological Survey and its ubiquitous maps that form the base of large-scale planning projects. His overview engages such engineering wonders as Grand Coulee Dam and the Tennessee Valley project. He speculates on noteworthy differences between European settlement patterns and the overwhelming scale of the American landscape with its inevitable issues of control and individual freedom.

A dense thinker and original writer, Corner draws on French literary theory, German philosophy, and American earthworks artists to enrich his ideas, but never allows the narrative to drift off from the land. Alternatively, MacLean draws on geometry that's implicit in modern art.

To disagree somewhat with Corner, who says that MacLean's photographs are documentation, "showing the land as it is," anyone can see that his images of landscape patterns are artfully framed — composed, color-saturated, aestheticised images meant to surprise and enthrall the viewer.

To the authors' credit, their work is speculative, not prescriptive. They open broad windows onto the landscape, free from the simplistic pieties of environmentalism or the professional language of designers. Their book persuades planners and designers to expand the territory of their investigations and engage the synoptic view — the view of the bird.

Phyllis Andersen is a landscape historian and author of a forthcoming book on pleasure gardens.

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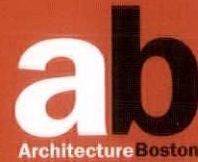
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<b>A.W. Hastings &amp; Co.</b> <a href="http://www.awhastings.com">www.awhastings.com</a>	4
<b>ArchitectureBoston</b> <a href="http://www.architectureboston.com">www.architectureboston.com</a>	52
<b>B.L. Makepeace Inc.</b> <a href="http://www.makepeace.com">www.makepeace.com</a>	50
<b>Boston Architectural College</b> <a href="http://www.the-bac.edu">www.the-bac.edu</a>	28
<b>Boston Plasterers &amp; Cement Masons — Local 534</b> <a href="http://www.opcmialocal534.org">www.opcmialocal534.org</a>	52
<b>Brockway-Smith Company</b> <a href="http://www.brosco.com">www.brosco.com</a>	2
<b>Build Boston 2008</b> <a href="http://www.buildboston.com">www.buildboston.com</a>	40
<b>C.H. Newton Builders</b> <a href="http://www.chnewton.com">www.chnewton.com</a>	7
<b>Campbell-McCabe, Inc.</b> <a href="http://www.campbell-mccabe.com">www.campbell-mccabe.com</a>	52
<b>Canam</b> <a href="http://www.canam.ws">www.canam.ws</a>	12
<b>Cape Cod Lumber</b> <a href="http://www.cclco.com">www.cclco.com</a>	14
<b>Copley Wolff Design Group</b> <a href="http://www.copley-wolff.com">www.copley-wolff.com</a>	28
<b>The Di Salvo Ericson Group, Structural Engineers, Inc.</b> <a href="http://www.tdeg.com">www.tdeg.com</a>	10
<b>Designer Bath and Salem Plumbing Supply</b> <a href="http://www.designerbath.com">www.designerbath.com</a>	15
<b>Diamond Windows &amp; Doors MFG</b> <a href="http://www.diamondwindows.com">www.diamondwindows.com</a>	51
<b>Erland Construction, Inc.</b> <a href="http://www.erland.com">www.erland.com</a>	50
<b>Existing Conditions Surveys, Inc.</b> <a href="http://www.existingconditions.com">www.existingconditions.com</a>	7
<b>Horiuchi Solien Landscape Architects</b> <a href="http://www.horiuchisolien.com">www.horiuchisolien.com</a>	14
<b>Iaccarino</b> <a href="http://www.iaccarino.biz">www.iaccarino.biz</a>	41
<b>Index-d</b> <a href="http://www.index-d.com">www.index-d.com</a>	8
<b>Indigo Insurance Services</b> <a href="http://www.indigoinsurance.com">www.indigoinsurance.com</a>	25
<b>International Masonry Institute (IMI)</b> <a href="http://www.imiweb.org">www.imiweb.org</a>	inside front cover
<b>Marc Truant &amp; Associates, Inc.</b> <a href="http://www.mtruant.com">www.mtruant.com</a>	47
<b>Nemetschek</b> <a href="http://www.nemetschek.com">www.nemetschek.com</a>	inside back cover
<b>Northeast Turf</b> <a href="http://www.northeastturf.com">www.northeastturf.com</a>	48
<b>Pella Windows &amp; Doors, Inc. of Boston</b> <a href="http://www.boston.pella.com">www.boston.pella.com</a>	47
<b>Pressley Associates</b> <a href="http://www.pressleyinc.com">www.pressleyinc.com</a>	10
<b>RSMeans</b> <a href="http://www.rsmeans.com">www.rsmeans.com</a>	11
<b>Shadley Associates</b> <a href="http://www.shadleyassociates.com">www.shadleyassociates.com</a>	7
<b>Spark Modern Fires</b> <a href="http://www.sparkfires.com">www.sparkfires.com</a>	15
<b>Steel Windows &amp; Doors USA</b> <a href="http://www.steelwindowsanddoors.com">www.steelwindowsanddoors.com</a>	24
<b>Thoughtforms Corporation</b> <a href="http://www.thoughtforms-corp.com">www.thoughtforms-corp.com</a>	back cover
<b>Triumph Leasing Corporation</b> <a href="http://www.triumphleasing.com">www.triumphleasing.com</a>	29
<b>WindowCandles</b> <a href="http://www.windowcandles.com">www.windowcandles.com</a>	51

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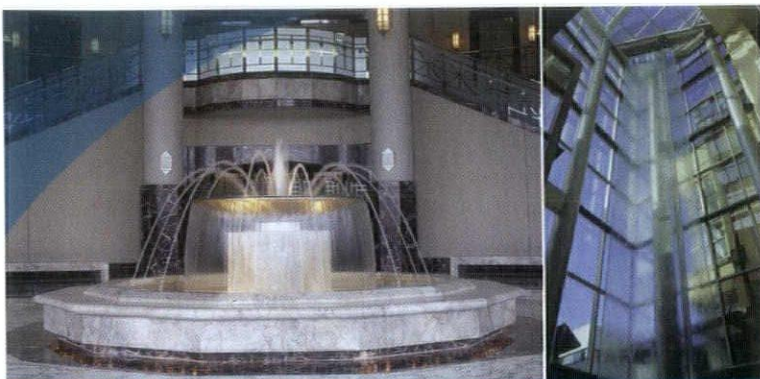
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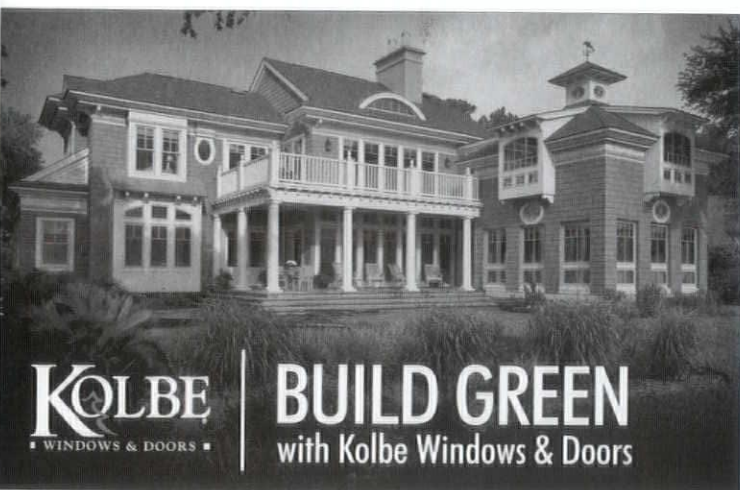
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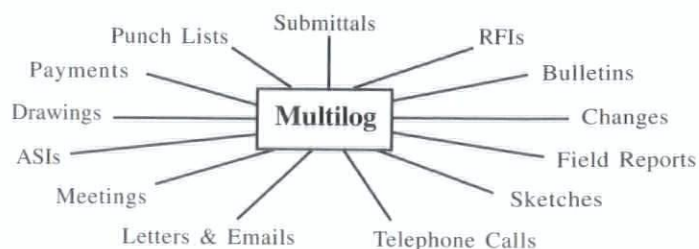
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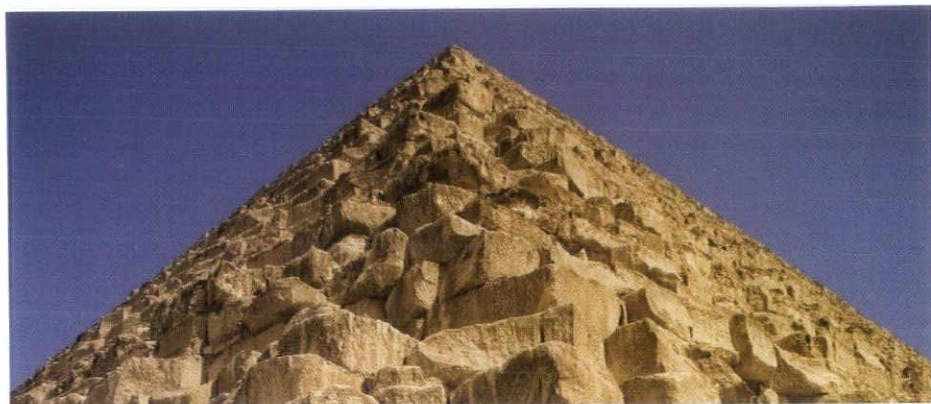


# Earth and Air

One of my first childhood ambitions was to be an architect. Why? Was it that my cousin's husband in Cleveland was an architect and a kind of role model for me? Was it that one of the few other Lloyds I'd heard of was Frank Lloyd Wright? Or was it that I grew up in New York, where I was continually astonished by the skyscrapers? I could see them from the BMT train as we crossed the Williamsburg Bridge from Brooklyn into "The City." I could look up at them from Times Square or Macy's or the 42nd Street Library. When my family moved to Queens, our house was on the last street in that development and for years — until a new neighborhood sprang up on the empty lot — we had an unobstructed view from our back porch of the Manhattan skyline (my Emerald City). I loved buildings the way I later got to love painting. And now that I write about music, I find myself using the term "architecture" a lot, as a way of describing and measuring structure — structures — shapes, patterns. *Measures*.

But I've never gotten over my early passion for buildings themselves.

Surely behind this passion is the exhilaration that's triggered by the tension between weight and buoyancy. (This is true in music, too — a cliché about Bruckner symphonies, for example, is comparing these big "heavy" works to vast "cathedrals of sound.") One of my favorite buildings is H.H. Richardson's train station in North Easton, Massachusetts. What could weigh more than those piles of heavy brown stones? Yet, with all the open space created by those expansive, interlocking arches — arches within arches — the station seems to be floating. Not unlike the way the Chrysler and Empire State Buildings seem to be lifting off. Soaring. Mies van der Rohe had a similarly fascinating trick. From the ground up, for the first couple of stories, his windows increase rather than decrease



in size, doubling then redoubling, as if space keeps opening up and out the higher you go. It's just the opposite of what you might expect and it takes your breath away. Something similar happens with Frank Lloyd Wright's Prairie houses, only the direction is different — space opens up horizontally rather than vertically. It's like Cinerama — the way that small square of movie screen widened out sideways and we were suddenly on the Rockaway roller coaster, gasping!

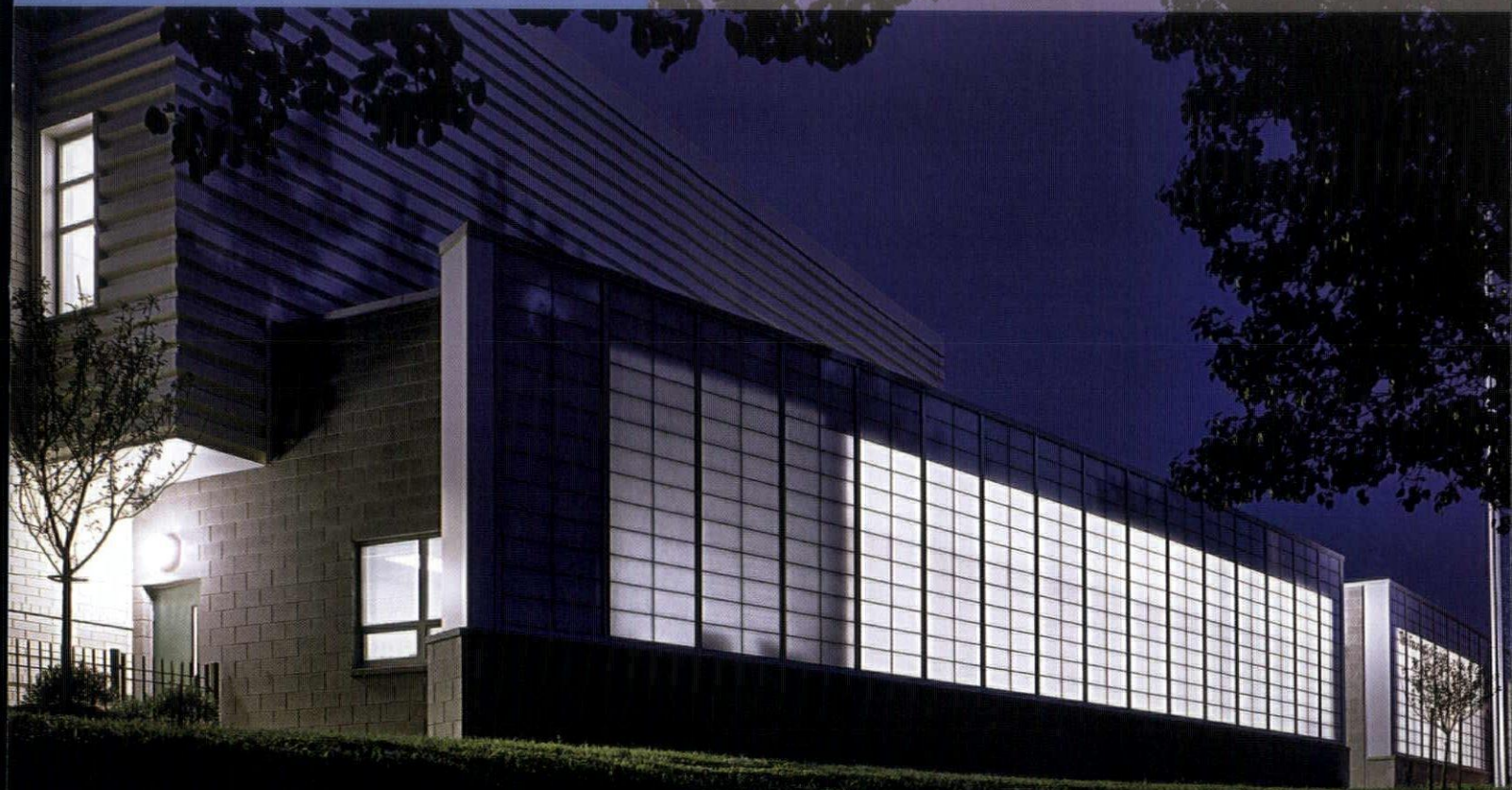
Whenever I can, I go to places to look at buildings. I grew up with a New Yorker's prejudice against the Midwest until I actually visited Chicago. Just walking through the Loop was like being in a museum of American architectural history — from the austere Monadnock Building to Mies's elegant Lakeshore Drive apartments. In the old Rookery Building, possessing one of Wright's earliest interiors, the glass dome hovering over the central lobby has that mind-bending combination of gravity and airiness.

I found that same mixture of earth and air in Egypt: the temple of Karnak, with the world's most massive columns reaching to the sky; the pyramids dissolving to an otherworldly point. I actually went to a technical high school for one semester to study architecture, but I disliked all the

math and graphs. Now I'm convinced that the very idea of mathematical proportions creates a kind of mystic — *musical* — numerology. Despite the surrounding marketplace of tourists, hired guides, vendors, and guards, for me the act of looking at these ancient wonders — watching Time itself slowly eroding their massive solidity into something precious and fragile — became an experience of spiritual elevation.

Last year, I fulfilled a longstanding dream to see Palladio's villas. Armed with James Ackerman's profound study, I discovered that these buildings — each in its varying state of repair or disrepair, access or lack of access — were not only exquisite in their musical proportions but also deeply moving. Simultaneously welcoming and awe-inspiring, they embodied that sense of balance — *measure* — I wish I could achieve in my own life, and keep searching for in the world at large. ■

Lloyd Schwartz is the Pulitzer Prize-winning classical music critic for *The Boston Phoenix* and a contributor to NPR's *Fresh Air*. He is the Frederick S. Troy Professor of English at the University of Massachusetts Boston. His latest book of poems is *Cairo Traffic* (University of Chicago Press, 2000).

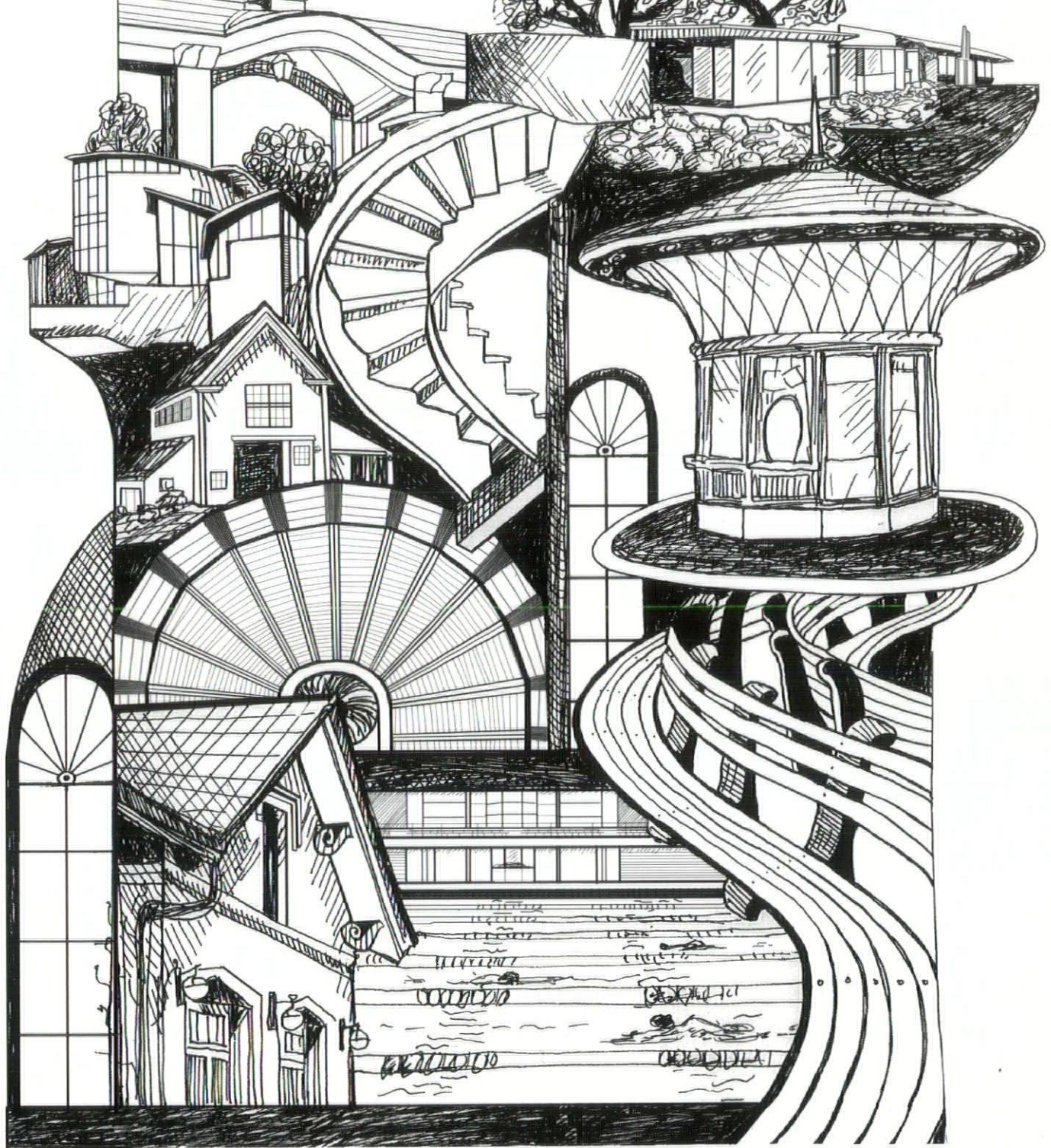


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