Why Do You Need This Book?

There was recently a lively email exchange among our faculty regarding the granting of a scholarship from an alumnus who wanted to reward a student for the “sustainable” qualities of his or her design. Architecture faculty tend to be very protective of the education of their students, and quite rightly are careful about what sorts of awards they hand out for design work. Ultimately, it was decided that a faculty jury would choose a prize winner based on “work that demonstrates well-reasoned responses in architecture with the promise of enduring qualities.” Which of course meant that we, the faculty, would need to determine precisely what that meant. That’s when things got lively. Certain buildings, among them the pyramids at Giza and Gothic cathedrals, were held up as paragons of sustainability. Let’s examine these claims for a moment.

Yes, the pyramids are sustainable, for what that’s worth, except that pyramids are for dead (or immortal, depending on whom you ask) people and were built by armies of workers (or aliens, depending on whom you ask) with lots of labor and material. It can be argued that they aren’t really buildings for mortals, they are giant gravestones for rich, famous demi-gods. They provide a comfortably cool space for the mummies they encapsulate, along with their dead cats, at enormous social and economic cost.

Likewise, Gothic cathedrals have been around for a very long time. If historical accounts and their interpretation can be trusted, these were financed in part through the sale of indulgences, which is certainly not an acceptable or endorsed practice for funding contemporary ecclesiastical architecture. While there are obviously still buildings of great civic importance being designed today, it is difficult to compare them to the pivotal place held by the seat of the medieval church (Figure 1.1). Another reason cathedrals have been enduring is that because every time
they broke, someone fixed them. The whole history of the flying buttress is predi-
cated on iterative design based on repeated building failures (Figure 1.2). The result
is impressive and wondrous, but the means of achieving that result is not a method
we would choose to replicate now, especially the failure part. Like the pyramids,
they are great places to visit, but you wouldn’t want to live there. They are cold in the
winter. They were conceived as religious primers for a largely illiterate populace,
through their iconography, their spatial sequence and their dizzying verticality. Like
Why Do You Need This Book?

the pyramids, they were not designed for the physical comfort of living people; they were designed overwhelmingly as houses for God.

If pyramid and cathedral design sounds like a great career aspiration to you, and if you can find that sort of client, I say, go for it! In our hearts, we all hope for those kinds of commissions, but there are few people wealthy enough or otherwise inclined to make such a commission. Though many would state that the chief role of architecture, like art, is to make us more vividly aware of our human condition and the aspirations of our age, I would argue that our primary and most frequent obligation as architects is to design buildings that delightfully accommodate human activity and don’t waste materials, energy, and money in the process.

My biggest difficulty with the argument for the pyramids and the cathedrals as paragons of “sustainability” is that there is more to enduring quality in architecture than staying power. Concerning oneself with “sustainability” certainly need not mean a focus solely on energy efficiency, but it seems that, in our time, sustainable designs must at least consider impacts in this realm. I believe that architects’ hackles go up when energy is mentioned because architects often assume that energy efficiency belongs in the realm of engineers. That is not necessarily so, and architects are the best-equipped to make the argument that basic design decisions must precede and underpin all subsequent choices about building technologies.

Rather, our course is called Environmental Building Systems to reflect, in my mind, the more accurate placement of ideas about energy use and its impact on the environment. These ideas should be part of a systematic understanding of architecture, not something tacked on. Norbert Lechner employs his own pyramid, actually more of a ziggurat, in his book Heating Cooling Lighting: Sustainable Design Methods for Architects, which I use as the textbook for my class. His philosophy is that the building

![Image](image.png)

Figure 1.2
The flying buttresses at the Cathedral of Notre Dame are an example of an adaptation used to sustain a building form.
Image by Andres Jimenez Botero
itself needs to do most of the heavy lifting before active and even passive systems are employed (Figure 1.3).

The faculty discussion I began with continued with one of our faculty sending the rest of us, and the donor of the scholarship funds, links to the description of Baumyschleger Eberle’s office in Lustenau, Austria as an example of a building potentially satisfying the aforementioned “sustainability” criterion. The building is touted in numerous articles as technology-free; it is even named “2226” because it maintains a temperature between 22° and 26° Celsius (72–79° Fahrenheit) with purely passive means. The best and most vociferous of these articles is published in Detail Online. What a marvel! What a new and fantastic idea! However, when one reads past the glitzy lead paragraphs into the meat of the article, one learns that the building has triple-glazed windows, vacuum-insulated panel insulation over its operable vents, and a building information management system to control said vents. Yet, somehow, it is described as being a “manifesto against technology overkill.” I would argue that the building is “sustainable” precisely because of these technologies and wouldn’t be otherwise. Of course, and more importantly, it uses strategies that we all should know are prudent from the start: a reasonable fenestration percentage, or percentage of the wall that is glass, of 24 (Figure 1.4); enough insulation for the climate (Figure 1.5); and thermal mass in its exposed polished concrete floors. John

Figure 1.3
Norbert Lechner’s approach to sustainable design involves considering basic building design before passive and active systems. Image by Barbara Jo Agnew, permission to use granted by Norbert Lechner
Why Do You Need This Book?

Straube makes an argument for these approaches most beautifully in his article “Can Highly Glazed Building Façades Be Green?” The reason I am writing this book is that many architects don’t understand the primacy of these concerns, or, even if they do, they ignore them in favor of visual effect. To be fair, our profession is so guilty of greenwash and wary of point-based rating systems with their own inherent flaws, as vituperatively argued by Joe Lstiburek in “Prioritizing Green—It’s the Energy Stupid,” that the minute a building is called “sustainable,” we cry foul. It is time to bring true sustainability out of the margins of architecture, and architectural education, once and for all.

Figure 1.4
The building named 2226 by Baumschlager Eberle in Lustenau, Austria, 2013, has triple-glazed windows sized to prevent excessive thermal gains or losses.
Image by Joanna Brindise

Figure 1.5
The windows seen from the interior of 2226 display the depth of the super-insulated wall section. Polished concrete floors provide thermal mass.
Image by Victoria Myers
A Word About the Word “Technology”

This book is about integrating building performance with design. Often, this effort is misconstrued as applying “technology” to design, as if shielding living space from extreme temperatures, or capturing rainwater from a roof surface, is somehow a “technical” activity. Part of the problem is with the connotation of the word “technical” which has often come to mean “technically demanding or difficult.” The recent trend toward embracing biomimicry, or biomimetic architecture, puts the lie to this idea. In a world where termites can build an elaborate system for shading and ventilation, and beetles can collect fog and channel it for drinking water, surely all “technical” solutions are not too demanding or difficult for architects to consider. It is true that students, when first introduced to these ideas and their manifestations in other buildings, tend to replicate them without an understanding of the principles behind them. In their eagerness to incorporate these intrinsically useful strategies, they may apply them to their designs in a stick-on fashion. This tendency can be overcome through greater familiarity with and understanding of the concepts underlying the use of these strategies.

However, let us go one step further, and break down the word “technology” and reclaim it for architecture. “Teknos” is the Greek word for “art or skill” and “logos” means the “the rational principle that governs and develops the universe.” I think that is something to be celebrated—the art or skill of discussing the rational principles that govern and develop the universe would be a handy thing for architects to have. This book endeavors to demonstrate that art, and give you the skills to use “technology” to support your architectural intent.

The Marginalization of Performance in Architecture

An example of the marginalization of performance in architecture was delivered virtually to my doorstep in the form of a small hut, built by students to be temporarily occupied for a fundraiser. It was constructed carefully, with elaborate joinery, a sleeping platform, a partial plywood enclosure, and shelves (Figure 1.6). After it rained the first time, a piece of translucent plastic sheeting and a blue tarp were lashed rather haphazardly to the top of the structure (Figure 1.7). I, and a group of building envelope consultants visiting my office, found it curious that a reasonable level of detail had been achieved in the constructive, spatial, and functional realms, when so little attention was paid to the bare necessity of the roof. The tarp was an afterthought, installed with no slope provided. Over the next few weeks, green pockets of water had formed as the tarp slumped into the holes between the overhead wood members (Figure 1.8).

There is clearly nothing wrong with using simple materials for simple purposes. For example, Shigeru Ban designed beautiful, inexpensive housing for earthquake victims in Turkey, using similar tarps as roof membranes. The film Shigeru
Ban, an Architect for Emergencies\textsuperscript{2} describes the outcome well. The difference was his understanding of the primacy of the need to keep people warm and dry. His architecture provided these basic human comforts, allowing his temporary structures to serve much longer than anticipated.
Part I

What Happens When You Ignore Building Performance?

I am faced every day with examples of what happens when building performance, particularly building integrity, is ignored in service of a seemingly higher goal. You, too, need only look beyond the surface of the buildings you encounter to start discovering these in your own community. By way of illustration, let me tell you about a church and its courtyard.

On a beautiful summer day, the courtyard is benign enough. It provides a serene garden to be viewed from the chapel, which is often the place used by families prior to funeral services. It is a lovely backdrop to the altar of this chapel and has been faithfully maintained by the church members (Figure 1.9). However, when seen in plan, it is the perfect storm. And all it takes is the perfect storm for it to fail. All of the roofs covering the portions of the building surrounding the courtyard slope toward it. This means that there are four downspouts emptying into plastic pipes that must run under the building and into the storm sewer system. These are fine, as long as they are not clogged. If they are clogged, they can back up and dump water at the weakest point in the system, which is often the less-than-watertight junction between downspout and drainage pipe.
Figure 1.9
A church courtyard is a restful spot for prayer and meditation and is maintained by the congregation.
Additionally, rain falling into the courtyard itself is essentially landing in a big, vegetated bathtub, which must itself be drained (Figure 1.10). This courtyard was fitted with such a drain, but over the years, the persons landscaping the area forgot it was there. Most casual gardeners don’t expect to have to work around a drain when planting at grade. So, it inevitably was covered up by gravel, soil, and vegetation.

During a pounding summer thunderstorm, the spaces adjacent to the courtyard became flooded when water rose above the threshold of the door by which it is accessed (Figure 1.11). It was only then that the parishioners dug out the forty-year-old blueprints and rediscovered the area drain, and regarded the four downspouts that discharge into the area with any particular interest.

Perhaps there was no good way around this, in this case. The courtyard was claimed outdoor space that allowed light to simultaneously penetrate the sanctuary and the chapel and other ancillary spaces, all of which have strong adjacency requirements in this program. The exterior of the building, visible from a major thoroughfare, was designed as an unbroken façade; mighty fortresses are not generally punctuated by downspouts, so these were hidden in the courtyard. But this tiny piece of land could ill afford to be inundated with runoff from all of these sources at once, and it requires great vigilance to prevent this situation from recurring (which
it has, multiple times). It is important to consider the effects of visual and spatial decisions over the lifespan of the building. Good maintenance should never be the antidote to bad design.

I also became involved with another situation in which the architect painted his feet into the proverbial corner. Again, the architect had a laudable desire in the original design to bring natural light into a corridor, this time into a deep and forbidding educational building (Figure 1.12). There was a clear motif of the arch throughout, with noodle-like portal frames and barrel vaults surrounding a central auditorium. At the top of these was a quarter-circle of continuous skylight, inserted into the opaque portions of the structure using a reglet at the top, and resolved at the bottom in a curb condition (Figure 1.13). The top of the skylight inevitably leaked, because as a quarter-circle meets its apex, it becomes dead level. The bottom leaked, too, most
likely due to the awkward joint between the curved skylight and the flat curb. Many efforts were made to tape and caulk these areas, but eventually, no amount of correction could sufficiently rectify the situation. The concrete masonry unit wall below the lower connection to the skylight became saturated with water and covered with mold, a fact that was neatly hidden behind, and exacerbated by, a strategically placed vinyl banner (Figure 1.14; Figure 1.15).

My friend Peter Ozolins was the architect called in to address this problem as part of a larger renovation project. He hired me to help him, primarily as a consultant on the green roof the client also wanted to add. He coined a great term for the impetus that had led the architect to make choices that were counter to the health
of the building. He called this force “the tyranny of geometry.” We were able to break the siren song of the circle long enough to design replacement skylights that sloped evenly throughout their length; in other words, we connected the dots with a straight line, not an arc (Figure 1.16; Figure 1.17). This nearly broke our architectural hearts, but a place of learning could no longer tolerate mold and rusting ceiling supports. The original design, though rigorously consistent in its dedication to the circle, did not account for the long-term integrity of the building.

We also demolished the greenhouse that was, and I am not making this up, located above the central auditorium, because our client got tired of having multiple student seats occupied by buckets required to catch all the roof leaks. We replaced the roof deck and added some much-needed insulation. The cost of
Figure 1.15
The back side of the wall covered by the banner showed efflorescence, moldy drywall, and rusting ceiling supports.

Figure 1.16
The existing building featured a quarter-round skylight.
all these corrections ate into the budget so significantly that we were not able to realize the green roof the client really wanted. Until they can raise another million dollars, they will settle for an easily retrofitted paver deck (Figure 1.18). The moral of this story is that integrity matters in buildings, much as it does in personal relationships. If you are good to the building, the building will be good to you. It is critical to consider what the building, and the people within, demand both now and in the future, rather than simply what looks harmonious on a piece of paper or a computer screen in the early stages of design. The best architecture achieves both visual harmony and the longevity architects and their clients so desire.

**A Tale From the Trenches**

What happens when you, yourself, are the architect who doesn’t know enough to stay out of trouble? My intent in this book is not to point a finger at others; after all, as the old saying goes, when you point a finger, there are three fingers pointing right back at you. I was motivated to write this book because of things that had gone
wrong in my own professional work that made me concerned about my own lack of knowledge. Perhaps Sir Karl Popper said it best:

The more we learn about the world, and the deeper our learning, the more conscious, specific, and articulate will be our knowledge of what we do not know; our knowledge of our ignorance. For this, indeed, is
the main source of our ignorance—the fact that our knowledge can be only finite, while our ignorance must necessarily be infinite.  

Luckily I have had the benefit of patient mentors and reasonable clients throughout my career, but many other architects are not so fortunate. Let me tell you a story.  

One of my earliest projects was a semi-invasive surgical clinic for a physician in Florida. This is the kind of building you go to when you need minor outpatient procedures done, nothing scary enough to require a full-blown hospital, but scary enough to require you to be protected from possible infection. Because of the nature of these procedures, the building had to meet the strict guidelines of the Agency for Health Care Administration (AHCA). While that agency name may sound benign to you, to me it still conjures up long, early morning drives to the state capitol, Tallahassee, to spread my drawings out on a large table while kind but firm reviewers went at them with sharp eyes and sharper pencils. There were also the site visits, where I along with representatives from our engineering consultancy firm and the contractor’s firm would follow the AHCA representatives around like obsequious puppies while they whipped out their tape measures to check the width of our doors, the height of our water closet (toilet) seats, and the integrity of countless penetrations through fire and smoke barriers.  

While this particular building projected a soothing, unintimidating, one-story, residential-scale image on the outside, the inside was taken up with relatively sizable and robust mechanical equipment to handle the heightened air filtration needs. During my Intern Development Program training, I was the project architect on the job, which means my employer had oversight over the design and construction documents that left the office, but I was responsible for the actual drawing and specifying of the building. This meant I had to understand how it went together, from bottom to top, and communicate this well to the owner and contractor. It was fantastic training.  

Fortunately for me, our firm had done similar projects in the past, so I was able to crib off of existing drawings, a huge advantage for someone fresh out of school. I used a standard wall section that had worked well for several other buildings our firm had designed in the same office park. The project was designed and built without incident, until a few months later, when the client reported mold growth in a few, but not all, of the patient exam rooms. As you can imagine, this was not good news for the surgical patients. Our firm was called in to try to figure out what had happened. My boss, again fortunately for me, is a calm and intelligent man, and he got to the root of the problem almost immediately.  

The first thing I checked was the composition of the wall. The rather straightforward wall section, from outside to inside, is comprised of brick veneer; an airspace; #15 building felt which is shingled over through-wall flashing leading to weep holes at the base of the brick; half-inch (13 mm) plywood; unfaced batt insulation in a 2 × 4 (100 × 50) stud wall cavity; and half-inch (13 mm) gypsum wallboard as the interior sheathing. This was pretty standard construction for this type of structure in the area. See if you can discover where the problem lies (Figure 1.19).
Figure 1.19
A wall section of a semi-invasive surgical clinic in Florida shows its component layers.
The answer is that there really isn’t a problem, at least not as it was drawn. This wall, as I mentioned, had worked perfectly well in past projects of similar construction. I had drawn, and the contractor had built, a typical brick veneer wall on wood studs with batt insulation, faced with gypsum board on the interior. There was no vapor barrier, not even a vapor retarder. This absence of vapor protection is a good thing in a mild climate, as the building assembly is able to breathe both to the inside and the outside. But the problem was that I had neglected to consider the effect of the vinyl wallcovering I had specified on the inside of the exam rooms, which was very popular in the 1990s in medical facilities for its visual interest combined with its durability and ease of cleaning. Remember the aforementioned semi-invasive surgical procedures, and you will get an idea of why this might be important.

After some head-scratching and sleuthing, we discovered that the brick was being intermittently but reliably wetted by the landscape sprinklers only on one side of the building. The brick on this façade was then heated by the sun, evaporating the water. Though some of the water vapor was released harmlessly to the exterior, the sun’s heat also drove water vapor inward through the brick, through the studs and batt insulation, through the gypsum board onto the inside face of the vinyl wallcovering, where it stopped. (Figure 1.20). Imagine that the air outside was 89°F (32°C), at 80% relative humidity. The dew point temperature, or the temperature at which that sample of air, when cooled, reached a point of 100% relative humidity, was 82°F (28°C). This meant that cooling that air to 82°F (28°C) or below resulted in liquid water condensing out of it. Assuming that the interior of the space was kept to 69°F (21°C) by the building’s aggressive air conditioning system, the dew point temperature had to lie somewhere inside the wall assembly, as shown by the thermal gradient line on the sketch. Water tends to condense on smooth surfaces, not fluffy ones like batt insulation, so it condensed on the outside face of the gypsum wallboard, readily wetting it. On the inside face of the gypsum wallboard, the vinyl wallcovering, which was virtually impermeable to vapor, trapped the moisture. This kept the gypsum wallboard wet, providing an ideal location for biological growth. The ensuing mold growth was limited to exam rooms located along the exterior wall that had been wetted by the sprinklers. In the absence of the vinyl wallcovering, any vapor that had permeated into the interior and condensed on surfaces within the wall would likely have been gradually removed by the air conditioning system, and we would not have had a problem.

This negative outcome was the confluence of a series of decisions, none of which in isolation might have caused an issue, but which in combination proved problematic. I later found, through a National Council of Architectural Registration Boards (NCARB) professional development program, that this problem was endemic in air-conditioned facilities with excessive outside air ventilation in hot, humid climates, in which interior wall finishes with low permeability had caused similar problems. Predictably, this has resulted in numerous costly repairs and disruptive lawsuits. According to the ASHRAE Position Document on Limiting Indoor Mold and Dampness in Buildings, a document best read by architects before retiring for bed in the evening:
In many parts of the world, moisture damage and microbial growth including mold have caused billions of dollars in repair costs and interruption of building operations. Further, in both North America and Europe, building dampness and mold have been documented to be associated with adverse health outcomes related to asthma and upper respiratory problems.18

And then, in an appendix on "Committee Observations Concerning Mold and Moisture Problems in Buildings," I found that the authors had commented on the exact situation I had encountered:
One example of the interactions between different building elements that combine to result in moisture accumulation includes vinyl wallpaper on the indoor surfaces of exterior walls in combination with an air-conditioned space in a hot, humid climate. Outdoor air with a high dew point infiltrates the wall and condenses on the cavity side of the cool interior gypsum wallboard. Because the vinyl wallpaper is relatively impervious to water vapor transport, moisture accumulates in the wall cavity, resulting in microbial growth, including mold, and eventually decay and rot.¹⁹

In other words, whoopsie! Though both introduction of outdoor ventilation air and infiltration were controlled in this clinic, the wetted wall insured that any air that did infiltrate the problematic wall was of excessively high relative humidity. The mold growth happened very early in the life of this medical clinic, which will not surprise anyone who has spent any time in Florida, and was noticed in the first few months after occupancy. Fortunately, we were able to fix the problem fairly simply by repositioning the landscape sprinklers, removing the vinyl wallcovering, replacing the affected gypsum wallboard, and finishing it with a more breathable coating of paint.

Lest you walk away from this story thinking, “no problem, I just won’t do work in Florida,” I would like to point out that vapor drive works in the other direction in cold climates, so there are condensation problems there, too; perhaps even more so since there you must deal with both summer and winter conditions and designing a building enclosure that can satisfy both.²⁰ Despite the happy ending, this experience stayed with me for a long time. It was my first brush with building forensics, the fascinating study of discovering what has gone wrong in structures and figuring out how to fix them.

Do Architects Really Have to Care About This Stuff?

Eric Cesal’s book Down Detour Road: An Architect in Search of Practice²¹ was published in 2010, in the aftermath of a recession that was particularly punishing to architects. While he seems to have eventually found professional satisfaction with Architecture for Humanity as a post-Hurricane Katrina volunteer, then coordinator of their Haiti Rebuilding Center, then leader of global disaster operations, and most recently their executive director, the book was written as a series of epiphanies he had about the profession during a period of unemployment. A main premise of the book is that architects need to be more open about their value to their clients, about what they do well, if the profession is to survive intact. He is concerned that much of our expertise is deliberately shrouded in mystique, which gives us some cultural cachet, but will eventually weaken our vocation. He likens an architect to a medieval “sorcerer,” or his modern-day equivalent, the “IT guy” who fixes your computer, both of whose means are inscrutable but seemingly necessary:
Because of the ways in which architects are trained, incomplete knowledge is often no barrier to a complete design. A design’s function is merely to convince. This often lulls us into self-deception—especially where reality is too complicated or aggravating. We cease to be transparent, even to ourselves.

As designers, we have the ability to conduct our work in a way that deceives the client as well as ourselves. Both in the academic world and the professional world, architects have many incentives to obscure any half-knowledge. We are called upon to be experts in situations where we’re clearly not, and we are sanctioned for demonstrating understandable ignorance. We are pushed into being sorcerers.

While the laws and statues of the states within the United States vary, they unfortunately do not offer much guidance in reigning us in from overextension. We are, in practice, often required to decide for ourselves the limits of our own professional knowledge. I offer as examples two snippets of code from the two states where I have practiced as a licensed architect. Florida’s statute states:

Notwithstanding the provisions of this part [on Architecture and Interior Design] or of any other law, no . . . registered architect, or employee or subordinate under the responsible supervision or control of such architect, is prohibited from performing engineering services which are purely incidental to his or her architectural practice.

While Virginia’s law reads:

The following shall be exempted from the provisions of this chapter [regulating architects, engineers, surveyors, landscape architects and interior designers]: 1. Practice of professional engineering and land surveying by a licensed architect when such practice is incidental to what may be properly considered an architectural undertaking.

Both of which are super helpful. This is not a purely theoretical concern. From personal experience, I can tell you that you, the architect, will be the one trying to determine what is "purely incidental" or "properly considered an architectural undertaking." Can you produce a plumbing riser diagram? Can you design a simple mechanical system for a small office? How far do you draw outside that imaginary 5-foot (1.5 m) boundary around the exterior of the building? Unless you have a lawyer on retainer, which might not be a bad idea, it will most often be your job to draw the line at what you do and do not feel competent to design, or supervise another architect or intern in your firm to design.

Cesal believes we are shooting ourselves in the foot to a certain extent because of our false bravado that we can handle anything, merely by ignoring whole
swaths of information. He argues that this attitude begins in architecture school. He writes:

Frequently, the student is not even required to confront the inconvenient. In designing his City for 3 Million Inhabitants, Le Corbusier famously described his process thus: “Proceeding in the manner of an investigator in his laboratory, I have avoided all special cases, and all that may be accidental, and I have assumed an ideal site to begin with.” It is questionable whether Le Corbusier had ever been in a laboratory. The average scientist would find such a proposition absurd. Scientific investigation does not begin by avoiding or ignoring special cases. Scientists may make efforts to exclude statistical outliers, or marginalize random events that might compromise the intent of the study. But such exclusions are done with rigor. These procedures are documented and repeatable. They are not used merely to exclude information or phenomena that the scientist finds inconvenient.

Cesal goes on to lament academic projects that begin with precedent research on high-profile buildings, often limited to the information available on the Internet and periodicals that focus on generalities, and end with designs that never confront any of the inconveniences Le Corbusier so glibly rejects. Cesal develops the argument further in his description of the deepening schism within the profession. On the one hand, he describes architects and firms that claim to possess “design skill” of a caliber necessary to produce highly regarded and recognized work, plus the “general technical knowledge” to get it built. He defines this general technical knowledge as the type of information gained during schooling, practiced during internships, and tested in licensing exams; for example, the basic understanding of site work, structures, envelopes, building systems, and code requirements.

In many cases, such as the Seattle Central Library that Cesal holds up as an example of this first approach (Figure 1.21), the design firm and the executing firm, or “architect of record,” for the project are not the same entity. It is perhaps of no surprise that LMN Architects, with whom the Office for Metropolitan Architecture (OMA) collaborated on the project, were not only local to Seattle, but received an American Institute of Architects/American Library Association (AIA/ALA) Library Buildings Award for the Seattle Public Library Temporary Central Library in the “Renovations” category of this award in 2003 for their work in temporarily relocating the Central Library to the Washington State Convention and Trade Center while the original Central Library was being demolished. OMA/LMN in collaboration won the same award in 2005, plus a 2005 National AIA Honor Award for Architecture, for the new facility. From this, it seems evident that though they may be credited with their visionary rethinking of what a library should be in the twenty-first century, OMA relied on LMN’s specific understanding of the requirements unique to libraries.
to pull off this project. But how many students will consider the contribution of LMN when thinking about the Seattle Central Library, or will have heard of LMN’s solo AIA/ALA award?

This brings us to Cesal’s description of the other kind of architecture firms, the ones who market themselves as experts on a limited number of project types, and thus possess the aforementioned “general technical knowledge” plus the “specialized technical knowledge” to provide a building suitable for their clients. They
may design competently and well, but their designs do not often receive the exposure, and thus the professional and academic accolades, of the firms purporting to excel in “design skill.”

To draw a parallel to the sciences, these specialized firms perhaps are working within what Thomas Kuhn would call “normal science,” by which Kuhn means “research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice,” while the “design skill” firms are dispensing with old, and thus creating new, paradigms. Paradigm is a word that has fallen out of circulation a bit since Kuhn introduced it, so I provide his definition of scientific achievements that rank as paradigms here, “Their achievement was sufficiently unprecedented to attract an enduring group of adherents away from competing modes of scientific activity. Simultaneously, it was sufficiently open-ended to leave all sorts of problems for the redefined group of practitioners to resolve.”

I, along with Cesal, would argue that the architects working within established paradigms are completing the vast majority of the built work in the world, and thus their value and importance should not be diminished. After all, if paradigms are constantly broken by every new project, how can they have any value in the first place? We need architects who are willing to continue within the current paradigm, which Kuhn also describes as “works [that] served for a time implicitly to define the legitimate problems and methods of a research field for succeeding generations of practitioners.” If you replace “research” with “design” in the previous sentence, you can imagine how many firms could, for example, design beautiful, functional libraries that work within OMA’s new paradigm of a library as a place where media and people mix in dynamic, interactive ways, rather than a place where books are merely stored and retrieved (Figure 1.22). This in fact is occurring around the country in projects such as Snøhetta’s James B. Hunt Jr. Library on the campus of North Carolina State University in Raleigh, which of course was completed in collaboration with “executive architect” Pearce Brinkley Cease + Lee (now Clark Nexsen) (Figure 1.23).

Cesal, who has master’s degrees in business administration and construction management in addition to his master of architecture degree, concludes by suggesting that neither the “design skill” firms nor the “specialized” firms are sustainable within the broader market. He states that neither will last in the long run; the former run the risk of falling out of fashion when the next big thing comes along, and the latter are hamstrung by their very specificity, as they cannot branch out to new types of projects when their niche markets run dry. He holds up companies such as Google and Apple as models for our profession. These broad-based corporations are both purveyors of style and innovation, and suppliers of the necessary products to ensure that they can meet the consumer desires they themselves have created. They possess both the design prowess necessary to lead the industry and the technical knowledge to ensure a near-monopoly on the instruments that help their customers achieve what they want. Their control over a wide, synthetic
range of products and services makes them resilient. He calls for an approach to architecture that acknowledges that while no one architect or firm can be expert in all three realms of “design skill,” “general knowledge,” and “specialized technical knowledge,” we can use our skills in framing problems to get our arms around complex design challenges. He summarizes his main point as follows: “the only thing that is required is a resolve to design in a way that does not consciously exclude the inconvenient or the unpleasant.”

I agree with Cesal’s observations, as they align with my own made during my time in practice and in teaching. In this book I would like to especially extend the argument to include a call for all architects, not just the ones who purport to have “specialized technical knowledge,” to be concerned with the responsibility of buildings not to fall down, not to leak, and not to make people uncomfortable or sick. While Cesal saw a split in the profession between design specialists and technical specialists, I see an even more problematic cultural division between the “thought leaders” and the “average Joes” who know how to put a building together.

Even the oft-quoted Immanuel Kant had something to say on this subject:

Even though mechanical and fine art are very different from each other, since the first is based merely on diligence and learning but the
second on genius, yet there is no fine art that does not have as its essential condition something mechanical, which can be encompassed by rules and complied with, and hence has an element of academic correctness . . . . Now since originality of talent is one essential component (though not the only one) of the character of genius, shallow minds believe that the best way to show that they are geniuses in first bloom is by renouncing all rules of academic constraint, believing that they will cut a better figure on the back of an ill-tempered than of a training-horse. Genius can only provide rich material for products of fine art; processing this material and giving it form requires a talent that is academically trained, so that it may be used in a way that can stand the test of the power of judgment. But it is utterly ridiculous for someone to speak and decide like a genius even in matters that require the most careful rational investigation. One does not quite know whether to laugh harder at the charlatan who spreads all this haze, in which we can judge nothing distinctly but can imagine all the more, or rather laugh at the audience, which naïvely imagines that the reason why it cannot distinctly recognize and grasp this masterpiece of insight is that large masses of new truths are being hurled at it, whereas it regards the detail (which is based on carefully weighed

Figure 1.23
The James B. Hunt Jr. Library by Snøhetta and Pearce Brinkley Cease + Lee (now Clark Nexsen) on the campus of North Carolina State University in Raleigh, North Carolina, USA, 2013, also features a large central space with a variety of seating options.
This perception was reinforced in a talk I heard recently, a keynote speech given by a much-revered architect. This award-winning architect told us that early in his architectural education he was bored by environmental stuff, and even now that he accepted its importance, getting buildings to do what we need them to do with respect to energy and comfort is “the easy part.” As a young energy modeler to my right muttered, “Easy for him to say.” The renowned architect explained that he personally was more interested in shaping behavior, in creating culture. This is unquestionably one of the roles of architects, but it is not their only role. Perhaps in our highly specialized society, relinquishing responsibility for the way buildings function to civil, mechanical, electrical, and plumbing engineers, building envelope consultants, daylighting specialists, and sustainability experts, to name a few, is an inevitable trend. But I intend to fight it, just a little bit, with this book. We may never return to the era of architect as master builder, or master craftsman, but I don’t think we can relinquish the pragmatic concerns I raise throughout these chapters to Somebody Else. If we do, we will truly fulfill our self-inflicted prophecy of becoming the professionals who know practically nothing about everything.33

Notes

2 For how one guy solved this problem, see www.jamesdysonaward.org/projects/cathedrals-cold/.
3 I must say here for the record that engineers tend to get a bad rap in our discipline. They are not all mechanistic philistines. Some of my best friends (and my dad) are engineers.
9 www.dictionary.com
10 See Chapter 3 for a discussion of this beetle.
11 www.dictionary.com
Why Do You Need This Book?


13 With apologies to Dave Barry.


15 ASHRAE, 2013 ASHRAE Handbook: Fundamentals: Inch-Pound Edition (Atlanta, GA: ASHRAE, 2013), 26.6. According to this source, which in turn references the 2007 supplement to the International Codes (ICC 2007), there are three water vapor retarder classes: “Class I: 0.1 perm or less; Class II more than 0.1 perm but less than or equal to 1.0 perm; Class III: more than 1.0 perm but less than or equal to 10 perm.” Class I water vapor retarders are also commonly referred to as vapor barriers.

16 Building Science Corporation, “Info-500: Building Materials Property Table,” https://buildingscience.com/documents/information-sheets/building-materials-property-table. According to this table, No. 15 asphalt-saturated felt has a dry-cup permeance of 6 perms, and latex paint (primer + sealer) has a dry-cup permeance ranging from 3.5–6.1. This would classify these materials as Class III vapor retarders. Vinyl wallcovering, while not included in this chart, is widely regarded as a vapor barrier, or Class I vapor retarder.


19 Ibid., 11.

20 Odom et al., 11.


22 Ibid., 52.


24 Commonwealth of Virginia, “Code of Virginia,” in Title 54.1 Professions and Occupations: Subtitle II: Professions and Occupations Regulated by the Department of Professional and Occupational Regulation and Boards within the Department (2016), 54.1–401(1).


26 Cesal, 158.

27 The word “research” that is bandied about in this context is problematic. There is often nothing systematic, controlled, or precise about the way in which students and practitioners seek information about past work to inform their own. The speed at which this happens often precludes rigor, and convenience of access prevails.


29 Ibid., 10–11.

30 Ibid., 10.

31 Cesal, 169.


33 This is a reference to an old joke, which I found verbatim in multiple sources with either no attribution, or self-attribution. It runs like this: “An architect is said to be a man who
knows a very little about a great deal and keeps knowing less and less about more and more until he knows practically nothing about everything, whereas, on the other hand, an engineer is a man who knows a great deal about very little and who goes along knowing more and more about less and less until finally he knows practically everything about nothing. A contractor starts out knowing practically everything about everything, but ends up by knowing nothing about anything, due to his association with architects and engineers.”

References
Commonwealth of Virginia. “Code of Virginia.” In Title 54.1 Professions and Occupations: Sub-title II: Professions and Occupations Regulated by the Department of Professional and Occupational Regulation and Boards within the Department, 2016.