

THE OTHER HALF OF THE PROJECT: The need for labor research in architectural theory and pedagogy

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Abstract

The basic constituents of every building project—material and labor—are clearly mutually critical. However, architectural theory and pedagogy are currently strongly focused on the material disposition of projects, placing far less emphasis on the labor processes that give them shape. This paper will first review architectural theories of construction labor in architecture. Next, a case study will be discussed to illustrate that labor research is a meaningful basis for design decision-making, and can help the architect perceive connections between her work and its social context. The paper concludes by recommending integration of labor research into school pedagogy.

The case study describes an architectural design thesis in the eastern Canadian arctic. In these communities, construction involves enormous costs, arising from the scarcity of material and human resources, and the need to import both. Of these two, the lack of building skills among the local workforce causes the greater expense, which could be minimized if architects designed buildings more appropriate to local skill levels. In doing so, architects can become advocates for the development of labor skills and the improvement of economic conditions in these remote settlements.

An understanding of labor conditions clearly allows an architect to better address the project constraints. But equally critical is the enrichment of architectural thinking by the consideration of labor issues. Understanding the local workforce requires that the architect evaluate the smallest details of her work, at the same time as it forces her to think broadly about the social conditions of the community.

Introduction

Of the two inputs to all buildings, materials and labor, the former has been the more consistently central to architectural interests, while the latter remains peripheral. This is particularly conspicuous in theory and in school curriculum, where the inputs and outputs of architecture are examined and reevaluated. The current prioritization of

construction materials over construction labor in both theory and education is likely explained by numerous factors. Materials can be experimented with first-hand, can be studied independent of the larger structure, and can produce tectonic innovation and iconic identity. Labor, on the other hand, often appears to be beyond the scope of the architect: in school, labor issues are the domain of the economist and the sociologist, and in professional practice, labor decisions are made almost exclusively by the contractor. But at 55% of typical construction costs, labor represents the more substantial component of the building process. More importantly, labor ties the architectural process to broader social themes: economic development, political stability, cultural heritage, and environmental efficiency. From this perspective, architects are disadvantaged by the marginalization of labor at the periphery of their purview, as are the communities they build for.

Despite the potential for labor issues to add depth to architectural work, there is a dearth in architectural theory locating construction labor in the architectural process, and considering reciprocities between architect and laborer. Further research on this topic would help ground the changing relationships between architect and construction laborer as the profession contemplates digital design and its consequences. This paper will first briefly survey the existing architectural theory on labor, starting with the utopian thinking of the 19th century, and leading to the confrontation of BIM in contemporary practice. The survey examines changing perceptions of the laborer's role in architecture, and the evolving relationship between architect and laborer. The survey also makes clear that labor has only sporadically been a major topic for architectural theory.

Following the survey, a case study describes a design project in the eastern Canadian arctic, and illustrates that thinking about the labor process can transform and deepen architectural decision-making. Equally important, the case study suggests labor as a lens which helps the architect to

see her impact on political, economic, and cultural conditions. These are critical lessons, especially in the formative experience of the architecture student. The paper concludes by recommending curricular integration of labor issues in schools, where the values of future professionals are influenced and their interests take form.

Survey

Architectural Theory examining the Role of the Laborer in Architecture

The history of construction labor as a topic for architectural theory conventionally begins with John Ruskin and his idealization of the Gothic builder, whose “ugly goblins, and formless monsters, and stern statues...are signs of the life and liberty of every workman who struck the stone” (Ruskin 163). His 1853 essay, *The Nature of the Gothic*, is a treatise on the role of the construction worker in the production of architecture, reifying manual work when it is spontaneous, expressive, and unimpeded by expectations of accuracy and order. Work produced under these conditions would draw the worker closer to their own best nature and to God, realizing the vision of a moral society. The architect is less present in this narrative, but still implicitly central. The mechanism required by Ruskin to create the ideal conditions for work requires that the architect understand the following:

“In the make and nature of every man, however rude or simple, whom we employ in manual labour, there are powers for better things: some tardy imagination, torpid capacity for emotion, tottering steps of thought...But they cannot be strengthened, unless we are content to take them in their feebleness, and unless we prize and honour them in their imperfection above the best and most perfect manual skill. And that is what we have to do with all our labourers; to look for the *thoughtful* part of them, and get that out of them.” (Ruskin 161)

This position recommends that the best architectural outcomes occur when the architect assumes the role of the manager, and establishes a framework within which laborers can innovate and deviate. In Ruskin's view, it becomes the duty of the architect to unlock the expressive potential of the laborer, and the duty of the public to appreciate its uneven results.

The romantic picture of construction work and labor was transferred from master to student, from John Ruskin to William Morris. The Arts and Crafts movement borrowed the social rhetoric of the Gothic Revival, and its proponents also explored connections between building construction and social transformation. In the Arts and Crafts movement, the Ruskinian aesthetic value system is superimposed with Marxist ideology, where labor is the common denominator for all members of all society. In his 1888 essay, *Useful Work Versus Useless Toil*, Morris extolled the continuous expression of some inherited human urge to create and build. “A man at work,” he claimed, is guided by the “thoughts of the men of past ages,” and he creates because it is in all men to create (4).

Where Ruskin may have struggled to differentiate good work from bad work based on aesthetic preference, Morris made the distinctions clear by drawing on the commercialization of skill, and the conscription of laboring classes to produce objects of little value for the consuming class (4-9) Concomitant with the class-based analysis of labor is the observation that all skills and services are for sale, regardless of whether they belong to an educated architect or an unskilled laborer. In conceding that the “education of the master is more ornamental than that of the workmen [but]... it is commercial still,” Morris predates the well-known Philip Johnson quote which describes the ultimate need of architects, like laborers, to sell their skills.

The 19th century marks the end of a period of rhetorical, personal essays examining the place of labor in architecture, and the relationship between the designer, master-craftsman, and the unskilled worker. However, the ideas of the Gothic Revival and the Arts and Crafts movement were given new life in the architectural manifestos of the early 20th century, and the curriculum of the Bauhaus, which revived the tradition of utopian European thinking on this topic. In his Bauhaus Manifesto, which established the ideological pedagogy of the first Bauhaus at Weimar in 1919, Gropius exhorts students and faculty to “...create a new guild of craftsmen without the class-distinctions that raise an arrogant barrier between craftsmen and artists! Let us desire, conceive, and create the new building of the future together” (Gropius 49). The rift to be mended between the craftsman and the artist was layered over other, related dichotomies: between craft and machine, between fine art and handicraft, between artistic and technical production. The pedagogical panacea for

these tensions was the development of a cooperative teaching system, with each workshop co-taught by a "technical master," who taught "practical" skills, and a "form master," who provided "artistic" guidance. Unfortunately for architecture students, though, the school offered no architectural courses until 1924, coinciding with the demise of the co-teaching model, the move to Dessau, and the shift to a work-study curriculum.

This shift signaled an end to Gropius' idealized vision of close collaboration between artist and craftsman, and the beginning of a long hiatus during which the place of labor in architecture has been little discussed. It seems that without a socialist theory of the role of labor in architecture, there was no theory at all. It's not clear why mainstream architectural movements and theory lost interest in the role of labor. It may be that—despite the commodification of architectural services as above, and even despite earlier socialist agendas—the profession is accustomed to its "confirmed detachment from the labor of fabrication...The gentlemanly ideal of distance from the business of production—an essential component of the architectural profession's self-image—has persisted against all the odds" (Ross 11).

One reason explaining the disengagement of architectural theory from labor may reflect the related disconnect between architects and construction laborers reinforced by contracts over the last century of professional practice. Standard design/construction contracts expressly *limit* the involvement of the architect in labor and construction issues. These disconnects are formalized in the parallel contracts of the architect and the contractor, which refer to each other but are both with the owner; and in the exclusion of construction strategies from architectural documents. AIA Document Contract B10, the Standard Form of Agreement between Owner and Architect, states explicitly in Section 3.6.4.2 that "the Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures" (Demkin 968). The legal obligations of standard contracts between client, architect, and contractors are intended to triangulate liability, but they also keep architects legally disconnected from construction labor.

Not only are they disconnected, but architect and labor are also increasingly remote from one another. The availability of product systems and assemblies avoids what architect / craftsman Darren Pye called "the workmanship of risk": the likelihood that the job could be ruined at any time by the vagaries of performance (Pye 20). The prefabrication and unitization of whole assemblies off-site, by industrial specialists, is meant to assure better quality on-site and reduce the occurrence of unexpected results. In doing so, it ostensibly diminishes the need for job-site vigilance, and changes the reliance of the architect on the laborer to execute their design intent.

Oddly, during the same timeframe that interest in labor issues appears to have decreased among architects, it evolved into a deep field of academic inquiry sustaining multidisciplinary work across the social sciences; from political economy to managerial methods to operations research. Harry Braverman's 1974 *Labor and Monopoly Capitalism* laid the groundwork for examining the role of labor in shaping the power structures in industrial society. The mechanism by which this happens, in Braverman's analysis, is that in humans, "the unity between the motive force of labor and the labor itself is not inviolable... the idea as conceived by one may be executed by another" (35). The separation between an idea and its execution sets up the necessary conditions for a labor market and for a management system, and, in turn, for managerial decision-making focused on the efficient use of purchased labor power. Braverman concludes that the corollary of improved efficiency is the "de-skilling" of workers, and their loss of personal investment and interest in the labor process (39). In this way, tension is established between managers who have everything to gain from improved efficiency, and workers who have little to gain from the same.

About construction in specific, Braverman had this to say in the mid-70s:

"This industry...favors new materials, especially plastics, painting, and plastering with spray guns...and the preassembly of as many elements as possible on a factory basis (a carpenter can install six to ten prefabricated door assemblies, pre-hung in the frames with hardware already in place, in the time it takes to hang a single door by conventional methods; and in the process becomes a door-hanger and ceases to be a carpenter)" (143).

This short commentary about de-skilling in the construction industry echoes earlier thoughts by Ruskin, Morris, and Pye, and seems to be the conceptual link upon which there is the most agreement in architectural theories of labor. All perceived a connection between rote work, quality control, and a corresponding loss of meaning in the work. However, in disciplines outside of architecture, the de-skilling charge of *Labor and Monopoly Capitalism* has been one of the most criticized. Challengers have contended that Braverman's model of a steady and inevitable degradation in skills was too deterministic, not taking into account work environments which challenged workers to expand their skills and the potential for labor processes to move toward a "recoupling of conception and execution" (Wardell 6).

Digital design is being positioned to do just that: to recouple conception and execution, but for the architect, not the laborer. As Robert Stern describes it, new technologies "make it possible for architects to regain their proper and responsible role not only with regard to design but also in the generation of construction documents and fabrication of the finished product" (15). The reciprocal question is whether digital processes will at the same time recouple conception and execution for construction laborers, and whether they will also regain the design role perceived for them by Ruskin.

For architectural theory, BIM is the chapter that seems to follow *The Nature of the Gothic* as a major conceptual framework, 150 years later, for relating architecture and labor. A provocative new book, *Building (in) the Future: Recasting Labor in Architecture* (co-edited by practitioner-academics Peggy Deamer and Phillip G. Bernstein) appears to be the only collection of contemporary thought on the topic of labor in architecture. The book examines the triad of client/designer/constructor, and the shifting relationships between them in the era of parametric modeling and digital fabrication. Co-editor Peggy Deamer notes that, around 2000, when architectural discourse shifted from formal investigations to digital production issues, "architectural theory quickly became post-critical: an opportunity to stop critical thought" (21). She questions why the topic of digital production seemed originally to hold little interest for theorists. This is after all a topic that potentially draws together relationships between capital, authority, and technology—relationships that seem inherently important, but overlooked in contemporary

architectural theory, understudied in school curricula, and easily overlooked in practice.

Digital design stands to benefit from this theoretical reinvigoration of labor issues. But the more conventional, analogue design process would be equally strengthened by the discussion. Understanding the political, economic, and cultural dimensions of labor can be critical to solving many architectural problems. Not only can labor transform an architect's understanding of the social context of the project, but it can also transform her understanding of design issues and material opportunities. In this sense, thinking about labor as part of the design process can suggest ways of designing, building, and even advocating for good social outcomes. The case study which follows describes how thinking about labor issues changed one student's perception of a complex architectural problem and its solutions. It illustrates that through labor, architectural proposals at the scale of the detail can have large-scale consequences at the scale of the economy. The case study is followed by a recommendation for increased discussion of labor issues in architectural pedagogy.

Case Study

How Labor Issues can transform the Response to an Architectural Design Problem

The case study describes a graduate M.Arch thesis (mine), which lasted 1.5 years between 2003 and 2005, and which began with a simple observation about housing delivery in the eastern Canadian arctic: it wasn't working. Housing was very expensive to build, but the territory needed a lot more of it, quickly.

The creation of the territory of Nunavut on April 1, 1999, gave Inuit—a northern aboriginal people—sovereignty over an immense swath of tundra, formerly the far northern and eastern reaches of the Northwest Territories. Nunavut makes up one-fifth of the Canadian landmass, but its population of 30,000 people accounts for only 0.1% of the national population. The population does however account for 50% of the national Inuit population (Aboriginal Peoples in Canada in 2006: Inuit). The overarching objective of the creation of Nunavut was to restore the self-determinacy,

self-sufficiency, and self-confidence of Inuit living in the Eastern arctic, whose social structures had been eroded since forced settlement in communities from the 1950s onwards. The creation of the territory was an event on which "Inuit hopes and aspirations hinge[d]" (Nunavut Implementation Committee).

By 2005, Nunavut had a 54% rate of residential overcrowding, and a rate of tuberculosis due to overcrowding 25 times higher than the national average ("Nunavut's housing crisis by the numbers"). In this remote part of Canada, most housing is publicly provided: 45% of 8,200 homes (Bell). The need for more public housing is dire. In 2005, it was anticipated that the number of additional public housing units needed across the territory would be 4000 in 2010, representing a doubling in the public housing stock ("Nunavut's housing crisis by the numbers"). The Nunavut Housing Corporation or NHC (the territorial housing authority) estimated at the time that in order to meet needs, it would have to achieve a pace of 350 new units per year for the next 10 years. Between 2000 and 2005, however, the NHC had provided just 50 to 75 units per year. With the elevated cost of construction in the arctic, \$750 million would have been required at the time to satisfy public housing demand. However, at that time, the operating budget of the entire Government of Nunavut was less than \$80 million per year (D'Arcy).

The high cost of building was clearly due to the cost of its inputs—materials, labor, or some combination of both. Of these two inputs to construction, I hoped to find that materials were responsible for the high cost and inefficiency of territorial housing delivery. Like most architects and design students, we hope that the solution to a design problem will be spatial, formal, and physical, in other words, a solution which draws on our typical scope of knowledge. With this premature direction, I began meeting with local entrepreneurs and material distributors to discuss how material costs could be driven down.

There is no doubt that the cost of importing all construction materials is a financial burden. Many factors contribute to elevated cost. All building materials have to be shipped or air-lifted to even the most southern parts of Nunavut. Materials arriving one summer usually have to be stored until the next summer. The risk of having to get the order right further drives up the price. Local manufacturing is impractical, because it is less expensive to import finished

stone from halfway around the world than to quarry and finish arctic rock in the territory (Hine). Even if local products could be manufactured, there is not enough local demand to result in reasonable prices. Finally, because of the small market, the building supply industry tends towards the monopolistic. Bulk ordering of materials also favors the development of monopolies.

In short, it seemed increasingly unlikely as the research progressed that materials could be provided at much less expense. Although I felt best equipped to solve problems about materials and how they go together, this problem, as it turned out, lay in *who* put materials together. The real challenge to the arctic construction process was the inefficient use of construction labor. This was an inefficiency that could be lessened if architects designed buildings differently and also became advocates for the development of local labor skills.

As most of the construction in the arctic is for public authorities, the Government of Nunavut (GN) determines procurement rules for the majority of building projects. This includes rules about hiring, which are dictated by Nunavummi Nangminiqagtunik Ikajuuti (NNI) Policy. The NNI Policy was established to incentivize the hiring and training of Inuit. It requires that each community in the territory establish a minimum quota for local labor on each public job. This quota is meant to be based on an assessment of local skill, and represents the proportion of total project wages paid to local laborers (Nunavummi Nangminiqagtunik Ikajuuti Policy). According to the Nunavut Land Claims Agreement—the 1993 federal legislation outlining the rights and responsibilities of Inuit in Nunavut—the GN has the mandate to achieve 85% Inuit employment in the labor force by 2010, reflecting the percentage of Inuit in the population of the territory (Government of Nunavut Department of Education). In most communities, reaching a local labor quota of 85% is a challenge. Table 1 shows the percentages required by Nunavut communities in 2003-2004, and the percentages achieved under labor contracts awarded the same year. Requirements were revised for 2004-2005 in response to achievement the previous year. Table 1 shows that eight of the 22 communities with complete data lowered their requirement for local labor inputs between the two years, while five increased their requirements. In both years, only two communities expected to be close to the territorial 85% target for Inuit labor on building projects.

Community	2003-2004 Inuit Labor %		2004-2005 Inuit Labor %	2003-2004 to 2004-2005 Change in Requirement, as %
	Required	Achieved	Required	
1	45	42	45	0
2	40	41	40	0
3	80	n/a	80	0
4	45	39	45	0
5	n/a	n/a	40	
6	85	100	85	0
7	75	n/a	60	-20
8	60	53	55	-8
9	75	55	60	-20
10	60	44	50	-17
11	60	71	60	0
12	60	53	50	-17
13	30	75	50	67
14	35	43	60	71
15	60	60	65	8
16	30	n/a	30	0
17	30	31	30	0
18	40	35	35	-13
19	0	n/a	40	
20	35	32	30	-14

21	55	86	60	9
22	40	36	35	-13
23	45	n/a	40	-11
24	0	n/a	30	
25	60	65	65	8

Table 1: Inuit Labor Percentages in NHC Construction Contracts 0304-0405 (Nunavut Housing Corporation)

High labor costs result when a contractor bidding on a labor tender anticipates that locally available workers will not be able satisfy the local labor quota, because the quota does not accurately reflect either the range or level of skill that actually exists within the community. Of the two, low level of skill—lack of trade certification—is especially difficult for contractors to negotiate, because basic laborers on site cannot earn as much per hour as apprentices or journeymen, which makes the wage-based quota even harder to meet.

The contractor in this position has few choices. One option is to pay a penalty established under the NNI policy for insufficient Inuit involvement. Another is to “accept anyone from the community who comes onto the jobsite,” even if they are under-skilled, in order to meet the quota (Jacques). But this choice also penalizes the project, as buildings built by under-skilled workers run late and miss the mid-December deadlines required for close-in on government projects. Yet another option is to fortify the local work force with expensive, experienced laborers brought in from outside the territory, and to meet the local quota by paying local laborers to perform menial tasks, or worse, to stay home. (Bertol; D’Arcy). But when there is

little hope to advance beyond basic labor, attrition rates rise (Belleau). This deeply compromises the intention shared by public and private sectors to demonstrate that “work in the construction trades can be a decent living and an honorable profession” (Nimchuk).

Faced with the added costs required to compensate for insufficient local skill, the contractor places high bids for labor contracts. The result is that the public sector is further constrained in the services that it can deliver. Table 2 compiles information on the material and labor bids for new construction in one of Nunavut’s three regions during 2004-2005. (This region comprises communities labeled in Table 1 as numbers 6-12.) Costs listed represent the lowest bids submitted. The NHC rule of thumb is that the cost of labor in Nunavut should approximate the cost of materials (D’Arcy). According to this criterion, Table 2 indicates that only two communities (numbers 6 and 7) would be allowed to proceed. In both of these communities, labor accounted for between 50-60% of the combined costs of material and labor inputs. In the other five communities, labor costs accounted for 60% or more of combined costs. Those bids were rejected, and the projects did not proceed that year.

Community	Building Type	Material (M)	Labor (L)	Total M+L	%M	%L	Proceeding
6	4plex	403,300	386,105	789,405			
	per unit	100,825	96,526	197,351	51	49	Yes
7	3plex	276,450	362,500	638,950			
	per unit	92,150	120,833	212,983	43	57	Yes
8	3plex	276,450	429,500	705,950			
	per unit	92,150	143,167	235,317	39	61	No
9	3plex	246,450	482,325	728,775			
	per unit	82,150	160,775	242,925	34	66	No
10	3plex	312,625	474,400	787,025			
	per unit	104,208	158,133	262,341	40	60	No
11	4plex	345,675	563,400	909,075			
	per unit	86,419	140,850	227,269	38	62	No
12	3plex	276,450	424,500	700,950			
	per unit	92,150	141,500	233,650	39	61	No
	detached dwelling	108,521	212,700	321,221	34	66	No

Table 2: 2004-2005 Public Housing Program (Nunavut Housing Corporation)

The only way to mitigate the high labor bids is to assure that local construction workers are capable of the job. Trades-training is part of this, but so is appropriate architectural design. The understanding of labor as the cause of construction inefficiencies suggested architectural ideas about details better suited to execution by less-skilled laborers or laborers-in-training, and materials that are likely to be in stock, locally salvageable, and easily replaced in the event of error. The thesis went on to study a flexible construction system (Fig. 1-4) using inexpensive materials such as dimensional lumber and sheet wood which could be used in both residential and civic buildings, and provide "reasonable hope for a cheaper solution" (Ward 7). The generative detail involved short, slim, scarf-jointed

members lashed together with straps. As a system, it proposed ribbed double-skinned walls which can be shaped to avoid high wind loads. The tectonic that emerged was irregular and spiny. The architectural approach did, in the end, embody David Pye's concept of a "workmanship of risk."



Figure 1: Architectural system driven by local labor conditions: Model of building (Roszler)

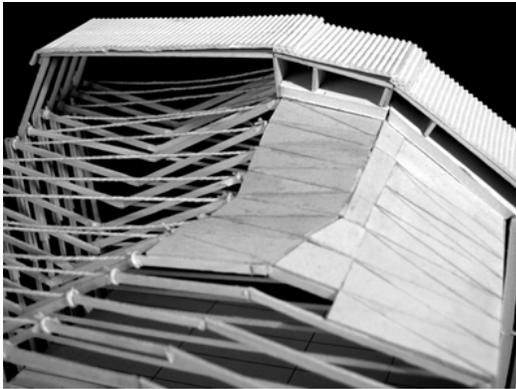


Figure 2: Architectural system driven by local labor conditions: Model of assembly (Roszler)

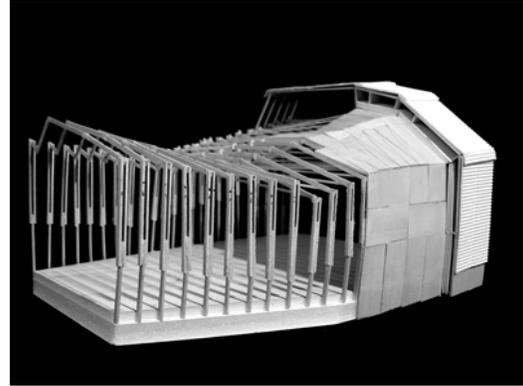


Figure 3: Architectural system driven by local labor conditions: Model of assembly (Roszler)



Figure 4: Architectural system driven by local labor conditions: Model of detail (Roszler)

Whether this architectural system is likely to be implemented is beyond the scope of this paper, but also somewhat beside the point. The most formative experience of the thesis was to understand the connection between building systems and social systems—a link which is directly made by labor. The research and design process illustrated the possibility that the social context can meaningfully shape architectural solutions, and that architecture, in turn, can do its part to nurture the goals of a community.

That architecture and society can mutually shape each other through the work of construction labor seems an indispensable lesson to students. The awareness of labor issues in schools of architecture is peripheral. Typical architectural history surveys focus on buildings as symbols in their physical and social contexts, but with little focus on the ways that human resources have been marshaled to execute those buildings. Typical tectonics courses have the potential to deal with the interface between technology and labor, but tend instead to be focused on material, formal, and textural issues. Design-build courses, which are increasingly common in architecture curricula, also have potential to introduce students to labor issues, but seem chiefly motivated by tectonic explorations. Design-build pedagogy might also offer students more exposure to labor inputs if, instead of building the project themselves, the students had to engage, manage, and coordinate with subcontractors. In this way, the design-build pedagogy would encourage students to go beyond the development of details, and to develop a process of interacting with builders that allows those details to be realized.

Conclusion

Architects would benefit in many ways from knowing more about the construction labor conditions that are the context for their work. As the case study shows, an understanding of labor clearly allows an architect to better address the project constraints. Equally critical is the enrichment of architectural thinking by the consideration of labor issues. The tectonics of a project are more deeply grasped as inextricable from the labor that executes it, and, conversely, the details we design can be enhanced by an understanding of what builders can do.

The awareness of labor issues in architecture could be deepened by researching perceptions of construction work in the architectural theory of pre-industrial, industrial, and digital timeframes. It would be equally interesting to study those periods when the architectural literature has had conspicuously less to say about labor, and to understand why interest in this topic waned when it did. Labor issues would also be usefully explored in school, and easily integrated into history and theory courses, tectonics studios, and design-build programs. As demonstrated by the case study presented here, ideas about labor and material can reciprocally strengthen one another in an architecture project, and provide connections between the physical and social motivations of the project. Most importantly, an understanding of labor can help the student form values about the meaning of their work as they enter professional practice: in asking for a building built by laborers to our specifications, we are also asking for a society built to our specifications.

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