Introduction: Building from Tradition

Over the course of the last decade there has been a resurgence of interest in the handmade building, as well as in the use of local and renewable materials in building construction. This has come at a time when concerns about the environment and economic development are at an all-time high. These volatile circumstances have either provoked or encouraged some individuals to consider methods of construction that are more responsive to local conditions. In the past, raw materials were shaped to provide shelter and to accommodate the cultural, social, and economic needs of individuals and communities. This is still true today as architects, engineers, and builders turn once again to local resources and methods, not simply for constructing buildings, but also as a strategy for supporting social engagement, sustainable development, and cultural continuity. *Building from Tradition* closely examines how building practices—developed and refined by previous generations—continue to be adapted to suit a broad range of cultural and environmental contexts.

The relationship between materials and humans began with the first attempts to build shelter. Materials employed in construction rarely remained in their 'natural' or raw state, and were transformed from the moment they were exposed or extracted. To understand the nature of a material meant to work with it directly, and working with accessible resources led to an understanding of their limits and capabilities. As architectural historian and theorist David Leatherbarrow notes, "No stone is known in construction that is not first 'grasped' manually. Knowledge of the nature of materials, on which selection depends, is a matter of manual or at least bodily *comprehension*."[1] Materials originated from direct methods of production—worked by hand or formed using simple mechanical equipment. This immediacy fostered a dynamic exchange between materiality and people, each influencing the other.

Building materials were the product of human work, their 'evolution' occurring through manual processes and the material itself acting as the medium through which accumulated knowledge was passed from one generation to the next. Materials were selected not only for their functional properties but also for their social, symbolic, and ritual value. It is this process of discovery and identification, when repeated over successive generations, that can be identified as *tradition*. Tradition is often understood as something that is passed down through action, and in this case specifically, through the act of building. Methods and techniques were disseminated globally over thousands of years; knowledge was transferred via diverse routes and adapted according to the regional climate and resources. Local identities and building practices emerged out of this constantly changing process.

Today, the builder's immediate relationship to the site and building process has given way to construction systems dependent upon global supply chain logistics and economies. Beginning with the Industrial Revolution, building construction has been radically transformed and traditional methods have been superseded by construction systems reliant on manufactured materials such as steel and glass. After World War II, the use of industrialized materials grew dramatically. In the United States, for example, almost half of the materials consumed in 1900 were based on renewable resources such as wood and other plant-based materials: by 1990, the consumption of these resources declined to less than 8 percent.[2]

The shift from traditional to modern methods has not occurred in all places equally, nor has it transpired all at once. The reliance on large-scale manufacturing and distribution—now the norm in industrialized countries—has been periodically challenged by (perceived and real) material scarcity, causing brief returns to older, more direct methods of construction. Such a revival of low-tech practices occurred in the German Democratic Republic during the Cold War period, when the lack of resources and growing demand for housing prompted the government to implement a large-scale program reliant on earth-based construction.[3]

The US government sponsored a similar program during the Great Depression. In these instances, economic necessity warranted an occasional departure from industrialized systems. In so-called developing nations, this is often still the case; individuals with limited financial means build with what is close at hand, rather than relying on expensive materials imported from other areas.

Resources such as earth and bamboo are still commonly used for construction in many parts of the world, and yet these materials are often labeled as 'alternative' and regarded as inferior to industrially produced concrete or steel systems. In the US and Europe, trade organizations and producers of manufactured building components promote the use of their products and support new materials research and testing. With the exception of wood, few traditional materials have been developed and marketed in this way, mostly because their composition and execution introduce numerous variables that have not, until recently, been well understood by the construction industry. As a result, the predictability of these materials hardly improved before the 1990s, and traditional construction methods remained relatively unaffected by modern advances in building technology.

Current concerns about climate change and a greater demand for healthier buildings have fostered an interest in the use of minimally processed and transported construction materials. Consequently, some traditional materials have experienced a modest resurgence since the mid-1990s. More than a romantic revival of anachronistic practices, recent developments have focused on enhancing material performance by contemporary means. Research and testing, in addition to collaborative on-site training, are providing a greater understanding of materials whose properties have previously been difficult to quantify. Studies focused on improving material performance have been carried out with the intent to develop and promote sustainable construction practices. The German government, for example, has funded research focused on establishing guidelines for certain types of earthen construction; consequentially, that material has obtained a higher level of performance over the past two decades than in the last thousand years.

Traditional materials offer several significant advantages over contemporary building products. Their production is often achieved through simple processes, requiring minimal (or no) power, making them very attractive in countries where energy costs are high. In addition, the materials are commonly *biocompatible*—that is, non-toxic and easily cycled between economic and natural systems.[4] Most are either renewable or derived from resources so ubiquitous that their supply is considered virtually inexhaustible. The application of traditional materials in building construction often relies on low-tech methods using manual labor, reducing reliance on expensive power tools and equipment.

In addition to having a low impact on the environment, many of the materials can be designed to fulfill multiple functions within a building, reducing the number of discrete elements typically required in a conventional construction assembly. For example, straw shaped into bales performs thermally as well as structurally, providing a high degree of insulation. Similarly, heavy earth masonry or rammed earth walls can function simultaneously as structure and as temperature-regulating thermal mass.

The multifunctionality of various traditional materials often simplifies construction, making it easier for non-experts to understand and actually take part in the building process. Thus, community participation frequently plays a key role in projects incorporating traditional materials. These efforts act as social and economic catalysts, challenging accepted modes of spatial production by disengaging from global markets and connecting instead to local resource systems. This is an important aspect for a number of architects working in locations such as China and India, where engaging tradition and local culture through 'old' construction practices has become a potential strategy for countering the uniformity of contemporary development. Traditional materials in these scenarios offer possibilities that conventional ones cannot: materials originating in the surrounding landscape create strong ties with the local geography and culture, and their immediacy provides valuable opportunities for engagement and experimentation.

Although traditional materials may offer many advantages, their potential is often limited by a contemporary set of complex circumstances—building regulations, environmental factors, and a lack of skilled labor, to name but a few. As a result, the materials are frequently modified, or combined with industrial products, to make them more suitable for current applications. In some instances such adaptations might standardize material

behavior or improve certain physical properties, such as moisture resistance, as is the case when cement is added to rammed earth or when bamboo undergoes lamination. However, the imposition of modern technologies and processes can also eliminate important attributes and characteristics. The most compelling integration of 'old' and 'new' technologies occurs when a material's inherent properties are well understood and fully utilized from a technical as a well as cultural standpoint.

Combining traditional and contemporary methods is not new. Even Le Corbusier, one of the most prominent figures of the modern movement in architecture, experimented with hybrid construction techniques that integrated industrial with non-industrial materials such as straw and earth. In *Towards a New Architecture* of 1923, Le Corbusier argues "natural materials, which are innately variable in composition, must be replaced by fixed ones."[5] The architect fluctuated, however, between a desire for the predictability offered by standardization and mass production and an enthusiasm for natural, locally sourced materials.[6] Evidence of this vacillation can be seen at the Weißenhofsiedlung in Stuttgart, where Le Corbusier and Pierre Jeanneret used reeds as permanent formwork for constructing the insulated concrete slabs of Houses 14 and 15 (1927).[7] The architects also experimented with lightweight, natural materials as a means of enclosure for steel and reinforced concrete structures. Compressed straw and cement rendered panels were installed over the concrete framework of the Pavillon de l'Esprit Nouveau (constructed in 1925) and were also intended for use in covering the steel structure of the Maison Sec (proposed 1929).

Le Corbusier's earlier use of traditional materials occurred mostly in response to economic constraints: he disguised the qualities of the natural materials by covering them with cement plaster, thus limiting their role in shaping the buildings spatially. Later, Le Corbusier combined traditional and contemporary technologies in more obvious ways, in his design for the Maison de Weekend in La Celle-Saint-Cloud (1934) and in his proposal for refugee housing, Maisons Murondins (1940). Both projects demonstrate a more conscientious use of local materials and manual craft, with natural materials taking on a deeper significance. Architectural historian Mary McLeod attributes Le Corbusier's shift in sensibility to his disenchantment with both government and industry after the stock market crash of 1929: "Just as the rational, geometric forms of the twenties were a manifestation of his faith in technology and American systems of Scientific Management, the rustic, more primitive works of the thirties were a rejection of the supremacy of this selfsame viewpoint."[8]

In Maisons Murondins, Le Corbusier specified *pisé*, or rammed earth, not only for its economy and proficiency in regulating temperature but also for its potential to relate the buildings to the landscape and to the earth. Of this Le Corbusier writes, "Life in these pisé buildings can have great dignity and regain for man in the machine age a sense of fundamental human and natural resources."[9] Le Corbusier's reasons for incorporating traditional materials into his buildings were pragmatic, and yet their inclusion also portrays a desire to evoke symbolic connections to culture and place.[10] Le Corbusier's hybrid approach, combining the 'variable' with the 'fixed,' is an important precursor to much of the work discussed in this book, highlighting as it does some of the motivations that inspire contemporary architects and designers to use these same materials in their own projects.

This book serves a dual purpose. As a materials reference book, it provides essential information about the history, properties, and traditional applications of common plant-based and geological materials. This can be found in Part I, *Material Fundamentals*. The second, and arguably more central, intention of this volume is to offer a critical analysis of traditional building practices today. Part II, *Material Strategies*, serves this purpose by examining the materials and methods through the lens of the contemporary conditions driving their development in recent years. Diverse economic, social, environmental, and cultural conditions (and often a combination of these) have compelled architects, engineers, and other professionals to return once again to older, more direct forms of construction. It is clear, however, that no place or practice has remained 'pure' or can be disentangled from external forces. Each case study in the *Material Strategies* part represents a particular intersection between what could be identified as 'tradition' and outside influences attributed to globalization.

Tradition and contemporary development need not be seen as diametrically opposed to one another. In the past, tradition has often been perceived as a foil to the modern and used to frame and define 'the other'—that is, the undeveloped, the rural, and at times, the non-

Western. In this light, tradition was viewed as conservative, backward-looking, and fixed in place and time, its perceived rootedness and immutability offering a means for preserving the 'authentic' in a changing, modern world. When examining a majority of the projects featured in this book, the (re)introduction of traditional building practices does not necessarily insure their absolute authenticity or continuity with the past. Instead, tradition is liminal—continually calibrating to a set of rapidly changing circumstances and values. From this perspective, it is useful to reevaluate the original meaning of the word *tradition*: actions related to communication or knowledge transmission. In the transfer of ideas from one place to another, from one individual to the next, changes were inevitable and processes were modified along the way.

Even though the 'traditional' in most of the case studies has been introduced through a synthetic process, the projects facilitated communication and knowledge transfer—among individuals and between people and matter. In all cases, something new emerged from this dialog, which defies classification as either traditional or contemporary. Perhaps these examples present a way forward for traditional materials and methods, or conversely, stand to critique their position within a globalized society. Regardless of the outcome, it is clear that the speed of their evolution is accelerating. Newer technologies have been integrated with traditional applications to form hybrid systems able to fulfill the contemporary requirements of efficiency and stability. Whether or not these 'traditional transformations' will be accepted and adopted for the long term still remains to be seen, but what is certain is that they are progressive, forward looking, and worthy of our study.

Notes

1 David Leatherbarrow, *The Roots of Architectural Invention: Site, Enclosure, Materials* (New York: Cambridge University Press, 1993), 159.

2 Kenneth Geiser, *Materials Matter: Toward a Sustainable Materials Policy* (Cambridge, MA: MIT Press, 2001), 259.

3 Ulrich Röhlen and Christof Ziegert, *Lehmbau-Praxis, Planung und Ausführung* (Berlin: Bauwerk Verlag GmbH, 2010), 190–191.

4 Geiser, *Materials Matter*, 4.

5 Le Corbusier, *Towards a New Architecture* (1931: rpt. Mineola, NY: Dover, 2009), 232.

6 Flora Samuel, *Le Corbusier in Detail* (Burlington, MA: Elsevier/Architectural Press, 2007), 19–20.

7 Heinz Rasch and Bodo Rasch, *Wie Bauen? Materialien und Konstruktionen für industrielle Produktion* (Stuttgart: Akademischer Verlag Dr. Fritz Wedekind & Co., 1928), 175.

8 Mary McLeod, "'Architecture or Revolution': Taylorism, Technocracy, and Social Change," *Art Journal* 43, no. 2 (July 1983): 143.

9 Le Corbusier, *Oeuvre Complete 1946–1952*, ed. Willy Boesiger (Zurich: Editions Girsberger, 1955), 27.

10 Samuel, *Le Corbusier in Detail*, 32.