Stance and Circumstance: Intentional Materiality

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INTRODUCTION

Few students escape from architecture school without at least once being questioned, "What materials are you proposing for your design?" In most cases, their response may have barely developed roots in a vague familiarity with normative construction, or in a scatter-shot palette garnered from a project's immediate context, or in a compositional effect mimicking a popular publicized trend. These facile responses are only slightly more satisfying than the absolute silence which generally follows the question, "Why would you propose these materials for your design?" Such questions, particularly the later, are invariably challenging. In the context of studio, where students are expected to address numerous issues surrounding architectural design, mere details (such as architecture's materiality) are often frantically determined at the last minute or completely overlooked.

If we expect students to think more critically about architecture's materiality, the consideration of such questions must not be marginalized—materials thinking must be considered in the terms of design, and must be fundamentally integrated throughout the design process. In studio, integrative thinking must be facilitated so that students understand materials, not merely as pragmatic means to solve formal problems, but as instrumental and inspirational catalysts for conceptual thinking. Students must be taught that architecture, as a built art, is fundamentally grounded in its medium of expression—materials. As such, their attention to its materiality will help their designs to more clearly convey their ideas, intentions, and values, as well as the critical issues which inform a given project.

To think critically about materials in the context of studio does not demand laborious calculations of strengths or loads. Neither does it demand drawn out meditations on the essence of a brick or a 2×4 . While both are necessary to the distant aim of material mastery, neither is sufficiently informing in isolation. Critical thinking is relational. It is not limited to the physical possibilities that a material presents, regardless of whether these are pragmatically or poetically interpreted. Rather, critical thinking brings both pragmatic and poetic interpretations of materials to bear in relation to two realms of influence—stance and circumstance. Stance is value laden. Circumstance is issue oriented. Each may inform, and be informed by the other, and their interdependence holds a promise of significant material expression.

STANCE

The dictionary defines "stance" as an attitude of mind, or as a standpoint—a position from which a thing is viewed. Establishing a characteristic attitude or position requires clarifying and refining values which is fundamental to all facets of architectural education. When architectural, and particularly material, values are applied to actions, they are reflected in the results. Perhaps more fundamentally, however, they affect design processes and intentions. Values color the way an opportunity is seen or its potential interpreted; they color the way a question is asked, and how work is pursued; they color expectations, and the types of goals, principles and standards which are established. When materials are is considered in terms of value, they can be applied to action—a first step away from the accidental and inconsequential, toward the intentional and significant.

A stance related to materials is always colored by many factors and variables, though certain general aspects can be characterized in terms of degree, form, inflection, and content. Stance involves the "degree" to which materials become catalysts for design thinking, the architectural "form" of material expressions, the "inflection" of material commentary, and the "content" of significant issues which are addressed and materially expressed.

DEGREE

Like all other aspects of stance, "degree" implies value related to the importance of materials in design and architecture. It is a measure of the extent to which materials become catalysts for design thinking. It involves the perceived potential of materials to pragmatically and poetically inspire creative solutions to architectural problems, but further affects their potential for architectural expression, and even the scope of subject matter.

To speak of stance in terms of degree recognizes that materials may be significant and operative, or may be fairly peripheral to design decisions. Degree helps point to a level of interest or willingness to entertain questions of material influence. For some, materials are simply and primarily media for realizing a design-the servants of form or other architectural ideals. They are distantly tied to architectural subject matter and meaning, and are rarely given significance in relation to or expression of values.¹ For others, however, materials are viewed more integrally, as fundamentally contributing to both the conception and realization of architectural work. Materials are inextricably connected to the interpretation of architectural issues, and their expressive role may extend beyond mute rendering to enrich meaning or even to create subject matter through qualities imparted by materials alone.²

It is arguable that both approaches require a type of material mastery. When materials are pure media, they must be perfectly suited to the ideas that they express—so as not to interfere, so as to become transparent.³ Conversely, when materials are brought to reciprocally inspire design, mastery allows any architectural issue to be materially interpreted, and for the potential of materials themselves to be discovered and expressed. These approaches clearly imply different values, and consequently different ways of seeing, working, and asking questions; they further result in architectural works which differ greatly in character, and even content. While architecture cannot avoid its media, the degree to which materials affect and are affected by architectural concerns can either expand or limit their potential.

FORM

Value is brought to materials, not in isolation, but in the context of building where they are given forms toward architectural aims. In relation to material stance, "form" refers to the particular expressive character of architectural elements, whether tectonic, figural, or gestural. Despite a great diversity of underlying motives and purposes, architectural forms may be recognizably united when rendered within a tectonic, figural or gestural family.⁴ Conversely, similar building elements or architectural ideas may differ distinctly depending on their tectonic, figural, or gestural character.⁵ Outwardly perceptible differences in form give character to architecture's expression; they further have significant implications for how materials are thought of, valued and brought to bear in design and expression.

In tectonic forms, material media is frequently related to the message. Tectonic forms are inner-referent, drawing their cues from within the realm of building. They encompass the material amplification of construction, structures, building process, or operational characteristics of architecture; in materials they capture evidence of the hands, tools, and machines used in their making. Through inner-reference, architecture creates its own subject matter and constitutes its own expressive system of forms which have direct, as opposed to representational, relationships to their subject matter. Their roots in pragmatic aspects of the physical building and building processes point to their inherent significance.⁶

By contrast to inner-referent tectonics, figural forms are outer-referent, drawing inspiration from a larger realm of subjects including nature, iconography, mythology, religion, ritual, history, and cultural practice. Outer-referent sources expand architectural subject matter through figural additions which adorn the building to sanctify place or function, or to articulate utilitarian or other architectural purposes. Figural forms utilize materials representationally; although materials may be masterfully handled, they are nevertheless secondary media for conveying other distinct subject matter.

Gestural forms differ from tectonic and figural forms by their lack of distinct subject matter; materials rely on effect, in the best sense, to be the "bearers of magical messages."⁷ In gestural forms, materials are immediately significant through their capacity to convey a feeling, to grow into meaning by some aspect of their nature, or to affect our senses and perceptions directly. Gesture draws on limitations as well as aesthetic, poetic, and constructive potential to render a material perceptibly and sensorily recognizable. Articulate materiality contributes to the spirit of a place by creating effects which are less dependent on concrete meaning than on powerful visual and tactile sensations—this is the realm of gesture.

Through gesture, the aesthetic potential of materials are revealed in the concert of construction and the physical forming of mass and space. Gestural materiality moves beyond conventions of normative use to reveal significant aspects of a material's natures. It brings artistry to re-present the familiar or to create something new and unexpected. The imagination and power of *techne*⁸ are brought to visualize, transform, and reveal materials as beautiful and useful media. Gesture involves artifice, but also recognizes the significant character imparted naturally through making; it raises both to design expression.⁸

INFLECTION

"Inflection" relates to the attitude or tone of a material comment relative to some aspect of stance or circumstance. Material inflection can make a gentle or conquering gesture in relation to site. It can validate or challenge the natural or built contexts through the selection of materials and their construction in architectural form. The inflection of materiality may be sober and serious, or cleverly ironic. Each of these attitudes are relative; they are given meaning in relation to expectations and experiences, but can also enhance the character of values implied by stance or the interpretation and expression of issues related to circumstances.

THE RELATIONSHIP OF STANCE AND CIRCUMSTANCE

The "degree," "form," and "inflection" of a stance may possess a measure of autonomous consistency which is independent of the specific issues surrounding a project. The purposes and intents of a stance may carry broader architectural implications which transcend the particular, and are aimed at the timeless and universal. In such cases, aspects of stance may be recognizably reflected throughout the body of an architect's work or the works of an era, with little material indication of the differences between projects or their contexts.

Nevertheless, the timeless aims of an unwavering stance are not necessarily more significant than those which appear to be more provisional. A material stance may change more quickly from project to project, or from one material or process to another. In the most significant cases, these changes are not the result of personal whims, but of attention to the unique conditions which surround each project and can inform its material solution. When differences are ignored in favor of "higher" ideals, projects may reflect a uniform, material consistency. But when the circumstances surrounding a project are given relevance, stance may adjust and allow materiality to become specifically meaningful.

CONTENT: THE CONFLUENCE OF STANCE AND CIRCUMSTANCE

The positional aspect of stance implies its relational character; stance necessarily makes extensions and connections to other things which are given significance related to values. While degree is a measure of extent, form is related to external character, and inflection is related to tone, "content" is generated through extension and connection to issues which are foregrounded for material consideration. Any issue which affects architectural design can be considered in terms of materials, though our values inevitably create biases which affect the way we see a project and what we see in it its potential content.

Content is the confluence of stance and circumstance. While stance is characterized by the material values brought to a project, "circumstance" relates to those specific preexisting project conditions-the makings of content-which await material interpretation. Circumstances are defined as the external conditions that affect or might affect an action. They encompass spheres of influence which range from the highly specific to the very broad, and include such elements as the purpose and life of a building, the character of a site and its natural and built contexts, the availability of materials and the local knowledge required to use them skillfully, regional senses of place and history, as well as cultural values and technological knowledge. The circumstances of a project help limit the field of material possibilities. Though aspects of circumstance rarely dictate materials decisions, they do present opportunities for conscious interpretation which can reveal a project's particular richness and specificity.

The circumstances of a project provide venues for material focus toward an intentional materiality. Issues can be perceived poetically or pragmatically; a material response can accommodate a utilitarian requirement or express relevant values, ideas, issues or intents. The possibilities for material content differ with each project, and are only limited by the capacity to interpret issues in material terms. Among the content laden circumstances which affect almost every project are use, utility, context, sustainability, economy, and technology.

USE

Among architecture's most important purposes is to facilitate and improve human activities and experience as they occur in the "use" of architecture. How can materials contribute to such aims? As with all issues of circumstance, the



Fig. 1. Use / Figural and Tectonic Form. Both the interior and exterior material palettes of the Winn Memorial Library by Henry Hobson Richardson exemplify the ability of materials to convey aspects of architectural use. The exterior polychromatic stone walls and heavily rusticated granite base convey a sense of permanence and dignified, civic presence appropriate to the institution. Within, a warmer palette of more domestic materials including richly detailed wood paneling and furnishings create a sense of familiarity and comfort which welcomes the reader to linger. Woburn, Massachusetts.

material possibilities related to use are both pragmatic and poetic. Pragmatically, materials may address such issues as safety, comfort, acoustics, and maintenance. They may be directly related to the particular requirements of an activity, or may involve the physiological or psychological needs of special user groups. Such issues should inform the selection of materials and their applications relative to the use of architecture. Pragmatic considerations of use are among a responsible architect's obligations to clients and particularly users.⁹

Materials may meaningfully be brought to a poetic interpretation of use as well. Materials contribute fundamental to the character of a place, and consequently affect the quality of human activities or experiences in that place. Our perceptions of a material's character may be grounded in memory or culturally related to material typology. More directly, a material may passively or dominantly engage our senses. A material may convey a sense of permanence or ephemerality, weight or lightness, monumentality or familiarity, complexity or directness, opulence or simplicity; these qualities contribute to atmospheres which anticipate and amplify use by pointing to its character and significance. These sensibilities can be brought to a building's external expression to convey its identity, or clarify its organization or order. More



Fig. 2 Utility / Tectonic Form. The Research Center for Rank Xerox by Nicholas Grimshaw and Partners utilizes a refined industrial palette of metal components for every facet of the exterior expression, including the tectonically expressive mechanical and natural environmental control elements. Welwyn Garden City, England.

intimately, materials can articulate the finer scale of occupancy through consciously crafted spaces which may heighten our experience of a place or activity. In this way materials can contribute to a consonance between place and activity, which affects the way we feel and think about what we do in architecture (Figure 1).¹⁰

UTILITY

Utility may also be foregrounded, involving the material interpretation of those things which fulfill an instrumental purpose relative to the life of the building. As the physical fabric of building, materials are functionally necessary to the realization of its instrumental purposes, but may also be visually expressive of these requirements. Aspects of utility are rooted in pragmatics—in the ordered materiality of constructional, structural, and environmental control systems. (Figure 2) Nevertheless, utilitarian aims can be examined in poetic terms as well. When utility becomes architectural content or subject matter, necessity is made a virtue. Material rendering becomes crucial to convey a consonance between material form and function.¹¹



Fig. 3 Context / Gestural Form. The city of Jaiselmer, India glows golden yellow throughout the day. Every intricate building in the fortress town is constructed of the same luminous sandstone, unifying their densely accreted forms; under other climatic conditions, the rich detail of its ornamented walls would have worn away.

CONTEXT

Rooting materials decisions in the circumstances of a project and its context helps combat arbitrary material justifications. Contexts may affect material thinking related to specific characteristics of the site, or more general aspects of the setting, field, region, or beyond; even more broadly, context is colored by the views and values of a culture and period.

In any context, materials are affected by the climate; in extreme sunlight, some fade; when moisture changes, some rot; as temperature swings, some crack. Some materials allow us to be more comfortable in architecture. As materials stand the tests of time in context, and come to be used in climate moderating ways, architecture evolves in relation to place.

The physical features of natural and man-made settings as well contribute to the character of context and can inform materiality. In any setting, a building's materiality takes some relative position. Natural settings are distinctly transformed by the material presence of buildings, which suggest what is valued and perceived. Materials may relate to topographic characteristics or natural features, or may respond to the landscape through physical or symbolic blending, or by exaggerating the contrasts between nature and artifice. In built contexts as well, materiality is relational. In very few special places, a prevalent local material or building tradition transcends differences in time and purpose to create a richly perpetuate sense of material place. (Figure 3) More commonly, however, materials and process have far greater variability, demanding other criteria for contextual relation. If material interpretations arise from meaningful circumstances, then differences of use, utility, time and technology should likely result in differences of materiality; thus mimicry and replication are sorely insufficient responses to existing material contexts. (Figure 4) Rather, similarities in logic, consistencies in motive, or pervasive



Fig. 4 Context / Tectonic Form. The new entry to the Louvre Museum presented I.M. Pei with a challenge of material interpretation. Rather than attempting to adopt the formal motifs or material palette from the existing context, a distinct shift was made from the weight, opacity, and figural form of load bearing stone to the lightness, transparency and tectonic detailing of glass. Paris, France.

orders allow even distinctly different materials, applications, and technologies to build a coherent context.¹²

SUSTAINABILITY

A stance informed by values which embrace sustainability takes an extended view of the effects which architecture and its materiality produce. Sustainable thinking about materials should be proactive, anticipating the ecological and environmental impacts of a project, and seeking to mitigate the negative and reinforce the positive aspects of building the environment. It should also be expansive, recognizing the local as well as global, and the present as well as future implications of our decisions. Sustainable materiality considers both the short and long-term availability of materials. The immediate conveniences of the building industry can produce deep and long-lasting costs within it and beyond. Materials themselves further contribute to the utilization of other resources including energy and clean air, water, and land; resources are taxed during in all phases of material procurement and processing, architectural construction, ongoing maintenance, and occupation related to energy utilization. Some aspects of sustainable materiality suggest that a regional perspective be brought in selecting materials and using them in climatically appropriate constructions, though wide-spread availability and artificial climate control make both of these approaches optional. Other potential exists in the increasing availability of natural and industrial



Fig. 5 Sustainability / Tectonic Form. Recycled and recyclable materials are increasingly available within the industry. Reusing salvaged timber not only builds toward sustainability, but allows us to reclaim prized old-growth wood.

materials which have been, or can later be recycled. (Figure 5) Sustainable practices, by definition, are sound and maintainable over the long run; they apply responsible action in view of the present and the future, recognizing the interdependence of actions.

ECONOMY

When architects speak of economy, clients rejoice. The factors affecting the costs of materials range widely from availability and worth, to costs of procurement, processing, and construction, not to mention issues of longevity and maintenance, or costs associated with all forms of energy consumption in production and use. Economy in any of these areas can save money, and affect design possibilities. Nevertheless, and in spite of most typical clients' views, valuing economy goes well beyond simple issues of initial, incurred, or ultimate material costs. Working economically can be related to sustainability-both of economic resources but also of material resources whose costs are tied to numerous issues of availability and energy. A sense of economy might lead us to practice and design in ways which produce value and create worth, rather than simply buying it. By working with less and valuing it more, inherent worth is suspended as artistic interpretation uncovers a material's latent, lingering potential. (Figure 6) As such all materials, regardless of cost, may be able to transcend raw material value to rise through the vision of an astute, inventive designer and the artistry of a skilled, conscientious builder. A sense of economy may guide us toward efficiency in materials processes which can be, in itself, beautiful. It may lead us to reconsider the constructive and expressive potential of standardized or prefabricated parts, or materially gesture to the difference between construction and assembly. Material construction is naturally complex and orderly; to work economically would



Fig. 6 Economy / Gestural Form. The Clayton County Library is among several projects by Scogin, Elam, and Bray which experiment formally and structurally with materials. The exterior cladding materials reinvent a common industrial metal siding in the image of library boxes through the simple addition of patterned paint. In the context of the library, industrial materials are reconsidered and elevated to new significance. Atlanta, Georgia.

capitalize on the inherent expressive potential which either brings.¹³

TECHNOLOGY

For some, architecture is a dominantly technological pursuit. A stance valuing technology might find each design project an opportunity for the development of architectural knowledge toward its ultimate improvement. Technology may not always be thought of as a variable circumstance, though its developments inevitably affect architecture. Most often technological changes are gradual and constant, and are more slowly integrated in thinking and work. Occasionally, however, technological revolutions create whole new architectural paradigms. The development of new materials, or processes which make materials more efficient, less expensive, or more widely available, can lead to profound shifts in architectural use. In relation to materiality, the processes of design, construction and structuring, and ultimately the uses of building can become vehicles for developing technologies related to new materials, new processes, or new uses of existing materials. (Figure 7)

Most aspects of technology are related to issues of materials and materiality. In the past, advances in transportation



Fig. 7 Technology / Tectonic and Gestural Form. The stair by sculptor James Carpenter revisits tensile structure technologies developed by Robert Le Ricolais to suspend the stair whose technological explorations extend to the laminated glass stair treads. Each architectural or sculptural project becomes a vehicle for the development of new glass technologies. Chicago, Illinois.

made all sorts of materials more widely available, changing architecture's local and regional material character forever. Advancing technological knowledge and capabilities as well change how architectural opportunities are perceived and how materiality is addressed, or conversely how a material's potential is envisioned and applied to architecture. Materials use reveals not only the capabilities, but also the values of a time. By definition, advances threaten the status quo; while advances may be positive catalysts for change, they also demand careful consideration of their architectural and other implications to insure that promised benefits outweigh costs. As technological advances eliminate many material limitations, other relevant criteria for material thinking must be pursued. Further, material advances demand parallel design advances. Other eras have experienced the inappropriate application of new materials to forms generated under other circumstances, resulting in awkward inconsonances. As industry creates new materials, or recreates old materials with new potential, architectural form should appropriately respond. And as ideals demand new materials, architects should lead in their development (Figure 8).14

CONCLUSION

The clearest evidence of the need for intentional materiality grounded in stance and circumstance is its overwhelming absence in the contemporary built environment. We cannot



Fig. 8 Technology / Tectonic and Gestural Form. "...what intrigued me was the grain, the color, the memories implied by bricks. Bricks were used in a different way, as a permeable skin protecting the masonry behind."¹⁵ In IRCAM by Renzo Piano, all that is left of brick is color, grain, and memory. Changing material technologies should result in changes to architectural form; here the material itself has been transformed to a larger masonry unit, the height of four "bricks" and it is assembled with metal spacers to create permeable panels, protecting the masonry beneath. Paris, France. fault students alone for an inability to articulate a material position when most are challenged daily to make sense of so much imitation, mimicry, fashion, and generic, placeless materiality.

Encouraging students to consider both stance and circumstance in relation to architecture's materiality allows them to view materials in terms of values and issues. It helps them to see materials as more than simple media, but as fundamentally related to, and expressive of, the broadest range of architectural concerns. When issues inform materiality, the vast field of material possibilities is opened, and also meaningfully limited. Any design issue can be interpreted in material terms, making materials appropriate and inspiring catalysts for design thinking and action. When students bring value-laden and issue-oriented materials thinking to the design process, they move toward intentional materiality. They begin a long road toward developing their own material mastery, not only through knowledge of what materials can do, but through responsible and conscious consideration of their reasons and the results.

NOTES

- ¹ The use of materials as media for the expression of other ideas has been practiced in many ages, though sensitivity to material media has ranged greatly. The significance of this practice can be easily illustrated by considering examples of classical architecture which applied stone to tectonic and figural form alike, and to structures which were poorly suited to the material. While not ruled by rationalist notions of materiality, these are clearly significant architectural works which exhibit other kinds of material mastery. Other instructional cases are architectural forms, such as the classical wreath, which are perpetuated through changes in materials, from natural boughs, to carved stone, to cast iron or any other suitable material. The value of such forms is related to the ideas which they represent, rather than their particular material incarnation. Nevertheless, certain materials or unskillful renderings are incapable of convincing representation; countless cases of shoddy materiality contributed to the downfall of post-modern efforts to revive historicist form.
- Examples of architecture inspired by materials and process can also be seen across architecture's history. In the nineteenth century, cast and wrought iron along with glass led to innovations and the development of new architectural forms, following a period of initial resistance to the inevitable formal changes. The Eiffel Tower, now the signature structure of Paris, was considered a monstrosity by many in its day, for the monumental use of a utilitarian material applied to create a structure-dominant form. During the modern embrace of rationalist notions regarding function and form, material inspiration became indivisible from design process and architectural expression. High tech, and most recently neo-modernism reveal resurgent interests in material experimentation and articulate making as architectural subject matter.
- ³ In a footnote, Gottfried Semper poetically forefronted artistry and the representation of ideas over the overt focus on or expression of materiality. "The denial of reality of the material, is necessary if the form is to emerge as a meaningful symbol, as an autonomous creation of man. Let us make forgotten the means that need be used for the desired artistic effect and not proclaim them loudly, thus missing our part miserably." Gottfried Semper, "Style," p. 257.

- ⁴ Elements of gothic architecture illustrate this idea in relation to figural form. Take for example, a pair of details—the intersection of two vaulted ribs whose juncture is represented by a stone knot, and a scupper whose purpose in expelling water from the building is also represented in stone by a spitting gargoyle. While the purposes and forms of the two details are distinct, they are nevertheless united through their articulation in figural form, and the representational character of their materiality. The work of Carlo Scarpa exemplifies this idea in relation to tectonic form. In the Olivetti Building, details which fulfill a variety of functions are unified through a thematic material palette, a consistency of working logic, and through a pervasive system of tectonic forms.
- ⁵ These differences are illustrated when we compare a single purpose articulated in either figural or tectonic form. For example, caryatids and wide flange columns share a similar purpose of vertical structural support, yet their formal differences make them dramatically distinct. Medieval gargoyles and modern scuppers, or gothic mouldings and copper flashings illustrate through similar comparison.
- ⁶ Despite the fact that tectonics grow out of the practice of architecture, not all tectonic forms are practical in purpose; tectonics can be structurally superfluous but visually central to a building's legibility. The representation of tectonics has been practiced for centuries as a means of articulating buildings. Frank Lloyd Wright used the term "analogous structure" to describe the external patterns of wood trim which were not structurally active, but which described the hidden presence of structure beneath. Mies van der Rohe's structurally superfluous but tectonically expressive corners represented idealized, lightweight steel structures deeply buried within massive concrete fireproofing. By the same token, figural forms are not necessarily unuseful, and can be vitally necessary to the physical life of a building. Historically, figural forms adorned many necessary parts of buildings, and often described their particular purpose through the choice of subject matter. A spitting gargoyle is a logical and legible figure to represent the expelling water of water.
- ⁷ "It is precisely their mute presence, however, that renders materials suitable as the bearers of magical messages; instead of conveying a readable text, they evoke feelings, trigger connotations and address the deeper levels of our perception." Gerhard Auer, Editorial, *Daidalos* 56, 1995, "Magic of Materials," p. 19.
- ⁸ The work of recent architects such as Thomas Mayne, Eric Owen Moss, and Frank Israel reveal an evident reveling in the sensual power of the medium. While materials in their works are often applied to tectonic forms as well, the visual and textural characteristics of their often rich and complex formal constructions appeals even more strongly to the visual and tactile senses.

- ⁹ For example, the design of a school requires the use of nearly indestructible materials which can also be easily maintained, and frequently cleaned.
- ¹⁰ Other poetic material interpretations of use might include Tadao Ando's concrete chapels whose pure walls, marked only by the subtle texture of formwork caught in bold swatches of light, convey a profound sense of simplicity and humility. By contrast, St. Peter's Cathedral relies on a lavishly encrusted materiality to convey a very different sense of the nature of religious activity.
- ¹¹ High tech architecture illustrates the formal power of materially interpreting utility. Both the Pompidou Center by Renzo Piano and Richard Rogers, and Lloyds of London by Rogers make all facets of utility the architectural subject matter of their expression. In both cases, extreme and non-pragmatic measures were taken to make pragmatic elements of utility expressive.
- ¹² Hassan Fathi's work to regenerate methods of adobe vault construction without the use of supporting stays was rooted in the scarce availability of wood in the arid regions of Egypt. The result was a characteristic form arising out of limited but consistent material resources. Similar material and constructional consistencies can be seen in many countries which still possess architecture from periods when local materials and methods were the only viable options.
- ¹³ Frank Gehry's work has frequently recontextualized and revalued materials in unexpected contexts of use. From cardboard furniture, to construction-grade plywood as finished cladding, to chain link fence in the domestic realm, alternative uses of materials offer new formal possibilities, and challenge us to reconsider what is valuable or even beautiful. Frank Israel's reified plywood forms, and volumetric stud constructions bring new elegance to these common materials as well.
- ¹⁴ The relationship between materials and their formal articulation is distinctly colored by time-both by the technological developments and the paradigms which characterize a period. Material technologies sometimes change more rapidly than architectural sensibilities. When cast-iron became widely available, architecture was still dominated by historicist formsexpectations limited the development of forms more uniquely suited to iron and it was cast into molds replicating classical and gothic forms and ornaments. When we compare the use of a particular material across time, however, we can often see how changes in technology and sensibility allow for radically different interpretations of particular materials. For example, stone can be used to build up stereotomic, massive walls, or can be shaved thin and suspended from equally lightweight steel frames. These differences reveal aspects of technology and sensibility.
- ¹⁵ Renzo Piano Building Workshop: In search of a balance, PROCESS: Architecture, v 100, p. 43.