son to be called an illuminating engineer, not Louis B. Marks (96). Such quibbles, and there could be many more of them, might seem unimportant, but they point to the need for greater care precisely in the area Jalde identifies as his greatest concern.

A larger problem is Jalde’s attempt to make all topics subservient to automobile issues when they are not. Chapters such as “Lighting as City Celebration,” which addresses political rallies, festivals, conventions, arches and light festoons, seasonal holidays, and other chapters on fairs, amusement parks, and illuminated landmarks all present interesting and valuable material, but none refers to the automobile; yet all end with what could be called an auto-relevant refrain. Two examples should suffice: After “Night at the Amusement Parks,” in which no automobiles appear, Jalde states, “However, many of the visual attributes of the amusement park ultimately came to characterize many of the new roadsides created for and by the automobile” (179). After “The Great White Way and Electric Sign Art,” in which little mention of automobiles is made, Jalde interjects that “illuminated signs helped make the night visually intelligible and exciting for those who viewed it from behind a windshield” (223). The author does include a final chapter on main streets and commercial strips, and one might with great effort see this as a culmination of the previous chapters, but even here the treatment of the automobile is present, however muted. Ultimately, the epilogue echoes the chapter conclusions, comprising one elongated paean to the car and its inseparable link to lighting. “By 1970, the influence of the automobile on nighttime lighting was felt in its entirety. . . . Cities were lit primarily to facilitate the movement of motor vehicles” (235). Were it not for the richness and variety of the other topics that Jalde does address, one might believe this statement.

In all, propelled by a desire to see light as a central component of material culture, inspired by its influence on architecture and artistic thought, and riveted by its effects on place-making, the authors of these works show aspects of light previously only partially recognized in social history, philosophy, aesthetics, and geography. What troubles some in considering light seriously is the facility with which it creates an appearance, a spectacle. Jalde recounts the Russian playwright Maxim Gorky’s disgust at the bright stage-set world of Coney Island (174–75). Neumann recalls the American lighting designer Derek Philip’s deep disappointment that what seems grand at night can be a shanty town by day (81). Increasingly, however, with the help of volumes like these, we see not just a glow or a glare, but a lamp, a standard, a store, a street, a skyscraper, a city, and ultimately a people that use light to express new depth, diversity, and dynamism in their lives.

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Note

Douglas Knerr
Suburban Steel: The Magnificent Failure of the Lustron Corporation, 1945–1951
Columbus: Ohio State University Press, 2004, 248 pp., 15 b/w illus. $44.95 (cloth), ISBN 0-8142-0961-0; $9.95 (CD), ISBN 0-8142-9031-0

Prefabrication is so engrained in our cultural psyche that it reemerges again and again, serving as the perpetual answer to a housing market made dull by time-tested building techniques and familiar and reliable financing arrangements. It is a recurring dream in support of an uncompromisingly pragmatic American icon. At the moment, prefabricated housing is gaining glimmers of renewed interest among specialists and the general public as a viable alternative to a predictable housing market. Recent narratives tell of the archetypal chic couple having to bear the burden of filling their five-acre wooded lot with something more than a “cookie cutter” house. An emerging popular tactic for breaking the mold, initiated perhaps by slick periodicals addressing the phenomenon, is to consider a custom prefabricated option.

A refreshing alternative to the chic and slick is Douglas Knerr’s book Suburban Steel. This work establishes a sustained historical, political, and technical relationship between immediate consumer need, mass production, and all-steel, porcelain-enameded, single-family “product.” Although Knerr’s historical window frames the brief corporate life of the Lustron Corporation (1945–51), the author documents a wonderfully complex sociopolitical context as a necessary precursor for the conceptualization of the company. This context includes the formation of progressive social housing ideology (starting in 1890), the beginnings of the Garden City Movement (1918), the establishment of the Federal Housing Act (1934), the GI Bill (1944), and the Veteran's Emergency Housing Act (1946). Facing the prospect of the release of ten million veterans from the armed forces between 1945 and 1946,
the Truman administration initiated a series of policies to address the housing crisis.

Accounting for these formations of ideology and policy, the author also accomplishes the difficult task of interlacing technological advancements with large-scale politics. Knerr provides a comprehensive rendition of the development and application of porcelain panels for the commercial building industry (some, not surprisingly, for gas stations) by Chicago Vitreous Enamed Products, initially Lustron’s parent company. The book also pinpoints technical predecessors and corporations that anticipated Lustron’s approach to the development of its all-steel house. For example, the Ferro Enamel Corporation and ARMC0 Steel are credited with introducing the concept of the all-steel house to the American market. This design, developed around 1932, called for load-bearing porcelain panels. Knerr also documents an earnest attempt by the federal government to recruit modernism. Between 1940 and 1942, notable modern architects including Marcel Breuer, Walter Gropius, Richard Neutra, and Frank Lloyd Wright were “enlisted” by the Defense Housing Division to consider the nexus between modern design and mass production in an effort to differentiate between “temporary” (that is, military) and prefabricated housing.

With this comprehensive historical setting in place, Knerr is able to identify prerequisites for the formation of Lustron. In 1945, steel remained a controlled commodity under the authority of Civilian Production Administration (CPA). As vice-president and general manager of Chicago Vitreous Enamed Products, Carl Strandlund had the responsibility of negotiating the necessary steel allotment for his company. Having failed to convince the CPA that Chicago Vitreous’s steel allotment request was warranted, Strandlund adroitly aligned his company’s interests—the production of steel enameled panels— with those of the U.S. government—the mass production of housing. The most critical policy in the administration’s pipeline was the Veteran’s Emergency Housing Act, which when passed in 1946 allowed scarce resources to be diverted to the development of housing. Strandlund was able to use the potential of this policy (along with the public sentiment associated with returning veterans) as collateral to leverage political will, and established the independent Lustron Corporation by 1946.

Over the life of the company, he received approximately $40 million in loans from the government’s Reconstruction Finance Corporation—charged with supporting programs that addressed the emerging housing crisis—to produce housing on a large scale. By acquiring a one-million-square-foot plant (also facilitated by the federal government) in Columbus, Ohio, in 1947, the company planned to produce one hundred houses per day. The product was an all-steel, porcelain panel, one-story, gabled-roof “ranch-style house. While its aesthetic was conservative, many of its features (including a radiant heating system and a combined clothes- and dish-washing machine) were cutting edge. In the end, however, Lustron manufactured only 2,498 houses and was bankrupt within four years of commencing production.

Perhaps due to his social science perspective, Knerr argues that the company’s failure was a result of its “cozy” relationship with the federal government and the latter’s inability to provide sustained support to get the operation off the ground. “As this study has argued, [Lustron’s] demise can be viewed as more a function of its relationship with the federal government than business shortcomings or market acceptance of its product. The company’s reliance on government capital and association with the crisis atmosphere of the mid-century housing shortage placed it in a political crucible throughout its existence” (190).

While the government’s role in Lustron’s “magnificent failure” might be self-evident, an objective reading of Knerr’s historical account suggests that Strandlund may have been more to blame for the company’s demise. Strandlund made a series of formative decisions that limited the company’s possibilities and future. First, Lustron’s invention appears to be more a historical coincidence than a conscious adaptation of progressive social will and politics. There is no indication that Strandlund was a visionary in terms of housing. In his capacity as vice-president and manager of Chicago Vitreous, he was being entrepreneurial in shifting his company’s end product (porcelain panels) to mesh with governmental policy in meeting the looming housing crisis. In turn, the government’s policy found a viable instrument in the Lustron firm to produce housing on a large scale. In this sense, the choice of material and scale of operation was based on production versus, say, the ability of the market to absorb steel houses at a rate of one hundred per day. Indeed, one of the fundamental concepts embraced by Lustron was that it should start big. In doing so, it placed mass production ahead of demand, requiring an unnecessarily large upfront capital investment.

Second, the selection of steel had significant consequences in the marketplace. Lustron produced a house within the “closed system” of mass production. Efficiencies are gained by repetitive procedures and the large amount of product they create. There is little opportunity for customers to “customize” their factory orders to suit their needs. To overcome these marketing shortcomings, Strandlund appropriated a “style deprecation” strategy from the automobile industry. Supposedly, when customers’ lifestyles changed, they would simply move into a newer and larger Lustron home. The closed system also had drawbacks: the product required a particular level of expertise to build and maintain. In the case of Lustron, dealers who were responsible for the delivery and construction of the houses were faced with high labor costs adding to what was intended to be the modest price of the home. The net result of these accumulated inefficiencies was a house that tended to price itself out of its own market while providing little or no design flexibility.
Third, the history of Lustron is far more interesting than the design of the house. Aesthetically speaking, an all-steel, panelized ranch home lacks aesthetic appeal. Practically, the design was riddled with flaws affecting the efficiency of its production. These were not addressed until 1949, when a prominent Boston architect, Carl Koch, was hired to redesign the structure from the perspective of production. Koch argued for more preassembly in the factory and reduced the number of required components from three thousand to thirty-seven. His redesign also raised the company’s control of quality and reduced the need for specialized labor in the field. He was responsible for reengineering the porcelain panels—converting them from mere cladding to load-bearing structural members—and thus simplifying the design somewhat. Curiously, this “innovation” produced a house similar to that developed by ARMCO-Ferro in 1932. In fact, Lustron’s original product had used techniques more appropriate for commercial buildings than private dwellings.

Those seeking sleek, graphic renderings of the Lustron product or similar products of the era will have to look elsewhere. Photographs are few and relatively poor in quality in this volume. However, the text is refreshing in its comprehensive approach to the social, economic, and political complexities of prefabrication. In truth, the other side of Lustron’s so-called failure represents success. Using its size as an asset, the company was instrumental in formulating several innovations, including community-planning guidelines for the proper “installation” of its homes. It negotiated arrangements with labor organizations that are influential to this day; it established dealership, warranty, and support networks for the delivery and maintenance of its product; and it pioneered financing programs making it possible to convert “mobile” property into fixed real estate.

While Knerer’s conclusion that Lustron’s relationship with the federal government was the primary reason for its failure is questionable, the material presented is rich and comprehensive. Indeed, its complexity is somewhat ironic given the apparent simplicity of an “off-the-shelf” single-family home. Thanks to any number of companies, including Lustron, all homes built in America today are prefabricated in some way, and every household component imaginable is backed by a formidable industry. This industry provides instantly realizable convenience to homebuilders facing the huge mortgage required to fill the sprawling emptiness of a wooded lot.

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Yasmin Sabina Khan

Engineering Architecture: The Vision of Fazlur R. Khan


Engineering Architecture is a story of the structural evolution of tall buildings, intertwined with the historical, economic, and sociopolitical events of the second half of the twentieth century. In this book, Yasmin Khan provides insight into the significant contributions to the science of structural engineering made by her father, Fazlur R. Khan, and demonstrates the impact of his design philosophy on the architectural expression of tall buildings.

The author sets the stage by looking at Fazlur Khan’s experiences during his early years at Skidmore, Owings and Merrill (SOM) in a chapter titled “An Environment for Innovation” (54). She describes the atmosphere, spirit, and intellectual context in which Fazlur Khan conducted his innovative work. By documenting conversations with clients, architects, and partners at the firm, she reveals aspects of Khan’s personal character and collaborative spirit in order to demonstrate the central role played by a multiplicity of human interactions in the shaping of the built environment.

She also describes world events that had a bearing on the direction of her father’s work and career. While illustrating developments in the structural technology of tall-building construction, she assesses the impact of the economic boom of the late 1950s on construction in Chicago. Furthermore, she details how the increase in real-estate prices in the 1960s influenced the physical configuration of buildings. Finally, she discusses how the oil crisis of the 1970s shifted construction out of the United States to oil-rich countries, circumstances that framed Fazlur Khan’s design of the Hajj Terminal at the international airport in Jeddah, Saudi Arabia.

Because Yasmin Khan understands the theoretical basis of structural behavior she is able to reconstruct the incremental steps that Fazlur Khan took to develop the concept of the bundled tube, one of the greatest innovations in advancing the engineering of skyscrapers. Beginning with Khan’s first design for SOM, the Brunswick Building, the author reveals the thinking that led him to conceptualize a tall building as a tube and how this idea appeared in the Sears Tower many years later and finally became the common strategy in structural engineering it is today.

In the early 1960s, the most accepted approach for the design of tall buildings was beam-column frame construction. Because this type of construction relies on rigid connections, shear walls and trusses, it can only handle wind load stresses up to a height of twenty to thirty stories. Fazlur Khan addressed this deficiency by treating the behavior of structural systems as a whole rather than as an assembly of individual members, contrary to the way structural engineers were conventionally trained.

Using one of her father’s drawings (67) to compare the deflected shape of a beam-column frame with that of a shear wall, Yasmin Khan explains how Fazlur Khan’s integration of the two systems resulted in a more efficient structure through mutual restraint and the reduction of deflection. In discussing the Chestnut-DeWitt Apartments, the first tall building utilizing a framed tube structure, she explains that Fazlur Khan