Suburban Steel

Knerr, Douglas

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CHAPTER ONE

An Uncomfortable Convergence:
Housing Reform and
Industrial Influences

In love of home, the love of country has its rise.
—Charles Dickens, *The Old Curiosity Shop*

The Lustron Corporation was not the first to challenge the status quo of housing in America. It had been going on at least since the Second Great Awakening of the 1830s and 1840s when evangelicals and “sanitarian” linked public health issues to housing and identified a host of social ills associated with inferior housing. These reformers advanced notions of “decent” housing and identified the evils of substandard, crowded tenements in the core of America’s developing industrial cities. Substandard housing also often encompassed conditions of tenure such as lodging, boarding, or other temporary states of residence—all of which early reformers believed fostered individual and societal instability.

As definitions and descriptions of inferior housing emerged, at the other end of the spectrum an ideal for individual and societal stability appeared in the form of the single-family house on the urban periphery. As industrial cities developed through midcentury and a new middle class gained prominence, society increasingly celebrated ownership of this type of housing as virtuous and ennobling. Its iconic status reflected the Lockean tradition of the sanctity of private property fused with the American ideal of individualistic achievement. The power of those influences, coupled with an expanding industrial economy, fueled the conquest of the suburban frontier. The original suburbanites—proprietors, managers, professionals, and others who performed the “mental work” of the new economy—slowly but surely made their way to the more distant fringe communities, shattering the bonds of the old “walking city” and forever changing the social character of American life. Aided
by transportation innovations, industrial cities became increasingly segregated by social and economic class and politically transformed by a new and powerful suburban-based socioeconomic constituency.  

The idyllic appeal of the suburban neighborhood, with its well-appointed houses, paved streets, sanitary sewers, and generous lots soon captured the imagination of the American public. However, the dream of suburban home ownership remained elusive for the majority of American families. Many decades would pass before the nation would accept that every family had a right to that aspiration or agree to support systems that provided both the productive and financial resources necessary to make such dreams possible. Yet a chorus of voices in the late-nineteenth century known as the progressives began to lay the foundation for a restructuring of the American housing system.

The Progress of Reform

As the twin engines of urbanization and industrialization remade the social, political, economic, and physical landscape of American society in the late-nineteenth century, the plight of the urban working classes impelled reformers to political action and challenged them to adopt broader conceptions of the role of housing in society. The language, attitudes, perceptions, and strategic approaches of the housing reform movement that began in the late-nineteenth century remained significant, clarifying as well as occasionally obscuring subsequent approaches to the perpetual American housing crisis.

Progressive reformers focused intense energy on housing issues during the heyday of the movement from the 1890s through the Great War. Progressive housing reform drew on many sources of expertise and tapped the talents of social activists, architects, industrialists, academics, journalists, bureaucrats, and politicians. Housing fascinated the progressives since many believed that environmental factors exerted a powerful influence over character and behavior. This belief gave rise to new definitions, new approaches, and new possibilities. Properly conceived and implemented, housing could order a disordered society, encourage democracy in the face of undemocratic influences, and foster morality, virtue, and character to counter myriad threats presented by “decadent” urban lifestyles.

Reformers embraced a number of strategies, each embodying the spirit of the movement. Initial efforts focused on the tenements. Tenement reform encompassed a variety of commercial and governmental strategies to achieve change. “Model tenement” associations appeared in New York City at midcentury and quickly spread to other industrial cities. Associations often employed a strategy known as
“Philanthropy and 5 Percent,” which involved forming a commercial entity to construct model housing for workers and limiting investor dividends to keep rents affordable. The effort to control capitalism for the benefit of the deserving poor was an innovative idea, although in many cases the impulse to control extended to officious moral oversight by “pantry snooping” reformers anxious to impose their vision of the virtuous life upon residents. While the approach attracted a great deal of attention and produced some successful results, it had little overall impact on America’s tenement problem.

Progressive beliefs in the power of government encouraged reformers to lobby for legislation and advocate sociological jurisprudence to effect changes in housing. Arguing that the state’s power to protect and foster public safety and health extended to housing, progressives believed that government should play a key role in reform. New York City again led the way by enacting a series of tenement house laws from the late 1860s through the turn of the century that restricted the type and placement of buildings, mandated fire escapes and other safety features, and allowed for the razing of existing structures in the interest of public health. Other cities adopted the New York model of tenement reform to varying degrees. Although these laws did not alleviate the tenement house (urbanist Lewis Mumford observed that “housing reform by itself has only standardized the tenement”), the appearance of housing legislation on the local level was a significant step. Appealing to issues of public safety and child endangerment, progressive reformers prepared a seat at the reform table for government and convinced at least some Americans that governmental action was necessary to mitigate the social costs of an ill-housed populace.

Another significant progressive era development in housing reform was the professionally planned company town. Though not a new idea—the first American company town dated to 1645—the manner in which progressive capitalists worked with housing reformers to develop new conceptions of worker housing was influential and reflective of broader trends and themes. The impulse to control the workforce was a hallmark of the “welfare capitalism” movement of the late nineteenth century. Savvy firms and their owners understood that constructing an environment to house their workers and initiating various controls over their social, economic, and political behavior was a natural extension of the processes of rationalization, standardization, and systemization occurring throughout the industrial economy. Applying cost/benefit and systems analysis to worker housing proved just as revealing as the application of these analytical tools to other facets of the business enterprise. As surely as firms used horizontal and vertical integration to gain control over raw materials and markets, so too they understood that the company town could be a valuable tactic to control their labor costs, forestall unionization, and shape a labor force best suited to the demands of the modern industrial enterprise. Planned company towns
thus reflected the larger dynamic processes of industrial development well under-
way by the late nineteenth century and typified progressive desires to control and
rationalize those processes.5

The company town movement attracted a range of interest well beyond the field of industrial relations. Housing reformers, representatives of the “professional wel-
fare” community, architects, city planners, and other design professionals vied for commissions or attempted to exert intellectual influence over the conception and implementation of company towns. Drawn by the opportunity to design a planned community from a blank slate and embracing the challenges of constructing a total living environment based on the latest thinking across a number of disciplines, these professionals advanced ideas and strategies that would influence the larger field of housing reform.6

Progressive social ideology manifested itself in many aspects of the company town, and by the early-twentieth century architects and planners grew more sophisticated in their approach. New conceptions about housing the working classes had been per-
colating throughout the movement, and professionals working on company towns found a ready laboratory in which to experiment with new approaches. By the middle teens, the housing reform movement was in the midst of a shift from a “shelter model,” where reform focused on improvement of buildings such as tenement houses, to a “community model,” which emphasized the planning and control of numerous environmental variables that influenced the lives of residents. This was a significant change, for the community approach framed the discussions about housing reform in both urban and suburban contexts for decades to come. Subsequent attempts to alleviate America’s housing problem needed to address the issue of community envi-
rionment in one way or another to be considered viable.7

Beginning with well-known examples of the planned company town such as Pullman, Illinois, and extending into the more sophisticated “second generation” of company towns built during the teens and twenties, the community development model held sway over the cadre of professionals who planned, landscaped, decorated, and supervised daily life in company towns across the nation. In the “play space” of the company town, where conventional restrictions of the outside world were mitigated and where corporate financing provided a range of possibilities, designers could practice social engineering freely to foster both the “efficiency and uplift” of the working residents as well as satisfy the aesthetic and economic requirements of their corporate clients. In a positive sense, the company town forced designers to view housing as a dynamic process and enabled them to experiment with new ideas in a controlled environment.8

For progressive housing reformers forced to consider society at large, however, things were more complicated. The harsh economic realities of the free market—
the decentralization and inefficiency of the housing industry, the increasing class and social stratification of the suburbanizing industrial city, and the prevailing view that government had at best a limited role in housing reform—each presented daunting challenges. The “community organization problem” implied a vast array of interdependent reform issues centered on the concept of decent housing. In the coming decades, reformers wrestled with every conceivable issue as the tabula rasa of the American urban hinterland was reshaped by the rise of modern suburbia. The company town looked simple by comparison, for the reform constituencies faced innumerable problems and an opposition who employed powerful philosophical, historical, economic, political, and social arguments against the extension of the opportunity for decent housing to a greater number of Americans.

Yet by the eve of America’s entry into World War I, progressive reformers could reflect upon a number of significant accomplishments. Although disparities remained—vast numbers of urban working-class families remained in urban slums while increasing numbers of middle-class families set their sights on the good life in the emerging suburban fringe—reformers had succeeded in initiating and focusing a broad national discussion about the viability of America’s housing system. The discussion engaged creative and energetic minds from a number of professional fields, from the public and the private sectors, and from a variety of political and economic backgrounds. Far more than simply identifying a nationwide housing problem, progressives defined the problem in a broad social context. Their thinking evolved from a localized focus on the tenement house to a more sophisticated view of housing and its connection to dynamic social, economic, and political processes. They began with ideas about improving shelter and arrived at concepts of “sheltering communities,” a logical progression given the complex underpinnings of the built environment and the movement’s own focus on environmental determinism.

Progressives also established a baseline definition for “decent” housing, argued that all Americans had a right to its benefits, and highlighted roles that the public and private sectors might play in the search for reform strategies and tactics. The identification of housing reform as a nationally prominent issue that demanded the attention of both government and private industry made it increasingly difficult for either to ignore. Although crisis conditions motivated each sector, from the time of U.S. intervention in World War I the interplay of public and private interests in the struggle for housing reform presents a useful framework for analysis. It explains at least in part how a public/private “hybrid” corporation such as Lustron could emerge with so much fanfare in the late 1940s with millions of government dollars seeding its dream of extending affordable housing to a mass market.

The relationship between housing reform and the housing industry is complex and multifaceted—at times contentious, at times mutually beneficial, and frequently
mischaracterized. Historians are far more familiar with the evolution of public responses to the housing crises of the twentieth century and have constructed a coherent interpretive arc that chronicles the increasing involvement of the state in housing reform. Yet the role of business and industry in this story has not received prominent attention and thus remains uncomfortably seated within the overall picture. The housing industry has served as a convenient foil against which “heroic” reformers have railed. It has correctly been blamed for the perpetuation of economic and social repression and has suffered the barbs of critics across a range of disciplines. Yet there is another dimension of the story—one in which the housing industry plays an important role in the reform saga.

One of the earliest reform strategies provides a useful illustration of the interconnectedness of the free market and the reform impulse. “Philanthropy and 5 Percent” relied on socially conscious capitalists for the philanthropy yet provided economic return to perpetuate the reform process. Each constituency saw benefit in the interaction and touted it as a model that united the spirit of uplift with the realities of the marketplace. The creation of model company towns and industrial villages also relied upon an equation of mutual benefit for capitalists and reformers. While these relationships were often neither easily categorized nor easy to duplicate, and even though some reformers were uneasy with their overtly commercial character, the movement saw potential for broader social application early on. Indeed, until the crises of war and depression impelled the state to take a more active role in housing issues, reformers had few other places to turn with such ready resources. Usefully entangling business and industry in the reform process required creative thought and careful planning but remained a potentially promising tactic in the quest to achieve productive results.

As the federal government became increasingly involved in housing issues, reformers and the housing industry faced a new situation filled with promise and fraught with potential conflicts. Many in the industry feared “creeping socialism” on a philosophical basis and the possible erosion of profits from government competition in housing construction on a more practical basis. At the same time, however, some in the business of housing saw great promise in the new era and realized that economic relationships with an activist government could potentially return handsome profits. Each sector had common interests, though identifying areas of mutual cooperation took time to develop, required creative thinking on both sides, and frequently required intermediaries who could facilitate both the process and its perceptions.

Beginning with U.S. involvement in World War I, the federal government played an increasingly significant role in expanding opportunities for home ownership. Visionary elements in industry saw a mass market for housing waiting to be conquered and
were intrigued by the idea that an activist government might assist in the conquest. Even businessmen in industries not directly related to housing sought ways in which to adapt their products to housing in order to benefit from government-sponsored programs and initiatives. The often combative nature of the government/industry relationship in the housing market has masked the significant role that the housing industry has played by embracing opportunities presented by governmental policy. The form and consequence of the embrace did not satisfy the desires of any relevant constituency perfectly, but out of the interaction grew a restructuring of the American housing system that increased opportunities for home ownership in desirable community settings for greater numbers of Americans by midcentury.

Architects, businessmen, reformers, and other progressives attuned to the housing industry soon faced a circumstance ripe with possibilities. American intervention in World War I and the organization of a wartime economy brought large-scale federal involvement in housing issues for the first time. The pressing need to provide housing for defense workers in plants across the nation provided an acceptable rationale for unprecedented governmental involvement in the private housing market. Like the capitalists who planned company towns as a means to foster productivity and mitigate labor disputes, the federal government sought to achieve these goals on a nationwide level. And like the planned company towns, federal housing programs advanced a broad conception of housing and community that reflected progressive ideology.9

The Wilson administration initiated proactive and coordinated programs to address the housing problem as a key component in its war mobilization plan. The Department of Labor’s U.S. Housing Corporation (USHC) and the U.S. Shipping Board’s Emergency Fleet Corporation (EFC) were created in 1917 to organize housing policies and manage their relationship to overall labor strategy.10 The architects, planners, and policy makers who designed the wartime communities had a clear vision of what form their projects should take. They did not replicate the urban flat or the log cabin, but the middle-class suburban community. They emulated the middle-class suburb because they believed that it held the key for advancing the social identity of the working classes. By practicing community building on a national scale, they hoped to encourage stability and patriotism as well as productivity. Policy makers promoted and justified federal intervention on grounds of increased productivity, but they also seized the opportunity to provide the working classes with the best implementation of housing and community then available. By molding the built environment of workers, the federal housing programs attempted to impose a vision of an idealized middle-class lifestyle upon the 250,000 workers and their families who occupied government-sponsored housing during the war years.11

World War I defined an important role for the federal government in housing
reform. The connections between worker housing and productivity, social harmony, urban congestion, and the health and morals of the working classes presented the federal government with an unprecedented opportunity to influence society and impose a coherent vision for future reform. In the short period between spring 1918 and the end of 1919 the USHC and the EFC built over 16,000 houses at 150 sites throughout the country, including many complete communities. Inspired by the English Garden City movement, the USHC’s Architectural Division advanced a vision of the ideal worker community that both reflected past reform efforts and influenced future thinking. They built permanent houses—over 90 percent of them were detached single-family or two-family structures—and situated them within well-planned communities on the urban periphery. Certainly economics played a primary role in this strategy, but the program also believed that permanent structures provided workers with something worth owning and reflected the best aspects of the communitarian ideal.  

The war housing program was both a continuation of the reformist impulse and a stunning departure from the past in terms of federal involvement. The USHC and the EFC built more than houses—they provided a model for community building as well as a blueprint for future efforts. Yet the locus of action within the federal government was problematic from the beginning and increasingly unpalatable to a nation steeped in traditional views about housing. What was possible in an atmosphere of crisis and what was possible in an atmosphere of peace and prosperity proved vastly different. Almost immediately after the armistice, Congress moved to end the programs, divested its ownership in remaining housing stock, and launched an investigation into the “egghead” influences in the USHC as part of a general backlash against governmental involvement in the private housing market.  

Yet the retreat by the federal government from direct intervention in the housing market did not mean that it exerted no influence over the process of residential decentralization that gained momentum throughout the 1920s. Although the tactics of direct intervention were not politically palatable outside a crisis setting, the state continued to influence the progress and nature of the American housing system. The most enduring contribution was the articulation of an ideal for American housing: the single-family house situated in a zoned, planned suburban community built by private industry. The federal government’s proper role, best articulated by Herbert Hoover, was to promote the suburban ideal and facilitate the flow of capital to private industry for its physical implementation. Hoover’s “associationalist state” assisted the rise of suburbia and promoted it as the locus of the American dream through the public encouragement of private initiative. Interestingly, the abandonment of direct market intervention did not include an abandonment of the wartime housing program’s embrace of the suburban form as the preferred instrument for social progress through better housing.
The housing industry, or “real estate lobby” as it was often described, consisting of investors, builders, developers, real estate firms, and manufacturers of housing components, enthusiastically welcomed federal endorsement of the suburban form but resisted direct involvement at every turn. The public largely supported this viewpoint, especially as fears of socialism spread in the wake of the Bolshevik revolution. In that atmosphere the prospect of a federal government deeply involved in the housing market seemed unthinkable. Indeed, the suburban homestead provided a powerful anticommunist image as the bastion of American citizenship, economic free will, and private enterprise.

Although associationalists like Hoover rejected direct intervention, they conceived a vigorous federal role as booster and facilitator of relationships between government, private industry, professional groups, and reform organizations in the interest of promoting the suburban single-family dwelling. A number of organizations and promotional efforts received federal endorsement, including Better Homes for America, the Architects’ Small House Service Bureau, the Home Modernizing Bureau, and various “Own Your Own Home” campaigns. As Secretary of Commerce, Hoover encouraged these organizations and even served as president of Better Homes for America. He viewed this organization as an ideal example of the cooperative approach and regarded it as a “collateral arm” of the government in publicizing the need for better housing and home ownership, improving housing standards, and encouraging public participation in housing reform. Under Hoover, the Department of Commerce also served as a research base for data collection on housing issues, sponsored housing conferences that attracted considerable industry participation, distributed literature promoting city planning, and published educational pamphlets for potential homeowners. The rationalizing impulse was also evident in efforts to promote easier access to home-building capital, review of zoning- and building-code formulation, promotion of standardized contractor specifications, and support for greater efficiency and streamlining in the lumber industry.

Indeed, federal promotion of the suburban ideal provided opportunities for many constituencies. Business and industry profited handsomely from the construction of suburban communities. Home-building interests such as real estate agents, suburban developers, and contractors, as well as all their economic constituents, stood to gain dramatically. Companies manufacturing housing components benefited from increased business, as well as from the impetus for rationalization and standardization of production that inevitably accompanied an expansion of the market. As the production of each component of housing became more efficient and modern, it gave additional credence to the idea of rationalizing the entire process.

Housing-related professions also anticipated wonderful opportunities. Architects sought a greater role in directing the physical form of American housing, as did
associated professions such as planners and landscape designers. Founded in 1920, the Architects’ Small House Service Bureau focused on invigorating the authority of the profession in the design and placement of single-family dwellings. The Bureau naturally advocated the hiring of professional architects rather than relying on free plans from local lumber dealers or the one-size-fits-all approach of the pre-cut house then widely available through mail-order catalogs. The infusion of “expert” talent represented an opportunity to increase the efficiency of house construction and lower costs, a benefit for the potential homeowner and a boon to the architectural profession and the building industry.17

The architectural profession was especially interested in demonstrating its mastery of the modern industrial process while at the same time showing what it had learned from its progressive-era experiences with community building. The profession might be just the intermediary industry that government needed. Versed in both the economic and social background of housing, architects saw themselves as uniquely positioned to carry the progressive reform vision and unite it with practical economic and political realities. The profession seemed poised to offer a heroic response to the housing problem, for it was clear by the early decades of the twentieth century that the timeworn process of home design and construction was woefully inadequate to provide affordable housing to an expanding population. The new era challenged traditional conceptions of “dwellings,” demanded a thorough understanding of industrialization and system-building technologies, pushed market considerations deeper into the design process, and propelled a rendezvous with technology and social forces that promised to revitalize the architectural profession. Providing a blueprint for affordable, durable, attractive, mass-produced housing, along with the challenges of directing and influencing engineers, manufacturers, developers, and government policy makers, meant a new primacy and gravity for the profession at the center of a society with rational industrial systems in place for nearly everything except affordable housing.18

The influence of the associationalist approach in the furtherance of the suburban ideal provided a model for public and private sector relationships. Among these intersections lay a dynamic arena where elements of government policy, commercial enterprise, professional interests, and nonprofit organizations would vie for influence, profit, and power over the course and direction of the American housing system. In the 1920s one commonality was established: the identification of the single-family suburban home as the center of a new productive and consumptive American lifestyle. This setting would emerge to provide philosophic, political, economic, and social foundations for American domestic aspirations in the twentieth century. The promotion of the suburban homestead as the new “palace of consumption” where amenities and technical wonders opened up new possibilities for the good life influenced the course of American housing reform in meaningful ways.19
Whether the associationalist model could actually produce an expansion of suburban housing at a level of affordability within reach of the middle-class mass market remained to be seen. The good life of suburbia represented a worthy and desirable aspiration for individual Americas, received the blessings of the federal government, fit at least part of the communitarian vision of the progressive reformers, and presented a profitable development for the housing industry. The question of where seemed settled, yet the question of how remained a vexing prospect.

**Technological Challenges**

The overall expansion of the consumer economy in the 1920s brought a host of mass-produced material goods into the American household as well as an expectation for a more prosperous future. The advancement of the middle class was underway, and the spread of more sophisticated organizational and productive systems provided American industry with the means to tap this ever expanding market. The automotive industry best exemplified the transformative potential of mass production and mass marketing. By the end of the decade one in five Americans owned a car and millions more had tasted the freedom that automobility offered. However, a good many shiny new cars were parked in front of substandard dwellings—a fact that deeply disturbed observers of the state of the American housing system.

Why had American entrepreneurial vigor made the automobile affordable to the mass market but not housing? Why was housing the "industry that capitalism forgot?" The appeal was seductive and provided one of the most prominent constructs for the critique of the housing industry for the next three decades. The public understood the analogy, the press seized upon its apparent simplicity, and excitement surrounding a technological solution to America's housing problems grew consistently more intense in both public and private sectors. America's housing problem, which had been a constant since the industrial revolution, seemed ready to surrender to the application of systematic thinking, modern industrial methods, and innovative architectural design. The transformational potential of affordable, mass-produced housing had broad social, political, and economic ramifications. The expansion of home ownership could provide an engine for economic expansion as well as salve a variety of social ills spawned by industrialization. Reformers had more than made a case for decent housing as a bellwether of a modern progressive society. Now it was time to employ the best means that modern society could muster to make the object of desire created by both industry and government a reality.

As the prosperity of the 1920s lifted more Americans into the middle classes and a middle-class housing market began to emerge, observers of the American hous-
ing system wrestled with a strategic shift. Increasingly, the dialogue moved from discussions about housing construction to a systematic analysis of housing production. Aligning the housing process with the promise of the machine age drew the interest of a diverse range of thinkers and doers, including prominent representatives from political, academic, professional, and commercial life. Part of a larger consideration of social organization that emerged from the intellectual ruins of the Great War, housing became a key element in the national discourse about economic progress, social stability, and political ideology.

The discussion encompassed a wide range of topics, including commercial prospects and market consequences, aesthetic appraisals, political assessments, intellectual critiques, and social considerations implicit in restructuring the productive organization of the housing industry. These “modern” thinkers were consistently troubled by the apparent unwillingness of the industry to embrace the potential of the factory age and face up to the social promise inherent in a new and powerful productive paradigm. This point of view provided a common motif for the diverse range of voices calling for an industrial solution to America’s housing woes.

Business leaders were often particularly harsh in their assessment of their fellow capitalists in the housing industry. Edward Filene, a noted Boston merchant, social critic, and influential voice for progressive business practice, publicly bemoaned the overly complex and inefficient architectural design of many American houses. Custom building to individual tastes presented a major roadblock to mass production, Filene argued. “We are paying a high price for complexity,” he wrote, arguing for a rational approach to housing standardization that would “eliminate everything that does not add to its beauty, its quality, or its usefulness.” Excessive ornamentation and adornments emulative of older European styles struck Filene as especially useless and ill suited to the new technological promise of modern American life.

Similarly, social critic and historian Lewis Mumford argued for a new American interpretation of housing that embraced a modern aesthetic while retaining meaningful connections to people’s lives, their communities, and the environment. Reproducing the French chateau, the English manor house, or the Mediterranean villa not only interfered with a purely American interpretation of housing but also mitigated the efficient application of modern production methods. A new design aesthetic grounded in the productive potential of the factory system and based on a greater harmony between American lifestyles and American physical environments seemed to hold transformational promise.

The suburban restructuring of residential life represented a rational and holistic view of housing and social reform for the middle classes and a hopeful vision for those aspiring to middle-class lifestyles. The integration of land, people, and industry, viewed as mutually interacting elements of social policy, provided a blueprint for the recon-
struction of American society based on an ideal balance between urban and rural. Suburbia would become the preferred locus for a modern industrial and consumptive society, free from the deleterious living patterns created by the first industrial revolution and free to accept the architectural, social, and political imprint of a purely American vision for modern living. Suburban life would produce a new American—propertied, invested in the social order, and prepared to enjoy the benefits of decent housing and stable communities without abandoning the cultural and democratic advantages of the urban experience. Indeed, Mumford’s views represented the belief that the community development model of progressive housing reform could be brought to full fruition only in a suburban setting.

A grand vision indeed, but who would build this new utopia? And would anyone of modest means be able to afford it? The political counterreaction to the federal government’s direct involvement in the housing market during World War I precluded a prominent governmental role in the creation of the new suburbia. Real estate and construction interests stood fast to the view that government should support but not compete with the private housing market. Yet experimentation with hybrid approaches to model suburban community building revealed a willingness on both sides to pursue innovative ideas. Model suburban communities presented reform organizations, commercial interests, and governmental entities with opportunities to transform vision into reality. Using limited dividend strategies, working in concert with local and regional government, and attracting financial support from progressive business interests, model communities such as Chatham Village in Pittsburgh, Pennsylvania, Sunnyside Gardens in Queens, New York, and Radburn, New Jersey, offered attractive, affordable, and community-rich habitats for their middle-income occupants.

As desirable as these communities were, they remained “demonstration samples,” limited in scope and based on financial models that were unrealistic for society at large. Mumford astutely observed that comprehensive housing reform required a fundamental transformation of the economic and political underpinnings of the American housing system. However, changing long traditions of free enterprise and private land speculation, as well as restructuring all of the institutions that supported them, seemed a near impossible task. “Modern housing,” Mumford wrote, “demands not merely an improvement of the physical structures and the communal patterns. It demands such social and economic changes as will make it available to every income group.” Reformers like Mumford and Catherine Bauer, a longtime housing activist and author, believed that a suitable remedy to the “boutique” nature of the housing industry lay in the realm of the federal government. Bauer observed that there

must come a technique for building complete communities designed and administered as functional and constructed by large scale methods. Only government can
make the decisive steps and set up a new method of house production as a long time social investment to replace the wasteful and obsolete chaos still prevailing.

The housing industry had not matured in an industrial or societal sense. It had not produced a product suited to the needs of the mass market. It had not followed the Ford model of industrial progress. In short, capitalism had failed the housing industry, and the housing industry had failed capitalism.

What was the private housing market doing to develop the productive technologies necessary to build a suburban experience that would be accessible to the mass market? Although the industry had made important technological strides since the turn of the century, it was still far from offering an elegant, affordable, and practical solution to the integration of productive technologies and community building. However, innovative firms and individuals were working toward better manufacturing processes and wrestling with a more systematic view of housing production. Consideration of alternative building materials such as concrete and steel, as well as experimentation with composite wood products, grew more prevalent and attracted considerable attention from reformers and entrepreneurs.

For example, Thomas Edison proposed a system for constructing an entire concrete house in one pour operation in the first decade of the century. While the “monolithic concrete house” proved impractical on a commercial scale, it reflected increasing interest in prefabricated construction techniques using industrially pliant materials. Architect Grosvenor Atterbury, another early pioneer, devised a housing system of precast hollow-core concrete panels for floors, walls, and roofs. Supported by the Russell Sage Foundation, Atterbury erected several hundred houses in Forest Hills, New York, between 1910 and 1918. Although the process also proved too expensive for widespread commercial implementation, Atterbury’s work was significant because it was the first philanthropically supported experimentation in prefabricated construction for the mass market. The Russell Sage Foundation made the results of the Forest Hills project, including patents for specific construction innovations, available to other nonprofit organizations working toward “a scientific solution of the housing problem.”

The idea that prefabricated construction methods using alternative materials might provide the solution to the housing needs of the majority of Americans represented a change from previous views of prefabrication as suitable only for temporary construction. Prefabricated dwellings had a long history of filling housing gaps in newly settled areas or as secondary shelter for recreational purposes. The challenge before industry pioneers like Atterbury was how best to move prefabrication from a specialized temporary housing solution to a “movement” that would influence the progress of industrialization in the housing industry and encourage a more systematic view
of the American housing system. Reconciling technological progress with reformist thinking about housing and community also represented a difficult challenge.

In the coming decades, prefabrication would gain credibility, though progress was slow due to several factors. The decentralized structure of the housing industry made it difficult for individual firms to undertake research and development efforts into new construction systems. Capital-starved and existing from project to project, few builders had the resources or perceived the need to experiment with alternative materials or processes before they were proven cost effective and had gained widespread public acceptance. Larger corporations in the building products industry also saw few benefits in developing overall construction systems unless those systems used their products exclusively, which was unlikely. Although firms continued to refine the production of building components, the challenge of developing industrialized building systems far exceeded the scope of individual organizations. The overall health of the housing market until the mid-1920s also mitigated development since companies had few incentives to pursue new methods in the midst of unprecedented prosperity.

Perhaps most important, however, was the lack of governmental stimulus and technical assistance to the housing industry. Until the 1930s the federal government did virtually nothing except for a small program in the Bureau of Standards that encouraged the standardization and simplification of building materials. In contrast, European governments actively pursued centralized policies for public housing and sponsored research and development projects to spur the acceptance and marketability of new building systems and construction materials. As we have seen, this was certainly not the American way, and neither the federal government nor the housing industry had any systematic interest in industrialized building until the advent of economic crisis. Consequently, pioneering individuals and enterprising firms pursued research and experimentation in industrialized building largely on their own.

One industrialist who heeded Edward Filene’s and Lewis Mumford’s calls for technological advancement was Albert Farwell Bemis. As head of Boston-based Bemis Industries, a firm that controlled various building-product concerns, Bemis funded research into prefabricated construction systems using materials such as plywood, concrete, and steel. Throughout the 1920s his firm experimented with various systems and amassed a large amount of data that influenced future development. Although no single system proved commercially viable, research into elements of the building process refined thinking about prefabricated design. Specifically, Bemis advanced a “cubical modular” design theory that stressed flexible coordination of structural components. Work on joining methods proved especially promising, since a
reliable system for tying construction modules together represented the most challenging aspect of production because it had tremendous impact on labor costs regardless of the type of materials employed. \(^{29}\)

Bemis published the results of his company’s work in a three-volume series entitled *The Evolving House*. The first two volumes surveyed the history and economics of housing. The third volume, *Rational Design*, provided a theoretical discussion of modular design theory and offered practical guidance on the dimensional engineering of modules and advice for architecting a “continuum of cubes” to achieve maximum cost effectiveness and design appeal. Bemis believed that the use of “stock” modules coupled with creative architecture provided the key to developing systems that improved quality, reduced cost, and lent themselves to mass market production. \(^{30}\)

Eager to demonstrate production economies inherent in modular building components, Bemis Industries offered technical assistance to firms willing to put its research into the field. Several companies sought partnerships with Bemis and built small-scale developments using the approach, but none attempted a large development since financial institutions were unwilling to support such “radical” and unproven construction methods. Bemis’s work had a greater long-range impact on the housing industry through the company’s creation of the Modular Service Association (MSA), a nonprofit organization dedicated to the promotion of dimensional coordination and standardization of construction materials and processes. Industry groups such as the American Standards Association and the American Institute of Architects served as joint sponsors of the MSA. In the 1930s and 1940s, the MSA worked with the building industry and the federal government to advance “modular coordination” and to promote the reduction of labor-intensive and costly on-site fabrication. Bemis was indeed a visionary who legitimized basic concepts of prefabrication within the housing industry and gave physical form to construction systems that held commercial promise. \(^{31}\)

While Bemis approached industrialization within accepted architectural and construction paradigms, other pioneers advanced more revolutionary views of housing and technology. Buckminster Fuller’s Dymaxion house of the late 1920s represented a reconceptualization of housing and the processes that produce it. Fuller argued that housing design had to conform to modern industrial methods rather than attempt to recast modern industrial methods to accommodate outmoded notions of housing forms. The original Dymaxion house was a prefabricated hexagonal metal unit suspended by wires from a central mast and included numerous amenities. Decades ahead of available production technologies, the house never progressed beyond the model stage. However, its radical nature excited the public about the promise of a new era in housing based on technological progress and challenged architects and engineers to consider how housing design could be reconciled with emerging building technologies.
The Dymaxion would be the first of many “houses of the future” to capture the public imagination and spur ongoing development of innovative housing technologies.32

Although elements of the housing industry began to conceptualize a role in the reconstruction of the housing system, uniting reformist visions with practical implementation demanded radical changes that industry alone could not achieve. It would take a crisis to impel action and an activist federal government to guide the process. The tumult of the Great Depression and World War II focused American institutions on the need to reconstruct the housing industry, expand the role of the federal government in guaranteeing opportunities for decent housing across the income spectrum, and implement policies to expand home ownership among the middle classes. Frank Lloyd Wright observed that “a citizen in his own life in his own home with his feet on the ground . . . is truly a free man.”33 The connection between decent housing and “freedom” in America would take on a new meaning in the years to come as the nation faced a series of enemies that challenged the definition of American ideals. If home and hearth were to feed the nation’s strength as it battled the evils of depression, Nazism, Japanese militarism, and communism, home and hearth needed far more attention.

**Housing the Commonweal**

As the economy disintegrated after the Great Crash and the housing market collapsed, the nation found itself woefully unprepared to address a housing crisis fueled by a growing number of foreclosures. Failing credit markets took a heavy toll on those families who were able to purchase homes for the first time during the 1920s. The promise of middle-class status through suburban home ownership so deliberately trumpeted by the government and the housing industry gave way to the grim reality of downward mobility. Foreclosures threatened to destroy the image of a prosperous middle class as a key to national stability and progress.34

The federal government was initially unable to respond the crisis. It had no strategic approach to housing policy, no programs in place to assist homeowners who faced foreclosure, and no programs to aid the perpetual problem of access to decent shelter for lower income families. The freewheeling economic ideology of the 1920s and the success of the housing industry in forestalling governmental “interference” in the housing market now seemed absurd in the face of a crisis that reached deep into the heart of the American middle class. A new political climate that expected—even demanded—federal action brought new pressures and opportunities for the housing industry. Fruitful collaborations would emerge during the 1930s and advance housing technologies. Government, academic, and private interests
devoted considerable energy to the notion that the key to America’s housing problems lay in the refinement and application of productive technologies.

Issues of housing reform attained prominence during the Great Depression because they affected more Americans with political influence and the will to use it. It was not just the tenement dwellers and their supporters battling for reform. Now middle- and working-class families whose faith in the American way had been shaken demanded action and petitioned government for reform and redress. For the first time in American history, public faith in the housing industry began to crumble, and the industry prepared for an unprecedented assault as people turned to the federal government for strategic, broad-based solutions.

Reformers rejected the claims of the real estate lobby that the housing crisis was solely the result of weakness in the housing market since the mid-1920s. The reform community argued that the problem went far deeper and was rooted in the structure of the industry. Inefficient and often low-quality production practices implemented by small firms using multiple subcontractors with minimal oversight, coupled with unnecessarily complex financing and valuation practices, defined a system hopelessly mired in the preindustrial past and unable to provide suitable housing even in good economic times. In contrast, real estate interests saw strengths where reformers saw weakness. The complex web of economic relationships in the housing industry reflected the true spirit of American free enterprise and one of the last bastions of individual entrepreneurship in an economy increasingly dominated by large-scale enterprise. Like the mom-and-pop retail establishments that resisted the advent of large chain stores in the 1920s and 1930s by lobbying government for protective legislation, the real estate community felt that government should protect the status quo of the housing industry since it virtually defined all that was good about the American system.35

Yet the economic and social pressures of the depression and the centrality of the housing industry to economic recovery made such views untenable in the public mind and among policy makers in the Roosevelt administration. Roosevelt’s Brain Trust turned first to strategies designed to stabilize the housing market by restructuring the nation’s home finance credit system. This was politically efficacious since easing foreclosures meant tying an important constituency to the New Deal in its early stages. The administration would also pursue housing policies designed to assist a greater spectrum of Americans by expanding opportunities for home ownership through government-sponsored community development, some of which produced beautifully designed and socially vibrant communities.36

Less visible to the public but prominent across a range of initiatives was support for the development of housing technologies. Veteran reformers who argued for technological progress during the 1920s assumed important positions in New Deal hous-
ing agencies and consistently advocated the application of mass-production meth-
ods to the housing market. Improving building technologies served multiple pur-
poses: as a means to improve the industry’s capacity to serve the mass market; as
an incentive to create jobs in an industry fundamental to economic recovery; as a
strategy to effect change in a manner more palatable to the industry than broad reg-
ulation or outright competition; and as an example of government-supported
efforts that assisted capital-starved firms in the research and development of new
technologies and products that held future promise.

Indeed, much of the federal government’s housing efforts during the New Deal
can be characterized as subsidies to the housing industry in one form or another. The New Deal was actually quite gentle on the industry. While controversy fre-
quently arose over specific measures, commercial interests rarely failed to feast at
the federal trough—even though they consistently denounced federal involvement
as socialistic. What emerged was a spectrum of subsidy and involvement, from con-
structing residences, developments, and communities, to assisting technological de-
velopment, implementing construction standards, and stabilizing credit markets.
Governmental “control” was easily identified but not always appreciated. Using the
federal system to promote the rational productive capacity of the housing indus-
try was the greatest contribution of the New Deal to the industry and set the stage
for the expansion of better housing opportunities for a greater number of
Americans in the decades to come.

The New Dealers first turned to the Home Owners Loan Corporation (HOLC),
an agency created by the Hoover administration in 1932. HOLC emerged from the
president's Conference on Home Building and Home Ownership held in December
1931. The conference endorsed Hoover’s plans for establishing a system of home loan
support banks similar to the Federal Reserve System in an effort to back primary
mortgage-lending firms and restore faith in the mortgage credit system. HOLC addressed
the issue of home foreclosures, and the politically savvy New Dealers greatly
expanded its scope. Backed by federal capital and bonds, HOLC lent money to sav-
ings and loans to purchase defaulted mortgages and refinance low-cost loans to home-
owners. Thousands of Americans were able to retain ownership of their homes with
help from HOLC, and many of them became lifelong Roosevelt supporters.37

The administration soon advanced a more ambitious program with the Housing
Act of 1934, which established the Federal Housing Administration (FHA). The FHA
sought to reorder the housing industry by promoting the construction and financ-
ing of moderately priced single-family houses and by implementing standards for
community planning in suburban settings. The FHA insured long-term mortgage
loans made by private lenders as well as loans financing home improvements and
repairs. The Act also authorized the establishment of national mortgage associations
to provide a secondary market for home mortgages. The FHA-insured mortgage transformed the American housing system by insuring billions of dollars of mortgages and bringing much needed stability to the housing market. It took much of the speculative risk out of the equation for builders and thus made possible the financing of large-scale developments. The FHA helped the housing industry move toward rationalization of the financial aspects of the business. Rationalizing the production end of the equation, however, would take additional time and considerable effort.

HOLC and FHA demonstrated FDR’s commitment to the housing needs of the middle class. But these measures did little to assist the “one-third of a nation” that remained ill-housed. New Dealers who advocated a greater role for the federal government in the financing and construction of houses for the poor and the working classes exerted substantial influence in the creation of policies that pushed the administration beyond a purely fiscal approach focused on the middle class. The economic crisis enabled reformers in and out of government to call for direct, large-scale housing initiatives for lower-income Americans. The private housing market had failed, they argued, and furthermore demonstrated little interest in providing decent low-cost housing. In their view government involvement in the low-cost market was not competition, but a necessary extension of the industry for the public good.

The passage of the National Industrial Recovery Act (NIRA) moved the federal government deeper into the housing industry than ever before. The Housing Division of the Public Works Administration (PWA) built housing for low-income working-class families between 1933 and 1937. Designed as a temporary agency, it nevertheless produced well-designed and attractive developments. In collaboration with the FHA and the local housing authorities in Fort Wayne, Indiana, the PWA also explored the use of prefabricated stressed-skin wood panels to construct single-family houses. Known as the Fort Wayne Plan, the development used a combination of public effort and private financing to encourage the proliferation of affordable housing. The PWA Housing Division provided thousands of jobs and economic stimulus in fifty-nine communities across America. The quality of construction, upscale materials, and artistic touches by PWA craftsmen gave these communities a dignity previously unknown in lower-income housing.

However, the PWA Housing Division was intensely controversial from the start. Led by Harold Ickes, the PWA was designed to build housing for those who could not afford privately built homes. Yet industry groups such as the National Association of Real Estate Boards, the United States Savings and Loan League, and the National Association of Retail Lumber Dealers stalwartly opposed the PWA and viewed it as a threat to the free enterprise system. In their view HOLC and the FHA were appropriate measures to stabilize the private market, but any further governmental involvement was unwarranted.
“Despite industry opposition, the New Dealers pressed on. Buoyed by FDR’s landslide reelection in 1936 and the continuing economic crisis, the progressive coalition pressed for the creation of a permanent governmental agency that would continue the work of the PWA. In 1935 they began to fight for the Wagner Steagall Act, which called for the creation of a new permanent housing agency. Congress passed the Act by an overwhelming margin, and in September 1937 Roosevelt signed it into law. Wagner Steagall stated that the provision of good housing for the poor was a perpetual social obligation and created the U.S. Housing Authority to implement the new social vision—“the provision of decent, safe, and sanitary dwellings for families of low incomes and the eradication of slums.” Under the direction of Nathan Straus, Jr., the USHA assembled a talented and experienced staff of reformers, including Catherine Bauer and Leon Keyserling. The Authority operated by funding local housing agencies and subsidizing construction and maintenance costs. By 1939 the USHA had eclipsed the efforts of the PWA, constructing over 50,000 public housing units. In addition to the overall benefit of providing needed housing and stimulating the construction industry, the USHA’s focus on housing technologies exerted an important influence on the industry at large.42

Additional government agencies and programs that provided leadership in the development of affordable housing using advanced methods and materials included the Resettlement Administration and its successor agency the Farm Security Administration, the Tennessee Valley Authority, the U.S. Forest Products Laboratory, and the National Bureau of Standards. These agencies created and implemented sophisticated economic models that assessed all elements of the construction process in an effort to refine and rationalize. Assessment of labor practices, raw material costs, production methods, and process efficiencies gave planners a clear picture of costs associated with each element of the project. Emphasis on prefabricated components, division of labor, and innovative material handling systems seemed finally to bring the benefits of modern management to the housing industry. The managerial approach provided a lesson to the housing industry that would have significant consequences in the coming decades.

Established in 1935, the Resettlement Administration developed housing for low-income families. Its most notable contribution was the creation of the “greenbelt” communities, which attempted to adapt the English garden city approach to the housing needs of families displaced by the depression. Located thirteen miles from the heart of the nation’s capital, Greenbelt, Maryland, was the administration’s first effort. This development, and the two others in Greenhills, Ohio, and Greendale, Wisconsin, became laboratories in which planners, architects, landscape contractors, and construction firms experimented with new ideas, processes, and building technologies. Prefabrication played an important role in the construction of town houses, apartment...
buildings, and single-family residences. Assembly line construction methods in the field and the use of alternative building materials provided excellent examples for the private building industry. Encompassing the best of the communitarian ideal, the attractive layout of the towns produced a vibrant social experience and demonstrated that innovative and cost-effective building methods could produce an attractive result.\textsuperscript{43}

This was government involvement at its best. \textit{Architectural Forum} reminded the housing industry that the greenbelt program offered a powerful blueprint for widespread implementation: “private builders may well study [the Resettlement Administration] for clues to . . . simplify and therefore generally improve standards of planning, methods of design, and construction.”\textsuperscript{44} Several private builders indeed drew valuable lessons from the greenbelt communities. Abraham Levitt and Sons used many of the same planning and construction techniques to create middle-income housing on Long Island in the late 1930s. Using a holistic approach that attempted to rationalize all elements of the development process, Levitt controlled everything from land acquisition to the furnishing of individual houses in an effort to provide “swank” at a reasonable cost. Similarly, in Chicago, William Harmon used the same approach to develop housing for wage-earning families. Harmon’s Colonial Village was immensely popular and served as a model for the future of mass suburban development.\textsuperscript{45}

In 1937 the Farm Security Administration (FSA) replaced the Resettlement Administration but continued its mandate. The FSA advanced construction technology by researching and employing stressed-skin plywood prefabrication in the construction of housing for displaced farm workers. By 1940 it constructed over 20,000 individual units and developed significant expertise in site fabrication, which would prove essential to the success of the defense housing program during World War II. \textit{Architectural Forum} noted that “in the face of national emergency, Farm Security stands out as the agency most experienced in the work of building houses quickly and cheaply.”\textsuperscript{46}

The Tennessee Valley Authority (TVA) also made significant contributions to the advancement of housing technologies and construction processes during the 1930s. Housing thousands of construction workers at numerous project sites presented a challenge that had to be met quickly. In 1934 TVA architects began developing sectional housing that could be transported by overland trucking. Using wood frame construction, the houses were prefabricated to a high degree of finish in the factory, including all mechanical systems and even such minor components as light bulbs and screens. Sections were bolted together at the erection site and prepared for habitation in as little as four hours. The reduction of site labor resulting from the high level of factory fabrication saved the TVA millions of dollars and provided a lesson in the potential of full factory prefabrication that was not lost on private industry. Prefabricators looking to bring the advantages of sectional housing to the middle-class marketplace found the TVA’s experience invaluable. The development of the
mobile home industry and subsequent advancements in modular housing can be traced to the TVA’s housing program.47

Two other agencies of the federal government provided essential assistance to the development of prefabricated housing technologies during the depression era. The U.S. Forest Products Laboratory of the Department of Agriculture was instrumental in advancing stressed-skin wood panel construction. Researching component materials such as glues and plywoods, assessing the performance of stressed-skin panels across a variety of environmental conditions, and investigating potential long-term problems of the system provided prospective manufacturers with essential data. The industry readily embraced this type of public subsidy, since capital-starved startup firms could not afford the type of research and development expertise offered by the Laboratory.48

The National Bureau of Standards also provided essential technological assistance and organization to the industry. In 1937 the Bureau began a program to assess various building materials and structural systems likely to assist the development of low-cost housing. Performance testing in the laboratory and in the field aided the development of commercial standards and “simplified practice recommendations” for prefabricated as well as traditional construction. Of particular importance was research into the performance of prefabricated components and systems, which aided the struggle to reform antiquated building codes. Building codes were most commonly based on the specification of certain materials rather than the performance of overall systems. Countless local variations presented a significant barrier to prefabrication, especially since local codes were designed to favor certain materials and construction practices. Specification codes precluded the development and implementation of alternative materials and processes deemed threatening to traditional practice. The Bureau’s work lent credibility to calls for code reform from the prefabricated housing industry as it began a long struggle to challenge the economic, political, and legal protection afforded traditional residential construction.49

Savvy builders throughout the nation took careful note of the emphasis on production efficiency, economies of scale, and technological innovation brought to the forefront by the federal government’s involvement in housing. However, what caught their attention was not the opportunity to construct private developments for the poorest third of the nation, but the prospect of applying these managerial and productive technologies to the middle-class market where profit margins would be far more attractive. Private interests now had a blueprint for large-scale suburban development, the FHA to stabilize the credit system by underwriting the speculative risk, and a powerful ideological argument in promoting home ownership.

Yet the housing industry was not publicly appreciative. It continued to perceive governmental involvement in the housing market as potential competition and further evidence of the “creeping socialism” of the New Deal. It was a virulent disease,
they argued, a first step in the socialization of the country and a threat to all sectors of the industry. “We do not concede the need or the right of the federal government . . . to enter the housing field by building, owning, or operating permanent housing projects,” stated Joseph Merrion of the National Association of Home Builders. This stance was not new, nor would it change in the coming years.

The battle over public and private housing during the 1930s set the stage for decades of controversy. Yet it was an exciting time for housing reformers and the industry in general. An activist government, advances in production technologies, and an industry eager for recovery brought constant energy to the field. Indeed, the Progressive Era looked static compared with the vibrancy of the New Deal. Innovative public projects as well as advancements by private interests set the stage for progress unimaginable in previous eras. Industrialized building seemed to come of age just as American society stood ready to embrace new ideas and approaches to the ever present housing problem.

A Systematic State of Mind

Government and industry grew increasingly interested in prefabricated building systems as depression conditions worsened. Statistics revealed the shocking truth that only 20 percent of American families in the mid-1930s could afford even a “low-end” single-family house costing around $4,000. As the government could not possibly close the gap with public housing initiatives, facilitating the development of productive technologies and pressing industry where possible to adopt them in the field seemed a reasonable approach. Encouraging other depression-crippled industries to consider housing applications for their products also fit into the administration’s recovery strategy. For example, with the steel industry operating at severely diminished capacity, developing housing applications for steel products, such as framing and roofing systems, or pursuing the development of all-steel housing, presented intriguing market possibilities.

The New Deal intended to “jump start” industry and expand opportunities for greater numbers of Americans to become active consumers. “Get Building Going” became a rallying cry of the administration, and industrialized building seemed an attractive element of the greater pump-priming efforts of New Deal economic policy. The challenge to the housing industry was clear: could it live up to expectations for more affordable housing through greater production efficiency? Expectations nurtured by housing reformers—industry pioneers like Bemis, visionaries like Fuller, and social critics like Mumford—coupled with an activist government focused on housing issues, now assumed a more concrete form in the public mind.
During the 1930s a number of technologies matured sufficiently to merit serious consideration for use in industrialized building systems. Lumber manufacturers developed better forms of plywood and experimented with “sandwich” systems known as stressed-skin panels, which combined framing, interior and exterior walls, and insulation into one unit. Closely related was the development of wallboard, which was intended to replace labor-intensive lath and plaster construction. Wallboards made from such materials as wood pulp, gypsum, newsprint, plant fibers, and asbestos promised to revolutionize interior finishing and also to serve as important components in sandwich construction modules. Prefabrication using wood and wood-related products garnered much attention from architects and building firms since these materials were familiar to the trade as well as amenable to their toolboxes.52

Other materials such as steel and concrete, though more radical in nature, also gained widespread attention due to their inherent flexibility and durability. Better quality steel and the availability of sheet steel opened up new opportunities for specialized fabrication. Improved alloys also produced lighter steel without reducing tensile strength, which would become an important factor in introducing load-bearing steel wall units in prefabricated designs. Residential construction with concrete had also benefited from technological advances. Improved mixes, especially the use of lightweight aggregates, and advanced processes for pouring and forming, gave greater dimension to concrete as a material suitable for mass-produced housing. Although both materials had significant limitations, development and experimentation continued due to the productive flexibility and potential economies inherent in large-scale application.53

The architectural profession watched the development of alternative housing products and construction processes closely and played an important role in mediating new technologies with traditional approaches to housing and the influences of communitarian thinking. Interest in prefabrication was widespread in the architectural profession, and it embraced the economic and social challenges of housing technologies with great vigor and much insight. Many prominent architects believed that without the guiding hand of the profession, industry would seek to impose systems of prefabrication that emphasized production efficiency at the expense of design flexibility and environmental and community contexts. Yet they remained fascinated by the potential benefits of industrialized housing and sought to exert influence over the conception and implementation of housing technologies in public and private spheres.

Walter Gropius, a German architect of Bauhaus fame who immigrated to the United States in 1937, reflected upon the tension between production efficiency through standardization and the individualistic character of American housing. Gropius embraced standardization, but warned of its impact on self-expression. He
advocated a flexible system of prefabrication that would capitalize on industrial processes yet satisfy the vagaries of personal taste and fluctuating fashions of the American consumer. Like his colleague Le Corbusier, Gropius saw the house as a “machine for living” and sought design systems that achieved “uniformity in detail and variety in the general effect.” Like Bemis and his “cubical modular” system, Gropius wrestled with the question of how best to design differential styles with standardized components. The art of the architect and the science of production would intersect to produce industrialized housing that was not only affordable but contextually appropriate.54

“Prefabrication needs the architect,” implored architect Miles Colean, and indeed the best and the brightest of the profession such as Frank Lloyd Wright, Richard Neutra, George Frederick Keck, Carl Koch, and a host of others advanced prefabricated designs and significantly influenced the progress of the “movement” in the coming decades. The influence of a new generation of architects and housing engineers who attained professional maturity in the depression era also spurred interest in prefabrication and brought the enthusiasm and energy of youthful ambition to the field. Inspired by a creative freedom implicit in the design process, anxious to tackle large-scale problems, and convinced of the primacy of the architectural profession in the struggle to improve American housing, these individuals and firms explored new territory on all levels of the design process, from overall purpose to the use of nontraditional materials to physical setting. The involvement of noted architects also garnered considerable media attention and sparked the public mind with a long procession of “houses of the future.” While this proved a double-edged sword in heightening public expectations, it also fueled a more sophisticated and realistic assessment of the promise and limits of housing technologies.55

In 1935 the editor of *House and Garden* magazine sponsored a Symposium on Prefabrication. One of the first venues to provide a forum for discussion of the myriad aspects of industrialized housing, it drew participants from various fields, including architects, engineers, businessmen, and representatives from philanthropic organizations involved in housing technologies. Conferences and round tables of various types appeared more frequently in subsequent years and served as important places for debate, discussion, and cross-pollination of ideas and people from government and industry.56

Conferences sparked media interest in prefabrication as well, and the majority of articles cast a positive and hopeful tone. Seemingly any new idea about mass-produced housing received serious consideration regardless of its technical or commercial feasibility. Feeding the nation’s desire for solutions to the housing crisis, the media supported prefabrication but often misled the public about the immediacy and cost impact of specific designs. As one industry observer said, the press “produced words
much faster than prefabrication did houses.” Overall, though, media attention was extremely beneficial to the progress of prefabrication.57

The scope of serious efforts to advance housing technologies encompassed a wide range of public and private institutions and entities during the 1930s. Nonprofit foundations, universities, government agencies, and commercial firms large and small made significant contributions to the progress of industrialized building. For example, the Housing Research Division of the John B. Pierce Foundation continued the contributions of the nonprofit sector to housing research. Building upon the work of the Bemis Foundation and the Russell Sage Foundation, the Pierce Foundation focused on cost-efficient materials and structural systems. Founded in 1924 to foster research and development in heating, ventilation, and sanitary systems, as well as to educate the public and chronicle industry progress, the Pierce Foundation investigated a wide range of processes and materials. By the early 1930s its efforts focused on construction materials that could provide enclosure as well as structural integrity. Using a combination of steel framing and a hydro-calcium silicate composite known as Microporite, by mid-decade the Foundation had constructed several promising prototypes.58

Partnerships between universities and building firms also aided the development of prefabricated technologies. Purdue University founded the Housing Research Project in 1935 to investigate new designs for low-cost housing. Detailed engineering studies of overall designs and various subcomponent systems provided industry with valuable data and influenced future designs. Universities and foundations also played important roles in the consideration of housing issues beyond physical structure. Within the context of serious research, these institutions brought a value-added proposition to the movement that industry found difficult to accomplish. The fragmentation of the housing industry and the many disciplines involved in construction processes often prevented due consideration of factors external to production. With commercial pressures removed, a more holistic approach to prefabrication could emerge.59

The commercial promise of mass-produced housing drove both entrepreneurs and established firms toward more efficient systems during the 1930s. Investment increased as the media lavished attention on new innovations and industry personalities. By the end of the decade, approximately forty U.S. firms manufactured prefabricated houses. However, they contributed less than 1 percent of the single-family houses built between 1935 and 1940.60 The industry was still immature, highly speculative, and, in terms of materials used, somewhat conservative. The industry also focused far more on production than distribution and marketing, thus leaving the question of how best to integrate all facets of industrialized building for future endeavors.

Because the development and implementation of prefabricated housing was capital intensive, it is not surprising that large firms took important steps toward com-
mmercialization. Interested in the forward integration of current product lines, large firms hoped that mass-produced housing could create a new market and fuel corporate recovery. They experimented with housing on various levels, from developing prefabricated mechanical systems to designing entire houses and communities. Corporations such as U.S. Steel, Johns-Manville, Pullman Standard, Celotex, U.S. Gypsum, American Rolling Mill (ARMCO), Bethlehem Steel, and General Electric pursued interest in prefabrication. Big business advanced the industry in several important ways. The advent of managerial specialization and organizational theory then blossoming throughout American industry provided important tools to define the scope and scale of production and distribution problems facing the nascent prefabricated housing industry. Large firms provided the capital infusion and human resources necessary to nurture technological advancement. Engineers were particularly important for the advancement of production standards and quality control. Integrative thinking and strategic analysis were difficult concepts for the housing industry. Prefabricated housing required the mastery of industrial systems and a keen understanding of market behavior to achieve success. The participation of successful large firms helped the industry attain a greater understanding of its potential and a clearer picture of the obstacles inhibiting its further development.61

However, big business did not have the solution to the transformation of the American housing system. Industrializing the housing industry was a process far exceeding the capacity of any single institution. Yet several large-scale ventures during the 1930s demonstrated the influences of systematic thinking and foreshadowed future trends. General Houses, Inc., organized in 1932 by Howard T. Fisher, advanced the idea of using prefabricated standardized components for constructing custom-built houses. The significance of General Houses was its hybrid approach. Modeled after the automobile industry, it organized a system of prefabrication that employed external vendors to supply standardized components, which it then assembled under the General Houses brand name. Unlike the automobile industry, however, General Houses had no factory. Instead, suppliers shipped parts to regional warehouses for coordination, and the company then shipped the component packages to construction sites.62

General Houses employed a steel framing system with sandwich panels of asbestos, cement, insulation, and plywood for the interior walls. Prices for the house in 1934, not including freight and the cost of a lot, ranged from $4,500 for a four-room design to $8,550 for a six-room, two-story model with attached garage. Suppliers included Bethlehem Steel, Weyerhaeuser Timber, and Pullman Standard. Although General Houses largely avoided technical problems in the manufacturing and distribution process, financial and marketing difficulties prevented the firm from achieving the full benefits of its business strategy. Foreshadowing key barriers for the industry, General Houses faced opposition from the building trades, where the use of prefab-
ricated components was perceived as a threat to traditional craftsmanship, and from financial institutions, which had no valuation models for prefabricated housing and thus shied away from writing mortgages. Although it achieved limited success in the private market, General Houses became one of the first prefabricated housing firms to participate in the defense housing program where risks of unfavorable labor relations and unpredictable financial valuations were assumed by the government.

Another venture that influenced the development of the industry was Houses, Inc., a corporation founded by construction engineer Foster Gunnison in 1934 at the request of Owen D. Young, chairman of General Electric. Gunnison and Young did not intend to produce houses but envisioned the company as a clearing house, liaison, and facilitator for the development of new prefabricated systems. With financial backing from a number of building-product firms, Houses, Inc. proposed to conduct research, raise capital, and provide technical and managerial assistance. One of the most notable ventures of Houses, Inc. was the “American Motohome,” designed by American Houses, Inc. The Motohome, a steel frame and asbestos panel house, incorporated mechanical systems developed from Pierce Foundation research and innovations at General Electric. The debut of the Motohome in April 1935 reflected the keen interest of the press and the public in prefabricated housing and established a pattern for product introductions followed by subsequent firms. The “unveiling” of the Motohome took place in Wanamaker’s department store in New York City, where President Roosevelt’s mother, Sara, officially opened the exhibition. During the next six months nearly 500,000 people toured “the prefabricated house that comes complete with food in the kitchen.” Model homes erected in nearby Westchester County also drew extensive press coverage and thousands of visitors. Company advertising illustrated “Motohome Communities” and depicted fleets of trucks carrying this technological wonder from factory to home site.

Houses, Inc. invested in other designs, but disputes among company management and strained investor relations eventually doomed the enterprise. Gunnison left the company in 1935 to start his own prefabricated housing firm, and a year later General Electric abandoned its interest, forcing Houses, Inc. to declare bankruptcy. Yet two firms associated with Houses, Inc. continued to pioneer prefabricated designs and refine business models. Although American Houses abandoned production of the Motohome due to low sales, it continued to develop prefabricated technologies for the low-cost market. Focusing on wood rather than steel, American Houses was able to pursue partnerships with project builders in an effort to build sales volume. The move to wood prefabrication made its product more palatable to consumers and required less sophisticated production equipment. Better able to rationalize its productive investment, American Houses became an important contributor to the defense housing program during World War II.
Additionally, Foster Gunnison parlayed his experiences with Houses, Inc. into one of the most important prefabricated housing firms in the nation. Gunnison Homes, Inc. built stressed-skin plywood panel homes for the low-cost market and achieved notoriety as an innovator in production methods and marketing techniques. A master promoter and engaging personality, Gunnison understood the marketing challenges faced by prefabricated housing firms and devised ideas to encourage acceptance of his product. One idea, the “Gunnison Village Plan,” used FHA-insured mortgages to encourage local project builders to acquire land, erect a community of Gunnison houses, and provide amenities such as parks, playgrounds, and community centers. His attempt to integrate prefabrication with conventional merchant building proved too risky for prospective builders during the depression, so the company developed a marketing and distribution system using retail dealers selling to individual customers. The latter system spread the risk of acceptance over a wider range of potential customers, many of whom might like the house but hesitate to live in a “prefabricated community.”

Gunnison’s focus on marketing represented an important step for the industry, and the Gunnison Village Plan represented a keen understanding of the problems of integrating technologically advanced production with established systems for residential development. Although production innovation was important, prefabricators who ignored the realities of the real estate industry were likely to fail. They might have the best house in the nation, but they would have nowhere to put it. As Gunnison’s case illustrates, the franchise dealer system served as an interim solution to the marketing and distribution dilemma. Influenced by the effectiveness of the dealer system in the automobile industry, prefabricators believed that such a system would carry them through the initial phase of development until widespread acceptance in the financial industry would pave the way for large-scale development projects and partnerships with merchant builders.

While the heirs of Houses, Inc. found success using wood, other firms remained convinced that steel offered the most flexible and potentially efficient material for prefabricated housing. In 1932 the Ferro Enamel Corporation and ARMCO Steel introduced the all-steel ARMCO-Ferro House. A frameless design, the house employed a chassis system of large porcelain-enamedel steel panels that bore the weight of the structure. Enamedel-steel roofing shingles complemented the wall panels. Even interior features such as baseboards, lighting fixtures, switch plates, and flooring were fabricated from porcelain-enamedel steel. Built to demonstrate the potential of steel housing, the press proclaimed the ARMCO-Ferro house the “highlight of the exhibit of all ‘homes of the future’” at the 1933 Century of Progress Exhibition in Chicago.

Although significant technological challenges remained, a handful of steel framing and wall panel systems became commercially available by the late 1930s. Issues
of condensation and corrosion continued to plague designers. While steel houses had significant thermal benefits, engineering the proper balance of thermal conductivity and thermal retention proved a difficult task. The higher cost of metal-fabricating equipment over wood also meant that steel-prefabricating companies would have higher up-front costs and larger investments in productive infrastructure. Recouping this investment required a reliable marketing and distribution system, which was further complicated by the uniqueness of steel housing. Firms often attempted to conform their designs to standard vernacular styles such as the ranch house or Cape Cod in an effort to increase market acceptance and deemphasize the “radical” nature of the house. Indeed, steel prefabricators trumpeted the “dual benefits” of attractive design and maintenance-free construction. The potential benefits of steel were alluring since it readily lent itself to large-scale fabrication. As a housing material, it provided product differentiation in terms of ease of maintenance, precision engineering, and permanence. Differentiation was a double-edged sword, however, since being different could be as much a problem as a benefit. Nevertheless, interest in steel prefabrication housing remained strong even though significant technological and marketing challenges remained.

Housing expert and industry observer Burnham Kelly noted that prefabrication attained the status of a “movement” during the 1930s. Indeed the general calls for improved technology and building processes of prior eras were given form and expression during the decade. Interest in government, industry, and the nonprofit sectors indicated that progress toward a more productive and rational system of housing was conceivably within reach. Yet the movement remained embryonic and uncoordinated. A wide range of interests recognized its potential significance but lacked the ability to integrate individual effort into a coherent whole. The enormity and complexity of America’s housing problems made it difficult to assess the actual contribution that prefabrication could make. Additional time and experimentation would be needed, but the interest and energy of the movement demonstrated significant potential.

Ironically, the technological progress of the 1930s in some ways complicated the effort to define solutions. It created new possibilities but heightened the potential disruption of the status quo. Did the entrenched interests of the housing industry have nothing to fear but fear itself? Or would the prospect of new technologies replace the old power structure? Resting on decades of economic, political, and social tradition, the inherent irrationality and particularistic character of the housing industry could not be changed overnight. It is not surprising, then, that those who championed the transformational potential of prefabricated housing, whether in the name of profit, industrial recovery, or social benefit, encountered reluctance and resistance. The movement had achieved a certain momentum, yet its final destination remained unclear.
What was clear by the end of the 1930s, however, was the convergence of technologies toward new systems for low-cost residential construction. The development of new building components and materials fueled interest in developing overall systems that employed new products and processes. Working with a variety of materials, architects, engineers, builders, and manufacturers sought to understand how advancing housing technologies could be systematized to serve the mass market. Both government and industry had been active participants in the development of new technologies and processes, and in the coming years another type of convergence would emerge in the alignment of interests between industry and the federal government in the furtherance of housing technologies to serve the goal of providing affordable single-family housing in suburban settings to the middle-class market.

Two productive strategies emerged, each with important market and policy implications. One was the process of site prefabrication, a system that used an “outdoor assembly line” to construct single-family suburban subdivisions. The strict organization of labor and materials on a large scale made possible timely and cost-efficient construction. Specialized crews would rotate from site to site in a preset pattern. Once the foundation crew was finished, the framing crew took over, and the foundation crew moved on to the next site. Houses rose in a carefully orchestrated concert of production on street after street until the entire subdivision was finished. Site prefabrication balanced the requirements of traditional construction methods while imposing aspects of rationalized production. It was a flexible system that held the promise of providing average American families with decent suburban housing at an affordable cost. The power of uniting community planning with production efficiency came as close as anything had in the past to putting affordable single-family suburban housing within reach of the mass market.

The other approach was factory prefabrication, where an entire house was manufactured in a single factory for delivery to an assembly site. A far more challenging and potentially disruptive strategy, it held the promise of providing the full benefits of industrialized construction. Factory-made housing offered the greatest amount of control over the finished product since its sole focus was on the house. The abandonment of traditional construction processes meant that all aspects of a house could be subject to rigorous engineering on a systematic basis. Analysis, regimentation, and standardization were applied equally to every component of the house from floor to ceiling. The opportunity to control all aspects of the manufacturing process promised at last to bring the production and pricing achievements of the automotive industry to the housing market.

Operated on a large scale, factory-made housing offered a number of economic attractions. Unaffected by climatic or seasonal conditions, cost efficiencies inherent in continuous production could be realized. Further efficiency gained by pricing lever-
age on suppliers and the ability to influence supply chain quality control potentially gave factory-made housing competitive advantages in the marketplace. Indeed, at its most flexible, factory production could respond quickly to market conditions by introducing new features or new models based on market demand or preference. As in the automotive industry, the segmentation of product line to serve multiple price points meant that a firm could provide an entry-level house and retain loyalty as customers became more affluent and desired larger houses with more amenities.

Yet the apparent advantages and potential of factory-made housing came with enormous challenges. Capitalization costs would be vast. Attracting investors to an unproven and embryonic industry even in the best of economic times would require skillful planning and influential financial connections. Firms needed to “start big” to achieve production economies, and although there were plenty of examples of this, there were no models for the marketing and distribution of houses on a nationwide basis. Marketing and distribution structures had to support large-scale production as the franchised-dealer structure did in the automotive industry. Yet there was no evidence that the franchised-dealer structure—or any other distribution model—would work in the housing industry.

The key dilemma was that the separation of the house from the lot enabled the refinement of productive expertise but at the same time threatened to derail its benefits. The residential construction industry was based on a balance of production and realty interests spread across a variety of commercial and governmental entities. The completed house on a lot represented an accumulation of stakeholders, each accounting for only a small fraction of the total value of the property. Each stakeholder had an interest in increasing the economic value of its particular contribution with little regard to the whole. Prefabrication of any type, but especially factory-made housing, accumulated responsibility and influence over a greater proportion of the total value of the housing product. That any one entity could control a greater proportion of value opened up a world of possibilities. Unlike small builders or local developers, factory-made housing firms could justify expenses for research and development in the fabrication and assembly of the house itself and in the creation of nationwide marketing and distribution systems. As Burnham Kelly observed, “there has been no element in the house building industry with sufficient motivation and with sufficient power and means of control to initiate fundamental changes.” Large-scale factory-made housing might be able to capture a sufficient portion of the total value equation to implement systemic changes in the housing market.

The prospect of such a disruption, however, raised numerous issues. The private market remained wary of industrialized housing, largely because they were uncertain about the ultimate impact on their industry. Prefabricators thus found it difficult to predict where opposition would arise since so many different entrenched
constituencies were affected by new processes. A combination of active and passive resistance emerged throughout the industry. Passive resistance was far more dangerous to the development of industrialized housing since the prefabricated housing industry had to change the system to become truly effective, while entrenched interests had only to maintain the status quo. The entire American system of housing was designed to protect these interests. Financing practices, building codes, labor systems, land tenure, and real estate sales practices presented numerous opportunities to impede the development of industrialized housing. By the end of the 1930s, it was clear that the private housing market would not and could not provide the energy and resources to drive the development of industrialized housing. A different type of convergence would be necessary.

The unprecedented involvement of the federal government in the housing market during the depression era, and particularly its interest in housing technologies, fueled a movement toward an alignment of interests between the federal government and the prefabricated housing industry in the furtherance of public policy goals. Faced with the continued intransigence of the private housing market, the federal government was increasingly willing to support prefabricated housing to achieve societal goals—first for defense housing during World War II, then as a potential solution to providing single-family suburban-based housing for the postwar middle-class market. The embrace of productive technology in the housing industry was a logical extension of government support for productive technologies in defense-related sectors and drew heavily on the paradigm of government support to industry that transformed the American economy from depression era malaise to the world’s premier economic power in a few short years.

With war clouds on the horizon, supporters of industrialized housing saw an opportunity to advance the industry as a potentially powerful weapon in the cause of housing reform. After years of speculation and promise, the technology and the will to invest in it appeared likely to converge during the war years. There were many positive signs that prefabrication would change the housing system for the better. The interest of big business was significant in itself, for it demonstrated the viability of the industrializing paradigm. Even though initial efforts had been unremarkable and driven by the desperation of the depression, technical advancements were made and a greater understanding of systems engineering had been achieved. Greater appreciation of the entire range of implications for prefabrication was also evident, especially the importance of marketing, promotion, distribution, and setting. Using the factory system to produce housing for the American mass market seemed innately rational. How best to achieve it was not known, yet in the crucible of wartime crisis innovative and influential approaches would emerge as the government, the housing industry, and various reform constituencies sought to further opportunities for better housing.