4.0 DESIGN TRENDS IN OHIO, 1940-1970

This section focuses on recent past architectural resources found within the different regions of Ohio. Preservationists have debated ways to differentiate between architectural style and resource type when categorizing resources of the recent past (1940-1970). This historic context attempts to clarify methods for doing so. Additionally, the discussion focuses on the construction methods and materials of the recent past, as this period is distinguished by rapid innovations and adoption of new approaches. Because housing comprised a substantial portion of recent past design trends, suburban residential land development practices are discussed as well, along with the landscape design methods typically used in suburban neighborhoods. Throughout, some of Ohio's major architects, planners, and developers are described, along with representative examples of landmark buildings and developments.

Gray & Pape identified more than one thousand buildings constructed between 1945 and 1970 in Ohio. Consequently, the following discussion provides only an overview of the resource types, architectural styles, and architects, developers, and planners important to Ohio's recent past built environment. Listings of properties identified by Gray & Pape are in Appendices C, D, and E. In Appendix C, Gray & Pape provides a list of 1,004 architects and/or architect-designed Ohio resources from the recent past (ca. 1940-1970) that were identified during the course of the current project. The list is far from comprehensive but offers a foundation for future research efforts. Appendix D is a compilation of 256 recent past architectural resources that Gray & Pape found listed in local architectural guides and inventories, included on various Internet sites, and identified by way of this project's online survey. Gray & Pape consulted every issue of *Ohio Architect* magazine published between 1954 and 1970 to compile a list of 297 Ohio buildings that warranted editorial mention and/or that received an award for design; these findings are presented in Appendix E. Hundreds of architects practiced in Ohio during the 1950s and 1960s. The American Institute of Architects (AIA) historical directories of American architects practicing in Ohio in 1956, 1962, and 1972 are provided in Appendix G, along with rosters of architects practicing in Ohio as published in 1954 and 1964 by *Ohio Architect*.

An important historical pattern that emerged during research for this period was the homogenization that occurred across Ohio's regions during the mid-twentieth century. The regions historically exhibited considerable cultural, economic, and socioeconomic diversity, and these characteristics were evident in the pre-1940 built environment. Forces of standardization, however, characterized the economic prosperity and industrial might that propelled Ohio through the 1950s and 1960s. As has been described in preceding sections, these forces wrought a tremendous change in leveling certain important aspects of Ohio's regional diversity, particularly with regard to its architecture and construction methods, as well as social, demographic, and socioeconomic characteristics.

4.1 Overview of the Post-World War II Building Industry

The onset of World War II marked a sea change in the evolution of the American construction and building industries, largely as a result of massive government intervention in manufacturing activities. The War Production Board (WPB), formed in 1941, had the authority to prohibit any construction work unrelated to the war effort and to direct all critical materials to defense industries. It originally operated as a highly centralized organization. Their first objectives were to expand mining facilities and plant capacity, and to convert existing plants to manufacture of war materiel. The WPB allocated materials and supplies on a quarterly basis to the military and various domestic agencies, such as the War Food Administration. In December 1942, the WPB assumed responsibility for scheduling various production programs to maintain balance among competing needs. Production and allocation of critical components also were scheduled (Jester 1995:41; Office of War Information 1945:111).

In September 1943, the WPB began to decentralize operations to its regional offices and to relax controls over small-scale users of materials. The WPB maintained regional and district offices in Ohio at 1300 Union Commerce Building, Cleveland; 604 Central Tower, Akron; 34 E. Fourth Street, Cincinnati; 145 N. High Street, Columbus; 129 S. Ludlow Street, Dayton; and 833 Security Bank Building, Toledo (Office of War Information 1945:113). The regional offices concerned themselves with production quotas, factory operations, labor relations, defense-related work, war bond drives, plant security, factory safety, labor/management grievances, and salvage and recycling efforts (Ohio Historical Society 2010c).

By 1944, attention turned to planning for resumption of civilian production after the war's end. In June 1944, four "reconversion orders" authorized more widespread use of aluminum, construction of experimental models, purchase of machine tools, and limited resumption of civilian production in locales with available manpower and facilities. By late 1944, detailed plans for relaxation of production controls over specific industries had been developed. The WPB was abolished in November 1945 and its functions transferred to the Civilian Production Administration as the transition to a peacetime footing commenced. This and other agencies were combined in 1946 to form the Office of Temporary Controls. A year later, the Department of Commerce took over that office's few remaining responsibilities and government controls on critical materials ceased (Office of War Information 1945:111-112; Ohio Historical Society 2010c).

The wartime shortages of building supplies, such as wood, rubber, steel, iron, and aluminum, led wartime contractors to make adjustments to typical building practices. Concrete was poured without the typical amount of reinforcement, fiberglass was used instead of asbestos, and new and improved materials such as glued laminated timber and plywood were used rather than solid wood (Jester 1995:41).

While few residential buildings were being constructed during the war, buildings related to the war effort were in high demand. Facilities to assemble or house aircraft, ships, tanks, guns, munitions, and supplies were constructed at a rapid pace. The development of these war-related plants and facilities also led to the expansion and creation of facilities to train military personnel; as a result, small cities of camps and cantonments were constructed using new building materials, and were connected by miles of roads lined with newly constructed barracks, mess halls, and hospitals. All of these were interconnected with new utility systems such as electrical systems, heat, water, and sewage (Jester 1995:41). An example of this type of plant in Ohio was the Permold Company aluminum casting plant in Medina, which also was associated with the aforementioned Medfair Housing complex.

Following the war, traditional building materials such as brick and stone remained in short supply, but newer materials that had been developed and improved during the war were readily available. The most widely used of these materials included gypsum board (or wallboard) and extruded aluminum. Many of the buildings constructed during the war utilized gypsum board instead of metal and wooden lath as a base. Wallboard, which came in prefabricated sheets, was easier to install and required the use of no metal or steel. Manufacturers, most notably National Gypsum and United States Gypsum, benefited greatly as drywall transformed interior construction methods. In the process, traditional plasterers began to be squeezed out. More labor intensive and time consuming, plaster work was ill-suited to the emphasis on speed and efficiency that postwar builders held at a premium. Although many 1940s and 1950s housing developments still featured plastered interior walls, commercial, industrial, and other building types soon featured only gypsum. By the early 1960s, the vast majority of residential developments also had adopted this material (Jester 1995:42).

As for aluminum, while it had been available during the 1920s and 1930s, its limited availability and cost kept it from widespread use. During the war years, however, companies began producing laminates of two aluminum alloys, in which an exterior coating clad the core material to provide corrosion protection. Extensive use in aircraft construction led to greatly increased production and a postwar surplus. Aluminum manufactures sought new markets for using aluminum and found them in the construction industry for use in doors, windows, and siding (Jester 1995:42).

After a brief postwar recession, the U.S. economy and building production industry began to expand. Using their wartime savings, along with the many financial benefits available to veterans, consumers had access to considerable income. As previously noted, extensive transportation improvement programs led to a boom in suburban development. Between 1946 and 1969, construction expenditures in the U.S. grew almost every single year (Jester 1995:42). The construction materials of choice for many government-supported projects were concrete and steel. Research and development of pre-stressed concrete and steel expanded rapidly following World War II, drastically reducing the construction costs of multi-story buildings, which were much needed in a booming construction market (Trachtenberg and Hyman 1986:544-545). The use of pre-stressed concrete became so widespread that carpenters soon found they could make more money building formworks for panel walls and decks than working on traditional building projects (Jester 1995:42).

Meanwhile, the experimental architecture of the period from 1950 to 1970 depended primarily on advancements in structural and mechanical systems. New building materials and innovations, such as prestressed concrete, glazed curtain walls, porcelain coated glass, sealants, and fiberglass, allowed architects and engineers to enclose spaces with cantilevers, utilize hung roofs, create geodesic domes shapes and other forms, and control their interior climates with better heating and air conditioning systems. These combined to create almost unlimited possibilities in architectural design (Jester 1995:42).

4.2 Suburban Land Development Practices

Suburban land development historically began with a parcel of undeveloped land; typically, the land formerly was used for agriculture. In some areas, marginal lands, such as wetlands, were drained and filled to create buildable land. Woodlands also were cleared to make way for housing developments. As noted in Section 3.2.3, land near the outskirts of cities was targeted for suburban development, with growth typically taking place in concentric rings or spokes around an urban core. Two types of residential subdivisions prevailed. In the first, the tract would be subdivided into individual lots for detached, single family houses. Each house would be surrounded by a private yard. The second type of subdivision featured groups of attached and semi-detached apartment buildings arranged in a cluster, along with common areas, such as walkways, gardens, lawns, parking, and playgrounds. Infrastructure, such as streets, drainage, and water, sewer, electricity, gas, and telephone lines, would be constructed to serve both types of subdivisions (Auman et al. 2004:3/3).

By 1945, a fifteen-year dearth of new home construction, population growth, and six million returning veterans, combined to create unprecedented housing demand in the United States. To meet the demand, Federal housing policies provided developers with numerous incentives for building suburban residential subdivisions. Lessons learned during the war years about mass production, standardization, prefabrication, and economy of scale informed the construction practices they adopted and made possible construction rates of unprecedented speed and scale. Nationally from 1944 to 1946, single-family housing starts skyrocketed from 114,000 to 937,000. The trajectory of growth continued for the remainder of the decade, culminating in 1950 with construction of a record-high 1,692,000 new single-family houses (Auman et al. 2004:3/10; Ames and McClelland 2002:65).

From the 1940s through the 1960s, large-scale subdivisions encircled major metropolitan areas as well as countless smaller cities and towns. Although later reviled by critics as wastelands, these subdivisions represent both an unprecedented building boom and massive efforts on the part of public and private organizations to create a single-family house that a majority of Americans could afford (Ames and McClelland 2002:66). The living conditions and lifestyles for Americans of all walks of life were transformed during this period, and the consequences of this historic pattern of development continue to play out to the present day.

4.2.1 Influences on Post-World War II Design Trends for Suburban Houses

As previously noted, the design principles used for postwar residential subdivisions actually had roots extending back many decades. The long-held belief that a detached dwelling on its own lot represented a safe, healthy setting in which to raise a family continued to shape overall suburban development patterns. Lower construction costs through use of balloon-frame construction and increasingly standardized, mass-produced, and prefabricated building components exercised a major influence by making home purchases more affordable (Ames and McClelland 2002:61; Auman et al. 2004:3/8).

An early example in Ohio of a housing development using standardized and prefabricated materials was the work of the Hobart Welded Steel Company. Located in Troy, Hobart Circle consisted of 10 welded steel houses built between 1932 and 1941. One of the houses has since been demolished. The all-steel houses featured welded steel floors, exterior and interior walls, ceilings, roofs, and kitchen and bath cabinets. Each house was prefabricated at the firm's location on West Main Street in Troy and moved to its site by flatbed truck. Although the company used non-traditional building materials and methods, many of the houses displayed traditional architectural styles, such as Georgian Revival, Dutch Colonial, and Cape Cod. Hobart Circle was listed in the NRHP in 1989 for its architectural and engineering significance (Cornelisse 1989).

At 172 S. Ridge Avenue in Troy, the E. A. Hobart House, built in 1940, was another example of the steel company's work. Larger than other Hobart houses and rendered in the Art Moderne style, the house was designed by E.A. Hobart and individually listed in the NRHP in 1989 for its architectural and engineering significance. The Hobart Welded Steel House Company was associated with the Hobart Brothers Manufacturing Company, which produced welding equipment, generators, and other industrial equipment (Cornelisse 1989). Now known as Hobart Brothers Company, the firm was founded in 1917 by Charles Clarence Hobart. It remained in the Hobart family until 1996, when Illinois Tool Works acquired the firm (Hobart Brothers 2010).

During the 1930s, in addition to its aforementioned regulatory powers over home financing, the FHA's publications of housing and subdivision standards exerted enormous influence on postwar home building practices. The FHA published its first set of approved house designs in 1936, *Principles of Planning Small Houses*, and updated them periodically. Circulars, such as *Property Standards*, *Recent Developments in Building Construction*, and *Modern Housing*, addressed issues of prefabrication methods and materials, housing standards, and principles of design (Ames and McClelland 2002:61; Auman et al. 2004:3/8).

In 1936, the first five FHA house types were designed to meet basic housing needs and also provide at least a small array of amenities. Illustrated by floor plans and simple elevations, each type featured at least two bedrooms, a living area, full bathroom, and kitchen. Builders could use variations in exterior building materials, stylistic ornamentation, and siting on the lot to create variety when building multiple examples of the same model. Although lacking picturesque features, the FHA models were designed to include modern appliances in the kitchen, as well as an integrated mechanical system in lieu of the traditional basement furnace. The smallest and simplest model, House Type A, measured 534 square feet (Plate B61). In the building industry, it became known as the "FHA minimum house" (Ames and McClelland 60-61). At 624 square feet, House B was a larger version of House A. Houses C and D each had two stories, with two upstairs bedrooms; House D also offered an attached garage. The largest model, House E, featured two stories and three bedrooms, and included a bit more exterior ornamentation than the other models (Ames and McClelland 2002:62). These house types are among the antecedents of the traditional house types such as the Cape Cod (see Section 4.4.8) that proliferated during the 1940s.

By 1940, the FHA had developed a new approach to designing model houses. The 1940 edition of *Planning Small Homes* introduced house designs that allowed for standardization as well as expandability and variability. With the "minimum house" serving as the core, new models arose by expanding the overall footprint and/or by adding rooms to form an L-plan or building on a basement level. Exterior treatments, ranging from gables, porches, roof types, sash patterns, chimneys, and veneers, also created variability. Builders also were to take into consideration environmental factors, such as orientation to sunlight and prevailing winds in siting the houses. The revised designs for larger models offered options for both central-hall and sidewall stair plans, built-in garages, and additional bedrooms (Ames and McClelland 2002:62).

During the postwar period, middle-class American domestic lifestyles became increasingly casual, particularly when compared to social customs of the 1900s and 1910s. Consequently, on the interior, floor plans were modified to emphasize and foster family interactions in the common area while maintaining privacy in the bedroom area (Auman et al. 2004:3/8).

4.2.1.1 Suburban Apartment Buildings

Section 207 of the National Housing Act of 1934 established the first national standards for rental housing and permitted federal insurance for privately financed rental housing projects for low- and middle-income tenants. The FHA oversaw rental housing in much the same way as owner-occupied housing. Within a year, the first privately developed, large-scale multiple-family project was under way in Arlington, Virginia. In the depressed housing market of the 1930s, many builders found multiple-family housing to be an attractive option. The economy of scale and use of standardized components in large projects also aided affordability. Consolidating mechanical systems and stacking like rooms (such as bathrooms) atop one another in multiple-story buildings were commonplace as well (Ames and McClelland 2002:30, 36, 49-50).

Multiple-family housing developers typically hired architects and landscape architects to plan their developments. These professionals were to assure that the designs were cost-effective and met the FHA's minimum guidelines. Developers preferred to build these projects in suburban locations, where neighborhood amenities offered additional lures to tenants. Land values in the suburbs also were more stable than in urban cores. As previously noted, however, many early twentieth-century suburban communities had a restricted amount of space available for multiple-family housing (Ames and McClelland 2002:50-51). Along with market-rate multiple-family housing for middle- and upper-income residents, the 1930s saw a push for construction of low-cost housing for low-income residents. In the Housing Act of 1937, Congress committed the federal government to building "decent, safe, and sanitary" housing for low-income working Americans. This legislation created a system of local public housing authorities that remains in place to the present day. Federal grants were made available to subsidize rents, but no funds were made available for maintenance and renovation of housing units. New Deal work relief programs, including the Works Progress Administration and Public Works Administration, constructed a number of public housing projects across the country. Cedar Apartments, Outhwaite Homes, and Lakeview Terrace in Cleveland were the first three projects to be contracted by the Federal Emergency Administration of Public Works. Cedar Apartments was the first public housing to be constructed in the country. Ground-breaking for Cedar Apartments was on June 17, 1935, followed shortly by the Outhwaite Homes project in October 1935 and Lakeview Terrace, November 1935. (Lauder 1971) By the end of World War II, however, private real estate interests were objecting to publicly subsidized housing, for fear that it would unfairly compete with their projects. Federal legislators responded with limits on construction expenditures, leading most public housing projects of the 1950s and later to be much more austere in their design and appearance to similarly scaled private housing project (Vogt 2003).

During the 1930s and 1940s, most multiple-family projects consisted of groups of two- and three-story buildings. This was true of public housing for low-income residents as well as market-rate housing for moderate- and middle-income residents. To appeal to tenants, a variety of floor plans would be offered in a range of square footages. In many instances, the buildings were arranged to fit the existing topography, while also relating to one another to evoke a sense of community. Exterior architectural treatments, such as staggered roof lines, cornices, fascia, and dentil friezes on complementary plans, and repetition of architectural embellishments, further unified the overall design (Ames and McClelland 2002:51, 63).

An example of a late 1930s public housing project was Laurel Homes in Cincinnati, bounded by Liberty, Linn, and John streets and Ezzard Charles Drive. Constructed by the federal Public Works Administration, the development featured 25 brick apartment buildings and 4 subsidiary brick buildings. Each flat-roofed building rose three to four stories in height. The arrangement of the buildings around courtyards, the pedestrian circulation network, and placement of parking lots conformed to the FHA's guidelines. (Gibbs 1987) Between 2000 and 2002 all but three buildings in Laurel Homes were demolished to make way for a new public housing project (City of Cincinnati 2010). Another example of a public project from the same period was English Woods, located on Cincinnati's west side near the inner-ring suburbs of Price Hill and Westwood. Built in 1942 as defense housing, the project consisted of slate-roofed, brick row houses, each two to three stories in height. A total of 82 buildings had 717 housing units. The hilltop site featured a band of trees that encircled the development, and parking lots were limited to the periphery (Vogt 2003). After decades of deferred maintenance, the project was closed in 2005 by the Cincinnati Metropolitan Housing Authority.

As it had done with single-family dwellings, the FHA began issuing design guidelines in 1940 for multiple-family dwellings to aid developers in creating projects that would qualify for FHA financing. All aspects of multiple family house design were included, such as interior floor plans, kitchen layouts, and placement of unit entries. In 1940, FHA architect Eugene H. Klaber developed a series of "unit plans," featured in FHA's monthly *Architectural Bulletin*, which guided market-rate rental housing construction through World War II. The landscape design guidelines included suggestions for plantings in common areas; sample site plans showing how buildings could be arranged to maximize privacy, sunlight, and fresh air; and separation of pedestrian walkways from streets (Ames and McClelland 2002:51, 63).

The FHA also eschewed grid patterns for mid-twentieth century multiple-family projects, much as it had for single-family neighborhoods. Apartment buildings were to be clustered in groups around courtyards, with pedestrian walks interspersing them, while parking lots and garages were confined to the perimeters of each cluster. Service alleys were eliminated and tenants were provided with designated areas, such as centralized trash locations, for their routine needs. In addition to playgrounds and common areas, some larger multiple-family developments included commercial space as well, such as small grocery stores, recreation centers, and doctors' offices (Ames and McClelland 2002:51).

By the 1950s, the influences of modernism began to be seen in both urban and suburban rental housing, and on projects for low-income public housing as well as market-rate housing. The FHA continued to guarantee mortgages for privately financed developments that met its minimum standards, thus allowing the agency to exercise considerable influence on designs of apartment communities. Technological innovations affected standard construction practices and building plans, especially structural system improvements and the widespread adoption of elevators; FHA started approving projects with elevators during the late 1940s. Mid- and high-rise apartment buildings now became feasible. Mechanical systems, including central heat and air conditioning, also were improved and now could function efficiently in multi-story buildings. Two influential publications of the period were Clarence Stein's *Toward New Towns* (1951) and Eugene Klaber's *Housing Design* (1954); the former focused on mid- and high-rise design while the latter featured efficient unit plans for tall buildings (Ames and McClelland 2002:69; Rifkind 1998:81).

Mid- and high-rise apartment buildings were constructed in both urban and suburban settings during the 1950s and 1960s. Design tenets espoused by leading architects of the period, such as Le Corbusier, Mies van der Rohe, Frank Lloyd Wright, Philip Johnson, and others, significantly influenced design of apartment towers. In urban cores, these buildings often housed public housing projects. They typically replaced entire city blocks of older, one- to five-story buildings that had been deemed "blighted." Dictated by cost considerations, public and low-income housing featured austere design with limited amenities. Modernist design influences were apparent at many such projects through the use of flat elevations, narrow ribbons of windows, flat roofs, exposed concrete framing, and an absence of architectural embellishment. Multiple towers, each identical to the next, usually were constructed, resulting in much greater population density on the redeveloped sites (Rifkind 1998:81). The high-density public housing projects of the 1950s and 1960s had the unintended consequence of creating concentrations of poverty. Furthermore, revisions to the original 1937 housing act set income caps for tenants, gave preference to applicants with the lowest incomes, and allowed housing authorities to charge tenants no more than 30 percent of their income. The rent restrictions meant that housing authorities faced financial shortfalls to pay for maintenance, especially in the absence of federal dollars for such costs (Vogt 2003).

High-rise suburban developments typically displayed the same types of modernist design influences as urban projects, but boasted a much greater range of amenities. The buildings were visually distinctive to attract tenants and present an up-to-date image. Tenants also enjoyed the latest versions of exterior treatments, including outdoor balconies and prefabricated components such as steel-framed windows and sliding glass doors. Attached or underground parking garages provided sheltered parking for tenants. Site plans included space for a wide range of amenities, including rooftop swimming pools; landscaped grounds with fountains, patios, and terraces; and on-site restaurants and lounges. Provisions for full-time, on-site management staff also were made. As a result, these developments advertised themselves as offering maintenance free, carefree living (Ames and McClelland 2002:69).

4.2.2 1950s and 1960s Residential Design

The suburban residential design trends of the 1940s matured over the course of the next two decades. Residential subdivisions were constructed throughout Ohio during this period. The housing met the needs of people of all socioeconomic levels. Subdivisions aimed at buyers of modest means typically consisted of smaller, more simply designed dwellings with a limited number of floor plans and exterior design treatments. Subdivisions for middle- and upper-income buyers featured more elaborate dwellings and landscaping plans. Some middle-income and many upper-income developments included architect-designed houses. House plans published in mass media also were readily available to provide design inspiration. Developers of recent past subdivisions often employed landscape architects to plan the overall development and provide designs for the layout and planting of common areas, street corners, streets, and sidewalks. In some subdivisions, homeowners were referred to landscape architects for help with designing their yards as well (Ames and McClelland 2002:69).

In Ohio, traditional architectural embellishments remained popular throughout the recent past period. Modern styles, such as International and Wrightian, were employed on a much more limited basis. Regardless of the architectural influence, however, recent past subdivisions incorporated numerous other aspects of modern design tenets. For example, modernism sought to integrate interior and exterior spaces through the use of picture windows and sliding glass doors, indoor/outdoor spaces such as patios and courtyards, and zones designated for specific uses. Placement of houses on lots often took advantage of views. House designs of the period emphasized private family space and, consequently, houses often were situated so that the best views were found at the rear. Hedges, freestanding shrubbery, and flowerbeds were designed to form geometrical patterns while reinforcing the horizontal and vertical planes of modern houses (Ames and McClelland 2002:69; Greinacher et al. 2008:n.p.).

Fascination with outdoor living was a hallmark of 1950s and 1960s residential suburbs, and reflected the increasingly casual lifestyles of the period. To meet popular demand, builders placed a patio, typically little more than a concrete slab, at the rears of houses and included sliding glass doors to access them, invariably from either a family room or kitchen. Barbeque grilles, patio furniture, swing sets and slides, and other recreational equipment became commonplace in backyards across the country. The manicured lawn remained an ideal for many suburbanites, but gardens, flowerbeds, fountains, and other landscaping features also proliferated with the idea of turning yards into outdoor rooms. Several 1950s publications influenced trends in suburban landscaping and yard design, including Garrett Eckbo's *Landscape for Living* (1950) and Thomas Church's *Gardens are for People: How to Plan for Outdoor Living*, Eckbo's *Art of Home Landscaping*, and Sunset Magazine's *Landscape for Western Living*, all published in 1955-1956, as well as mass publications such as *Better Homes and Gardens*, *House and Home*, *American Home*, and *Architectural Forum* (Ames and McClelland 2002:71).

4.2.2.1 Case study – Rush Creek, Worthington, Columbus

Begun in 1956, Rush Creek Village has been recognized for its outstanding architectural quality. Richard and Martha Wakefield conceptualized the subdivision based on the design principles of Frank Lloyd Wright. The couple worked with architect Theodore van Fossen to plan the entire community. During the late 1930s, van Fossen had studied at the New Bauhaus school in Chicago, and also worked as a builder and furniture maker on two Wright projects in 1939 and 1940. Richard Wakefield, a builder, oversaw all of the construction (Brown, et al. 2003, City of Worthington 2010; Williams 2004).

Every aspect of the subdivision was planned. The project occupied a wooded lot intersected by streams and steep ravines. Van Fossen planned the neighborhood's winding roads and house lots to follow the existing topography. While respecting the topography, the landscape design also unified the community. Wright's Usonian houses of the 1930s inspired the design of each dwelling. Meant for people of modest means, Usonian (a play on "U.S." and "useful") houses were small-scale, and featured an open floor plan centered on the kitchen. The Usonians were known for having numerous windows, doors, and porches to integrate the indoors with outdoors (City of Worthington 2010; Williams 2004).

Van Fossen's approach to the subdivision's design focused on "organic" principles, which, he said, "means to enter into the nature of a project, to develop it like an organism develops" (Williams 2004). The tenets he followed included:

- Houses adapted to the natural contours of the terrain and featuring exterior treatments inspired by the surrounding environment so that they seem visually rooted in the landscape.
- Each house's composition includes elements integrated into the design as a whole, and expressed in terms of an underlying pattern or theme common to them all.
- Respect for the integrity of the materials themselves in the ways they are used throughout the project on both interiors and exteriors.
- Living arrangements with an interrelation between indoors and outdoors, giving each house unique vistas while protecting privacy (Brown, et al. 2003, City of Worthington 2010).

Listed in the NRHP in 2003, Rush Creek is believed to be the largest "organically" designed subdivision in the United States. The community is noteworthy, as well, for its stated purpose of bringing affordable, architect-designed houses to buyers of modest means (Brown, et al. 2003, Williams 2004; City of Worthington 2010).

In keeping with organic design, the terrain was not bulldozed prior to construction of the houses. Rather, each house was constructed on a concrete block foundation. Use of concrete block allowed flexible design and shapes. Houses thus were integrated with the surrounding landscape. When houses were built partially below grade, the concrete block could continue to be used on upper levels. The care taken with the development's landscape design allowed each house to be situated to take advantage of views while privacy between houses was maintained through strategically placed walls and plantings. The planes, lines, and angles of each house also relates to neighboring properties, such as the correspondence between one dwelling's roof line's and another's carport fascia (Brown, et al. 2003, City of Worthington 2010; Williams 2004).

Although each of Rush Creek's 49 houses was unique, all were unified by a consistent set of design principles. As a group, they exhibited numerous Wrightian influences, such as flat roofs with wide eaves, horizontal terraces, semi-concealed front doors (to enhance privacy), carports, built-in furniture, large windows overlooking nearby ravines or gardens, and incorporation of favored materials, such as concrete block and cypress. The houses are rather modestly sized, ranging from approximately 1,000 to 2,000 square feet, and each occupies a one-acre, irregularly shaped lot. Most have a deep setback from the street (Brown, et al. 2003, City of Worthington 2010; Williams 2004).

At 1,000 square feet, the Wakefield house is among the smaller examples. Facing southeast to maximize sun exposure, the dwelling features a long cantilevered carport that leads to a home office. On the interior, the office flows into a living and dining room, which retain original built-in furnishings. The floors feature quarry tile laid over heating pipes, another Wrightian touch. The house has two small bedrooms, one of which can be divided into a third with a folding wall (Williams 2004).

Van Fossen and the Wakefields assured Rush Creek's architectural unity by requiring that original owners submit building plans for approval before conveyance of the deed. Deed restrictions were put in place to govern house exteriors and additions, as well as major changes in landscaping (which could affect neighbors' views). A homeowners' association, the Rush Creek Village Company, was legally established as a not-for-profit corporation in 1954. It is comprised of the subdivision residents and governed by a Board of Trustees who are elected from the residents. The Board's Plans Review Committee must review and approve all plans for alterations (City of Worthington 2010; Williams 2004).

4.2.2.2 Case study – Upper Arlington

In 1913, real estate developers Ben and King Thompson began the planning and development of the City of Upper Arlington on the southwest side of Columbus. As was true of most twentieth century suburban developments, Upper Arlington was established on a large tract of farmland. The Thompsons followed Garden City design principles in planning their community. They built a field office from which to supervise the project; this building later became the Miller Park branch of the Upper Arlington Library. The village was incorporated in 1918 with a population of 20. During the 1920s, the first commercial district was constructed. Growth continued at a steady rate over the next two decades, allowing Upper Arlington to become a city in 1941 (Duran, et al 1985). The Upper Arlington Historic District with boundaries aligned with the original "1000 acres" purchase was listed in the NRTP for its significance as an early twentieth century planned suburban community.

In the years after World War II, the city experienced rapid growth, due largely to the Baby Boom and rapid development in the Columbus metropolitan area. Between the late 1940s and 1960, the city more than doubled in area through annexation of adjacent land. Much of the post-war development took place north of Lane Avenue in an area known as River Ridge. In contrast to the park-like character of the city's oldest sections, the 1950s neighborhoods in this area featured grid street patterns and ranch houses. As the city continued to expand northward during the 1960s, larger houses were constructed in subdivisions more closely patterned on the original City Beautiful approach.

Upper Arlington's first school was constructed in 1924; it is now known as Jones Middle School. In 1939, the Upper Arlington Elementary School opened on Barrington Road. Rapid population growth during the 1950s prompted a flurry of new construction. Tremont Elementary School, completed in 1952, served all children north of Lane Avenue. The city took over Perry Township School in 1955 and renamed it Fishinger Elementary. Three more elementary schools followed: Wickliffe in 1957, Windermere in 1959, and Greensview in 1965. Upper Arlington High School went into service in 1956. Finally, Hastings Junior High was built in 1961; it is now known as Hastings Middle School (Upper Arlington City School District 2010).

4.3 Resource Types

New construction materials and design developments, coupled with Americans' dependence on the automobile and expansion into the suburbs, led to the emergence of several new building types and designs, as well as numerous architectural styles across the country. The following discussion highlights some of the various resource types, styles, and distinctive building practices found in Ohio's recent past. This listing is not intended to be a comprehensive description of all architectural resources types in Ohio; rather, it is intended to illustrate how modernist design trends played out on representative resources in Ohio.

4.3.1 Residential Buildings

Recent past residential buildings in Ohio can be classified under two basic building types: multiple-family or apartments and single-family homes. Apartments were constructed both within the city limits as well as in the outlying suburbs, and are composed of a building that contains more than two housing units under one roof. These buildings often are grouped together to form an apartment complex. Multiple-story apartment buildings are called apartment towers, and typically incorporate parking within the design of the building. A group of two or more apartment towers is referred to as a courtyard. This configuration often includes an outdoor green space and/or pool and a parking lot (Wyatt and Woodard n.d.).

During the mid-1960s, developers began building medium-density, multifamily dwellings. Dubbed 'cluster housing,' this residential type often centered around a common area, such as a lake, tennis court, or swimming pool. These developments offered widowed, single, divorced, and elderly people a viable opportunity to enjoy suburban living. They also provided an alternative to the single-family, detached dwellings that comprised the bulk of suburban residential construction for the preceding fifteen years (Wright 1981:256–260).

Single family homes not following a formal architectural style were constructed in vast numbers throughout the post-World War II era. The following discussion highlights popular house types from this period that are found in Ohio.

4.3.1.1 Cape Cod

The Cape Cod emerged as the first recent past housing type to be seen in large numbers. The type's antecedents extend as far as back the eighteenth century and the clapboard dwellings common in New England. Beginning with the 1876 Centennial widespread interest in reviving forms and architectural details from Colonial-era architecture was seen particularly in residential design. As a result, the basic Cape Cod house form often featured Colonial Revival treatments, such as symmetrical massing, centered entries with transoms and sidelights or a pediment, exterior end or central interior chimneys, wide fascia boards, returned eaves, and classically inspired trim such as bead and reel molding. This simple, affordable house type accounted for much of the low- and moderate-income housing built during the 1940s and early 1950s. Subdivisions with Cape Cods often followed FHA guidelines for neighborhood planning, such as curvilinear streets and cul-de-sacs (Ames and McClelland 2002:66).

Although inspired by the Colonial period, twentieth-century Cape Cod houses are easily distinguished from their forebears. During the early twentieth century, Cape Cod houses often featured a wealth of detailing, well beyond what would have been found during the eighteenth century. Traditional building materials, such as clapboard or shingle siding, also commonly were used. By the 1940s, the Cape Cod had been adapted and simplified for rapid construction in subdivisions of hundreds, and sometimes thousands, of houses in planned communities throughout the state (Ames and McClelland 2002:66). (Plates B2, B4, B62).

Typically one or one-and-one-half stories and encompassing about 800 square feet, the 1940s Cape Cod often followed the FHA's 1940 *Principles for Planning Small Houses*. The exterior featured minimal ornamentation. On the primary façade, two symmetrically spaced dormers pierced the steeply pitched roof. Depending on their locale, the house usually was erected on either a concrete slab or a concrete block foundation with a crawl space; basements also might have been included. Interior rooms usually included a living room, kitchen, bathroom, and two bedrooms (Ames and McClelland 2002:66).

The house type was erected using both with traditional methods and materials and with innovative ones. For example, exterior walls finishes often consisted of clapboard siding, but sheets of insulated asbestos in a variety of colors also were used widely. The windows could have traditional wooden, double-hung sash, or steel-framed casement sash. Interior walls might be finished with lathe and plaster, or with gypsum wallboard (Ames and McClelland 2002:66).

4.3.1.2 Ranch

Ranch houses originated in California during the 1930s, and became the housing type of choice throughout Ohio's suburbs during the 1950s and 1960s. California architects Cliff May, H. Roy Kelley, and William W. Wurster, among others, are credited with adapting the traditional housing of Southwestern ranches and haciendas to a suburban house type. In keeping with the period's emphasis on family privacy, the California Ranch of the 1940s and 1950s typically was built of natural materials, such as adobe or redwood, and was oriented to an outdoor patio or gardens at the rear of the house. Due in large part to widespread publications, such as *Sunset Magazine* and May's books, *Western Ranch Houses*, California Ranches reached a national audience during the 1940s and 1950s (Ames and McClelland 2002:66).

Ranch dwellings suited popular tastes for a number of reasons. During the late 1940s, magazine surveys indicated a growing desire for informal family living, living space that was contained on a single floor, and basement space for utilities, laundry, and multipurpose/hobby rooms. With its rambling footprint, the Ranch could accommodate all of these uses. Furthermore, its association with the West Coast lent the Ranch an allure that owed to Americans' growing fascination with Californians' lifestyles (Ames and McClelland 2002:66).

The Ranch house's success also mirrored the economic prosperity of the 1950s and 1960s. Builders of Ranch developments emphasized the modernity, efficiency, and convenience of their houses by including stylish new features, such as sliding glass doors, picture windows, decorative concrete block wing walls, and carports. They also stressed the latest interior finishes, such as kitchen cabinets and appliances, bathroom fixtures, and stone-veneered walls with fireplaces (Ames and McClelland 2002:66).

Such was the Ranch type's popularity that builders of low-cost, FHA-approved houses also sought to incorporate Ranch characteristics into their dwellings. By the late 1940s, the basic Cape Cod type had been modified to a more ranch-like appearance while leaving the interior floor plan unchanged. Typical cosmetic treatments included a more asymmetrical façade, contrasting siding on the lower and upper portions of the exterior walls, and horizontal window sash placed just beneath the eaves. Picture windows, broad chimneys, basement multipurpose rooms, and rear patios also were easily integrated into the modified Cape Cod type. Such houses are found in numerous lower-cost subdivisions throughout Ohio (Ames and McClelland 2002:66).

A typical 1950s/1960s Ranch house is one-story, with a low-pitched hipped or side-gabled roof with a moderate eave overhang and an asymmetrical floor plan (Plate B63). Front porches are often small, and may consist only of a concrete stoop fronted by one or two steps. On the primary façade, large picture windows are frequently off-centered. Remaining windows may have double-hung sash, but are just as likely to be narrower "ribbon" windows with sliding sash. Many Ranch houses prominently feature a carport or an attached garage, a reflection of the automobile-centered culture in which they became popular. Most Ranch houses have little decorative detailing and are clad in wood or brick, sometimes in combination. The interior features of Ranch houses include an open plan with an emphasis on family gathering areas. The rear of the house often has a patio accessed via sliding glass doors, as well as a courtyard or garden (McAlester 2000:479).

4.3.1.3 Split Level

The growing families of the 1950s and 1960s and proliferation of home entertainment options, especially televisions and stereos, brought many consumers to seek an option to the Ranch type that offered greater separation between bedroom areas and family gathering spaces. An adaptation of the Ranch, the Split-Level house provided greater privacy by placing bedrooms on an upper level a half-story above the main living/kitchen area and directly atop an all-purpose room on a lower level (Ames and McClelland 2002:66-67) (Plates B64-B65).

Split Level houses were similar to the Ranch design in that emphasis was still placed on the horizontal, and they featured low-pitched roofs with overhanging eaves. The interior of Split Level houses was devoted to three types of living space: quiet areas, noisy and service areas, and sleeping areas. The lower level was typically the location of the garage and family room, or "noisy" area. The mid-level encompassed the "quiet" living areas and the kitchen and dining room, while the upper level was devoted to the bedrooms. Split-Level houses typically featured a combination of exterior wall materials, including wood, clapboard, aluminum, vinyl or brick, with brick often being used on the lower level (McAlester 2000:481). The popularity of the Split-Level house led to the creation of the Bi-Level house, a type with an entryway on the primary façade that was centered between stories, resulting in a two- or "Bi-Level" interior plan. The front door opened to a landing halfway between floors. This type also was known as a split-foyer.

4.3.2 Industrial Buildings

World War II generated a tremendous industrial surge throughout the country, resulting in the construction and expansion of hundreds of new wartime industrial facilities across America. Wartime production plants were constructed as quickly and as cheaply as possible, often in stages, in order to expedite production. Factories like the GE Aircraft Engine Plant in Evendale, Ohio, constructed by Albert Kahn Associates, Inc., (1941) arose seemingly overnight, utilizing materials such as hollow-tile exterior walls, poured concrete foundations, and monitor-type roofs (Hildebrand 1974:213). These massive factories were designed to work around the clock and were composed of multiple buildings, (sometimes covering acres of land) utilized for factory and production space, as well as office and administrative uses. In addition, space was devoted to cafeterias, locker rooms, restrooms, and, in some cases, worker housing. The worker housing often was built to attempt to alleviate the housing shortages that plagued most rapidly industrializing areas across the nation during the war years. Hastily constructed, the houses generally were small in size and simply detailed. Depending on their proximity to the industrial plant, many housing areas were demolished as plant operations expanded.

New technologies and processes developed during the war dramatically altered the shape of industry in the postwar era. Among those changes, research and development became a key component to every industry (Murdock & Darbee 2007:169). Nearly all major industries created laboratories for the development of new products and improved production. While some of these facilities required the creation of a new building or series of buildings, some research facilities, such as NASA's Lewis Research Center at Cleveland and at the Wright-Patterson Air Force Base at Dayton, spanned acres of land and included multiple research buildings as well as areas devoted to product testing (Knepper 2003:448).

4.3.2.1 Industrial Parks

Following the trend toward decentralization and suburbanization, large corporations of the 1960s began relocating their facilities to the outskirts of cities. Urban land prices and high taxes, as well as the difficulty associated with realigning existing streets and utility lines, prompted many corporations to build new factories away from traditional industrial zones (Murdock & Darbee 2007:170). It was during this time that the Modern Industrial park was born.

Located along superhighways outside the congested confines of city centers, industrial park buildings of the postwar era stood amidst spacious, manicured grounds, with ample parking for employees. Characteristically, these buildings are not stylistically distinctive, but typically follow a single-story format with straight, horizontal lines. Ample parking and service areas are located on the rear for trucks and freight (Murdock & Darbee 2007:170). Although these industries initially consisted largely of light manufacturing or "clean" industries, the trend toward decentralization eventually attracted the larger, heavier industries, so much so that by as early as 1963, more than half of U.S. industrial employment was suburban based, a trend that held true in Ohio as well (Knepper 2003:384, Jackson 1985:267).

A representative example of an Ohio industrial park from this period is the William and J. Preston Levis Development Park in Perrysburg, established in 1965. The 383-acre property was the first such park established by Owens-Illinois. The park's mission was to develop products conceptualized at the firm's technical center (Plate B66). A distinguishing feature of the park was that its composition was made up entirely of units owned by the same company. Owens-Illinois conducted research on glass ceramics and improving efficiency of production lines for glass bottles, developed a two-piece metal can, and tested display panels for computerized information at this facility. The property soon included pilot plant operations for new products developed through the firm's research projects. In 1971, some of the land was donated to Bowling Green State University and the University of Toledo to use for a shared regional computing center (University of Toledo Libraries Canaday Center 2007b).

The Technical Center building (Plate B66) is an excellent example of modernist architecture. The horizontally oriented design almost seems to merge with its surrounding landscape. Comprised of a series of blocks, the building displays typical characteristics of International Style, including cubist forms, smooth exterior wall surfaces, asymmetrical massing, and open interior spaces. Most of the building sections are flat-roofed, although some sections display a slightly pitched gabled form, presumably due to the roof-mounted mechanical equipment in these places. Offices are housed in a section of the building that features the extensive bands of metal-framed windows usually found on International Style buildings, while remaining exterior walls are devoid of fenestration. In keeping with the philosophical tenets of the International Style, the building displays no architectural ornamentation or embellishment. Rather, the clean, simple lines, smooth wall surfaces, and asymmetrical massing make the aesthetic statement for the property. This building now is used as the Northwest Ohio Regional Book Depository, a facility operated jointly by the two universities (University of Toledo Libraries Canaday Center 2007b).

4.3.2.2 Office Parks

Suburban office parks were very similar in design to industrial parks of the 1950s and 1960s. Whereas industrial parks might include a multitude of uses, ranging from technical research to manufacturing to corporate office space, office parks tended to feature a more limited range of activity. Banks, insurance companies, legal firms, accounting firms, and other white-collar employers moved to suburban office parks in large numbers in search of cheaper land and lower taxes, as well as an escape from crowding, traffic congestion, and other ills typical of urban areas.

By the 1970s, municipal leaders increasingly sought to retain major employers in downtown locations. They began to offer incentives, such as tax breaks, to encourage companies to redevelop urban properties. Large-scale downtown redevelopment projects utilized design principles quite similar to those found in suburban properties. A typical example was the aforementioned ca. 1969 Riverview project in downtown Toledo, bounded by North St. Clair Street, Madison Avenue, North Summit Street, and Jefferson Avenue. Part of the Riverview Development urban renewal project, it was constructed by Riverview One Corporation. I.M. Pei planned the overall redevelopment of the 16-acre site. The New York-based architectural firm Harrison & Abramovitz designed Fiberglass Tower itself. In 1969, the 30-story, International Style Fiberglass Tower was the first component of the project to be completed (Plate B47). In addition to the tower, the project site included a parking garage and a plaza. Completion of Fiberglass Tower was credited with spurring redevelopment of adjoining lots, which came to include the Holiday Inn of Toledo Downtown, the Riverview Branch of the First National Bank of Toledo, Edison Plaza, and Levis Square (Knibbe 2010).

In addition to marquee projects such as the Fiberglass Tower, Ohio's cities and towns have numerous examples of more modest, suburban office park developments. Such projects typically include anywhere from two or three to more than a dozen buildings. Although occasionally a single tenant occupies the entire park, it is much more common for multiple tenants to be present. A typical example of such a property is at 835 Sharon Drive in Westlake (Plate B67). Located on a 6.1-acre lot, the ca. 1962, single-story building encompasses 68,524 square feet. The interior ceiling height is 14 feet. Spaces for lease range from 400 square feet in size up to 4,400 square feet. Constructed of concrete block with a brick veneer, the building is almost entirely devoid of ornamentation, but for flagpole, curved walk from the parking lot, and minimal landscape plantings. Its austere appearance, flat roof, and symmetrical massing and fenestration are characteristics commonly found on this property type.

4.3.3 Commercial Strip Malls, Shopping Centers, and Malls

The construction of shopping-related facilities dramatically increased following World War II, as consumerism in America soared. In general, shopping centers do not follow any one particular style, but are easily classified according to type. At first, existing commercial establishments in traditional commercial centers were "updated" with modern architectural elements such as new fenestration, the application of metal façades, or new signage. As the automobile culture of the 1940s and 1950s moved Americans away from urban areas, retailers began relocating their department stores to more affordable, lower density areas, which allowed for the construction of abundant parking. A ca. 1957 Montgomery Ward's store in Portsmouth was typical of this trend (Plate B68).

These early suburban commercial projects often began with a single major retailer, but soon grew to become shopping centers. Typically linear in design, they utilized an L or U shaped building composed of ten to twenty storefronts. As the number of stores increased, the concept of the campus shopping center evolved, which consisted of an outdoor shopping complex, or shopping plaza, housing thirty or more stores, anchored by one or two large department stores at the center (Jackson 1985:259). Typical examples of these modest shopping centers are found at Bagley Plaza, 404-424 W Bagley Road, Berea (Plates B69-B70) and 33311-33631 Aurora Road, Solon (Plates B71-B72). The Bagley Plaza property consists of a single, rectangular, one-story strip that encompasses 9,300 square feet of rental space. Two rows of angled parking slots extend along the primary façade (Showcase.com 2010a). The Aurora Road property features an L-plan with a parking lot tucked in the juncture of the two wings. Renovated in 1999, the property has a total area of 182,481 square feet (Showcase.com 2010b).

During the late 1950s, a new concept, the indoor mall, was realized and eventually became the most popular shopping facility design of the 1960s. Shopping malls are characterized as an enclosed, climate-controlled shopping space, anchored by several large stores that are connected by long, shop-filled corridors. By the 1970s, the concept of the mall had expanded to a new concept, the regional mall, which was made up of hundreds of stores and restaurants and often included recreational attractions, such as cinemas and ice skating rinks (Jackson 1985:260). In addition to those discussed in Section 3.3.1, shopping malls built in Ohio from the early 1950s to early 1970s included the ca. 1958 Western Woods Mall in Cincinnati; the ca. 1965 American Mall in Lima; the ca. 1965 Southland Mall in Marion; ca. 1969 Beechmont Mall in Cincinnati; the ca. 1969 Westland Mall in Columbus; and the ca. 1972 Southwyck Mall in Toledo; (Blackbird and Florence 2010).

Among Ohio's mall developers who enjoyed success during the 1960s and 1970s was Edward J. DeBartolo, Sr., from Youngstown (Jackson 1985:259). DeBartolo began his career in real estate development during the post-World War II period by constructing prefabricated dwellings on the outskirts of Youngstown. Realizing that these new suburban residents would require shopping options, he completed his first open-air shopping center project, Boardman Plaza, in 1951. The project enjoyed immediate success and enabled DeBartolo to become a prolific commercial developer in several states. His future projects included the ca. 1962 Greater Cleveland Great Lakes Mall, Normandy Mall in Jacksonville, Florida, and Glen Burnie Mall in Baltimore (Mall Hall of Fame 2008b).

One of DeBartolo's projects, Woodville Mall, became emblematic of the gradual decline of enclosed shopping malls (Plate B73). The tenth mall developed by DeBartolo's firm, Woodville Mall was located in Northwood and was the first enclosed mall in the greater Toledo area. Construction on the 89.8-acre site began in May 1967 and completed almost two years later. The 871,000-square foot mall included a 2-level LaSalle's department store, a 2-level J C Penney, and a 1-level Sears. The Woodville Mall was constructed in anticipation of population growth east of the Maumee River, but little subsequent development occurred in the area. As a result, Woodville fared poorly in competition with other regional shopping centers and malls more conveniently located to shoppers. The mall remained in operation through the twentieth century but was sold in 1996 when the Indianapolis-based Simon Group took over the Edward J. DeBartolo Corporation (Mall Hall of Fame 2008b).

4.3.4 Transportation-Related Commercial Buildings

As home and automobile ownership increased, so did the American travel industry. With increased travel on America's roadways, motels (or "motor-courts"), service stations, and restaurants opened to cater to the needs of travelers. Typically located on the outside of major cities and towns along newly constructed federal-aid highways, transportation-related buildings of the 1950s through 1970s had a distinctly modern feel in design and architecture. The following list highlights the common transportation-related resource types found in postwar Ohio. An example of a successful Ohio real estate development firm specialized in commercial projects is Glimcher Realty Trust. Founded in Columbus by Herb Glimcher in 1959 as a building-supply company, the firm soon began developing Kmart stores, McDonald's restaurants, and strip shopping centers. Still owned and operated by the Glimcher family, the firm remains in business today (Rose 2009).

4.3.4.1 Motels and Hotels

Motels and hotels constructed during the mid-twentieth century were typically basic in design. While Googie or New Formalist elements were sometimes used on the exterior, these buildings are more often made recognizable by three basic configurations: courtyard, strip, and multi-story block. Courtyard motels typically are composed of a single story building arranged in an L or U shape, with parking in the recess of the building. Strip hotels are arranged in a linear pattern with parking located between the buildings. The multi-story block building features multiple levels of rooms, thus increasing the overall capacity for guests (Wyatt and Woodard n.d). The ca. 1960 Holiday Inn Westlake at 1100 Crocker Road, Westlake, is an example of a hotel constructed during this period, although it has been renovated and updated over the years (Westlake Porter Public Library 2010).

More flamboyant examples of motels and hotels also were constructed in Ohio. These buildings were designed to catch travelers' attention and lure them off the road for a stay. An excellent example is the ca. 1970 Christopher Inn at 300 East Broad Street in downtown Columbus (Plate B74). The 140-room motel is a boldly designed cylinder with bands of windows encircling the upper stories. An attached, three-level parking garage is integrated into the motel's design by way of swooping concrete bands about the base of the motel and just above a glassed-in area housing the lobby, cocktail lounge, and restaurant. The building was demolished in the 1970s. (Campbell 2010b).

4.3.4.2 Restaurants

Postwar restaurants imitated the stylistic influences found in typical Modern architecture. Googie elements are often seen, as is an emphasis on a particular brand name or corporate logo, such as the golden arches of McDonalds. Typically, restaurants of the Modern era follow three distinct types: eat-in, walk-up, or drive-in. Eat-in establishments were composed of a freestanding building with a primary entrance, kitchen, and ample seating. Walk-up or "stand" establishments were composed of a small rectangular building with large windows for serving customers but no indoor seating; this was a popular choice for hamburger and ice cream stands. The drive-in restaurant typically featured a small rectangular building with parking spaces under an attached canopy that projected from the main building; adjacent to each parking space a small stand with an intercom allowed customers to order and receive their meals in the car (Wyatt and Woodard n.d.). A later modification of the drive-in restaurant, drive-thrus, emerged during the 1960s and became widespread by the 1970s. Service windows were placed to the side and/or rear of the restaurant building, allowing customers to drive up, place an order, pay, and receive a meal, all without leaving the confines of their car.

During the recent past, many restaurants also sought to offer diners exotic experiences, both in terms of their menu and their décor, preludes to the now ubiquitous theme-based restaurant. The ca. 1961 Kahiki Supper Club at 3583 East Broad Street in Columbus was an outstanding example of this restaurant type (Plate B75). An excellent example of Tiki style (see Section 4.4.7), the 20,000 square-foot-restaurant offered gourmet Asian and Polynesian cuisine. Diners were greeted at the door by oversized Tiki statues. The tropical-themed interior featured thatch huts, waterfalls and fountains, palm trees, murals, and tropical fish, plants, and parrots. Founders Bill Sapp and Lee Henry built the restaurant after their bar, the Grass Shack, burned down on the same site in 1959. An immensely popular establishment in its heyday, the supper club had customers waiting for hours for the opportunity to enjoy the unique dining experience (Wright 1997). The Kahiki Supper Club was listed in the NRHP in 1997; however, in 2000, the restaurant closed and the building was razed to make way for the construction of a Walgreens drug store.

4.3.4.3 Gas Stations

Perhaps the most iconic gas station chain in Ohio was owned by Standard Oil Company, the Ohio-based Sohio petroleum company. Sohio developed a distinctive design for its gas stations during the early 1930s (Plate B76). Designed by the architectural firm Clauss & Daub, the flat-roofed building featured a low-slung silhouette, horizontal massing, and ribbons of windows, all of which were in keeping with the newly emerging International Style of the period. A wide band just beneath the roof's edge provided further horizontal emphasis. The almost rigid symmetry of the grid pattern of the glassed-in front and sides of the auto bays was relieved by the customer service bay, which featured a centered pair of entry doors flanked by large, plate-glass windows, and placement of the company's name above the customer service bay. Approximately 40 examples of Clauss & Daub's plan were constructed; it is not known how many of these are extant today.

Sohio's decidedly ahistorical aesthetic stood in sharp contrast to earlier gas station designs by the Standard Oil Company as well as others. During the 1910s and 1920s, thousands of gas stations featured Period Revival treatments, ranging from gabled roofs with returned eaves to dentil molding and entries with transoms and also half-timbered versions resembling cottages. The forward-looking approach adopted by Sohio, however, became the standard by the 1940s. After World War II, gas stations became increasingly functional and utilitarian in their form and appearance.

Gas stations constructed from the 1950s through the 1970s feature a streamlined or Googie appearance, reflecting their association with the modern automobile culture. These buildings typically utilize highly visible, glossy signs that dominate the exterior of the building. In the 1950s and 1960s, gas stations were normally owned and operated by a single owner, and were comprised of a one-story building, typically in an oblong box shape with or without a canopy for the fuel pumps. Canopies could be small and nondescript, or could dominate the entire design of the building. Popular designs such as Frederick Frost's "drum like Mobil station" and Walter Dorwin Teague's Texaco station with its smooth white exterior could be found across America (Jackson 1985:257). By the 1970s, gas stations had grown in size, and expanded to include full service car care center; this latter version proved to be short-lived, as they were soon replaced with the "mini-mart" and "convenience" store concepts that offered no car care, but sold food-related items in addition to gas (Jackson 1985:257).

4.3.5 Entertainment and Recreational Commercial Buildings

4.3.5.1 Drive-in and Movie Theaters

As the American population shifted to suburbs, entertainment options followed them. Richard Hollingshead Jr., is credited with inventing the drive-in theater during the early 1930s. He drew inspiration from the popularity of drive-in restaurants and patented his idea. The nation's first drive-in theater opened in Camden, New Jersey, in June 1933. The popularity of the automobile made the drive-in theatre an attractive entertainment venue. Offering multiple showings at affordable prices, drive-ins served as a dominant fixture in American suburbs throughout the late 1950s. At their peak in the late 1950s, almost 5000 drive-ins operated across the country; that numbered has dwindled to less than 500 today. Presently, a total of approximately 30 drive-in theatres are operable in Ohio, including the Startlite Drive-In at Amelia, Dixie Twin Drive-In at Dayton, Skyview Cruise-In at Lancaster, Winter Drive-In Theatre at Wintersville, and Melody Cruise-In at Springfield (Drive-ins.com 2010).

Consisting of a large, often sloped, parking area dotted with hundreds of metal poles and clip-on speaker sets, and oriented toward a large central screen, the only building typically located on the site was a projection building, which also included a food service area. By the 1960s and 1970s, drive-ins became less popular and rising land values in suburban areas meant their sites could be converted to more profitable uses. Taking the place of drive-ins, movie theaters required less land to build, and could either be located in an already established shopping center parking lot or incorporated into a new shopping center design. These buildings typically consist of a box office, lobby, marquee, and the theater space (Jackson 1985:255). From 1941 through the 1960s, the Jay Emanuel Publications firm of Philadelphia published Theatre Catalogs for theatre owners and operators. The catalogs contained information about both indoor and outdoor theatres and featured sections on the latest innovations of the time (Drive-ins.com 2010).

4.3.5.2 Bowling Alleys

Often constructed near shopping centers, bowling alleys became a popular recreational option in post-World War II America. Often featuring Googie signage and interior design, these bowling alleys were typically large metal or brick buildings with an open interior plan featuring areas dedicated to a shoe rental counter, restaurant or snack bar, and bowling alley space with seating, score keeper tables, and ball returns (Wyatt and Woodard n.d.). As shown by the aforementioned William Pierson's Cleveland bowling alley, resources such as these sometimes have significant associations with local and state social history. Other recent past bowling alleys known to exist in Ohio include Yorktown Lanes in Parma Heights and Park Lanes in Mansfield.

4.3.6 Religious Buildings

Religious buildings and complexes comprise a high proportion of the post war era's most advanced designs and often are the most prominent expression of modernism within a community. During the 1950s and 1960s, religious buildings began to be designed using a variety of Modern-era styles and construction techniques. These included, but are not limited to, New Formalism, Articulated Frame, and Expressionism. Modernism's emphasis on flowing interior spaces and integration of indoors and outdoors dovetailed neatly with theological thinking of the period, especially as espoused by Protestant theologian Paul Tillich with his use of the terms "holy emptiness" and "majestic simplicity." Architects attempted to create spaces that reflected the experiences of spiritualism and devotion felt by congregations (Rifkind 1998:191).

In addition to their overall architectural stylistic characteristics, religious buildings can be described by building plan: axial or centralized. Axial plan churches are based on the linear progression from the entrance hall to the nave. Centralized plans are based on the concept of early single room meeting houses. In either instance, these buildings are typically sheltered by a centralized roof, utilizing a number of forms. Representing various faiths, the buildings often rose multiple stories in height and feature large sections of glass and articulated roof forms to accentuate height and natural light (Wyatt and Woodard n.d.).

St. Stephen's Episcopal Church in Columbus was nationally publicized as an early expression of modernist church design in the United States (Ohio Architect 1954). Designed by local architects Theodore Brooks and Gilbert H. Coddington the complex served as a religious and social center for the growing student population at the Ohio State University. The overall design imparted intended warmth of detail through the use of natural materials such as brick and wood, and the use of glass to provide a welcoming entrance, allow for natural light into the narthex and at the sanctuary, and to provide an open, naturally flowing circulation from the buildings into the enclosed landscaped courtyard.

Ernest Gaal designed the Our Lady of Peace Church at 20 East Dominion Street, Columbus. Built in 1966, the building has a low pitched pyramidal roof and battered-brick corner columns. The roof is crowned by a stylized metal steeple with the church bells left exposed. With its sculptural elements and open spaces, the interior design was influenced by Eero Saarinen (Darbee and Recchie 2008:13/2).

4.3.7 Educational Buildings

With a growing Baby Boom population, the need for more educational buildings dramatically increased during the 1950s. Modern-era school buildings are typically a collection of single-story buildings spread out over multiple acres (for both scenery and future expansion needs), reflecting Modern architectural design influences. A typical 1950s-1970s school complex is composed of several buildings in order to separate administrative activities, cafeteria, recreation activities, auditorium, library, and classrooms. They are linked by landscaped plazas and/or covered (often aluminum) walkways. Often constructed of brick-veneered concrete block, they are usually long, horizontal buildings with flat roofs (Wyatt and Woodard n.d.).

A typical example of 1960s elementary school design is the ca. 1969 Butternut Elementary School in North Olmsted (Plate B77). The school's layout consisted of two wings oriented around a courtyard. The larger wing featured a series of instructional modules clustered around a large open study center. The study center was located adjacent to the school's entry courtyard. Each graded modules included flanking classrooms, coat rooms, and small group work spaces. The smaller wing included a multipurpose gymnasium/cafeteria, art, music, and kindergarten rooms (McCormick 2001:76). The school's exterior, almost entirely devoid of ornamentation, reflected the continuing influence of International Style design precepts.

In 1969, Cincinnati architect Jack E. Hodell designed Mariemont High School to suit current pedagogical theories for team teaching and small group work (Plate B78). The building consists of a series of hexagonal pods. Each pod housed open-space learning centers for integral subjects, such as English, social studies, and mathematics. Adjacent to the learning spaces were administrative/guidance units. An auditorium cluster included instrumental and vocal rooms. In keeping with dictates to incorporate large interior spaces for flexibility, the cafeteria connects to the gymnasium to provide spectator space. A two-story library pod was organized with grade-appropriate materials that matched the classroom on each of its levels. In a departure from the traditional wood and tile floors and plastered or sheetrock walls and ceilings, the project architects specified acoustical tiles and carpeting to reduce noise levels. Lacking the corridors that typically comprised 20-25 percent of school building space, the 111,000 square foot facility was lauded for its construction cost savings. Hodell also received praise for integrating the school into its wooded, 38-acre setting (McCormick 2001:114).

Other elementary, middle, and high schools in Ohio dating from the 1950s and 1960s that have received awards and/or been featured in local architectural guides include the ca. 1967 Athens Senior High School, designed by Baker, Joseph & Associates of Newark; ca. 1966 Miller High School in New Straitsville, designed by Kellam & Foley of Columbus; ca. 1964 Brent Elementary School in Cincinnati, designed by Russell I. Champlin, in Cincinnati; ca. 1963 Marian High School in Cincinnati, designed by Gartner, Burdick & Bauer-Nilsen, in Cincinnati; ca. 1959 Lutheran High School East in Cleveland, designed by Ward, Conrad, Schneider & Szabo; ca. 1968 Dr. George W. Crile Elementary School in Parma Heights, designed by Don M. Hisaka & Associates, in Cleveland; ca. 1958 Amos McDannel Elementary School in Stark County, designed by Firestone & Motter, in Canton; ca. 1957 Warren City Schools in Trumbull County, designed by Arthur F. Sidells; ca. 1961 Scottwood Elementary School in Columbus, designed by Brooks & Coddington, in Columbus; ca. 1952 Ohio State School for the Deaf in Columbus, designed by Crumley & Musson, also of Columbus; ca. 1967 Hithergreen Middle School in Montgomery County, designed by Eugene W. Bentz, in Dayton; and the ca. 1959 Elmwood High School in Wood County, designed by Munger, Munger & Associates.

Community colleges emerged as an entirely new educational facility during the post-World War II period. Their numbers grew quickly during the 1950s and 1960s, as Ohioans invested considerable sums in improving the skill levels of its technical and industrial workforce.

Unlike traditional colleges that had young adult students living on-campus, community and technical colleges were designed to serve working adults, a mission reflected by their campus designs. Sinclair Community College in Dayton received a community college charter in 1966. The school's roots extended back to a YMCA that originated in 1887. Dayton used urban renewal programs to acquire a 20-acre tract and built a downtown campus that was inspired by the Chicago Circle campus of the University of Illinois. Designed by New York architect Edward Durell Stone, the modernistic college buildings were a series of cubes meant to harmonize with the downtown Dayton skyline (McCormick 2001:164).

The rapid expansion of colleges and universities that took place during the 1950s and 1960s resulted in design and construction of numerous buildings, some of which were bestowed with awards for the quality of their architectural design. Among the college and university buildings that have been featured in magazines and books about Ohio's architecture are the Beasley Convocation Center, Vernon Alden Library, Educational TV and Theater Building, and Botanical Science Research Building, all at Ohio University in Athens; the Administrative Building at Miami University in Oxford; the Engineering and Science Center at the University of Cincinnati; the Health Sciences Complex at Case Western Reserve University in Cleveland; the Main Classroom and Physical Education buildings and University Center at Cleveland State University; the Metro and Eastern campuses at Cuyahoga Community College; Bibbins Hall at Oberlin College; the College of Business Administration at Kent State University in Kent; the Mershon Auditorium, Olentangy Dormitories, Drake Union, Robinson Lab (Plate B79), and Morrill and Lincoln Towers (Plate B80) at Ohio State University in Columbus; and the Science Building, Anderson Arena, and Doyt Perry Stadium at Bowling Green State University.

4.3.8 Government and Institutional Buildings

From the 1930s through the early 1950s, American government institutions expanded with unprecedented rapidity in response to the Great Depression and World War II. The commencement of the Cold War during the late 1940s assured that the government would maintain the reach of its powers and perhaps expand even further. As Americans enjoyed escalating levels of prosperity, government agencies at the national, state, and local levels had the resources needed to expand and modernize their facilities. Classical architecture for government buildings now carried a taint, due to its use by the Nazi government in Germany. Modernist styles, on the other hand, were regarded as progressive and enlightened, bringing them in line with American ideals. As a result, thousands of government buildings constructed across the country during the 1950s and 1960s followed modernist tenets (Rifkind 1998:105-106). Other contributing factors to the preference for modern design were its efficiency and comparatively low cost, made possible by use of standardized components, readily available and inexpensive materials, and limited ornamentation.

The City of Lakewood's municipal building is a typical example of a 1950s government building. Rendered in the International Style, the flat-roofed building features horizontal massing emphasized by bands of windows with flush metal spandrels above and beneath them, and a simply adorned primary entry consisting of poured concrete surround and aluminum-framed entry doors surmounted by a flat metal canopy.

Publicly funded institutions also engaged in major building campaigns during the recent past period. An example of a recent-past institutional project is the Ohio State University Hospital constructed in 1951 (Campbell 2010c). Located at 775 Park Street, Columbus, the complex originally consisted of three buildings rendered in the International Style (Plate B81). Each building displays the emphatic horizontal planes characteristic of the style, with narrow bands of windows interspersed by masonry bands, flat roofs, and rectangular forms longer than they are tall. The buildings were arranged in a triangle, with the largest and tallest at the apex and, at the base, two buildings less than half as large. A surface parking lot was situated at the periphery of the complex, with access via two roads.

4.4 Modern Architectural Styles

The preceding resource types represent building types that correspond to a specific use or form, and may or may not feature aspects of Modern architectural styles. In contrast, Modern-era architectural designs from the 1940s to the 1970s represent the artistic expression of a building, through its building materials, plan, exterior and interior architectural features and details, and an intentional lack of applied ornamentation. While no one particular style of architecture prevailed, the period can be defined by a range of design influences, originating from an individual architects work or that of a distinctive school of design, but all fundamentally focusing on creating architecture intended to express the function and proposed use of the building.

In their pioneering exhibition of 1932 at the Museum of Modern Art in New York City Henry-Russell Hitchcock and Philip Johnson first coined the term “The International Style” to generally describe this broad twentieth century modern architectural movement. In their exhibition catalog, *The International Style*, Hitchcock and Johnson credited three men, Walter Gropius in Germany, J. J. P. Oud in Holland, and Le Corbusier in France, as the founders of the style. Although arriving a bit later, Mies van der Rohe also was acknowledged as a major influence on the development of the International Style. Each, however, drew upon the groundbreaking work of predecessors, such as the late nineteenth century “skyscrapers” of Louis Sullivan and John Welburn Root II, Henry Hobson Richardson’s simplification of design and attempts at direct expression of structure during the 1870s and 1880s, and even the iron and glass Crystal Palace at the 1851 London Exposition (Hitchcock and Johnson 1995:38, 41).

Innovation in structural design and materials were the common threads of these predecessors. Proponents of The International Style, which in this context is synonymous with the broader twentieth century modern architectural movement, emphasized the primacy of function in determining a building’s design, while eschewing ornamentation and embellishment as unnecessary at best, and a distraction at worst. Three principles of the International Style thus were developed: architecture as volume, regularity, and avoidance of applied ornamentation. Concerning the first principle, the steel and reinforced concrete structure elements of modern buildings allowed greater freedom of design than had been possible in earlier eras. The volume of space contained within the structural skeleton became the focus of the design effort because even surface materials could be light or transparent; walls transformed from features of mass to ones of transparency. The use of regularity involved, at least partially, a concession to the dictates and economy of standardized building components as well as the need to equalize load bearing among all structural elements. With the International Style, architects chose to expose the underlying rhythm of the structural members in the ways they used surface treatments. Finally, although the International Style rejected applied ornamentation, its proponents argued that architectural detail provided the only necessary decoration (Hitchcock and Johnson 1995:51-53, 55-57, 69-71, 81-82).

The principles of the International Style, and all the modernist expressions that followed it, were not universally accepted. Indeed, several decades passed before even professional organizations, such as the American Institute of Architects (AIA), embraced modernism. In his study of the AIA's prestigious Gold Medal award, Richard Wilson noted that, between 1938 and the late 1950s, as a group, recipients were more traditional and conservative in their approach to design than award recipients between 1957 and 1968 (Wilson 1984:62-63).

The majority of Gold Medalists between 1938 and 1958 received their training at the Ecole des Beaux-Arts in Paris or at schools utilizing similar principles, including Paul Cret, Louis Sullivan, John W. Root, Ralph Walker, Eliel Saarinen, and Auguste Perret. Such formative influences may account for their later approaches to modernism. Furthermore, during the 1920s and early 1930s, the questions of what modernity entailed and its implications for architecture had yet to be resolved. No single approach to modernism ever existed (Wilson 1984:63-64, 66-68).

Henry-Russell Hitchcock divided early modernists into two camps: New Traditionalists and New Pioneers. The New Traditionalists were romantic and humanistic in their approach, and used the lessons of the past to meet today's needs. Their ranks, according to Hitchcock, included Eliel Saarinen, Frank Lloyd Wright, Auguste Perret, and Louis Sullivan. The New Pioneers, on the other hand, were radicals who adhered to purity of design and engineering while claiming to break completely from the past. They included Le Corbusier, J. J. P. Oud, Mies van der Rohe, and Walter Gropius. The crux of their divergent approach was a difference of opinion over functionalism and its role in determining architectural form and beauty. New Traditionalists acknowledged the importance of function but argued that form was not merely an expression of function but also expressed human spirit and thus was given meaning. Conversely, New Pioneers emphasized reason and the intrinsic qualities of architectural materials and expression of such through functional use (Wilson 1984:69-70).

In time, uniquely American interpretations of modernism emerged. The humanistic impulses of architects such as Wright, Willem Dudok, Eliel Saarinen, and Clarence Stein proved extremely influential. Their work emphasized nature, ornamentation, and variety, and readily acknowledged historical antecedents. In general, their projects reflected an emphasis on human-scale environments as well (Wilson 1984:73-75, 78-82).

Another interpretation involved blending modernist principles with traditional architectural elements. The period between World War I and World War II was a time of immense innovation and progress, as well as a period of great nostalgia in America. Reflective of this tendency, architects began to utilize modern architectural principles but with a conservative approach. The result was an eclectic mix of new modern stylistic modes using earlier twentieth century design elements. While traditionalist modern buildings can be found in public and civic examples, the principal medium for the style was the skyscraper, which thrived between the two wars. Skyscrapers emphasized traditional architectural elements such as spires, vertical sections, and monumental designs, but combined them with modern elements such as clean lines and lack of ornamentation. Traditionalist modern buildings displayed a combination of traditional or historical architectural elements: verticality, monumental limestone cladding, arches, and axiality. These contrasted with modern features, such as starkness of detail, cubist massing, flat roofs, and asymmetric elements (Trachtenberg and Hyman 1986:554).

A variation of traditionalist modernism could be found as well with “stripped classical” buildings. This approach embraced the monumental scale, sense of discipline, order, and stark whiteness associated with the buildings of antiquity, but in an appearance lacking the delicate ornamentation found in earlier twentieth century styles. Monumentality and bulk characterized “stripped classical” buildings. Exterior walls were clad with large areas of masonry, brick, or concrete panels over a steel frame to define the volume of the building. The visual weight of these materials was a marked contrast to the lightness and transparency of International Style. “Stripped classical” was very popular from the 1930s through the 1960s, especially for governmental and industrial buildings. It was used on horizontally and vertically massed buildings. Such buildings usually featured plain, white, symmetrical façades that often had regular bays with height exceeding width. Openings such as windows and doors were treated as voids, rather than as continuations, in the exterior cladding. While there was a lack of classical detailing, classical elements were referenced repeatedly, typically by using implied columns as well as a broad horizontal member suggesting classical entablature (Sonnott 2004:269; Wilson 1984:77-78).

From the cultural and artistic milieu of the early 1930s, a variety of modernist architectural styles emerged. Miesian drew upon the inspiration and innovation of the International Style. New Formalism, Wrightian/Usonian, and Neo-Expressionism sprang from the same creative ferment as the International Style, but continued to explore organic and historical antecedents as well. Brutalism represented aspects of the modernist movement taken to an extreme. Tiki and Googie did much the same, primarily through their exploitation of new materials and construction methods, but due to their embrace of commercialism and popular culture are far more whimsical than other modernist styles. The following discussion outlines each of these styles as they appeared in Ohio. While arguably the original concept of modern architectural expressions may have rejected the artificial confinement of stylistic labels; current-day historic preservation and cultural resource management practices and documentation standards require some ability to categorize and draw distinctions between various architectural examples. The stylistic definitions and terminology outlined below provide a common terminology.

4.4.1 International Style, 1930–1960

While the term originated to describe the broader modern movement, the International Style has come to define a specific modern design approach to architecture. The International Style has three character-defining features: an emphasis on volume rather than mass, regularity in the inclusion of principal components, and strict avoidance of ornamentation. The end result is a pristine form placed on the landscape, resulting in a sculptural appearance. Originally developed in Europe, primarily within the Bauhaus School, the International Style was introduced to the United States in 1932 at the New York modern architecture exhibition. The style had many significant architects, most notably Europeans Le Corbusier, Mies van der Rohe, and Walter Gropius, and Americans R.M. Schindler, Richard Neutra, and Phillip Johnson (Whiffen 1999:247–252). Function was of extreme importance in International Style architecture, and great care was placed on emphasizing how a building served its residents, an ideal that would greatly impact American building design in the latter half of the twentieth century (McAlester 2000:470). International Style buildings expressed function by utilizing materials such as glass, concrete, and steel to create boxlike, cubist forms, designed as an asymmetrical whole within a single structural framework (Gordon 1992:113).

The style reached its peak during the 1950s, but many of Ohio's examples predate World War II (Gordon 1992:113). Common characteristics of Ohio's International Style buildings include the use of reinforced concrete, cubist forms, smooth exterior wall surfaces, asymmetrical massing, open floor plans, flat roofs, extensive use of glass, and metal frame windows. In residential architecture, windows were typically individual casement, or fixed glass, while commercial examples featured single-paned windows with metal frames. Many times, corner windows and ribbon windows also were used. Doors were normally very simple in design, with or without glass panels. Residential examples of the International Style in Ohio also featured the use of glass walls and flat or ascending roofs.

In Cincinnati, several International Style dwellings have been identified. Architect George Marshall Martin designed the 1933-1934 Lowrie House, which has been recognized as one of the first International houses in southern Ohio. The house was constructed of white-painted brick and featured a flat roof and steel casement window sash. A contrasting band separating the first and second stories emphasized the horizontal massing of the building (Greinacher 2008:np). Architect John W. Becker designed the 1938 Rauh House. The long, low, flat-roofed building is constructed of brick covered with white stucco. The windows included steel lintels to make possible wide openings as well as wraparound corner windows. Each porch had a cantilevered, flat roof (Greinacher 2008:np).

One of Ohio's most important International Style commercial buildings also is in Cincinnati. Built in 1946-1948, the Terrace Plaza Hotel at 15 West Sixth Street was the first major International Style building constructed in the state after World War II (Plate B82). The New York-based firm, Skidmore, Owings & Merrill (SOM) crafted a design for the steel-reinforced, concrete-frame building that was innovative in many ways. Occupying a narrow, 90-foot by 400-foot lot, a seven-story base housed retail and office space, including two department stores, Bond and JC Penney. Both stores opened at street level through continuously-glazed windows; Bond's originally were two stories in height. The third through seventh stories were clad in thin brick veneer with a stacked bond pattern; this section of the building was devoid of fenestration but featured a distinctive, landscaped roof terrace. At the eighth floor, an eleven-story skyscraper with a setback on the three street sides seemed to float on a glass-enclosed lobby. This portion of the building was clad in thin brick veneer pierced by ribbons of symmetrically arranged windows. The building housed three restaurants as well, most notably a circular, stainless-steel and glass-enclosed restaurant that topped the eastern end of the hotel's roof (Cincinnati Form Follows Function 2010; Fein 2009; Mitchell 2004).

Louis Skidmore, a native of Lawrenceburg, Indiana, and alumnus of the University of Cincinnati, headed SOM's design team. Natalie DeBlois, a Columbia University graduate, acted as an architect for the project and, along with Phyllis Hoffsmeier, oversaw much of the interior design. Designers Benjamin Baldwin, Ward Bennett, Davis Allen, and others designed furniture, textiles, staff uniforms, tableware, graphics, and even ashtrays and matchbook covers specifically for the hotel. Morris Lapidus was responsible for the Bond department store interiors. Project developer John J. Emery, Jr., commissioned several artists to create original works for important public spaces within the building. The rooftop Gourmet Room featured a curving, 30-foot mural by Joan Miró, while New York artist Saul Steinberg completed a satirical mural of the Cincinnati cityscape. In the Terrace Café, artist Jim Davis's multicolored, plexiglass wall sculpture was placed behind the bar. Another sculpture, a mobile by Alexander Calder, hung in the hotel lobby. The rooftop terrace included outdoor dining, and offered an ice-skating rink during winter months (Cincinnati Form Follows Function 2010; Fein 2009; Mitchell 2004).

Numerous exterior and interior changes have occurred at the Terrace Hotel since the Emerys sold the building to the Hilton chain in 1965. On the exterior, the two-story department store windows were reduced to one story, while some storefront glass has been replaced with brick infill. A drive-through entrance was added on the Sixth Street side of the building. On the interior, the original artworks were donated to the Cincinnati Art Museum. Several remodeling campaigns took place within the seven-story base. The hotel areas retain original materials and detailing, including marble veneer, stainless steel-clad columns, woodwork, railings, balustrades, ceiling canopies, and light fixtures (Mitchell 2004; Cincinnati Form Follows Function 2010).

4.4.2 Miesian Style, 1945–1970

Miesian architecture is based on the designs of German architect Ludwig Mies van der Rohe, who immigrated to the United States in 1938. Miesian architecture reflects the rationalist tendencies expressed in his work. Mies was a leader of the International Style movement, and soon developed his own expression of modern architecture, based on a mastery of screen walls and glass-enclosed spaces. Miesian buildings feature minimalist designs and utilize curtain wall construction methods made possible by post-World War II innovations in engineering and materials. Unlike International Style buildings, Miesian interior spaces were left open with few constraints on how they could be used, creating universally adaptable spaces (Whiffen 1999:255-259). The style was extremely influential in multi-story office tower and commercial building design, but rarely used in residential projects. A fine example of a Miesian building in Ohio is the Libbey-Owens-Ford Company Building in Toledo (Plate B46), constructed by Skidmore, Owings, and Merrill, in 1960 (Gordon 1992:115).

Miesian buildings feature a grid-like, steel-framed exterior, creating a precise rectangular form. Glass curtain walls with slender mullions are used, and spaces between steel members are almost always filled with glass. Flat roof slabs, supported at the ends, are common. In tall buildings, the ground story of the building is often set back behind a series of steel piers, which often creates a visual effect of the building “floating” above its site (Whiffen 1999:255–259). At the College of Wooster, the ca. 1962 Andrews Library building displays many of these characteristics (Plate B83). It was designed by the Cleveland-based architectural firm Schafer, Flynn & Associates. Further examples of Miesian style in Ohio include the 1966-1968 Assembly Building at Miami University; the ca. 1968 Newark City Building at 40 West Main Street; the ca. 1970 Motorists Building at 471 E. Broad Street; and the ca. 1969 Hinsdale Hall at Hiram College.

4.4.3 New Formalism, 1955–1970

New Formalism emerged as a rejection of the limits of Modernism. Closely associated with architects Phillip Johnson, Edward Durrell Stone, and Minoru Yamasaki, New Formalist buildings utilized classical elements, such as building proportion and scaling, colonnades, and entablatures, combined with modern innovations in concrete design and engineering (Whiffen 1999:261) Architects working in the style attempted to reassert the idea of architecture as art by using classical forms and proportions and rich exterior materials such as marble or granite. The style most frequently was utilized in public buildings, including banks, government centers, libraries, museums, and school buildings (Gordon 1992:116).

A common feature of the style is a stark separation between nature and building, typically through the use of a podium or raised slab foundation, thus creating a temple-like feel. Other characteristics include the use of exotic forms and details, evenly spaced arches, columns, and other classical elements, and smooth wall surfaces often covered in stone. Delicate decorative, albeit functional, details, such as patterned sunscreens or grilles, polished metal, concrete, or stone, represented a departure from the strict prohibition on ornamentation found in the International Style. New Formalist buildings are also typically set within a formal designed landscape (Gordon 1992:116; Whiffen 1999:264).

In Mansfield, the ca. 1967 Richland County Courthouse displays many of these characteristics (Plate B84). Designed by Zaugg, Thomas & Associates, the three-story, brick-veneered building is raised slightly above ground level and fronted by a wide, paved terrace. An arcade of slender columns spans the primary façade and is topped by a decorative cornice with stylized classical details. The centered entry is surmounted by a pediment with an exaggerated rounded arch. Other examples of New Formalist buildings in Ohio include the ca. 1963 Langston Hall at 95 Union Street in Oberlin; the ca. 1965 Grover Herman Fine Arts Center and the ca. 1969 Andrew V. Thomas Memorial Hall, both at Marietta College; the 1961-1962 Cleveland Institute of Music on East Boulevard; the ca. 1965 Jewish Community Center at 1759 Euclid Avenue, Cleveland; the ca. 1969 Temple Brith Emeth on Shaker Boulevard in Pepper Pike; and the ca. 1966 King Memorial Hall and the ca. 1968 Bibbins Hall both at Oberlin College.

4.4.4 Wrightian and Usonian, Ca. 1935–Present

The Wrightian Style derives its name from the design principles and works of Frank Lloyd Wright and his Taliesin Fellowship. Wrightian designs feature one-story, horizontal buildings with dominant flat roofs (Whiffen 1999:267). While using the flat roof and simplistic styling of the International Style, Wrightian buildings incorporated elements natural to the particular building site (a concept Wright called “Organic Architecture”), such as stone and wood siding. Wrightian buildings typically feature a one-story, open floor plan, designed to human scale. Exterior materials are typically wood, and there is often a contrast of structural materials through the use of colors and texture. Wrightian houses usually feature large, overhanging flat roofs or low-pitched gable roofs. Entrances to the houses typically are concealed, such as with a wing-wall or in a recessed bay. Common elements include carports or overhangs and large floor-to-ceiling windows. (Roth 1979:255–256).

Similar in principal, Wright first developed his Usonian design for houses during the 1930s. Pairing innovative design with standard and readily available construction materials, these were Wright's "answer to the demand for beautiful and affordable middle-class homes in the post WWII America" (Allen Memorial Art Museum 2010). Character-defying elements of Usonian houses included an open floor plan, but with separation between public spaces and private areas; a concrete slab floor with embedded water pipes to provide radiant heat; a flat roof and, often, a cantilevered carport overhang; a large, masonry fireplace, usually in the main living area; simple built-in furniture; board-and-batten interior wall coverings; and tall glass walls and doors. Usually composed of a single-story house with simple massing and a flat roof, Wright's Usonian designs provided a model for many of the residential buildings following 1945 (Allen Memorial Art Museum 2010; Roth 1979:261).

In Oberlin, the 1948-1949 Welzheimer-Johnson House was the first of nine Usonian houses known to have been constructed in Ohio (Plate B85). Featuring brick construction, an L-plan footprint, a flat roof with deep overhangs, and a carport, the dwelling is notable as well for its redwood trim, curvilinear motifs in the clerestory, and stained croquet balls used as dentil molding. Wright also created a landscape plan for the property.

Frank Lloyd Wright is known to have designed several Usonian dwellings in Canton, including the ca. 1951 Nathan and Jeanne Rubin House on 44th Street, the ca. 1954 Ellis A. Feiman House on Santa Clara Road; and the ca. 1954 John and Syd Dobkins House on Plain Center NE. In Cincinnati and Hamilton County, Wright's commissions included the ca. 1954 Gerald and Beverley Tonkens House on Knoll Road in Amberley Village, Hamilton County; the ca. 1955-1958 Boulter House on Rawson Woods Circle in Cincinnati; and the ca. 1959 Boswell House on Carmargo Road in Indian Hill, Hamilton County. He also was responsible for the Wrightian-style, ca. 1956 Meyers Medical Clinic at 5441 Far Hills Road in Dayton, as well as the ca. 1955 Louis Penfield House on River Road in Willoughby Hills. In Cincinnati, local architect Abrom Dombar was credited with designing the Usonian-style Abrams House on Perth Lane during the late 1940s. These examples are included in Appendix C.

4.4.5 Neo-Expressionism, 1950–Present

American Neo-Expressionist buildings are based on the principals of the first wave of Expressionist architecture happening in Germany in 1910. Early German works tended to combine elements of three themes: the creature, the cave, and the crystal (Trachtenberg and Hyman 1985:513). While the style flourished in Germany and Holland through the 1920s, few examples of early Expressionist architecture are found in America. Although American Neo-Expressionist architecture of the mid-1950s has its roots in the earlier German Expressionist movement, it is not a continuation of earlier examples. American Neo-Expressionist architecture highlights the building as art and conveys meaning on an emotional level, directly through a building's design (Whiffen 1999: 273). Neo-Expressionist buildings utilize sculpted or "freehanded" designs and have a tendency to avoid geometric forms, particularly the rectangle and right angle. Curved and angled concrete or brick-faced walls are commonly used to create dramatic, irregular shapes as well as arches (Whiffen 1999: 276).

Neo-Expressionist architecture relies on modern building materials and innovations; including laminates, plastics, stuccos, and concrete work (Whiffen 1999: 277). Buildings constructed in the style typically feature curved walls, irregular shapes, massive sculpted forms, and often reflect the concept of architecture as a piece of sculpture or art. Neo-Expressionist buildings feature a strong emphasis on structural engineering, as well as a distortion of form for an emotional effect. The style was a popular choice for religious and public buildings. Designed by Wallace Harrison, the ca. 1953 Sophronia Brooks Hall Auditorium at 67 North Main Street in Oberlin is an example of a Neo-Expressionist public building.

Built between 1947 and 1953, the Park Synagogue at 3300 Mayfield Road in Cleveland Heights is an outstanding example of a Neo-Expressionist building (Plate B86). The building stands as the only Ohio project by Eric Mendelsohn, an architect of international fame. Occupying a scenic, 33.5-acre, rocky, heavily wooded site intersected by a 40-foot ravine, the project posed a significant design challenge for Mendelsohn. He conceived a sprawling complex situated near the center of the property at its highest point and drew inspiration for the aesthetic design from the natural setting. The centerpiece of the project was a massive dome for the synagogue. On the dome's exterior, preformed copper covered a four-inch shell with a concrete structural frame composed of six steel-reinforced columns. Cork insulation covered the columns and the interior of the dome was sheathed with acoustic tile with staggered joints. At 680 tons and measuring 125 feet high and 120 feet in diameter, it was one of the largest domes in the world, and was meant to "promote the illusion of a vast floating cloud atop a glass drum, 65 feet above the pavement." The circular shape of the dome was continued on the interior in the shape of the sanctuary and in numerous "porthole" windows. Overriding the congregation's resistance, Mendelsohn insisted on using clear glass instead of stained glass in all the windows. Circular motifs were a trademark of Mendelsohn's, and he had used curved glass walls and circular stairwells in other projects (Goldberg 1986; Johannesen 1979: 205-207).

Overlooking a wooded area, the main sanctuary featured sidewalls composed almost entirely of glass. The ark/pulpit/platform area was the focus of the sanctuary. A metallic crown stood atop the ark, and Mendelsohn designed the silver decoration for the original Torah covers. The curtain was woven with silver and gold threads, while prevalent colors elsewhere in the sanctuary were soft earth tones. Mendelsohn chose industrial linoleum flooring, which in 1950 was still a new material (Goldberg 1986).

Other buildings within the complex included Miller Chapel, which was reached via a glass-enclosed, curved corridor. This space was designed for daily and children's services and small weddings. On the rounded front, a golden grille with figures of sheaves of wheat, pomegranates, and grapes in gold and silver referenced Biblical descriptions. A study designed for the synagogue's rabbi overlooked the 40-foot ravine. Adjoining the sanctuary was the original assembly hall, with movable partitions that allowed the two spaces to merge whenever needed. Leading from the assembly hall to the exterior courtyard are a pair of massive, stainless steel and plate doors (Goldberg 1986). Still in use today, Park Synagogue stands as one of Ohio's most significant examples of Neo-Expressionist design.

4.4.6 Brutalism, ca. 1960–1970

Brutalism in its early phase was developed as a design philosophy, rather than a style. Brutalism rejected the conservative and fixed nature of typical Modernist architecture. Essentially a "flesh and bones" architecture devoid of any exterior decoration, the approach left exposed a building's major components: framing, sheathing, and mechanical systems. Originating in England, the term Brutalism was first used in 1953 to describe the architectural work of a group of British architects. The term Brutalism is derived from the French word "beton brut", which means rough concrete. The building's structure typically is composed of concrete, using a system of cast-in-place concrete sections that are coffered on the underside to reduce the weight of the form. Brutalist buildings are characterized by heavy, boxy massing constructed on a large scale. Highly sculptural, blocky shapes often are stacked together in various ways, creating unbalanced elevations (Whiffen 1999:279–284).

Common design elements often include broad, austere wall surfaces with windows treated as deep penetrations into the concrete walls. Vertical slots are often contrasted with broad linear forms. Exterior surfaces are typically exposed slabs of rough-textured concrete showing hammer marks and imprints from the wooden formwork (Whiffen 1999:279). Brutalism rarely was used for residential architecture, but was applied to institutional or public buildings and small-scale commercial buildings.

In Ohio, the Ohio Historical Center in Columbus shows the influence of the Brutalist style through its bold, geometric massing and the use of rough-finished concrete surfaces (Plate B87). W. Byron Ireland, an alumnus of the Harvard Graduate School of Design and former associate of architect Eero Saarinen, designed the edifice. Constructed between 1966 and 1970, upon its completion the building was lauded for its daring design featuring a triangular base with a glass-enclosed plaza above it and a cantilevered three-story block atop the plaza. The cantilevered block overhangs the open outdoor plaza by nearly 40 feet on all four sides, making it one of the largest cantilevers ever attempted. In addition to its significant engineering achievement, the historical center is noteworthy for its aesthetic design. In particular, throughout the building on both the interior and exterior, board-formed concrete finishes are visible, a defining characteristic of the Brutalist style. The modernist style was selected deliberately by the trustees of the Ohio Historical Society as a contrast with the building's use as a repository of the state's historical collections, archives, and library. The new historical center was dedicated on August 23, 1970 (Ohio Historical Society 2010d).

Other examples of Brutalist design in Ohio include the ca. 1971 addition to the Cleveland Museum of Art, designed by Marcel Breuer and Hamilton Smith; and the ca. 1969 Crosley Tower and the ca. 1970 Engineering and Science Center, both at the University of Cincinnati, and designed by A. M. Kinney & Associates.

4.4.7 Tiki, Ca. 1945–1970s

Tiki Architecture is a whimsical style, and is often grouped under "roadside architecture" of the 1950s. The term Tiki refers to large wooden or stone sculptures and carvings found in the Polynesian Islands. The Tiki style features Polynesian themes, and is sometimes referred to as Polynesian Pop (Kirsten 2003). The first documented use of Tiki themes in America came in 1934, when the restaurant Don the Beachcomber opened in Hollywood California. Don the Beachcomber was a Polynesian-themed bar and restaurant whose owner had been inspired by his experiences in the South Pacific. While Tiki elements were used sparingly during the late 1930s, the style experienced a boom following World War II. Sailors returned home with stories about life in the South Seas, and several books about the South Seas, including *Kon Tiki* by Thor Heyerdahl and James A. Mitchener's *Tales of the South Pacific* (which inspired the musical "South Pacific" in 1949) highlighted tropical regions and styles. As the middle class continued to grow, and air travel expanded and became more affordable, more and more Americans were able to travel abroad to regions in the South Seas, bringing back even more stories and pictures of the region (Kirsten 2003). As a result, the Tiki Style was used extensively in hotels, restaurants, and bars to create settings that capitalized on the relaxed and tropical nature of the style. Extremely popular in California, Tiki reached its height in popularity in 1959, when Hawaii officially became a U.S. state. One of the most famous Ohio examples of the style was the Kahiki Supper Club, located in Columbus, and designed by Ralph Sounik and Ned Eller (Plate B75). The restaurant was completed in 1961 and remained in business until 2000, when it was demolished (Wright 1997).

As its name suggests, the style utilized many Polynesian themes, including the use of Tiki figures, typically of stone or wood, lava rock or a lava rock motif, bamboo or imitation bamboo, shells, coconuts, palm trees, and faux thatched roofing materials. Roofs are typically steeply pitched and often feature an A-frame shape. Landscaping and interiors may feature waterfalls and flashy or exotic signage.

4.4.8 Googie, 1950–1970

Googie architecture, sometimes called "roadside" or "coffee shop" architecture, was a popular style for transportation-related commercial buildings, including restaurants, coffee shops, and drive-ins. The style is rooted in the design of a California coffee shop by John Lautner. Lautner's stores featured glass walls, arches, and angles that seemed to defy gravity. The term Googie became an accepted architectural style after it was published in a 1952 *House and Home* magazine article (Hess 1986:62). The Googie style is flashy and expressive, and was popularized by the optimism of mid-twentieth century consumer automobile culture.

Common features of the Googie style include large angled roofs, acute angles, exposed decorative steel beams, glass block, stainless steel finishes, stucco for exterior walls, large picture windows, and use of bright colors and signage, typically neon. The influence of Googie architecture in residential architecture can typically be seen in low, sweeping rooflines with broad eaves, angled bands of windows, sharply angled porch supports, and inverted triangles (Langdon 1986:116–118).

Googie architecture typically was used as a building-sized advertisement, both for independently owned commercial enterprises and for franchises and chains. For the latter, standardized designs were adopted and used consistently across a wide geographic range. A typical example was the White Castle building, featuring white, porcelain-enameled wall panels and a castellated "tower" at the corner above the primary entry. This chain originated in Wichita, Kansas, during the 1920s, but relocated to Columbus in 1934 and purchased the Porcelain Steel Building Company (Luce 1983). The distinctive design soon was imitated by other chains, such as White Tower, Little Tavern, and Toddle House. The White Tower System, originated in Milwaukee and soon reached Illinois, Michigan, Ohio, Pennsylvania, among others (Jakle and Sculle 1999:38). A White Tower restaurant in Dayton bore a close resemblance to the White Castle type, but for the restaurant's name (Plate B88).

Googie architecture extended to signage as well. The Big Boy franchise is recognized for its iconic, hamburger-bearing "Big Boy" (Plate B89). Robert Wian established the first Big Boy restaurant in 1936 in southern California, and sold Big Boy franchise rights to entrepreneurs across the country. In Fairfax, Ohio, David Frisch entered the restaurant business in 1939 with a drive-in eatery. In 1948, he purchased a Big Boy franchise and quickly established a chain across Ohio that remains in business to the present day (Jackle and Sculle 1999:76-78).

4.5 Stylistically Distinctive Construction Methods

Technological advances in engineering and building materials following World War II allowed architects greater freedom of design than at any other time. As architects employed these materials, many became almost synonymous with the resource types, such as skyscrapers, on which they were used, as well as the architectural styles, such as International, that were most suited to their aesthetic characteristics.

4.5.1 Curtain Wall

During the first half of the nineteenth century, buildings were constructed using exterior load-bearing walls that served to support the entire weight of the building. Advancements and refinement in the use of structural steel during the early twentieth century, as well as developments in the use of reinforced concrete, plate glass, and building sealants permitted the use of much smaller support columns to support large building loads, thus making exterior walls no longer necessary for structural support (Trachtenberg and Hyman 1979:498–499; Jester 1995:206, 272). Exterior walls could now be composed of lightweight panels hung to a structural frame, creating what is known today as a curtain wall. A curtain wall is defined as a non-structural, exterior building cover used for protection and privacy only (Whiffen 1999:303). As this method developed, architects and builders were able to increase the amount of glass used on a building's exterior, eventually leaving only the mullions of the exterior to be made of metal (Jester 1995:69).

Curtain wall construction is a key characteristic of modernist commercial and office building architecture of the 1950s and 1960s. Because curtain walls are not part of a building's structure, they can be constructed using lightweight materials, making them an economical choice for building design. Curtain walls also allow for more glass to be used in a building, creating more natural light. Developments in ceramic-coated plate glass, or spandrel glass, and building sealant technology during the 1950s allowed architects to utilize a number of sizes and colors of glass for their designs, making the curtain wall a contributing feature to a building's overall architectural appearance (Jester 1995:206, 272). While the first curtain walls were made of steel, most curtain walls utilized in modernist buildings were created with extruded aluminum members (Jester 1995:49, 64). The aluminum frames typically are infilled with spandrel glass, but stone veneers, metals, porcelain enamel, and louvers or vents also were used (Jester 1995:62, 206, 259). A typical example of curtain wall construction in a multi-story building is the ca. 1959, 21-story East Ohio Building at 1717 East Ninth Street in downtown Cleveland (Plate B90). The first story is almost entirely composed of large plate-glass windows topped by a wide band. Upper stories are composed of an aluminum grid infilled with clear glass and opaque spandrel panels.

The principal difference between curtain walls and the more common storefront window system is that curtain walls are designed to span multiple floors, as well as account for building design requirements such as thermal expansion and contraction; building movement; water diversion; and thermal efficiency (Jester 1995:69).

4.5.2 Articulated Frame

By the 1940s, commercial and public architecture began to benefit from innovations in engineering and materials, while companies hired architects to design buildings similar in size and scale to their peers (Doordan:2002:132). Curtain wall buildings thrived during this period and architects began to design buildings that respected the versatility of the materials yet conveyed a sense of mass and structure (Doordan 2002:136). By the late 1950s and early 1960s, functional building designs were being based more and more on the fundamental frame of the building, while at the same time highlighting a company's desire for efficiency and success. Building innovations in wind bracing and fire proofing allowed for distinctive building designs, and the increased use in computer-aided designs allowed engineers to create new and creative designs highlighting a building's framework.

Articulated frame buildings typically are constructed using three types of construction methods: curtain wall, steel, and concrete. In all three variations, the frame of the building is emphasized throughout the design. The structure of the building often is overstated by materials or building design, placing a strong emphasis on the structural bones and mass of the building. Articulated frame buildings typically have flat roofs, regularly spaced window openings, and little or no ornamentation.

4.5.3 Structural Aesthetic

The use of structural aesthetic features in modernist buildings is closely linked to advancements in pre-stressed concrete and the popularity of the curtain wall in post-1950s construction. One of the most famous uses of structural aesthetic is Mies van der Rohe's design for the Lake Shore Drive Apartments, completed in Chicago in 1951. Mies created the illusion of a steel structure by using a concrete form encased in a veneer of steel to which I-beams were welded as a brace, thus creating "symbolic structure" (Roth 1979:283). Mies's structurally aesthetic curtain wall became the model for skyscrapers through the 1950s and 1960s, and buildings were constructed using an aggressive scaffolding of steel or masonry members, creating "a real or symbolic exhibition of skeletal structure" (Trachtenberg and

Hyman 1979:546). The use of structural aesthetic was common in many forms of modernist architecture where exposed framework (concrete, brick, or metal) was used to imply an intricate piece of structural engineering. The aforementioned Libbey-Owens-Ford Tower (Plate B46) is an example of structural aesthetic design.

4.5.4 Slick Skin

As early as the 1920s, the concept of cladding a building entirely in glass was discussed by early Modern architects such as Le Corbusier and Mies van der Rohe. The technology of the early twentieth century, however, placed limitations on the amount of glass used on a building's exterior (Trachtenberg and Hyman 1979:528–529; Whiffen 1999:287). During the 1950s, as curtain wall technology progressed toward smaller and smaller framing for windows, architects came closer to the ideal of creating a building with a seamless exterior glass membrane. By the 1960s, new methods of assembling glass, using small clips and glass structural fins, created stronger glass and thinner window gaskets, which led to the virtual disappearance of mullions and transoms and created the look of a "flexible skin" exterior (Whiffen 1999:288). During the mid-1960s, reflective glass was introduced, thus allowing architects to create a building that mirrored the surrounding environment, giving a sleek but ghostly characteristic to the building's design (Whiffen 1999:288; Trachtenberg and Hyman 1979:546).

Buildings utilizing slick skin in their construction have tinted and/or mirrored glass, which gives the building a seamless look. Originally constructed using a rectangular form, later slick skin buildings employed smooth rounded elements, allowing the glass to flow around corners or span rooftops. Sculptural in appearance, the exterior covering typically extended from the ground level to the roof. Slick skin buildings were most commonly used in office towers during the 1960s and in later decades (Whiffen 1999:288). The aforementioned ca. 1964 Tower at Erieview in downtown Cleveland (Plate B56) is an example of slick skin design.

4.6 Construction Methods and Materials; Technological Innovations

In the United States, wood, brick and stone remained the dominant building materials into the early twentieth century. Among these materials, timber played the biggest role in the construction industry. About 86 percent of all extant buildings in the United States consist of wood frame construction, with residential buildings comprising the majority of the total (Jester 1995:36). Wood is not only readily available in the United States; it also possesses characteristics desirable to construction. Easy to cut, turn, plane, and finish, wood meets a wide variety of building needs. Exposed to steam, wood becomes pliable and shapeable, enabling manufacturers to create any number of structural members or decorative items. Similarly, brick and stone lend themselves well to construction. Possessing good compression strength, these materials make solid foundations and load-bearing walls. Certain varieties of stone allow for shaping and carving, making the material suitable for decorative purposes. Brick, too, provides an excellent medium for architectural expression, with any number of colors and textures available to builders. Durable and attractive, reinforced brick construction was used extensively in the commercial, industrial, and institutional sectors.

Approximately 4 percent of the nation's buildings consist of reinforced brick construction (Jester 1995:34).

The advent of the skyscraper during the late nineteenth century required a more modern approach to building construction. As architects and engineers designed ever-taller structures, they soon exceeded the practical limits of load-bearing brick and stone. Advances in iron and steel manufacturing provided architects the materials they needed to reach beyond the capacities of traditional building materials. With the invention of iron and steel frame construction, brick and stone became little more than a veneer upon a metal skeleton. Standardization of metal building components made metal frame construction efficient and economical. Consequently, metal frame buildings became increasingly common during the early twentieth century and, by the late twentieth century; metal frame construction constitutes 7 percent of the nation's buildings and 11 percent of enclosed square footage (Jester 1995:34).

Modern steel manufacturing evolved simultaneously with the rise of the skyscraper, which created demand for specialized metals. Advances in metallurgy in turn created a need for trade organizations equipped to test products and set industry standards. With the aid of professional societies, such as the American Society of Mechanical Engineers, trade associations established voluntary standards. The metal testing process not only improved the quality of steel, it created a model for materials development in general. Driven by market demand, materials development spawned an industry in itself, bringing about a need for additional civil, mechanical, electrical, and chemical engineers (Jester 1995:37).

Through the 1920s, industrial research significantly improved the quality of building materials. In conjunction with the federal government, trade associations and professional groups standardized products. Prominent organizations associated with testing included the American Society for Testing and Materials (ASTM), the National Fire Protection Association (NFPA), and the Underwriter's Laboratory (UL). Through its publication, *Standards*, the ASTM promoted building materials by educating the construction industry about the latest advances. Legislation mandating fire prevention standards in construction became increasingly common due to the efforts of the NFPA. Prevention of electrical fires became a major project for the UL, which remains one of the oldest certification laboratories in the country (Jester 1995:39).

A number of building products developed during the 1920s stemmed from materials created or improved for military purposes during World War I. Plywood, for example, transitioned from a simple, decorative veneer to a structural component, thanks in part to its use in aircraft fuselage construction. Laminated glass, first developed for military vehicle windshields, became a standard product in the automobile industry after the war. The decorative veneers Micarta and Formica evolved from lightweight components used for airplane control linkages, gears, and electrical devices (Jester 1995:38).

A building boom, driven by the strong economy of the 1920s, propelled demand for new and innovative materials. Thermal insulation, acoustical controls, and lighting equipment became part of the normal materials list. The need for thermal insulation arose due to an increase in steel frame construction. Insulating materials of the early twentieth century consisted of slag wool. This material gave way to asbestos, which became increasingly common during the first half the twentieth century. Shredded or powdered fillings became popular forms of insulation after World War I, as did aluminum- and copper-covered batt insulation (Jester 1995:38).

During the early 1930s, the construction industry declined considerably, as the nation struggled to cope with the Great Depression. By 1936, building activity began to increase. A measure aimed at stimulating the economy, house construction, resumed to levels nearly equal to the 1910s. Due to economic pressures, however, new houses tended to offer fewer rooms and less ornamentation. Also indicative of the era, the federal government backed building loans only reluctantly. As the government took steps to account for expenditures, the FHA began regulating materials standards for construction of government buildings. Further regulation in the building industry occurred as the National Bureau of Standards released journal articles regarding building materials and structures reports (Jester 1995:39).

Standardization of building materials became increasingly important during the Great Depression, as manufacturers looked for ways to build products with fewer raw materials. This process of adaptation led to development of new materials, but the depressed market made it difficult for manufacturers to locate ready buyers. Nevertheless, by the late 1930s, many in the construction industry began to recognize the implications of standardization, scientific research, and mass production. Innovative architects also appreciated the advantages of modern building technology, as they found ways to incorporate the latest materials into their designs. The growing movement found its greatest expression in the minimalist, International Style, which relied heavily on modern building materials (Jester 1995:40).

With the outbreak of World War II, the construction industry shifted its focus toward wartime production. Through the Reconstruction Finance Corporation, the federal government assumed control of any company that manufactured materials deemed necessary for the war effort. Key to the wartime production, the metal and rubber industries became areas of focus for the government. As noted previously, having lost access to natural rubber supplies in the South Pacific, the United States rubber industry launched a campaign to perfect synthetic rubber. Neoprene and Butyl, both developed during the 1930s, proved critical to the invention of natural rubber substitutes. Substitutes for steel and copper proved more challenging, forcing contractors to pour concrete with little or no reinforcing materials. Fiberglass became a substitute for asbestos, and glued laminated timber helped replace steel trusses when spanning long distances (Jester 1995:41).

Construction of war machines and the plants to manufacture them greatly strained the nation’s resources. The United States government ordered the construction of thousands of structures, including 1284 airports, 175 million square feet of construction space, and thousands of barracks, mess halls, hospitals, chapels, and all manner of structures related to supporting troops. The effort drained the country of traditional building materials, but the unprecedented production of new materials left the nation with an abundance of modern building supplies, such as gypsum board, cement-asbestos siding and roofing, and aluminum alloys (Jester 1995:41–42).

With the end of wartime production, manufacturers of modern building materials turned their attention to supplying consumers with their products. Principles of science and mass production, as developed during the 1930s and implemented during World War II, proved exceptionally useful during the postwar years, as postwar prosperity created a seemingly endless market for building materials. Government-aided research and development helped improve older technologies and develop entirely new ones. Prestressed concrete, for example, became a viable product by the late 1940s, and concrete panels became exceedingly common for building construction. The advent of this material greatly affected the building trades, as many carpenters abandoned their traditional skills to build formwork for concrete structures. Steel and glass also became common building materials as curtain wall construction came to dominate high-rise construction. The glass wall trend continued through the 1960s, finally meeting popular resistance during the energy crisis of 1973 (Jester 1995:42).

In general, the postwar era saw a growing trend toward mass-produced synthetic materials and composites. Many of these materials evolved from research conducted by the petroleum industry. Interior finishes, such as bonded, decorative laminates, and molded plastics made of polyvinyl chloride, polystyrene, and polyolefines, urethanes, and silicones all developed from petro chemicals. Due in large part to military spending on research and development, modern materials evolved to adapt to current trends in the aerospace industry. In the process, natural building materials continue to decline in use, as metal and concrete supersede wood, brick, and stone (Jester 1995:43).

Standardization of materials effectively homogenized construction within the United States. Consequently, building materials and construction methods used in Ohio resembled those used elsewhere in the country. Materials advertisements in *Ohio Architect* clearly show that Ohio’s architects had access to the latest building technologies. And although architectural styles varied from one region of the country to the other, construction techniques remained largely the same, due in no small measure to the standardization of materials. As a result, regional variations in materials and construction methods, which appeared well pronounced during the early nineteenth century, virtually disappeared by mid-twentieth century.

The following list of materials addresses the more common building materials used in the post-war era. Building contractors throughout the country, including the State of Ohio, used these materials in everyday construction. Advertisements found in *Ohio Architecture* provide specific examples of a few of the materials manufactured in Ohio or at least offered by suppliers operating in Ohio. Note that materials manufactured in Ohio were readily available wherever distributors found a market for their products. With a well-developed railroad network and rapidly developing interstate highway system at their disposal, manufacturers of building materials could ship their products throughout the country. In addition, a great many building materials and construction methods were simply licensed products that any number of manufacturers or contractors around the country could produce. As a result, building contractors throughout the country might have equal access to any given product. Thus, nationwide manufacturing and distribution networks combined to minimize or eliminate differences in materials from one area to the next.

4.6.1 Molded plywood

Consisting of multiple layers of soft or hard wood veneers, plywood panels possess a high strength-to-weight ratio, dimensional stability, and resistance to splitting. Exposed to steam, plywood becomes pliable and moldable. Used for structural or decorative purposes, plywood meets a wide variety of building needs (Jester 1995:132). Among the many Ohio firms that have supplied plywood products to local builders through the mid-to-late twentieth century are Cleveland Plywood and the Dougherty Lumber Company, both in Cleveland and Tri-State Architectural Panel Sales in Toledo.

In 1865, John K. Mayo received the first known plywood patent. The reissue patent noted that the material was suitable for covering or lining structures. It appears, however, that plywood saw little use during its initial production. Not until the late nineteenth century did the material increase in popularity. Used by the furniture industry for drawer bottoms and other concealed parts, as well as for piano pin planks, sewing machine covers, seating, and desktops, plywood remained largely a decorative item, with limited structural use. By about 1890, manufacturers made door panels from hardwood plywood. By 1905, the Portland Manufacturing Company was making Douglas fir plywood panels. These materials remained largely decorative until World War I, when the aircraft industry adopted plywood for covering fuselages (Jester 1995:132).

Following the war, the automobile industry began using plywood for door panels, and in 1924, the Pacific Coast Manufacturers Association established a system for grading plywood. The Forests Products Laboratory in Madison, Wisconsin, experimented with plywood during the late 1920s to determine the feasibility of using the material for sheathing. With the advent of waterproof plywood in 1934, the material became an acceptable structural component and covering for use in house construction. Numerous experiments conducted during the 1930s aimed to develop prefabricated plywood walls and partitions. In 1936, Foster Gunnison developed the first commercially prefabricated house using exterior plywood. Additional prefabricated plywood houses soon followed, including the Dri-Bilt house, offered by the Douglas Fir Plywood Association. Designed by Jacques Willis in 1938, the Dri-Bilt house included plywood walls, subfloors, ceilings, and partitions (Jester 1995:134–135).

Plywood became a popular building material for Modernist architects of the 1930s. Richard Neutra and Lawrence Kocher both designed houses using plywood for exterior walls. The material's growing popularity, however, did not assure the success of prefabricated houses; rather, plywood found increasing use in subflooring and sheathing. Plywood also became a standard material for door construction, as well as parquet floor manufacturing (Jester 1995:135).

The success of these newfound applications depended largely on industry standards, which provided for uniform quality of surface finishes. In 1933, the Bureau of Standards established a series of finishes for plywood, which included Good 2 Side, Good I Side, Sound 2 Sides, Sound I Side, Wallboard, and Concrete Form Plywood. Standardized panel sizes also evolved during the early 1930s, with the 4- by 8-foot panel emerging as the most common size. Thicknesses for 3-ply panels included 3/8 inch and 1/2 inch, but other thickness eventually emerged (Jester 1995:135).

Advances in plywood construction, initiated during World War II, improved production of the material. Using radio-frequency technology, manufacturers replaced convection heating when activating the heat-reactive resins that bound the various layers of veneer to one another. Also attributed to wartime production, the process known as bag molding enabled manufacturers to add compound curvature to molded plywood (Jester 1995:134).

Following the end of World War II, plywood found a ready market with the postwar housing boom. In addition to its use as a structural component, factory prefinished hardwood panels became increasingly popular during the 1950s. Developed by U.S. Plywood Corporation during the mid-1940s, Plankweld panels came in 1/4-inch stock and included a variety of colored finishes (Jester 1995:135).

When applying structural plywood or paneling, builders typically nailed the material to studs spaced on 6-inch centers for panel perimeters and 10-inch centers for intermediate studs. Builders used a variety of joints when lining up panels, including lap, tongue-and-groove, V-joint, concealed with battens, and flush (Jester 1995:135).

4.6.2 Glued Laminated Timber

Laminated timber consists of multiple layers of wood glued together to form a cohesive structural member. The grains of the individual wood pieces all run parallel along the longitudinal axis of the member. Thickness of laminations typically measure 1 to 2 inches but lengths and widths vary considerably. Most laminated timbers consist of softwoods, including Douglas fir and southern pine. Shapes vary from straight beams and columns to arches of every description. The overall lengths of laminated timbers vary according to the application. Due to their laminated construction, these members can clear spans longer than natural, solid timbers (Jester 1995:137).

The earliest known laminated timbers date to the late nineteenth century. However, laminated timbers did not see widespread use for at least another ten years. The first patent for laminated timbers went to Otto Hetzer of Weimer, Germany, who created glued laminated beams in 1901 and curved laminated members in 1906. Consequently, European builders referred to laminated arches as the Hetzer construction method. Until World War I, Hetzer’s laminated arches saw extensive use in the construction of German and Swiss railroad stations, factories, workshops, and gymnasiums. Due to a shortage of casein glue during World War I, Hetzer’s arches failed to spread to greater Europe (Jester 1995:137).

The first building in the United States to employ laminated timbers was the Peshtigo High School gymnasium in Peshtigo, Wisconsin. Built in 1934, the gymnasium included a series of Type W laminated arches. Despite skepticism by engineers, the glued laminated arches proved more than adequate. During this time, the United States Department of Agriculture’s Forest Products Laboratory in Madison, Wisconsin, established a research program aimed at developing glued laminated timber. The department released the results of their research in

1939. A more thorough study did not follow until 1954, when the department released suggested design specifications (Jester 1995:138).

Success of laminated arches had much to do with advances in adhesives. Water-resistant casein glue provided the bulk of adhesives used prior to World War II. Although water-resistant, the glue did not lend itself well to exterior applications. More weather-resistant synthetic glues appeared on the scene during the early 1930s. These glues proved suitable for exterior structures, including bridges. Unreaformaldehyde and phenol-formaldehyde remained in use through the 1950s. Resorcinol resin and phenol-resorcinol adhesives joined the list of available glues during the 1950s (Jester 1995:138).

Researchers learned that glued laminated timber provided as much strength and support as the wood itself. Consequently, laminated timber saw wide use through the mid-to-late 1930s. Churches, barns, gymnasiums, garages, storage buildings, and warehouses all benefited from laminated timber. Prior to World War II, the majority of projects using laminated timber occurred in or around Wisconsin, where the United States Department of Agriculture's Forest Products Laboratory conducted its glued laminate experiments. World War II, however, diverted much-needed steel to the war effort, necessitating a substitution for steel trusses. Unit Structures, the first manufacturer of laminated timbers in the country, remained the primary manufacturer of laminated timber members during the 1930s. During the war, Unit Structures authorized Timber Structures of Portland, Oregon, to build laminated timbers. Upon winning a wartime contract, Unit Structures convinced the military to use glued laminated timber for many of their new buildings (Jester 1995:139).

The success of glued laminated timbers during the course of the war earned the material a solid reputation. After the war, numerous manufacturers entered the glued laminated timber industry. Due to a need for extensive clear spans, churches often utilized glued laminated timbers, as did schools, aircraft hangars, supermarkets, auditoriums, factories, and warehouses. Promoted by the Americana Institute of Timber Construction, the glued laminated timber industry expanded significantly. Between 1954 and 1963, the amount of glued laminated timber increased from 31,420,000 board feet to 85,937,000 board feet (Jester 1995:139).

Toledo architects Munger, Munger & Associates specified laminated timbers for the St. Patricks of Heatherdowns Catholic Church. Completed in 1957, the church features a series of pecan stained laminated wood bents (*Ohio Architect* 1958:101–2). These massive arches provide a wide, unobstructed view of the length of the nave (Plate B28). The church remains standing on Heathersdown Boulevard in Toledo.

4.6.3 Concrete Block

The popularity of concrete block expanded significantly during the first two decades of the twentieth century, due in large part to the increasing availability of improved Portland cement. Prior to the twentieth century, attempts to mass-produce concrete building blocks failed, owing to the inconsistency of Portland cement. By 1902, the American Society for Testing and Materials had established standards for gray Portland cement, making the material more consistent in its composition. That same year, Harmon S. Palmer established the Hollow Building Block Company for the purpose of manufacturing cast iron, concrete block machines. By 1904, Palmer's company had a capacity of 400 machines per year (Jester 1995:37, 80).

The typical block machine of the early twentieth century consisted of a metal, mold box with a hand-release lever for removal of the mold sides and cores. Masons loaded the mold with a mixture of Portland cement, water, sand, and aggregate then tamped the material to eliminate voids. Once released from the mold, workers placed the blocks on an appropriate surface to dry. By the 1920s, molds operated according to an extrusion process, and power tampers had replaced hand tamping. Power tamping gave way to automatic vibrators in the 1930s, and block machines increased in capacity to make multiple blocks simultaneously. By 1940, much of the block making process was automated (Jester 1995:83).

Available in a wide variety of sizes and surfaces, concrete blocks offered builders an array of decorative possibilities. By 1924, concrete block trade associations had established standards for block sizes. The 8- by 8- by 16-inch block became the most common size by 1930. The weight of the blocks also changed over time, as improvements in aggregates reduced the mass needed to make a block. Patented in 1917, F.J. Staub's cinder block significantly reduced the weight of concrete blocks. Strong, durable, and able to take a nail, cinder blocks dominated the concrete block industry in the 1920s and 1930s. By the 1940s, however, other aggregates entered the market, including pumice, expanded shale, clay, and slate aggregates. Mass-produced at manufacturing facilities, blocks of the late 1930s and 1940s became less decorative and more utilitarian. By the postwar era, plain-face blocks dominated the concrete block industry (Jester 1995:83).

The Geist Coal & Supply Company of Cleveland manufactured a variety of concrete block types in the 1950s. The company promoted their patented Roman Roughs and Bermuda Blocks as ideal for construction of patios, outdoor fireplaces, garden walks, and walls. They also manufactured patio block and slump brick, for exterior and interior planters, as well as for interior walls (*Ohio Architect* 1954: 44-45).

4.6.4 Reinforced and Pre-stressed Concrete

While the use of concrete has a long and successful history, one inherent problem with the technology was a lack of tensile or flexible strength. In 1860, S. T. Fowler developed a process by which he embedded metal bars within the concrete to resist shearing stresses, providing the material a greater range of construction applications. Commercial use of reinforced concrete, however, is generally credited to Ernest Ransome who, through the 1890s, refined the process of casting individual reinforced units, such as girders, beams and floor slabs which then rested atop concrete columns. (Jester 1995: 93-95).

The sixteen story, Ingalls Building (1903) in Cincinnati is generally credited as the first skyscraper constructed using Ransome's reinforced concrete system. Considered a pioneering and experimental project, the construction proved that the equivalent of steel frame load bearing capacity could be attained through concrete construction at a lower cost. Although derided by critics at the time of construction, the building did not topple under its own weight as predicted. It was listed on the National Register of Historic Places in 1975 and also recognized by the American Society of Civil Engineers as a National Historic Civil Engineering Landmark (Sambi 1975).

Reinforced concrete gained widespread use in the construction of buildings, arched bridges, and after about 1910, for shells, domes and thin shell roof construction for auditoriums and other larger scale structures. Disguised under marble, terra cotta and brick cladding for much of the twentieth century, the concrete frame emerged as an architectural element in the 1970s and 1980s when architects embraced functional aesthetics (Jester 1995: 95-96).

The continuing effort to increase the tensile strength of concrete led to the advent of pre-stressed concrete. Used in structural members subject to bending or tension, pre-stressed concrete counteracts loads to a designed degree. Pre-stressed members are internally stressed through either pre-tensioning or post-tensioning. Most pre-stressed members receive linear pre-stressing, where pre-stressing is applied to the long axis of a member. This enables the member to resist tensile stresses from bending (Jester 1995:115).

Initial attempts at creating pre-stressed concrete occurred as early at the mid-1880s. However, due to creep, or shrinkage in concrete, early efforts at pre-stressing failed. Not until 1925 did anyone patent a method for successfully pre-stressing concrete. Accounting for shrinkage, R.E. Dill of Alexandria, Nebraska, developed a system for pre-stressing, but his method failed to gain widespread acceptance. Three years later, Frenchman engineer Eugene Freyssinet employed high-strength steel wires to post-tension concrete members. By the late 1930s, German engineer E. Hoyer had developed a system for pre-tensioning concrete members (Jester 1995:115; Libby 1990:265).

Pre-stressed concrete came into limited use in the United States during the 1930s, when Preload Corporation used circular pre-stressing techniques to manufacture tanks and pipes. The modern pre-stressed concrete industry, however, did not arrive until 1949. In that year, Belgian engineer Gustav Magnel visited the United States, delivering a number of lectures on the subject. Soon after, a group of American engineers designed the first pre-stressed bridge in the nation. Opened in 1951, the Walnut Lane Bridge in Philadelphia included 13, 160-foot long post-tensioned girders in the main span and seven, 74-foot long girders in the approach spans (Jester 1995:115–116).

The pre-stressed concrete boom expanded significantly during the 1950s, due largely to the construction boom of the postwar era, steel shortages during the Korean War, and passage of the Interstate Highway Act of 1956. The pre-stressed concrete conference, held at the Massachusetts Institute of Technology in 1951, as well as the formation of the Pre-stressed Concrete Institute in 1954, helped promote the material. Following resolution of a number of technical hurdles, including the proper formulation and processing of suitable concretes, the material gained wide acceptance in the construction industry (Jester 1995:116).

Manufacturers of pre-stressed concrete apply tensioning prior to or after the concrete has set. The pre-tensioning technique requires the manufacturer to stretch the reinforcing steel before pouring concrete into the form. Once cured, the manufacturer releases the tensioned steel, allowing the load to transfer to the concrete. The bond between the concrete and steel absorbs compression forces, transferring the stress throughout the length of the member. The opposite procedure occurs during the post-tensioning process. Reinforcing steel goes into the form in an unstressed condition. Enclosed within sleeves or conduits, the steel remains isolated from the concrete. Upon reaching the required compressive strength, the manufacturer applies tension to the steel by aid of jacks. Once the steel reaches the desired level of tension, the manufacturer locks the free ends in place, transferring compression to the cured concrete. An injection of grout fills the voids between the conduits and steel, insuring a watertight seal. This particular method works well when joining large, precast segments to span long distances (Jester 1995:116).

Pre-stressed concrete members became exceedingly common in building construction by the mid-1950s. Builders employed smaller, pre-stressed members in the construction of commercial buildings, parking structures, schools, and warehouses (Plate B29). With transportation considerations in mind, members for building construction remained relatively short in length, with some members as short as 36 feet. Among the early structures built with pre-stressed concrete members, the Boeing Company Development Center in Seattle (1956) held the title as the largest pre-stressed concrete industrial building in the world. The 21-story Norton Building (1957), also located in Seattle, holds the honor as the first pre-stressed concrete building to exceed six stories. Other early successes include monorails at the 1961 Seattle World's Fair, followed in 1971 by Disney World's monorail in Orlando, Florida (Jester 1995:117).

In Ohio, pre-stressed concrete members have been used in hundreds of bridge projects. Beginning in the late 1940s, use of pre-stressed concrete I-beams allowed concrete span lengths to be increased to 150 feet. Pre-stressed members proved to be more economical than steel I-beam units as well. Early examples of Ohio bridges incorporating pre-stressed concrete already had been determined eligible for the NRHP. They include the 1952 Roseville Bridge on County Route 32 in Muskingum County and the 1960 US Route 37 bridge over the Scioto River (Parsons Brinckerhoff et al. 2005:3/100-3/102). A listing of historic-age bridges in Ohio is included in Appendix F. Pre-stressed concrete also found uses in Ohio's buildings. For example, the Kroger Headquarters building at 1014 Vine Street, Cincinnati, has a pre-stressed concrete frame (Greinacher et al. 2008:n.p.).

4.6.5 Architectural Precast Concrete

Used for either load-bearing or non-load-bearing purposes, architectural precast concrete includes all types of precast concrete building components. These elements are either reinforced or pre-stressed and rely on an array of fasteners to adhere the components to the structure, including reinforcing bars, bolts, threaded rods, and structural steel shapes (Jester 1995:108).

Precast concrete found limited use in the United States during the 1930s, but the Great Depression severely hindered its growth and development. The building boom of the postwar period, however, created significant demand for precast concrete. Often used as an exterior wall surface, precast concrete panels offered architects a variety of finish possibilities, which might entail sandblasting, water washing and brushing, etching with acid or bush hammering. One of the more popular finishing processes developed in the 1930s became known as the

Mo-Sai technique. Mo-Sai relied on densely packed mineral aggregates and minimal amounts of cement to create a variety of textures. Patented by Dextone Company in 1940, Mo-Sai became available to a number of licensed manufacturing firms throughout the United States (Jester 1995:108,110).

In Ohio, the Marietta Concrete Company manufactured precast concrete panels for the construction industry (Plate B30). These panels appear to have been available in a rectangular shape with a textured, corrugated surface (Ohio Architect 1970). Other shapes and patterns might have been available as well. An example of an Ohio building displaying this material is a ca. 1968, eight-story office building at 5 Severance Circle in Cleveland Heights (Plate B91). The precast concrete panels are the dominant exterior treatment on the building. The grid of panels is pierced by small, regularly spaced rectangular window openings. Raised vertical bands along the edges of the panels emphasize the building's verticality, while slightly lighter horizontal bands demarcate each story.

4.6.6 Tilt-up Concrete Construction

Tilt-up concrete construction walls are formed horizontally then raised into position, much like the raising of a wooden barn. The concept actually dates to the Roman Empire but the idea did not fully develop until the invention of rebar in the early twentieth century. The improved tensile strength afforded by rebar reinforcing made tilt-up concrete construction a more viable building option. However, the method saw limited use until the post-war era, when ready-mix concrete and mobile cranes made the erection of tilt-up buildings more practical. Ready-mix concrete allowed for precise concrete mixtures, tailored to the work site environment and cranes enabled builders to raise pre-formed walls into place, regardless of the location of the construction site (Tiltup 2010).

Tilt-up concrete construction became exceedingly popular in the late 1940s and 1950s. An efficient method of construction, tilt-up concrete construction saved considerable time and money. By the twenty-first century, tilt-up construction comprised 15 percent of all industrial buildings and structures within the United States (Tilt-up Concrete Association 2010). In Ohio, the Portland Concrete Association regularly advertised tilt-up concrete construction in the *Ohio Architecture* journal. The advertisements noted that tilt-up construction was one of the fastest growing building methods (Ohio Architect 1954:14). Touted for speed and economy of erection, tilt-up concrete walls offered builders a low-cost method of construction (Plate B31).

4.6.7 Thin Stone Veneer

Used for non-load-bearing purposes, thin stone veneer does not exceed two inches in thickness. The most common thin stone veneers include granite, marble, travertine, limestone, and slate. Applied to the façade of a building, the material provides the appearance of load-bearing masonry (Jester 1995:168).

Builders used thin stone veneers as early as the 1890s. Burnham and Root specified thin stone veneer for the 1895 Reliance Building in Chicago. Applied to the first two stories, the stone veneer measured between 2 and 4 inches thick. The material appeared on other buildings throughout the early twentieth century. By the late 1930s, thin stone veneer commonly covered entire façades. The Rule-Page Building (1940) in Mason City, Iowa, and the Federal Reserve Bank (1950) in Detroit, Michigan, offer early examples of commercial buildings clad entirely in thin stone veneer. Not until the early 1960s, however, did architects more often specify thin stone veneer for buildings. Clad with marble veneer, the John F. Kennedy Center for Performing Arts in Washington, D.C. was among the first such high-profile buildings to feature the material (Jester 1995:168).

Throughout the duration of the nineteenth century, quarried stone blocks required hand finishing. Development of finishing machinery during the early twentieth century made the process more efficient. Gang saws, for example, enabled stone workers to cut multiple blocks of stone simultaneously. By the early 1930s, gang saw technology enabled veneer manufacturers to cut blocks to as thin as 1 inch. Once reduced to a thin slice, carborundum wheels further refined the slabs. Manufacturers offered a wide variety of finishes, including rockfaced, sawed, sandblasted, peen-hammered, pointed, bush-hammered, rubbed, honed, and polished. During the early 1950s, typical stone thicknesses included 7/8, 1¼, 1½, and 2 inches, with most manufacturers recommending 1½ inch thickness for stone veneer. Panel sizes during the 1950s typically measured 3 or 4 feet square (Jester 1995:170) (Plate B32).

Following typical masonry practice, builders installed thin stone veneer panels on mortar beds, with mortar-finished joints. Builders typically installed stone veneer with a 1/4-inch space between panels, and manufacturers recommended allowance for an expansion joint every 30 feet vertically and every second floor horizontally. Manufacturers also recommended that installers leave a 1-inch deep cavity behind each panel. As many as four galvanized or asphalt-covered steel rods served as lateral anchors, tying the panels to structural framing. Builders sometimes used plaster of paris as a quick-setting spacer behind the panels. Interior panels received support with wire anchors, which the installer tied to some form of backup material, such as brick or block. Stainless steel strap anchors become increasingly common by the late 1940s (Jester 1995:170–171).

Composite building panels became increasingly common by the late 1950s, with stone veneer-covered, precast concrete panels dominating the industry. The Marble Institute of America's *Marble Engineering Handbook*, and the National Association of Marble Producer's *Marble-Faced Precast Panels*, helped standardize thin stone veneer construction during the 1960s. Use of the material increased significantly during the 1970s and 1980s, with a 600 percent increase in marble and a 1735 percent increase in the use of granite during this period (Jester 1995:171).

In Ohio, the Columbus-based Hamilton Parker Company began offering thin stone veneer products during the 1950s. The company originally was a fuel supply company, but the gradual erosion of the coal market necessitated a shift in business strategy. Hamilton Parker enjoyed considerable success with the new product line and continued to diversify its inventory of building supply materials over time (Hamilton Parker 2010).

4.6.8 Simulated Masonry

As its name implies, simulated masonry consists of a moldable material shaped to mimic stone. Made from cement, epoxy, fiberglass, minerals, or some other synthetic substance, simulated masonry served the same decorative purpose as cast stone and concrete block. Although merely an ornamental veneer, simulated masonry cladding was designed to impart a sense of permanence (Jester 1995:175).

Manufactured at a factory or cast on-site, builders applied simulated masonry directly to the wall. This type of construction enabled builders to adapt the material to existing conditions. Although promoted for new construction, the material became a popular method for renovating older structures. Considerably less expensive than stone construction, simulated masonry gained wide appeal following its invention. The material found particular success among middle-class Americans, who could now afford the appearance of stone, if not actual stone construction (Jester 1995:175).

Considered the originator of simulated masonry, the Perma-Stone Company of Columbus began promoting its product in 1929. A complete package deal, the Perma-Stone process included molds, materials, and installation by a licensed and trained dealer. The popularity of the material soon attracted additional simulated masonry companies. Formstone, made by the Baltimore-based, Lasting Products Company, was another popular brand that appeared on the scene in 1937. Similar to the Perma-Stone process, Formstone came with all necessary tools, materials, and a company-trained contractor (Jester 1995:175).

The Perma-Stone process entails the mixing of a cementitious material at the building site. After adhering metal or wood lath to the façade, the contractor coats the lath with a brown coat. Prior to setting, the contractor creates grooves in the surface of the brown coat, creating a textured surface upon which the scratch coat will adhere. While the scratch coat remains wet, the contractor applies the finish coat with the aid of pressure molds. The molds shape the finish coat to impart the look of stone, giving the Perma-Stone its unique appearance. A waterproof membrane application seals the Perma-Stone, making it resistant to moisture penetration. The process works on flat or curved surfaces, and any number of coursing patterns and joints work equally well. Color also remains variable, as the pigments mix directly into the cement, allowing for creative enhancements (Jester 1995:177).

Formstone follows a similar process as that used for Perma-Stone. Once the contractor has applied the metal or wood lath to the surface of the wall, they then apply a 3/8- to 3/4-inch layer of cement mortar atop the lath. Much like the brown coat applied during the Perma-Stone application, the Formstone contractor scores the initial coat of mortar, making a textured surface suitable for holding the second coat. Once dry, a second layer covers the first layer, creating a surface for the final layer, which includes the stone shapes. The contractor creates a variegated effect by alternating colored cements between forms. While still wet, the contractor textures the mixture with a roller designed to impart a stone-like appearance to the Formstone. The type of texture depends on the type of roller. The contractor can use any combination of pigments to color the Formstone (Jester 1995:179).

The makers of Formstone promoted the product as a means to refurbish deteriorated masonry or improve insulation of an existing building. With its large inventory of soft-brick buildings, Baltimore, Maryland, became the “Formstone Capital of the World.” Whether used for new or old construction, the overall popularity of simulated masonry declined after the 1950s.

Cheaper cladding materials, namely aluminum and vinyl, captured the siding market during the 1960s and 1970s. Nevertheless, limited quantities of Perma-Stone and Formstone remain in production today (Jester 1995:179).

4.6.9 Spandrel Glass

Used to cover knee walls and spandrel beams in curtain wall construction, spandrel glass typically rests above and below horizontal strip windows. A ceramic-coated plate glass, the material came in an unlimited variety of colors and sizes. Spandrel glass found widespread popularity in the postwar era, where it commonly adorned commercial buildings (Jester 1995:206).

Spandrelite, introduced by Pittsburgh Plate Glass in 1955, emerged as one of the more popular spandrel glass options. Manufactured in a variety of sizes and colors, the material offered architects a virtually unlimited pallet from which to choose. Also available in an array of colors and sizes, Vitrolux, by the aforementioned Libbey-Owens-Ford firm in Toledo, earned a large share of the spandrel glass market (Jester 1995:208). The firm's multi-story office tower in downtown Toledo utilized grey-toned spandrel glass (Plate B46). When originally constructed, the Kroger Headquarters in downtown Cincinnati featured extensive use of light blue enameled panels and glass, but the material was replaced during a renovation in 1980 (Greinacher 2008:np).

Spandrel glass became common on commercial buildings after World War II. Buildings known as "glass boxes" featured spandrel glass in any number of colors. The Lever House, located on Fifth Avenue in New York City, became one of the better-known buildings to exhibit spandrel glass (Jester 1995:208). The material found widespread use on new construction, especially multiple-story office and medical arts buildings, and also on remodeling projects to update commercial facades on Main Streets across Ohio, such as in Medina (Plate B44).

4.6.10 Vinyl Tile

Despite earlier experiments with plastics, vinyl tile did not become a viable option for flooring materials until the late 1920s. Used as a binding agent, coumarone-indene offered flooring manufacturers a variety of color options. By the late 1940s, coumarone-indene had largely replaced asphalt in flooring tiles.

Although Carbide and Carbon Chemicals Corporation introduced vinyl-flooring material as early as 1931, the material did not see widespread use until after World War II. Following the war, the price of vinyl decreased, making it a more practical flooring option. As a result, between 1947 and 1952, the number of firms manufacturing plastic flooring increased from 22 to 34. The material came in either roll or tile form, and consisted of polyvinyl chloride-acetate or other some similar synthetic substance. The rapid expansion of the industry had much to do with the fact that manufacturers could adapt older machinery, used to produce asphalt and rubber tiles, to manufacture vinyl tiles (Jester 1995:241–242).

Regardless of their composition, all vinyl tiles follow the same production process. Manufacturers create a moldable putty-like substance by exposing a chemical concoction to heat and pressure. During this stage, the manufacturer adds coloring pigments to the mix. The plastic substance then travels through a series of rollers, gradually diminishing in thickness. Punch plates or knives cut the hot, plastic material to shape. A highly efficient process, vinyl tiles require little time for manufacture (Jester 1995:242).

Vinyl tiles remain available in three basic types, including vinyl asbestos (VAT), vinyl composition tile (VCT), and backed or cushioned vinyl tile. Comprised of vinyl chloride-vinyl acetate copolymer, asbestos fillers and crushed limestone, plasticizers, stabilizers, and color pigments, vinyl asbestos tile offers exceptional wearing strength but has a limited color range due to the gray tint imparted by the asbestos fibers. More expensive than VAT, vinyl composition tile consists of polyvinyl chloride resin, plasticizers, fillers, and pigments. This flexible material holds up exceptionally well against wear. The third type of tile, backed vinyl, incorporates an alkali or waterproof backing with a wearing layer consisting of vinyl, resins, plasticizers, pigments, and fillers (Jester 1995:242–242).

Application of vinyl tiles requires a rigid base, such as wood or concrete. Water-resistant adhesives help adhere the material to the base while creating an impervious layer between the tile backing and the base material. Due to its compatibility with subfloor surfaces and binders in the tile, bitumen served as the adhesive of choice during the 1950s (Jester 1995:243).

During the 1950s, vinyl tile manufacturer, Robbins widely advertised their line of vinyl flooring products in *Ohio Architect.* The company's advertising campaign focused on the durability of vinyl, which the company touted as a product designed to last a lifetime. Among their many registered trademarks were Liftetime Vinyl Tile, Lifetime Vinyl Terra-Tile, Lifetime Vinyl All-Purpose Terra Tile, Lifetime Vinyl Safety Tread Runner, and Lifetime Vinyl Stair Treads (*Ohio Architect* 1954). In addition, the company offered a variety of rubber flooring products, including rubber tile and rubber Terra-Tile. Vinyl tile, however, appears to have been the company's showcase product.

4.6.11 Gypsum Board

Gypsum board typically consists of a gypsum core wrapped in a paper covering. Lightweight and fire resistant, gypsum board provides an excellent wall covering. Furthermore, the material requires only a matter of hours to install, as opposed to several weeks, as was the typical amount of time required for plastering (Jester 1995:269).

The material dates to 1894, when Augustine Sackett patented his 32- by 36-inch multi-ply gypsum board. By 1898, the Sackett Wall Board Company offered a three-ply gypsum board, touted as a substitute for lath and plaster. However, builders tended to use the material as a backing for plaster. By 1909, the Sackett Wall Board Company, and the more recent Samson Plaster Board Company, had come under the control of the United States Gypsum Company (US Gypsum). Soon afterward, a US Gypsum engineer discovered a method for making plaster board with folded paper edges. By World War I, the gypsum board industry had established standards for manufacture of the material (Jester 1995:270).

During the 1920s, US Gypsum offered a variety of building boards, including sheetrock wallboard, sheetrock tile board, Rocklath, and Gyp-lap sheathing. Under license from US

Gypsum, numerous manufacturers produced wallboard, including the National Gypsum Company, Certain-Teed Products Corporation, Celotex Corporation, Ebsary Gypsum Company, Newark Plaster Company, and Texas Cement Plaster Company. These companies found a ready market during World War II, when wartime restrictions on metal and lumber forced builders to find alternatives to lath. Consequently, wallboard found extensive use in wartime housing (Jester 1995:270).

Less expensive than plastering, and simpler to install, wallboard became the wall covering of choice in the postwar era. During the 1940s and 1950s, a variety of textures and colored surfaces appeared on the market. Decorative pastels, insulating layers of foil, and even vinyl-covered boards offered builders complete wall systems. Plain gypsum board also functioned as a subsurface for installation of decorative wall coverings, such as patterned vinyl and wood-grained paneling that became popular at this time (Plates B92-B93). Additional developments included vapor-retarding and water-resistant barriers, and boards impregnated with asbestos fibers, mineral wood, glass wool, fiberglass, and other fire-resistant materials. Fire-rated gypsum board became a common item by the mid-1950s (Jester 1995:270). Gypsum wallboard and fire-rated gypsum board have been used in buildings of every type throughout Ohio since the 1950s.

4.6.12 Fiber Reinforced Plastic

A variety of fiber reinforced plastic (FRP) products appeared on the market after 1945. These materials included some form of polymer combined with reinforcing fibers. Common polymers used in FRP included acrylics, vinyls, polyolefins, phenolics, and polyesters. Combined with a combination of fillers, catalysts, stabilizers, coloring agents, and fibrous substances, such as asbestos, carbon fibers, or glass fibers, the polymers set up to create rigid or semi-rigid materials (Jester 1995:142).

Use of reinforced plastics prior to World War II was limited due to the characteristics of available resins. Requiring great heat and pressure to cure, resins of the time destroyed the reinforcing fibers. Not until the introduction of cold low-pressure resin polyesters in 1941, and allyl resins in 1942, did FRP manufacturing become a viable industry (Jester 1995:142).

Manufacturers used one of two processes to create FRP products. Contact molding, used largely for building materials, employed an open mold technique. A worker sprayed resin and reinforcing materials onto the mold, creating a fabricated form. The other method involved machine molding, which required a pair of matched molds. Attached to one another, placed in an oven then rolled to remove air bubbles, the matching sections of material formed a continuous sheet of FRP (Jester 1995:144).

Following World War II, FRP manufacturers sought new markets for their products. Accustomed to building three-dimensional forms, some FRP companies built automobiles and boats. The material also proved useful in construction. The most common use of FRP in this area was the manufacture of corrugated fiber-reinforced translucent sheets. Introduced in the late 1940s, the sheets soon came in a variety of colors. By the mid-1960s, Sanpan panels, manufactured by Panel Structures of East Orange, New Jersey, and Kalwall panels, made by

Kalwall Corporation of Manchester, New Hampshire, dominated the industry (Jester 1995:144).

In Springfield, JMS Composites has manufactured FRP since 1967, specializing in complex shapes and designs for the agricultural, transportation, industrial, marine, medical, military, machinery/equipment, and wastewater treatment industries. The firm produces both prototypes as well as standardized components in a variety of thicknesses, pigmentation, gel-coating and post-finishing (ThomasNet 2010).

4.7 Landscape Architecture in Ohio

The first landscape architects who practiced in American during the nineteenth century focused on large estates, religious properties, and government grounds. Very few landscape architects were employed prior to 1900, however, with the display of Frederick Law Olmstead's grounds at the World's Columbian Exposition of 1893 in Chicago, and the founding of the American Society of Landscape Architects in 1899, the profession gained much needed publicity and respect. Economic, social, and artistic interests created in part by the Industrial Revolution and a new class of homeowners able to afford larger homes with larger grounds aided the growth of the field (Karson 1989:7).

Many early examples of landscape architecture in Ohio can still be found in Ohio's parks. One of Cincinnati's earliest parks, Burnet Woods, served the Clifton neighborhood. Inspired by Frederick Law Olmstead's work on Central Park, the city envisioned Burnet Woods as a natural park where local residents could escape the urban din and return to nature. The park's artificial lake was built in 1875, with various trails, open green space, and structures to follow (Cincinnati Park Board 1995: 14; Recchie 2008).

Some large estates in Ohio also retain their early landscape architecture work. The Mortimer Matthews House, a shingle-style house located just north of Cincinnati, features original sunken gardens and large grounds attributed to famed landscape architect, Warren Manning. Manning would also contribute to grounds in various Cincinnati parks during his illustrious career (Tishler 1988). A.D. Taylor worked under Manning before establishing his own practice in 1913, and was hired as a consultant to the Cincinnati Park Board from 1927-1941. Among his many landscaping projects in the city were the approach to Union Terminal, Fleischman Gardens, Alms Park, Ault Park, and Mount Echo Park (Cincinnati Park Board 1995:59).

By the post-World War II period, new ideas concerning the future of landscape architecture were considered in workshops and conferences across the country. In 1955, the American Society of Landscape Architects (ASLA) established the Committee on Research in Landscape Architecture to help identify avenues for further growth in the modern era. Some of the major issues considered were the explosion of new housing developments throughout the country, and the ongoing construction of the Interstate Highway System. The Ohio Branch of the ASLA established its own Roadside Development Research committee to study ways of beautifying new highways with landscape buffers. The Ohio Department of Highways employed a landscape architect in order to make the highways a more beautiful as well as safer method of travel (Engineering Experiment Station 1961: 5, 32).

Landscape architecture during the modern era was tasked with creating a pleasing visual atmosphere in a variety of settings. It also helped to provide urban residents with a respite from the fast-paced, dense, concrete worlds they inhabited. Although more recent urban complexes, such as the Proctor and Gamble Headquarters in Cincinnati, adopted green garden-type areas that offered rest and relaxation to urban citizens. Local parks, however, were the most common way to accomplish this feat.

During the 1950s and 1960s, Ohio parks were one of the major beneficiaries of landscape architecture. Many city and county parks followed a path of development similar to that of the State Park system, creating parks around flood control lakes and dams to take advantage of the recreational opportunities associated with water. When new parks were created along the lakes, it was necessary to create gathering places for the people to enjoy. Landscape architects laid out open green spaces and trails through forested areas. They arranged flower gardens and other plantings to further beautify the area, and worked with the park boards on the many golf courses that developed in Ohio's state and local parks.

In the Columbus suburb of Clintonville, Whetstone Park and the Park of Roses are a noteworthy example of recent past landscape architecture in a municipal park (Plates B94-95). Established in 1940, Whetstone Park served as the site of 500 Victory Gardens during the war years. Additional land acquisitions starting in 1944 brought the park to its current size of 150 acres. In 1951, members of the Columbus Rose Club and the Central Ohio Rose Society began work on creating a rose garden within Whetstone Park. The Columbus City Council approved the project and issued bonds to pay for its development, while the Mayor created the Columbus Rose Commission within the Columbus Recreation & Parks Department. The commission oversaw plans for the rose garden's development and worked with landscape architect George B. Tobey on the park's design (Clintonville Online 2010).

Construction of the rose garden began in June 1952 on a gently sloped, 13-acre tract within Whetstone Park. All beds were excavated to a depth of 24 inches and the topsoil was mixed with imported peat moss and commercial fertilizer before being returned to the beds. Approximately 21,000 bales of peat moss were required for the endeavor. Dozens of rose varieties were planted in geometric configurations, and a circular fountain provided a focal point (Plate B94).

The Columbus Park of Roses opened in June 1953. The following year, the American Rose Society Headquarters moved from Hershey, Pennsylvania to a new building within the park (Plate B95). The modestly sized one-story, flat-roofed building featured typical International Style elements, including horizontal, asymmetrical massing, ribbon windows, and a metal framed, glassed-in entry system. Landscaping around the building included a variety of rose bushes. In 1974, the society relocated to Shreveport, Louisiana.

In recent years, the Columbus Recreation and Parks Department has added specialized gardens within the Park of Roses, including an Herb Garden, Daffodil Garden, Perennial Garden, and new collections of miniature and heritage roses. Now featuring more than

11,000 rose bushes, the Columbus Park of Roses is currently one of the largest municipal rose gardens in the country (Clintonville Online 2010).

Other successful modern-era municipal park projects in Ohio include the Serpentine Wall in Cincinnati, Heritage Parks in Cleveland, and Canal Park in Akron. The Serpentine Wall at Sawyer Point in Cincinnati was created by the New York City landscape architecture firm of Zion & Breen Associates in 1970. Coinciding with the construction of Riverfront Stadium, the Serpentine Wall raised the riverfront park out of the flood plain with a concrete step wall. Another well-regarded park project in Ohio was Canal Park in Akron. Under the guidance of landscape architects Lawrence Halprin and Associates of San Francisco, Canal Park became the heart of a new housing and commercial district on the south end of downtown Akron. Officially dedicated in 1975, Canal Park changed an abandoned canal into an integral part of the downtown community (Ohio Chapter ASLA 1985:23-26).

Residential suburban developments also were subject to landscape design. Landscape architects often assisted developers with site planning, delineating lots, planning ingress and egress routes, and making recommendations for placement of small parks and green spaces as well as periphery commercial spaces. Some subdivisions, such as the aforementioned Rush Creek Village in Worthington, featured much more extensive landscape architecture. As the NRHP nomination for the development noted, architect Theodore van Fossen planned every aspect of the neighborhood, from its narrow, winding roads and cul de sacs to the spatial relationships among individual houses and natural features. The houses were arranged to capitalize on views of the steep ravines and Rush Run that characterized the area, while also providing privacy from one house to the next (Friends of the Ravine 2004:3; Brown et al 2003).

The 39 acres of ravine topography influenced the architecture of the houses, including the selection of building materials, color palettes, and organically inspired design. Each house was designed with an eye toward integration of indoors and outdoors through porches, decks, pools, and large expanses of glass. Important aspects of the landscape architecture at Rush Creek include

- Orientation of the houses at offset angles from the street, typically between 30 and 90 degrees, capitalized on the potential for views from within the house toward the ravines, and enhanced privacy between the houses;
- Horizontal massing of each house, with flat roofs, overhangs, and cantilevers, extend the horizontal planes and integrate each building into the surrounding topography;
- Landscaping hedges placed across properties rather than parallel to property lines reinforce the development's overall unity and the shared views;
- Orientation of the street system on an east/west axis follow the rolling topography, while short cross streets, dead-ends, and cul de sacs enhance quiet and privacy for residents;
- The effort to blend the housing into the natural setting included deliberate exclusion of sidewalks, street lights, and curbs on the streets; a swale paralleling each street collects storm water to flow down to the Rush Run (Friends of the Ravine 2004:3, 7).

Recognized for its historical and architectural significance, Rush Creek Village ranks among Ohio's most distinctive suburban neighborhoods of the mid-twentieth century.

4.8 Selected Ohio Architects, Builders, and Developers

Between 1940 and 1970, hundreds of architects practiced in Ohio. Appendix C lists 1,004 architects and/or architect-designed Ohio resources from this period that were identified during the course of this project. An eclectic array of Ohio's recent past resources have been included in architectural guides and inventories and featured on various Internet sites; a sampling of these are presented in Appendix D. Between 1954 and 1970, *Ohio Architect* magazine routinely recognized almost 300 projects that were thought to be particularly noteworthy examples of the period's design trends; these are in Appendix E. Rosters of the architects practicing in Ohio during the 1950s and 1960s are provided in Appendix G. As part of this project, oral history interviews were conducted with architects Paul Ricciuti, Dellas Harder, Peter Van Dijk, Dick Eschelman, Raymond J. Jaminet, Bruce Goetzman, and Paul Westlake; engineer J. Philip Richley; historians Donald Hutsler and William Keener; and planner Norman Krumholz; the interviews and full transcripts are available under separate cover. Summary information about each interviewee is included in Appendix J.

Given the sheer preponderance of architects who worked in Ohio during the recent past, and the volume of their output, a comprehensive discussion of each individual's career is beyond the scope of the current project. The following sub-sections feature a sample of some of the architects who made lasting contributions to Ohio's built environment, and attempt to highlight the geographic and architectural diversity of these architects' careers. This discussion should not, however, be construed as a ranking of importance or significance. It is fairly easy to see how the training/background some of these architects had (Taliesin Fellowship, Gropius, etc.) influenced the built environment with which they were associated.

4.8.1 Carl E. Bentz

Carl Ellsworth Bentz (1911-1997) served as State Architect of Ohio for twenty years, beginning in 1958 with the administration of Governor William O'Neill and continuing through 1978 during the second administration of James Rhodes. A native of Columbus, Bentz attended the Ohio State University School of Architecture during the early 1930s. He earned numerous academic honors, including the AIA Medal for Student Excellent upon his graduation in 1935. Bentz began his professional career at Richards, McCarty & Bulford in Columbus. With the outbreak of World War II, he served as an associate architect with Jennings and Lawrence Engineering to work on the design of the Ravenna Ordinance Depot. In 1942, he joined the Army Corps of Engineers and was posted first at Ravenna as Port Engineer, then reassigned to Erie Proving Ground. He returned to Columbus in 1946 and became a partner in the firm of Tibbals Crumley Musson Architects (AIA 2009; Wikipedia 2010b).

After being appointed to the position of State Architect in 1958, Bentz designed or supervised design of a number of public buildings, including the ca. 1967 Jerome Library at Bowling Green State University, the ca. 1966-1968 Assembly Building at Miami University, the Ohio Department of Transportation building at 25 South Front Street in downtown

Columbus, and the underground parking garage beneath the lawn at the State House. A member of the AIA since 1942, Bentz became a Fellow in 1968 for his career in public service, and a Member Emeritus in 1979, a year after being awarded an AIA Ohio Gold Medal (AIA 2009; Wikipedia 2010b).

4.8.2 Eugene W. Betz

Dayton-based Eugene W. Betz graduated from the University of Cincinnati in 1944. The same year, he joined the firm Schenck & Williams, and eventually became a junior partner. Betz spent much of his career on public, institutional, and industrial buildings. During the 1950s, his projects included a Frigidaire Appliance Plant (1950), a Coca Cola Bottling Company facility (1952), the Miami Valley Hospital (1953), Good Samaritan Hospital (1954), Belle Haven School (1954), Bell Telephone offices (1955). By 1965, Betz established himself in an independent practice, but he continued his focus on institutional and public buildings. During the 1960s, his projects included the ca. 1966 Cobalt Unit of Good Samaritan Hospital and the ca. 1967 Hithergreen Middle School (American Institute of Architects 1956:41; Campen 1973).

Betz designed his own office building, located at at 2223 South Dixie Highway in Dayton. The two-building complex was a fine example of modernist design. The buildings were offset from one another at an angle and connected via a sleek glass-enclosed walkway. The low-slung, horizontally massed building featured curtain wall construction, piers and beams of pre-cast concrete form panels faced with stone block, and clerestory windows. The landscape design for the property reflected modernist tenets as well. The sidewalks were lined with stone-faced retaining walls, which also enclosed a raised planting bed that partly obscured the building from street view. A rear stone-faced wall enclosed a private courtyard space. Between the two buildings is a path with concrete stepping stones set in a black stone garden (Avdakov et al. 2010:145).

4.8.3 Harold Burdick

Cleveland-based architect Harold Burdick (1895-1947) was a graduate of Cornell University’s School of Architecture and veteran of World War I. Burdick worked for the architectural firm’s Walker and Weeks and Mead & Hamilton before establishing his own firm. Although interested in modernism, Burdick was hampered by conservative local tastes. During the 1920s and 1930s, he designed approximately 28 houses in Shaker Heights, but all of these were rendered in traditional styles, such as French Provincial, Georgian, and Neo-Classical, as modern designs were not yet permitted (Gibans 2007).

Built in 1938-1939, his own dwelling at 2424 Stratford Road, Cleveland Heights, a 1938 brick-and-glass block, has been identified as the greater Cleveland area’s first International Style dwelling. The modestly scaled dwelling featured glass block walls, floor-to-ceiling windows, and steel frame construction. Burdick deliberately selected modern manufactured materials for the interior finishes. The flooring was laid on Masonite boards and the ceilings covered with Celotex gypsum board. The interior walls consisted of movable panels. Built-in cabinets and pocket doors on ball bearing tracks made for streamlined profiles, maximized space, and created free flowing spaces. The all-electric kitchen was cutting edge for its time. The house also featured what may have been the first domestic use of fluorescent lighting.

Although always intended to be his family's home, Burdick also meant for the house to be a prototype for an affordable, modernist dwelling that could be built using mass-produced materials (Cleveland Heights Historical Society 2010; Encyclopedia of Cleveland History 2010e).

4.8.4 Charles F. Cellarius

Charles F. Cellarius (1891-1973) graduated from Yale and the Massachusetts Institute of Technology. After World War I, he practiced in Cincinnati until his death. Cellarius devoted his career to traditional design and was especially known for his work with Colonial Revival styles. During the 1920s, he served as the supervising architect for Mariemont, a suburban development in Cincinnati. Cellarius's most notable works were educational buildings at Ohio University, Ohio State University, Wooster College, Miami University, the former Western College for Women, and the University of Cincinnati. During the 1950s, he also designed high school buildings, including Fairfax, Bond Hill, and Woodward in Cincinnati. Collaborating with architect Herbert F. Hilmer, Cellarius designed the ca. 1953 Church of the Redeemer in Hyde Park, Cincinnati, and the Westminster Presbyterian Church in Mount Washington, Cincinnati (Langsam 2008). His career is representative of the traditionalist architects who worked in Ohio even during the height of modernism's influence.

4.8.5 Abrom Dombar and Benjamin Dombar

Brothers Abrom and Benjamin Dombar were Cincinnati natives who spent most of their careers in this city. Born in 1912, Abrom attended the University of Cincinnati School of Architecture but left school to work with Frank Lloyd Wright as a charter member of the Taliesin Fellowship, 1932-1935. He next acted as the first supervising architect on construction of Wright's "Fallingwater" in western Pennsylvania. His career was interrupted by service in the Army during World War II, after which he returned to Cincinnati. For the remainder of his career, Abrom continued to explore Wright's approach to "organic architecture." His projects in Cincinnati included his own 1949 dwelling, the 1949 Benjamin House, and the 1959 Rand House (Greinacher et al. 2008:np; Langsam 2008).

Born in 1916, Benjamin Dombar trained at Wright's Taliesin in Spring Green, Wisconsin and Phoenix, Arizona from 1934 to 1941. After service in the Army during World War II, Benjamin rented an office from Cincinnati architect Woodie Garber, then worked for Carl A. Strauss & Associates from 1945 to 1948. Benjamin maintained a relationship with Wright during this time as well. In 1948, he supervised an addition to Wright's Rosenbaum house in Florence, Alabama, as well as construction of the 1954 Cedric Boulter House in Clifton, along with its 1958 addition. From the late 1940s until at least 1997, Benjamin worked independently and with his brother, Abrom. He continued to use Usonian elements in his designs throughout his career, including radiant floor heating; carports; corner windows; and passive solar design (Greinacher et al. 2008:np; Langsam 2008). His projects in Cincinnati included the 1954 Cholak House, 1957 Richfield House, 1965 Leiter House, and 1965 Runnels House (Greinacher 2008:np).

4.8.6 Nelson Felsburg

Nelson Felsburg (1899-1979) received his training at the University of Cincinnati and spent his entire career working in the city. He worked with C. Howard Gillespie between 1921 and

1929 and with Garber & Woodward between 1923 and 1929. He then moved to the firm of Joseph G. Steinkamp & Brother for a ten-year period. In 1939, he rejoined Gillespie and the two worked together until 1958. Felsburg spent the remainder of his career practicing independently. From 1943 until 1977, Felsburg served as the architects' representative on the Cincinnati Board of Appeals. His major projects included the Hamilton County Juvenile Detention Home, Hamilton County Courthouse Annex, James N. Gamble School, Eastern Hills School, Summit Country Day School, and 12 buildings for the Hudepohl Brewing Company. Among Felsburg's most enduring legacies was a $30,000 gift to the AIA Cincinnati that enabled the founding of the Architectural Foundation of Cincinnati in 1982 (Langsam 2008).

4.8.7 R. Carl Freund

Born in Appleton, Wisconsin, R. Carl Freund (1902-1959) trained at the University of Cincinnati and OMI. He worked as a draftsman for A.L. Fechheimer, Zettel & Rapp, J.S. Adkins, and Crowe & Schulte, before establishing his own practice. As Staff Architect and Superintendent for the Cincinnati Board of Park Commissioners, Freund was especially noted for his park projects. His designs included the 1940 Mount Echo Park Open Shelter, 1941 Inwood Park Comfort Station, 1941 Fernbank Park Pavilion, 1942 Mount Echo Park Comfort Station, 1955 Park Board Administration Building in Eden Park, the ca. 1955 Trailside Museum in Burnet Woods, the ca. 1955 Bellevue Hill Shelter House, and the ca. 1955 Oak Ridge Lodge at Mount Airy Park. Freund worked with the Civilian Conservation Corps on the Open Shelter at Mount Echo Park, and used an organic, naturalistic approach to his subsequent park projects that was quite sympathetic to that organization's design tenets (Langsam 2008). Other projects by Freund include the mid-1950s St. Gabriel Church in Glendale and the Church of Visitations in Eaton.

4.8.8 Woodward (Woodie) Garber

Among Ohio's most flamboyant modernist architects, Woodie Garber (1913-1994) was the son of Cincinnati architect Frederick W. Garber. After training at Cornell University, Woodie Garber worked for John Russell Pope and New York-based Skidmore, Owings & Merrill during the 1930s. He returned to Cincinnati in 1939 to join his father's firm, Garber & Woodward Architects, but the two men disagreed vehemently on architectural practice. The elder Garber favored traditional styles, while Woodie Garber was a vocal advocate for modernism. In 1949, Woodie Garber formed his own firm. He produced an eclectic range of projects during his lengthy career in Cincinnati, including the Ninth Street Fire Station (1951); Schneider House (1954); Cincinnati Public Library (1955); Mitchell House (1956); Swifton Elementary School (1958); Thriftway Supermarket (1959); the All Saints Chapel addition to Christ Church in Glendale (1959-1960); Frisch's Mainliner Restaurant (1960); Moore House (1962); Indian Hill High School (1963-1967); Procter Hall at the University of Cincinnati (1968); and Garber House (1966) (Greinacher et al. 2008:np).

Garber's firm, Woodie Garber & Associates, embraced all aspects of modernism. Although Cincinnati was slow to accept the new movement, in 1951, Garber received a commission to design a fire station for the city. For the Ninth Street Fire Station, Garber created a flat-roofed, geometric, largely transparent design that was well received (Sullebarger 2007).

Garber's first major public commission followed a short time afterward with the Public Library of Cincinnati and Hamilton County. The daring and innovative design, featured in both *Time* and *Life* magazines, consisted of a steel-reinforced concrete frame, cantilevered upper levels, and a glassed-in penthouse and landscaped rooftop terrace. The street level elevations were composed almost entirely of stainless steel-framed windows, and the glass originally angled outward at the bottom to eliminate glare. On the interior, the open floor plan was designed to be flexible and meet changing needs. The cantilevered upper floors extended beyond the structural columns to allow continuous wall-hung shelving (Sullebarger 2007; Greinacher et al. 2008:np).

Garber indulged his love of experimentation when designing his own house in the late 1960s. Located in Glendale, the flat-roofed, nearly square building had inset porches at opposite ends. The exposed structural grid had wood infill and extensive planes of glass; Garber used crushed milk glass for exterior cladding as well. On the interior, the living area was dominated by a stone fireplace on one side and opened to a galley kitchen on the other. The combined living and kitchen spaces were daring for the time but anticipated the "great room" that became commonplace in suburban housing by the 1980s. The bedrooms and bathrooms lay beyond the kitchen (Sullebarger 2007; Greinacher 2008:np).

Other innovations by Garber included the first hyperbolic paraboloid (double-curved) metal deck roof; these were used at Indian Hill High School and Frisch's Mainliner Restaurant. Indian Hill High School also featured the same crushed milk glass cladding as his personal dwelling. Garber's design for Swifton Elementary School had no interior bearing walls and no corridors to allow for maximum flexibility of use. At the University of Cincinnati, his design for Sander Hall, a dormitory, featured insulating, reflective glass for energy efficiency (Sullebarger 2007; Greinacher et al. 2008:np).

4.8.9 Garriott & Becker

Another modernist Cincinnati architect, Hubert M. Garriott (1894-1984) attended the Harvard School of Architecture as a special student from 1920 to 1922. He began his career in Indianapolis, practicing as Allen & Garriott until 1926. After relocating to Cincinnati, he formed a firm with John Scudder Adkins that remained active until 1931, but also practiced independently, and briefly was associated with John Henri Deeken in 1931. That year, he formed a partnership with John W. Becker that endured for more than thirty years. Henry A. Bettman, another Harvard alumnus, was a member of the partnership as well, from 1942 to 1948. In 1970, Garriott and the Pistler-Brown firm became associated as Architekton, Inc., until his retirement about 1976 (Langsam 2008; Greinacher et al. 2008:np).

John William Becker (1902-1974), a native of St. Louis, Missouri, trained at Harvard and Washington (St. Louis) Universities. He spent the majority of his professional career in partnership with Hubert Becker. Becker was responsible for some of the earliest modernist houses in Cincinnati, including his own 1938 dwelling (now demolished). He also served on the board of the Cincinnati Art Museum for 25 years (Langsam 2008; Greinacher et al. 2008:np).

Garriott & Becker's projects included the 1958 Engine Company No. 5; 1955 Rosenberg House; 1962 Cincinnati Fire Division Headquarters; the Central [later Walter C. Langsam] Library and Patricia Corbett Pavilion, both 1960s projects at the University of Cincinnati; and Marquette Manor, high-rise apartment building for the elderly (Langsam 2008; Greinacher et al. 2008:np).

4.8.10 J. Byers Hays

Cleveland based architect J. Byers Hays (1891-1968) began his career in New York City, working for Raymond Hood, an early modernist whose work later was included in the Museum of Modern Art's 1932 Modern Architecture exhibition. In 1920, Hays relocated to Cleveland to work with Walker and Weeks as their chief designer. In the wake of the 1929 stock market crash, Hays left the firm and established a partnership with Russell Simpson, also from Walker and Weeks. Hays's peers identified him as a leader in Cleveland's modernist design at a time that the Case Western Reserve School of Architecture still taught according to Beaux-Arts principles. Hays designed two of the earliest modernist houses in the Cleveland area; located in Cleveland Heights, the twin, flat-roofed houses were built for Theodore Frech, Superintendent of General Electric's Nela Park, the state's (and possibly the nation's) first industrial research park. Around the same time, Hays and his partner won a national competition sponsored by General Electric for a model small house ($6,000-7,500) that would showcase the company's new electrical appliances. Some of the modernist houses he designed during the mid-1930s were located on Severn and Derbyshire roads (Gibans 2007).

4.8.11 John deKoven Hill

Born in 1920 in Cleveland, John deKoven Hill was one of Wright's Taliesin Fellows from 1937 until 1953, and again from 1963 until at least 1995. He served as the interior designer for Wright's project, the 1954 Gerald B. Tonkens House in Amberley Village near Cincinnati. From 1953 until 1963, Hill worked as the architecture editor for *House Beautiful*. During his tenure, he promoted modernist design, particularly Wright's organic architecture. He was the chief designer for the J. Ralph & Patricia B. Corbett House (1959-1960), a Wrightian house in Cincinnati's Hyde Park neighborhood. The project was featured in *House Beautiful's* February 1960 issue as the "Pace-Setter House of the Year" (Langsam 2008; Greinacher et al. 2008:np).

4.8.12 Robert L. Holtmeier

Born in Norwood, Ohio, in 1912, Robert L. Holtmeier earned a Bachelor's degree in architecture from Carnegie Mellon Institute of Technology in Pittsburgh in 1930. He first worked for the firm Crowe & Schulte, of which his uncle, Edward J. Schulte, was a principal. Holtmeier next collaborated with Bernard Pepinski, whose office was in Cincinnati's landmark Ingalls Building, and then joined the firm of Garber & Woodward for a short period. A brief partnership with Woodie Garber followed but the two architects' personalities clashed. Beginning in 1954, Holtmeier partnered with John Gartner; in 1957, Jack Burdick joined the firm, which became Gartner, Holtmeier and Burdick. Holtmeier departed the partnership the following year; Otto Bauer-Nilsen joined it to form Gartner, Burdick, & Bauer-Nilsen, known today as GBBN Architects. Holtmeier practiced independently until his retirement in 1981 (Langsam 2008).

During the latter half of his career, Holtmeier focused on ecclesiastical architecture. His first such commission was a new church for St. Margaret Mary in Cincinnati's North College Hill neighborhood. By this time, traditional masonry, Gothic Revival edifice was considered too expensive to build. Holtmeier created a simple, modernist design with brick walls. The walls and wood ceiling on the interior were left unfinished, which cut construction costs substantially. The design was well received and led to other church projects in Ohio, Indiana, and Kentucky. Holtmeier ultimately completed over 50 commissions for the Archdiocese of Cincinnati, including 20 new church buildings, five additions to existing churches, and alterations to 15 or more churches. He also worked on schools and rectories in addition to residences and commercial projects (Langsam 2008).

4.8.13 Henry Fletcher Kenney

Henry Fletcher Kenney was one of the few landscape architects working in Ohio who was identified during the course of this project. The Cincinnati-based Kenney worked in both traditional and modernist design traditions. An extensive collection of drawings and landscape plans are housed at the Cincinnati Historical Society. He designed landscapes for a number of modernist houses in the Cincinnati area, as well as in northern Kentucky; his portfolio eventually encompassed more than 1,000 projects. During the 1950s, Kenney designed additional gardens for the Peterloon estate, built by Cincinnati's Emery family during the late 1920s. His landscape design for the H. E. Lunken House was featured in the 1954 book, *A Treasury of Contemporary Houses*, compiled by the editors of *Architectural Record* (Peterloon Foundation 2010; Langsam 2008).

One of Kenney's best known projects was his own garden, known as Cedarwood. Established in 1935, the terraced garden's features included an enclosed herb and rose garden, reflecting pool, vegetable and cutting gardens, and walking paths to the surrounding woods. Kenney was an early practitioner of water conservation, using ground covers, mulches, and humus to conserve moisture; meanwhile, the pool's water came from rain catch basins along a hillside cut and rain barrels at downspouts on buildings. Although this garden is no longer extant, it was documented during the 1954 annual meeting of the Garden Club of America, the records of which are on file at the Smithsonian Institution (Smithsonian Institution 2010).

4.8.14 Robert A. Little

Robert A. Little was a student of Walter Gropius's at Harvard University's School of Architecture. He spent most of his professional career in Cleveland. Among his most significant contributions was Pepper Ridge, a planned community of modernist houses, located in Pepper Pike. Little designed most of the houses himself, as well as many other aspects of the community, such as the street network. He sited each of the houses with respect to the sun's movement during summer and winter months in order to conserve energy. An emphasis of his work was the creation of specific zones for adults and for children in both public spaces and private spaces. Many of the original families still own houses in Pepper Ridge, and consulted with Little on subsequent updates (Gibans 2007).

Little's work was featured in a variety of publications, including books and popular magazines. Clevelander Victoria Ball's book, *Interior Design*, published in 1960, used several of his houses to illustrate contemporary lifestyles with open floor plans, integration of indoor and outdoor spaces, and dedicated areas for children's and adults' activities. Like many modernists, Little also was interested in using new materials in his designs and with designing interior furnishings specifically for the dwellings he created (Gibans 2007).

4.8.15 Miami University Faculty

The faculty at Miami University's School of Architecture is credited with bringing a diversity of modernist ideas to Oxford during the 1950s. Victor Fürth, an expatriate from Prague, held an engineering degree earned in Prague, and had studied in Florence. After practicing in Austria, Yugoslavia, England, and France, he fled to England in 1939 at the start of World War II. After remaining in England through the war years, he worked in Germany and Greece as an engineer on emergency shelter plans. Fürth joined Miami's faculty in 1949 on an exchange program, then became a permanent U.S. resident in 1954. In the U.S., his work was characterized by diagonal displacement of flowing interior spaces under a flat roof, built-in furniture, and a singular circular window with a view to a garden He is known to have designed seven houses in the Oxford neighborhood Springwood between 1960 and 1969, as well as the Bern Street Apartments on South Campus Avenue (Ellison 2009:217).

C.E. (Mik) Stousland became chair of Miami's Department of Architecture in 1952. He designed several modernist houses in Oxford and two houses in Springwood, along with additions to nineteenth century houses being used as fraternity houses. Faculty members Kep Small and Andy Wertz, working with Hal Barcus, created a more diversified range of projects, including modernist residences on Fairfield Road and Westgate Drive in Oxford, a small bank at West High Street and College Avenue, and the modernist Alexander Dining Hall (1962) and Hoyt Library (1973) for Western College (Ellison 2009:217).

David Briggs Maxfield (1906-1971) graduated from Syracuse University in 1930 with a bachelor's degree in architecture. He immediately began teaching at Miami's School of Architecture, remaining there until 1949. During that time, he also completed a Master's in Architecture from the University of Cincinnati. After leaving Miami, Maxfield received a number of commissions for ecclesiastical buildings in Cincinnati, including the 1957 Christ Church Episcopal complex at Fourth and Sycamore streets and a 1969 round church for St. John's United Church of Christ in suburban Delhi Township (Langsam 2008).

4.8.16 Ernst Payer

Ernst Payer (1904-1981) was another European who relocated to the United States. He first trained under Josef Hoffman in Vienna, then moved to Harvard University to study under Walter Gropius. During the 1940s, Cleveland-based developer James Rideout hired Payer to work for his firm. Rideout himself was a modernist builder of note, as he developed an enclave of five houses on South Lane in Moreland Hills. In addition to his own house, the project ultimately included the homes of architect George Dalton and structural engineer Richard Gensert, and a house designed by Neal Guda for Ralph and Harriet Gibbon (Gibans 2007).

Equally known for his flamboyance and self-promotion, Payer made significant contributions to modernist architecture with both residential and commercial designs. His clients included some of Cleveland's leading figures in business, medicine, and cultural affairs who lived in neighborhoods such as Waite Hill, Moreland Hills, and Bentlyville. Each house was carefully sited to take advantage of views or site features. Payer preferred large lots that permitted houses to be set far back from the street and accessed by winding drives through native woodlands. His houses ranged in size, with both size and quality growing over the years. Elements common to all of his designs included large expanses of glass in major rooms with decorative screens to protect the interiors from sunlight (Gibans 2007).

Other projects by Payer in the greater Cleveland area included the Medusa Portland Cement Company corporate headquarters in Cleveland Heights; public libraries in Cleveland, Cleveland, Heights and Orange; and the Crawford Aviation and Auto Museum at the Western Reserve Historical Society. Payer's body of work demonstrated forward-looking use of glass, lighting, and contemporary interior design. His talent for self-promotion assured that examples of his work were included in magazine advertisements, articles, and photographs on the latest trends in lighting, electricity, and building materials (Gibans 2007).

4.8.17 Carl A. Strauss & Associates

The architectural firm Carl A. Strauss & Associates produced some of Cincinnati's finest modernist buildings. Carl A. Strauss (1912-2002) and his longtime partner, Ray Roush (1920-2007), enjoyed a decades-long collaboration. Strauss attended the University School in Cincinnati, then earned a bachelor's degree at Williams College in Amherst, Massachusetts, in 1933, followed by a master's in architecture from Harvard University in 1937. He then studied in England and Europe for a brief period. Strauss's career began with the firm of H. M. Price. Upon the U.S. entry into World War II, Strauss served in the Army's Air Corps Intelligence unit until 1945. After the war, he began his long-time partnership with Roush (Langsam 2008).

Born in Manchester, Ohio, Roush graduated from the University of Cincinnati. He maintained a relationship with the school for many years that included mentoring many students through the school's cooperative employment program. After graduation, Roush joined the military, where his architectural skills were put to use for the Supreme Headquarters, Allied Expeditionary Forces. Roush created detailed, three-dimensional maps for paratroopers and amphibious forces using aerial photographs he took himself. He remained in Europe after the war and worked on designs in the offices of urban planning at the Ecole des Beaux Arts in Paris. After returning to the U.S. in 1956, he worked in Madison, Wisconsin, designing houses and furniture, after which he moved to Cincinnati to join Strauss's firm. The pair continued to work together until 1984. Roush continued to work independently until the onset of Alzheimer's disease forced him to retire (Billman 2002).

Both Strauss and Roush favored an organic approach to their modernist designs. They utilized natural materials, site-sensitive designs, and subdued color palettes for the residential projects. An integration of indoor and outdoor spaces was sought as well, and they were known for designing buildings to fit around natural features. They jokingly referred to themselves as the “Hillside Firm” because many of their projects occupied lots on the steep hills that characterize Cincinnati’s topography. Although challenging from a construction perspective, these venues allowed the architects to design dwellings with outstanding views and to create a sense of bringing the outdoors inside (Billman 2002; Langsam 2008).

The bulk of the firm’s work consisted of residential projects. Many of their clients were associated with the Cincinnati Contemporary Arts Center, which has promoted appreciation of modernism since its founding in 1939. Two of their designs are featured in *Great Houses of the Queen City* (Cincinnati Historical Society, 1997): the 1959 James H. Stone house in Hyde Park and their last project, the 1984-1986 Weston House in East Walnut Hills. The Stone House was chosen as an *Architectural Record* house in 1960. Other projects included the 1957 Wyler House in the Clifton neighborhood and the 1960 Keirle House in the Clifton neighborhood. A notable commercial project by the firm was the 1968-1969 Xomox Corporation Headquarters in Cincinnat (Greinacher et al. 2008:np; Langsam 2008). A 2006 film, “A Hillside Firm,” documented the contributions made by Roush and Strauss to Cincinnati’s built environment.

4.8.18 Builders and Developers in Ohio

Every city and town in Ohio had at least one builder or developer who undertook suburban projects during the 1940s, 1950s, and/or 1960s. In large cities, such as Cleveland, Columbus, and Cincinnati, numerous companies were active during this period. Trade organizations, such as the Ohio Home Builders Association and the National Home Builders Association, were established to meet the needs of merchant builders and developers, as well as the construction contractors who worked with them. Local Chambers of Commerce and other economic development organizations worked closely with builders and developers to increase commercial activity and to spur additional growth.

Although the impact of Ohio’s builders and developers, and the trade and commerce organizations associated with them, is unquestionable, historical information about their specific activities is difficult to locate. With missions focused on lobbying and marketing, trade organizations and chambers of commerce typically have not engaged in concerted efforts to preserve archival records of their activities. Builders and developers had a propensity to focus on their next project rather than concern themselves with preserving records of past projects. A small number of builders and developers who worked in Ohio during the recent past were identified during the course of this project. Oral history interviews were conducted with Joseph Nohra, Vice-President of Finance at Cafaro Corporation, a major shopping center developer in Ohio and with Denise DeBartolo York, a member of the DeBartolo family of commercial developers. The complete transcripts of the interviews are available under separate cover. Three developers also are profiled in the following sub-sections. Although these individuals are far from a representative sample, they provide some insight into the period’s development patterns.

4.8.18.1 Charles H. Huber

Charles H. Huber came from a family of builders. The Dayton native’s father, Herbert C. Huber, established the H. C. Hubert Construction Company in 1924. The elder Huber built houses in several Dayton neighborhoods, as well as in suburbs such as Oakwood and

Kettering through the 1930s and 1940s. Upon Herbert's death in 1954, Charles Huber helmed the family business and, in 1956, became president of the firm, now named Huber Homes, Inc. (Avdakov et al. 2010:45-46).

Almost immediately, Huber undertook a major suburban development in Wayne Township on the outskirts of Dayton. The still-rural township was not yet connected to water and sewer connections, so Huber took on the task of forming a utility company and constructing the necessary infrastructure. Huber Utilities operated the first privately licensed water and sewer treatment plant in Ohio. Huber acquired and developed land in a piecemeal fashion as it became available, and eventually established the community of Huber Heights. The township's lack of zoning regulations permitted him considerable flexibility in his construction projects. Huber typically purchased a tract large enough to subdivide for residential development, then platted lots with curving streets. By offering affordably priced houses with up-to-date amenities, Huber's firm enjoyed almost immediate success (Avdakov et al. 2010:45-46).

Huber's firm used marketing practices that now have been standard industry practices for decades. The company introduced new house models annually, with each bearing its own name. They included Cape Cod and ranch models and most featured brick veneer, a material that became a trademark design element. The new models were introduced at public open houses, a marketing ploy that became so successful as many as 30,000 people would attend in a single day. Huber's company also allowed open house visitors to watch a new house being built, giving him the opportunity to highlight the quality of the construction techniques being used. The innovative company soon won nationwide recognition, including four excellence awards from *McCall's* magazine's Congress of Better Living, and three consecutive National Association of Home Builders' First Award of Merit beginning in 1958. Both *McCall's* and *The Saturday Evening Post* featured Huber Homes in 1960 (Avdakov et al. 2010:45-46).

By 1970, the population of Huber Heights reached 18,943. By 1976, construction by Huber Homes surpassed 10,000 houses. The last plats were recorded during the late 1970s, and the city finally incorporated in 1981. The population has since grown to more than 38,000. Between the late 1970s and 1992, Huber Homes built another 5,000 houses, as well as condominiums, apartments, and townhouses (Avdakov et al. 2010:45-46).

Charles Huber set aside hundreds of acres for schools, churches, parks, and shopping. The first elementary school, Kitty Hawk, was completed in 1959. Three more elementary schools were added by 1965, and a high school was finished the following year. A middle school followed in 1970. In areas of Huber Heights where school construction could not keep pace with increases in student enrollment, Huber built houses without interior partitions and rented them to the county school system for $1 per year; the last of these closed in 1974. Another middle school and two more elementary were built during the 1970s, by which time the city's school had an enrollment of 10,000 students. Construction of churches proceeded at a similarly rapid pace. The St. Timothy Lutheran Church (1958), Huber Heights Baptist Church (1959-1960), and Huber Heights Church of the Brethren (1960) were the first to be completed, with three more under way the following year. Huber personally donated land to the community for park space. Although land was set aside for commercial uses, such as shopping centers, the Huber firm did not build any of these projects. In addition to its extensive work at Huber Heights, however, Huber Homes built several thousand houses in other cities, including Columbus and Cincinnati, as well as Atlanta, Georgia, Scottsdale, Arizona, Indianapolis, Indiana, and Ft. Lauderdale, Florida. Charles Huber died in May 2003. (Avdakov 2010:63-64).

4.8.18.2 Emery Family

In Cincinnati, the first real estate development endeavors of Thomas Emery's Sons began with several 1880s apartment houses, including the Lombardy on West Fourth Street. The family focused on apartment buildings, as well as hotels, through the early twentieth century, with projects in Walnut Hills, Avondale, and Clifton, among others. During the 1920s, Thomas Emery's widow, Mary Emery, made her own mark with the aforementioned planned community of Mariemont in suburban Cincinnati. Following Thomas's death, his nephew, John J. Emery moved to Cincinnati to run the family business. His estate, Peterloon, has been recognized as an architectural masterpiece of Georgian and Queen Anne revivalist design. John Emery's commercial projects included the Carew Tower and the Netherland Plaza, both major Art Deco landmarks in downtown Cincinnati (Langsam 2008).

During the post-World War II years, John Emery was recognized as a driving force in the revitalization of downtown Cincinnati. Perhaps the most significant project of the postwar period was the aforementioned Terrace Plaza Hotel, a modernist skyscraper that featured numerous technological, architectural, and aesthetic innovations. John Emery also founded the Cincinnati Country Day School, served as a trustee and benefactor of the Cincinnati Art Museum, and held the office of vice-president of the Boy Scouts of America. He remained active in cultural and civic affairs until his death in 1976 (Langsam 2008; Peterloon Foundation 2010).

4.8.18.3 Myers Y. Cooper

Myers Y. Cooper was born in Licking County, Ohio, in 1873. He attended the National Normal University in Lebanon, Ohio, for two years. In 1894, Cooper joined two of his brothers, Samson and James, to form a real estate business. After a few years, he went into business for himself. Cooper developed a number of housing subdivisions in Cincinnati, most notably in Hyde Park. He sold more than two thousand houses by offering them on credit to people who could not pay the full price immediately (Ohio History Central 2005mm).

Cooper established a number of businesses related to his primary interest in real estate. These included the Hyde Park Lumber Company (still in business today), the Hyde Park Savings Bank, and the Norward National Bank, and served as the chief executive officer of all three. He also held interests in coal mining. In addition, he held the office of president of the Ohio Fair Managers Association and of the Ohio Council of Churches. An active member of the Republican Party during the 1910s and 1920s, Cooper successfully ran for governor of Ohio in 1928. After serving a single term, he returned to his business and civic interests in Cincinnati, and continued to be a prominent businessman and developer until his death in December 1958 (Ohio History Central 2005mm).