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Information for Parks, Federal Agencies, Indian Tribes, States, Local Governments, and the Private Sector

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Preserving the Recent Past

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Cover photo: Olympic Stadium, Helsinki, Finland, photo by Thomas C. Jester. The stadium was designed by Toivo Jantti and Yrjo Lindegren in 1938 for the 1940 Olympics, which were cancelled due to the war in Europe. Finland hosted the 1952 Olympic Games.

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Rebecca A. Shiffer

The Recent Past

And now there's only one thing that I'd like to know.
Where did the Twentieth Century go?
I'd swear it was here just a minute ago.

—*Steve Goodman,* The Twentieth Century is Almost Over

CRM first examined cultural resources from the recent past in a 1993 thematic issue (Volume 16, No. 3). By 1993, cultural resource professionals were beginning to define the recent past and to formulate arguments for the preservation of its buildings and landscapes. Since then, preservation gains and losses, media attention, scholarly publications, and grassroots word-of-mouth have all raised public awareness of the significance and state of the 20th-century built environment and cultural landscapes.

Perhaps the surest sign of a growing interest in the recent past occurred with the convening of over 800 people from the US and abroad in Chicago in March 1995 to participate in the Preserving the Recent Past conference sponsored by the National Park Service and other federal and state agencies and national organizations. The conference offered three tracks — Resource Evaluation, Preservation and Reuse Strategies, Materials Conservation — and an in-depth workshop examining the Curtain Wall, a building construction type unique to the 20th century.



The Fountainbleau, Miami Beach, Florida, designed by Morris Lapidus, 1954. The architect said of his building, "People loved it, but the critics were aghast." Autographed postcard courtesy of Dennis R. Montagna.

Conference presentations and conversations among participants stressed again and again that while traditional approaches to the preservation of historic buildings and landscapes, as reflected in the track titles, are largely applicable to 20th-century resources, some evolution in methodology will be required if we are to succeed in preserving the recent past. Preservation efforts must begin with an understanding of the historical and cultural significance of the resources, many of them less than fifty years of age. Until now, cultural resource professionals have relied on the passage of time to explain that significance and to tell us what elements of the past are worthy of preservation. But more recent resources are already disappearing too rapidly to afford the luxury of allowing specified periods of time to pass before studying them. Time obliterates — often literally — as easily as it clarifies. With solid scholarship, the significance of much of the recent past can be put in historic perspective now.

Like resource evaluation, formulating preservation and reuse strategies takes on a special twist because more recent resources often lack the broad popular appeal of older resources. Modernist buildings, suburbs, roadside structures, and missile silos do not easily fit the popular concept of "old," let alone "historic." They also defy the general understanding of "aesthetically appealing," which consciously and unconsciously drive many people's decisions about the worth of elements of the built environment. Cultural resource professionals largely appreciate the significance and fragility of the recent past, but they still face the formidable task of convincing a public that generally does not "get it."

Finally, the conservation of recent materials is still a nascent field, and it promises to offer far more complexities than the care of traditional materials such as wood, bricks, paint, and mortar. The 20th century has witnessed the unprecedented growth of new manmade building materials. With the rapid change that has been a given in this cen-



Designed by architect Charles Noble in 1936, the Elwood Bar in Detroit, Michigan, was constructed with porcelain enamel panels, a relatively new building material at that time. Photo courtesy of William Scarlet.

tury, many of these materials have already passed out of use. Zenitherm, Flexboard, and Cushocel are long gone from the shelves of the lumber yard and home center. The large-scale industrial manufacturing processes and equipment used to make these materials are now obsolete or non-existent, making modern materials virtually impossible to replicate for restoration needs. As a consequence, recent materials challenge the ingenuity of cultural resource professionals, who are eager to learn of successful projects that could inform their own work.

The articles presented here reflect current issues in the state of the recent past. Five of these—denoted by the Greyhound bus station logo—are reprinted from the published proceedings of the Preserving the Recent Past conference. H. Ward Jandl's introduction lays out the questions faced by cultural resource professionals dealing with the recent past and underscores the need for continued discussion of the issues unique to 20th-century buildings and landscapes. Bruce Kriviskey reports on historic preservation planning efforts in Fairfax County, Virginia, which are perhaps unique in including local historic design review of an historic district constructed entirely in the 1960s. Tim Samuelson and Jim Peters describe the restoration of a building significant for its associations with the history of American rock-and-roll, and the emerging needs to restore 1950s building materials that have been considered intrusive at worst, and ephemeral at best.

Three articles examine modern building materials and construction. Carol Dyson and Floyd Mansberger discuss the history of and offer conservation techniques for structural glass, which found wide application on both the interior and exterior of buildings constructed and remodeled during the mid-20th century. Ann Milkovich McKee presents perhaps the first comprehensive research on a group of materials that may be the most ubiquitous, most derided, and least understood of recent building materials — simulated stone (Formstone, etc.). Bruce Kaskel examines the curtain wall, the construction system that literally changed the face of corporate architecture during the decades following World War II.

Concern with the preservation of 20th-century cultural patrimony is not solely, or even primarily, an American phenomenon. Thomas Jester looks beyond our borders and surveys ongoing international efforts to evaluate, interpret, and preserve architecture of the recent past.

These articles, and the conference for which they were first prepared, are by no means the last words on this topic. Instead, they are among the first words in a field of scholarship and conservation that will ultimately lead to effective methods of preserving and caring for 20th-century resources. Ward Jandl calls the preservation of the recent past "the greatest challenge of all..[one which] preservation professionals will be grappling with for the remainder of this century and well into the next millennia."

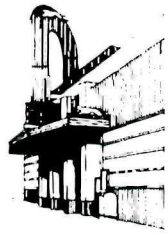
Where do we go from here? To meet this challenge, we need to build upon what we know and reach further. As in any new field, our understanding and appreciation of the significance of the resources has advanced further than our knowledge about how to maintain and conserve them. Many excellent books, articles, and other published materials about the recent past, specific building types, and, to a lesser extent, materials, are now available. One aspect of the field that needs greater attention is the research and study of the properties of modern building materials. This is the essential foundation for making informed decisions about treatment; it is impossible to determine an appropriate treatment without understanding what you are treating. We must attempt more conservation treatments, instead of removal, of these historic materials, forging partnerships between preservation professionals and the building owners who are their clients to support these efforts. And we must actively share results with colleagues through publications, meetings, conferences, and newer on-line technologies.

Rebecca A. Shiffer is an architectural historian, Technical Assistance Branch, Chesapeake and Allegheny System Support Office, Northeast Field Area, National Park Service, Philadelphia.

H. Ward Jandl

Preserving the Recent Past

An Introduction



Over the past several years, preservationists have finally begun to devote serious attention to the immense challenge of documenting, evaluating, and conserving cultural resources from the 20th century. This attention occurs not a moment too soon: it is clear that these are the issues that preservation professionals will be grappling with for the remainder of this century and well into the next millennia.

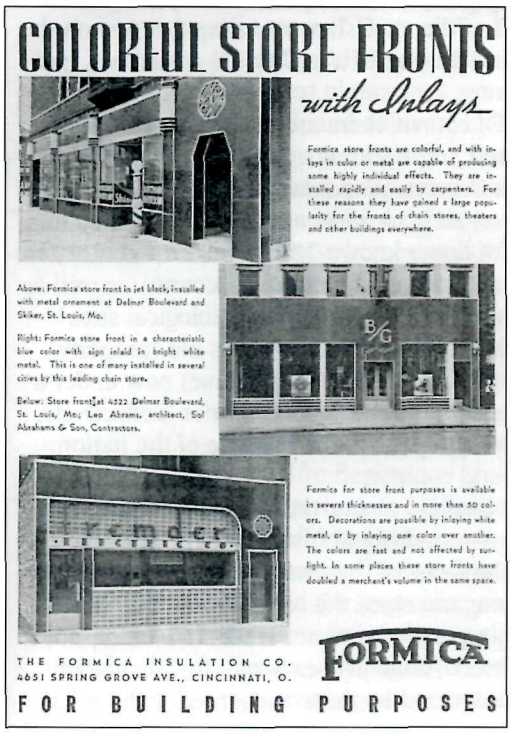
Our predecessors in the preservation movement fought battles to protect remnants from the Victorian age: buildings and neighborhoods that were not widely appreciated in the 1950s and 1960s by the general public—or by many architects and historians, for that matter. While these resources still continue to be at risk, at least today there is a broad body of information and knowledge about their history, significance, and care.

At the present time, we as preservationists are confronting perhaps the greatest challenge of all: how to deal with the 20th-century built environment. It is hard to identify the defining moment when we recognized that it was time to face up to our recent past. Was it when Barbara Capitman pushed to have a good chunk of Miami Beach placed on the National Register? Was it when Philip Johnson decided to donate his Glass House to the National Trust for Historic Preservation? Was it when state and local preservationists fought to save Lockefield Gardens in Indianapolis, a public housing project from the 1930s? Was it when the marble veneer of Amoco's highrise headquarters in Chicago began to fail? Or was it when Connecticut's State Historic Preservation officer requested a determination of National Register eligibility for the Merritt Parkway?

We are faced with defending, documenting, evaluating, and preserving resource types that did not even exist until the middle part of the 20th century: the shopping mall, the network of highways criss-crossing the country, the curtain wall skyscraper, the housing development, the edge city. What is the history of these new building types and by what criteria should their significance be evaluated? Which of the 2,800 nearly identical Lustron houses constructed around the country between 1948 and 1952 are worthy of preservation and why?

The strategies for protecting and reusing these resources, while owing much to past efforts with 18th– and 19th–century structures and neighborhoods, must deal with a scale that is unique to the 20th century: multi-building, high-rise housing projects, colossal airport hangars, and military bases that are measured in miles, not acres. Such strategies must also include a heavy—and particularly creative—dose of education and awareness-building: why should the public care about military structures built during the Cold War? What is so special about mass-produced, prefabrication houses? How can the general public be made aware of the importance of early gas stations, bus terminals, and other roadside architecture?

Enormous challenges also face architectural conservators, engineers, and architects who are beginning to rehabilitate and restore 20th–century resources; the materials in need of conservation are not only the traditional brick, stone, wood, and iron of yesterday but more complex materials such as plywood, fiberglass, stainless steel, and plastics. Building systems are no longer simple masonry bearing wall construction or wood balloon frame but curtain wall or post-tension concrete. How does one preserve 20th–century materials that may be identified with significant health problems?



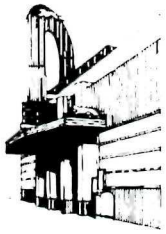
Plastic laminates were used not only for countertops but for storefronts beginning in the late 1920s. This Formica advertisement promoted designs using colored and metal inlays. Architectural Forum, *January 1937.*

The serious study of the recent past is a relatively new phenomenon; there have been few scholarly books on the subject, and articles in professional journals are few and far between. The papers included in the handbook for the national conference, Preserving the Recent Past, Chicago, March 30 through April 1, 1995, have made an important contribution to understanding and addressing these issues. The conference was organized specifically to bring together preservation professionals from North America and Europe to consider the unique challenges of preserving 20th–century historic resources. Together, the workbook and the conference will greatly expand the body of practical information available to preservation professionals on evaluating and protecting the recent past.

H. Ward Jandl, Deputy Chief, Preservation Assistance Division, National Park Service, Washington, DC, died suddenly of heart failure just two weeks prior to the conference, Preserving the Recent Past. The conference and workbook were his idea and stemmed from his interest and expertise in 20th-century building types and their preservation.

Bruce M. Kriviskey

Saving the Suburban Sixties
Historic Preservation Planning in Fairfax County, Virginia



The notion of "historic preservation" in Northern Virginia's Fairfax County—the most intensely developed jurisdiction in the Washington, DC, metropolitan area—often taxes one's credulity. Those familiar with the county, but whose perceptions are of only gridlock and sprawl, strain to remember what is left that is old, much less historic. They recall waggish bumper stickers that use Fairfax as a verb describing an act that should not be done to other nearby counties or, for that matter, to the rest of Virginia. Those less familiar with the county may have read what some observers have written about our "Edge Cities," "Beltway Bandits," and "McMansions."

The history of Fairfax County can be captured in three "snapshots." The first shows a group of earnest Paleo-Indians ambushing a Wooly Mammoth at the crossing of two well-worn paths in the ice-age tundra. The second shows a graph of population change in the county since the first census in the 1790s. The population level was virtually flat until the 1930s; it doubled each decade from 1940 until 1980, and it doubled again over the past 14 years to over 820,000 today—an average increase of 88% per decade since World War II. The third is of Tysons Corner, a gas station and a general store as late as the 1960s, now the commercial hub of the county and the seventh largest business district in the country, with over 20 million square feet of office and retail space. Archeologists might say that snapshots one and three depict the same spot and simply show the impact of the view shown in snapshot two on the past and present of a traditional crossroads trading center.

Of course, there are venerable sites of historic and architectural significance in the county—Mount Vernon, Woodlawn Plantation, and Gunston Hall, to name a few. There are also hundreds of lesser known 18th– and 19th–century historic sites scattered around the county, as well as more than 2,000 recorded archeological sites including one about 8,000 years old (properly excavated and recorded, of course) now under a parking structure in Tysons Corner. Collectively, these ably represent the heritage of the nation, state, and county.

Needless to say, these invaluable traces of the past— traditional history, if you will—have been the focus of the county's preservation planning program since the early 1960s. But, this is history to read about, not recall; to look at, not to have lived. About 10 years ago, this dichotomy was recognized by those concerned with under-



Tysons Corner about 1940.

Photos courtesy of Fairfax County Public Library Photographic Archives.



Tysons Corner in the 1980s.

standing and preserving the heritage resources of the county and questions were raised, traditions challenged, and goals debated.

Debate focused on defining the most historically-significant periods in the history of Fairfax County. Prehistoric days that ended with the explorations of Captain John Smith and other Europeans? Days of the Royal Proprietor, Thomas, Sixth Lord Fairfax, when the lands that became the great plantations were granted, assembled, cleared, and cultivated? Patriot days when the county's two Georges, Washington and Mason, fathered a nation and its Bill of Rights? The days when westward expansion meant a scattering of wilderness homesteads 10 or so miles upland from the Potomac? Or the days when Colonel John Singleton Mosby provided many sleepless nights for Union occupying forces? All of these are significant times that affected tens, hundreds, and even thousands of people. But, the era that affected hundreds of thousands came after these.

The Beginnings of the Recent Past

In the late 19th century, economic and social woes affecting the nation and the ease of travel and communication throughout the country reduced the importance of state governments. By the turn of the century, the scale of the federal bureaucracy began to expand with the rise of new regulatory agencies and the expansionist foreign policy of the times. In the early 20th century, the world view brought on by World War I and the "alphabet soup" response to the woes of the Depression caused Washington to become the hub as well as capital of the nation. Fifty years ago, World War II pushed a moribund military into the forefront of the bureaucracy and, in the heat of the Cold War, the military-industrial complex mushroomed, crossed the Potomac, and grew in the fields of Fairfax County.

In the late-19th and early-20th centuries, Fairfax County was the dairy center of the United States and the breadbasket of the nation's capital. To accommodate these activities, the mud and gravel roads that once were only farm-to-market routes began to be traveled in both directions. Washington residents, particularly the upwardly mobile middle class, sought homes or weekend retreats way out west in the inexpensive, open countryside of McLean, Mount Vernon, Great Falls, and Fairfax City. Houses were added to tiny crossroads villages like Dunn-Loring, Langley, Vienna, and Clifton, while trolley lines grew along with public services and local commerce. This gentle infiltration began as Washington became an employment magnet. It became a great invasion as the city's population exploded from the "War to End All Wars" to the "War on Poverty," as tens and then hundreds of thousands of people made Fairfax County their home. In re-re-re-redoubling the population, they made another kind of history, not more or less significant than the past 250 or 10,000 years, but different and more challenging to identify, record, communicate, and, yes, preserve.

Identifying the Recent Past

In 1988, Fairfax County adopted its Heritage Resources Management Plan. This plan identified 10 so-called study units beginning with the prehistoric Paleo-Indian cultures, the time of Hunter-Gatherers, and the beginnings of European contact. It then focused on the historical periods including those of the tobacco plantation society, free black communities, Civil War and Reconstruction, and agrarian culture. The latest of these study units is most relevant to the recent history of Fairfax County— that of suburbanization and urban dominance.

The plan described the cultural context of each study unit as well as the heritage resource types that typify the time or group. For the suburbanization unit, typical resources included horse farms and commercial agriculture, industrial parks and shopping centers, planned communities and crossroad clusters, trolley lines and paved highways, single-family housing and cooperative apartments, government offices and military installations, and schools and parks. A subcate-

gory of the study unit, perhaps unique to northern Virginia, is "colonialization"— the design influence of Mount Vernon and, to a lesser extent, Williamsburg in both new construction and remodeling. Here, columns and cupolas were added to everything from 19th-century vernacular farmhouses to gas stations and high-rise office buildings. Architectural kitsch became architectural history as the visual character of much of the county was formed.

Not surprisingly, studying this part of the past bucks the traditional concerns of archeologists, historians, and preservationists. Because of this, many of the resources identified in this unit had been unsung and unsaved. With the prodding of the Heritage Resources Management Plan, an awareness of the cultural significance of these properties has increased and they are now considered worthy of study and recording. Researchers have found that they are fun, too.

Recording the Recent Past

The Fairfax County Inventory of Historic Sites was begun in the 1960s and now includes nearly 300 properties. At least a fourth of these were built or remodeled in the 20th century and include such niceties as Wright's Usonian Pope-Leighey House, built in 1940 and relocated in 1964; roadside attractions such as the 1950 Frozen Dairy Bar, now in architectural mothballs; shopping centers such as Seven Corners, opened in 1956, the first in the Washington metropolitan area; and planned communities such as Hollin Hills, 1949-1962, and Reston, begun in 1965.

The inventory is primarily that, a list of properties deemed to be of sufficient interest to be studied and recorded. Inventory properties are not protected, although over 30 are also listed in the National Register or included in local historic districts. They are, however, taken into consideration in the county's planning and zoning processes. There is also a parallel inventory for archeological sites, now numbering over 2,000, but only a handful of these relate primarily to 20th-century resources.

An example of the type of recording of the recent past that is taking place in Fairfax County is the photographic survey of the planned community of Hollin Hills. Begun in 1949 and completed in the 1960s, this single-family housing project was singled out as a "milestone in the future of American architecture" in the 1957 centennial exhibit of the American Institute of Architects. Its houses designed by the late Charles M. Goodman, came in 14 "basic" types. Buyers could make individual modifications within the context of the architectural design and the park-like landscape, a new concept that bridged the gap between custom and cookie-cutter design. The purpose of this photographic recording project, undertaken by students of the urban architecture program of Virginia Polytechnic and State University (Alexandria Center), recorded all the basic themes and variations. This has sparked an interest in studying other works by this well-known Washington area architect as well as an interest in contemporary, as opposed to traditional (read "colonialized"), design in the county.

Communicating the Recent Past

In addition to sponsoring the work of others, such as the Hollin Hills survey, Fairfax County has a growing interest in publishing materials relative to recent history. The Fairfax Chronicles, the county's newsletter devoted to archeology, history, architecture, and historic preservation, has been published for the past 16 years. Within the past four or five years, more and more articles and photographs about the early and mid-20th century have been included. These are extremely popular with the public, particularly school children. An article and twilight color photograph of the neon-lighted Frozen Dairy Bar stirred up much nostalgia as did a recent article on the 30th anniversary of the opening of the Capital Beltway, the circumferential highway serving the Washington metropolitan area. In that issue, early aerial and ground photographs were printed side by side with increasingly more cluttered street maps to tell the story of post-World War II development in Fairfax County in a way that both long-time residents and newcomers could understand. It was history they could touch, and laugh at. The cover photograph showed the brand new Beltway bumper-to-bumper with the parked automobiles of those who came to witness its grand opening in 1964. It hasn't changed much since.

One of the more popular communications devices sponsored by the county, in conjunction with the Virginia Department of Historic Resources, is a highway marker program. These are the roadside markers that you try to read as you drive past (new ones are now placed at intersections or at convenient pull-offs) that tell who lived, fought, or otherwise did something of historical interest at that place. The three latest markers in the county deal with the outer defenses of Washington, but not during the Civil War or War of 1812. Rather, these tell about the three Nike anti-aircraft missile launching sites located in the county during the hot days of the Cold War. These were well-guarded secrets until phased out in the 1960s, except for the fully-equipped one used as a tour site to impress on foreign dignitaries that America did, indeed, carry a big stick. Now they are grassy spots in public parks, but with a history as important as the line of fortifications that ringed Washington on the Virginia side of the Potomac

100 years earlier. Both sets of fortifications were more psychological deterrents than actual ones, and none ever fired a shot in anger.

Preserving the Recent Past

Like the forts and launching sites of past eras, Fairfax County has the latest arsenal of historic preservation tools at its disposal. These include 13 Historic Overlay Districts officially designated by the Board of Supervisors and subject to design review as part of the county's Zoning Ordinance. Because of the architectural traditions and development patterns of the county, none of these include the uniformly old urban neighborhoods that are typical of historic districts throughout the country. Rather, most Fairfax County districts focus on a single primary structure—the Pohick Church of 1769, or the 1794 Sully and 1806 Woodlawn Plantations. An essential part of these districts, if not the key, is the larger landscape context that defines approaches to the primary, or core, properties as well as views to and from them.

A few of the county's historic districts are more traditional building clusters, the least traditional of which is the Lake Anne Village Center of Reston. This residential/commercial complex was built in 1965 and formally designated as a Fairfax County Historic Overlay District in 1983. To my knowledge, this is the only designated historic district in the country subject to local design review where every bit was built in the 1960s.

Fitting right into the theme of suburbanization and urban dominance, Reston occupies the former 7,000-acre Bowman Farm, which by the mid-20th century was the largest single tract of land in the area. The Bowmans had tried to develop a new town themselves, but eventually sold the land to Robert E. Simon. In 1961, he began to plan, build, and market Reston, and to use his initials in the name. Ironically, this had been the site of another planned town in the 1890s with the less catchy name of Wiehle, which never grew to more than a handful of buildings.

Unlike Wiehle, Reston, home now to over 60,000 people, was phenomenally successful. From the beginning, critics hailed Reston's concept of village centers surrounded by greenbelts as a significant planning and architectural achievement. Lake Anne Village Center, designed by the New York firm of Whittlesey and Conklin, was the first of the village centers built and was designed at a pedestrian scale with a mix of residences, offices, and retail stores gathered around lakes and plazas, urban spaces in the suburbs. As a 1981 Washington Post article observed, "No piece of Northern Virginia real estate was more praised and honored in the 1960s than Reston's Lake Anne Center."



Hollin Hills in the 1950s.



Photos courtesy of Fairfax County Public Library Photographic Archives.

Lake Anne Village Center, Reston, 1977.

The center was designed and built as a whole with each element fitting into the entire scheme. Buildings ranging in height from two to four stories line the lake and plaza while one 18-story apartment building stands as a focal point at the end of the plaza. A "J" shaped row of shops topped by apartments encloses the wide plaza and crowns the northern tip of the lake. The buildings share a common vocabulary of design and materials; the modern, straight-edged architecture is executed in medium brown brick with dark brown wood trim, gray concrete, and glass. The buildings are complex compositions of solid and void, with many balconies, sheer brick walls, flat but varied rooflines, and expanses of glass. Concrete sculpture and, today, mature landscaping accent the plaza where moms with strollers enjoy the human scale.

As with the more traditional of Fairfax County's Historic Overlay Districts, the goal is to protect the architectural and environmental fabric of the center and to assure that future development is compatible with its existing architectural character. For the Lake Anne Village Center, this is not as easy as it sounds. These mixed-use buildings were products of the 1960s, and designed to meet contemporary needs with the technologies of the times. As such, they are essentially speculative commercial buildings designed and constructed to last around 30 years. Today, 30 years later, parts

are wearing out, pieces falling off, and buildings built before energy was a problem and big-box stores were the competition present challenges to preservation-minded owners and to the county's Architectural Review Board. Working with Reston's own Design Review Board while projects are still on the drawing boards has smoothed this process significantly.

Challenges to Preserving the Recent Past

Aside from the technical challenges of preserving an architectural fabric that was never intended for anything near posterity, the biggest challenge to preserving the recent past of Fairfax County is overcoming the notion that it just isn't past enough. The "50-year threshold" has not been crossed, and we are dealing with architectural nostalgia, not architectural history. This, however, is a purist, not populist, argument. A browse through any of today's "Antiques and Collectibles" shops where Fiesta Ware, Tonka trucks, and chrome-plated dinette sets command premium prices reflects the growing public fascination with the recent past. But, what of this past is significant enough right now to warrant public respect and scholarly interest?

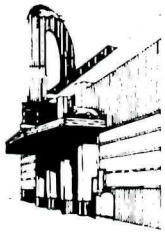
In Fairfax County, as in any other suburban jurisdiction, the answers fall along a sliding scale. To us, however, all evidence of the recent past is significant because of what it can teach us about where we, not just our parents or grandparents, have come from and how we have coped, for better or for worse, with the opportunities, needs, and constraints of geometric growth. That is why we are sifting through what is left of the resources of the recent past, some to merely note, some to celebrate, some to preserve, and all to respect. Would that our parents and grandparents had done the same.

Bruce M. Kriviskey, AIA/AICP, is the Chief of the Heritage Resources Branch in the County of Fairfax Office of Comprehensive Planning, Falls Church, Virginia.

Tim Samuelson and Jim Peters

Landmarks of Chicago Blues and Gospel

Chess Records and First Church of Deliverance



For most of its first 20 years of existence, the Commission on Chicago Landmarks has been largely concerned with the protection of the city's world-famous collection of late-19th and early-20th century architecture: the skyscrapers and early commercial buildings of the Loop, the mansions of the Gold Coast and the Near South Side, and a variety of Prairie School residences.

On at least two occasions in the last few years, however, the Commission has headed in an entirely new direction, from the well-traveled paths of architects Louis Sullivan and Frank Lloyd Wright to that of such influential musicians as Chuck Berry, Dinah Washington, and Muddy Waters.

In 1989, the Commission designated an otherwise nondescript, two-story building at 2120 South Michigan Avenue as a Chicago Landmark, due to its use between 1957 and 1967 by Chess Records, one of the principal music labels associated with the development of American blues and rock and roll. And, in 1994, a former hat factory building at 4315 South Wabash Avenue was given city landmark status, partly because of the importance of its longtime occupant, the First Church of Deliverance, to the development of American gospel music in the 1930s and 1940s.

The process of landmarking these two buildings, particularly in the case of Chess and its interior design, has proven to be a new and enlightening challenge that has altered the way the

Chicago preservation community looks at recent-date historic sites. It also raises several questions about how to document these modern sites, and the need for new research techniques.

The Chess Records Story

In contrast to the finely detailed buildings that authenticate the works of Chicago's turn-of-the-century architects, Chess Records was a raucous, streetwise business rough-hewn out of the city's streets. Leonard and Phil Chess were tough-talking Polish immigrant brothers who captured the distinctive sound of Chicago's African American blues performers of the 1950s and 1960s on record, forever altering the course of American musical history.

Many other companies, such as Cobra, J.O.B., and VeeJay, also helped to make Chicago a vibrant musical recording center in the mid-1950s. A few of their buildings—such as Cobra's studios in the 2800 and 3400 blocks of West Roosevelt Road and the Universal Studios at Rush Street and Walton Avenue—are still standing. However, the Chess building at 2120 South Michigan Avenue is probably the most intact, and important, survivor.

The brothers had established themselves in the operation of nightclubs on Chicago's South Side in the 1940s. Catering primarily to a black clientele, the Chess brothers recognized the commercial potential of the local musicians who performed in their clubs. In establishing Aristocrat Records in 1947, they sought to capture the intensity of these performances on record.

From the beginning, the Chess brothers made their label a forum for the rugged, emotional sound of "Mississippi Delta," country blues.



The building at 2120 South Michigan Avenue in Chicago is unremarkable except for its former use as the home of Chess Records from 1957–1967. Chess and its recording artists were instrumental in the development of American blues and rock and roll.

Among the roster of blues artists recorded by Chess throughout the 1950s were Muddy Waters, Howlin' Wolf, Sonny Boy Williamson, Little Walter, and Willie Dixon, the latter being a multi-talented composer, bass player, and producer who had a major impact on the creative direction of the Chess label. Equally important were the contributions of Chess Records, and its subsidiary Checker Records, in the early rock and roll recordings of Bo Diddley and Chuck Berry. Leonard Chess' first office was in a small storefront at 2300 East 71st Street. The following year he moved to a new storefront location at 5249 South Cottage Grove Avenue, where the operations remained for three years. The label changed its name to Chess in 1950 and Phil Chess joined his brother full time.

From 1951 to 1954, when 10 records produced by Chess made the national hit charts, the company operated out of a storefront at 750 East 49th Street. Between 1954 and 1957, its headquarters was a double storefront at 4750-4752 South Cottage Grove Avenue.

Several of these early buildings still remain, but the best known Chess address—and the one that the City of Chicago chose to designate as a landmark—is the two-story building at 2120 South Michigan Avenue, where Chess Records operated from 1957 to 1967. Many of Chess' most influential recordings were made here, including "Johnny B. Goode," "Rescue Me," "Red Rooster," and "I'm a Man."

In addition, "2120" is the address that many musicians have long equated with the Chicago blues sound. In the 1960s, several British rock groups came here to record, including the Rolling Stones ("12 x 5") and the Yardbirds, and the building itself has continued to be a tourist mecca for blues fans from around the world.

The Story of First Church of Deliverance

In contrast to Chess Records, the story of First Church of Deliverance is a less transient one. It was founded in 1929 as a small congregation on South State Street, but since 1933 it has continuously occupied the building at 4315 South Wabash Avenue.

The reasons for the building's designation as a Chicago Landmark principally relate to its unique Art Moderne style of design, which is quite unusual for a house of worship. But an equally important part of the church's history relates to its influential role in the general acceptance of gospel music.

Under the leadership of its longtime pastor and founder, Rev. Clarence H. Cobbs, First Church was one of the earliest African American churches to broadcast its services on the radio, beginning in 1934. (One of the earliest radio ministries in the U.S. dates to 1921 at WHT in Chicago.)

While spiritual music had always been an integral part of First Church services, it was largely through its weekly radio broadcasts that the church became widely known as a national center of gospel music. An Ebony magazine article called Rev. Cobbs "the most popular Negro radio minister in the U.S.," and noted that his broadcasts were heard by more than one million listeners.

Although gospel music had deep roots in African American culture, it emerged as a popular musical style only in the 1930s. Thomas Dorsey, the longtime music director of Pilgrim Baptist Church on Chicago's South Side, is considered the father of American gospel music, having set his church's hymns and spirituals to a more secular, syncopated jazz/blues beat.

In 1937, less than a mile away at First Church of Deliverance, Rev. Cobbs had hired organist and composer Kenneth Morris to be his gospel choir director. Morris and music director Julia Mae Kennedy quickly established a musical program that began to attract local and national entertainers.

Jazz/blues singer Dinah Washington frequently sang at the church with the Sallie Martin Singers, and trumpeter/singer Louis Armstrong also took part in musical events. Other notable musicians who have either made recordings in the church or been otherwise associated with its musical programs include Nat King Cole, Earl (Fatha) Hines, Delois Barrett Campbell, and Billie Holiday, who, church lore maintains, often brought her pet chihuahua to Sunday services.

In addition to Morris' influence as choir director and organist (e.g., he introduced the Hammond electric organ to gospel music), he and Sallie Martin, who is often acknowledged to be the "mother of gospel music," wrote and published numerous gospel standards, including Mahalia Jackson's "Dig a Little Deeper" and "How I Got Over," the theme song of First Church of Deliverance.

According to national gospel authority Beatrice Johnson Reagon, Morris and Martin "were among the vanguard of musicians who began...the changes that occurred in gospel music during the 1930s and 1940s."[1]



First Church of Deliverance, shown here shortly after 1946. Visible atop one of the towers are speakers that broadcast services to the street. Radio broadcasts of First Church's services helped to popularize modern gospel music. Photo courtesy of the Commission on Chicago Landmarks.

The "Fugitive Nature" of Research

In order for a building—or object or district—to be considered for city landmark status, it first has to be recommended to the City Council by the Commission on Chicago Landmarks, a nine-member board appointed by the Mayor. The Commission's decisions are aided by a research staff that is now a part of the Department of Planning and Development.

In late 1988, when the Commission staff proposed landmark designation of the Chess Records headquarters, it was unsure of how the Commission would react to the proposal. With a period of significance spanning a decade in the 1950s and 1960s, Chess Records was the most recent-date site ever proposed for Chicago Landmark status. Furthermore, the notion of designating a building that was related to recent musical genres was far from the Commission's more common themes of architecture and history.

The building itself also was problematic. Part of the significance of the site was that the Chess Brothers had made an impact on the course of international popular music while working out of makeshift quarters in a small, two-story loft building in an unglamorous commercial district, immediately south of downtown Chicago. Sited amid other small-scale buildings, the 25'-wide terra cotta front of the Chess Records building was well designed, but unexceptional in its architectural composition.

It was also a somewhat sobering experience to research something of such recent vintage. While this enabled the Commission's staff to talk to many of the people who were actually involved in the history of the building—including many very knowledgeable musicians, recording engineers, and visitors—the divergent recollections of these observers, especially compared to actual site evidence, demonstrates the vulnerabilities and potential inaccuracies in researching recent history. It also provides a wonderful reality check about the presumed accuracy of our research of the more distant past, where the opportunities to talk to actual participants are not possible.

As it turned out, Chess was a very "workaday" place. The alterations to the 2120 South Michigan Avenue building were done quickly and

inexpensively to serve a specific purpose, with little aesthetic forethought. Many of the original participants interviewed by the Commission's staff were amused by the interest shown in the exact details (history, construction materials, chronologies, etc.) of a business and building they thought of in an everyday casual manner.

Through building inspections, personal interviews, and research in numerous, 30-year-old music trade journals, the history of the building was gradually pieced together.

Historic Fabric...of the 1950s

Originally erected in 1911 for an auto parts dealer, the building was later used for the wholesaling of neckties and upholstery slipcovers. In 1956-1957, it was remodeled as the headquarters of Chess Records, in order to give a modern appearance for the growing company and to combine office, studio, stock room, and shipping facilities.

Normally, these alterations would be considered to be obtrusive and inappropriate changes for a 1911 building. In this case, however, they constituted a "historic fabric" that was integrally tied to the period of the building's musical significance.

The building's granite- and terra cotta-framed first floor had been replaced in 1956-1957 by composition stone cladding and a stock brushed-aluminum storefront. The interiors were cosmetically altered with a typical, late-1950s buildout that included redwood paneling and "lannon stone" facing for walls, fluted translucent glass for office partitions, and ceilings of drywall and perforated acoustical tile. The studio and other parts of the building continued to evolve during occupancy by Chess, as engineers and recording technologies rapidly changed.

Furthermore, after Chess moved out in 1967 (to 320 East 21st Street), more changes occurred, as the building was remodeled for a dance and theater studio run by a former Chess studio manager. Later, the building was bought by a former Chess musician and remodeled again. Consequently, by the late 1980s, the building contained layers of paneling, ceiling tile, and other materials reflecting these various changes. The preservation challenges, needless to say, are unusual; how, for instance, do you date such recent materials as 1950s, versus 1970s, drywall?

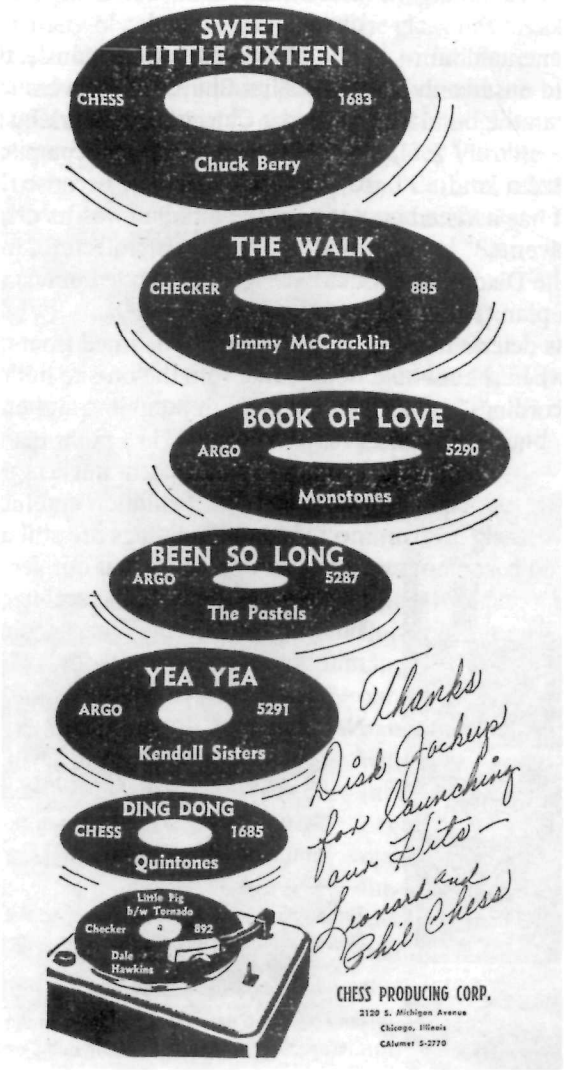
The only evidence of the original floor plan for Chess Studios was a set of drawings filed with the city for its building permit in 1956. However, there was a significant divergence between these drawings and what could be observed by a thorough inspection of the building today, including such major changes as the location of stairs and walls.

A major discovery—made subsequent to the landmark designation research—was obtained through contact with Jack Wiener, an original Chess engineer who was responsible for the buildout of the entire 1956-1957 remodeling. He revealed that the plans filed with the city were almost completely thrown out and redone at the time of the remodeling, particularly in the second floor studio area. (A particularly sobering discovery for those of us who depend heavily on official permit drawings.) Site investigation further revealed that the wall configuration of the 1956-1957 interiors were more intact than staff had originally surmised.

As for First Church of Deliverance, the changes that were made to its interior have been minor. As a result, the research into this structure was much less complicated and the major concerns have focused on the church's largely unaltered terra cotta-clad, twin-towered exterior.

The Landmark Process

In the case of Chess Records, staff had initially feared there would be difficulty in getting the nine-member Landmarks Commission Board to



Promotional literature for Chess Record Company, shortly after it moved its operations in 1957 to 2210 South Michigan Avenue. Photo courtesy of the Commission on Chicago Landmarks.

designate something so recent, so modest, as a Landmark. Early on, this fear was confirmed when one commissioner asked: "What's a Chess Records?" Despite that one query, however, the fact that the music was so well known to most of the Commissioners actually helped contribute to its acceptance.

It turned out that a mere mention of the song "Johnny B. Goode," recorded by Chuck Berry at the Chess Studios in 1958, was an immediate touchstone to most of those involved. At one City Council meeting, an alderman—in fact, an oft-time foe of landmarks—noted, "Yeah, I always liked that song," and voted for designation.

The proposed designation of the Chess Studios also generated widespread public interest. News of its proposed designation immediately made the front page of the Chicago newspapers and spread across the country in magazine articles and radio and television broadcasts—something never experienced even in the cases of the most famous and threatened Sullivan and Wright buildings.

A live radio broadcast from the building in 1989 by musician John (Cougar) Mellencamp urging listeners to write to the Landmarks Commission to "save" the building generated hundreds of letters, even though most had mistakenly interpreted this announcement to mean the building was threatened by demolition.

Since the building was designated a landmark in 1989, the Commission's staff has assisted the building's new owners, Blues Heaven Foundation (founded by the late Willie Dixon), to determine an appropriate restoration plan. The building's "period of significance" was determined to be pre-1960, which was the time when the studio was remodeled for multi-track recordings.



Since 1989, when this photo was taken of Chess Records' former home (1954-1957) at 4752 South Cottage Grove Avenue, the ornamental terra cotta panels have been removed by vandals. Photo courtesy of the Commission on Chicago Landmarks.

Fortunately, both pre-1960s engineers are alive and willing to work with the foundation to reconstruct the original appearance and equipment. While the studio's most important music was recorded pre-1960, this period of restoration unfortunately will not reflect the appearance that was seen later by the Rolling Stones, the Yardbirds, and other music groups who later recorded there.

In addition, there remains the challenge of restoring materials and equipment which, while cheap and improvised in the 1950s, are ironically difficult and often costly to duplicate today. This includes: solid redwood paneling, Flutex ribbed glass, acoustical walls of pyrobar furred out with drywall held by spring clips, original electronic equipment, rubber floor tile, and a basement echo chamber.

Furthermore, serious attention must be given to the repair and conservation of the building's 1950s-era storefront; for instance, what kind of finish was given to the aluminum at the time and what was the appearance of the original "2120" address sign itself. Few exterior photos survive, and memories of such minor details have predictably lapsed.

As mentioned previously, the issues pertaining to First Church of Deliverance, which was designated a Chicago Landmark by the Commission in 1994, were much less complicated than those of Chess Studios, largely because the major significance of the building was its distinctive Art Moderne style of architecture. In contrast, its landmark designation gained only a small amount of news coverage.

The lessons learned from these two designations—and from the on-site building research—should be both humbling and enlightening for preservationists. They point out the urgency of researching our recent musical past, particularly while the documentation and individuals connected to the buildings are still alive. These buildings also remind us that our sense of history can be found not only in the architectural plans of buildings, but in the diverse cultures of our communities.

Notes

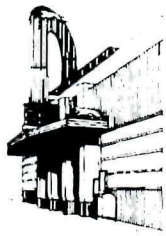
1 Beatrice Johnson Reagon, editor, *We'll Understand It Better By and By, Pioneering African American Gospel Composers* (Washington, DC, and London: Smithsonian Institution Press, 1992),17.

Tim Samuelson is a preservation specialist in the Landmarks Division, Chicago Department of Planning and Development, Chicago, Illinois.

Jim Peters is a preservation planner in the Landmarks Division, Chicago Department of Planning and Development, Chicago, Illinois.

Carol J. Dyson and Floyd Mansberger

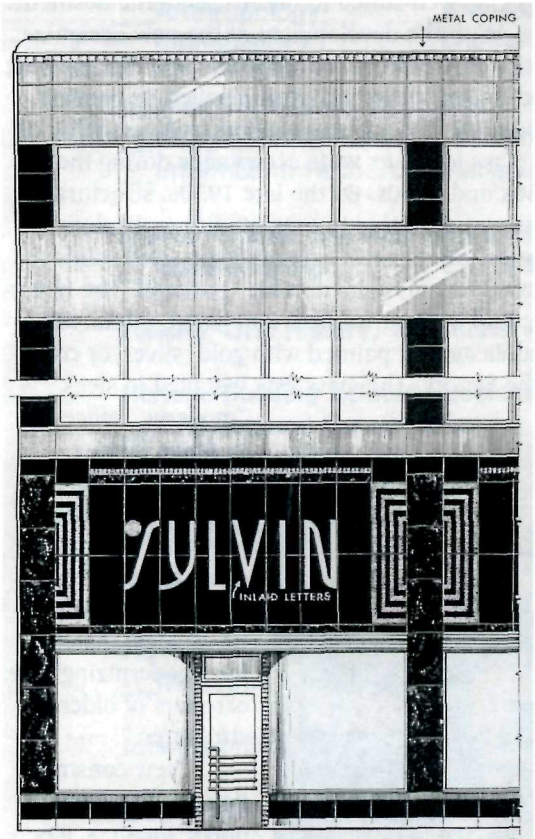
Structural Glass: Its History, Manufacture, Repair, and Replacement



Colored opaque structural glass was once widely used in this country. Although it is no longer manufactured in the United States, structural glass is still best known by the historic proprietary names of "Vitrolite" and "Carrara." This paper discusses the history, manufacture, and characteristics of structural glass and the repair and replacement options available today.

Colored opaque structural glass was fused at high temperatures, rolled into slab form, slowly annealed, and mechanically polished. Historically, the glass was marketed in black, white, and a variety of colors and finishes. The glass has also been known by many other terms, including recreated rock slab, sanitary glass, rolled or opaque opal glass, and heavy obscured structural glass. Besides Vitrolite and Carrara, other trade names included "Sani-Onyx," "Argentine," "Marbrunite," "Nuralite," and "Opalite."

Inlaid letters, curved bulkheads and sandblasted decoration combine in this advertisement rendering to demonstrate the versatility of Vitrolite. Source: Sweet's Catalogue, 1937, 17/20.



VITROLITE EXTERIOR TREATMENT OF BUILDING
STORE FRONT SHOWING CURVED BULKHEADS AND SANDBLAST DECORATION. VITROLITE FOR UPPER STORIES HELD IN PLACE BY MASTIC CEMENT AND METAL MOULDINGS. SCALE ⅛"=1'-0"

Composition and Production

Opaque structural glass was composed of silica, feldspar, fluorspar, china clay, cryolite, manganese, and other materials vitrified with intense heat (about 3,000 degrees F). The opacity of structural glass was created by the addition of fluorides into the batch. Upon annealing, the fluorides precipitated, creating a dense mass of particles suspended in the clear matrix. The fluoride particles would scatter, reflect, and trap light until the glass was semi-translucent or completely opaque. Colors were added to the clear matrix before firing.

After the materials were vitrified in pots or tanks, the sheets were then rolled to the desired thickness much like plate glass. The glass was annealed (cooled) much more slowly than modern plate glass, taking from three to five days—depending on the thickness. The process demanded exact control of the temperature and speed of the annealing process in order to provide consistent opacity, color, and finish. The glass was sometimes "hardened" by use of rapid heating and cooling methods to increase its strength. At this point the glass finish was "fire polished." Some applications made use of this soft finish without further polishing. To achieve a more glossy finished glass, the surface of the slabs were mechanically ground with fine sand and rollers and then polished to a mirror-like finish with felt blocks and rouge. After polishing, the slabs were cut to size. Normally the material was cut, holes drilled, and the edges finished to the owner's specifications in the factory.

Early History and United States Production

The use of glass in imitation of other materials has a long history. Colored, semi-translucent glass was first developed in ancient Egypt and Rome in imitation of stone and marble. In the 16th century Venetian craftsmen were producing a semi-translucent glass by adding fluorides such as cryolite to the matrix. The Chinese also added cryolite to glass to produce an imitation porcelain.

In the United States, at the end of the 19th century, the development of the regenerative furnace and the discovery of natural gas reserves in Pennsylvania, West Virginia, Oklahoma, Arkansas, Texas, and Missouri led to a rapid expansion of U.S. domestic flat glass production. The resulting investment of capital laid the foundation for varied innovations in technology and production of flat glass during the early-20th century.



Structural glass was popular in restaurants due to its sanitary, non-absorbent and non-staining qualities. This restaurant had Carrara and Black Glass walls, wainscotting, counters, aprons and shelving. Source: Glass, Paints. Varnishes and Brushes: Their History, Manufacture, and Use, *1923.*

Opaque structural glass slabs were first developed about 1900 as a sanitary alternative to white marble slabs for wainscoting or table surfaces. The product, Sani-Onyx, was created by the Marietta Manufacturing Company. About the same time the Penn-American Plate Glass Company began production of Novus Sanitary Structural Glass. By 1906, the Pittsburgh Plate Glass Company (PPG) had begun production of Carrara glass in white and black.

Eventually, approximately 10 U.S. firms were producing structural glass, but the two products that dominated the market were Carrara and Libby-Owens-Ford's Vitrolite (which appeared on the market about 1916). By 1929, U.S. production of opaque structural glass was over five million square feet, and the glass was being marketed in a variety of colors and finishes.

Although some structural glass was imported (primarily from Belgium and Czechoslovakia), imports constituted less than 5% of the U.S. market. Although the U.S. discontinued production in the early 1960s, structural glass continues to be produced today in Czechoslovakia and Japan.

Early Uses of The Material

When it was first introduced around 1900, structural glass was marketed as comparable to statuary marble in appearance, but, due to its smooth impervious surface and non-absorbent qualities, easier to clean and more sanitary. The fact that the glass was homogenous, non-porous, non-crazing, and could be produced in large sheets made it more appropriate than marble or tile for aseptic conditions such as hospital fixtures and surfaces.

During the first two decades of the 20th century the material was primarily used in utilitarian locations requiring durable, non-staining, easily cleaned and maintained slab materials: wainscoting, flooring, refrigerator linings, lavatories, table and counter-tops, bank coupon desks, and electrical switchboards, and in places such as hospitals and bakeries. The ability of the material to reflect light without glare also made it suitable for corridors, operating rooms, and laboratories. In these years structural glass was also being used on exterior surfaces, especially storefronts, where it was substituted for stone in bulkheads and dados.

At the Peak of Popularity

Although as early as 1906, the Penn-American Plate Glass Company was producing their Novus Sanitary Structural Glass in various colors, up until about 1930 most structural glass was produced only in shades of white, off-white, and black.

The softer "fire polished" and "satin" (the more marble-like) finishes also predominated the early applications. By the 1930s, however, the glossy, colorful, mirror-like finishes became popular, being well-suited to the Art Moderne aesthetic.

With the development of the new design aesthetics of Art Deco, Art Moderne, and Streamlined Modernism, structural glass reached its greatest popularity. The variety of colors and versatility of the glass led to its wide acceptance during the 1930s and 1940s. By the late 1930s, structural glass was available in over 30 different colors ranging from pastels to jewel tones, and solids to striated "agate" and "dendric" patterns. The material could be bent, carved, laminated, inlaid, and sandblasted, or painted with gold, silver, or color at the factory. The glass was installed in sleek "moderne" office building lobbies, movie theaters, restaurants, and confectioneries, among other places. The glass also proved to be an ideal material for "modernizing" the exteriors of older structures.



Early use of the material on building exteriors was in simple bulkheads and dadoes. The signage shown here was sandblasted and then painted. Source: Glass, Paints, Varnishes and Brushes: Their History, Manufacture, and Use, *1923.*

New construction for storefronts, movie theaters, gas stations, and auto

NATIONAL PARK SERVICE, PRESERVATION ASSISTANCE DIVISION

INFORMATION ON TRAINING IN CULTURAL RESOURCE MANAGEMENT IN 1996

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Course title/working title: _____

Dates of course: provide exact dates if known _____

or circle the month(s) being considered

Jan Feb March April May June July Aug Sept Oct Nov Dec Yet to be Determined

Length of course: how many days ___ or how many hours___ or how many weeks___ [6 weeks is the maximum for listing]

Tuition/fee for participant [it is assumed that participant pays for travel to and from course as well as any lodging and meals, if your organizations provides those, please say so] _____

City, State where training will be offered _____

Category in directory that you would like your course to be found [if more than 2 are marked, course will go automatically under "Common Ground"]

Common Ground

Anthropology and Related Specialties
___Anthropology ___Archeology ___Cultural Anthropology ___Ethnology
___Ethnohistory ___Marine Archeology (Diving)

Applied Technology Specialties
___Geographic Information System (GIS) ___Global Positioning Systems(GPS)
___Information Resources Management

Crafts, Trades, and Apprenticeships
___Blacksmithing ___Crafts Training ___Stained Glass ___Tiber Framing

Folklife, Oral History, Traditional Arts, Cultural Traditions

Historic Building Related Specialties
___Architectural Conservation ___Architectural Treatments ___Documentation of Historic Structures
___Hazardous Materials ___Historic Architecture ___Historic Building Materials
___Historic Preservation ___Historic Preservation Ed. ___Interior Design
___Rehabilitation/Standards ___Preservation Maintenance ___Specific Building/Structure Types

History, Public History

History of Science, Technology, Engineering
___Industrial Archeology

Interpretation

Landscape Preservation

PLEASE PREPARE ONE FORM FOR EACH COURSE. [please turn page over]

Language Retention and Ethnic Studies
___African-American Studies ___Alaska Native Studies ___American Indian Studies
___Asian-American Studies ___Hispanic-American Studies ___Native Hawaiian Studies

Museum Related Specialties
___Archives ___Collections Management and Care ___Conservation ___Furniture Conservation

Planning, Preservation Planning and Related Specialties
___Identification and Survey ___Preservation Planning

Preservation Law
___*Section 106 Review Process*

Heritage Education

Describe the course [you may attach a course syllabus or flier or other more lengthy description]

What audience is the course designed for:
___technical, single discipline audience ___several disciplines ___general public
___other, please describe_____

Co-sponsors for course, if any

Who can be contacted for more information about the workshop?

Contact Person:

Sponsoring Agency/Organization:

Address of Sponsoring Agency:

telephone; fax; e-mail:

Person completing this form:

_____
Name

_____
Agency/Organization

_____
Telephone # Date

Please return or fax
by November 3, to:

Dahlia Hernandez
National Park Service
Preservation Assistance Div.
P.O. Box 37127
Washington, DC 20013-7127
202-343-9566 or 202-343-3803 (fax)
Please call if you have any questions

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telephone; fax; e-mail:

Person completing this form:

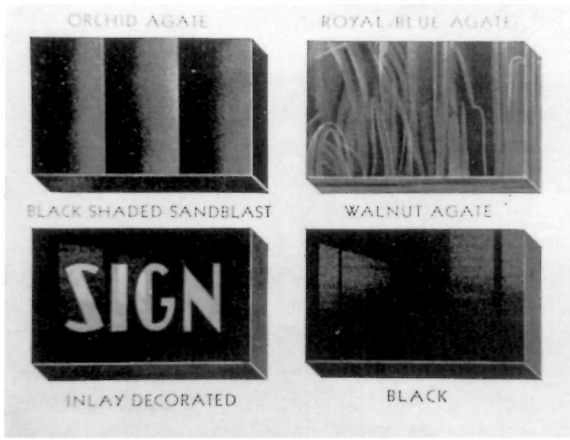
_____
Name

_____
Agency/Organization

_____
Telephone # Date

Please return or fax by November 3, to:

Dahlia Hernandez
National Park Service
Preservation Assistance Div.
P.O. Box 37127
Washington, DC 20013-7127
202-343-9566 or 202-343-3803 (fax)
Please call if you have any questions



Structural glass could be bent, carved, sand-blasted, inlaid, painted and came in a variety of colors and finishes. Vitrolite's variety of decorative finishes are shown here. Source: Sweet's Catalogue, *1937, 17/20, 1936.*

dealerships were clad in gleaming structural glass set in aluminum glazing systems. PPG produced their own complement to Carrara, Pittco-Carrara Glass Store Fronts, in which the metal window sash overlapped the Carrara facing material to protect the edges. In order to promote the use of Vitrolite in new construction, the Libby-Owens-Ford company offered a prefabricated Vitrolite-faced concrete masonry unit called Glastone. Opaque structural glass was no longer seen as a substitute for stone—it was extremely popular in its own right.

Late Use of the Material

By the 1950s, structural glass was losing its popularity. Changing design tastes, and competition from other materials such as plastic laminates and ceramic panels, were eroding its market. Although still utilized for storefronts, structural glass advertisements in the 1950s now emphasized the same purpose for which it was originally designed: use in utilitarian spaces such as residential and commercial bathrooms and kitchens.

A 1959 Carrara brochure is the last time structural glass was prominent in Sweet's Catalogue. In that edition, Carrara glass was being (unsuccessfully) marketed by PPG as a spandrel glass, and was available in the traditional "polished," "suede," and a new "rough" texture. Possibly the new coarse texture was designed to compete with other new materials such as textured porcelain enamel panels. A 1963 PPG brochure on curtain wall systems discussing Carrara as a spandrel panel choice is the final time the material is seen in Sweet's Catalogue. PPG kept the trade name listed in the Sweet's index until 1969, but the material was no longer displayed.

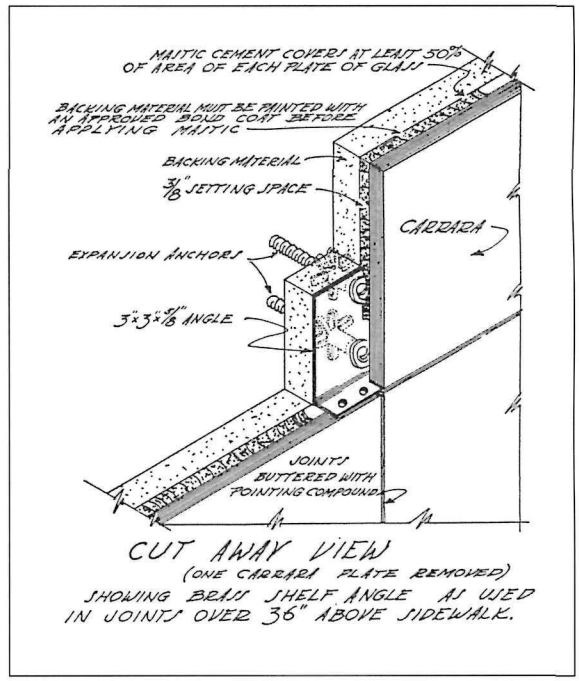
Material Installation

During its 60-plus years of domestic production, structural glass was available in thicknesses from 1 /4" to 1-1 /4". The panel sizes were determined by use. On exteriors the maximum size was six square feet if the panel was to be installed 15' or more above the sidewalk, and 10 square feet if installed below 15'. Interior wall panels could be sized up to 15 square feet. Toilet partition panels could be produced in sizes up to 25 square feet and were created by laminating two 7/8" slabs together with bituminous adhesives.

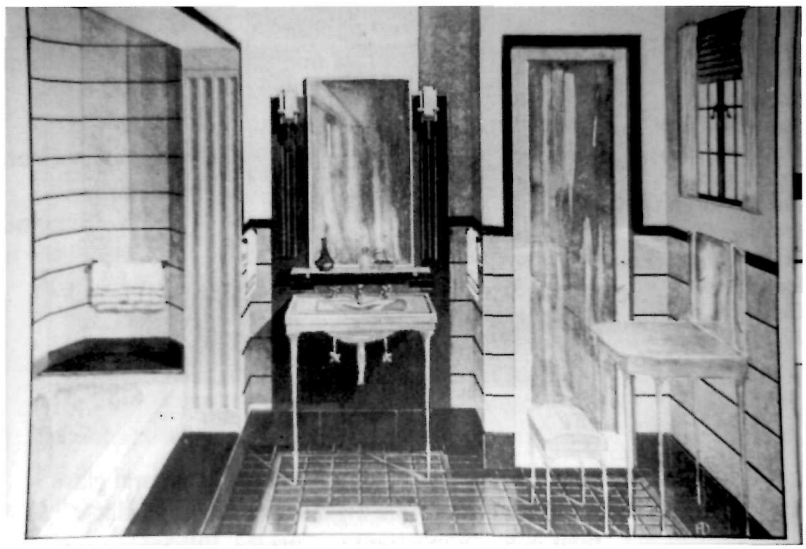
The versatility of the material was partly due to its tolerance of various substrates. The glass could be readily applied to most flat surfaces, including plaster on metal lath, concrete, or masonry. Wood substrates, however, were discouraged. The backing surface was prepared and sealed with a bonding coat supplied or approved by the glass manufacturer. The mechanical fasteners (non-ferrous metal brackets, angles or channels) were secured to the substrate. The panels were pre-fabricated at the factory to specifications and were attached with an asphaltic mastic. The mastic was applied to the back of the glass in 3" daubs covering 50% of the back of the panel. The glass was set in position by rocking the panel until the flattened mastic was forced into the back-up surface providing a keying action. When the cement was set, the joints were pointed with a pointing cement, which, like the mastic, was provided by the glass manufacturer. Panel edges could be protected with 1/16"-thick cork tape, which was set back 1/8" from the front of the glass. In locations where high moisture was expected (such as tub surrounds) and the backup substrate was masonry, the panels were sometimes attached with cement rather than mastic. On exteriors, non-ferrous angle irons or clips helped hold the panels in place.

Condition Assessment

Much of the popularity of opaque structural glass was due to its durability. The glass does not warp, craze, fade, or easily stain, and resists most



Installation details for a typical Carrara veneer storefront. Source: Glass and Storefront Products, *1940.*



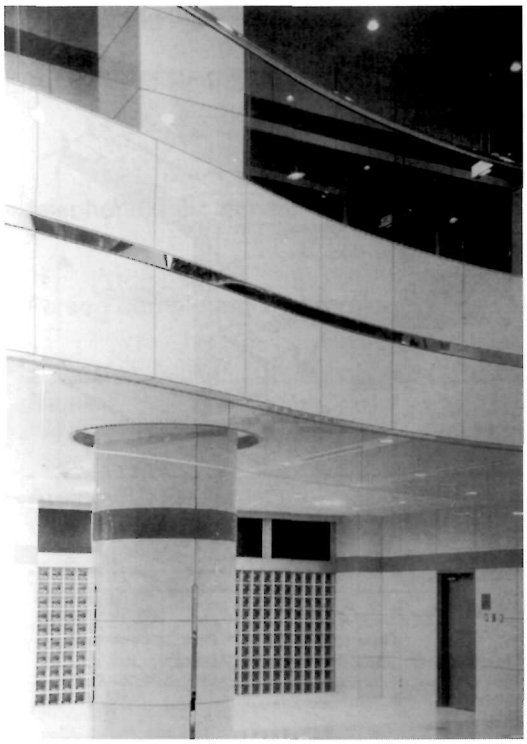
Polychromatic Vitrolite brightened residential bathrooms and kitchens. Source: Bathrooms and Kitchens of Distinction with Carrara: The Modern Structural Glass, *circa 1935.*

acids. When structural glass panels do fail, it is from either impact or deliberate alterations (such as installation of new fixtures) and is manifested in cracks, holes, and chips.

Because 1) the material is non-absorbent, 2) most fasteners for structural glass are non-ferrous, and 3) the plastic nature of the mastic is forgiving, there is less reason for severe deterioration from moisture than with clay-based masonry products. The mastics and pointing cements are the weak link in the system. Although the mastics are durable, they harden over time. The pointing cements also gradually deteriorate. The dark shades of structural glass absorb a significant amount of heat, causing the panels and walls to be subjected to more thermal stress. Although they were often heat-tempered, the joints on dark facades are exposed to more thermal expansion and contraction.

Most failures in structural glass systems are readily obvious: panels are visibly cracked, damaged, missing, out of alignment, or delaminating, joints are deteriorated, or water intrusion is evident. Because most exterior installations are below 15', the panels are easily accessed. One can gently push on a panel to see if it is still securely adhered to the substrate. If a wall has been subjected to severe water damage, then removal of selected panels may be necessary to determine the stability of the mastic and the substrate.

Several Japanese firms still produce colored structural glass, including NEG's NeoClad, shown here. Source: "Exclusively NeoClad, Architectural Panels," Nippon Electric Glass Co., Ltd., Glass and Storefront Products, *1940.*



Conservation Techniques

Because structural glass is no longer produced in the U.S., repairing, whenever possible, rather than replacing, is the best approach. Maintenance of structural glass is straightforward. The glass can be cleaned with water and ammonia or detergent. Joint repair can be done with traditional joint cement (with an integrated watertight surface), latex caulking, or glazing compound. Silicone sealant is reportedly harder to control due to the fine joints. Traditionally, joint cement was colored to match the glass. New materials should also be tinted to match, with pigments compatible with the joint patching material.

Minor hairline cracks can be filled with caulking tinted to match the glass. One method for repairing chips or holes is to fill the defect with polyester resin adhesive tinted to match the glass. The surface can then be polished with fine sandpaper and buffed with polish. Tim Dunn of Vitrolite Specialist, a St. Louis contracting firm that specializes in the restoration of this historic glass, has had success filling the hole with glazing compound and then painting the area with computer color-matched paint.

Removal

Removal of structural glass panels is difficult due to the gradual hardening of the mastics and the fine joints between panels. Two publications on structural glass, Douglas Yorke's article in *The Association For Preservation Technology Bulletin*, Materials Conservation For The Twentieth Century: The Case For Structural Glass, and the National Park Service's Preservation Brief No. 12, *The Preservation of Structural Glass,* have excellent discussions of the repair and removal of structural glass panels.

No method is immune to glass breakage. Commercial solvents can be injected behind the glass to soften the mastic. Then piano wire can be slipped behind the panels to cut through the mastic. Another method, reportedly effective but time consuming, is to direct steam for approximately 10 minutes at the face of the panel to soften the mastic. The panels can then be pried or sawn off. When prying glass panels off, a block of wood

should be used to protect the face of the glass from the crowbar or nail puller.

In-kind Replacement

Colored opaque structural glass is no longer manufactured in the United States. When pieces are broken, severely damaged, or missing, finding an appropriate replacement material is difficult.

However, when structural glass manufacture was discontinued, many glass shops were left with large inventories. Occasionally shops still have stock left in warehouses today. Salvage of used material is difficult but a few architectural salvage yards, or glass repair specialists, may be able to locate a supply. Karl Platt, a glassmaker and preservationist in Milton, Virginia, has a substantial stockpile of structural glass he has purchased from glass shops over the years.

One kiln in Czechoslovakia still produces structural glass in the traditional method. The material is distributed in the United States by Floral Glass and Mirror of Hauppauge, New York, but there are limited choices in size, colors, and finishes.[1] The panels are sized metrically and are approximately 1/4" thick. They are produced in black, white, mint green and beige. Differences in the panel thickness may be adjusted for with the mastic and mechanical fasteners. Metric panels could be cut down to fit the necessary English dimensions.

Japan has at least two new products that are similar to historic structural glass. NEG Industries' NeoClad is an opaque colored glass that comes in white, beige, and gray colors. ASAHI Corporation is producing an opalescent, nearly opaque structural glass in white and light gray. As with the Czechoslovakian glass, limited colors, metric sizes, and the cost of shipping to the United States, make matching the size, strength, finish, reflectivity, and color of domestic glass problematic.[2]

Substitute Materials

Another glass material that is often suggested as a substitute material is spandrel glass (backenameled clear glass). With the advent of computer color-matching, back-painted or backenameled glasses may be adequately matched in color. The clear depth of material, however, does not provide an appearance of homogenous opacity, and ultraviolet light may fade the colors. Experience has shown that the edges of the glass are visible, which emphasizes the lack of true opacity. Polishing and painting or enameling the edges to match the back could help solve this problem.

Mary Oehrlein of Oehrlein and Associates, Architects, in Washington, DC has researched various materials as substitutes for structural glass. One product she has suggested that holds promise is laminated glass. In a custom job, the translucent, colored polyvinyl inner layer(s) can be laminated a mere 1/8" from the outer face of the glass and might suggest the desired color opacity. The combination of colored translucent interlayers and back-painting might produce a material more similar in appearance to structural glass.

The replacement of 1-3/4" freestanding laminated partitions, such as those used in lavatories, poses a special problem because most in-kind replacement materials are thinner. The use of solid-surfacing materials, such as those used for present-day counter tops, if polished, has also been suggested. Once again, color (solid black is currently unavailable) and reflectivity are issues. Another substitute material that has worked in some cases is colored or back-painted polycarbonate sheets. Of the "plastic" materials—Lucite, Plexiglass, and Lexan—the latter is a polycarbonate and reportedly the least susceptible to scratches.

Conclusion

To conclude, there are no perfect substitutes for historic structural glass. Good maintenance of existing facades and safeguarding extant stockpiles are of great importance to the future survival of this endangered material.

Notes

1 The Czechoslovakian structural glass is available as follows: colors—black, white, beige, and mint green; thickness—approximately 1/4 inch; source—Floral Glass and Mirror, 895 Motor Parkway, Haupauge, New York, telephone 800-647-7672 or 516-234-2200.

2 The two Japanese structural glasses are available as follows. Japanese opaque structural glass: product name— Neoclad; colors—white, beige, and gray; thickness—0.5mm to 7.5mm; source—NEG America, Inc., 650 East Devon, Suite 110, Itasca, Illinois 60143, telephone 800-733-9559. Japanese structural glass: product name—New Sunprito; colors—white and light gray; thickness—5mm to 9mm; manufactured by ASAHI Glass Company; source The Sentinel Group, PO Box 399001, Miami Beach, Florida 33139, telephone 800-827-7848.

Carol J. Dyson is an architect with Preservation Services, Illinois Historic Preservation Agency, Springfield, Illinois.

Floyd Mansberger is the Director of Fever River Research, Springfield, Illinois.

Ann Milkovich McKee

Stonewalling America

Simulated Stone Products

The term simulated masonry covers a number of products manufactured to imitate the appearance and characteristics of stone. These products are made from various materials, including cement, minerals, epoxy, and fiberglass, among others. They can be cast in specific shapes or applied directly onto a building substrate, molded or shaped to resemble the texture of masonry, and struck to create mortar joints.

Origins and Development

The attempt to imitate masonry and stone is not a modern phenomenon. Cast stone, which is often considered a form of simulated masonry, has been used in the United States since the last quarter of the 19th century. Another product, rockfaced concrete block, gained popularity in the early 20th century. Simulated masonry is similar to both cast stone and concrete block in that it, too, mimics another material, but its construction technique made it a more flexible product. Rather than being a modular system cast on site, simulated masonry was usually manufactured on site and applied as a facing material. The process allowed for maximum flexibility to adapt to specific and sometimes unexpected site conditions. While simulated masonry products were marketed for new construction, they were also widely used on existing buildings. They were seen as an easy way to update a building or construct a new building without incurring the cost of actual stone construction while conveying a sense of permanence.



Perma-Stone, a molded wall facing made of aggregates, cement, crushed quartz, mineral colors, and metallic hardeners, was suitable for both new construction and renovation. Perma-Stone *catalogue, 1954. Courtesy of Michael Cheek.*

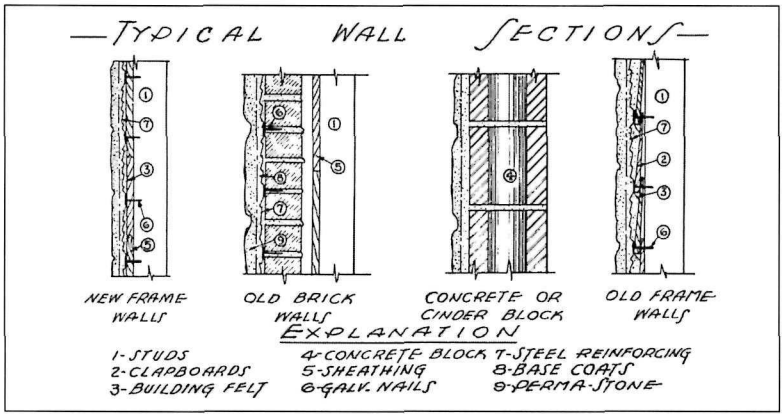
Simulated masonry played a large role in the changing aesthetics of the American public beginning in the 1930s. Of the simulated masonries that could be applied directly to a building, probably the best known is Perma-Stone, which was touted as the "originator of moulded stone wall-facing." Beginning in 1929, the Perma-Stone Company, based in Columbus, Ohio, sold and marketed its patented and trademarked product through the use of licensed and trained dealers. The company provided the molds and materials (portland cement, aggregate, crushed quartz, mineral colors, and metallic hardeners) necessary for the job, but the dealers manufactured and installed the materials. The company's success spawned many competitors attempting to capture a share of the growing market for this type of remodeling process.

Another successful cement-based simulated masonry was Formstone, a product of the Lasting Products Company in Baltimore. Formstone was first available in 1937, the same year that Lasting Products obtained a patent for its process. The company was responsible for the manufacture and distribution of the specific tools and materials necessary to complete a Formstone project. The actual on-site work was done by registered contractors who had been trained by the company.

Simulated masonry products were often hailed as thoroughly modern inventions. Rostone, made from pressurized shale, alkaline earths, quarry waste (lime), and water, was first produced in 1933 for the Century of Progress Exhibition by the Rostone Company in Lafayette, Indiana. Rostone was used to create the Wieboldt-Rostone House (Walter Scholer, 1933), one of 10 houses designed to exhibit modern building materials and innovative construction methods. Rostone was manufactured as prefabricated panels and shipped to the site for construction by trained contractors.

In addition to cement, many other materials have been used as the base for simulated masonry products. By 1960, for instance, fiber-reinforced plastic panels were available. One product, Terox,





Top, a worker hand-presses a final Perma-Stone coat to a wall surface.

Bottom, Perma-Stone could be applied to many new and existing substrates.

lated masonry can be applied to existing conditions or used as part of new construction on almost any building type.

Rostone not only simulated stone in appearance, but also its manufacturing process closely recreated the formation of natural stone. No portland cement was used in its manufacture; rather, it was made from natural ingredients that underwent a chemical reaction to form a new material. The manufacturing process began with drying, pulverizing, and finely grinding shale. Lime and then water were added, and the resulting mixture was placed in molds or hand-formed into specified shapes. To induce the necessary chemical reaction, the molded mixture was hardened through exposure to heat. The material could be colored during the manufacturing process, and afterward the surface could be finished in a variety of textures. On cooling, Rostone components were ready for shipment to the job site.

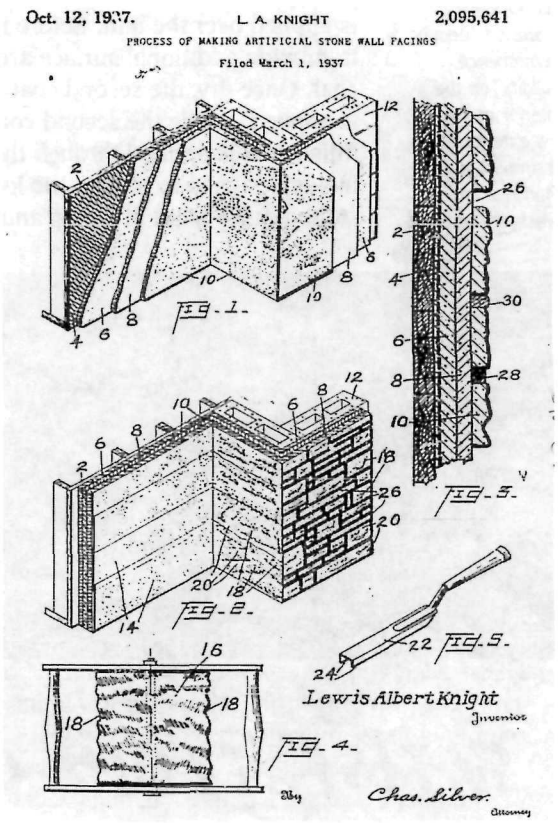
The finished surface of Formstone, patented in 1937 by Lewis A. Knight, was tooled to produce polychromatic effects.

Uses and Methods of Installation

Simulated masonry was often used as a remodeling material, but it also could be used for new construction. Relying on the stereotypical perception of stone as signifying wealth, stability, and grandeur, these products were sold as the modern version of a natural stone. They provided an inexpensive way for middle-class America to enjoy the prominence of a "stone" house. Many companies stressed the opportunity to update a house or building to a level, or class, that would never be possible without their product. Advertisements also routinely proclaimed that simulated masonry was maintenance free, fireproof, and energy efficient. All these properties appealed to buyers seeking an inexpensive way to modernize buildings by covering over deteriorating facades.

Perma-Stone was marketed for new construction, but the majority of its applications were in remodeling or renovation projects. Formstone, on the other hand, appears to have been used more widely for new construction. The Rostone Company initially marketed its simulated masonry as a "modernization" material for storefronts. Schemes for gas stations built of Rostone were also proposed, but whether any were actually built is unclear. The company also targeted the residential market for the use of Rostone on exterior and interior walls, floors, roofs, and decorative elements such as door surrounds and fireplace mantels.

Rostone panels were produced as standardized 16"x 24" sheets either 1" or 1 1/4" thick; custom sizes and shapes were available for an additional cost. The panels could be finished with three different surface textures: honed, a polished surface; natural, a slightly rough finish that mimicked natural stone; and shot blast, a moderately rough surface. Rostone could be made in any color, but earth tones were most popular. Greens, pinks, and reds were used as accent colors in





In 1950 the Wieboldt-Rostone House was covered with Perma-Stone, shown in poor condition. Photo by Jack E. Boucher, HABS, NPS.

Perma-Stone promised "Beauty, Permanence, Solidity" on the interior as well as the exterior. Perma-Stone of Montréal LImitée brochure, undated.

carved designs and to convey a multidimensional look.

In modernization and remodeling projects, Rostone panels were applied directly over the existing wall surface. When Rostone was used in new construction, the panels were attached to a steel frame with specially designed clips. The joints were filled with a mastic, thus providing an easily maintained system.

Perma-Stone, a cementitious material, is produced on site and applied directly to the building in a process similar to that of applying stucco. Used extensively for remodeling, Perma-Stone provides a stonelike concrete veneer that can be "permanently" attached to wood or steel lath or applied directly onto concrete and masonry.

To install Perma-Stone, metal or wood lath is secured to the building to provide a base for attachment. The application process is a three-part procedure. A first coat, referred to as a brown coat, is applied over the lath. Before it sets, it is grooved to provide additional surface area for the next coat. Once dry, the second coat (the scratch coat) is applied. While the second coat is still wet, the finish coat is applied through the use of pressure molds designed to imitate the look of natural stone. Minor hand finishing and application of a final membrane coating to serve as a water repellent complete the job.

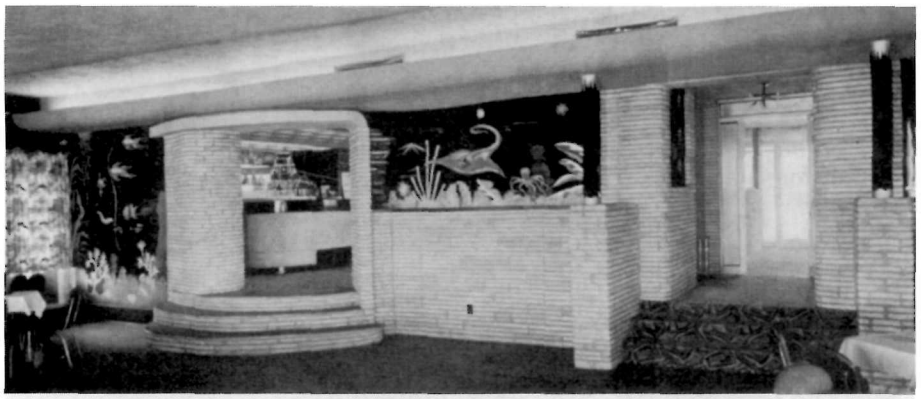
In the direct application technique, Perma-Stone can be applied to curved surfaces as well as broad flat ones. The "stone" wall can be laid up in random, broken, or coursed ashlar. Joints can be raked, beaded, or pointed. Because color is added directly into the product on site, the color choice is unlimited and can vary. This provides the opportunity to develop interesting strata and varied stone colors. The texture of the finished simulated stone is restricted only by the molds and the amount of hand finishing a mason is willing to do.

As a frontrunner in the simulated masonry industry, the Perma-Stone Company zealously protected its patented and trademarked product and did not hesitate to pursue court injunctions against those who tried to use it without permission. Perma-Stone held several patents covering its product recipe, pressure casting procedure and molds, and membrane-curing technique. To ensure quality control, only licensed dealers and contractors are permitted to use the process, molds, and materials. Today the Perma-Stone Company still maintains a registered trademark for Perma-Stone products.

The philosophy behind Formstone was to provide a process for making an artificial stone facing that used the tools of masons and cement finishers and could be readily carried out by them. The procedure and finished installations have some similarities with Perma-Stone, in that Formstone too is a cementitious material applied in a multilayer process. Where the two differ markedly is in the formulation of the "stones" and finishing procedures.

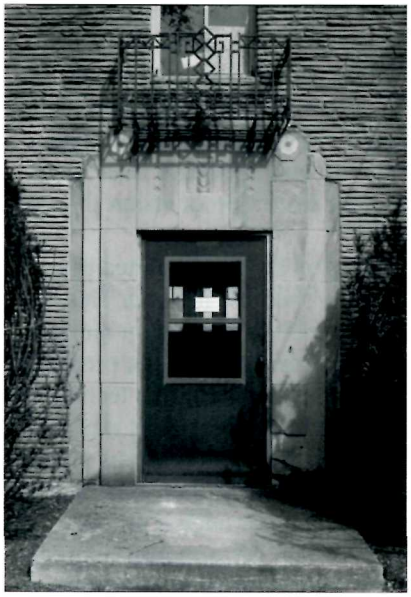
In the case of an existing building, the walls are covered by a perforated lath of wood or metal if they were not masonry (no lath is needed if the wall is masonry or stone). A layer of cement mortar 3/8" to 3/4" thick is applied over the lath, and the surface of this layer is scored before it sets and dries. A second layer, typically 1/4" to 3/8" thick, is applied. While this layer is still plastic, the finish layer is applied. The finish layer, also ranging from 1/4" to 3/8" thick, can be formed with two or more colored or shaded mortar cements that are distributed to produce the polychromatic effects desired to achieve the appearance of stone.

Before the material in the top two layers has set, a waxed paper or other nonadhering material is placed on the wall. A cast aluminum roller with a crinkled surface is passed over the waxed paper, creating a crinkled



NOUVEL INTÉRIEUR DE L'HÔTEL EDGEWATER

SATISFACTION GARANTIE



The door surround on the Wieboldt-Rostone House (Walter Scholer, 1933) is the only area of the exterior where the original building material, Rostone, a precast form of simulated masonry, is intact.

impression in the mortar. Several rollers of different sizes or textures could be used on the same project to achieve the desired effect. After the waxed paper is removed, the crinkled surface is scored with guide lines for the "mortar joints." Grooves are cut into the top layer with a chasing tool, which has two parallel cutting edges allowing for the creation of a mortar joint mimicking those found in natural stone construction. The groove may be left unfinished or may be pointed with mortar.

A variety of finishes can be created with different textures (using different rollers) and colors. Most tinting is created by adding color into the mortar mix, but surface color could also be achieved by dashing colored powdered materials such as "mica, oxide pigments, stone dust, slate dust or chips of mineral or artificial stone ... on the outer layer. This produces a speckled surface, simulating particular natural rocks or stones." The powdered material is placed on the surface either before the waxed paper is applied or after the texture of the stone has been created and the wax paper removed.

Formstone seems to have been marketed as a product to refurbish and modernize existing buildings of any type. It was promoted as a material that could solve problems of deteriorating masonry and stone structures and poor insulation. Purchasers received a 20-year guarantee and assurances that the wall facing was "maintenance free." Baltimore, with its large number of brick buildings of an indigenous soft brick, became the "Formstone capital of the world."

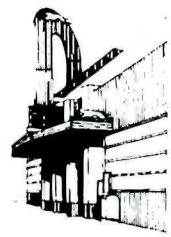
Simulated masonry products reached their zenith during the 1950s, but by the early 1980s interest in such products had nearly ceased. Other products such as vinyl and aluminum siding were mass-produced and more economically installed on both new and existing construction. More importantly, these new products appealed to the changing public aesthetics. However, both Perma-Stone and Formstone are still being produced in small quantities today. The countless examples of simulated masonry across America are reminders of the public's penchant for remodeling houses.

Ann Milkovich McKee is Assistant Professor of Architecture in the Department of Architecture, Historic Preservation Program, Ball State University, Muncie, Indiana.

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Bruce S. Kaskel

The Metal and Glass Curtain Wall



The era following the World War II saw the development of new technologies that had a fundamental effect on the curtain wall. Principal to these new technologies were improvements in aluminum, glass, sealants, and insulation materials.

Aluminum was first isolated in 1825 but was not produced on a large scale until after 1889, when Charles Martin Hall was granted a patent for a process by which aluminum could be made on a commercial scale. By the 1920s, aluminum was being incorporated into building details such as doors, windows, trim, and exterior signage. Although aluminum costs three to four times as much as a comparable steel section, architects still found frequent cases where the expenditure was justified.

The onset of World War II saw aluminum production soar, since it was the principal material of many war materials. During the war, more than 200 factories produced a multitude of aluminum shapes. After the war, the abundant production capacity created a demand for new aluminum

applications and at the same time the price plummeted.

Aluminum found a welcome niche in cladding curtain walls. The material was more corrosion resistant and lighter than steel and certainly much lighter than masonry. Aluminum curtain walls were relatively easy to erect, especially in cold weather which significantly limited the ability to erect walls of brick and mortar. Aluminum curtain walls were also thinner, freeing up valuable floor space for lease. This had the advantage of increasing the rentable floor area. This advantage was estimated to add $18 per linear wall footage in savings in the 1950s.

The principal forms of aluminum were twofold: rolled aluminum sheet, which was flattened and stamped to create opaque wall panels; and extruded aluminum shapes, made by forcing the molten aluminum through a steel die. Extruded aluminum resulted in long lengths of aluminum of almost any cross sectional shape, only limited by the possibilities in die fabrication. Aluminum extrusions were highly consistent in dimensional qualities and were therefore usually employed as the principal framing members of curtain walls. Figure 1 shows the installation of fabricated sections at Mies van der Rohe's 860-880 Lake Shore Drive apartment buildings in Chicago.

While extruded aluminum was used as the framing members of curtain walls, glass was the principal material for the in-fill between those aluminum extrusions. The post-war commercial adaptation of air conditioning compensated for the heat gain and thermal inefficiencies of larger areas of clear glass. Large unimpeded views through clear glass had always been a desirable feature for the office environment. Now larger glass panels could be set within minimally thin aluminum "sticks."

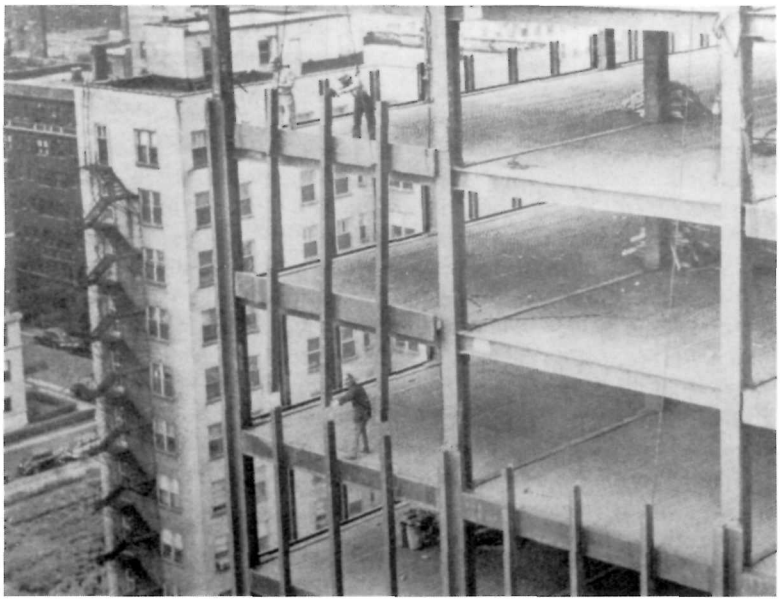


Fig. 1. Construction photograph of 860-880 Lake Shore Drive apartment buildings, Chicago, Illinois (Mies van der Rohe, 1949-1951). These were among the first residential buildings in the United States to be clad entirely in glass, with a two-story prefabricated steel and aluminum curtain wall system.

Glass technology also made numerous advances in the post-war years. Prior to the 1950s, glass for buildings was made by either the sheet or plate process. These processes had limitations on the size of the glass and were not able to produce absolutely flat and uniformly thick glass. This lead to inevitable distortion of vision through the glass process.

In 1959, Pilkington Brothers Limited produced the first glass by the float method. This process which floats a ribbon of glass on molten tin while heating both sides of the glass, produces perfectly flat and parallel surfaces. This technology took off and within a decade, float glass was produced in many different countries and was replacing the plate glass process. Most float glass was finish by controlled cooling through a process called "annealing." As high performance coatings and uses for curtain wall glass came in demand, stronger glass manufactured by tempering or heat strengthening, instead of annealing, became popular.

Large glass panels had the disadvantage of transmitting heat and glare from the sun. Metallic oxides were added to the manufacturing of the glass to absorb heat and light and to aid in creating more comfortable conditions for building occupants. Still, large glass sheets will transmit significant heat gain in the summer and heat loss in the winter.

It wasn't until the energy crisis of the mid-1970s, that architects began to demand more efficiency from aluminum and glass curtain walls. Insulating glass (IG) units, created by factory sealing together two sheets of glass with a thin air space between them, vastly improved the energy performance of glass lites. Early IG units were sealed with a metal edge band. These have proven to be problematic, since water can become trapped between the glass and the metal edge band, ultimately leading to failure of the IG unit. Improvements in aluminum framing with plastic thermal break materials reduced conduction of heat through the curtain wall. More recently research into improving the thermal performance of glass has led to development of low-emissivity metallic coatings, gas filled units and photo-responsive units.

The demands of the aluminum and glass curtain wall also lead to improvements in joint sealants and thermal insulation materials. Early metal curtain walls were caulked with glazing compounds that quoting one practitioner, "were little more than vegetable oil stuff." Such caulking materials, proved to have little ability to stop water, and required frequent reapplication. Improved sealants were developed which adhered better to metal and glass and consequently were

more watertight. Two-part elastomeric sealants principally made from polysulfide were developed in the late 1950s. These sealants were generically identified by the principal manufacturer, "Thiokol." The components were mixed with a paddle and had a limited four-to-six hour pot life. Later, Tremco developed a one-part sealant called "Mono" which, although the smell was less than appealing, exhibited tenacious adhesion. Mono sealants, however, hardened over time. This has contributed to glazing failures due to the hard sealant compressing on the glass. Contemporary one-part elastomeric sealants such as silicones and polyurethanes were first marketed in the 1970s, and remain the common sealant materials today.

Insulation materials such as fiber-glass and mineral wool blankets were developed by manufacturers such as Pittsburgh-Corning, Owens-Illinois, US Gypsum, and Johns-Manville. These materials were touted for their significant contribution in reducing heat loss. One source noted that, "many of the insulating materials suitable for thin curtain wall construction are more than 15 times as effective as thermal insulators than ordinary masonry."[1]

Although the new materials had infinite promise in creating new claddings, many 1950s vintage curtain walls were only half-hearted efforts at incorporating the technology. Curtain walls often were little more than an assembly of old style aluminum windows held in place with a grid of reinforced mullions. Many early "all-glass" curtain walls were actually backed by concrete block walls at each floor behind opaque glass, to satisfy prevailing fire code requirements. Lever House in New York, shown in Figure 2, is an example of early curtain wall construction in the United States. The all glass building also suffered from a lack of consideration about orientation. Long walls of glass were faced on the south, east or west, which exposed occupants to the intense morning and afternoon sunlight and glare. Glass exposed to direct sunlight has been found to cause thermal stresses that can crack the glass, especially in situations where the glass is partially shaded by awnings or deep exterior mullions.



Fig. 2. Lever House, New York, New York (Skidmore, Owings and Merrill, 1952). The clean curtain wall appearance "belies its complex internal construction which was cobbled together from off the shelf parts," as described in Architectural Record, *June 1989.*

The new curtain wall also created new problems, of which architects and builders were not completely aware. Interior condensation and rapid expansion/contraction became new design concerns. Although aluminum is corrosion resistant, mill finished aluminum can corrode over time and with exposure to atmospheric pollutants and moisture. Early curtain walls were also prone to leak. Furthermore, when water did get past the curtain wall, it was nearly impossible to track its path and find the leak. Therefore, early designers realized that they needed to find a way to let water that got into the wall back out again, before it became a leak on the interior. A double system of drainage with weeped internal gutters was commonly utilized to collect and hold water at the spandrel area. These gutters could be designed to hold up to a 6" head of water, and to allow the water to drain out when wind pressure subsided. Problems with water leaks are still evident with many curtain walls due to the misunderstanding of how to design for water infiltration or due to poor quality workmanship in implementing a water resistant design.

Standards and the Metal and Glass Curtain Wall

As with any material in its infancy, it soon became apparent that standards of quality and performance were needed. An early curtain wall symposium defined the ideal technical parameters of a metal and glass curtain wall as being between 2" and 5" thick; self-insulating; able to withstand high winds; weatherproof on the outer surface; vapor-proof on the inner surface; ventilated and drained for control of internal moisture; designed for expansion and contraction of the building; easily removable for repair; sound deadening; adaptable to all types of building frames; installed from the inside without scaffolding; easy to fabricate, ship, and handle; attractive; maintenance free; and moderate in cost. Furthermore, this system was intended to last 40 to 100 years.

As the metal and glass curtain wall industry developed, and lessons were learned about the performance of these walls, it became apparent that performance testing of mock-ups of the curtain walls could go a long way to alleviating expensive problems in the field. Some of the earliest mock-up tests of a metal curtain wall were performed in the early 1950s in a laboratory in



Fig. 3. An early aluminum curtain wall used in conjunction with the then more traditional limestone curtain wall. The fluted aluminum spandrel plates and center pivot windows have contributed to water leakage over the years.

Coral Gable, Florida. The tests were performed on curtain wall mockups for Chicago's 900-960 Lake Shore Drive Buildings designed by Mies van der Rohe. Similar to the mock-up testing performed today, these tests subjected the mock-up to water and air pressure differentials, and used both static and dynamic test methods.

Guidelines for the performance of curtain walls were introduced through manufacturer's organizations such as the National Architectural Aluminum Manufacturers (NAAM) and later through the Architectural Aluminum Manufacturer's Association (AAMA). National consensus standard organizations, such as American Society for Testing and Materials (ASTM) have adopted many of these manufacturers' group standards. Through these organizations, structural performance, thermal performance, water resistance performance and air infiltration limits were established. More recently, requirements have been promoted for resistance to condensation and for high performance paint coatings.

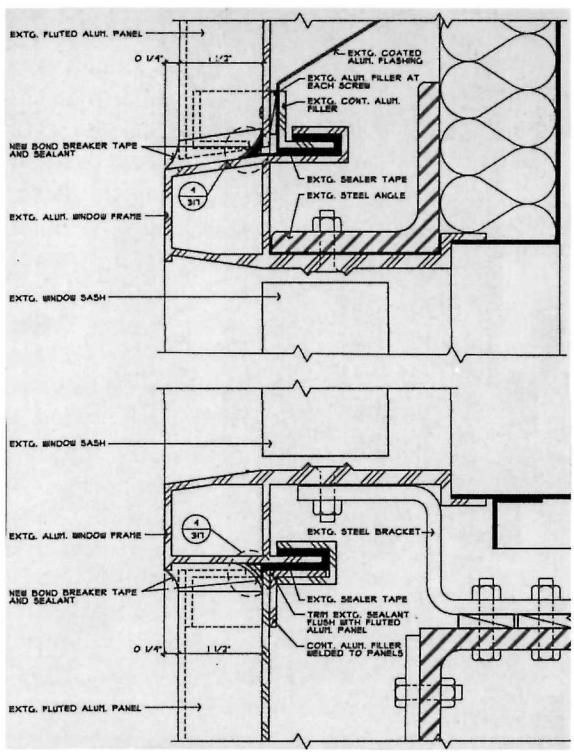
As curtain walls became lighter and the buildings clad with these walls became taller, it soon became apparent that the most significant force acting on the curtain wall was not its own dead weight, but instead was the "live load" imposed on the wall by the force of the wind. Through the development of boundary layer wind tunnel testing, there arose a better understanding of the effect of wind loads on curtain walls. Wind tunnel testing revealed that not only was the wind force greater higher up on the building, but wind forces varied considerably depending on the topographical conditions around the building, the shape of the building, and the orientation of the building. Wind tunnel testing also clearly revealed the effects of vortex currents which create high wind suction at building corners.

Fig. 4. A section at the window head and sill conditions for the curtain wall shown above. Sealant repairs have been specified at key locations to mitigate water leakage.

Maintaining and Servicing the Metal and Glass Curtain Wall

Although the early advocates believed that curtain wall maintenance would require, "no painting, caulking or refinishing, cleaning not required for durability or appearance," this has not proven to be true. Curtain walls, like all claddings, require work to maintain them in a serviceable condition, and often require major repairs to restore them to their original condition. These repairs are often undertaken to refresh a dated facade and to aid in leasing an older building. With proper upkeep the 1950s and 1960s curtain walls can continue to last as long as their masonry counterparts.

Sealant replacement is the most common maintenance requirement for the middle-aged metal and glass curtain wall. Figures 3 and 4 show an early curtain wall and the maintenance for its continued performance. Early generations of polysulfide sealants become embrittled over time and will no longer stop water entry into the wall. "Mono" sealants can harden and contribute to glazing failures due to the sealant compressing the glass. Butyl sealants, which remain flexible over time, can be pushed out of the sealant joint by the repeating action of winds pushing against the aluminum and glass. Old sealants can usually be replaced by cutting out the old material and clean-



ing the substrate with a suitable solvent and clean cloth wipe. Then after preparation, the new material can be installed in a properly designed new sealant joint.

Glass replacement is sometimes warranted, either due to physical damage to the original glass or due to the benefits inherent with replacing older and often times energy-inefficient single-glazed curtain walls with high performance insulating glass (IG) units. Even early generation 1970s IG units may now need replacement, due to the breakdown of the metal edge bands and fogging of the IG unit with water vapor. Large glass units that pushed the limits of annealed glass for thermal stresses can crack and need replacement. Tempered glass can spontaneously break due to mineral inclusions in the glass and may require preventive measures to safeguard against glass fall-out. Laminating safety films are sometimes applied to the interior face of tempered glass to correct this problem.

Although the aluminum components of the curtain wall are considered corrosion resistant, mill finished aluminum can corrode over time with exposure to atmospheric pollutants and moisture. The anodized coating on finished aluminum can discolor and pit. Sometimes, the original color just looks old and tired, and like many building materials, requires a fresh coat of paint. High performance air drying paints are available for the repainting of aluminum curtain walls. These high performance paints are banned in some areas of the country because of volatile organic compound (VOC) restrictions.

When maintenance and servicing are not deemed sufficient to correct the look or function of an older curtain wall, recladding of the entire building is possible. The new lightweight aluminum curtain wall can be installed directly over the old wall. Even with the weight of two exterior walls, the system is still usually lighter than a masonry wall system. Prior to implementing an overcladding project, however, it is critical to consider what will be buried in the wall, such as internally corroded metals, water damaged materials, and even molds and mildew.

The metal and glass curtain wall of the 1940s, 1950s, and 1960s was a product of its time: the continued desire for lightweight, high performance, and economical wall systems, coupled with industry advances from the war years. The industry has progressed with new standards of construction and methods for quality control testing to improve new construction. However, older metal and glass curtain walls can still serve for many years with careful maintenance and repair.

Notes

1 *Architectural Forum* (March 1950): 83.

Bruce S. Kaskel, SE, AIA, is an architect and engineer with Wiss, Janney, Elstner Associates, Inc., Chicago, Illinois.

Thomas C. Jester

International Perspectives on 20th-Century Heritage

Americans are not alone in their efforts to preserve cultural resources from the 20th century; other countries have likewise begun to consider more recent aspects of the built environment for their heritage value. In response to known and potential threats, particularly rapid change in the environment, the notion of heritage is slowly expanding to include significant 20th-century properties. Because the public often views heritage as a way to distinguish the past from the present, it is difficult to argue that 20th-century properties are worth preserving. This is particularly true in countries with resources dating back many centuries, where 100 years is considered a short period of time. The vast number of properties from this century also makes selecting properties worthy of preservation more challenging, a problem exacerbated by the relative dearth of objective historical analysis on 20th-century buildings and sites. Changes to properties over time and accelerated deterioration due to limited lifespans of some buildings also raise questions about integrity. With so many issues to

address, many countries have begun looking to neighbors for answers and perspectives in order to formulate approaches to 20th-century heritage.

A number of international forums have provided opportunities for professionals to discuss mutual problems, exchange information, and develop strategies for inventory, evaluation, protection, and conservation. One of the most comprehensive international meetings on 20th-century heritage was sponsored by the Council of Europe, an intergovernmental organization, in 1989. The Council of Europe meeting, Twentieth-Century Architectural Heritage: Strategies for Conservation and Promotion, examined approaches to conserving 20th-century architectural heritage. The formal recommendations of the meeting call on governments of the member countries to develop strategies for identifying, protecting, conserving, restoring, and promoting heritage from this century.

More focussed international initiatives are also underway. In 1989, DOCOMOMO International (the International Working Party for the Documentation and Conservation of Buildings, Sites, and Neighborhoods of the Modern Movement) was formed to: facilitate the exchange of documentation and conservation information, protect threatened Modern Movement buildings, stimulate interest in the Modern Movement, and create a register of significant Modern Movement buildings. DOCOMOMO is made up of over 30 national and regional working parties. The U.S. working party of DOCOMOMO, established in 1995, will be affiliated with the University of Southern California's School of Architecture and housed at Frank Lloyd Wright's Freeman House in Los Angeles. With biennial conferences and an extensive news journal, DOCOMOMO's activities represent a positive step toward creating a wider constituency for modern buildings.

Recently, the International Council on Monuments and Sites (ICOMOS) sponsored a seminar on 20th-century heritage in cooperation with UNESCO's World Heritage Centre and the International Centre for the Study of the Preservation and the Restoration of Cultural Property (ICCROM). Twenty-five participants, representing 13 countries, met on June 18-19, 1995, in Helsinki, Finland, to discuss 20th-century heritage issues. The two-day seminar reviewed national efforts on this topic within an international context, explored methods to analyze the significance of 20th-century heritage, and considered how to identify 20th-century properties that could potentially be included in the World Heritage List (see sidebar for a list of the meeting recommendations).

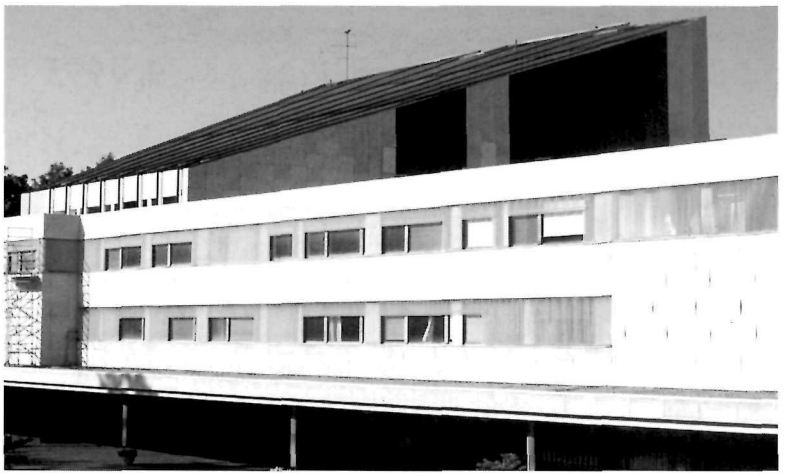
After briefly surveying international efforts to address "recent" heritage, participants discussed the identification, registration, and protection of 20th-century heritage. A central question emerged: whether different criteria than those used for "traditional" heritage are needed for evaluation. While opinions on this issue varied, most participants agreed that new resource types—urban and rural districts, social housing, transportation systems, modern landscapes, to name a few—currently pose evaluation challenges as countries move away from a purely "architectural" view of cultural heritage, and away from focusing on monuments and masterworks, to recognizing more vernacular buildings and sites. This evolving approach reinforces the continuity of heritage and takes into account social, ecological, economic, and cultural dimensions. In the United States, such dimensions are recognized when properties are evaluated, using the National Register's Criteria for Evaluation, for their association with American history, architecture, archeology, engineering, and culture.

Inventory techniques vary from country to country, and it was clear that thematic methods are useful. But continuity must be maintained by extending survey periods that often exclude much of the 20th century. Recognizing that the built environment in this century is extensive, a number of participants suggested that new recording technologies be developed to collect data, taking advantage of rapidly evolving computer applications.

All participants stressed the importance of education at all levels to raise awareness about recent heritage. Appreciation of "modern" environments is needed, particularly at the local level. The media should be used as much as possible to highlight important properties on an international level. On a professional level, better historical analysis—through objective thematic and monographic studies—is needed to avoid reliance on traditional art historical interpretation and premature judgements, often in the media, about significance.



Many of the original features that characterize Finland's Olympic Stadium were retained or sensitively modified during a recent rehabilitation. The stadium tower appears on CRM*'s cover.*



The failing thin marble panels on Finlandia Hall, designed by Alvar Aalto (1962–71), in Helsinki, Finland, raise a serious question about the replacement of deteriorating modern materials: should new marble, or a more durable material with the same appearance, be used when replacement becomes necessary? Photo by Thomas C. Jester.

In a brief session on intervention and technical issues, the group discussed reuse approaches based on sustainability and expressed concern about repair and maintenance practices that may not take into account a building or site's historic character. Training, the participants agreed, is needed to address the use of distinctive technologies and more recent materials. Most felt that established conservation principles should be employed to care for recent heritage.

The final seminar discussion focussed on the inscription of 20th-century properties in the World Heritage List, which presently contains slightly more than 400 properties noted for their "outstanding universal value." Buildings more than 25 years of age can be considered, but to date only four properties dating from the 20th century have been inscribed in the World Heritage List—Auschwitz (Poland), Niemeyer and Costa's Brasilia (Brazil), Gaudi's Parc and Palace Guell and Casa Mila (Spain) and Skogskyrkogarden (Sweden). Of the two 20th-century properties nominated by the United States, one, the Wright Brothers National Monument, was withdrawn in 1981 because it was no longer materially associated with the first flight, and the other, Taliesin and Taliesin West by Frank Lloyd Wright, was withdrawn in 1991 for further study. A review of the State Parties' tentative lists (properties that may be nominated to the World Heritage List in the future) by ICOMOS International revealed that the number of 20th-century properties remains marginal except in some European countries and the United States.

The U.S. tentative list of 20th-century properties includes the General Electric Research Laboratory (Schenectady, New York), Goddard Rocket Launching Site (Massachusetts), Lowell Observatory (Arizona), Pupin Physics Laboratory (New York City), Trinity Site (New Mexico), and Frank Lloyd Wright's Unity Temple (Oak Park, Illinois) and Robie House (Chicago).

Participants in the Helsinki meeting felt strongly that more properties from the 20th century deserve to included in the World Heritage List, but couldn't agree on whether the existing criteria in the "operational guidelines" require changes to make more 20th-century nominations possible. However, most attending supported the requirement that the passing of one generation (25 years) is necessary to allow time for sufficient historical perspective when evaluating properties from this century. To aid ICOMOS and the World Heritage Centre with one component of its efforts to evaluate 20th-century heritage, DOCOMOMO International has been asked to develop a working document (including guidelines and new criteria for evaluation, if necessary) to select Modern Movement properties for inclusion in the World Heritage List. The working document will be discussed at the 1996 DOCOMOMO conference in Slovakia before being submitted to ICOMOS.

Few of the complex 20th-century heritage questions can be easily answered; properties from the recent past represent a large percentage of the built environment, and are diverse in character, suggesting that it will take time to develop successful identification, protection, and restoration approaches. However, it is encouraging to observe the gradual evolution of the notion of heritage worldwide and recognition that action must be taken to ensure that reminders of modern life are left to future generations.

Thomas Jester is an architectural historian with the Preservation Assistance Division, National Park Service, Washington, DC, and participated in the recent ICOMOS seminar on 20th-century heritage.



One of the best-known houses in the world, Frank Lloyd Wright's Fallingwater (1936) is a "modern" National Historic Landmark that could potentially be nominated for inclusion in the World Heritage List. Photo by Jack E. Boucher, HABS, NPS, 1985.

ICOMOS Seminar on 20th-Century Heritage, June 18-19, 1995

General Recommendations

1. It is noted that the 20th-century heritage should not be defined only with reference to its architectural forms, but taking into account the broad ecological, social, anthropological, economic, and cultural framework which forms the whole. There is a need to stress the importance of memory over considerations of materials.

2. The established principles of conservation are a valid basis for the safeguarding and care of the recent heritage.

3. While some of the heritage of the 20th century has particular characteristics that differentiate it from earlier constructions, it results substantially from the continuity of heritage. Its identification and inventory need to be updated on a regular basis. Attention is required to all types and even modest examples of such heritage, and in particular to urban and rural ensembles, housing schemes, and industrial heritage.

4. Systematic documentation of the 20th-century heritage in all its dimensions and in relation to its context is necessary. Such documentation should take into account the potential offered by new recording methods.

5. Due attention should be paid to the full spectrum of the heritage of the entire century, including buildings and ensembles built in new technologies as well as those using traditional building materials and structural forms.

6. It was recognized that the life cycles of man-made environments are mainly based on economic and functional considerations, and require critical choices to guide the process of selection of cultural properties that merit protection.

7. Considering the international character of much of the 20th-century heritage, networking and joint efforts are of particular importance. Such action should be taken both in relation to identification and inventory, as well as to education and training in collaboration with existing initiatives.

8. Research programs on specific problems concerning techniques and materials in restoration work with due respect to their aesthetic qualities should be encouraged. The publication of results from achieved experiences and preparation of corresponding specialized bibliographies are priority actions. Attention should be given to the economic consequences of restoration and regular maintenance with respect to employment policy and sustainable development.

9. In order to promote communication and raise public awareness, the media should be used to stress the importance of the 20th-century heritage especially to the young people. The international community should also draw attention to the qualities and values of specific cultural properties.

10. The Council of Europe Recommendation R (91) 13, gives the general guidelines for actions in this field.

11. A follow-up of the seminar is necessary. It should include the distribution of the working documents and keeping regular contacts between participants. If a future meeting is organized on this subject, it should be open to other disciplines and decision makers, and should take place in another part of the world.

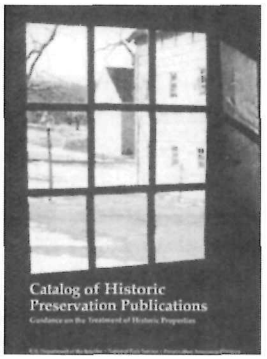
Recommendations Concerning the World Heritage Convention

1. There should be an on-going process of consultations among ICOMOS, DOCOMOMO, and the World Heritage Centre in order to define the 20th-century heritage and develop a methodology for its identification.

2. It would be advisable only in exceptional cases to propose for inclusion in the World Heritage List properties that are less than 25 years old in order to allow sufficient time for historical perspective and scientific analysis.

PRESERVATION AND THE RECENT PAST: offerings from Technical Preservation Services (TPS), Preservation Assistance Division, National Center for Cultural Resource Stewardship and Partnership Programs, Washington, DC.

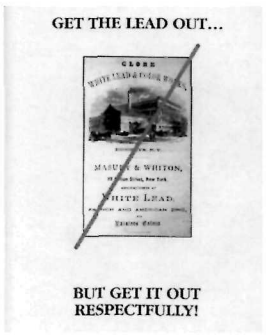
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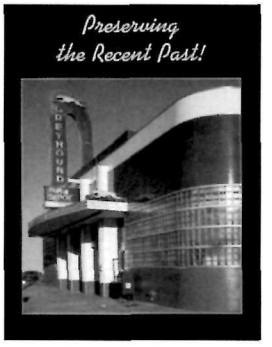
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The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings. by Kay D. Weeks and Anne E. Grimmer. *$12.00.* This new publication offers essential guidance for the treatment of historic buildings for a broad audience. The *Guidelines* define the four treatments and establish a model process for selecting the appropriate one. Technical and design recommendations are provided within a consistent philosophical framework. Richly illustrated. *GPO stock number 042-005-01157-9.* Available through the Government Printing Office.

Preservation Brief 37: Appropriate Methods of Reducing Lead-Paint Hazards in Historic Housing. by Sharon C. Park, AIA and Douglas C. Hicks. *$1.75.* The latest in the series of popular Preservation Briefs designed to assist owners and developers of historic buildings recognize and solve common preservation problems. This Brief provides recommendations for planning and implementing measures to reduce the hazards of lead-based paint without damaging the historic character of historic buildings and sites. Worker safety is also discussed. 16 pages, 32 illustrations. *GPO stock number: 024-005-01149-8.* Available through the Government Printing Office.



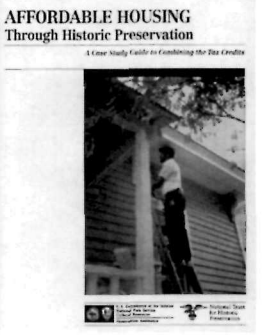
Preserving the Recent Past. *$49.00.* This 600 page book was developed for the national conference of the same title held in March1995 and is an invaluable resource for those evaluating, maintaining and reusing cultural properties from the 20th century. The philosophical and practical issues associated with preserving resources from 1920 to 1960 are included as well as an extensive reading list. Published by the Historic Preservation Education Foundation, P.O. Box 77160, Washington, DC 20013-7160.

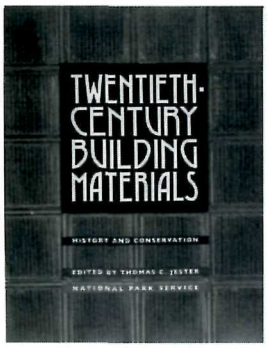


Affordable Housing Through Historic Preservation: A Case Study Guide to Combining the Tax Credits. Susan Escherich and William Delvac. 1994. *$3.50.* This is the first of two books providing an excellent overview of how to finance historic buildings for affordable housing. It discusses how to combine the historic rehabilitation tax credit and the low-income housing tax credits and offers detailed case studies. Prepared in partnership with the National Trust for Historic Preservation. 74 pages, 32 illustrations. *GPO stock number: 024-005-01148.* Available through the Government Printing Office.

Forthcoming—fall and winter 1995

Affordable Housing Through Historic Preservation: Case Studies by Building Type. Susan Escherich, Editor. Building on the success of the first book of case studies in affordable housing, this publication examines additional examples in which financing has combined several tax credits. This publication focuses on preserving and rehabilitating schools, hotels, rowhouses, factories, and warehouses for affordable housing. Approximately 100 pages with 50 illustrations. Soon to be available through the Government Printing Office.





Twentieth-Century Building Materials: History and Conservation. Thomas C. Jester, Editor. $50.00. This forthcoming National Park Service/McGraw-Hill publication will provide an historical overview of building materials from 1880-1960. Brief histories and the conservation of 36 materials ranging from aluminum to zenitherm is a must for the architect, owner, or firm restoring modern materials. For further information about ordering this publication, write to the National Park Service, Preservation Assistance Division, P.O. Box 37127, Stop 424, Washington, DC 20013-7127.

New Video

Working on the Past with the Secretary of the Interior's Standards for the Treatment of Historic Properties. $15.00. This forthcoming video, VHS format, 28 minutes, discusses the practical and philosophical differences among the four most used treatment standards: Preservation, Rehabilitation, Restoration, and Reconstruction. It provides step-by-step guidance for choosing a historic preservation treatment and its effect on historic materials and features. Sales and distribution will be through the Historic Preservation Education Foundation, P.O. Box 77160, Washington, DC 20013-7160.

Conferences

Preserving Modern Landscape Architecture. November 9-10, 1995. Wave Hill, New York. This conference will address the protection of post-World War II landscape architecture of public and private places. This two-day symposium will initiate a dialogue aimed at curtailing unmonitored losses and modification of these significant resources. The first day is devoted to seminar sessions with the second day encompassing tours of Lincoln Center, the James Rose Center in Ridgewood, NJ, and three residential landscapes designed by James Rose in the 1980s. For more information, contact Chris Panos at Wave Hill, 675 West 252nd Street, Bronx, NY 10471.

Affordable Housing and Historic Tax Credits. February 8-9, 1996. Washington, DC. This national conference will address the preservation and financing of affordable housing in America. It will feature case studies from planning to implementation of projects that have both met the Secretary of the Interiors Standards and combined low income and investment tax credits. Co-sponsored by the NPS, the Historic Preservation Education Foundation, National Housing and Rehabilitation Association, and Affordable Housing Finance Magazine. To get on the mailing list for the conference, call Technical Preservation Services conference line at 202-343-6011.

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