Digital Reconstruction of the Richmond Theater Fire Monument at Monumental Church
Alfonso Narvaez, Principal Architectural Conservator, and Lane Burritt, Senior Architectural Conservator,
John Milner Associates, Inc.

John Milner Associates has recently been engaged in the restoration of Monumental Church in Richmond, Virginia. Designed by notable early American architect Robert Mills, the building and associated monument commemorate the 72 victims of the Richmond Theatre Fire of 1811. The building and monument are important early examples of Greek and Egyptian revival architecture synthesized into a unique octagonal church. One of eight churches originally designed by Mills in this form, Monumental Church is the last surviving church of this design left standing.

The sculpture is a large sarcophagus containing the names of the fire victims with each panel surmounted by a winged orb. A large Roman funerary urn sits on top of the monument and is adorned with symbols including inverted flaming torches, stars, and a wreath with winged hourglasses, mourning faces and an eternal flame.

Over time details deteriorated and were lost. Pollution and weathering resulted in disaggregation of the marble until finally in 2002 the urn collapsed damaging a large section of the monument. At high risk of continued loss, conservators from JMA determined that any corrective actions could not be undertaken without loss of critical detail. JMA determined that the best approach was to employ a non-contact method of capturing detail from the original prior to attempting any treatment.

In April of 2004 a team lead by JMA conservators met on-site to document, conserve, and dismantle the original monument using an articulated seven axis laser scanner which permitted very precise scans of the monument in-situ.

The JMA team worked together to analyze areas of loss and compare these with information from historic photos to digitally reconstruct the monument using a variety of software tools. Some areas were sculpted by hand in clay and then re-scanned to provide a starting point for the digital manipulation of the model in the computer.

As an initial proof-of-concept, a half-sized replica of the partially reconstructed monument was milled in REN high-density resin-based syntactic foam that has the density and workability of fine hardwood. This model allowed hand sculpting, visualization, and fund-raising for the full-size replica.

The firm of S. McConnell & Sons of Kilkeel, Northern Ireland was selected to fabricate and install the monument. Installation of the completed monument occurred on September 6, 2005 with a rededication ceremony planned for October 7, 2005 which will coincide with the premier of *Saving Grace*, a full-length documentary detailing the full history, conservation, and replication of the monument.

The potential for application of the technologies employed in this project to historic preservation is very high. The process uses well-proven means and methods for data acquisition; reconstruction of lost details, dimensional accuracy, and machine-assisted carving and sculpting that allows complex architectural and sculptural ornament to be recreated faithfully and accurately.

This presentation will discuss the technical and philosophical challenges facing replication of historic monuments and features and the potential of these new tools to assist in the preservation and documentation of at-risk cultural property.

Faking It?: Artificially Patinated Metals and the Question of Age and Authenticity
Jacqui A. Hogans, Project Associate, RAND Engineering and Architecture

Some metals have been celebrated for how they improve with age. Instead of becoming so rusty as to lose any structural integrity, some metals such as copper, weathering steel, and bronze seem to become even more distinctive as they get older. It has become increasingly common, however, to artificially patinate these metals so that they look much older than they actually are. Metals are artificially patinated in order to integrate new construction in historic areas or to provide an aesthetically pleasing transition between a building and an addition; often, such buildings and sculptures are believed to be much older than they actually are.

This artificial patination, either in the form of a coating that will wash off with time, or by the application of chemicals to accelerate the natural aging process, poses particular problems for buildings conservators.

This paper will discuss the physical differences between metals that are allowed to patinate naturally and those with accelerated aging processes, the dangers—both from a chemical and a conservation-ethics standpoint—of using such materials, and how these materials may behave over time.

New Buildings Behind Old Facades: Redevelopment Challenges for Historic Buildings
Sarah Gray, P.Eng, Project Manager, Halsall Associates Ltd.

In recent years, revitalized urban centres have lured people to trade in car-centric suburbia for a more pedestrian-friendly lifestyle in the city. Soaring property costs, compounded by the fact that urban centres often have little to no open space, limits "greenfield" construction needed to meet increased housing and commercial property demand. Responding to this dilemma, many developers are transforming vacant or neglected buildings into luxury condominiums or mixed-use properties. Historic buildings, with interesting details such as carved stone, pressed metal cornices, and cast iron storefronts are often among the most sought-after properties for redevelopment. In an effort to balance economic and consumer demands with regulations set forth by historic review boards, some developers offer a compromise solution for redeveloping historic buildings: they maintain and restore historic building facades, while completely reconstructing interior structures. This practice is commonly referred to as "facadism."

"Purist" preservationists claim that facadism is a forgery of history, a "Disney-fication" of Main Street that merely evokes a time long gone. Others claim that facadism is completely legal and just another part of a building's evolution in ever-changing economic and architectural climates. This paper discusses each side of the facadism debate, from maintaining architectural significance to the economics of rehabilitating existing walls. Examples of facadism projects in Toronto and Boston will be discussed.

Conservation of the Sarcristy Window, Mission San Jose y San Miquel de Aguayo, San Antonio, Texas
Jennifer Correia, Architectural Conservator, Milner + Carr Conservation, LLC and Frank Matero, Professor of Architecture and Chair of the University of Pennsylvania, Graduate Program in Historic Preservation

The carved stonework of the Mission church of San José y San Miguel de Aguayo is considered by most scholars to be the zenith of artistic expression of Spanish Baroque architecture in the continental United States. This irreplaceable sculpture has been copied and replicated numerous times in buildings throughout Texas, and is now ingrained in local San Antonio culture. Contemporary conservation practice advocates for an integrated approach whereby any remedial interventions are considered in the larger context of past and present condition assessment, treatment testing and field monitoring, and preventive strategies.

The recent conservation of the micritic limestone of the chursh's Sacristy Window allows an opportunity to study the interrelationship of traditional and new techniques for stone conservation set within a 75-year context of traditional repairs and restoration. Over a century of documentation together with more recent study over the past decade has revealed unstable stone conditions that now threaten the integrity of the church. Salt-contamination leading to flaking and delamination has caused accelerated disfigurement of the surface, and bedding detachment has created destabilization of the intact carved elements. A comparison of conditions based on graphic surveys from 1997 and 2004 with Geographic Information Systems software (GIS) revealed an alarming increase in both the amount and rate of change. Site and material analyses confirmed the sources of the problem.

The phased conservation program was designed guided by a set of overall project goals and individual treatment objectives. Performance criteria were evaluated using laboratory analysis. One additional advantage was the reevaluation of previous treatments that used similar techniques on site ten years earlier. Given the fragile nature of the carved surfaces, emergency stabilization was achieved by preconsolidation with Hydroxilated Conversion Treatment (HCT) followed by desalination with paper pulp poultices and consolidation (Conservare OH100). HCT is a relatively new pretreatment for carbonate rocks prior to ethyl silicate treatments. Laboratory testing of physical properties together with SEM examination was undertaken on replicate stone prior to use on-site. Existing destabilized surfaces were then grouted with a moderately hydraulic lime grout (St. Astier 3.5), delaminated stones were micro-pinned with small ceramic pins embedded in filled Acryloid B72 adhesive, and losses were filled with a hydraulic lime mortar. In addition, the entire surface was cleaned with a new commercial low pressure/low volume micro-abrasive system utilizing precipitated chalk. This project offers a complex example of balancing the issues of decay damage, age-value, and past repair choices in presenting the architecture as a formal whole.

Structural Conservation Using Articulated Reinforcement at the Lewis Store
Melanie Kasper, EIT and Samuel Y. Harris, RA, PE, Principal, S. Harris & Company, Architectural Technology

The structural system of one of the oldest surviving urban retail buildings in the United States, The Lewis Store, was recently reinforced because the existing condition of the system was grossly inadequate to handle recommended loadings for future occupancy. Located in Fredericksburg, Virginia, the 1749 Lewis Store is a two story building structurally constructed of heavy timber beams and a masonry envelope. Due to several design restraints, access to this existing structural system was limited to above the members. An articulated structural system was designed and constructed between the floor joists, hidden within the building framing. The all steel system consists of a series of modified trusses, composed of turnbuckles, clevises, threaded rods, and plates. Once the system was installed, the trusses relieved the main summer beam of incoming loads from the adjacent joists. This system proved to be successful because it was disguised from the public's eye and did not require the removal of original fabric. Substitute reinforcements such as this system are increasingly favorable in conservation as they minimize the appearance of rehabilitations.

Arnold House Clapboard Restoration
Benjamin Haavik, Team Leader, Property Care, Historic New England

In 2003, Historic New England, formerly the Society for the Preservation of New England Antiquities, embarked on an exterior restoration of the Eleazor Arnold House, 1693, in Lincoln, Rhode Island. The Arnold House is a rare surviving example of a "stone-ender," a once common building type first developed in the western part of England. With an exposed fieldstone end wall and pilastered chimney, the Arnold House was originally a two-story structure with an integral lean-to and four rooms on each floor.

Donated to SPNEA in 1919 by Preserved Whipple Arnold, the house has undergone three major interventions. In 1920, stabilization efforts were directed by Norman Isham, a leader in architectural restoration, and, in 1950, a complete structural rehabilitation of the house and chimney was undertaken. In 2006, after three years of planning, the repair and restoration of the exterior clapboards and casement windows has been completed.

The 1950s work on the Arnold House drastically changed the appearance of the building. Double hung sash windows were removed and replaced by casement windows and major structural interventions replaced much of the original fabric of the structure. The appearance of the newly "restored" Arnold House did not resemble any historic period of the structure's past. SPNEA succeeded in creating a fabrication.

When planning the exterior work, Historic New England was faced with the decision of preserving the 1950s restoration (preserving the fake), reconstructing the early 20th century appearance of the structure (making a new fake), or attempting to enhance the 1950s interpretive work that had already occurred (attempt to make the fake a better fake).

This paper will discuss the thought process behind the recent restoration efforts at the Arnold House.

The Fight to Save Civil War Graffiti: Plaster Consolidation Tests in the Lockwood House, Harpers Ferry, WV
Lara Kaplan, Conservator, Lara Kaplan Objects Conservation LLC and Judy Jacob, Senior Conservator, National Park Service

Situated on Camp Hill in Harpers Ferry, West Virginia, the Lockwood House was built in 1847 to serve as quarters for the U.S. Armory paymaster; it was used during the Civil War as headquarters for Union Generals Henry H. Lockwood and Phillip S. Sheridan. The house was vacated in the 1950s and acquired by the National Park Service in 1995. Traces of Civil War era graffiti are visible under layers of peeling wallpaper and paint on many of the plaster walls; some areas of plaster have deteriorated to a friable condition. To preserve the graffiti, a plan was made to document the walls with photographs, consolidate friable plaster, and reattach lifting plaster layers. This paper focuses on tests that were conducted to find a suitable plaster consolidant.

Following a literature review and conversations with colleagues, the range of possible consolidants was narrowed down to Consevare® OH100 Consolidation Treatment (OH100, ethyl silicate solution) and Acryloid® B-67 (B-67, isobutyl methacrylate) in mineral spirits. An ideal plaster consolidant would offer good penetration, neither complicate subsequent overpaint removal nor stain the substrate on which the graffiti was written, and be of low toxicity and flammability.

Working within the confines of a limited time frame and budget, tests were performed *in situ* and on pieces of detached plaster from the walls and ceilings. The tests were designed to compare the efficacy of the two products and variations in application technique.

Three weeks after application of the consolidants, solvent odor had greatly diminished and the treated plaster was examined. Increases in strength and stability were gauged by probing exposed plaster edges. Sounding ascertained the presence of voids. Darkening and color changes of plaster and paint were also noted. Sections of overpaint were removed with a scalpel to determine if the consolidants had affected the paint layers. Finally, sample pieces were split in half to observe the depth of penetration of the consolidant, determined by noting the extent of darkening and increased cohesiveness of the plaster.

At the conclusion of the test, OH100 was found to be the most suitable consolidant for the friable plaster. It caused less overall visual change to the plaster and paint than B-67 and appeared to have penetrated more thoroughly into the samples. It also seemed to consolidate the plaster to a better extent than B-67, as was evident by probing treated samples. Sounding indicated that voids had been filled. Overpaint removal tests suggested that OH100 might have consolidated some of the paint, but not to an extent that would greatly hinder overpaint removal in the future.

Removing Coatings to Reveal Civil War Graffiti in an Historic House in Fairfax, Virginia
Kirsten E. Travers, Conservation Technician, Fairfax Museum and Visitors Center

Blenheim is an historic house located in Fairfax, Virginia. Completed around 1858, the house was relatively new when the area was torn apart by Civil War. The Willcoxon family, Confederate sympathizers who owned the house, were forced to leave the area in 1861 and their new home was occupied by Union soldiers, who used the structure as a hospital and military headquarters.

As a result of the years of Union occupation, Blenheim is filled with Civil War soldier graffiti. Names, dates, regiments, and cartoons drawn in pencil, charcoal and wax crayon cover every wall on every floor of the house. After the war, the Willcoxon family moved back to their farm and, understandably, painted, whitewashed, and wallpapered the walls of their once fresh, new house, obliterating the graffiti.

It is interesting to note that the third floor attic was never touched and to this day appears much as it did at the time the graffiti was written. The attic alone contains the greatest concentration of Civil War graffiti in the United States.

For the past century and a half, Blenheim remained in the ownership of the Willcoxon family. In 1997, the city of Fairfax purchased the house after the death of the last remaining descendant. For the past year, efforts have been made to remove the layers of paint and wallpaper that cover the graffiti. Chemical paint strippers, solvents, and mechanical methods have been used to carefully remove the paint and whitewash layers without disturbing the inscriptions beneath. The condition of the recently uncovered graffiti varies in quality but a number of soldier names have been identified. In addition, a brief display of the more interesting graffiti found in the house will conclude the presentation.

Recovering from Flood at Westover: Innovative Approaches to the Treatment of Deformed Wood and the Evaluation of Damaged Ornamental Plaster
F. Carey Howlett and Stephen Z. Marder

Westover is one of Virginia's pre-eminent James River plantation mansions and one of the finest American examples of Georgian architecture. William Byrd III built the house circa 1750 on ancestral lands. The symmetrical 2 1/2-story structure possesses elegant proportions, handsome brickwork and exceptional pedimented entrances of Portland stone. The interior contains woodwork with full-height wainscot, classical cornices, an elegant carved staircase, marble mantels and ornamental plaster ceilings.

In 2005 a plumbing leak went undetected during the prolonged absence of Westover’s owners, causing severe damage to some of the best plaster and woodwork in the house. Water saturated wainscot-covered interior brick walls, causing original wainscot to warp, twist and fracture as the unpainted reverse sides of the paneling took on moisture. The flood also saturated ceilings, causing sagging, delamination, staining, paint blisters and the loss of some plaster ornament.

John Milner Associates managed the flood recovery project, working with F. Carey Howlett & Associates to address

deformed wainscot and SZM Enterprises to conserve the plaster ceilings. Treatments of both plaster and woodwork were designed to preserve the original materials and minimize the need for replacements.

Following careful disassembly of the damaged woodwork, an innovative protocol was developed to flatten the wooden panels, stiles and rails. The large quantity of deformed material necessitated mass treatments that included periods of extreme humidification followed by pressure and carefully controlled drying. A small greenhouse, outfitted with humidistatically and/or thermostatically controlled humidifiers, a dehumidifier, a portable air conditioner and a heater, served effectively as an environmental chamber. A specially designed press was constructed to suit the overall size of the panels. Treatment accommodated the variable thicknesses of the panels (they were originally surfaced only on one face, so the thickness of each varied from 11/16" to 1"). Treatment was designed to successfully flatten warped, bowed and twisted woodwork without causing new checking or any detectable loss of dimension.

Conservation of the plaster ceilings included the repair of damaged keys, the consolidation of water-damaged ornament, and the selective replacement of the few irreparably damaged elements. Treatment provided an unexpected opportunity to explore the authenticity of the ornamental plaster. While 18th-century visitors to Westover commented upon the "stucco" ceilings at Westover in letters to acquaintances, the age of the current ornamental plaster has long been questioned. Indeed, preliminary examination indicated the flat ceilings to be of nineteenth and twentieth century origin, with evidence of sawn wood and metal lath. The initial assumption, therefore, was that none of the decorative plaster survived from the eighteenth century.

Intensive examination of ornament in the first story passage and parlor, however, led to the conclusion that much of the ornament is earlier than the flat plaster and possibly dates from the original construction of the house. Coating and plaster analysis and a comparative study of the style and fabrication of ornamental elements enabled the discernment of old, probably original ornament from later 19th- and early 20th-century replacements.

Repairing Victorian-Era Wooden Greenhouses of the West Coast
David Wessel, Principal Conservator and James Cocks, Conservation Technician, ARG Conservation Services

In the Victorian age, elaborate greenhouses were constructed on the west coast of wood and glass. These structures were typically designed to imitate the aesthetics of European originals, but due to the availability and limitations of regional materials, wood was substituted in place of metal for fenestration framing elements. This substitution of materials intrinsically poses special challenges for the conservation of the wooden forgeries. High levels of humidity within the buildings have caused ongoing deterioration of the wooden elements, accelerating the frequency and extent of necessary conservation treatments. Two of these structures will be examined in terms of their contexts, conditions, and treatments.

The Conservatory of Flowers was erected in San Francisco's Golden Gate Park in 1878, becoming one of the country's first municipal buildings of its type. Today, it is one of the last remaining municipal wood greenhouses of the Victorian period in the United States. Materials analysis and historic conditions suggest the Conservatory was fabricated of locally grown redwood with local mills, although historic publications boasted the building materials were imported from England. Throughout the structure's life, major repairs were performed on deteriorated woodwork, but deterioration was accelerated in the second half of the 20th century because of two conditions. First, the building's natural ventilation system was compromised through modifications made in 1959. Second, the penetration of rain water from the exterior of the building, caused by inadequate or deteriorated waterproofing, increased the level of moisture in the wood.

The Luther Burbank Greenhouse was constructed in 1889 to house plant breeding and seed germinating work carried out by Mr. Burbank. The structure, also constructed of wood and glass, exhibited accelerated deterioration, concentrating at the bolts connecting the interior and exterior halves of the mullions. Failure of the recent lead-free paint coatings, particularly at the upper levels of the greenhouse, was also a typical condition leading to its accelerated decay.

In each instance, treatments were performed to preserve as much of the historic materials as possible, while providing the long term protection of the structure. Due to the nature and extent of deterioration, in both instances disassembly of the structure was required, followed by careful reassembly with each preserved mullion in its original position. Various interventions were performed to retain and provide further protection and stabilization.

This presentation examines deterioration processes of historic structures constructed with wood that, in these cases, are actually historic substitute materials, and the conservation treatments that were undertaken to preserve the structures.

Ethyl Silicate as an Alternative Binder for Grout and Mortar
Lurita McIntosh, Graduate Student in the Graduate Program of Historic Preservation, Columbia University

Traditionally, grouts for masonry materials have been based on lime, hydrated lime, and cement, often in combination, and sometimes with pozzolan or casein as additives. Good results have been achieved with these formulas; however, lime- and cement-based grouts can produce soluble salts and surface discoloration associated with lime streaking. For repairs and consolidation of siliceous stone, ethyl silicate has been proposed as an alternative binder for grouts. Ethyl silicate would eliminate both the production of salts and lime streaking, while allowing for strength modification and excellent adhesion to a silicate substrate. In addition, this would take advantage of the inherent low viscosity of alkoxysilanes, reducing the need for fluidizing additives. Ethyl silicate binders for grouts and mortars have already been employed by Hans Leisen and the APSARA team on the sandstone at Angkor Wat; however, they have not been evaluated with materials available in America or on common American building sandstones. In order to determine if these new grouts are more compatible with these silicate substrates than traditional ones, a testing program measuring adhesion, capillary uptake, water vapor transmission, and strength and modulus through biaxial flexure will be conducted according to ASTM and modified ASTM protocols. The results of this testing program have the potential to significantly impact the field of stone conservation, especially the conservation of silicate cemetery markers which often utilize grout injection as a major method of treatment.

Bringing Linoleum into the 21st Century: The Conservation of Linoleum and Felt-Based Floor Coverings
Jennifer Cappeto, Associate, Higgins and Quasebarth

Do you remember playing with toy cars on the floor of your kitchen as a kid? You and your friends pushed the cars along the pattern in the linoleum, using the straight lines for roads and flowers as buildings. Maybe you even had a fun linoleum floor in your bedroom. Did you ever think that as an adult, anyone would ask you to conserve linoleum? Did you know that there are different types of "linoleum", such as felt-based floor coverings?

Linoleum was first developed in England to replace oilcloth, which had a strong odor and only moderate durability. Linoleum was extremely durable, relatively easy to manufacture, and was made of readily available materials. The first linoleum factory in the United States was built on Staten Island in 1872. Early linoleum was made with simple patterns until 1882 when Frederick Walton developed the technology to create inlaid linoleum, characterized by ornate patterns. Inlaid linoleum was often used to imitate more expensive materials such as wood parquet tiles, ceramic tiles, Oriental carpets or brick.

As linoleum became ubiquitous in the American home, manufacturers experimented with less expensive alternatives to this type of floor covering. Felt-based floor coverings, known as "felt-base", were invented in 1910. These floor coverings were much less expensive but had very low durability. By the 1960s, polyvinyl chloride (vinyl) flooring replaced both felt-base and linoleum as an inexpensive flooring material.

This presentation will review the history of linoleum and felt-based floor coverings, as well as difference in their manufacture. We will discuss the common forms of weathering and deterioration exhibited by these two types of floor coverings. Using treatments performed at the Lower East Side Tenement Museum in New York City as examples, we will review conservation treatments for both linoleum and felt-base.

Lincoln's Letters: Conservation of the Inscriptions at the Lincoln Memorial, Washington, DC
Michael Kramer, President, The Gilder's Studio, Inc.

When the Lincoln Memorial was dedicated in 1922, the paint was fresh on the more than 4,500 characters carved into the limestone walls of the three chambers. These inscriptions consisted of the Gettysburg Address and Lincoln's Second Inaugural Address as well as the Dedication behind Daniel Chester French's famous sculpture. By 1995 the original paint had become very friable and deteriorated to the point of being illegible in places. The challenge of this project was to try and consolidate and preserve the original painting of the inscriptions while producing a stable substrate onto which a modern paint system could be safely applied. After adhesion testing in situ, a quantitative benchmark was established by which performance of 5 different consolidating agents could be measured. Winsor and Newton's Gloss Artist's Varnish out-performed the other four agents and was used to consolidate and re-attach the original paint to the limestone. This provided a stable foundation for the application of the new layers of Japan Paints thereby making the inscriptions legible again.