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Making Technological Facilities NHLs

Harry Butowsky

On October 15, 1966, President Lyndon B. Johnson signed Public Law 89-665, otherwise known as the National Historic Preservation Act of 1966. Among the many reasons given in the preamble of the Law for its passage, Congress stated the following:... although the major burdens of historic preservation have been borne and major efforts initiated by private agencies and individuals, and both should continue to play a vital role, it is nevertheless necessary and appropriate for the Federal Government to accelerate its historic preservation programs and activities to give maximum encouragement to agencies and individuals undertaking preservation by private means, and to assist state and local governments and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities."

The National Historic Preservation Act established many new programs for both Federal and state governmental agencies. The Act authorized the Secretary of the Interior to expand and maintain a national register of districts, sites, buildings, structures and objects significant in American history, architecture, archeology and culture; established an Advisory Council on Historic Preservation to advise the President and Congress on matters pertaining to historic preservation; and in Section 106, the Act required the head of any Federal Agency responsible for any undertaking to consider the effect of that undertaking on any property included in the National Register and afford the Advisory Council on Historic Preservation an opportunity to comment with regard to the undertaking.

In the 23 years since the passage of the National Historic Preservation Act of 1966, many scientific and technological resources have been listed in the National Register of Historic Places. While many of these resources are obsolete facilities never to be brought back into operational use, an increasing number, such as the Allegheny Observatory in Pittsburgh, Pennsylvania; the Twenty-Five Foot Space Simulator at the NASA Jet Propulsion Laboratory in Pasadena, California; and Apollo Mission Control at the NASA Johnson Space Center in Houston, Texas, are still active facilities, destined to be used for research for many years to come. The question now facing the historic preservation community—including the Advisory Council on l-historic Preservation, State Historic Preservation Officers, and the National Park Service—is whether the designation of these active facilities as National } Historic Landmarks is compatible with the provisions of Sections 10(~ and 110(f) of the Historic Preservation Act of 1966, as amended, and Section 101 of the act requiring the comprehensive survey of historic properties. *See full report inside.*

The Designation of Technological Facilities as National Historic Landmarks

A Report

Harry Butowsky

The Historic Preservation Act of 1966 provides for the comprehensive survey of historic resources, their listing in the National Register of Historic Places if determined eligible, and their protection under Section 1()6, and in the case of National Historic Landmarks, under Section 110(f) of the law.

Questions concerning a possible conflict between these provisions of the Historic Preservation Act have been the subject of debate among Federal, state, and local government officials and private property owners for many years. This issue came to a head in August 1989 when Rep. Robert Walker, ranking Republican member on the Committee on Science, Space and Technology, introduced a legislative waiver in the fiscal year 1990 authorization bill for the National Aeronautics and Space Administration to exempt NASA's 20 National Historic Landmarks from the provisions of Sections 106 and 110(f) of the National Historic Preservation Act of 1966. While this action took the preservation community by surprise, quick response in the Congress resulted in the signing of a Programmatic Agreement between the Advisory Council on Historic Preservation, the National Conference of State Historic Preservation Officers, and NASA, and the deletion of this legislative waiver from the final bill.

NASA s concerns date back to September 8,1980, when President Jimmy Carter signed Public Law 96344 that asked the Secretary of the Interior to prepare a study concerning sites, locations, and events associated with the historical theme of Man in Space for the purpose of identifying a possible new unit of the National Park System commemorative of this theme, with special emphasis to be placed upon the internationally significant event of the first human contact with- the surface of the moon. Public Law 96344 also asked NASA and other responsible government agencies controlling such sites to preserve them from destruction or change during the study and congressional review period insofar as was possible. The comprehensive report was requested no later than September 30, 1981.

As a result, the *Man in Space National Historic Landmark Theme Study* was published in 1984 and 25 historic resources associated with the history of the American Space Program were designated as National Historic *Landmarks. (See CRM Bulletin,* April 1986, Man in Space: These are the Voyages of...) The required follow up report, *The Man in Space Alternative Study,* although completed in early 1987, and containing a series of recommendations for the preservation and interpretation of the historic resources associated with the early years of the space program, still has not been officially released to the Congress because of NASA s objections. (See *CRM Bulletin,* Vol. 10: No. 6, Man in Space: The Voyage Continues.")

In a letter dated October 2, 1987, to Secretary of the Interior Donald P. Hodel, NASA Administrator James C. Fletcher stated that NASA simply cannot afford to become entangled in time consuming, protracted negotiations over the status of planned changes to operational facilities which are absolutely crucial to the Nation s continuing aeronautics and space research, technology, and exploration missions. The mandatory upgrading of facilities and systems, which are critical to the safety of manned flight activities, are

immediate over-riding concerns. Accordingly, I have no choice but to request that you take action to dedesignate the facilities (NASA NHLs) described in Enclosure 1 as historic landmarks."

A similar issue surfaced again on September 11, 1989, when the History Areas Committee of the National Park System Advisory Board met in Washington, DC, and heard objections raised by the General Council of the National Science Foundation and representatives of the Yerkes, Palomar, Mount Wilson, Lick, and Allegheny observatories that were studied in the National Park Service s *Astronomy and Astrophysics National Historic Landmark Theme Study*.

While representatives of these observatories did not dispute the national significance of their sites, they all expressed a fear that the application of Section 1()6 regulations, triggered, as they saw it, by the listing of their observatories in the National Register of Historic Places, would delay or even possibly result in the loss of grants from the National Science Foundation, NASA, and other Federal agencies. They all believed that the application of Section 106 procedures to their research facilities would place them at a competitive disadvantage in the search for tight Federal monies with other more modern facilities not subject to the provisions of current historic preservation law.

This feeling was so pervasive that a spokesman for the University of Pittsburgh, the administrator of the Allegheny Observatory, informed the Board that the University was reversing its previous endorsement of the National Historic Landmark proposal for the Allegheny Observatory despite its having been listed in the National Register of Historic Places since 1979.~

The representatives of the observatories were in general agreement that they would all welcome the designation of their sites as National Historic Landmarks, providing they were not subject to the provisions of Sections 106 and 110(f) of the Historic Preservation Act of 1966. Since such a designation is not possible today under existing law, the History Areas Committee recommended postponing consideration of seven of the National Historic Landmark nominations for a period of one year and requested the National Science Foundation (the granting agency for scientific funding in the United States), the Advisory Council and the National Park Service to work together to reach all agreement that would include mechanisms providing for a satisfactory balance between historic preservation needs and the recently expressed concerns by the owners of the observatories about the designation of dynamic operational facilities.

On September 20, 1989, Rep. Bruce F. Vento, chairman of the House Subcommittee on National Parks and Public Lands of the Committee on Interior and Insular Affairs; Re p. Robert J. Lagomarsino, ranking Republican member of the l louse Subcommittee on National Parks and Public Lands; Rep. Robert A. Roe, chairman of the House Committee on Science, Space and Technology; and Rep. Robert S. Walker, ranking Republican member of the House Committee on Science, Space and Technology, sent a letter to the National Park Service Director, James M. Ridenour, requesting that the nominations of the seven sites at issue in the *Astronomy and Astrophysics National Historic Landmark Theme Study* be deferred for one year to permit the Advisory Council to complete all assessment of this situation and to successfully negotiate a programmatic agreement with the National Science Foundation. In compliance with this request the National Park Service recommended on October 18,1989, that consideration of the disputed sites in the theme study be deferred until October 1990.

Also on September 20, Representatives Vento, Lagomarsino, Roe, and Walker sent an additional letter to John F. Rogers, chairman of the Advisory Council on Historic Preservation, requesting that the Council analyze this issue and prepare a comprehensive report to the Congress by September 30, 1990.

Finally, in an additional development during October 1989, Congress added language to the Department of the Interior s appropriations bill for fiscal year 1990 (Amendment No. 150) concerning the Advisory Council on Historic Preservation s funding that stated the

following: 'Provided, That none of the funds under this head may be used to process undertakings of Federal Agencies, as specified in Sections 1()6 and 110 of the National Historic Preservation Act of 1966, as amended, on grants or contracts to institutions or facilities whose main activity is the conduct of scientific research and such agencies shall be relieved of the requirements of seeking comments on such undertakings unless requested in writing by the grantee. '

The question that the listing of technological facilities in the National Register of Historic Places has raised is the general perception among members of the scientific community who fear that such a move would severely limit their ability to upgrade or modify their facilities. While the National Park Service continues to believe that the designation of properties as National Historic Landmarks and their listing in the National Register of Historic Places are compatible with their continuing function as scientific resources, members of the scientific community have expressed their concerns. During the next few months all of the interested parties must see if an agreement is possible that will satisfy the concerns of the National Science Foundation and the owners of the observatories so that both the historical significance of these properties can be recognized and important scientific research can continue as in the past.

In an interview on this subject published in the *Chronicle* of *Higher Education* on October 4, 1989, Dr. Robert Brucato of the Palomar Observatory said of the proposed National Historic Landmark designations, It s a nice thing to have in your scabbard, but it s a two edged sword.... What conceivably could be used to help Palomar could also be used against Palomar."

The National Park Service, through the administration of the National Historic Landmarks Survey, has tried to maintain the principal of comprehensive thematic survey of the Nation s historic resources as required by public law. In repeated cases, involving technological resources and other recent nominations as varied as the University of Illinois Stadium, the Ohio State University Stadium, Fenway Baseball Park in Boston, Massachusetts; Brandy Station and Cedar Mountain Battlefields in Virginia, and the Boston Post Road in New York, both public and private owners have objected to designation based, among other reasons, on perceived complications with the administration of Section 106 of the Historic Preservation Act of 1966. The successful resolution of these cases has so far proved elusive.

Deferral of official action on proposed designations raises the fundamental question of whether, as a practical matter, the mandate to conduct a comprehensive survey is inimical to the requirements of Section 106. Put another way, is the perceived burden of Section 1 ()6 compromising the ability of state and Federal agencies to conduct a nationally comprehensive survey with its attendant requirement for comprehensive thematic analysis? If so alternative ways of conducting the landmark survey might be examined. One of these might be an administrative list of properties found to meet the National Historic Landmarks criteria of national significance maintained by the National Park Service. Another might be a two-tiered system listing National Historic Landmarks—the first tier being designated landmarks carrying no Section 106 sanctions or other enhanced procedural protections and benefits—and a second list, following public hearings, of those National Historic Landmarks (called participating landmarks) that share in existing procedural sanctions. The solution to this question has yet to be determined.

In the years since the passage of the National Historic Preservation Act of 1966, the National Park Service has tried to maintain a balance between the operational needs of highly technological facilities and the thematic survey requirements of the National Register and National Historic Landmarks Programs. The National Park Service will work with the Advisory Council on Historic Preservation, the National Science Foundation, the National Aeronautics and Space Administration and concerned State Historic Preservation Offices in the preparation of the Advisory Council s Report to the Congress on this matter.

To be continued...

*On October 17, 1989, the U.S. Secret Service requested that the NHL. nomination of the United States :Naval Observatory be deferred for security reasons.

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Cultural Resource Work at Wupatki National Monument

Steve Cinnamon

Wupatki National Monument was established in l 924 to... preserve and protect... prehistoric ruins... which are a link to the past The monument s 35,253 acres were partially surveyed as early as 1897. Between 1981-87, a comprehensive archeological inventory was conducted by Bruce Anderson of the Southwest Cultural Resource Center, NPS, recording 2,668 archeological sites from paleo-Indian, archaic, and prehistoric through modern time. The survey has provided an extensive database of information for park managers to manipulate and use for interpretive and management purposes.

The monument s cultural baseline information has been strengthened not only by archeological surveys but also by the additional theses and dissertations produced by park staff. Lauren Ritterbush completed a thesis on prehistoric water catchments; Brian Morozas completed research using aerial photography and remote sensing techniques to identify prehistoric agricultural fields; Scott Travis used survey results to analyze agricultural field distribution; Steve Cinnamon used the archeological survey site locations in assessing the prehistoric human impact on the desert grassland; Chris Downum prepared a dissertation on the history of archeology in the Flagstaff area and developed prehistoric settlement patterns based on ceramic analysis.

Interest in the characteristics of prehistoric sites and their preservation has encouraged others outside the Service to study Wupatki National Monument, as well. Tim Burchett, Northern Arizona University, is proposing to study the construction sequence of Wupatki Pueblo. His pilot project, which he completed as a volunteer for graduate course work, will be expanded using ceramic remains recovered during the 1933 excavation and a comparison of historic photographs following the initial stabilization efforts at Wupatki Pueblo. Robert O Connell of California is exploring the cultural architecture variation in Wupatki and other large ruins. He argues that Wupatki Ruin especially represents a diverse culture as determined through architectural style. The patterns of rock size used in wall construction emulate Chacoan style in three rooms of Wupatki Ruin. The course patterned walls might be analyzed at selected sites across the monument to determine if local stone material was a factor for the patterns.

The site density at Wupatki is three times that projected by archeologists in the 193()s. Site types range from lithic and ceramic scatters to field houses, enclosures, and pueblos; to historic Navajo hogans constructed of cottonwood, juniper and stone. The mixture of cultural material is vast. The area has potential for interpreting both the environment and man s occupation from at least 10,000 years ago to the 20th century. The inclusion of Navajo occupation through the mid-19th century is another aspect just now being reported. Alexa Roberts, University of New Mexico, has conducted genealogical studies of Navajo occupants in Wupatki Basin. She has been able to reconstruct the ancestry of 418 people associated with the first Navajo occupant of the Wupatki area, Peshlakai Estidi, who settled in the area following The Long Walk from New Mexico to Arizona.

The ruins preservation program has also grown. The archeological survey recorded an additional 8() pueblo sites which were recommended to receive some form of stabilization treatment. An archeological assessment was completed in 1987 to help managers determine which sites should be treated initially. A computer forms database program, lust Do It *(NPS Courier,* 1988) enabled the monument resource management specialist to set priori- ties for work based on structural integrity, visitor impacts, cattle

grazing, or structural uniqueness. In order to expand limited funds more efficiently, sites have been selected based on their proximity to sites developed as interpretive foci, such as Lomaki, Citadel and Wupatki Ruins. A team of preservation specialists from the Southwest Regional Office brought tremendous amounts of expertise when it comes to ruins preservation. Team members included Larry Nordby, Terry Morgart, Jim Trott, Todd Metzger, and James Firor. A minimal intervention approach in ruins preservation was initiated. Realization by Todd Metzger of the loss of architectural information—which is considered a unique artifact of each site—due to the "broadbrush approach of former ruins stabilization measures, led to a raising of the awareness of architectural integrity and uniqueness of the ruins. Extensive documentation precedes any on-site work. A compilation of detailed forms on wall attributes and features is now prerequisite to physical treatment. Physical intervention or alteration via amended mortar is kept to a minimum where sites are structurally weak. Mortar samples are analyzed for inclusions of cultural origin and pollen in an attempt to determine season of construction. Dry laid capstone protects the interior of wall cores replacing extensive use of amended mortar and foreign stone. Wedging and shifting stone is substituted for pointing mortar between rock courses. The end results are prehistoric ruins which have been recorded in detail, are structurally sounder, and capable of withstanding minor visitor use.

A methodology for targeting sites for work was developed to help the area s managers. Sites were defined as front country (developed for interpretation), mid-country (visible from roads or front country sites, thus attracting attention to themselves), and back-country sites (remote parts of the monument with little visitation). The cross-referencing of sites on a priority list to map locations enabled sites in each category to receive some degree of treatment. These new sites were treated in addition to the 40 classified structures which have received extensive stabilization treatment between 1933 to 1985.

The museum collection is being added to the Automated National Catalog System. IBM computers have been upgraded to meet the program requirements and a temporary museum aid was hired to compile museum collection lists from at least three other areas where artifacts are stored. Dr. Sara Stebbins, an archeologist formerly with the Museum of Northern Arizona, was hired to complete a job often assigned as a collateral duty to ranger personnel. The full-time devotion to the project is meeting with success. A VIP from Aurora, Colorado, Don Smith, spent six weeks at the park and was able to get the program up and running with the assistance from the Southwest Regional Office personnel. Don is a retired computer program manager who chose to enter volumes of data into the computer instead of walking trails and manning a visitor center information desk.

The Volunteers In Parks (VIP) program assists field managers in conducting on-site monitoring of prehistoric sites which are in various "zones" depending on their proximity to roads and interpretive sites. Tom Angenent and John Breckon, members of the Northern Arizona Amateur Archeological Society, visit sites across the monument every week, looking for signs of visitor impact.

Wupatki National Monument was established as a reservation" of prehistoric cultural material. Gradually, cultural resource surveys have been completed and research accomplished. As in all good research, more questions are generated. The proximity of the monument to the local university and strong rapport with an innovative regional office staff have given Wupatki s cultural resources the attention they deserve. In addition to a cooperative agreement with the anthropology department of Northern Arizona University (see separate story), Wupatki and Sunset Crater have benefited from the expertise of Dr. Richard Holm, a volcanologist, who has described the six stages of activity from Sunset Crater, a report of a former trading post, two administrative histories, a geologic base map of Wupatki, and has assisted student conservation aids to receive college credit for their work in the monuments.

Steve Cinnamon served until recently as a resource management specialist at Wupatki-Sunset Crater National Monument, AZ. He is now a resource management specialist in the Midwest Regional Office of the NPS.

Minority Anthropology Students

Train at Wupatki

Muriel Crespi

This summer found Wupatki National Monument participating in an innovative project with Northern Arizona University (NAU) and minority anthropology students. The U.S. Department of Education funded the student project, thanks to the efforts of Dr. Robert T. Trotter II, cultural anthropologist and Chair of the Department of Anthropology, and Dr. Shirley Powell, archeologist, who helped write the winning grant. As the following Cinnamon and Trotter articles discuss, the grant supported a 7-week ethnographic and archeological field course to train 14 social science students. They came from Indian, Hispanic, Black, and Asian minority groups, and from colleges that ranged from the University of California to Dartmouth.

Collaboration characterized the field project at several levels. While the Department of Education covered student costs, the university paid faculty summer salaries, and the regional office and park added an ethnographic component to the cooperative agreement that made the institutional connections between Wupatki National Monument and NAU. Superintendent Henderson provided support in the form of office space for the project, Volunteers In Parks status to students, and the continuing encouragement that was crucial to the project s success.

Students, NPS, and NAU were all beneficiaries of the project. Minority students with limited national park exposure had first-hand contact with a park, its staff, and its cultural and natural resource management concerns. Positive associations with experienced NPS professionals linked students to an otherwise invisible national agency. This promises payoffs for the students own sense of membership in a complex system and enthusiastic support for national parks.

As future social scientists, the trainees benefited from working under practicing professionals who cared about developing anthropological expertise in a new and ethnically diverse student generation. The unexpected sophistication of the students final archeological and ethnographic presentations made it clear that NAU faculty had given considerable time to the design and implementation of feasible research projects.

Park management acquired useful new information about Wupatki archeological resources and visitor behavior, as Cinnamon and Trotter indicate, and old questions found answers as new ones were raised.

The interactive aspects of ethnography encouraged discussions between the Superintendent and on-site investigators to consider any project modifications that seemed useful in the light of new data. This produced results that focused more directly on park concerns. Another pay-off was the opportunity for park staff to learn firsthand about ethnographic techniques and their application to management s pragmatic concerns.

The learning was mutual. Interactions with park staff also resulted in providing the anthropological professionals with an informal practicum on park issues. First-hand introductions to NPS needs and goals will foster informed NPS constituents, while also encouraging a closer fit between future University projects and Wupatki research needs. In the same vein, the Service s Cultural Anthropology-Ethnography program, a relative newcomer to the NPS pool of resource specialties, will especially benefit from Trotter s introduction to and interest in NPS ethnographic needs.

Overall, the summer was a winner for NPS. Other parks and regions might wish to adapt the Wupatki model for access to ethnographic and archeological expertise from local

universities. It s difficult to find more cost-effective projects. Caution is needed, however, because we cannot expect Anthropology Departments to regularly invest time and energy in preparing competitive grant proposals that meet NPS needs, and we cannot always assume the proposals will win. Still, other parks and regions might usefully explore the potential for low cost, if not cost free, collaborative projects, especially in ethnography.

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Archeological Field School

Steve Cinnamon

In addition to individual researchers at Wupatki National Monument (see related story), a field school was conducted this past summer in cooperation with the Department of Anthropology of Northern Arizona University. What began as interest in Wupatki s potential for field work was furthered by a meeting between academic representatives and personnel from Wupatki-Sunset Crater National Monuments, in order to generate faculty or student interest in the research needs identified in Cultural Resource Management Plans. University interest exceeded our expectations and the university secured a grant to provide a field school for minority students in the hope of promoting their interest in graduate anthropology programs. Drs. Shirley Powell and David Braun, archeologists, and Dr. Robert Trotter, cultural anthropologist, visited Wupatki National Monument during the fall of 1988 and viewed sites which were in close proximity to the Wupatki visitor center. Superintendent Larry Henderson wanted public access to be a priority objective in their venture. A small rubble mound just west of Wupatki Ruin, WS-1432, was selected for study. It had not been excavated but did show some signs of historic pothunting damage. All archeological clearances and ARPA permit requirements were met. Dr. Braun wrote the research design for the archeology field school; Dr. Trotter wrote the research design for ethnography students and the process was underway. Fourteen students participated and visitors were invited to the site and were able to interact with the student archeologists.

After seven weeks of testing, 1x1 meter or 1x2 meter plots were fully recorded, documented, and backfilled. Almost 9,000 artifacts were recovered, primarily lithic flakes and ceramic fragments. Wall fall and original deposits of Sunset Crater cinder were exposed. Hundreds of hours of visitor observation and interviews were recorded by the ethnography students, including family interaction, trail boundaries, visitor center use, and visitor activities at remote sites (see separate report by Robert Trotter). These items were the subject of student papers given for the university and Service personnel.

The students reported on the cultural affiliation and approximate date of the site as well as numbers and types of vessels based on ceramic remains from surface collections and removed from the back fill. The site size was more clearly defined by examining outlines of wall fall and wall abutments. What was described as a one-room, two-story structure by survey archeologists in 1983, is now thought to be a five-room, two-story structure which was occupied during the later years of Wupatki s existence. No points were found and small sherd size led some students to believe that impacts over 50 years of visitor use were substantial. Faunal remains found in the back fill of excavations were similar to those recorded by other researchers 25 years earlier.

The park staff and ethnography students gained valuable insights into visitor response to signs requesting help to preserve ruins by staying off walls. The students made numerous management recommendations that can be incorporated into trail use/design before next summer s high use periods. Overall, the superintendent is very excited to be in close proximity to such an outstanding academic community at Northern Arizona University.

Ethnographic Field School

Robert T. Trotter, II

Ethnographic research at Wupatki National Monument was directed at understanding the behavior of visitors in archeological parks. Prior to initiating the ethnography, we interviewed NPS personnel to determine the most important starting point for our research. The park staff requested that the research help determine how long people stayed at the ruins, where they went, what interested them, what types of interpretation worked well, and how visitors generally behaved. We accomplished this by periodically timing visitors, unobtrusively following their movements through the ruin, listening to public conversations, and asking questions. From these observations we devised further questions to ask for in-depth interviews about their experiences in the park.

Students received training in direct observation, interviewing, computer-based field note management, and ethnographic analysis. They began the project by making general observations and then discovering visible patterns of visitor behavior. The students subsequently selected focused topics to complete the ethnographic research cycle.

The students verified that Wupatki visitors are mostly middle class Anglo Americans. The second largest group at Wupatki are foreign visitors. These included Europeans and Asians, and mostly from Germanic based cultures. Numbers of French speaking tourists also visit the park, as well as a sprinkling of people from Japan and other countries. Minority visitors made up one of the smallest groups. Students observed Black, Native American, and Hispanic visitors during the course of their research, but these visitors are the exception.

The average time a visitor stays at Wupatki Ruin, and the visitor center, is less than 3n minutes. During this time, visitors typically move from the parking lot into the visitor center, look at the exhibits, make purchases, and then go to the archeological site itself. About] 0 percent of the visitors skip the visitor center and go directly to the ruin. Beginning with the overlook to the ruin, people choose among several routes which shorten or lengthen their stay.

The students focused their research on topics that allowed us to understand what tourists did during this brief stay. The reports provide descriptions of the similarities and differences in male/female patterns and adult/child patterns of interaction in the ruins. We made discoveries in differences in their use of interpretive material, differences in questions they asked, and in the information they wanted about prehistoric lifestyles.

The field school results have been compiled in a series of ethnographic reports which are rich in detail and have direct practical use in addressing park management concerns. The reports include profiles of what visitors want to know about archeological sites, what forms of interpretation they like and dislike, and for what reasons. They include all exploration of the ambiguity over behavioral boundaries within the park, why that ambiguity exists, and points of contact where clarification is necessary. They provide profiles of individuals who are likely to abuse the ruins. One report gives an analysis of the patterns of visitation of German tourists, and the reason so many of them are interested in U.S. prehistoric parks. Other reports include suggestions for better, and more coordinated publicity about parks, as well as people s opinions on different forms or philosophies of preservation. They provide details about what visitors expect to see, how they feel about archeological monuments and the impact those monuments have 011 their understanding of the world around them. Each report provides a set of recommendations for retaining current services, and recommendations for change.

Ethnography turned out to be a valuable tool for determining visitors ideas, knowledge, and actions. We identified important issues by observing people, listening to

their conversations, and then by asking them directly what they thought about the monument. This provided us with a vehicle for comparing what people did at the ruins with what they said about them. During the pursuit of this research, all of us came to value very highly Wupatki National Monument and the people who work there. We hope our efforts will make their tasks easier. Copies of the ethnographic reports produced by the students are available from the office of the superintendent of Wupatki-Sunset Crater National Monuments, or the Chief Ranger at Wupatki.

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Dogwatch

James P. Delgado

"Dogwatch" is the term traditionally used for the two-hour watch during which half the ship's crew eats supper and swaps stories.

Some 186 fireboats were built in the United States between 1866 and 19#9. As the date of the first boat's construction indicates, fireboats were the product of the Industrial Revolution, even though the concept of using vessels to fight fires on other vessels and along a port's waterfront dates to mid-18th-century London. In the United States, pumps and hand-engines were placed on "floats" or small boats by New York volunteer firefighters as early as 1809. The 19th century development of large volume steam powered pumps provided sufficient pressure for effective firefighting. The first use of a floating steam pump to fight fires was aboard an unpowered London barge in 1852 that drew from an unlimited source, the Thames. Harbor tugs and towboats, the most common steam powered craft in any harbor, were the first fire fighting vessels in the United States. Very few vessels were designed as fireboats; rather, many tugs were fitted with pumps and monitors for auxiliary fireboat use. New York's first fireboat, for example, was a tugboat under contract to the port for firefighting.

The need for maximum capability to combat serious waterfront blazes on wooden ships and the wooden waterfronts of the late-19th and early-20th century compelled many fire departments in port cities to design and construct their own full-time fireboats. Naval architect Charles West, speaking to his colleagues in 1908, noted that the "comparatively temporary nature of American building construction" had led to the rapid development of fireboats in the United States. In 1896, naval architect H. De B. Parsons, speaking before the Society of Naval Architects and Marine Engineers, stated that "fireboats are of such importance to all marine cities, that they are properly regarded as a permanent and indispensable feature of their fire equipments."

Fireboats were built and employed on the Atlantic Seaboard, on the Gulf, Great Lakes, Pacific Coast, and on occasion on the inland rivers. Throughout the 20th century, an average of 33 American port cities had fireboats. The great port of New York has had the greatest number of fireboats, and continues to possess the Nation's largest fleet today, while other ports, such as New Orleans, Philadelphia, Cleveland, Chicago, Buffalo, Seattle, Los Angeles, Portland, Oregon, and Baltimore have built several boats. In 1986, the Los Angeles Fire Department conducted a nationwide fireboat survey. A total of 27 cities in the United States that responded to the survey had 65 boats in service. Two cities, Tacoma and Seattle, Washington were preserving laid up historic fireboats. Of the remaining vessels, only 10 were 50 years old or older; most other fireboats date from the 1960s or later.

Of these 10 fireboats 50 years old or older, only 8 remain in service in 1989— 2 New York boats, *John J. Harvey* (1931) and *Fire Fighter (193*8), New Orleans' *Deluge (1922*), Los Angeles' Ralph J. Scott (1927), Portland, Oregon's *David Campbell* (1925), Seattle's *Alki* (1927), Mobile's *Ramona Doyle (1939*) and Buffalo's Edward M. Cottcr (1900). Each of these vessels is historic and as much a part of the Nation's maritime history and culture as the great square-riggers, river steamers, battleships, and tall-masted schooners that once plied our waters and which are today preserved and displayed at maritime museums around the country Yet fireboats for the' most part have been ignored in the recognition of the nautical past, relegated to the realm of fire history and the enjoyment

of fire buffs who delight in the restoration of pumpers and engines of years past Fireboats are appropriately a part of that history, but they also speak to the working waterfronts and the work-a-day craft that kept maritime trade, commerce and naval defense active and healthy

Tacoma, Washington, has moved its historic *Fireboat Number 1 ashore.* Now displayed in a concrete basin, the fireboat is the only museum fireboat in the United States Listed in the National Register of Historic Places—the first American fireboat so honored—Fireboat Number 1 attracted the attention of maritime preservationists and historians to the saga of the American fireboat If plans are successful, a nearby port's fireboat will also be preserved as a museum display *Duwamish,* built in 190 9 for Seattle, laid up after a noteworthy career, is slated to become a waterfront museum ship, her engines and pumps kept operational for occasional waterfront parades and maritime events The other historic fireboats remain in operation, retooled with new engines and occasionally with new pumps and equipment

To honor the contributions made to American maritime, naval, and firefighting history by these fireboats, the National Maritime Initiative of the National Park Service recently studied them as part of a special "Maritime Heritage of the United States" theme study done as part of the National Historic Landmarks survey. National Historic Landmarks are the most significant of the Nation's recognized historic structures, buildings, sites, and objects

Seven fireboats were studied Three represent the second generation of American fireboats; large steel-hulled, powerful pumpers as represented by *Duwamish, Deluge,* and *Edward* M Cotter(r, formerly William S Grattan The significance of these boats as excellent examples of the type is enhanced by the national significance of the ports they served Two gasoline-powered third generation fireboats were studied; Fireboat Number 1, which is the only boat to retain all of its original equipment, notably the gasoline engines, and *Ralph* 1 *Scott,* formerly *L.A. City/ Number* 2, chosen as a representative of the type and for the importance of the port of Los Angeles and two of the Nation's worst tanker fires which the boat fought

Only one vessel survives, New York's *Fire Fighter,* that was designed and constructed as a fourth generation diesel-electric fireboat The Nation's best known fireboat, Fire Fighter, represents a long and celebrated career capped with awards, a nationally significant port, and the culmination of classic fireboat design One World War II fireboat was also studied *City of Oakland,* formerly *Hoga,* YT-146, was included because of its noteworthy firefighting role at Pearl Harbor during the Japanese attack of December 7, 1941 The only known surviving Navy vessel afloat from the "Day of Infamy," *Hogo* saved men in the water, assisted three ships in distress, and fought fires for 72 hours on USS Nevada, *Tennessee, Maryland,* and *Arizona.*

The seven fireboats were found to be nationally significant by the National Park System Advisory Board, a body that reviews all National Historic Landmarks. The Secretary of the Interior designated all but one (the City of Buffalo objected to designating *Edward M. Cotter* and that study was deferred) of the fireboats as National Historic Landmarks on June 29 and 30,1989, helping insure their preservation and recognizing their unique contributions to America history.

The story of America's fireboats, and the reasons why the seven NHL fireboats are national treasures, are fully explored in a new book, the first comprehensive history of these unique crafts written by Paul Ditzel, known as the “Dean” of fire service writers, a contributing editor to *Firehouse(Magazine(, and* a civilian inspector in the I os Angeles Eire Department, Fireboats is a 225 page hardbound book lavishly illustrated with 22S photographs The book accurately documents facts and figures while at the same time the heroic, difficult, dangerous, and often tedious duties of the firefighting mariners fill the

pages Fireboats is available from the publisher, Conway Enterprises, Inc. , PO Box 70 9, New Albany, Indiana 47150,
(1-800-457-2400) at $24.95 each, plus $2.50 shipping and handling.

NPS Helps Charleston After Hugo

Responding to an emergency call from the City of Charleston, the National Park Service sent a team of experts to assist the city in dealing with the damage caused by hurricane Hugo.

The Charleston Hurricane Assistance Team (CHAT) arrived in Charleston just six days after Hugo hit. The team immediately began a survey of the 135 most significant structures to assess the damage. Along with the survey the team prepared technical information for homeowners and held a series of public workshops for citizens and contractors. HABS architectural photographer Jack Boucher joined the effort to record the damaged structures.

To help meet the longer-term need for technical assistance, the Service agreed to aid the city's preservation officer by rotating preservation professionals to Charleston during October and November to continue structural inspections and to provide design services. A description of the work done in Charleston by the NPS team will appear in the next issue of the *CRM Bulletin.*

Preservation Technology Update

The Use of Fire-Rated Wooden Shingles on Historic Buildings

Sharon C. Park, AIA

Many historic buildings were roofed with wooden shingles, a combustible building product. Concerned about protecting architectural resources from destruction by fire, some local jurisdictions may ban the use of combustible materials or require the use of fire-retardant materials, such as fire-rated wooden shingles, in place of combustible materials. While most local codes accept untreated wooden shingles in residential areas, for commercial or municipal buildings fire-rated wooden shingles are generally required. For historic buildings, firerated shingles can provide additional protection to irreplaceable resources. Although many Federally-owned historic buildings are generally not governed by specific codes, it is important to design and detail restoration work with long-term protection of the historic resource in mind.

Over the last 20 years, a number of commercial treatments for wood shingles have been developed to address fire code requirements. This article discusses the various classifications of rated wooden shingles, how shingles are treated, the effectiveness of these treatments, and some installation assemblies to meet rated construction. For purposes of this discussion, the term shingle will be used to describe both sawn shingles and commercially split wooden shakes. The fire-retardant treatments are the same for both sawn and split products. The intent of fire-retardant-treated materials is to slow down the spread of fire, thus buying precious time for fire fighters and escaping inhabitants. Fire-retardant materials generally will not be ignited by burning embers but will eventually burn in the presence of active flames.

The requirements for the use of specific building materials and for their performance in a fire ultimately rests with the local inspector, often the fire marshal. While there are three major building codes used throughout the United States (BOCA; Southern; and Uniform), the interpretation of these codes and the implementation of special local requirements rest with local building permit departments. It is, therefore, important to consult with these officials. In addition, there are a number of model preservation codes that do permit, through special variances, the continued use of "authentic ' materials on historic buildings that would not be approved for new construction. Wooden shingles may fit that special exemption category if the building is located in an area that was designated for non-combustible materials. With special construction details, fire-rated wooden shingles are permitted in some Class A noncombustible material areas.

The criteria and testing procedures for fire-rated shingles have been established by the Underwriters Laboratory, Inc., and are known collectively as UL-790. These test standards have been adopted by the American Society for Testing Materials (ASTM-E108), the National Fire Protection Association (NFPA-256) and the International Conference of Building Officials ([Uniform Building Code Standard 32-7). To determine the classification of the shingles, the materials are subjected to the following tests: intermittent-flame test; spread of flame test; burning-brand test; flying-brand test; rain test; and weathering tests. The Forest Products Laboratory of the U.S. Department of Agriculture has carried out long-term testing on a number of fire-rated shingles to determine their effectiveness over

extensive periods of time (5 years, 10 years, and accelerated testing to simulate 20 years). A listing of organizations that can provide test results or information on fire-rated shingles is provided at the end of this article.

There are generally three classifications for fire-rated roofs:

Class C
generally commercially available fire-retardant shingles that will withstand light exposure to fire.

Class B
fire-retardant materials and special roof assemblies that will withstand moderate exposure to fire.

Class A
non-combustible materials or roof assemblies that will not readily burn.

Most commercially available fire-retardant shingles arc factory pressure-impregnated red cedar. Other woods, such as white cedar, pine, cypress, and oak, can be treated as well, but are generally sent to a factory after purchase from a mill or are treated at the site by the contractor. There are companies that specialize' in factory preparation of wooden shingles for fire-rating; a list of such companies is generally available through local trade associations or from the mill that supplies the shingles. Colonial Williamsburg had specially made cypress shingles factory-treated for use on the reconstructed hospital building that required Class A construction (see photo).

The most effective way of making wooden shingles fire-retardant is by impregnating them at a factory, under pressure, using a variety of chemicals. These chemicals are proprietary to each company but are generally salt-laden and replace the moisture in wooden shingles. The wooden shingles are placed in a vacuum chamber and the moisture is drawn out. The wood cells are then penetrated with the fire-retardant chemicals and subsequently kiln-dried. As the chemicals replace the natural moisture, there is no significant change in the weight of the shingles. Chemically pressure-impregnated shingles can have a Class C rating, and in some cases, a higher Class B rating. With special roof assembly details using, for example, fire-rated gypsum drywall, Class A ratings can be obtained.

Pressure-impregnated shingles maintain their ratings for the life of the shingle. They can be trimmed or split without the need to treat the exposed edges. Pressure-impregnated shingles are labeled at the factory as to their Class rating.

Shingles can also be treated with surface-applied chemicals or can be immersed in chemicals, but these are generally not rated because the field applications cannot be monitored or guaranteed by the coatings manufacturers. Local inspectors, however, may accept dip-treated or painted shingles in a Class C roof. Because there is no one agency or licensing organization responsible for rating treated shingles, the approval of treated shingles often rests with the local inspector. All of the surface-applied coatings must be periodically reapplied; some as frequently as once a year. Any raw edges must be treated if there is any site trimming of shingles. There are a few intumescent paints that are promoted to improve fire-resistance of combustible materials, but these paints are not recommended for shingles as they are thick, can trap moisture under the shingles, have a tendency to blister off in the first year, and are generally not effective over time. Because of the uncertainty over the long-term effectiveness of chemical dips and coatings, it is best to specify factory pressure-impregnated shingles if they are to be installed as part of a reroofing job that requires a rated shingle.

Following are descriptions of various, but typical, roof assemblies using fire-rated shingles. These are general details described in various code books. If fire-rated construction is required, the owner or architect should check with local building officials

for information on what is accepted. As previously mentioned, each jurisdiction may have varying requirements.

Class C roofs

Class C treated shingles on any type of sub-roofing; i.e. open shingle lath, spaced roofing boards, or solid tongue-and-groove planks or plywood.

Class B roofs

Class B treated shingles on any type of sub-roofing; or Class C treated shingles on a minimum of l /2 plywood solid decking or tongue-and-groove planks. Some jurisdictions recommend heavy building paper (30 lb. felt) or a foil-type (.002 polyethylene foil) underlayment, but ratings can be achieved without them. These underlayments directly in contact with the shingles can accelerate their deterioration by reducing the ability of the wooden units to dry.

Class A roofs

Class B treated shingles laid over a composite roof decking of a minimum 1/2" plywood nailed to rafters with 1/2" core of fire-rated gypsum panels topped with another layer of 1/2" plywood or shingle lath as nailers for shingles. Some rated assemblies also rely on the use of heavy roofing paper (30 lb. building felt). As heavy felts tend to hold moisture on the undersides of wooden shingles, it is best to avoid direct contact of these two materials.

Other rated roof sub-strates can be lightweight concrete which, on a historic building, would generally only be found on a reconstructed roof. Sprinklers for the wooden roof and underside of the eaves have also been used in areas where there is adequate water supply. There are a number of substitute materials with a Class A rating, but they rarely replicate the appearance of historic wooden shingles.

As a general note for historic buildings, in selecting a wooden shingle and a roofing system that meets the code, it is important to match the visual appearance of the historic roof. Unfortunately, there has been a tendency to use rustic shakes on a wooden roof in the misguided assumption that handsplit surfaces reflect early craftsmanship. In fact, historically rough handsplit shingles were typically dressed or smoothed with a drawknife in order for the roofing to lie flat and be weather-resistant. The introduction of sawn shingles in the 19th century greatly reduced the labor associated with a wooden roof. Unless there is documentary evidence that rustic shakes were historically on a building, they should not be specified. There are commercially available wooden shingles that match the historic appearance or which can be modified as part of the specifications. There is some concern that the chemical treatment of wooden shingles makes the product more brittle and, therefore, shortens their useful life. In fact, it is difficult to prove the claim that the life of the shingle is shortened. What appears to be true is that in the short-term the shingles are more brittle and subject to cracking upon installation. Therefore, additional shingles should be ordered (perhaps 10%) and care should be taken to avoid banging the shingles upon installation. Once installed, the treated shingles appear to last as long as untreated shingles. Fire-retardants appear to give added protection against mildew, moss, lichens, and other spores which can accelerate the deterioration of wooden shingles. For very humid areas, special fungicides can always be used in conjunction with the fire-retardants without reducing the effectiveness of the fire protection The tests performed by the Forest Products Laboratory indicate that over a 1 0-year period there is not any more shortened life in a fire-retardant treated shingle as compared to an untreated shingle.

For any roof assembly, the longevity of the shingles will depend on a number of factors. One of the most important is that the shingles be able to breathe and dry out between rains. For that reason, there must be adequate ventilation in the attic; if insulation is used between the roof rafters, there must be ventilation channels provided. Vapor barriers on the attic side of the rafters are a good idea to reduce condensation on the

underside of the shingle. Heavy building papers (30 lb. roofing felts) are not recommended to be used in contact with shingles as they can hold moisture on the back side of the wooden units and accelerate deterioration. lb shingles are to be treated with special penetrating coatings to revitalize the wood cells, only vapor-permeable solutions should be used. Roofs should be kept free of leaves and branch debris, and gutters should be cleaned regularly.

Preservation and Repair of Historic Stucco

Anne Grimmer

Stucco, which is essentially a type of exterior plaster, has been used since ancient times, and is still one of the most commonly used building materials in the world today. Composed of sand, lime or gypsum, binders, and, in many cases, cement, it is primarily an exterior surface coating for houses and small-scale commercial structures.

In the United States, stucco is frequently associated with certain historic architectural styles, particularly Mission, Spanish Colonial, Prairie, and Pueblo Revival as well as Tropical Art Deco and Art Moderne styles. It is also found in many examples of the earlier Federal and Gothic Revival styles of the 18th and 19th centuries.

Stucco was traditionally a popular building material for a variety of reasons. Basically it was inexpensive and when "scored" or "lined" in the European tradition, could simulate finely dressed stonework. While covering a less costly substrate such as rubblestone, fieldstone, brick, log or wood frame, stucco could give a building the appearance of being more expensive and substantial. While providing an elegant surface veneer, stucco could also serve as a water-repellent coating, protecting the building from rain penetration, as well as offering a certain amount of fire protection.

Early stucco consisted primarily of lime and sand, with straw or animal hair included as a binder. The composition of stucco varied regionally depending on local custom and available materials. Stucco often contained substantial amounts of mud or clay, and a surprising array of additives ranging from animal blood to eggs, sugar, salt, tallow, and even alcoholic spirits, including wine, beer, or in parts of Canada, rye whiskey.

While stucco was applied directly to stone or brick, it was necessary to attach wood lath first when stuccoing log or frame structures in order to obtain an adequate key to hold the stucco. The use of wood lath was gradually superseded by the introduction and popularization of metal lath by the late- l 9th century. Like interior wall plaster, stucco has traditionally been applied as a multiple-layer process, sometimes consisting of two coats, but more commonly as three coats. Whether applied directly to a masonry substrate or onto wood or metal lath, a stucco surface consists of a first "scratch" or "pricking-up" coat, followed by a "floating" or "brown" coat, and finally with the "finishing coat.

Until around the early part of the 20th century when a variety of novelty finishes or textures were introduced, this last coat was commonly given a smooth, troweled finish, and then scored or lined in imitation of an ashlar surface. Some of the more popular textured finishes, including the English cottage finish, pebble-dashed surface, fan and sponge texture, reticulated and vermiculated finish, roughcast (harling or wet dash) and sgraffito, were linked or associated with the "period" or revival styles of the late- 1 9th and early-20th century. The color of stucco was determined by the components of the stucco mix, particularly by the sand, or by natural or manufactured pigments which could be added to the stucco mix. Alternatively, stucco buildings were coated with a whitewash or colorwash, or painted.

Stucco became an even more versatile and durable building material in the late-19th century when Portland cement began to be added to it. No longer used just to coat a substantial material like masonry, stucco began to be applied over wood or metal lath on a light wood frame. With this development in construction, stucco ceased to be solely a veneer and became a more integral part of the building structure. By the early-20th century, stucco had become composed primarily of Portland cement, mixed with some lime. Today, gypsum has to a great extent replaced lime; lime is generally used only in the finish coat in Contemporary stucco work.

Repairing Historic Stucco

Like other historic building materials, stucco is subject to deterioration; failure results from lack of maintenance and consequent damage due to water infiltration. A partial list of causes of deterioration includes: ground settlement, lintel and door frame settlement, inadequate gutters and downspouts, intrusive vegetation, and excessive moisture migration within walls due to interior condensation and humidity. Previous repairs that were inexpertly carried out may be the cause of additional deterioration; for example, patches executed in Portland cement may be incompatible with early, mostly soft, lime-based stucco. Incompatible repairs can result in cracks, as can external vibration caused by traffic or construction, or by building settlement. Cracks permit the entrance of water, the enemy of all historic masonry structures, and eventually result in a loss of bond or key with the lath or the masonry substrate beneath.

Before beginning any stucco repair, an assessment of the condition of the historic stucco should be undertaken to determine the extent of the damage, and how much must be replaced or repaired. Some areas in need of repair will be obvious to the naked eye, clearly evidenced by missing sections of stucco or stucco layers. Bulging or cracked areas are typical places to examine. Punky or soft areas that have lost their key will be revealed by tapping gently with a wooden hammer or mallet which will echo with a hollow sound.

Once the extent of the damage has been determined, there are a number of repair options to be considered. In the interest of saving or preserving as much historic stucco as possible, patching rather than wholesale removal and replacement is generally preferable. When repairing textured stucco, it is not usually necessary to replace an entire wall section. However, because of the nature of smooth-finished and scored stucco, patching a scattered number of small areas may not be a successful repair approach unless the stucco has been previously painted or is to be painted following the repair work. On unpainted stucco such patches are hard to conceal because they may not blend in with the rest of the historic surface. For this reason, it is recommended that stucco repair be carried out in a well-defined area, or at least "squared-off" in such a way that follows existing scoring, if the stucco surface is scored. In some cases, it may be preferable to restucco an entire wall section or building feature, an elevation or partial elevation, such as one side of a projecting bay, the entire side of a building, or one portion of an elevation that is separated from its other side by an architectural feature, such as a chimney or porch. In this way, any planar or textural differences between the patched area and the historic surface will not be so readily apparent.

Complete removal of the old historic stucco and total replacement with new stucco of either a traditional mix or a more modern mix will probably be necessary only in cases of extreme deterioration. Such deterioration may be due to extended periods of disuse or abandonment of the structure and complete lack of maintenance which is likely to have resulted in a loss of bond on over 40-50 per cent of the stucco surface. Another reason for total removal might be where the physical and visual integrity of the historic stucco has been so compromised by prior incompatible and ill-conceived repairs that patching would not be successful.

While historic mortar analysis will provide useful information on the stucco's primary ingredients and their proportions, it will also help ensure that the new replacement stucco will duplicate the old in strength, composition, color and texture as closely as possible. However, unless authentic restoration is required, it may not be worthwhile, nor in many instances possible, to attempt to duplicate *all* of the ingredients, particularly some of the additives and their proportions. Even if identification of each of the items in the historic stucco mix is possible, it will not reveal how the original stucco was mixed and applied.

Although hairline cracks may be quite easily repaired with a thin coat of new stucco, most repairs are not so simple and will require the skill and expertise of a professional plasterer. After the cause and extent of deterioration has been determined, and the problem

identified, the appropriate repairs to the building should be made first before initiating the stucco repair.

In preparation for the stucco repair, all deteriorated, cracked and loose stucco should be removed down to the lath (assuming that the lath is securely attached to the substrate) or down to the masonry if the stucco is directly applied to a masonry substrate. The areas to be patched should be cleaned thoroughly of all debris with a bristle brush in preparation for the repair work. In order to ensure a neat and discreet repair, the area to be patched should be squared-off with a butt joint and not feathered. If there is lath involved, and if the stucco has lost its bond or key, or if the lath has deteriorated or come loose from the substrate to which it was attached, a decision must be made whether to replace the lath with wood lath, or to supplement the historic lath with modern expanded metal lath. When repairing stucco that is applied directly to masonry, the new stucco should be applied in the same manner, directly onto the stone or brick; do not insert metal lath when restuccoing historic masonry as it can result in hastened deterioration of the repair work. The masonry substrate as well as wood lath should be dampened thoroughly before stucco is applied. This slows down the drying process and is necessary for the stucco to adhere properly.

A stucco mix compatible with the historic stucco should be selected as a result of the mortar analysis, or based on an adaptation of a traditional mix. The prevalent modern practice of using stucco comprised mostly of Portland cement generally will be incompatible with the softer, more flexible lime-rich historic stuccos used throughout the 18th and most of the 19th centuries; unwanted hairline cracks are prone to occur due to the differing expansion and contraction properties of the two stucco types. [n these cases, a mix containing lime and sand or gypsum and sand, possibly with some cement added, should be used for this repair. However, in contrast to early, predominantly lime-based stucco, most late-]9th and early-20th century stucco is likely to have a high Portland cement content, and the stucco mix for repairs of this kind should be selected accordingly. Both the number of coats and the total thickness of the patch should match the original stucco surface. The first and second coats, each usually about 1/2 to 5/8-inch thick, should be sufficiently firm to receive and hold, when scratched or otherwise roughened, the next coat. The finish coat is applied after the base or the second coat has initially set; if this is not feasible, the base coat should be thoroughly dampened when the finish coat is applied at a later time. The finish coat should be troweled to match the texture of the original stucco.

General suggestions for successfully completing stucco repair follow those for similar tasks involving restoration and repair of historic mortar or plaster; for example, mix only as much stucco as can be used in a period of 2 to 2 1/2 hours. Any remaining mortar should be discarded. It is imperative that when working with stucco that it not dry too fast; therefore, it is important that the work area be kept in the shade, or even covered if possible, particularly in hot weather. Of equal importance is the necessity of thorough or complete wetting of the wood lath or masonry substrate before applying the stucco patches. If it is necessary to match a color, and if pigment has not been included in the stucco mix, the stucco can be painted, whitewashed or colorwashed after the stucco repair has been completed. To better harmonize or blend the patch with the historic or original stucco, it may be advisable to paint the entire wall or the architectural feature where the patch is located; if the patching is extensive on all elevations, it may be advisable to paint the entire building.

This article has been adapted from a forthcoming *Preservation Brief* on stucco to be published by the Preservation Assistance Division, National Park Service, in 1990.

Computer News

Betsy Chittenden

Using GIS in Cultural Resources

Geographic Information Systems, or GIS, is a technology that enables the analysis of maps and spatial data. The NPS GIS Division, located in Denver, has worked for several years to install GIS systems in parks to assist with natural resources management, siting of roads and facilities, and numerous other tasks. However, to date GIS technology has rarely been applied to cultural resources management. With strong technical assistance from the Denver GIS Division, the Interagency Resources Division will focus new studies on the applications of GIS technology in cultural resources management (CRM). The GIS Applications Program in Cultural Resources Management, or CRM GIS LAB for short, is using pilot projects to develop methodologies for common cultural resources management problems in Nps, state, and local preservation programs.

The CRM GIS l AB will be a cultural resources programmatic complement to the GIS Division. Its work will focus on the following activities: —encouraging technical interaction among cultural resources GIS users — designing and testing cost efficient standard GIS solutions to common CRM problems — encouraging the formation of an active communications network of cultural resources GIS users — performing GIS projects in support of WASO program activities, such as the National Register of Historic Places and National Historic Landmark designations — developing GIS applications that will support the strategic program planning functions of the Washington Office

How might GIS fit in with the day-today work of cultural resources management? One example is a recent project that used GIS to help delineate a meaningful boundary for a historic district located within the Cape Cod National Seashore. An enclave of small cottages built along a three-mile stretch of sand dunes near the tip of Cape Cod, Massachusetts were the seasonal homes of a number of important artists and authors. The inhabitants of the unpretentious "dune shacks" were an integral part of the thriving artists colony based in nearby Provincetown who drew inspiration from the natural landscape of dunes and the sea. Because the cultural significance of the historic district is derived from the inextricable relationship of the shacks and the surrounding dune landscape, the district boundary approximates the area within the visual range of the shacks. A series of simple maps were developed using GIS, each illustrating the view from an individual shack. These individual views were then overlaid to produce a composite viewshed representing the overall visual landscape of the community. The composite viewshed indicates that the majority of the land area visible from the shacks is bounded by the water to the north and the second dune ridge away from the shacks to the east, south , and west. The historic district boundary reflects this analysis.

Other cultural resource GIS projects are underway. The CRM GIS LAB is currently finishing up a project in the Waterford Historic District NHL about 30 miles west of Washington, DC. Here, GIS is supplementing traditional planning techniques to assist NPS and local planning officials determine the potential visual impacts of suburban development on a rural agrarian landscape. The CRM GIS LAB is beginning other projects relating to planning, survey, registration and protection issues. Several park units are also beginning to use GIS to tackle CRM issues. Antietam Battlefield recently used GIS to analyze significant historic viewsheds as part of a regional planning effort. The GIS

installation at Saratoga National Historic Park is being used to assist in planning historic landscape restoration.

With GIS technology being so new, and its application to cultural resources problems even newer, an important part of the work of the CRM GIS LAB will be to seek out others who are using GIS in cultural resources to build a network of people with experience. More than simply listing other users, the CRM GIS LAB hopes to do projects in collaboration with specific state, regional, and/or park GIS installations. The CRM GIS LAB also hopes to share experiences and increase expertise through personnel exchanges and details with other offices.

For more information call: John Knoerl, Acting Director, CRM GIS LAB, FTS/202/343-2239; or Phil Wundra, Chief, GIS Division, FTS 327 2590 or 30 3/ 969-2590.

The Preservation Priority Matrix, Revisited

Michael Adlerstein, AIA

One of the purposes of the *CRM Bulletin is* to air new creative concepts for discussion, leading eventually to adoption of improved methods. Catherine Colby's article on the "Preservation Priority Matrix" (PPM) in the last issue is a good example. It is supportable because it is a well-conceived, necessary program that could assist park managers in executing a crucial, yet often extremely subjective function-the prioritization of multiple cultural resource projects. The PPM attempts to establish a more systematic, objective method than presently employed to compare and rank different historic and prehistoric structures with a broad range of resource management concerns. I fully support the development of new tools such as PPM aimed at enhancing the cultural resource decision-making process.

However, the PPM also merits further consideration. Because it has yet to be coordinated with other Servicewide databases, it incorporates several ill-defined categories (for example, Integrity, Historical Significance, Architectural Significance) and some inherent inconsistencies with other databases, such as the List of Classified Structures (LCS), the Maintenance Management (MM) program, and the Inventory and Condition Assessment Program (ICAP). It also contains inconsistencies with the Systemwide and Regional Cultural Resources Summary and Action Program, and the Resources Management :Plan guidelines.

The long-term dominant cost of any database is the field work (surveying) and data input (typing). It is, therefore, crucial that all new NPS databases have the ability to "talk" to the other databases in the network, to avoid having to duplicate these extremely time consuming steps and to allow the data to be supplemented and interchangeable.

The use of "new" definitions for established, thoroughly institutionalized terms such as "significance," "condition," or "threats" can be a dangerous pursuit unless accomplished within a widely shared forum, especially if the established nomenclature has years of thoughtful evolution already behind it. For instance, the PPM defines "significance" to be based upon the resource's relationship to the legislated purpose of the park, rather than its national, state, or local significance as evaluated against National Register criteria.

The core of the PPM concept tackles a very thorny management problem, assigning weights to the several facets of the prioritization process. The assignment of varying weights is a management prerogative that might vary from region to region depending upon that year's goal and objectives, and therefore should be in a format that can accommodate change. It's easy to Monday morning quarterback the assigned weights in the PPM since any formula would be difficult to defend without a broad background of healthy debate. If a thorough dialogue, Servicewide, had occurred, a consensus set of established weights might have resulted. In fact, our partners who are closely associated with, but not actually within the nps, such as State Historic Preservation Officers, local historical commissions, and the Advisory Council on Historic Preservation, would have valid contributions to that dialogue. Right now, we have a good beginning for such a dialogue.

As a starting point, the PPM is a positive step into untested waters. It should initiate a process that will lead to a fully integrated, cultural resource decision-making tool. I encourage my colleagues to continue to innovate, experiment, and provide feedback on efforts such as PPM, as we all search for more sophisticated computer-driven tools to enhance the management of cultural resources.

Michael Adlerstein is the Chief Historical Architect of the National Park Service.