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COMMITTEE ON EARTHEN ARCHITECTURE

INTERNATIONAL COUNCIL ON MONUMENTS AND SITES, UNITED STATES COMMITTEE
DECATUR HOUSE 1600 H STREET, N.W. WASHINGTON, D.C. 20006 202-842-1866 FAX: 202-842-1861

## LETTER FROM MICHAEL TAYLOR, CHAIRMAN, US/ICOMOS SPECIALIZED COMMITTEE ON EARTHEN ARCHITECTURE

The US/ICOMOS Specialized Committee on Earthen Architecture is pleased to produce this first annual newsletter which presents current activities of North American professionals working in earthen architecture conservation. As you will notice from the following articles, a diverse assortment of reports detailing current research and projects is presented, reflecting a remarkable level of activity currently taking place in earthen architecture conservation in the United States, and by Americans abroad.

As a prelude to reading information contained in this newsletter, it is appropriate to review portions of the Guidelines for the Specialized Committees of US/ICOMOS (adopted May 16, 1989) in order to better understand what constitutes the goals of the committee: ICOMOS (International Council on Monuments and Sites) is an interdisciplinary, nongovernmental organization that brings together different kinds of specialists involved in the conservation of sites, buildings, and monuments. It also provides a forum which permits specialists in given fields, as well as persons interested in the problem involved, to work together to advance research, training and provide information on technical developments. The Specialized Committees of US/ICOMOS are the scientific and technical organs of US/ICOMOS. They undertake, in their respective subject area, specialized projects and studies on professional problems.

Through the work of its Specialized Committees, US/ICOMOS pursues five primary objectives:

1) to clarify and develop philosophy of historic preservation;
2) to disseminate the findings and product of their work and research to professionals and organizations;
3) to encourage exchanges between specialties;
4) to contribute in a systematic manner to the work of the ICOMOS International Committees; and
5) to provide a means for U.S. specialists to keep informed of developments abroad.

The US/ICOMOS Specialized Committee on Earthen Architecture was the first national committee for earthen architecture conservation organized to complement the ICOMOS International Committee on the Study and Conservation of Earthen Architecture. Chartered in 1989 under the chairmanship of Neville Agnew of the Getty Conservation Institute, the United States committee has made great strides in the few years that it has been in existence.

Foremost among the accomplishments of the national committee was the organization of the 6th International Conference on the Conservation of Earthen Architecture (Adobe 90), in October 1990, sponsored under the aegis of US/ICOMOS. The conference served as a forum for more than 300 delegates, including 150 Americans. They met and discussed common issues, research, and current projects. Sponsors of the conference included the Getty Conservation Institute, the Museum of New Mexico, ICCROM, CRATerre-EAG, and the National Park Service, Southwest Region. With this first newsletter issue, the committee intends to continue the dialogues that were initiated at the conference.

The membership of the specialized committee has grown to include representation from throughout the United States and from diverse preservation backgrounds. The seven committee members are Neville Agnew, Director of Special Programs, Getty Conservation Institute, California; Anthony Crosby, historical architect, National Park Service, Colorado; Lee Dassler, architectural conservator, New York; Edna Kimbro, architectural conservator, California; John Runkle, architect, Virginia; Sayed Abdul Zahir Shah, architect, New York City; and Michael Taylor, archaeologist, National Park Service, New Mexico.

### Collaboration with the ICOMOS International Committee for the Study and Conservation of Earthen Architecture

The effectiveness of the national committee in a large part relies on regular communication and collaboration with the ICOMOS International Committee for the Study and Conservation of Earthen Architecture. The importance and extent of this networking with the international committee is reflected in the accompanying letter by international committee chairman, Alejandro Alva Balderrama, ICCROM.

*This is the annual newsletter of the US/ICOMOS Committee on Earthen Architecture, a special issue of the US/ICOMOS Newsletter.*

*See page 18 for US/ICOMOS Newsletter items.*

Mr. Crosby, a member of the national committee (and largely responsible for its establishment), currently serves as secretary for the ICOMOS International Committee for the Study and Conservation of Earthen Architecture. Two other national committee members, Mr. Agnew and Mr. Taylor, also serve on the international committee.

Of great importance is the collaboration in the fall of 1992 of the national committee with the GAIA Project in the organization of the International Course on the Preservation of the Earthen Architectural Heritage in Grenoble, France, in the fall of 1992. This represents the critical aspect of training which is important to the success and effectiveness of both committees.

World Heritage Committee Meeting

The World Heritage Committee meeting will take place in 1992 in Santa Fe, New Mexico, December 6 - 14. The World Heritage Committee meets regularly to review nominations to the World Heritage List, to monitor sites and to appropriate limited funding for sites already listed. The National Park Service, Southwest Region, is hosting the meeting. The US/ICOMOS Specialized Committee on Earthen Architecture has undertaken a role in the December meeting.

Taos Pueblo and Paquime Nomination to the World Heritage List

Taos Pueblo, a multi-storied Indian pueblo made of earth located in northern New Mexico, was nominated to the World Heritage List by the United States in 1987. The village is mainly comprised of two large structures, terraced up to five stories each, representing the largest inhabited earthen structures in North America. Its placement on the List was deferred pending a comparative study of other pueblos in the American Southwest and northern Mexico.

Paquime is an extensive earthen archaeological site located in Chihuahua, Mexico, dating from circa 900 - 1400. Large portions of the site were excavated in the 1950's and 1960's. The site was nominated by Mexico/ICOMOS to be placed on the List in 1990. Its placement on the list was also deferred by the World Heritage Committee pending further study and possible inclusion with the Taos nomination.

Since 1987, documentation has been provided to the World Heritage Committee which provides more information on the uniqueness of Taos and Paquime as compared to other pueblos and sites in the region. In order to objectively assess the criteria for World Heritage listing of Taos and Paquime, a group of ICOMOS experts met in Santa Fe the week of April 13, 1992, to tour various pueblos and sites, including Taos and Paquime. The group consisted of Dr. Henry Cleere, England, World Heritage Convention Coordinator for ICOMOS; Herb Stovel, Canada, Secretary-General ICOMOS; Francisco Ursua, Mexico, Architect; Augusto Molina, Mexico, Architect/Archaeologist; Michael Taylor, United States, Chairman, US/ICOMOS Specialized Committee on Earthen Architecture. Recommendations by the group will be considered by the World Heritage Bureau meeting in Paris in July 1992.

Characterization of Earthen Building Materials Video Tape:

A didactic video tape entitled "Characterization of Earthen Building Materials" has been produced by the National Park Service, SWR; ICCROM and the Museum of New Mexico. The tape was produced at the Architectural Conservation Laboratory in Santa Fe, New Mexico, with funds from the Kress and Skaggs Foundations. Jeanne Marie Teutonico, Architectural Conservation Laboratory Director at ICCROM, is the instructor in the video. Material covered includes sampling, soil particle size analysis, and liquid and plastic limits. The tape will be available for sale in January, 1993, at cost. Please contact Michael Taylor, National Park Service, SWR, RCC, Box 728, Santa Fe, New Mexico 87504, for more information.

I hope you enjoy this first pilot newsletter prepared by the committee. Please let me know your comments and suggestions by writing to the above address.

## THE ICOMOS INTERNATIONAL COMMITTEE FOR THE STUDY AND THE CONSERVATION OF EARTHEN ARCHITECTURE AND THE NATIONAL ICOMOS SPECIALIZED SUBCOMMITTEES ON EARTHEN ARCHITECTURE

Letter from the Chairman, ICOMOS International Committee, Alejandro Alva Balderrama, ICCROM

Twenty years ago, the first international concern regarding the need to preserve the world's earthen architectural heritage was expressed in the city of Yazd, Iran [cf.: Premier colloque international sur la conservation des monuments en brique crue, Yazd-Iran, Conseil international des monuments et des sites et Icomos-Iran, 25-30 Nov. 1972]. These past 20 years constitute a rich process that has witnessed the involvement, commitment and well-defined role of institutions and professionals active in the field of preservation of the earthen architectural heritage [cf.: CRATerre-EAG, ICCROM Long-Term Plan for the Preservation of the Earthen Architectural Heritage: The Gaia Project, described in: Proceedings of the 6th International Conference on the Conservation of Earthen Architecture held in Las Cruces, NM/USA (October 14-19, 1990), Los Angeles, The Getty Conservation Institute, 1990].

On the occasion of the 6th International Conference on the Conservation of Earthen Architecture held in Las Cruces, New Mexico, USA (October 14-19, 1990), a meeting of the

ICOMOS International Committee for the Study and the Conservation of Earthen Architecture drew attention to the need for a better definition of the role, functions, structure, procedures and activities of this specialized body [cf.: Minutes of the Meeting of the ICOMOS International Committee on Earthen Architecture, Las Cruces, NM, October 18, 1990, and follow-up correspondence (unpublished)]. Similar considerations concerning all ICOMOS international specialized committees were expressed by the President of ICOMOS in his editorial of ICOMOS NEWS [cf.: ICOMOS NOUVELLES/NEWS Vol. 1, No. 2 September, 1991].

Consequently, on-going reflections regarding the structural definition of the ICOMOS International Committee for the Study and Conservation of Earthen Architecture as an ICOMOS "frontline unit" for scientific conservation suggest a characterization of the international committee as the specialized international, scientific and technical body of ICOMOS in this domain [cf.: Draft Rules of Procedure of the ICOMOS International Committee for the Study and the Conservation of Earthen Architecture (unpublished)].

The proposed definition of this body needs to have specific functions within the context of the objectives and activities of ICOMOS as mandated by the Statutes and resolutions of the General Assembly.

Preliminary considerations in this respect suggest that the committee may exercise the following functions:

- to advise ICOMOS, through its Executive and Consultative Committees, on the definition of institutional policies and programs in the domain of the study and conservation of earthen architecture;

- to promote ICOMOS international cooperation in the exchange and diffusion of knowledge and information in the field of preservation of earthen architecture;

- to encourage cooperation of ICOMOS with the programs, projects and activities of specialized international or national institutions working in this field;

- to encourage the participation of ICOMOS members in activities related to the field through the activation of national specialized subcommittees on earthen architecture;

- to play an active role as a channel of communication between the programs, projects and activities of ICOMOS national committees and/or their specialized subcommittees on earthen architecture;

- to collaborate with the programs, projects and activities of national subcommittees of ICOMOS in this field;

- to provide advice to ICOMOS on general or specific points concerned with the conservation of earthen architecture and, in particular, on the inclusion of earthen architecture in the World Heritage List;

- to contribute to the promotion by ICOMOS of the highest standards of conservation in the care of historic earthen architecture.

While the general role of the Committee aims at the overall construction and integration of an international scientific conservation community active in the field of the preservation of the earthen architectural heritage, the above-mentioned functions clearly connect this process with ICOMOS members participating in the promotion and the execution of activities within their own national specialized subcommittees on earthen architecture. In this respect, over the long term, the International Committee could ultimately act as a "clearinghouse" for national specialized subcommittees to participate efficiently in the definition and execution of international preservation policies and recommendations. However, there is still a need to identify and generate adequate mechanisms to induce this process.

As an example of the possibilities of this relationship, the ICOMOS International Committee for the Study and the Conservation of Earthen Architecture and the US/ICOMOS National Specialized Sub-Committee on Earthen Architecture (to date the only existing ICOMOS national subcommittee specialized on earthen architecture) have already launched a joint sponsorship initiative [cf.: International course on the preservation of the earthen architectural heritage, Grenoble, CRATerre-EAG/ICCROM, Sep, 14 - Oct. 2, 1992]. This activity represents an attempt to promote integral efforts in a field of common concern, cooperation and integration of efforts among ICOMOS international and national bodies, and, cooperation and integration of efforts of ICOMOS with other international institutions active in the field.

This joint initiative has probably stimulated several other national ICOMOS committees in recommending presentations to the International Committee. These representations are most welcome under necessary and indispensable requisites. In this respect, the draft rules of procedure of the ICOMOS International Committee for the Study and the Conservation of Earthen Architecture foresee correspondent representation - by right - in the Committee, for all those ICOMOS members who, in their respective national committees, are responsible for the coordination/organization of the activities of national subcommittees on earthen architecture. We believe that this mechanism will ultimately encourage the creation of national specialized subcommittees on earthen architecture broadening participation of ICOMOS members in activities related to the preservation of the earthen architecture heritage as members of these subcommittees. As a result of the visible relationship between the international committee and the US/ICOMOS Specialized Subcommittee on Earthen Architecture, the International

Committee has encouraged formal commitments for the creation of four new national subcommittees on earthen architecture [cf.: The Soviet National Subcommittee on Mud-brick, the Portuguese National Subcommittee on Earthen Architecture, the New Zealand National Subcommittee on Earthen Architecture and, recently, the Italian National Subcommittee Specialized in this field].

However, beyond considerations related to aspects of pure representation on the international committee, we see these events as a great opportunity to encourage the identification and definition of much needed plans, programs, projects and activities and to implement indispensable strategies in the field. All of this will assist ICOMOS in being actively present in its international role in the protection and preservation of cultural heritage and ultimately active in the preservation of the earthen architectural heritage.

## THE GETTY SEISMIC ADOBE PROJECT

Edna Kimbro, Preservation Consultant, 184 Old Adobe Road, Watsonville, CA 95076

In 1990-91 the Getty Seismic Adobe Project to explore seismic retrofitting techniques for culturally significant adobe buildings consistent with conservation principles commenced activities. The seismic threat to adobe buildings has long been of concern to the world-wide conservation community. However, the 1989 Loma Prieta earthquake, and subsequent legislation requiring retrofit of unreinforced masonry buildings, highlighted the threat from both earthquakes and unnecessarily destructive retrofit measures. While project results are expected to be applicable in the southwestern U.S. and in Latin America, the project focuses on the historic missions and adobe buildings of California's Spanish Colonial and Mexican era. The Getty Seismic Adobe Project is overseen by a multi-disciplinary advisory committee consisting of the following individuals:

Edward Crocker, archaeologist/adobe contractor, New Mexico Community Foundation, Santa Fe, New Mexico;

Anthony Crosby, preservation architect/adobe conservation specialist, National Park Service, Denver, Colorado;

M. Wayne Donaldson, preservation architect, chairman of the State Historic Building Safety Board, San Diego, California;

James Jackson, chief architect, Development Division, California Department of Parks and Recreation, Sacramento, California;

Melvyn Green, structural engineer, Melvyn Green and Associates, Manhattan Beach, California;

Helmut Krawinkler, structural engineer, Director, John A. Blume Earthquake Engineering Research Center, Stanford University, Stanford, California;

John Loomis, architect, Thirtieth Street Architects, Newport Beach, California;

Nicholas Magalousis, museum director/archaeologist, Mission San Juan Capistrano, Laguna Beach, California;

Julio Vargas-Neumann, structural engineer, Pontifica Universidad Catolica del Peru, Lima, Peru.

Project personnel includes:

Neville Agnew, GCI, project director for administration;

William S. Ginell. GCI, project director for technical performance;

Edna Kimbro and James Druzik, GCI, project coordination;

Charles C. Thiel, Jr., principal investigator/project manager;

E. Leroy Tolles, technical director;

Fredrick A. Webster, seismic consultant.

Pursuant to advisory committee recommendations, initial project activities included an intensive survey of representative adobe buildings in north-central and southern California, including several mission structures (churches and convents), and one and two-story adobe buildings. Mr. Crosby accompanied the survey team in southern California and provided valuable insights into the non-seismic origins of structural damage, as well as the architectural perspective. From survey sampling, a working typology emerged. For project purposes the structures formed three categories: churches with tall thick outer walls and without cross walls: convents with tall thick outer walls and inner cross walls, and residential/commercial structures with thick lower walls, both one and two story. A glossary of Spanish Colonial architectural terminology facilitated cross disciplinary communication and a draft seismic condition assessment form assisted data recordation.

A working bibliography of relevant literature is being compiled which is in the process of being edited and expanded. An inventory or census of historic adobe buildings in California was assembled as reported elsewhere in this newsletter. It too can be revised as additional information becomes available over the course of the project.

Documentation of the historical performance of adobe buildings in California earthquakes was widely sought but proved elusive. Historical photographs were located of damage to Mission San Juan Bautista, Mission San Jose and Mission Dolores in 1906, to Mission Santa Barbara in 1925, to Mission San Fernanda and the Avila Adobe in 1971, to Mission San Gabriel and the Pio Pico Mansion in 1989, and to the Castro, Bolcoff, Santa Cruz Mission and Branciforte Adobes in 1989. While the historical documentation was not voluminous, the photographic data combined with physical inspection of the subject structures shed light on the subject.

The project conducted in-depth research of seismic retrofit techniques used for historic adobe structures in the last 20 years with the cooperation of the designers of 9 different projects using different approaches. This study revealed that

retrofit techniques have become progressively less invasive since the late 1970's as more value has been accorded the basic historic fabric of adobe buildings.

Finally, the subject of conservation principles applied to seismic retrofitting of historic adobe buildings was explored. An initial effort was also made to formulate a framework for understanding the seismic performance of adobe based in part on project survey data and previous test results at UC Berkeley and Stanford. Project personnel presented the results of the latter efforts at the Seismic Retrofit of Historic Buildings Conference in San Francisco. The proceedings will be available in April 1992 from the Western Regional Office of the National Park Service.

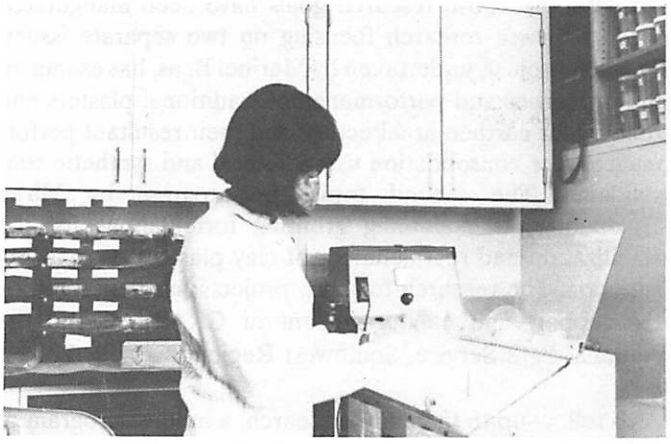
In 1992 the Getty Seismic Adobe Project will evaluate candidate approaches, prioritize them, and formulate the research design for a testing program. Project personnel will consult with structural engineers Julio Vargas-Neumann and Juan Bariola in Lima, Peru, and others if possible, and investigate candidate facilities. Work will continue on developing the theoretical framework and a "toolbox" of retrofitting measures consistent with conservation of historic fabric. Conservation and implementation concerns will be addressed by the development of a practical "how-to" manual based on conservation principles outlined in the initial phase. Procedural guidelines will provide advice to end users (owners and managers) on procedures and planning issues, and to reviewers (historic resources commissioners, staff, and building officials) on evaluation of seismic retrofit proposals for historic adobe buildings from the conservation perspective.

## CHARACTERIZATION AND STABILIZATION OF TRADITIONAL RENDERS AND PLASTERS FOR EARTHEN ARCHITECTURE

Frank G, Matero, Associate Professor of Architecture and Director, The Architectural Conservation Laboratory, University of Pennsylvania, Graduate Program in Historic Preservation, 115 Meyerson Hall, Philadelphia, PA 19104-6311

The Architectural Conservation Laboratory of the Graduate Program of Historic Preservation at the University of Pennsylvania is currently engaged in a phased research program on the use, characterization, and stabilization of prehistoric and historic plasters on earthen architecture in the New World. The program, begun in 1990, has identified three main research objectives:

- the compilation of a bibliography and historical survey on the materials, technology, and use of plasters and renders on earthen structures in the New World,

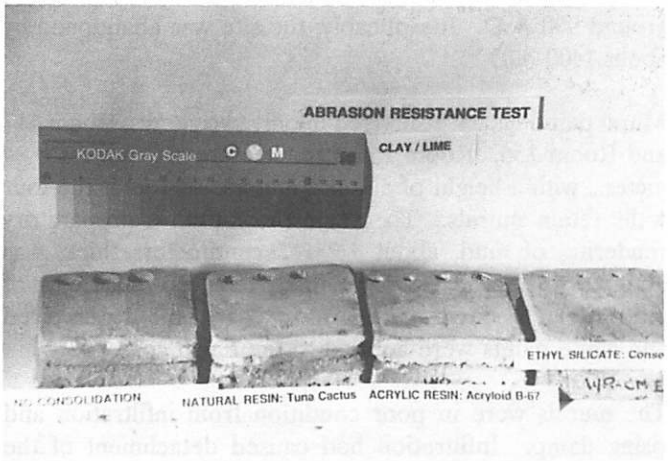


*Abrasive testing of various consolidants on plasters*

- the physical and chemical characterization of traditional plaster and render types used on earthen structures through materials analysis and physical testing, and

- the development and testing of conservation treatment options for the stabilization of historic and prehistoric plasters on earthen supports. This has focused on the issues of reattachment by injection grouting and capping as well as consolidation materials for degenerated plasters.

Surface coatings of clay, gypsum, and lime have been used traditionally on earthen structures for protection and decoration since the earliest times. Originally applied as sacrificial renewable surfaces, many of these plasters and renders have been removed, or lost over time, exposing the vulnerable earth construction below or survive in a fragile deteriorated state, no longer functioning as originally intended. While much current research on the conservation of earthen architecture has focused on the stabilization of the earthen support itself, relatively little research has been performed on these traditional finishes, especially for the New World.




*Results of abrasion tests for consolidated clay/lime plasters on earthen supports*

To date, the above research goals have been inaugurated through theses research focusing on two separate issues. The first project, undertaken by Maribel Beas, has examined the properties and performance of traditional plasters and renders for earthen architecture and their resultant performance after consolidation using natural and synthetic consolidants. The second topic, in progress by Mirna Goldberger, is examining grouting formulations for the stabilization and reattachment of clay plasters on masonry supports. The research for both projects has benefitted by the support and encouragement of CRATerre and the National Park Service, Southwest Region.

As a follow-up to the above research, a modest program of field testing in conjunction with the National Park Service, Southwest Region, was initiated in June 1991 at Fort Union National Monument in northern New Mexico to observe the long-term performance of reattachment grouts for exposed lime plasters on adobe walls. An additional program of laboratory and field testing is being implemented in 1992.

## CONSERVATION TREATMENT OF PREHISTORIC MURALS ON MUD RENDERINGS AT AZTEC RUINS NATIONAL MONUMENT

Constance S. Silver, Preservar Inc., Conservation of Cultural Property, 949 West End Avenue, New York, N. Y. 10025

This report summarizes the conservation treatments of prehistoric mural paintings on mud renderings at Aztec Ruins National Monument (Aztec Ruins), New Mexico. The treatments were carried out by the author from October 20-28, 1990. Aztec Ruins is under the jurisdiction of the National Park Service.

An important prehistoric site, Aztec Ruins consists of the remains of two large room blocks. The West Ruin, comprising approximately 500 rooms and kivas, is the room block interpreted to the public. Construction of the site began around 900 A.D. Inexplicably, the site was abandoned by about 1400 A.D.

Mural paintings have survived in only two rooms, Room 117 and Room 156. Room 156 measures about 3 meters by 4 meters, with a height of about 4 meters. Three of the four walls retain murals. To create the mural, a preparatory rendering of mud, about 1/2 - 2 centimeters thick, was applied to the wall. A more finely textured finish coat of mud was applied to the preparatory coat. Fine-textured red and white paints were applied to the finish coat.

The murals were in poor condition from infiltration and rising damp. Infiltration had caused detachment of the upper registers and etched deep channels into the renderings. Muddy drips, now hardened, were deposited in and around the channels. Rising damp had destroyed the lower registers of the murals, leaving the rendering detached and friable. There was also some delamination between the preparatory coat and the finish coat. The paint layer had become friable.

Treatment entailed re-hydration of paint and rendering with a 50:50 solution of isopropyl alcohol and water applied through wet-strength tissue. Pockets of detachment were injected with this solution, followed by injections of Rhoplex AC 33, diluted 50:50 in water. While damp, the treated areas were pressed back into plane on the wall, renewing the cohesive strength of the plaster and paint and the adhesion of the rendering to the wall. Vulnerable edges were strengthened and reinforced with a putty made from original rendering that had fallen to the base of the walls. Muddy drips were softened with isopropyl alcohol and removed mechanically. The residue was removed with small stencil brushes, followed by a Wishab sponge (manufactured by Akachemie, Germany). An eraser-like material, the Wishab sponge has been used for several years to remove dust from fine tapestries. To avoid rapid heating and drying of Room 156, neon lights were employed during the week of treatment.

Eighteen months after treatment, the murals have remained stable. Their original optical qualities are unchanged, and the original fabric is largely unaltered. The National Park Service has implemented a program to monitor conditions in Room 156. Based on analyses of data, the advisability of chemical consolidation of friable areas will be evaluated.

One wall of Room 117 remains, but only to a height of 1.5 meters. A fragment of a bichromed (red and white) mural painting, measuring about 1 meter by 1.3 meters, has survived. Anthropomorphic and geometric forms are incised in the white field. Although a small roof provides some shelter from the elements, water and soluble salts infiltrate from the reverse of the wall. The mural was in poor condition. About 70 percent of the preparatory rendering was detached from the wall, while about 80 percent of the finish rendering had delaminated in the form of large flakes.

Unfortunately, the white field was infused in the past with a resin-like material that now compromises the long-term stability of the mural. Although it was possible to stabilize the mural of Room 117 with the procedures used in Room 156, the treatment was an emergency intervention to arrest deterioration while definitive conservation measures are studied. There are two viable options, detachment of the mural or backfilling. Detachment is almost certainly precluded because the reaction of the infused material in unpredictable. Therefore, methods and materials for conservation backfilling are now under study.

## RECENT ADOBE STABILIZATION STUDIES AT FORT SELDEN

Charles Selwitz, The Getty Conservation Institute
4503 Glencoe Avenue, Marina del Rey, Ca. 90292-6537

In 1986 the Scientific Program of the Getty Conservation Institute began an agenda of research on methods to stabilize aged adobe. The work done up till early 1990 was reported in October of that year at the Adobe 90 Symposium. This report will describe more recent work on the use of chemicals to protect historic adobe. Our goal has been to develop procedures that can be used generically, but our focus has been on saving the old walls at Fort Selden. These walls have been devastated by heavy, wet snowfall that fell during the latter part of 1991. Fort Selden State Monument is located in southern New Mexico.

The earliest work had been concerned with the screening of a large number of consolidants. Several papers in the 1990 Symposium described the test wall program at Fort Selden, where the best candidates were evaluated on demonstration walls that were put up in 1988. This test program involved applying chemicals to walls approximately 5 feet high, 5 feet wide and 1 foot thick, wrapping the walls in plastic film to permit the chemicals to cure and then subjecting the walls to a rigorous water spraying schedule for a number of months, after the plastic had been removed.

The test wall research disclosed that the best stabilizations were achieved by using a polyisocyanate, Mobay Chemical's DN3390, or a mixture of alkoxysilanes, ProSoCo's Stone Strengthener H (SSH). SSH penetrated to a depth of about one inch and cured to provide a consolidated adobe layer that repelled liquid water but permitted water vapor to pass through. The DN3390 gave a harder product that was impermeable to water vapor. As a result, water that moved in behind the polyisocyanate-treated surface caused an outer layer to spall off. This did not happen with walls treated with the alkoxysilane. The tougher DN3390 surfaces showed less erosion than the silane-treated walls and the separation problem could be solved by forcing isocyanate consolidant through the bulk of the wall, but our attention focused on the use of SSH for work with historic adobe.

Treatment of aged adobe with either consolidant did not provide the degree of hardening and strengthening that had occurred with the test wall adobe. This appears to be due to the tendency of adobe to desegregate and soften when the walls are long standing. A substantially harder product is obtained by consolidation, if the old adobe is reformed into mud bricks and dried. When starting with older, weaker and more fragile adobe, the application of consolidant improves hardness and mechanical strength. It also provides a water-repellant composition but the treatment does not take the product to a level achieved with freshly prepared adobe.

A more serious problem is the difficulty in obtaining a tight wrapping with plastic film about the irregularly contoured historic walls. Tight wrapping is needed to keep the solvents that carry the polymers deeply into the adobe from evaporating and taking the chemicals back to the surface. If this happens before the chemicals get a chance to react and bond internally, the back-migrating polymers will form a crust on the surface. This yields a discolored surface that is prone to flaking.

Initial studies on some small, corral walls were done in a manner to duplicate the best-test wall procedures. Relatively large amounts of the isocyanate and silane consolidants were applied by brushing and bulk infiltration. This latter procedure was attempted by drilling large diameter holes into the adobe and using funnels to get each solution into the interior of a wall section. This was a mistake because the fragile walls could not take the drilling without extensive cracking and disruption. Large amounts of consolidant were applied and each treated section was covered by draping polyethylene film over it. This was not a tight wrapping. In the months that immediately followed, after removal of the film, each section was badly discolored. But with exposure and time the discoloration faded. Eighteen months later it was necessary to examine the stretch of corral wall carefully to find darker sections. The walls are hard and non-powdery, but they are badly cracked. These experiments suggest that a reasonable treatment might be merely the application of SSH by brushing or spraying during cool, dry weather.

In the laboratory a large number of coating procedures were examined. A Chinese method using gauze, glycerin and polyvinyl chloride film did not work. A large number of viscous adhesives and film combinations was tried. The most successful adhesive was a wheat starch paste. But the real breakthrough came with the testing of adobe mud as a barrier. Both laboratory and field studies showed that mud, as a temporary coating after treatment of the adobe with consolidant, left an adobe surface that was hardened, water repellant and without discoloration. Typically the mud was layered over the surface just after the adobe was treated with consolidant. When the mud had dried, it was easily removed. The use of mud was even more effective than tight wrapping in preventing discoloration. There is some evidence that the mud functions as a poultice to remove color bodies that form in the consolidant during the course of treatment.

In the laboratory the mud is easily applied by trowelling or brushing over the surface of a small piece of aged adobe. In the field this did not work well. Where the mud was trowelled on a solvent-wetted, large vertical surface, it generally fell off. We could eventually get a layer of mud to stay on by repeated applications and pressings but it was a cumbersome task and would not be a suitable approach for treating any major quantity of wall. This problem was

solved by using a stucco-type sprayer to apply the mud. In either case the mud eventually dried and was pried off to provide the desired result.

In December 1991, the application of mud was studied over impregnated adobe walls by spraying during a rainy period. Subsequently an effort was made to remove the mud coating when it had dried but this was not possible. It had bonded to the consolidated adobe surface. This indicated that adobe stabilization in this manner must be done during a period of dry weather. However the results of this work suggested a different mode of treatment for the historic walls. The non-removable dried mud layer was much the same color as the adobe it covered. It lay on the exterior as a thin, conformal coating that showed every contour of the surface beneath. It was a relatively hard material and had dried without any sign of cracking. The modification of the mud coating to make it non-removable appears to be an attractive option.

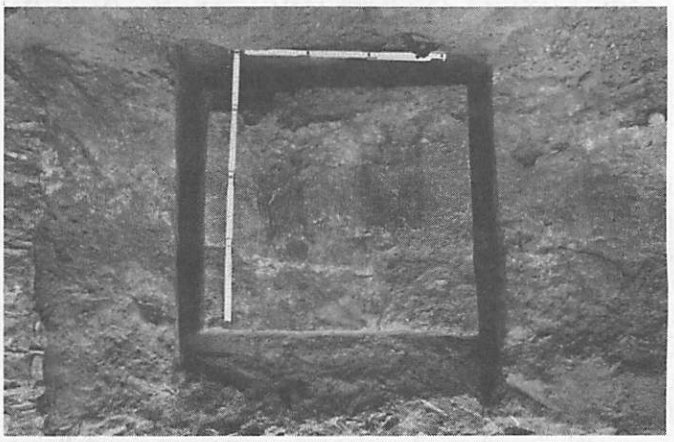
These studies suggest three approaches to treatment that should be compared in further studies. In each case the adobe would be impregnated with SSH. In one experiment this would be left exposed with no further covering. In a second experiment it would be covered with mud applied in a manner that would enable it to be removed when dried, and in the final test the mud would be applied under conditions that make it bond to the surface. We hope to try these procedures on full-scale historic wall tests in the near future.

## KIVA MURAL RECOVERY

Eric Blinman and Brenda Dorr, Office of Archaeological Studies, Museum of New Mexico, P.O. Box 2087, Santa Fe, NM 87504

In July 1991, University of New Mexico archaeologists working near Gallup, NM, excavated a prehistoric kiva with traces of painted designs on the interior wall plaster. Since the construction of a natural gas pipeline threatened destruction of the kiva, removal of the two best-preserved motifs was authorized by the Navajo Nation Historic Preservation Department, the New Mexico Historic Preservation Division, and the ENRON/Transwestern Pipeline Company. Responsibility for field recovery was assigned to Brenda Dorr (University of New Mexico, Office of Contract Archaeology) and Eric Blinman (Museum of New Mexico, Office of Archaeological Studies). Consultations were initiated with Claire Munzenrider, Bettina Raphael, Connie Silver, Clare Dean, and Carl Patterson.

The two adjacent motifs had been painted with black and red pigments on the most recent of three mud-plaster layers. Colors were weak, contrasting only slightly against the wall. Portions of both motifs had been damaged by plaster loss, but the remaining plaster appeared stable. Examination of

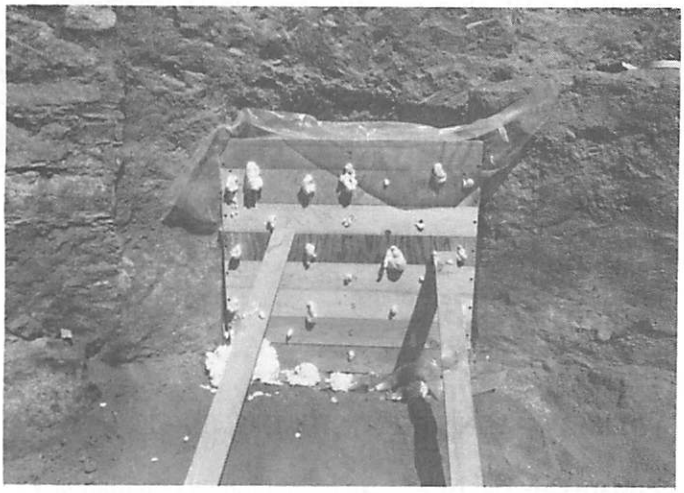


*Kiva wall after channeling to provide slots for the counterform frame*

the kiva architecture revealed that this portion of the kiva had not been lined with masonry. Instead, the plaster had been placed directly against floodplain sediments (silts and sands with some cobbles and gravel). The strength of the plaster and the integrity and variation in texture of the backing sediments were assessed with experimental cuts through other portions of the kiva wall.

Consultant opinions on the benefits of field consolidation and facing applications had varied considerably. Based on the relatively good condition of the plaster and backing sediments, both treatments were discounted. This decision was influenced by the danger that consolidants would alter the weak colors and that removal of a facing would constitute an additional and unnecessary risk to the integrity of the motifs. Instead, the removal strategy was to isolate the motifs, support the plaster against collapse with a counterform filled polyurethane foam, and remove the motifs as a block with an earthen backing that would serve as a permanent support.

Channels were cut through the kiva wall to define the sides, top, and bottom of the removal block and to provide slots for the insertion of the counterform frame. The counterform frame was prepared to fit the channels. Measurements of the depth of the curved mural face from the plane of the counterform were taken for use during laboratory conservation. Plastic wrap was placed against the mural face to prevent abrasion. Next, a layer of cotton batting was used as a cushion and to fill the fine topography of the mural surface. Then, a sheet of clear plastic film was placed over these layers and into the channels to separate the mural from the foam. The counterform frame was carefully installed within the channels. Boards with predrilled access holes were screwed onto the face of the form. After securely anchoring the counterform to the kiva floor, polyurethane insulating foam was injected through the holes to fill the area between the counterform and the protected mural



*Kiva segment after injection of polyurethane insulation between the counterform and the protected mural surface*

surface. During injection, the holes also served to monitor the spread of the foam and to relieve excess foam expansion. After the polyurethane had set, sediments at the back of the counterform were excavated, leaving a healthier margin of dirt extending beyond the form. The mural block, in its counterform, was then gently broken loose from the last of the adhering sediments and lowered onto its face. Excess dirt was removed to reduce weight, and the block was transported to the Museum of New Mexico.

The mural is not in the queue for laboratory conservation at the Museum of New Mexico. A permanent housing will be constructed for eventual display at the Maxwell Museum of Anthropology. Although the condition of the motifs will not be known until the counterform is removed, the block suffered no apparent damage from this removal technique. A single hairline crack was caused in the back of the block by lifting torque during laboratory handling. The one design change we would make would be to use solid plywood rather than boards for the counterform face.

## AN ONGOING EXPERIMENT WITH MODIFIED SOIL

Gil Sanchez, FAIA, Architect, 3022 Glen Canyon Road, Santa Cruz, CA 95060

The author has been experimenting with an adhesive as a method of modifying mud plaster to make it more erosion-resistant than unstabilized mud.

There are continuing attempts worldwide to find a material that will aid in the preservation of historic adobe monuments without being detrimental to the historic surfaces. The object is to apply a modified mud on historic adobe walls that breathes or lets moisture pass through the plaster naturally, not allowing condensation to occur between the historic material and the modified plaster.

The author discovered this modified mud adhesive in an historic adobe where he was doing a field investigation some years ago. Someone had applied a mud plaster mixed with this adhesive as a consolidant to the interior unstabilized adobe walls where the original plaster was missing. Twenty-five years after its application, the material appeared in good condition and was adhering well at the time he observed it.

It appears that this material is permeable. What makes this product attractive is that it is easy to acquire and is relatively inexpensive compared to the products now being tested.

A laboratory has been hired to conduct some preliminary tests, and the product looks promising. The modified soil absorbed moisture and, when dried, had a promising compression test result. It appears that the material is permeable and what makes it attractive is that it can be found on the shelf almost anywhere in this country and is relatively inexpensive compared to other, more exotic products.

The author has been informed by the manufacturer that it is generally comprised of polymer acetates. "Results from several sites have proved the polymers satisfactory so far," states Pamela French in IN SITU, Archaeological Conservation, Proceedings of meetings, April 6-13, 1986, Mexico.

In August of 1991 the author made about eight small adobe brick samples with the modified soil. The adhesive amount was varied, the bricks were weighed dry, then they were immersed in water for three days. Some samples survived; some didn't. The ones that survived were weighed to see if they had absorbed water; they had. The survivors were placed standing on end outside in the weather. There have been 14 inches of rain so far this year and the samples are holding up fine, so far. There appears to be no change in their configuration. In the spring of 1993, if the samples are still intact, compression tests will be conducted.

The author is applying the modified plaster on a historic adobe building which is under restoration. The approach taken is reversible.

This year the author hopes to apply the modified soil plaster, as an experiment and in a limited amount, on an exposed historic adobe wall.

The work is site specific. If the experiment works, then tests will be made with the adhesive/water proportion and soil. It's not a cure all, and the experiment is not as scientific as in a laboratory, but it looks promising.

## ADOBE PROVIDES INFORMATION ON PREHISTORIC AND HISTORIC ARCHITECTURE

Jeffrey L. Boyer, Staff Archaeologist, Office of Archaeological Studies, Museum of New Mexico, P.O. Box 2087, Santa Fe, NM 87504

Building on the results of adobe analysis at the Trujillo House near Abiquiu, New Mexico, the Office of Archaeological Studies (OAS) continues to study the use of adobe architecture at prehistoric and historic archaeological sites planned for destruction rather than preservation. In this way, OAS is working to preserve the architectural data potential of adobe sites when the structures cannot be preserved.

In 1989, OAS excavated two prehistoric Anasazi sites in the Pot Creek area near Taos in north-central New Mexico. The sites included two subterranean structures, commonly known as pithouses, that were 4 to 5 meters in diameter and had been dug 2.6 to 2.9 meters into gravel terraces. Walls consisted of several thick courses of adobe covered with thin layers of adobe plaster. Floors were poured adobe; floor features such as collared hearths were also adobe. Chronometric dates show occupations between AD 1125 and 1190 at one site and between AD 1195 and 1220 at the other. Analysis of adobe materials reveals that soil originally excavated from the gravel terraces to create the deep holes was augmented with silts and clays, probably from nearby river bed deposits, to make acceptable adobe. So much silt/clay was added, in fact, that even after some 800 years, rock hammers and chisels were needed to reduce the adobe to fragments small enough to grind with mortar and pestle. In conjunction with this project, OAS is also analyzing adobe from a nearby, small pueblo (surface) structure dating from between AD 1200 and 1250/1300. By comparing the sites, it may be possible to learn how the use of adobe by the region's native inhabitants changed through time. Unlike the pithouses, the pueblo is located on an alluvial fan whose soils are rich in silt and clay but poor in sands. Analytical results suggest that sands were added to the on-site soil during adobe production. Further, differences within the sample assemblage may indicate different makers, perhaps different families at the site. A draft report detailing the Pot Creek excavations and the analytical results will be complete by July 1992.

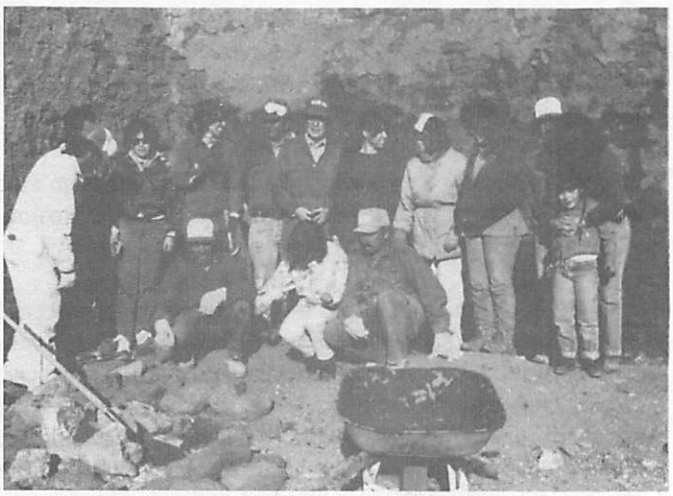
In late 1991, OAS excavated features at the Vigil/Torres House, a Hispanic homestead near Taos dating to the 19th and 20th centuries. Site structural definition is a major focus of the project's research design, which relies heavily on adobe analysis. Analysis of adobe materials from a cellar and from a house and its several additions, while not complete, suggests that some features were built of adobe made from natural on-site soil while others were built of adobe made from soil obtained from a buried midden area. One of the latter was an *horno*, an outdoor oven that was dismantled and its characteristic trapezoidal adobe bricks used in one wall of the cellar. While samples can be combined into three groups based on soil origin, significant differences in straw content between the house adobes and those from the cellar argue for different makers. Additional adobe and artifact analysis from the cellar and midden, in combination with ethnohistorical information, should help clarify relationships between the site features and, thereby, the site's occupants. Analysis should be completed and a draft report produced by the end of 1992.

## THE NEW MEXICO COMMUNITY FOUNDATION: PRESERVATION THROUGH COMMUNITY ACTION

Edward Crocker, New Mexico Community Foundation, P.O. Box 149, Santa Fe, NM 87504

Among the earthen structures serving some two billion of the world's peoples as residences or in various communal capacities are the unique assemblage of adobe churches in New Mexico. A survey sponsored by the New Mexico Community Foundation and the New Mexico State Historic Preservation Office beginning in 1986 has recorded more than 350 adobe buildings that represent parish seats, missions and chapels of several denominations. Most of these buildings date from the late-18th to mid-19th centuries. In addition to these are an additional 400 to 500 earthen religious structures represented by family and private chapels, moradas (sacred spaces pertaining to the Brotherhood of Jesus or *Penitentes*) and shrines. By far the majority of these buildings are located in small rural communities in which the churches especially represent the central embodiment of a tightly knit social structure, an intense spiritual fervor and a commitment to community self-help and autonomy.

It is typical of the communities of northern New Mexico that soon after World War II, populations diminished as



*Community volunteers at a work day in Chacon, New Mexico*

residents took advantage of the GI Bill to further their education. More attrition occurred as standards of living increased and local job markets, mostly agricultural and pastoral, could not fill the expectations. The resultant exodus involved mostly young people, leaving the older and infirm at home in the unfortunate imagery of a skeletal community. Unable to cope with the continual maintenance of the mud-plastered churches, they sought "final" solutions. With the best of intentions, some 95% of New Mexico's rural adobe churches were, to varying degrees, encased in portland cement. Now 30 to 40 years later, cracked plaster, leaky roofs and capillarity have allowed the earthen walls to be saturated to the critical threshold of 12 to 15%. Some have already succumbed to the moisture invasion; all are endangered.

In 1985 the New Mexico Community Foundation, under the leadership of then-chairman Susan Herter, conceived of and founded a program that came to be called "Churches: Symbols of Community." The central premise of her brainchild is that communities will coalesce to preserve the physical manifestation of their most central spiritual and cultural component, the church building itself, and that in the process a spectrum of re-vitalization can occur. The breadth and subtlety of the concept has been born out in our experiences in more than 100 communities that have been helped through technical assistance, materials, fund grants and the long-term execution of preservation plans. The results can be logged in several categories: Reinforcement, or in some cases reinstatement, of a sense of community through cooperative endeavor, economic development through the teaching of skills that are readily translatable to the local job market, cultural longevity through the re-discovery of forgotten or displaced values, and finally the preservation of the buildings themselves.

It is the culture, not the religion, that "Churches: Symbols of Community" was so insightfully designed to address. Indeed, the preservation work on the churches is a spin-off of intensive and culturally directed community work. That is not to say that the work is not performed to meet the highest standards of the industry. The staff includes an historic architect who is a graduate of ICCROM and two contractors with extensive experience in historic preservation work, one of whom is a graduate of CRATerre. In addition, volunteer architects, planners, conservators and craftsmen with the highest qualifications are regular contributors to the program. Because so much of the technical assistance comes from professionals who volunteer their services, many materials are donated, and more importantly because all of the labor is contributed by the communities themselves, a "Churches: Symbols of Community" preservation project will typically cost under 15% of market value.

By addressing preservation issues within a cultural rubric, by understanding the necessity that a community balance individual autonomy against communal obligation, and by providing technical assistance based on traditional building techniques, the New Mexico Community Foundation has developed an innovative and successful program to help insure architectural as well as cultural longevity in the communities of New Mexico.

For more information on this program, contact: Churches: Symbols of Community, P.O. Box 149, Santa Fe, NM 87504

## THE NEW MEXICO COMMUNITY FOUNDATION: SELECTIONS IN EARTHEN TECHNOLOGY
### No. 2 Straw Daubs: How Fiber Cuts Erosion

Edward Crocker

The maintenance of mud-plastered walls has proven the single most difficult and time consuming procedure endemic to earthen buildings that are not protected by an overhanging roof. In New Mexico, many of the historic adobe churches were plastered with cementitious products in the 1950's and 1960's in the hope that a permanent solution would relieve the strain of cyclical, labor intensive re-mudding in communities where populations were steadily declining. The fallacy of the permanent solution of portland cement has been exposed as several decades of accumulation of moisture has threatened most and destroyed some of the buildings that it was intended to protect. Now that a resurgence of community life and a re-evaluation of the cultural and technical value of the old ways has focused attention on the preservation of the churches, some of the old techniques of building and maintaining adobe are coming back into their own. Always of interest to both the communities and professional preservationists are methods of mixing and applying mud plasters so that they endure.

The greatest threat to an unprotected adobe wall in the Southwestern United States is erosion by water. Summertime convection storms may unleash violent torrents that, though short of duration, are intense mechanisms of destruction. Water flowing down a vertical surface, unless it is deflected from a straight path, will rapidly put a channel out of mud plaster and expose the adobe fabric beneath. One method of countering the force of high-velocity water erosion is to break the velocity of the downward flow. This may be done by re-directing the rivulets so that instead of flowing straight, they are forced to follow a random, labyrinthine path to the wall base. Straw, properly mixed and applied in a mud render, is an effective device to retard erosion.

It is an oft-heard phrase among the old *adoberos* of New Mexico that "un adobe sin paja es un adobe sin alma" (an adobe without straw is an adobe without soul). In a verbal, axiomatic tradition, this was a method of saying "use straw!" without explaining why. It is understood that straw performs certain functions, including balancing the granulometry in

adobes and mortars. It has other functions in the exterior mud renderings of buildings as well that may not always be understood, though they are still practiced.

While watching the women of Taos Pueblo re-mud a wall, I noticed that the mud was thrown onto the surface and then, using the heel of the hand, worked upwards in a low, arching motion away from the body. The handprint was that of half a rainbow. The straw in the mix was no more that 2 inches long and most of the pieces, as a result of the hand motion, were embedded either horizontally or only a few degrees off the horizontal. When I looked at a wall that had not been re-mudded for several seasons, I could see the efficacy of the technology: a rivulet beginning at parapet height encountered a barrier across its path and was diverted to one side. A few inches below it was again diverted, and in some cases divided by the straw. The downward velocity of the water was broken, and erosion reduced.

The same result can be achieved by using a hawk and trowel to apply the mud rendering. By cutting the mud on the hawk away from the body, using the edge of the trowel, the straw fibers are aligned perpendicular to the plane of the trowel. After cutting three or four times, most of the straw is aligned alike. Then, by turning the hawk 90 degrees so that the alignment is parallel to the body and cutting and lifting the mud onto the trowel and applying it in vertical paths, the straw is embedded generally parallel to the ground. With the use of the heel edge of the trowel in uni-directional horizonal paths, the straw on the surface is dragged into the desired alignment. Again, the length of the straw is critical in the success of the render: long fiber won't align. One-and-one-half to two inches is optimum.

*Traditional manner of applying mud plaster. Photo courtesy Museum of New Mexico*

**THE NEW MEXICO COMMUNITY FOUNDATION: SELECTIONS IN APPROPRIATE TECHNOLOGY**
**No. 3: Modified Sahelian Scaffolding in the New World: A Common Sense Solution**

Edward Crocker

When adobe buildings are stripped of their plaster and the raw bricks are revealed, an opportunity is presented to glimpse the methods of solving some of the technical barriers faced by the vernacular architects who built them. Unusual bonding patterns in lower courses may have compensated for adobes that were found to have poor compressive strength characteristics (see Selections in Appropriate Technology No. 4). Wooden members or ties may be revealed that at the time of construction had no useful purpose, but were derived from another time and place where those elements may have functioned as seismic arresters. (Such recondite techniques if examined over a broad cultural and geographical area may help delineate the evolution of building styles; see Selections in Appropriate Technology No. 5.) Sometimes, strange and seemingly inexplicable features emerge that haunt the architect, preservationist or historian until a reasonable function can be assigned to them. This was the case at the Capilla de San Antonio in Chacon, New Mexico, when the cement plaster was pulled off in the Spring of 1989.

The church of Saint Anthony is a medium-sized (1800 sq. ft.) adobe structure, cruciform in plan, with an attached sacristy, triple-wythe walls and a pitched roof sheathed with corrugated steel. From grade to eave, the walls are 12 to 14 feet high, depending on variations in the topography.

At the beginning of a community-based preservation effort when the adobe walls were revealed, an unusual feature appeared at each corner: Five-and-one-half to seven feet above grade, set in line with the plane of the interior wall, was a single 3 to 4-inch diameter cedar or oak viga or rough-hewn pole. The ends were sawn or axe-chopped flush with the vertical surface of the wall. Similar vigas were embedded at similar heights above grade on either side of the windows in the longitudinal walls of the nave. In several instances, where investigation was carried out, the poles were found to penetrate the full thickness of the walls. One of the poles ,located at the northwest corner of the west transept, was removed and found not to be mortised, nailed or tied to anything else embedded in the wall. The phenomenon of the poles was recorded and placed in the category of "technology to haunt."

In the spring of 1990 during the dismantling of a collapsed wall at the San Jose Mission in Upper Rociada, New Mexico, identical vigas were noted. Later the same year, they were found again, this time in the massive walls of the San Rafael Church in La Cueva. Here, the eave height is 16 to 18 feet from a variable grade. The mysterious poles

appeared at two horizontal planes in the walls, at roughly the 7-foot level and again at the 12 to 14- foot level. It was seeing them in two levels on what amounts to a two-story building that sparked my hypothesis that the poles represent a modified version of Sahelian scaffolding.

Many of the multi-story vernacular earthen buildings in West Africa bristle with protrusions of sticks that comprise a permanent scaffolding to facilitate annual re-muddings. Among the finest examples are the mosques in Dejanne, Mali, and Bobo Diolasso, Burkina Faso. The young men who do the plastering, step from stick to stick to do their work, rather than spanning the intervening spaces with catwalks.

I am not suggesting that the traditions of West Africa have any direct or indirect link with the churches in the Mora Valley of New Mexico, though that possibility is not out of the question. I am, however, conjecturing that by embedding the poles in the walls and allowing them to protrude perhaps 16 to 24 inches on both sides, scaffolding supports were provided for the duration of the building process. Planks on either side counterbalanced with a load of adobes would have provided solid footing and a convenient staging platform. As the wall grew and the poles were embedded, the need for the counterweights would have been relieved. When the walls were finished, plastering would have begun from the top down. When the scaffolding was no longer needed to reach the high areas, the poles were sawn or chopped off and covered with mud.

For further information on Sahelian see Spectacular Vernacular by Jean-Louis Bourgeois and Carolee Pelos, published by Aperture Foundation, New York, 1989.

## CROSS-CULTURAL PERSPECTIVES ON THE PRESERVATION OF EARTHEN ARCHITECTURE

Iftekhar Ahmed, 235 Puffin Court, Foster City, CA 94404

While the preservation of historic monumental structures has long been recognized as imperative in the continuity of cultural heritage, the conservation of traditional dwellings and settlements has only in recent times been considered important in the same regard. The significant difference lies in the fact that monumental structures can be frozen in time, preserved as they are for visual contemplation, spatial experience, historical study or even for recreation. But in the case of inhabited human dwellings, the issue at stake is preserving the continuum of their development. This should be done in such ways that the dwellings remain habitable, and external forces cannot drastically alter and replace them with alien forms and materials. The perpetuation of the natural evolution of culture achieved from within the culture is the guiding beacon in the philosophy of preservation. Traditional dwellings often require improvement or upgrading to cope with the demands of the present age. However, replacing traditional dwellings with modern ones does not allow cultures to progress; rather it disrupts the progress, often resulting in the creation of culturally alienating environments.

Two significantly different experimental attempts are described incorporating the above-mentioned principles of conservation. One is located in a hot-dry, semi-desert region and the other in conditions of extreme wetness -- high humidity, rainfall and seasonal floods. The first is a practical experiment already undertaken and the results are available. The second is more theoretical and is a written treatise on possible aspects of conservation.

### Fired Houses

Iranian-born California architect Nader Khalili discovered and developed a method for baking, and, thus strengthening from within an already completed earthen structure. He has described his work in two books, Racing Alone and Ceramic Houses (Harper and Row, 1983 and 1986). During 1979-1980 Khalili worked on a rehabilitation project for rural earthen houses in Iran. Some of the old houses were seriously damaged and weakened by prolonged exposure to the elements. Twelve such houses were rehabilitated by the firing method. In a performance assessment conducted last year by UNESCO, the fired houses were found to be in good condition after a period of more than ten years.

The basic method involves sealing domed or vaulted earthen structures (such as the rural houses in Iran) from outside and then firing the inside, much like a traditional brick kiln. Special burners, developed by Khalili, or wood fuel may be used for the firing. At high temperatures of above 1800 degrees Fahrenheit, the earth walls become baked into a brick-like form. The temperature and time required for firing depends on the size of the structure, as well as the thickness of the walls. Glazes can also be used on the earthen surfaces for decoration and water-resistance.

Khalili has undertaken some experimental projects, notable among them, a 27-foot diameter hemispherical dome in California. The author was involved in the construction of this experimental prototype. Such research provides direction for future rehabilitation and conservation projects, for which the firing technique holds much promise.

### Earthen Houses in a Wet Climate

During graduate studies at M.I.T., the author worked on a research project regarding earthen architecture in Bangladesh (see master's thesis, Up to the Waist in Mud: the Assessment and Application of Earth-Derivative Architecture in Rural Bangladesh, 1991). My studies yielded examples of highly refined vernacular architecture in Bangladesh. In recent years, serious environmental changes that cause

*Experimental prototype earthen dome prior to firing in California*

severe annual floods and socio-economic changes, such as the advent of imported, industrially produced building materials, prevent the traditional earthen houses from fulfilling present-day needs.

It was found that most traditional earthen wall construction techniques were well-developed. These techniques also served well when protected by extended roof eaves and regular maintenance. However, the traditional raised earthen plinth is susceptible to deterioration by flood water. For this reason modern materials such as brick and concrete are preferred, and are gradually replacing earth as a building material. In my studies I had proposed cladding the earthen plinth with locally available fired bricks, using lime-pozzolanic mortar (the available pozzolan being powdered brick dust). Brick and lime are generally compatible materials with earth and would serve well to protect the bases of the traditional earthen houses. The rammed earth floors of the houses also admit dampness from the rising sub-soil water level. A similar treatment, surfacing the floor with fired bricks laid in lime-pozzolanic mortar, would serve to retard the rising dampness and would render the interior of the houses inhabitable.

Such preservation techniques mentioned above may somewhat alter the properties of the earthen buildings; they may even significantly alter the appearance of the houses. To allow those buildings to continue functioning in the future, a reconciliation between their altered form and preservation needs will have to be achieved. This is a provocative and continuing dilemma in preservation. Its successful resolution will eventually yield habitable environments which at the same time respect their cultural heritage.

**EGYPTIAN VERNACULAR EARTH VAULT RISES IN TEXAS: Hassan Fathy Student Demonstrates Roofing Techniques**

Simone Swan, Swan House, 1305 Soundview Extension, Southold, NY 11971

An Egyptian-style, barrel-vaulted roof was built without centering out of sundried mud-bricks in Presidio, Texas, last December 1991. Simone Swan, writer and lecturer who worked with the Egyptian architect Hassan Fathy starting in 1976, formed several hundred hand-made adobe bricks measuring 10"x7"x3". In partnership with Presidio master--mason Gilberto Velasco, she mixed the aggregate and dried the bricks *in situ* at Fort Leaton, a large adobe hacienda on the Rio Grande restored by Mr. Velasco and the Texas Department of Parks and Wildlife. The vaulted roof was erected by hand leaning against a north-facing kickwall and supported as well by two loadbearing walls made of local adobes measuring 20"x12"x6".

The purpose was to compare techniques with masons from both banks of the Rio Grande and to explore possibilities of organizing low-cost, owner-built, energy-efficient housing according to methods cited in Fathy's book, Architecture For the Poor, in a climate and environment resembling closely the Nile Valley. The Presidio vault was built in maximum adverse climatic conditions, with outdoor temperatures varying daily from 30 to 80 degrees and prior to unpredictably frequent and high rainfalls during January 1992. The experimental vault withstood the extraordinary challenge with structural solidity and no damage, despite a 25" fall of rain during one month where normal precipitation averages 22" a year.

Ms. Swan has organized an ecumenical group of architects, soil mechanics, conservationists and public education specialists to make available to governmental and private agencies the Fathy methods of housing the homeless who live outside the cash economy. In partnership with Mr. Velasco, a new series of adobe roofs and walls will be built in Presidio in the spring of 1992.

**RESTORATION OF THE GUAJOME RANCH HOUSE**

Dr. Susan M. Hector, Project Manager, (619) 694-3037

The San Diego County Parks and Recreation Department is in the process of restoring Guajome Ranch House, a large adobe residence in the northern part of San Diego County, California. To date, the kitchen wing and chapel have been restored and are used by docents and park staff to interpret the history of the region.

The Ranch House is more than 6,000 square feet in size and contains 28 rooms. The adobe was built in 1852 by Cave

Johnson Couts. Couts and his wife, Ysidora Bandini Couts, were given the land as a wedding gift by their brother-in-law Abel Stearns. (Stearns was married to Ysidora's sister.)

The name "Guajome" comes from the Luiseno word for "frog pond". The adobe ranch was built on land saturated with water from springs and is adjacent to a marsh. Couts did not build the house on a foundation, but laid his adobe blocks directly on the decomposed granite subsoil. The adobe blocks wick moisture from the ground, and, under ideal conditions, pass the moisture into the air. However, Cout's son, Cave Johnson Couts, Jr., applied a stucco and cement coating to the building in the 1920s during a remodelling phase. This coating traps moisture inside the walls and has resulted in wall failure and deterioration throughout the structure.

As part of the Parks and Recreation Department's restoration of the building, a Historic Structure Report was prepared in November 1991 by architect Milford Wayne Donaldson. This report includes studies of the archaeology, history, hydrology, utilities, landscaping, and geology of the adobe area. Restoration plans and specifications are in progress. Although the county has received a grant for the restoration, additional funds are being sought to complete this large and complex project.

In addition to Guajome Ranch House, the Parks and Recreation Department manages two other earthen architecture structures. The Penasquitos Ranch House, located in the City of San Diego, is an adobe structure with three wings. This building has been restored. Current efforts at this site are focused on restoring outbuildings. The Vallecitos Stage Station, located in a desert valley, is a replica of the original sod building. The existing station was built in 1934 of cut sod and hand-hewn timbers to closely resemble the original stage station, which was destroyed by vandalism and weathering.

## HUMAN SYSTEMS RESEARCH, INC., TULAROSA AND LAS CRUCES, NEW MEXICO

Morgan Rieder, HSR Historical Architect
Human Systems Research, Inc., P.0. Drawer 728, Las Cruces, NM 88004

During the past year, Human Systems Research (HSR) has been engaged in projects involving the documentation, evaluation and stabilization of historic earthen architecture in southern New Mexico. In the Jornada del Muerto, on White Sands Missile Range, two adobe ranch houses built in the early years of this century and later associated with the 1945 Trinity test are the subject of an ongoing preservation effort. One of the houses was restored by the National Park Service 1984, but it now requires repair and a maintenance program. For this purpose, HSR has prepared a preservation guide specifying appropriate standards and procedures for conservation of the building. The other ranch house has deteriorated seriously. HSR has completed graphic documentation of the building, producing a set of measured drawings. During the recording process, original construction methods and materials were analyzed and sources of deterioration were identified. Based upon these investigations, HSR is developing a stabilization plan for the structure.

In the foothills of the Black Range, at the site of Lake Valley, a silver-mining boom town of the 1880's, HSR personnel carried out an architectural and archaeological survey, working on assignment to the Bureau of Land Management. Most of the historic buildings surviving at Lake Valley are of adobe construction and, although deteriorated to varying degrees, have undergone little or no alteration. Since the architectural survey included recommendations for stabilization of these properties, this project also concentrated upon structural investigations, backed up by archival research.

These projects have added considerably to an understanding of the different ways in which the regional tradition of earthen architecture was adapted historically, resulting in distinct vernacular building types. The projects have also provided new insights into the pathology and treatment of deteriorated adobe structures.

In line with HSR's commitment to the conservation of our regional architectural heritage, the organization's Las Cruces office is currently acting as a sponsor of the New Mexico Preservation Needs Assessment, a volunteer effort recently initiated by the State Historic Preservation Division. The Mesilla Valley has a particularly significant concentration of historic adobe buildings, and identifying those which are threatened will be a top priority for the Needs Assessment here.

## ADOBE FARM HOUSE MODIFICATIONS IN BOLIVIA FOR THE CONTROL OF CHANGAS DISEASE

P.G. McHenry, AIA, 4601 Montano NW # 52, Albuquerque, NM 87120

The author served as an architectural consultant for the Vector Biology Control Project, Arlington, VA.*, the month of June 1991, in the towns of Cochobamba, Sucre, and Tarija, Bolivia. He is pleased to make the following report:

Chagas Disease is a blood parasite malady common in most Latin American countries. It attacks multiple internal organs simultaneously over a number of years, finally resulting in death. Medication is effective only in the early stages. It is a major medical problem. It is transmitted by blood sucking insects of several types (not mosquitoes), depending

on climate and environmental conditions. These cockroach-sized insects prey on warm-blooded creatures and transmit the disease in the feeding process. The infection is readily transmitted between humans, farm animals, fowl and domestic pets, so an infestation can spread rapidly through a household or a community.

The insect's habitat is in cracks and crevices, behind pictures, wall paper, clothing and bedding stored or hung against the wall. The insects feed at night in the dark, so the sleeping rooms of the residence and animal pens are a primary abode.

Control of these insects can be accomplished by two major means: one is insecticide spray, and the other is elimination or modification of their habitat. The insecticide treatment is expensive, temporary and may have residual environmental effects. It is believed that elimination or modification of the habitat for the carriers is a more effective long-range solution than chemical sprays.

Most small farmhouses in Bolivia have mud-plastered adobe walls and a roof structure made of pole timbers, vigas, or beams, with a ceiling deck made of *Cana Hueca* panels (a fragile variety of bamboo-like cane). Above the cane ceiling is a layer of mud and straw, to provide a temporary roof by itself or as a base for fired-clay roof tiles. Mud plaster walls often have shrinkage (drying) cracks, and the cracks and crevices in the ceiling materials offer a perfect habitat for the insects. Nearly all of the materials used in construction are obtainable locally from natural sources, requiring no cash outlay by the builder. The only materials that must be purchased were doors, windows, hardware, gypsum plasters and cement for foundations. Frequently, the total cost outlay for a typical farmhouse might be as little as $100.

Past efforts by some organizations to make improvements have used new, non-traditional materials, such as gypsum plaster and corrugated iron roofing. These materials were not as familiar to the builders as their native materials; the builders lacked the corollary material and structure that would make them effective, and the materials represented a substantial cash outlay.

The author proposed several simple solutions that made a substantial impact on the habitat and reduced the construction cash budget by as much as 30%-40%.

1. Use a water-soaked sponge float treatment on cracked surfaces to remove existing cracks.

2. Use mud plaster (instead of gypsum) to cover the cane ceilings and other crevices in the building and wood surfaces.

3. Prepare a graphically oriented manual for modifications and new construction.

4. Separate animal and fowl pens away from living quarters.

* A management group for the Medical Service Corporation International, under contract to the United States Agency for International Development.

## STUDY OF ARCHITECTURAL VARIATIONS IN NORTH YEMEN

Lee Dassler, 239 West 106th St., 4D, New York, NY 10025

In March 1992, Lee Dassler, an architectural conservator specializing in earthen architecture, traveled to the Arab Peninsula to study regional variations in mudbrick architecture within four towns in North Yemen: Sahar, Sa'da, Barat, and Sanahan. The focus of the visit was to observe and record regional earthen construction details, techniques, and materials. Funded by a William Kinne Fellows traveling fellowship awarded by Columbia University in 1990, the trip was initially planned for 1991 and was postponed due to the Persian Gulf War. Beyond documentation, an overall goal of the project is to investigate the issues of development vs. preservation, economic priority vs. cultural retention, and appropriate regional technologies vs. imported materials and methodologies: issues intensely juxtaposed in northern Yemen due to the country's political, social and geographic isolation.

## CONSERVATION OF BRONZE AGE MUDBRICKS IN CRETE

Pamela Jerome, Registered Architect, Preservation Consultant, 426 East 9th Street, 2B, New York, NY 10009

A study was conducted during the summer of 1991 focusing on the preservation of Bronze Age mudbricks at the Minoan site of Palaikastro, Crete. The archeological site in eastern Crete was first excavated at the turn of the century by the British School at Athens (BSA). Although a palace has never been discovered, the site is considered one of the best-preserved examples of Minoan town planning. The site may have been the second largest city after Knossos during the Neopalatial era.

The current excavation continues under the auspices of the BSA and has brought forth some noteworthy ashlar buildings. Together, these are believed to comprise one of the extremely rare examples of a town shrine complex. Building 5, specifically, has produced some of the most spectacular Minoan finds of this century. Also of significant archaeological interest are the interior mudbrick partitions and staircase of Building 5, dating from the Late Minoan IB period (circa 1550 BC), and the resulting alteration to the structure's floor plan.

Analytical investigation was necessarily limited by the size of the mudbrick and mud-plaster samples, but revealed interesting data. Initial microscopic examination involved color characterization with the assistance of the Munsell soil charts, identification of the soil type, and photodocumentation. Microscopic analyses were performed using both transmitted and reflected light. Thin sections observed under a petrological microscope disclosed accessory mineral inclusions and the presence of grog. The thin sections, viewed under a reflected light microscope equipped with a whipple disk, were also used to calculate porosity by the statistical method of quantitative stereology. X-ray diffraction (XRD) identified the types of clays present, while preparation of the samples for this technique resulted in soil fractionation and granulometric analysis.

Other attempts to fingerprint the soil included the use of scanning electron microscopy (SEM) in conjunction with energy dispersive x-ray analysis (EDXA). These procedures identified discrete particles embedded in the artifacts, along with the elemental composition of specific or overall areas. The samples were subjected to qualitative and quantitative analyses for soluble salts. Tests were performed with a coulometer as well, to determine the percentages of calcium carbonate in the samples. CaCO3 is known to have consolidative effects, and its relative abundance in these samples was considered a positive find.

The importance of Building 5's layout, both in relation to the other structures at Palaikastro, but also to Minoan Crete as a whole, precludes its reburial. Thus, an appropriate method of conservation is required in order to allow the earthen construction of Building 5 to remain exposed for further scholarly research. Presently, Building 5 is protected by the temporary shelter erected in 1990. Future plans for the Palaikastro site involve the analytical testing of likely sources for the manufacture of these mudbricks. Comparative studies between mudbricks of nearby Minoan sites are also planned. Of priority however, remains the development of an appropriate permanent shelter, currently in the schematic design phase, its subsequent approval by the Greek authorities, and funding for its erection.

## FORT CUMMINGS STABILIZATION

In the winter and spring of 1990 an Adobe Stabilization Plan was prepared by the National Park Service for the Bureau of Land Management through an Intra-Agency Agreement. The plan details steps to be implemented in order to stabilize the partially collapsed adobe walls of abandoned Fort Cummings, an important Apache Wars period military installation. Fort Cummings is located approximately 15 miles northeast of Deming, New Mexico, and was occupied intermittently from 1863 to 1891.

The original adobe fort was approximately 320 feet by 360 feet and contained sufficient space for 100 men and 65 horses and mules. The original perimeter wall was 10-feet high and composed of adobe. Current plans call for the adobe walls to be stabilized in 1992 or 1993. New adobes will be inserted at the undercut wall bases and a sacrifice layer of new adobes will be placed on top of the walls. A volunteer live-in caretaker has been selected to live in a motor home near the fort and protect the ruins from vandalism. In the near future the ruins will be interpreted for the public through self-guided tours.

## PUBLICATION AVAILABLE

Adobe, Pressed-earth, and Rammed-earth Industries in New Mexico by Edward W. Smith and George S. Austin, 1989, New Mexico Bureau of Mines and Mineral Resources, Bulletin 127, 60 pages, 7 tables; 91 figures; softbound; $6.00 plus tax and postage ($6.00 + $0.31 + $1.50 in USA).

The earth construction industry in the United States is most developed in the American Southwest, particularly in the State of New Mexico. This publication is intended as a reference for both specialists and nonspecialists interested in earth construction, which is commonly referred to as adobe.

Adobes (or sun-dried mud bricks) have been produced in New Mexico for hundreds of years, and in the last 15 years the annual production of earth bricks (both traditional adobe and pressed-earth blocks) has been consistently about 4 million. Although adobe accounts for most of the production and is used in most earth construction structures produced in New Mexico, the pressed-earth block and rammed-earth industries have their proponents as well. The authors seek to identify and discuss all phases of these three industries, from the early Indian use of puddled adobe before the Spanish conquest of New Mexico in AD 1598 to the modern-day, solar adobe houses in the city of Santa Fe. This mode of construction is so popular in present-day Santa Fe that million-dollar adobe houses are not that unusual in the capital city.

The text includes sections on terminology and characteristics for all New Mexican adobe construction, geology of adobe soils, preservation of adobe structures, and on modern concerns such as radon generation from soils, adobe construction in seismically active areas, and thermal properties of adobe. Various commercial adobe operations employing handcrafting, semimechanized, and mechanized techniques are profiled to illustrate how adobes are produced. The pressed-earth block industry in New Mexico is similarly explained in a discussion of five types of hydraulically operated, gasoline and diesel-powered machines developed and sold in the state, as well as two hand-powered machines used from the 1950's into the 1980's. Rammed-earth companies in New Mexico have produced a number of

houses; these operations and the techniques they used are described. The advantages of using native soils, particularly in the high dry climate of New Mexico, are discussed; and a summary and conclusions follow.

Three appendices comprise the analyses of the particle-size distribution and clay-size mineralogy of commercial adobe soils, test data on the physical properties of adobe bricks and pressed-earth bricks, and the 1988 New Mexico Building Code relating to Unburned Clay Masonry (adobe). The publication concludes with a list of references and a glossary.

Copies are available from the New Mexico Bureau of Mines and Mineral Resources, Campus Station, Socorro, New Mexico 87801, USA.

## TRAINING OPPORTUNITIES

**The 7th International Conference on the Study and Conservation of Earthen Architecture (Terra 93)** will be held in Silves, Portugal, October 24-29, 1993. Building on the results of previous conferences, which were organized to promote ideas, experiences, methods and research on the earthen architectural heritage, Terra 93 seeks to provide a forum for further exchange of information in this domain. For more information contact: Margarida Alcada, D.G.E.M.N., Praca do Comercio, 1194 Lisboa, Portugal; tel (1) 8880995, fax (1) 8880957.

**The University of New Mexico School of Architecture and Planning** in conjunction with the **Office of International Technical Cooperation (OITEC)** is preparing to offer a workshop on earthen architecture primarily for Latin American architects and building officials. It will be given in English and Spanish. Contact P.G. McHenry, AIA, 4601 Montano NW, # 52, Albuquerque, NM 87120.

## US/ICOMOS NEWSLETTER

### US/ICOMOS TRUSTEE AND FELLOWS NOMINATIONS

US/ICOMOS is seeking nominations for positions on the Board of Trustees that will fall vacant in 1993. A cover letter and a curriculum vitae of the nominee should be sent to Terry B. Morton, President, by December 1, 1992. The Nominating Committee will review all suggestions and make its recommendations to the annual business meeting scheduled for January 16, 1993.

US/ICOMOS is also seeking nominations for 1992 Fellows. The criteria and guidelines are as follows: "The United States Committee of the International Council on Monuments and Sites shall honor, for achievement in international preservation, American scholars, professionals and civic volunteers, who have made notable long-term contributions to the enhancement of the quality of life. Those honored shall be known as Fellows and must have worked to advance international preservation standards and programs. Outstanding accomplishments shall be recognized in one or more areas of activity, including but not limited to architecture, architectural history, conservation, history, landscape architecture and urban planning. Nominees shall be members of US/ICOMOS. The sponsor of a nomination shall submit a digest of the nominee's career and achievements. It must contain a biographical sketch and summarize and editorialize the nominee's accomplishments in the international preservation activity in which the nominee has excelled. The sponsor shall list five individuals as references, to whom the jury will write for supporting letters. Sponsors must not solicit supporting letters."

### 1993 ROME PRIZE FELLOWSHIP

The American Academy in Rome announces the 1993/94 Rome Prize fellowship competition in the fields of Architecture, Conservation, Historic Preservation, Landscape Architecture, Urban Design and Urban Planning. The deadline for the competition is November 15, 1992. Each Rome Prize recipient is provided with a stipend, travel funds, room and board, and a study studio in which to pursue independent work for six months to two years at the Academy's eleven acre, ten building facility in Rome. Applications may be obtained by writing to the Fellowships Coordinator, American Academy in Rome, 41 East 65th Street, New York, New York 10021-6508, tel: 212-517-4200. Specify field of interest when requesting an application.

### TRAINING OPPORTUNITIES

**Masonry Conservation,** a two semester course beginning on Tuesday, October 20, 1992, will be held by RESTORE at the Architects and Designers Building in New York City. The course will be held each Tuesday evening from 6 to 8 p.m. and will continue through March 1993. For information contact: Jan C.K. Anderson, RESTORE, 41 East 11th Street, New York, NY 10003, tel: 212-477-0114.

**The Conservation of Excavated Sites: New Approaches and Techniques** will be held May 10-21, 1993, in Paphos, Cyprus. The course is offered by the Getty Conservation Institute and the Department of Antiquities of Cyprus and will address the following topics: defining the values and significance invested in excavated sites; surveying the physical condition of the site; identification of factors contributing to deterioration; selecting conservation options; site conservation measures and site maintenance. For information contact: The Training Program, The Getty Conservation Institute, 4503 Glencoe Avenue, Marina del Rey, California 90292, tel: 310-822-2299.

**The Attingham Summer School** will meet from July 9-27, 1993. The course will be based in three locations: West

Dean, Sussex, Nottingham University and St. Edmund Hall, Oxford. The **Attingham Summer Week** will be held in Devon and Cornwall from June 1-9, 1993. Brochures and applications for both programs may be obtained from: Mrs. Sybil Bruel, 285 Central park West, New York, New York 10024, tel: 212-362-0701, fax: 212-580-9352. Applications must be received by January 15, 1993.

## CALL FOR PAPERS AND PRESENTATIONS

The international seminar, **Preservation of the Industrial Heritage - Gdansk Outlook,** will be held in Gdansk, Poland, from May 11-14, 1993. The primary objective of the seminar is to bring together specialists to provide a forum for an interdisciplinary overview of research and technical expertise. Participants wishing to present a paper at a panel discussion or session are invited to submit a 500-word abstract, typewritten in English. Four copies of the abstract should be sent before September 30, 1992, to: Preservation of the Industrial Heritage, Waldemar Affelt, mgr inz, Secretary, c/o Politechnika Gdanska, Wydzial Budownictwa Ladowego, ul. Majakowskiego 11/12, 80-952 Gdansk, Poland, tel: 48-58-47-17-16 and 48-58-47-25-31, fax: 48-58-41-58-21.

## PUBLICATIONS

The ***Official Congress Proceedings*** of the Third Global Congress of Heritage Interpretation International are now available for $25 per copy and $5.00 postage and handling. The proceedings include 130 papers representing the state-of-the-art in heritage preservation and interpretation, with special emphasis on heritage-based tourism. With contributors from nearly 40 countries and diverse professions, the proceedings offer a cross-section of viewpoints and approaches. To order send check or money order to: HII Congress, c/o UH Sea Grant, 1000 Pope Road, MSB 226, Honolulu, HI 96822, or call 808-956-2866.

***Report on International Preservation***, a special issue of Places, A Quarterly Journal of Environmental Design Vol. 8 No. 1 (summer), is dedicated to issues of preserving buildings, towns, villages, countryside and monuments worldwide. Reports from China, Japan, Australia, Burkina Faso and others. Topics include tourism, traditional dwellings and arts, public policy and restoration. To order send $14 to: Places, 110 Higgins Hall, Pratt Institute, Brooklyn, New York 11205 or call 718-399-6090.

***Mechanical and Electrical Systems for Historic Buildings***, McGraw-Hill, 1991, is available from: Building Conservation International, 1924 Arch Street, Philadelphia, Pennsylvania 19103, tel: 212-567-0547, fax: 215-564-4850.

## CALENDAR EVENTS

¤ **September 23-26, 1992.** "Forward to the Past" will be the theme of this year's annual **APT Conference**, which will be held at the Sheraton Society Hill in Philadelphia, Pennsylvania. For immediate information contact APT at 703-373-1621 or 1622.

¤ **October 9, 1992.** US/ICOMOS will hold its annual **Breakfast and International Preservation Session** at the 46th National Preservation Conference to be held from October 7-11, 1992, in Miami, Florida. The US/ICOMOS breakfast will take place Friday, October 9, from 8:00-9:00 a.m., and will be followed by the international session "Preservation in the Caribbean: Honoring Cultural Diversity." ***Special Note to Members:*** *US/ICOMOS members who wish to make a brief (10 minute) presentation on international preservation projects or activities during the breakfast should submit their requests and topic outlines, as soon as possible, to US/ICOMOS.*

¤ **October 14, 1992.** Building Conservation International will present **The Seventh Annual British Connection**, a transatlantic exchange of ideas on building conservation. The seminar will be held at the Genealogical and Biographical Society of New York, 122 East 58th Street, New York City. For information contact: Gersil Kay, Building Conservation International, 1924 Arch Street, Philadelphia, Pennsylvania 19103, tel: 212-567-0547, fax: 215-564-4850.

¤ **December 6-12, 1992. Environment and Archaeology,** Emerging Trends and New Techniques for Heritage Management and Sustainable Development in Tropical Forests will held in San Juan, Puerto Rico. The conference will be sponsored by the Organization of American States and the Forest Service of the U.S. Department of Agriculture. It will address critical environmental issues facing tropical forests today and will examine how the study and practice of archaeology can be used to help resolve these issues. For information contact: Dr. Agamemnon Gus Pantel, Conference Chair, USDA Forest Service, Box 25000, Rio Piedras, Puerto Rico, 00928-2500, tel: 809-792-2458, fax: 809-792-7882.

¤ **February 17-19, 1993.** The **Interiors Conference for Historic Buildings II** will be held in Washington, D.C. This conference will provide a national forum to address successful methods of preserving and re-using interiors of historic buildings. A mix of plenary sessions will be presented covering six major subjects: Evaluation and Planning; Maintenance and Protection; Architectural Features and Systems; Finishes, Fixtures and Furnishings; Traditional Artisanry and New Technologies; and Stewardship, Rehabilitation and Long-Term Use. For additional information contact: The Interiors Conference for Historic Buildings II, P.O. Box 77160, Washington, D.C. 20013-7160, tel: 202-343-9578.

## ATTENTION!

**US/ICOMOS members who plan to attend the 10th ICOMOS General Assembly in Colombo, Sri Lanka, but who have not received registration materials** are urged to contact US/ICOMOS immediately to receive copies. Registration forms can be requested by mail or by calling US/ICOMOS at 202-842-1866.

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