is a growing awareness of its feasibility in housing (see Crocker article, below). New Mexico has an adobe building code (that is currently under revision), which makes it even more practical for the building industry to adopt. The future revision of the codes will more closely reflect the appropriate use of materials in association with adobe (see box, p. 23), and it is hoped that other areas of the country will recognize the practicality and comfort of this building material for housing in the 21st century.


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del país sepan reconocer la practicidad y comodidad de este material de construcción de viviendas para el siglo XXI.


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Ed Crocker


# Earthen Architecture and Incentives at Acoma Pueblo

Earthen architectural heritage is more than artifact, and the conservation of that heritage implies far more than the treatment of material culture. On a small planet occupied by more than five billion people, the immense utility and versatility of earthen architecture is underscored by the knowledge that nearly half those people live in or regularly use earthen buildings of one sort or another. Even if poverty is often the driving force behind the use of earth, the choice of material for two and one-half billion people attends the inevitable conclusion that in the use of earth are solutions to issues that even the affluent may find useful. This essay looks at one case, not yet a history, that is seeking in a mult-disciplinary way to answer a modern need through the use of deep tradition. Incorporating and adapting the ways of the past to the imperatives of the present is heritage conservation in its most esteemed form. The past, after all, is prologue.

If we look at heritage preservation as a living, pertinent, and creative pursuit, we need to help forge a mutually beneficial league joining the arts (yes, the liberal ones to be sure, but more explicitly in this case the plastic ones) and the social sciences. When we speak of "traditional technologies," the context is clearly anthropological within a compelling artistic context. Building design, siting, construction techniques, and use are problems solved differently by different groups, always dictated by physical conditions and cultural mandates. The manner in which those problems are addressed comprise part of a

particular culture's local knowledge; the traditional technologies offer a solution, with both technical and artistic components, to a physical or social need.

In a world of shrinking space, ubiquitous manufactured goods, and environmental degradation, all of which threaten cultural survival, the social sciences, especially anthropology and its attendant disciplines, are working to redefine and attach day-to-day relevance to their practices. Anthropology, ethnology, and archeology are taught and practiced differently today than they were just a generation ago. Implicit in their evolution is the acknowledgment that it is no longer sufficient to observe and report; objectivity, so long the bastion of anthropology's scientific pedigree, is now being complimented with a subjective aspiration to put the lessons of the past actively to work.

Just as the social sciences are working to recreate themselves, architecture (the most ubiquitous of the plastic arts) is undergoing one of its regular self-examinations. For many of us the very term "architecture" marks a discipline that is anything but disciplined, whose history is punctuated by alternating moods of depressed stagnation and brilliant creative explosion, constantly re-assessing itself and changing to either accommodate or flagrantly ignore the exigencies of the moment. Today, led by theorist-practitioners such as Vittorio Gregotti, cognizant architects are re-examining their roles as both conservationists and innovators. Gregotti suggests that both components of architecture, innovation and conservation, have been in a state of "advanced mediocrity" having intellectually retreated to a safe position characterized by an abhorrence of change. Architects, argues Gregotti, can shake the impasse only if they are as attentive to constituencies as to clients, responding as interestedly to craftsmen and communities as to engineers and planners.

In a wonderful and hopeful nuance, anthropology and architecture are thus learning to understand and to use one another's lessons in an eminently suitable context. This happy circumstance is nowhere more clearly illustrated than in the currently evolving approach to the conservation of earthen vernacular traditions. This includes the use of local knowledge in solving the ever-present quandary (as long as the world's population continues to grow) of providing affordable yet culturally appropriate housing for communities.

Among the indigenous peoples of the southwestern United States are those who have been referred to as the "first penthouse dwellers of America." The Pueblo communities of New Mexico and Arizona have long been renowned for their use of local natural resources in the construction of large, sustainable, and highly efficient communal house blocks.

Early photos capture the beauty of the puebloan forms and hint at the adaptive approach to the environment. Later studies, notably at Acoma in the 1970s, verify that the orientation and massing of the house blocks took maximal advantage of solar exposure, allowed minimal exposure to prevailing westerly winter and spring winds, and took a cognizant approach to the conservation of heat. The precise alignment of the facades a few degrees east of south, and the stepped configuration of up to three stories capping the coolest, northernmost rooms were successful answers to environmental challenges. No modern day engineer could contrive a better solution using the materials of the time.

Cornerstones Community Partnerships, a not-for-profit organization, has for the past 13 years been assisting rural communities restore their crumbling earthen religious structures, including churches, kivas, and clan houses, and revive the traditional technologies that led to their rise in the first place. Among the 150-plus communities to whom Cornerstones has provided technical assistance, training, and long-term support have been the pueblo communities of Hopi and Zuni.

At Zuni, where Cornerstones maintained a youth training program in architectural conservation over a period of six years, concern for finding an alternative to the standard Housing and Urban Development (HUD) plans, characterized by frame-stucco row houses outside the confines of the pueblo itself, became an issue of particular interest. Former governor Robert M. Lewis who, during a nearly 30-year tenure brought running water, electricity, and paved roads to Zuni, acknowledged regret that he had allowed HUD to follow the western pattern of housing in a distinctly non-western setting. The clan system as well as the long-established order in which extended families accreted rooms to their homes as needed, was nearly destroyed by the removal of both from the Middle Village into a setting where both clans and families were arbitrarily mixed.

During the last years of his administration Governor Lewis sought ways to reverse that trend. Among his thoughts was the idea of using local resources, both human and natural, in the building of homes. Although Governor Lewis did not live to see his thoughts materialize, the validity of the concept is about to be realized at neighboring Acoma and more distant Santo Domingo.

In 1997 the tribal governments in both pueblos approached Cornerstones for advice and assistance for the conservation of some of their older homes and for the building of new ones. At Acoma the local housing authority under the directorship of Raymond Concho is planning to build a model earthen HUD-financed home in 1999. If all goes well, this could be the harbinger of massive change in the way Indian housing is approached, and the ramifications for low-income housing generally are immense.

With technical assistance from Cornerstones, and with critical services being provided by the University of Pennsylvania, Graduate School of Fine Arts, Department of Architecture, the Pueblo of Acoma Housing Authority has been provided with designs for a subdivision layout as well as plans for solar-heated earthen dwellings. These designs came about through a graduate studio conducted by Tony Atkin at the University of Pennsylvania in which students worked with tribal officials and potential homeowners to derive plans compatible with the Acoma lifestyle. The plans also reflect the features and forms of the early houseblocks.

Construction of the 2,400-square-foot duplex will be predominantly of pressed earthen block. Following the lead set by Santa Fe Habitat for Humanity architect Alfred von Bachmayr, the design includes double-width cavity-walls effectively eliminating the need for insulation. Earthen plasters on the outside and lime plasters within provide sympathetic finishes easily and inexpensively maintained by the homeowner. Brick and earthen floors, *vigas*, and fireplaces downstairs are among the features, and a well-insulated roof over the second story assures that heat is conserved. Although it would be financially impossible to build homes with such amenities using traditionally cast adobe bricks, the use of pressed blocks makes the project affordable.

A cost analysis of the model home demonstrates that the pressed block is in fact competitive even with frame modular homes. Because a pressed block comes out of the machine and is laid immediately in the wall, transport and handling are eliminated and the cost per unit, laid in the wall comes to roughly 3 cents as opposed to a cast block at about $1.50. In the end, the earthen structure will cost approximately 90 cents per square foot more than a manufactured unit brought in from Albuquerque. And, of immense importance, this house will be built by a local labor force. Art and the social sciences are coming together very nicely in this project.

Those of us who advocate the use of earth as a building material, who see not just utility but beauty in homes constructed thus, are heartened by the visionary approach to their housing issues that the Pueblo of Acoma Housing Authority has taken. A great many communities will be watching closely as this project unfolds. If it works, it will bring jobs to the locally unemployed, reduce the import of high-energy-embodied materials such as Portland cement, and will result in homes that are efficient, beautiful, and sustainable. And in the process of building the houses, local knowledge will be passed along through mentorship programs that are part of the training. Strong incentives, indeed.

Loren Eisley commented that “if there is magic on this planet, it is contained in water.* A paleontologist, he was completely in awe of the diversity of life made possible by the presence of water on Earth. If I may borrow the thought from Professor Eisley, I would turn it to the use of builders, both vernacular and professional, and say that if there is magic in their craft, it is contained in earth.

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Note

* Loren Eisley, *The Immense Journey (*New York: Time Inc., 1962), p.10.

Further reading:

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