

new mexico architecture

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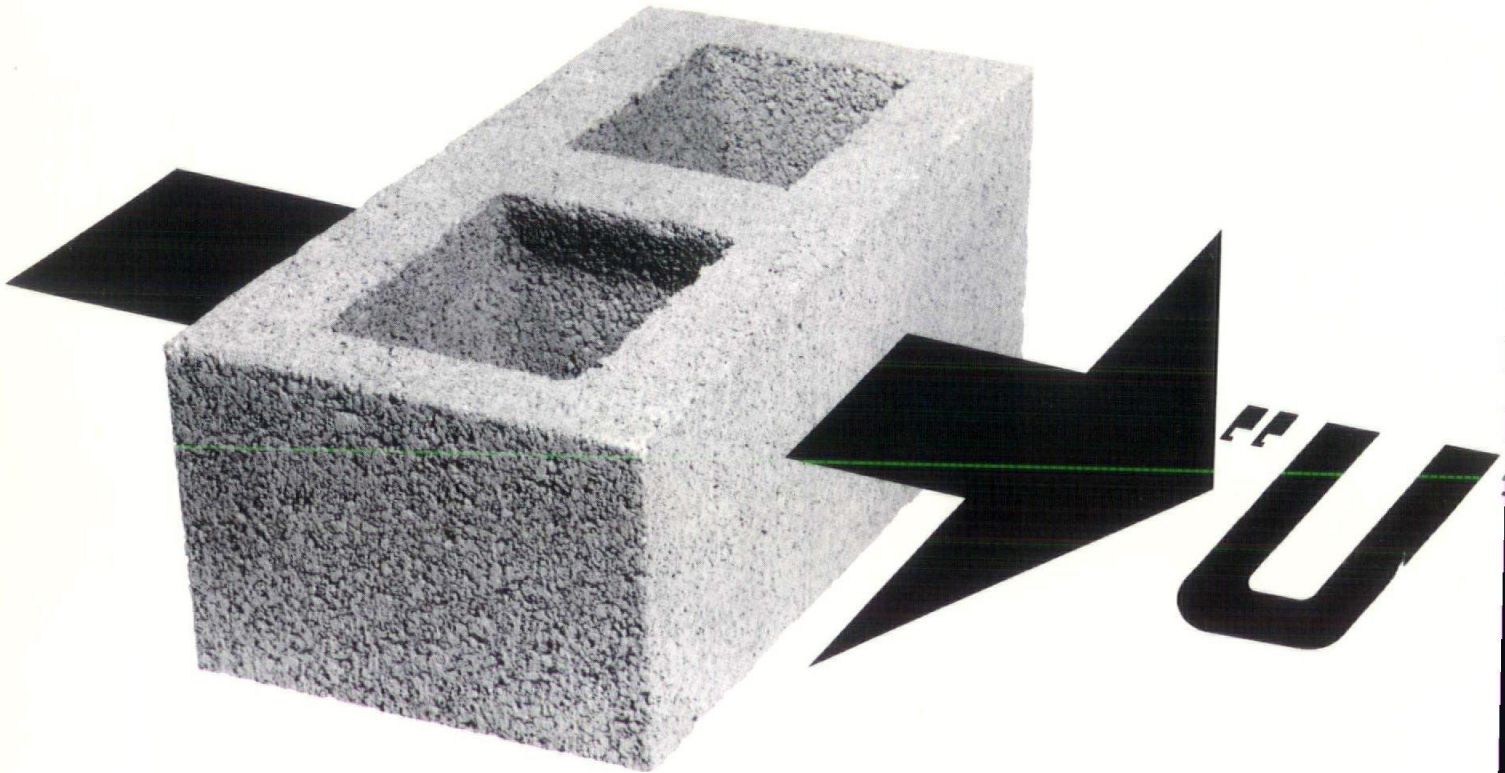
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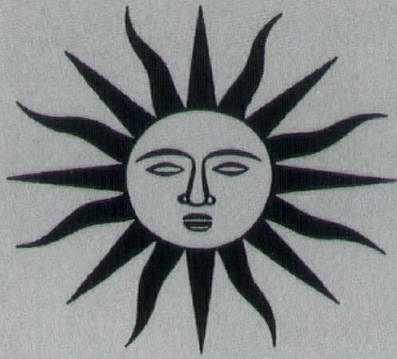
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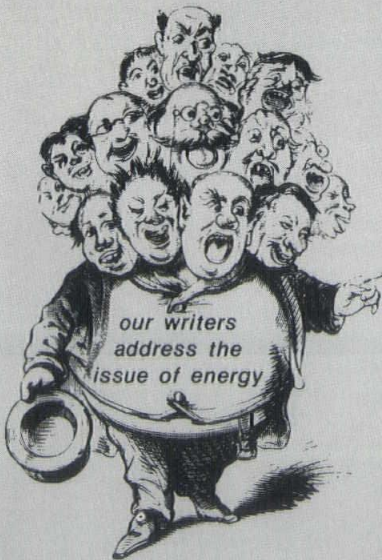


• vol. 22 no. 5 •

On the cover is a photograph of yesterday's inexpensive energy: the power plant at the abandoned Montezuma Hotel west of Las Vegas, New Mexico.

Will solar energy replace coal and oil as a major source of power and heat for the future?

Page 9 announces a special issue of **New Mexico Architecture** which discusses this important issue.



□ □ □ □
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(Cover — Power plant, Montezuma Hotel — Robert Nugent, Photographer)

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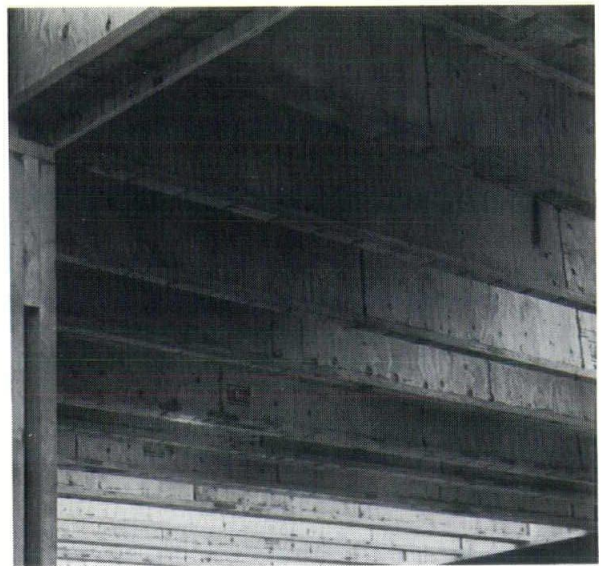
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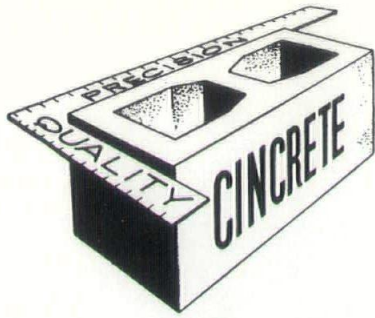
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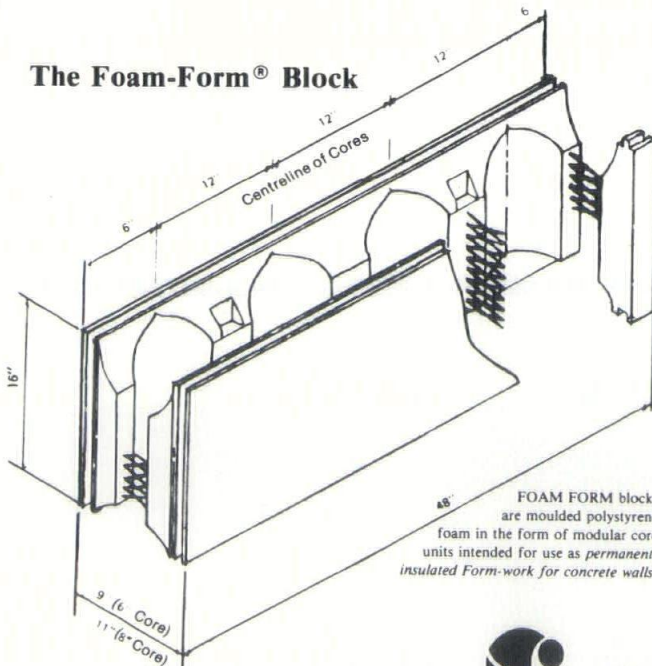
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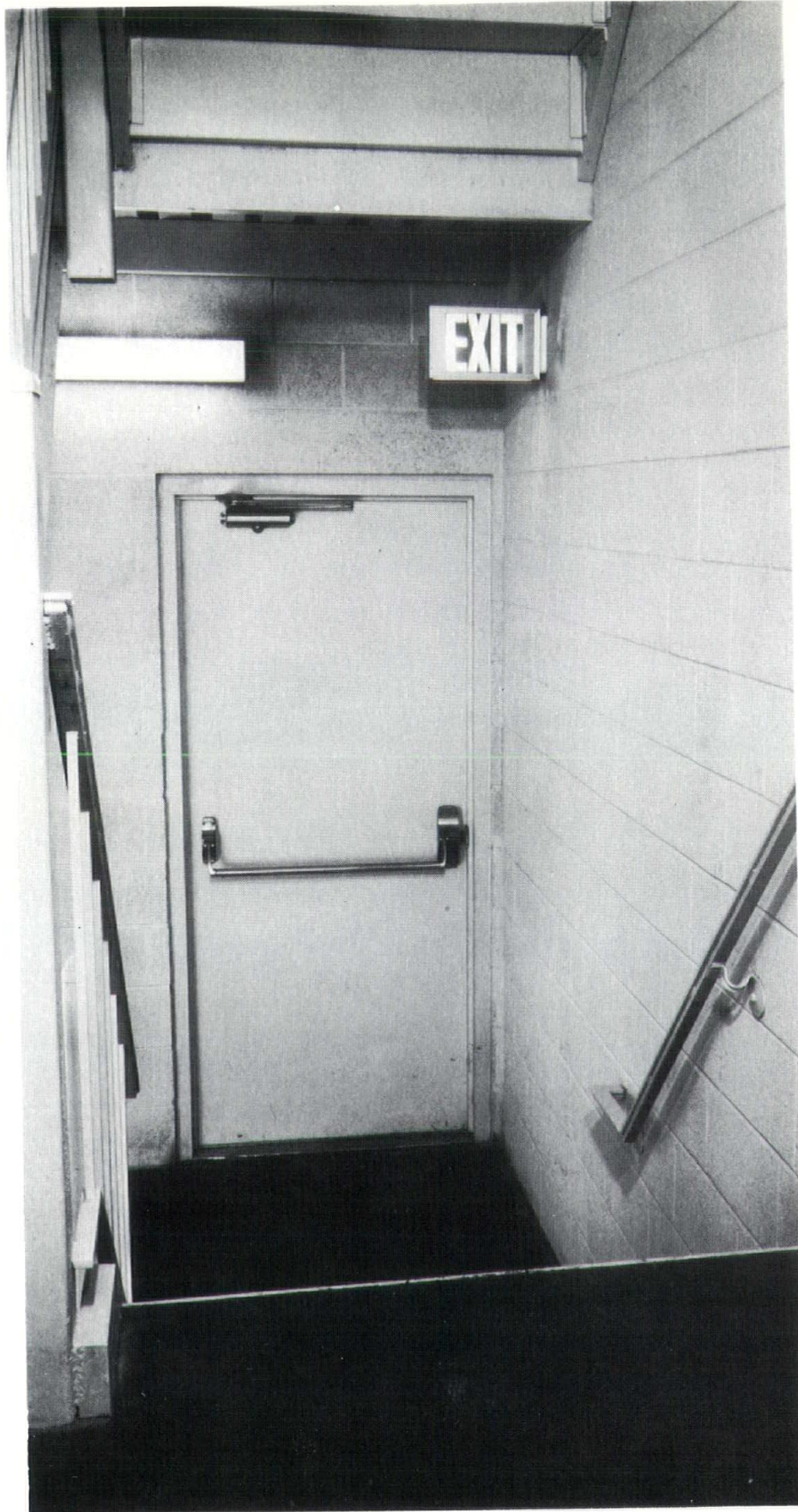
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CONRON AND LENT RECEIVE AWARD

At the annual awards luncheon of the American Society of Interior Designers, ASID, held last August in New York City, the Santa Fe architectural firm of Conron and Lent were presented with a first place national award for the work accomplished on the Palace of the Governors in Santa Fe. The Palace, as all New Mexicans know, is the oldest public building in the United States and one of this nation's most important historic structures.

The ASID Restoration and Preservation Awards are sponsored by the firm of Scalamandre, Inc., whose work in providing carefully researched restoration fabrics, wallpapers, rugs and carpets for over one hundred of our nation's historic structures have made them world renowned.

Conron and Lent, working closely with Michael Weber, Director of the History Division, Museum of New Mexico, and his staff, have restored and renovated eleven rooms and the two halls in the Palace of Governors. Careful research preceded each restoration decision. Nineteenth century window and door trim has been restored in rooms where evidence made the restoration possible. One room has been restored to an 1891 date, when it was the reception room for Governor Bradford

Prince; another room has been restored to its 1911 days when the building had been completely remodeled into a history and archeology museum by famed Santa Fe Archeologist, Jesse Nusbaum.

John P. Conron FAIA/FASID, of the Conron and Lent firm accepted the award and also gave a slide presentation on New Mexico preservation at one of the conference seminar sessions.

1980-81 LECTURE SERIES

Issues in Architecture and Planning is the theme of the 1980-81 lecture series being sponsored by the University of New Mexico School of Architecture and Planning and the Albuquerque Chapter of the American Institute of Architects.

All eight lectures will be given on Mondays at 7:30 p.m. in the Kiva Auditorium on the UNM campus. Admission is free.

The series opened September 15 with a lecture on *The Realities of City Planning* by Allan Jacobs, chairperson of the department of city and regional planning at the University of California at Berkeley. Jacobs, who served as planning director for the City of San Francisco for seven years, has had extensive U. S. and international planning experience.

His most recent book, *Making City Planning Work*, has received widespread acclaim for its con-

tribution to the applied practice of city planning.

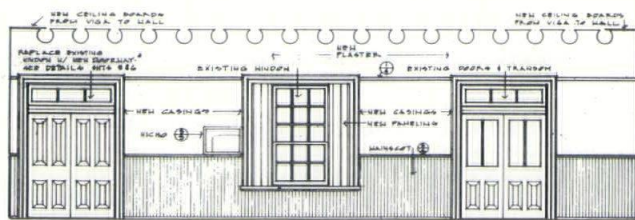
Other lectures scheduled during the 1980 fall semester include:

—September 29, *Designing the Exquisite*, by William Turnbull, director and partner in the San Francisco firm of MLTW/Turnbull. Turnbull, who has been part of many national honors awards juries, has taught at the University of California at Berkeley, Stanford University, MIT and other institutions.

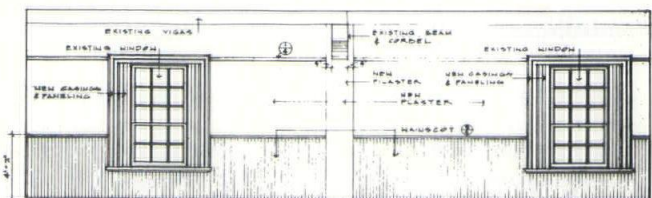
—October 27, *Energy Conservation Issues in Buildings*, by Fred S. Dubin, president of Dubin-Bloome Associates in New York. An internationally recognized engineer and energy management consultant, Dubin's major design projects include the Minnesota Mining and Manufacturing plant in Minneapolis, the Solar Energy Research Institute in Golden, Colorado, and the Salk Institute for Biological Studies in La Jolla, California. He is co-author of the book, *Energy Conservation Standards for Building Design, Construction and Operation*.

—November 17, *Evaluation: Probing the Sins of Architecture*, by Clare Cooper-Marcus, professor of landscape architecture at the University of California at Berkeley. Cooper is also known for her work on post-occupancy evaluations from the user's perspec-

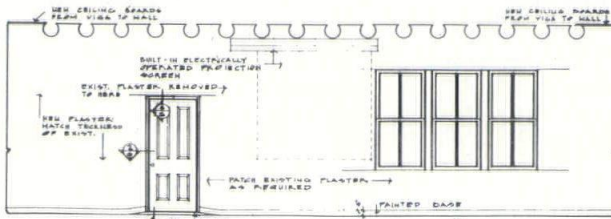
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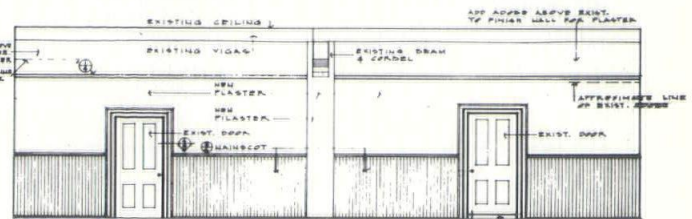
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Drawings of Room 5, Palace of the Governors, Santa Fe.

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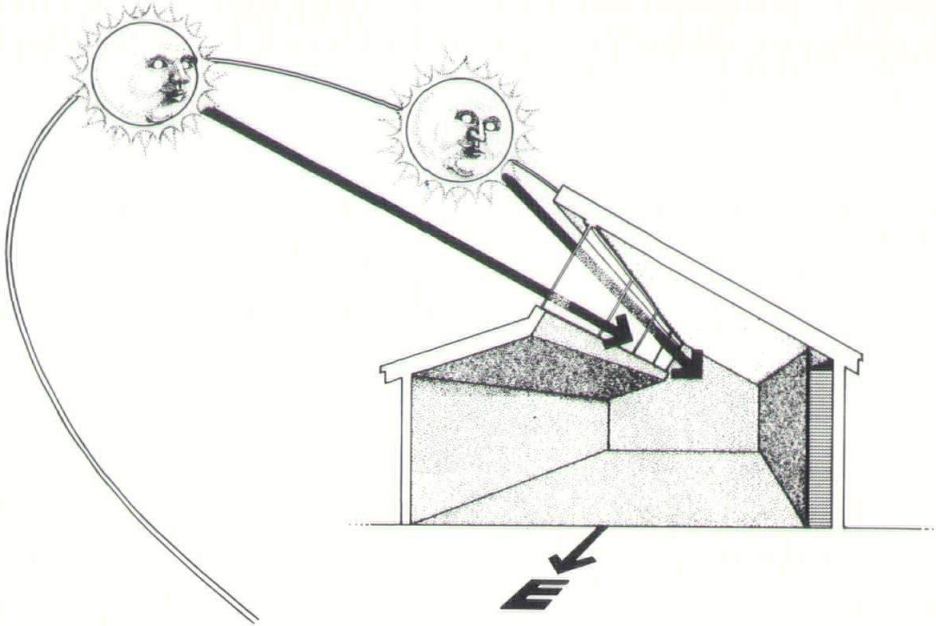
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To Come in the November/December Issue — "Energy."



**How
to
Make
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New Mexico Architecture expects to publish a special, enlarged issue devoted to the *energy crisis* that faces our country. How will this crisis impact on the design of our homes, offices, shops and schools?

Leading New Mexico experts will discuss the challenges and limitations which face the architectural profession and its clients. Architects will show us how they have responded to the challenge.

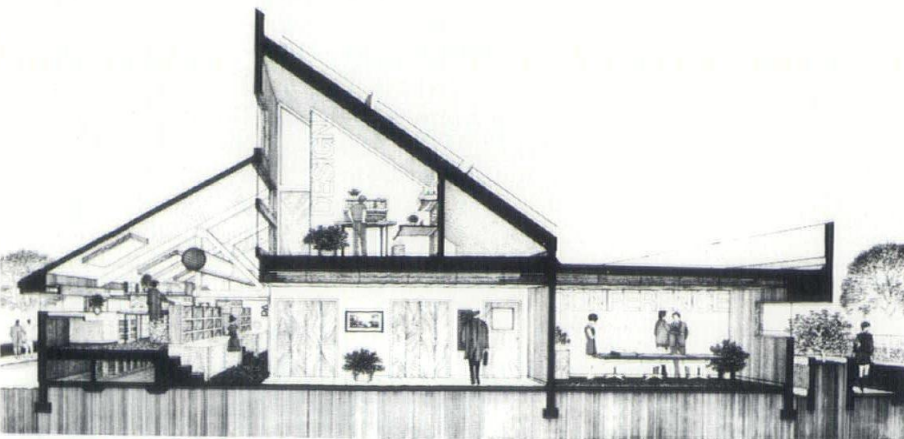
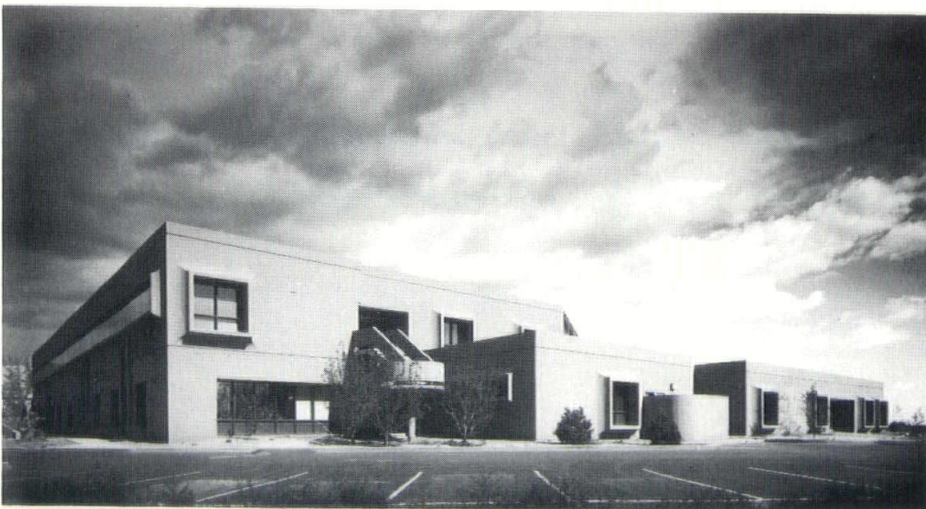
Contributing authors include: Frank H. Bridgers, Dean Powell, Herman G. Barkman, Larry W. Bickle, Edward Mazria, Don Felts, Thomas T. Shishman, James Dritt and Melvin Eisenstadt.

Architects whose work will be shown include; the Burns/Peters Group; Flatow, Moore, Bryan and Associates; Richard Grenfell; Van Gilbert; Schlegel and Lewis; and Schaefer and Associates.

The magazine staff and its advertising agent are seeking support for the special issue.

We hope to be able to generate sufficient support to publish all the material in the November/December issue.

If you wish to be represented in this important magazine please contact Cecil Gates, 505-881-3733.



Building with Earth

by: Lucinda Marshall

The first attempt at creating shelter was probably what we now call the pit house. A hole was dug in the earth; the excavated earth was used to bank the sides of the hole. This was roofed with timber, brush and more earth or other indigenous materials.

Examples of earthen structures above ground, from Biblical times on, are found in all parts of the world. Various building methods have been utilized in their construction.

Making Mudpies in 10 Easy Lessons: A Cookbook

WATTLE (JACAL) and DAUB building involved plastering wood with mud, a time consuming practice. It proved, however, to be a much sturdier structure than the pit house. This type of construction was used by the Hohokams when they built Pueblo Grande (located in Phoenix, AZ).

COURSED WALLS were laid course by course with a mud fluid enough for the builder to mold each level by hand. The top of each course was convex. After the course had dried for a day or so the next course was laid onto and into this convex top. The coursed blocks varied from 8" to 3' in height and from 8" to 12" in width. They were usually laid without a foundation.

In 1591 Spanish explorers reported finding a village, (in what is now Chihuahua, Mexico) Picuris de San Lorenzo, which was built of coursed mud. One structure, Castilla Viejo, was reported to be 8 to 9 stories high. 12 rooms, standing 3 stories high remained in 1900. Pieces of broken bone, ashes, and other material were found as fillers in the structure. The height of the structure is thought to have been possible because the rooms were clustered in a manner so as to support each other. Both the inside and outside of the walls were mud plastered. Vertical posts were also found, serving as support elements throughout the structure.

Coursed walls were also used in the Neolithic villages of the Middle East, such as Qualat Jarmo (Iraq), reportedly built some 8750 years ago. Today Iraqis refer to coursed mud building as 'tauf'.

Some Definitions

COB walls are built of mud (mixed with straw) that is applied in clumps. Each layer of clumps is allowed to dry before the next one is added. Cob houses are still found in England in the Devonshire area. These houses are built on foundations of stone or flint which are usually 9" high by 2' thick above ground.

CHALK MUD building is like Cob except that a different recipe is used for mixing the mud. This type of construction has been used in Wiltshire, England.

<p>RECIPE FOR CHALK MUD: 3 PARTS CRUSHED CHALK 1 PART CLAY & STRAW</p>
--

SOD walls are built from blocks of earth dug from the ground. The type of earth used contains a high vegetation content which binds the blocks together. The blocks are sun-dried and then plastered together.

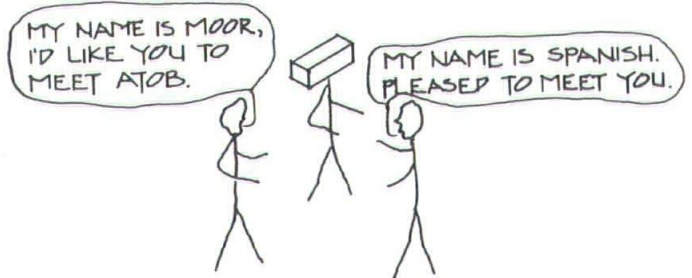
Sod building is still found today but presents problems of weather- and vermin-proofing. It has also been found to be unstable, subject to settling, etc. Sod is also referred to as 'terrone'. Terrone blocks measure 6" x 6" x 10" in size.

PISE' de TERRE*, Rammed Earth, is still used today. It is made by tamping moist earth into heavy wooden forms. Usually large chunks of wall are poured in one piece, but sometimes pre-formed rammed earth blocks are used.

Pise' is thought to have been used during the days of the Roman Empire. The early California colonists probably built some of their homes in this manner. 20th Century examples are numerous. They include Tom Hibben's Birmingham, Alabama housing project, built during the New Deal, which is still in use today. The Humphrey House in a suburb of Washington, D. C. was the first luxury house of rammed earth to be built in the post-WWII era. The Sheets House, in California is the largest rammed earth house in America. Finally, back in the mid-1800's the Church of Holy Cross in South Carolina, a rammed earth building, withstood an earthquake that destroyed most of the other buildings in the area.

PUDDLED MUD construction is similar to pise and is found extensively in the Southwest. The mud is poured into permanent wooden forms which are then studded and sheathed.

BAKED MUD BLOCKS** are referred to today as 'adobe', a word thought to come from the Spanish word 'adobar' (to mix, to knead) and/or from the Arabic word 'atob' (sun-dried brick). Probably the Arabic word was introduced into Spain by the Moors, and its meaning modified later.



Mud blocks have been made in various shapes, ways, and of various materials throughout the ages. Some early blocks were lump-shaped and were 8" to 12" long. Later blocks were cigar-shaped lumps 8" to 10" long. Today pear-shaped blocks called 'tubalis' are used in West Africa. They are composed of clay-soil, water, and fresh-dried grass. At the Casa Grande Ruins (Casa Grande, AZ) baskets were used as forms for pouring the mud.

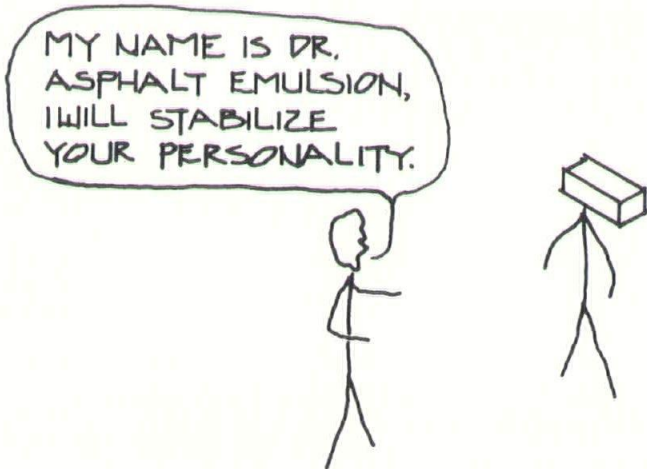
*The French term for what we call rammed earth.

**'Blocks' is used to distinguish adobe from clay 'bricks'.

Mud blocks were used in India as early as 2500 BC and are still used today. They consist of earth straw and Gobri (cowdung) which serves as an adhesive and as water-proofing. The Indian blocks are usually sun-dried. Their minimum width is 18" with an 8' maximum wall height.

Burnt adobe is fired in a kiln at a high temperature for several days instead of being sun- or air-dried.

The soil used to make adobe varies. A formula of $\frac{1}{3}$ sand, $\frac{1}{3}$ clay, and $\frac{1}{3}$ fine silt yields a fairly stable adobe. Fillers such as straw and twigs are frequently used as binders. In addition adobe is sometimes stabilized with such substances as emulsified asphalt (bitudobe).



Rammed earth and mud block construction appear to offer the most potential for present and future building. A more in depth discussion of these methods explains why.

RAMMED EARTH

Rammed earth construction is very stable, fire- and weather-proof. The soil is sometimes stabilized with cement or lime for additional weather-proofing and binding. Pise' is a natural insulator. The available literature, and examples of pise', suggest that this sort of building is best suited for simple construction; i.e.: low sidewalls, few openings, etc. It has been used with seeming success in South Dakota for farm-related structures such as chicken houses and tool sheds.

Pise' construction is particularly sensible when the earth used comes from, or near, the construction site. A preliminary idea of whether or not a site's soil is suitable for ramming is to observe whether the walls of an excavated area stand firm or sluff down. Does the soil remain firm in wet weather or turn to mud? In both cases, if the soil stands firm, it has good potential.

Optimal soil for ramming contains between 40--75% sand. The amount of desirable moisture varies inversely with the amount of sand in the soil. Shrinkage, which can be figured in relation to the length of wall, increases with moisture and decreases with the amount of sand. The sand tends to increase the durability of the soil. Within the percentage limitations of sand content mentioned above, any soil will have ample strength for building, however

strength decreases inversely with the sand content.

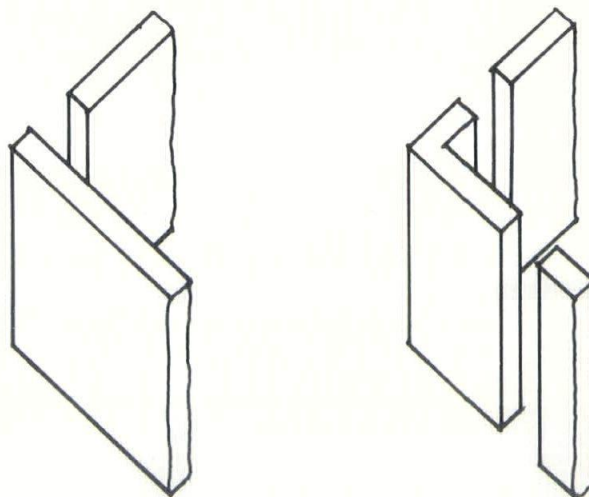
Straw, which is used as a filler and/or binder for adobe, isn't recommended for rammed earth. In some places manure is used as a filler. Whether this adds to or decreases strength and/or durability seems to be a matter of opinion which varies perhaps due to different soils and types of manure. It is worth noting, however, that sources from 'developed' countries put down its use; whereas it is lauded by sources from places such as India where the cow is a sacred animal.

In constructing a pise' wall the earth is, traditionally, rammed into heavy forms. The forms, thicker than those used for pouring concrete, must be able to withstand a very strong outward thrust pressure. The forms are, minimally, 1 $\frac{1}{2}$ " thick.

In recent years several different kinds of forms which are easier to handle than the heavy wooden forms have been developed. Plywood forms have been developed at Texas A & M University. Other forms include a roller-supported form with detachable wooden clamps that takes only 8 minutes to move instead of the 1 $\frac{1}{2}$ hours needed to move the older forms. There is also a braced metal form referred to as the Magdiel Wall Form, after its inventors.

The foundation on which the walls are poured should be at least as thick as the walls that will be poured upon it. The walls should be 12" thick for one story structures and 18" thick for structures with more than one story.

Rather than abutting 2 walls together to form a corner, it is common practice to pour a corner piece and fit the walls to it. Another way to avoid the corner dilemma is to locate openings such as doors and windows next to the corners.



Rammed earth potentially poses some aesthetic limitations. It may be undesirable for interior walls because of its thickness. In addition this kind of construction doesn't seem to lend itself to tricky angles or fancy curves.

Unless the structure is well protected from the weather by overhangs, it is desirable to provide it with some sort of protective coating. Stucco is good for this purpose.

HOMEMADE 2-COAT STUCCO:

3 GAL. SOAPY (STEARIC ACID) WATER
4 PINTS FINE SAND
MIX UNTIL STIFF. APPLY & LET DRY 24 hrs. PAINT FINISHED SURFACE W/ 1lb. COPPER SULFATE CRYSTALS & 3 GAL. WATER

PREVENT INTERIOR WALL DUSTING:

1 PART QUICKLIME
6 PARTS COTTAGE CHEESE (MEDIUM CURD)
SUFFICIENT WATER TO YIELD CREAMY CONSISTANCY

BUTTERMILK INTERIOR PAINT:

4 1/2 lbs. WHITE CEMENT
1 GAL. BUTTERMILK

Paints are unsatisfactory on the exterior. Any sort of covering is permissible on the interior, however.

ADOBE

The decision of whether or not to use a particular adobe is based on: strength in compression, resistance to washing, shrinkage and cracking factors, ability to withstand rough handling, and uniformity of size and shape. Other things being equal, adobe is more insulative than concrete block and is a particularly good sound insulator. It is more flexural than pise'.

If utilization of solar energy is desired, adobe is an excellent building material because of its insulative qualities, surface texture, easily sculptured shape, and thermal flow characteristics.

There is considerable leeway in finding a good adobe soil. However, several points should be taken into consideration. First, shrinking and cracking vary directly with the initial moisture beyond which both strength and density decrease in value. The moisture content of air-dried adobe should be 1 to 8%, which is low compared to other building materials. Like concrete, the greater the adobe density, the greater its compressive strength (although adobe is generally not as strong as other building materials).

Structural tests at the School of Engineering in Christchurch, New Zealand showed that a 1' length of 8" thick soil (cement-stabilized) wall will carry over 21 tons at failure. The weight of each lineal foot of wall 8' high was approximately 1/4 ton; leaving 20 3/4 tons for roof weight--far more than conventional roofing weight.

Another consideration in the choosing of a soil is whether or not it should be stabilized and/or filled; and if so, with what?

Asphalt stabilization yields blocks that are relatively maintenance free. Although it isn't necessary, they can be plastered or painted. Asphalt-based aluminum paint bonds well with asphalt-stabilized blocks; they are water-resistant and are completely unaffected by termites. Slow-setting emulsion is best because it doesn't separate into pure asphalt and water until it is thoroughly mixed with the soil. The term for asphalt emulsion stabilization is 'bitudobe'. Bitudobes are made with special mechanical equipment and are smaller than unstabilized blocks.

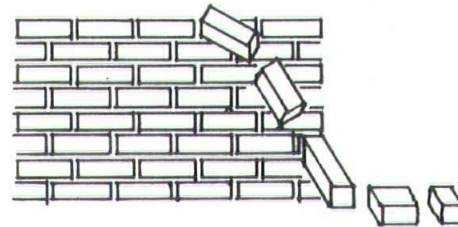
Portland cement stabilization adds a lot of strength to the adobe but doesn't waterproof it. The finished block needs to be coated with a sealer. Lime, which becomes waterproof as a result of what is called the pozzolan reaction, (or interaction with other elements in the soil) can be added as weatherproofing.

Shredded polypropylene added as a filler to the soil makes a less crumbly block but doesn't increase its strength. Wood chips reduce the weight of the soil, which is particularly valuable in roof construction.

In making adobe there are several choices concerning how the block is to be made. It can be hand-made or machine-made. It can be sun-dried or kiln-baked (burnt adobe). The machine-made blocks are stronger and more uniform in size than hand-made blocks. However, they must be made from a dry, rather than the customary wet, mix; and it is very hard to achieve a well-mixed dry mixture.

Burnt adobe is very absorbent and its exterior use is generally limited to arid regions. Their temperature insulation isn't as good as that of sun-dried blocks either, because the earth is fused during firing, causing the blocks to conduct more heat.

A good foundation as well as proper finishing is essential with adobe building. Poor quality or improperly treated adobe may very well conduct termites to any wood portions of the structure.



HUMPTY THE UNSTABILIZED BLOCK
SAT ON A WALL
HUMPTY THE UNSTABILIZED BLOCK
HAD A GREAT FALL

Certain mortar mixes are best suited for each of the variations of adobe. A cement-lime mortar works best with burnt adobe. Masonry cement may also be used. Stabilized mortar should be used with stabilized blocks. Lime-clay mortar works better with asphalt-stabilized blocks. The lime's optimality is due to its plasticity/workability as well as its waterholding qualities. In all cases, the mortar should be as strong as the blocks it is used with.

There are fairly universal common strength requirements for earth construction. Compression

strength should be at least 300 lbs. per square inch (psi). Tension/shear strength should be 50 lbs. psi.

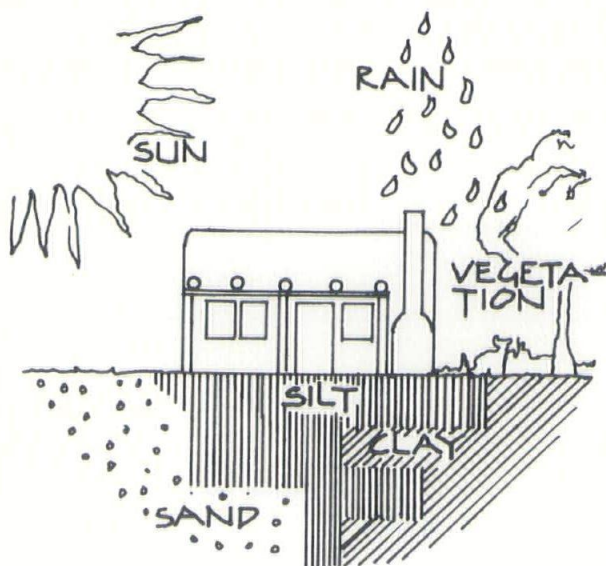
When determining how much dirt will be needed to make how many adobes, it is found that 5 to 8 cubic yards of dirt will make 400--500 blocks; assuming an average size of 10" x 4" x 14" and a weight of 35--40 lbs. The wall thickness should be 1/8--1/10 of the structure's height. Unburnt adobe is thought to be suitable only for structures up to 2 stories in height. The height of the structure may also be placed under some limitation due to the weight of the adobe.

Uncoated adobe will last 25--40 years in arid climates if the top and base of the structure are protected from the weather. If an exterior coating of the adobe is desired, it should be chosen on the basis of appearance, watertightness, durability and cost. On this basis, whitewash alone should not be used since it is neither durable nor waterproof. Linseed oil is also unacceptable due to its high cost and because at least 3 coats need to be used.

There are several disadvantages to using adobe as well as some technical considerations and difficulties. The main technical problems with using adobe are: 1) expansion and shrinkage/cracking and 2) water solubility.

Another technical consideration is that adobe is considerably more difficult to lay than cinder blocks; because of its weight and the irregularities among blocks it is usually only possible to lay 3 courses a day.

A study done by the Center for Environmental Research and Development at the University of New Mexico states that contractors and architects they had surveyed thought that adobe wasn't used more often because of: inadequate supply, undependability of delivery at a predictable time and price (which is quite high due to the weight of the blocks), and labor costs. An incidental but significant note--the study also stated that adobe could be a good material for use in self-help building situations.



CEMENT LIME MORTAR:

2 PARTS CEMENT
1 PART LIME
12 PARTS SAND

MASONRY CEMENT:

5 PARTS SAND
1 PART MASONRY CEMENT

TO COAT OR NOT TO COAT THE ADOBE--
THAT IS THE QUESTION!



Another very plausible reason that adobe construction isn't more prominent than it is, is the existence of fairly restrictive (in this regard) building codes. For instance, the City of Phoenix requires a wall thickness of at least 16" and a thickness:height ratio of 1:10 for unburnt adobe; and a minimum thickness of 8" and a thickness:height ratio of 1:12 for burnt adobe. Unburnt adobe construction is limited to 1 story in height. All adobe structures must have a weather-proofed exterior coating despite the fact that it is seemingly possible through stabilization to adequately weatherproof a block against a climate as mild as Phoenix'.

Structural limitations are due, in part (according to several City of Phoenix building inspectors) to Phoenix' classification as a Seismic Zone II area. It is questionable whether the fears about earthen construction are valid. One is reminded of the South Carolina church of pise' construction that withstood an earthquake. Also, there are reasonable arguments that with proper reinforcement, earthen construction could be brought within a very acceptable compression load ratio.

It has also been suggested that the codes' narrowness may be a result of pressure from various construction concerns, such as the concrete industry, which fears perhaps that if the merits of earthen construction are suddenly discovered by would-be homeowners, the concrete business isn't going to be so good-- and that just might be right!

A LOOK BACK

By now you may be wondering if humankind is coming or going. A cursory glance at the houses in which we live seems to indicate a sense of sterility and conformity as if dampers, not entirely definable, have been placed on the creativity of our applications of earthen construction to the problems of human

shelter. History amply exemplifies the potential breadth of earthen building.

In the Loess (silt) region of China people still live in below-ground dwellings. The dwellings are set 25' to 30' into the ground and have vaulted ceilings 15' high. They open onto sunken courtyards. Reportedly, these dwellings are appropriately warm in winter and cool in summer. They are also said to be free of vermin. Fields of crops are planted above the houses.

The first houses to be built above ground were probably used for storage purposes. In Ghorfa, Tunisia there are earthen structures built into the sides of hills which were used first for storage, then for living, and today they have deteriorated to the point where once again they are used mostly for storage. They appear as if they were built up upon each other. The first above ground structures built by the Hohokam Indians were also for storage and were primarily of wattle and daub construction. These structures gave way to dwellings of puddled mud, coursed and rubble rock construction at the Pueblo Grande settlement, and caliche (a limey subsoil) at Casa Grande.

At Pueblo Grande the structures were as high as 8'. At Casa Grande they were built on a 5' level of fill. The thickness of the walls (3'--4½' at the base) tapered off as they got higher to reduce the weight put on the foundation.

One of the reasons the walls were so thick may have been defensive. This possibility is bolstered by the fact that most pueblos were accessible only by either ladder or ceiling openings so that access could be cut off to enemies. This arrangement differs considerably from the elaborate stairway entrances to spaces such as in some of the palaces of Tunisia and Morocco and some of the Mayan temples in Mexico. These stairways were not only functional but also an integral part of the design of the buildings they served.

Many cultures, particularly those living in regions with harsh weather, have endeavored to create alternatives to the flat roof.

In places such as Lake Titicaca in Peru, which experiences heavy rainfall throughout the year, dome-shaped roofs were once common. Today cone-shaped roofs, constructed of mud and brush are found.

Similar roofs were apparently used in South Africa, but the only source on this information (an 1831 issue of a South African engineering journal) was unobtainable.

The shape of the teepee dwellings of the Indians of the southwestern U. S. may have evolved for the same reason.

In Iran and Egypt (particularly tomb architecture) the Barrel Vault has been used extensively. The arch (minus any plastering) usually measured 10" thick. Since the barreled roof exerted a high thrust pressure on its intersection with the vertical walls, the walls are (in some cases) 3'--4' thick. The thickness of the walls and ceiling provide excellent insulation. Another feature of the Iranian houses are the block size, 10" x 10" x 2", a smaller block than those commonly used in the U. S. today. The size of the blocks makes it much

easier to erect high walls without support forms.

Although many cultures have confined themselves to structures of minimal height, many others, from Biblical days on, have built earthen towers of incredible heights for this sort of construction. The oldest tower is thought to have been the Tower of Babel.

Some may say that building standards today are strict, but in ancient Babylon if a building fell down the builder suffered the same fate as the occupants. The name of the Tower of Babel's builder has been, needless to say, obscured by history.

Other more recent structures give testament to the fact that it can be done including the towers of Hannibal and the High Lama's Palace in Lhasa, Tibet of which the top 5 stories are of sun-dried block.

The ruins of one mud skyscraper in Morocco are still standing today. Bou Malne, a family stronghold, looks like a fortress. It was built of clay, straw, pebbles, and some wood. No lime, cement, or structural members are used in Bou Malne. The interior walls are of unbaked mud block.

AN OPINIONATED SUMMARY

Very legitimate pros and cons are offered in the ongoing debate about the use of earth as a building material. On the one hand, there are concerns about weathering, the difficulties in preparing an appropriate soil, and how high is safe. On the other side, there are arguments for the economy and potential simplicity of building out of earth, its energy saving qualities, and its plasticity.

Weathering and crumbling in earthen construction are valid but not insurmountable problems. It has been pointed out that many earthen structures still stand after hundreds of years. Taos Pueblo, Casa Grande and the Palace of the Governors in Santa Fe come quickly to mind.

A couple thousand years is a little longer than the desired longevity of most houses. But I would submit that with the technical abilities that we now have added to the tried and proven building methods of old it should be entirely possible to build a dwelling with a more than satisfactory stability and longevity. Weathering can be controlled very satisfactorily with soil stabilization, protective exterior coatings, the use of overhangs, etc.

I feel very hesitant to say I disagree with the building codes' limitations on height. With the reinforcement technology that is at our disposal, it is possible to erect acceptable buildings of more than one and two stories.

There is a lot of information available on what percentages of what should be found in each type of soil for each type of earth construction. Some of the information conflicts, some gives rigid guidelines, other sources give only the most general criteria. Soil varies from place to place and, where possible, the best information about soil composition and the practicality of a particular construction method may well be found by talking to people who have built out of earth in the area in which you wish to build.

I find it slightly absurd to question the aesthetics of earth. Earthen construction is a far more organic mode of shelter building than such commonly used materials as slump block. It provides a sense of harmony with our ecology which I feel is essential to providing more than a brief remainder to the life of our civilization.

The wall thickness as well as soil content provide another valuable asset to any structure-insulation. Earth is a natural sound and temperature insulator. It can facilitate a large savings in the rapidly rising cost of energy. Without added insulation in a world of ever increasing noise pollution, the extra quietude provided by earthen building could prove quite precious.

Finally, building from earth can be quite economical. The proximity of building materials, the do-it-yourself-because-it's-really-fairly-easy aspect, the insulative qualities and so on bring down its comparative price.

Our society seems to perpetually discard old ways for new in search of perfection, the good life. But perhaps our ancestors weren't so primitive as we would like to think.

Widespread use of earthen construction is not monetarily advantageous "for the building business"; nor is it as seemingly impregnable as the massive ways in which we use concrete. But it has what I think are qualities advantageous to the people it will shelter, consumers of housing. And it is truly a natural, which is I think the most compelling reason why we should advocate its use and improvement.

BIBLIOGRAPHY

I have listed here only those sources which I found most helpful. They are broadly divided into "HOW TO" and "HISTORY" references although the scope of most sources overlaps the 2 categories. Some of the material was written 10 or 20 or more years ago and there is a tendency to say 'this stuff must be dated and reading it will be a waste of my time'. Some of it probably is, but as I've tried to impress throughout this paper, earthen building methods haven't changed that much over the years and a lot of the older material presents very good detailed information which has not to my knowledge been significantly improved upon in recent years.

Other sources for information which I found quite helpful were the ASU Architecture Library, City Building Departments, and the Museums at Casa Grande and Pueblo Grande. U. S. Government Documents and United Nations publications may also prove to be helpful sources.

L. M.

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A pueblo street scene. (Circa, 1882)



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tive in low-income housing and public places. She is the author of the book, *Easter Hill Village*.

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—March 30, *The Basics of Design: An Overview*, by William W. Caudill, chairperson of the board of directors of Caudill, Rowlett and Scott of Houston. He has authored 11 books and more than 80 articles and research reports. From 1961 to 1969 he was the director of the School of Architecture at Rice University in Houston.

—April 13, *Women in Architecture: The Great Challenge*, by Ellen Perry Berkeley, architectural journalist and critic. She is a former senior editor of *The Architectural Forum* and *Architecture Plus* as well as associate editor of *Progressive Architecture*. She is one of nine founding members of the Alliance of Women in Architecture and one of seven founding coordinators of the Women's School of Planning and Architecture.

Further information about the series can be obtained by contact the dean's office in the UNM School of Architecture and Planning, 2414 Central Avenue SE.

HISTORIC LANDMARKS SURVEY UNDER WAY IN ALBUQUERQUE

Three City of Albuquerque employees work in the old, high-ceilinged offices on the third floor of the Kimo Theater. Among them they probably know more about the older sections of the city, its ancient buildings, and its senior citizens than do any other city employees. The three are staff of the Historic Landmarks Survey of Albuquerque, a program started in 1973 and funded at present half-and-half by federal funds granted through the State Historic Preservation Bureau and the City of Albuquerque.

The object at the state and local levels is to record and keep intact buildings of historical significance. Local operations focus on Albuquerque and a surrounding five-mile circle. Because of growth patterns and history of the area, most of the significant historic buildings designated so far have been in the near-north and south valleys, in Old Town, and in the historic city core.

Over the past years, the city has been using federal funds to assist in the rehabilitation of older houses in "community development" areas. Before starting such rehab programs, the community development staff asks the Landmarks Survey staff to survey the area to be worked to assure that no houses, churches, commercial stores, or other buildings of historic interest are about to be razed or face-lifted without regard for their potential historical significance.

Houses to be destroyed in a CD program are listed and submitted to the Landmarks Survey staff to allow an evaluation of their historical or social character before the wrecking ball swings or the bulldozer slashes into them.

One victory for the Landmarks Survey office is the salvation of the old Duranes Chapel. The chapel lies west of Indian School Road and its intersection with Rio Grande Boulevard. Several years ago the neighbors complained that the building was in such bad repair

that it was a hazard and that it should be condemned and razed. Ray Garza, city housing code inspector, looked at the chapel, and suspecting its historical value asked the Landmarks Survey to look at it.

The Landmarks Survey strongly agreed to the chapel's value and got the local padre and neighborhood to rally round the cause of saving the structure. The people of Duranes are now rebuilding the chapel with their own labor and love.

Susan Dewitt is coordinator of Historic Landmarks Surveys, working with Mary Davis, archivist/survey person, and Kathleen Brooker, historical architect.

The field duo of Davis and Brooker photograph buildings of interest, and fill in standard survey forms from observations, site measurements, and conversations with neighbors. Information from survey forms is used to create historical maps of the area. The surveyors also create a list of homes of interest for architectural or historic reasons.

Individual houses can be nominated by the owner, by a neighbor, by an architect, or by a member of the Landmarks Survey team for inclusion in the New Mexico State Register of Cultural Properties. Properties can also be nominated to the National Register of Historic Places. Acceptance in the register can depend on the property's representing outstanding architecture, being connected with important events, being connected with people significant to the past, or being a place where information likely to increase our understanding of the past may be found.

Through surveys of older, historically meaningful homes in Albuquerque has come the book, *Historic Albuquerque Today*, written by Susan Dewitt with Mary Davis as art editor, published by the Historic Landmarks Survey of Albuquerque.

The value of the City's Historic Landmarks Survey lies in its ability to fit in pieces of the puzzle which is Albuquerque's history.

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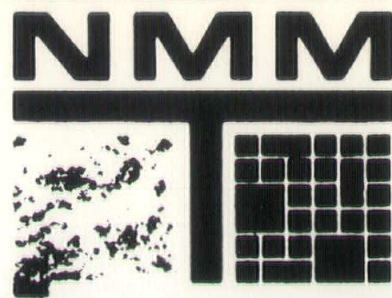
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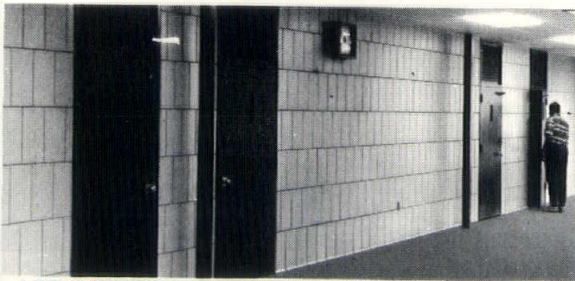
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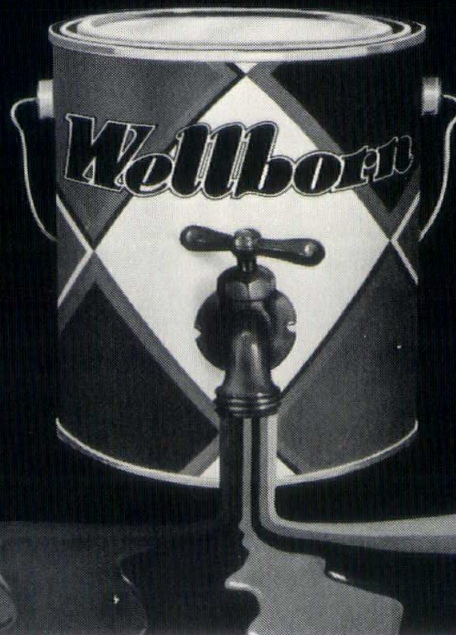
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