

TOWARDS A GREEN ARCHITECTURE

Frank Harmon

Since the Industrial Revolution in the 1800's, architects have firmly believed in the power of technology to solve environmental problems. Architects solve problems of lighting, heating, cooling and ventilation of buildings mechanically. We no longer deal with heat and humidity by opening the windows. Just the reverse: we close them up tight and crank up the AC. As post-Industrial Revolution architects, we have "transformed nature" by creating artificial environments, what the critic Reyner Banham called the "architecture of the well-tempered environment."

Ironically, buildings built prior to the Industrial Revolution were very much in balance with nature and solved problems in a very natural way: buildings were smaller and, consequently, used less energy; windows opened; construction materials were indigenous to the area in which they were used. Today, instead of solving environmental problems, architecture creates them. Our buildings use over fifty percent of all energy created in the United States, consume one third of all the trees that are cut, and siphon twenty-five percent of the nation's fresh water. As a result, today's architects are searching for more high-tech ways to use less energy. Yet to make our 21st Century buildings more environmentally responsible, we should not only look towards technology, but we should start looking backwards to lessons we can learn from pre-industrial construction.

Speaking of pre-industrial... on an August night several years ago, my wife and I drove to Taxco, a silver mining town on the central plateau of Mexico. We got lost on poorly marked mountain roads, swerved to miss a truck while driving in a thunderstorm, and arrived at our hotel at 2 AM, shaken and exhausted. The night watchman showed us to our room, where we collapsed, barely noticing our surroundings.

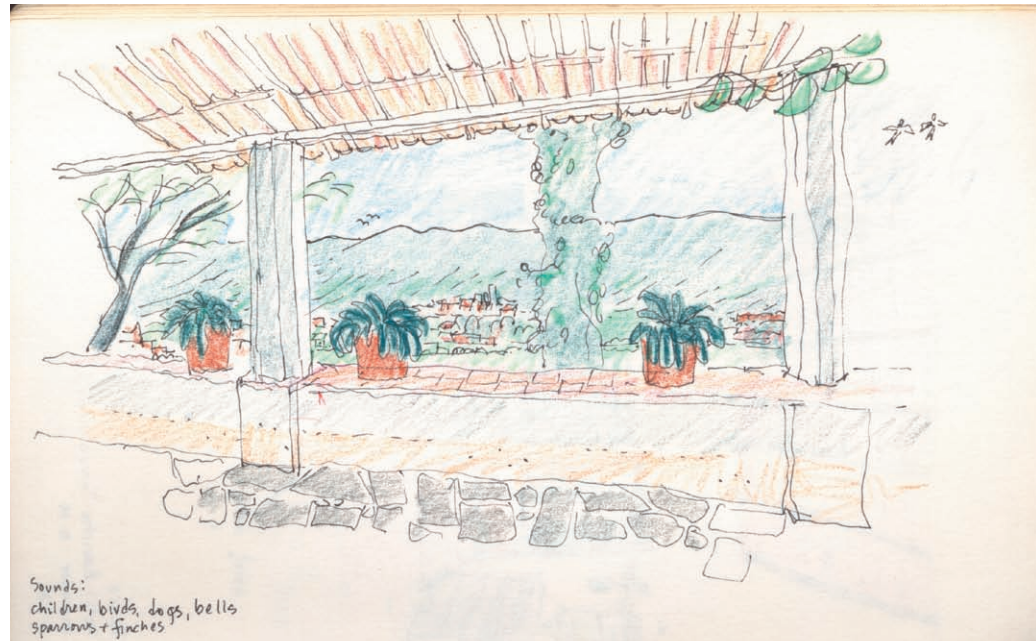
At dawn, however, we awoke to discover sunlight saturating the whitewashed adobe walls of our room and illuminating a roof made of gnarled tree trunks. Outside our room, a terrace overlooked the town of Taxco. And from that vantage point, we could see thousands of adobe houses which seemed to grow from the hillside, melting into the rocky hills outside the town.

Fastened to the terrace wall were several green glass bottles of the sort we throw away every day in the United States. Someone was growing vines in the bottles, obviously caring for the plants each morning. We felt at home in this place, in contrast to the frightening night on the road leading to it. In Taxco we were surrounded by the sort of people who turn old bottles into

"picturesque" and "ravishing." And I believe that what underlies its beauty are three quite elemental principles, or qualities: deference to the land, respect for simple, indigenous materials, and careful use of energy. The people who built Taxco understood these principles. Those who live there today still do. And these three principles—indigenous materials, energy conservation and responsible land use—are universal concerns for architecture today.

Sticks and Stones

Why do most of the ancient buildings we admire so much seem so naturally rooted to their places? Because prior to the Industrial Revolution, buildings were made of materials that were available close at hand. We instinctively



something beautiful—such a simple but human gesture, which held us together like the gentle architecture resting on the hills, or handprints in the adobe walls. Life was sustained by this decent place.

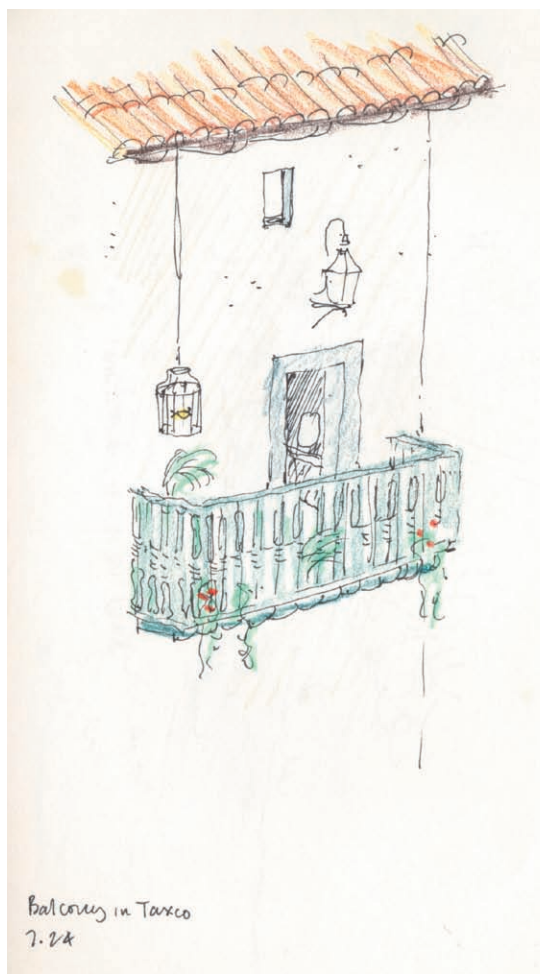
How is it that the town of Taxco, so simply constructed of sticks and mud, can have such profound emotional impact? I've heard Taxco referred to as

respond to the limestone buildings that rise on the rocky plateau of Avignon, France.

In Mexico, houses of woven twigs neatly plastered with mud are deeply moving. We feel the same kinship to materials in a log cabin, made from the very trees above it that shade its roof.

Yet in 2004, we build quite differently. The architect Glenn Murcutt creates houses sublimely connected to the land of Australia, yet he then uses sunscreens built in Norway and fireplaces imported from South Africa. When I built my own house in North Carolina several years ago, I was surprised to see a truck arrive at the construction site piled high with steel roof beams manufactured in Texas. How strange that a roof for my house, so carefully designed for the climate of Raleigh, came from 1500 miles away, nearly in Mexico.

It was at that point, I believe, that I began to think locally. For an outdoor classroom on the Scuppernong River in Tyrrell County I specified Atlantic white cedar, the same trees growing next to it



in a black water swamp. Atlantic white cedar has been used for generations in eastern North Carolina to make shingled houses and shrimp boats because of its strength and resistance to rot. The classroom's contractor, however, wanted to use western red

cedar from British Columbia, 4000 miles away. It was cheaper, he argued. But, I countered, using a local material would reduce the pollution caused by transporting the red cedar and encourage the growth of sustainable forests nearby. If the forests are nearby, we'll be encouraged to take good care of them. Besides, who wouldn't want to create a building in eastern North Carolina that is as familiar and friendly as a shrimp boat?

Taxco is built of mud, sticks, and the fronds of palm trees. Its buildings show the marks of their making like a clay pot that shows the fingers of the potter who formed the bowl. Since the Industrial Revolution, we have become detached from our environment and alienated from our built structures because we can't relate to how they are made. Yet I believe that, just as we feel a kinship to the maker of a handmade clay pitcher when we pour water from it, architects can evoke a shared physical world if we design and construct our buildings by adhering to those three simple principles so evident in that little town in Mexico.

Energy

We are engaged today in a war on terrorism. If we are not to be victims of this war, we need to accept responsibility for it. Part of our responsibility is our profligate use of energy in the United States and the extraordinary resources we expend to get that energy for our buildings.

If we must turn to technology to conserve energy, we will find it available. Photovoltaic cells on rooftops, for example, can convert the warmth of the sun into electricity, lighting the rooms below. Geothermal wells placed in the ground below a factory or office can use the constant earth temperature to heat and cool the workspace. My office is currently designing an Ocean Science Teaching Center to be located in Beaufort, North Carolina, where for two centuries traditional buildings have collected the ocean breeze for by facing into

the wind. Our building faces into the wind also, and with geothermal wells, a photo voltaic rooftop, and a wind turbine it will generate all the energy the center needs for lighting, cooling, and laboratory equipment. The teaching center will use fifty percent less energy than a normal building because its windows open to porches that shade the walls and catch the southwest summer breeze.

Of course, buildings that conserve energy cost more to build. The Ocean Science Teaching Center will cost about fifteen percent more than a conventional building. But compare that to what it costs for our military to make oil safe for SUVs. The science center will pay for its extra cost is less than five years. How long will it take to replace the trees that are being killed on our Blue Ridge Mountains from pollution from coal-fired power plants?

For many people, energy conservative design is synonymous with thick walls and small windows. "Efficient" buildings mean boring buildings. Yet nothing could be farther from the truth. Sustainable design doesn't mean bland design. Look at the old houses of Charleston, South Carolina, to see what I mean. Charleston's original planter families wanted their brick mansions to recall English country houses. Before long, however, they noticed that their slaves were more comfortable in the hot, humid summer than they were. Modeled on African houses, the slaves' cabins had porches and were one room deep, allowing the evening breeze to flow through the structure. Unlike the brick mansions, those wood cabins didn't hold the heat at night. Thus the Charleston "single" house evolved: one room deep with porches opening to walled gardens. And they are as desirable and comfortable today as they were then.

In Taxco, thick adobe walls temper the hot summer sun and release it into the rooms at night when the air is cool. As we learn to use energy more wisely, the air around us will be fresher and cleaner, and we'll want to open the windows.

Mother Earth

If we could point to one single thing that has had the most profound effect on the landscape as we know it today, it would have to be the bulldozer. Where once we had only mules and shovels to move earth, now earth-moving machines flatten hills, fill valleys, and clear forests for building sites. We are just beginning to realize the harm bulldozers have caused. In North Carolina our rivers and sounds, the second greatest estuarine system in North America, are dying—and not because of lost wetlands or storm run-off from Wal-Mart parking lots. The destruction of forests, which slow and absorb the rain, is killing this estuarine system.

In Taxco, the building sites were made by man and donkeys. Each rock ledge and declivity inspired creative building because the earth could not be moved. As individual as the houses are, the town's landscape enjoys a unity akin to a vine growing over rocks.

In the South, rural fields contain houses and barns built of flimsy materials, yet they seem as at home in their place as cows standing in a meadow. Farmers,



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not architects, designed and constructed these houses and barns, yet today we cannot build as well as those farmers, who were forced to respect the land and the natural landscape without benefit of bulldozers.

I believe that we, as architects, are ethically

challenged to design and build in such a way that enhances the land—that makes it better than the way we found it. And I'm not arguing for a retreat from technology, but, rather, for a more profound use of it. So how can we, in the age of the Internet, air conditioning, and photovoltaics, create the sense of wonder found in a thatched hut in Mexico? Good architecture lives in complicity with our senses. Ultimately, architecture is measured by simple things, like sunlight sparkling in a coffee cup. For architects, the act of building should be an act of caring. By building sustainably, in the words of the late Sam Mockbee, "What we build are shelters for the soul as well as houses for our bodies."