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The Brick Master of Kerala

Adam Hochschild

My wife and I recently spent five months living in Trivandrum, the sweltering, leafy capital of the south Indian state of Kerala. The house we rented, like thousands of others in the city, was built largely of concrete, and would have looked at home as a row house in California. A flat roof lay directly above our kitchen, bedroom, and living room, and absurdly, we discovered, it was rainproofed with tar.

Trivandrum is almost at the bottom tip of India, less than 600 miles from the equator. It was ferociously hot and humid: If you walked vigorously for a few minutes, you were drenched in sweat. We were not the first visitors overwhelmed by the heat of India; a 19th-century British governor-general felt "as though one were passing through the mouth of a foundry." But with this lunatic black roof soaking up the blaze of the tropical sun and then radiating it down at us like a broiler for 24 hours a day, it seemed as if we had gone from the foundry's mouth into its flaming innards.

We soon noticed, however, that it was much cooler whenever we visited friends living in the attractive brick homes designed by Laurie Baker, a bold and eccentric British-born architect who has lived in India for more than 50 years. Some Baker houses had strange, irregular, pyramid-like structures on their roofs, with one side left open and tilting into the wind, to funnel it into the house. These seemed inspired by the air intakes on ships' decks that funnel cool air below. And unlike our house, Baker's invariably had sloping roofs in traditional Indian style, with gables and vents where rising hot air could escape.

Gradually I realized that the flat, California-style roof on our rental house was not an isolated piece of insanity, but a small example of a much larger pattern. In architecture as in so much else, Indians want to be like us. But Baker's work, most unusually, combined Western and traditional Indian ways. Furthermore, people told me, his great passion in life was not the grand museums or concert halls by which architects usually make their mark, but low-cost housing for the millions of Indians who, quite literally, do not have a real roof over their heads. And on an unhappy subcontinent whose educated classes have by the millions emigrated to Europe or North America, Baker was that great rarity: a Westerner who had chosen to emigrate to the Third World. I became curious to meet him.

Long before I did so, I got a taste of life in Baker buildings at Trivandrum's Centre for Development Studies, a research institute and graduate school where my wife and I were Fulbright lecturers. The 10-acre campus, stretching across a heavily wooded hillside, is Baker's masterpiece. The offices, classroom clusters, and dormitories are all brick, with seldom a straight line; each structure curls in loops and waves and intersecting semicircles. The main building has a majestic entrance 30 or 40 feet wide, whose ceiling rolls out and up toward the sky and whose sides roll outward onto an even wider set of steps. Symbolic of an institution whose aim is to apply

economics to helping the poor, the building has, amazingly, no front door. Anyone can walk up the steps and through the wide entrance and down the corridors at any hour of the day or night. If you want to lock your office door that's up to you. But you can't lock the front door because there isn't one.

Not only is this campus one of the country's most beautiful, but Baker built it for roughly half the normal cost per square foot of Indian university buildings. And these buildings, too, were comfortable on even the most ovenlike of days. Some of the coolness was due to the breezes blowing through the jalis that fill many outside walls. A Baker jali is a brick version of traditional south Indian patterned wooden grillwork: Gaps between bricks let air and daylight through a wall, while diffusing the glare of direct sunlight. Some of the Centre's coolness comes from tiny courtyards around pools whose evaporation helps fight the heat. And some comes from the shade of the many coconut palms overhead: Baker located the buildings so he would have to cut down as few trees as possible. With only one or two exceptions, such as the campus computer center, none of the Centre's offices have the Indian bureaucrat's normal status symbol, an air conditioner.

Although virtually unknown outside india, Baker is a legendary figure in Kerala. One influential admirer was the late C. Achutha Menon, a Communist Chief Minister of Kerala, who hired Baker to design state housing for the poor. Another enthusiast is the decidedly un-Communist Maharaja of Travancore, who has no more political power these days but who still lives in a small palace in Trivandrum. He told me that he greatly respected Baker's work because "he's very practical, down to earth, and I think he's quite right: You need not build a house that's a copy of one in Manhattan. It doesn't suit."

A droll, unassuming man with a handsome gray beard, Baker has the manner of an avuncular, absent-minded professor who has left something behind on the way to class. His conversation rambles as if he hadn't a care in the world, and he wears no watch or socks -- although no one with any sense wears socks in steamy south India. His voice is hearty, and he speaks slowly, always in complete sentences. He is still working at age 83.

Baker grew up and studied architecture in the British mill town of Birmingham. A Quaker conscientious objector, he joined an ambulance unit at the start of World War II, then spent most of the war as a health care worker in China. On the way home, he was stranded for several months in Bombay where, through Quaker friends, he got to know Mohandas Gandhi.

The Mahatma, it turned out, had a great interest in architecture. "He said, 'Please don't take any notice of this terrible stuff around us' -- the four-, five-, and six-story buildings going up. There was a new telephone exchange, seven or eight stories high and covered all over with sheets of marble, stuck on, which he thought was terrible, gilding the lily." Gandhi sent Baker to see what he termed the "concrete slums" -- the tenements for Bombay's workers. Gandhi asked him, "What is the alternative? What can we do about it? We need people like you here."

Deeply inspired, Baker promptly came back to India as an architect and began to build treatment centers for lepers. He married an Indian woman, a doctor in one of the centers, "and to begin with I was the rest of the hospital staff." Until 1962, they worked in a remote Himalayan region; then they moved south to his wife's native state of Kerala.

It was in the Himalayan foothills that Baker first saw how traditional Indian architecture reflects thousands of years of trial-and-error research in energy efficiency. "The rock they quarried for building the foundation and basement walls was split or blasted out from the same bedrock on which they would build," he has written, noting that timber "was always found within a few hundred yards, or at most a mile or two, of the house being constructed." Seeing this reminded him of one of Gandhi's beliefs -- that all buildings should be made of materials found within a 5-mile radius.

Baker has not always been able to follow this principle, but he has come close. He is profoundly hostile, for example, to glass and steel: Making each requires large amounts of expensive imported fossil fuel, and in Kerala the steel has to come from other parts of India. He also hates plaster, which he regards as a costly prestige item that does nothing except cover up a handsome wall of bricks made from local clay.

Bricks he loves. He often lays them with his own hands. For him this is not a matter of Gandhian self-humbling, but of sensual pleasure: "Designing a house and getting someone else to build it is like preparing a menu with great care and then leaving it to someone to do the cooking and then the eating. It's no fun."

Mortar for bricks normally would require cement -- another Baker enemy, because until recently most cement in India had to be imported. Baker instead likes to use substitutes such as lime. When building the Centre for Development Studies, he made lime on the spot. He sent people to gather bullock-cartloads of seashells on beaches a few miles away, then had them baked in a mud kiln (its fan powered by someone pedaling a stationary bicycle) and ground up. Few of the scholars from India and abroad at the Centre realize that their office walls are partly held up by clamshells.

Nor do they know that they're walking on bamboo. Concrete floors and steps are ordinarily reinforced with steel rods, but Baker has found that a grid of split local bamboo, carefully lashed together in the right pattern, does just as well -- and at less than 5 percent of the cost.

Baker would like to work more with that great renewable material, wood, but the deforestation of India has made this impossible. He would love to see Kerala's devastated forests replanted with a traditional building wood, the jack tree, a fruitbearing Indian member of the mulberry family -- "a very beautiful wood, a nice rich amber color." It would be so easy, he muses, his hands gesturing plaintively, to plant groves of jack trees: "They could do it with picnics for the foresters' children! Give them each a jackfruit and have them go wandering spitting out pips."

Baker's great sorrow about Indian government policy-makers is that "They haven't the faith in their own materials." Baker's favorite building material of all is one that uses no fuel to produce, is usually only a few steps away, and is free: mud. To those who laugh, he points out that if you count everything from village house to Bombay office tower, 58 percent of all buildings in India are built of mud, and a good number of those are more than 100 years old. Mud is also completely reusable. You can tear down your old house, add water, and make a new one. Try that with glass and steel.

Sometimes, depending on the local earth, you need to add a stabilizer -- "to make it stick together, to act as a sort of glue or binder. There are dozens and dozens of stabilizers -- from latexes to the wild cactus in the forest: If you cut the cactus stalk a white milk comes out and it's a very good stabilizer." Baker had one memorable lesson in stabilizers in his early years: "We used to go through a place on our way from the Himalaya to Delhi, where we had to wait for a train. There were beautiful mud houses, but the soil was totally unsuitable. So I tried to find out what the stabilizer was that they used. But they would not tell me! What was this nosy blighter from outside wanting to know this for? Eventually I discovered that they were using pig's urine! We chased pigs and got their urine analyzed. The urea content is very high, and urea is a binder."

Most Indians' picture of ideal housing is what they see from America or Europe on TV. This means, Baker says, that few middle-class clients share his enthusiasm for mud. "I say, 'Have you thought of using mud? It would save you a lot of money.' And they say, 'WellÉno, you don't know our rain, Mr. Baker!'" Where he has most often been able to design mud buildings has been making housing for the poor. Baker's designs have been used for tens of thousands of such units in Kerala. A family sleeping under a tarpaulin or under nothing at all doesn't worry if its first real house doesn't look like one in the San Fernando Valley.

Laurie Baker has not turned his back on the modern world; the homes and offices he has built have running water, electricity, and sometimes garages. But in his embrace of brick, mud, bamboo, and much more, Baker has done what tragically few people in any field in the Third World have done, which is to be intelligently selective about what they take from the West.

Baker does everything he can to emphasize that building attractive and energy-efficient buildings is not something that depends on Western-style training. On the contrary, he says, architecture is too important to be left to architects. He has written nearly a dozen do-it-yourself booklets, with titles like "Laurie Baker's Mud," illustrated with his own pen-and-ink diagrams. Some have been translated into the language spoken in Kerala, Malayalam. Two of the most recent, "Rural Community Buildings" and "Cost Reduction for Primary School Buildings", were published on Baker's 80th birthday.

Baker's ideas have caught the imagination of younger, environmentally minded Indian architects and engineers, and nearly 100 of them now work for a nonprofit organization that practices his approach, COSTFORD, or the Centre of Science and Technology for Rural Development. In the past 15 years, COSTFORD has built homes for 10,000 poverty-level families, for which it charges no design fee. The Centre has also built government buildings and homes for 1,500 middle-class and professional families -- which has helped pay for the other work. The organization's Trivandrum office is run by Shailaja Nair, a 34-year-old architect, and her engineer husband. A picture of "Bakerji" is on the office wall. "He's half a century older than us," says Nair. "But, he's one of us. How do you explain a man like that?"

Nair takes me on a daylong tour of COSTFORD projects built with Baker-inspired designs. We end up in a rural village called Koliyacode to visit five recently completed mud homes of several rooms each. Government subsidies provided the equivalent of around $400 per house, and the village residents contributed more, in some cases their own labor. Most of the money went for wood (roof beams and window and door frames) and roofing tile. The roof overhangs the walls to protect them from the monsoon rains -- a sine qua non of mud architecture -- and a drainage ditch below carries the water away. There is no glass in the windows, but wooden bars keep out intruders and India's vast army of crows. Except for the roof tile and the wood, everything is dried brown mud: inner and outer walls, and even the large mud bricks that hold up some living room shelves. The earth in Koliyacode has just the right consistency and requires no stabilizer. The sturdy outer walls are about 6 inches thick. They do not crumble to the touch, and feel hard as concrete when I bang my fist on them.

The weather has gotten hotter than ever since I arrived in Kerala, but today, inside these buildings, it is wonderfully cool. The one place inside where it's hot -- the loft area underneath the tile roof, where the sun's heat has seeped through the tile and hot air from inside has risen -- is used to dry grain or freshly washed clothes. As I tour the houses, an increasing flock of villagers and their children gather, curious that a foreigner would come all this way to punch a wall of mud.

Sometimes Baker doesn't bother about blueprints; he prefers informal sketches and talking with construction workers on the spot. And so I ask if I can see a home he is now building. The house is for a government official and his wife, a poet. Appropriately, it is the poet whom Baker is mainly dealing with. She is, he says happily, his first client who is as eccentric as he.

"One of the things I'm noted to be crazy for is that I use old colored bottles set in cement -- they give a nice light. In the drawing room, about half the main wall is going to be made of bottles only. And then we've got some holes in the roof to let sunlight in and air out." Baker seizes a piece of chalk from a pouch slung over his shoulder and uses the brick wall of the house as a crude blackboard: He shows how each roof hole will have a raised rim of bottles. The rim will support a concrete cap, like that covering a chimney. And, he adds gleefully, these round skylight-vents will

also function as sundials. An even more unexpected feature of the house is that it is a spiral. A rising ribbon of smaller rooms, interspersed with a few desk-sized nooks for writing poetry, curls around a central living room, whose ceiling is two stories high.

A spiral home with poetry-writing nooks is not likely to be reproduced en masse as housing for India's poor, as Baker himself would be the first to admit. But even here, at his zaniest, Baker has built a house that costs vastly less than one of the same square footage designed by a conventional architect. First of all, as any high school geometry student knows, a circle is the shortest line that will contain a given amount of space. The outer wall of a rectangular house would use far more brick.

Second, the fact that most inside walls in the poet's house are also curved means some can be built with just a single thickness of brick, instead of the double thickness that straight brick walls of equal length would require to remain stable.

And finally, Baker is using a remarkable variety of recycled materials -- and not just the several hundred glass bottles. In the bathrooms, for example, bits and pieces of waste glass are put to work as tiles: "If you want a piece of glass to fit a window you go to the glass place and they cut your size, and there're always these little strips left that they throw under the table. So I said, 'Can I have some?'" In addition, several hundred chipped or broken roofing tiles are embedded every foot or two in this building's concrete roof, a signature Baker technique. As you look up at it, the inside of the roof looks like a checkerboard whose squares have been battered and then flown apart. These otherwise wasted tiles add so much reinforcement that Baker can use 30 percent less concrete in the roof.

Furthermore, once finished, the poet's house will consume far less energy than many homes half its size. Thanks to jali walls, cool air flows in; and thanks to the bottle-rimmed roof vents, hot air flows out. There are no electric ceiling fans (even modest Indian homes often have one per room), and no air conditioning.

As we continue our tour through the house, Baker gives instructions to the workmen, who today are making windows -- some of which, incidentally, will contain no glass, only rough vertical wooden slats which can be tilted one way or the other to catch the breeze. After several dizzying loops, we have spiraled up to the roof.

Here too, Baker says, "You can sit and write poems." The nearby trees tower another 15 or 20 feet overhead, their breadfruits and coconuts dangling almost within reach. The real poetry of this house is that it respects its surroundings and doesn't try to overpower them.

The same cannot be said, unfortunately, for what we can see from here of the city skyline. A few older buildings in sight, such as the palace of the maharajas, respect the ancient unwritten law that no building should be higher than one of Kerala's millions of coconut palms. But dotting the horizon are the palaces of the new maharajas -- slablike eight- and ten-story modern luxury apartment buildings for India's burgeoning business and professional class, all of them, Baker points out, requiring huge amounts of Kerala's scarce electricity to run their elevators and air conditioning. Baker's poetry in brick and mud is, by contrast, in harmony with its surroundings, not only aesthetically but in its knowledge that the earth will not forever permit us to be so profligate with its riches.
