



*The Dome in its Sonoran Desert landscape.*  
© 1985 Julius Shulman

By Wendell Burnette

## The Dome in the Desert

A glass house in the desert? Was it an architectural caprice, a folly, or was it a solution to the problems of desert living whose appropriateness is still not recognized? Having had the experience of living in The Dome for a full year, through all the seasons, I felt it incumbent upon myself to take a fresh look at this remarkable work of architecture.

Paolo Soleri, its designer, was born in 1920 in Turin, received a PhD in architecture from the Torino Politecnico, and in 1947 came to America to study with Frank Lloyd Wright, remaining with him for just over a year. Mark Mills, who assisted Soleri in the construction of The Dome, was born in 1921, received an architectural engineering degree from the University of Colorado, and studied with Wright for four years. It was at Taliesin that Soleri and Mills became friends. In 1948, when they and two other apprentices were working on an experimental structure at Taliesin West, which became what is known as the Sun Cottage, there was a misunderstanding with Wright that led to all four of them leaving. Soleri and Mills went to work with a developer, providing design work for some condominiums at the base of Camelback Mountain, below the north face in Paradise Valley. Soleri developed a scheme that involved a tower element supporting a hex-form canopy and he and Mills built a mock-up of Camelback out of concrete block and wood. It was shortly after this that "the Cli," as she was fondly called, came along.

Mrs Nora Woods of Philadelphia was the sister of a Mrs Cox of Cave Creek, with whom Soleri and Mills had become acquainted. It was through her sister that Mrs Woods found five acres of pristine Upper Sonoran desert in the remote town of Cave Creek, thirty miles north of Phoenix, and the architects who would build her home on it. Soleri and Mills were camping about a third of the way up Camelback on the developer's land, a privilege earned in ex-

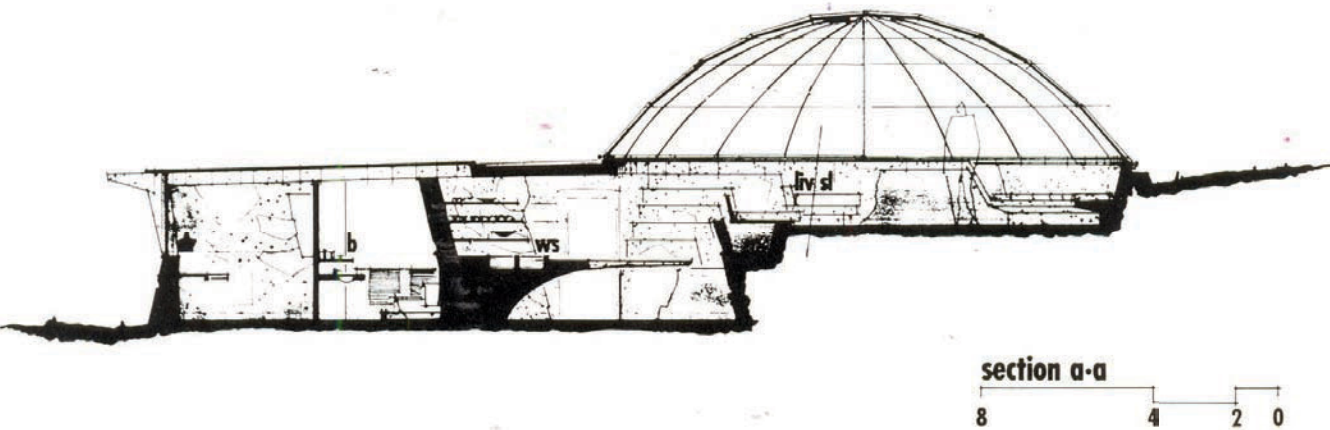
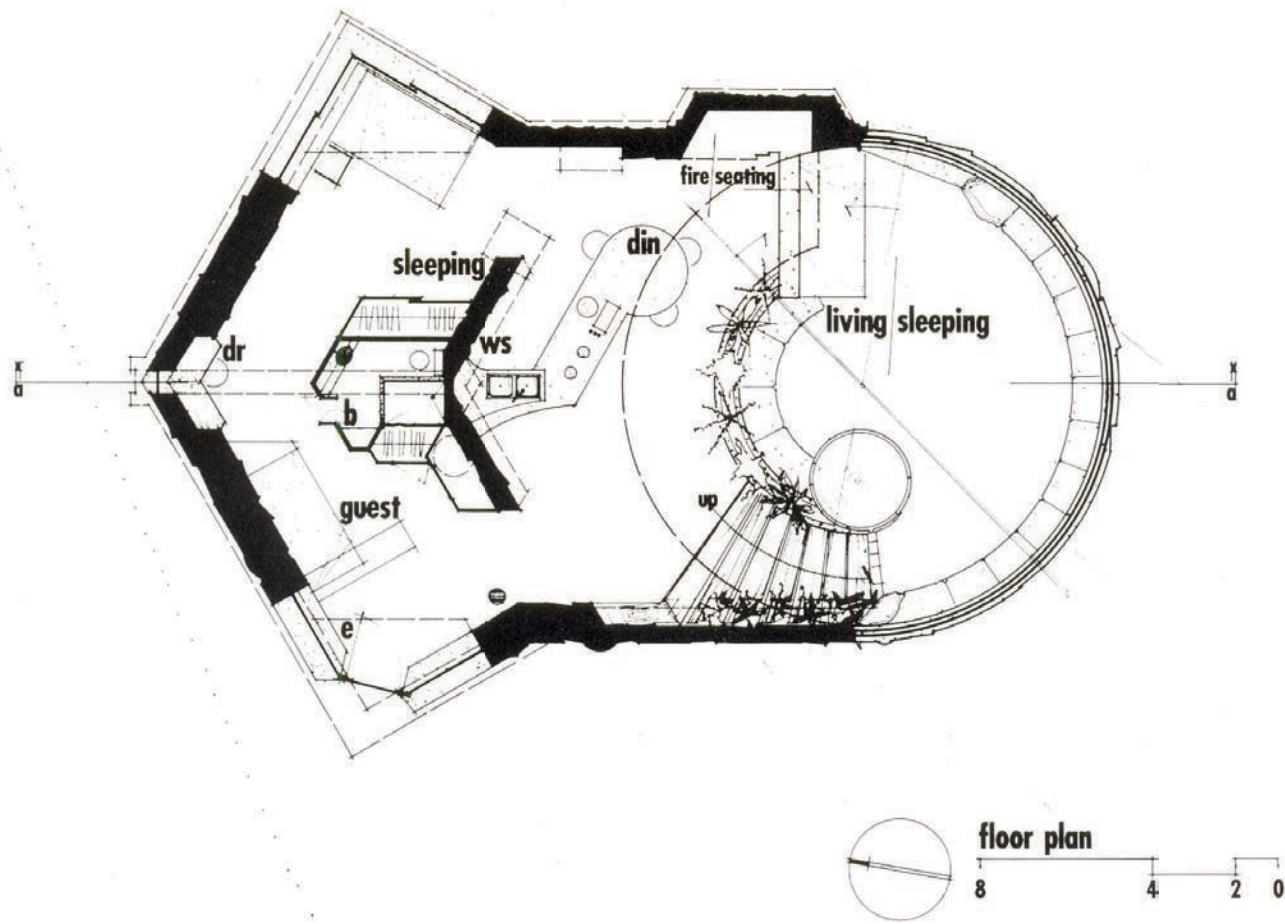
change for services, with only their bicycles for transportation. I asked Mills if they had a tent and he replied, "No. Paolo lived under a rock over there; I lived under something else over there."

In the course of the early discussions after a visit to the site, the Cli came up with the simple requirement that she "wanted something that she could look at the sky from," Soleri relates. (At the time, she lived in a slightly up-scale dwelling compared to her architects, a modest tent in the desert.) Soleri replied, "I have some unbuilt designs. You might want to look at them. Maybe we can pick one of those and transform it into an empirical event."

Soleri was referring to a series of sketches he had made while living on Camelback. While still at Taliesin in 1948, he had begun to fill beautifully crafted canvas-bound sketchbooks, the seed of what became "arcology." Some of the concepts involved domes, and after leaving Taliesin he developed this theme in the "Arizonians," which were "different sizes and shapes of domes for habitation." It was one of the Arizonians that he altered to meet the needs of the program.

"The deal was that she would buy the tools — \$300-worth," Mills told me. She also provided meals. With Soleri and Mills living on the site, construction began early in 1949. During the early phase Mrs Woods' daughter, Colly, came out from back east to help. Many fun-filled days of adventure were spent in the mountains around Cave Creek, in search of stones for the walls that satisfied Mrs Woods' collector instincts.

The site is a northwest-facing slope which drops to a wide arroyo with expansive views to Elephant Mountain and the broad New River Mesa to the north. The orientation of the main axis of the plan is slightly west of north, with a curious yet unintentional alignment with Elephant Mountain. The house blends with the slope



The entry, with the dome beyond. (© 1985 Julius Shulman)

slightly below the crest of the hill to the south. What emerges from the slope is a glass dome on a desert stone base, which escapes the slope altogether, providing entrance into the structure.

The layout of the plan gives the appearance of a symmetry that is not perceptible on site. Conversely, the interior of the space reveals a magical asymmetry of contrast: the cave-like and simultaneously sky-like qualities of the space. The cave-like level is compact and because of this assumes a flared-out geometry. A summer sleeping space opens to the east, with a large operable window and skylight allowing view and ventilation to a large palo verde that is immediately adjacent. An entry space opens to the west with a studio/sleeping space completing the opposite side of the flared-out geometry. In the center is a small bathroom with a shower. Natural light from a slot skylight above is allowed to project through a colored resin mural by Soleri to the coat closet beyond. The sink is a white porcelain oval set in a polished con-

crete shelf with glass shelves above. The wood-ply door to the bath is the sole interior door in the house. The slot skylight that aligns the main axis mitered down to form a slot window for the dressing area and offers a focused view towards Elephant Mountain; it begins at a kite-shaped skylight above the flared walls that form the kitchen space. These walls are the only interior load-bearing structural features and are of desert concrete, a technique that Wright developed at Taliesin West and both Soleri and Mills had had experience with. This was the primary material for all external walls and also for the roof, with random stones exposed in the ceiling plane. The walls that shape the kitchen are battered up to the north and support two integral concrete roof beams on either side of the slot skylight. These cantilever from the walls to the south, supporting the north edge of the dome hovering above. The same walls anchor in part the eleven-foot elbowed cantilever of reinforced concrete that is both kitchen counter and dining table. This pow-



erful form exemplifies Soleri's infatuation with cantilevered structures while solving the functional problem of space in a compact plan, allowing a clear floor with secondary axial alignment to the fireplace defining the lower-level sitting area.

When one enters the cave-like lower level there is a glimpse of the hovering glass dome beyond, an anticipation of mystery reminiscent of the entry into the Bradbury Building in Los Angeles. A flight of radial oak trends ascends into the dome, where an uninterrupted 360-degree view absorbs the abstract power of the desert landscape. Julius Shulman recalls a conversation with Mrs Woods when he was photographing the house for the *Architectural Forum* in 1950 in which she told him that to her it was "the most beautiful experience in the world to lie there at night and watch the stars and the moon and the drama of the shooting stars." The upper-level platform is ringed to the north by an interior battered retaining wall of desert concrete that forms

a planter and bench seat where the bed platform spans the lower-level seating area below. The south edge of the dome bears on a battered exterior retaining wall that forms another continuous bench seat, allowing easy viewing of the floor of the desert, the microcosm, in contrast to the macrocosm, vast views to the mesa and mountains beyond, seen to the north.

The basic components of Soleri's design are two. One is massive, to retain heat, while the other is light and flexible like an umbrella. The dome itself was composed of two halves capable of rotating one inside the other on circular tracks, so that the space could be fully closed or half open. The half-dome on the outside track was aluminum-painted to combat heat gain through reflection. Trapezoidal panes of glass were set in mastic on the flanges of aluminum T-sections bent to form and welded to a slotted pipe that rode on ball bearings over a solid pipe track set on steel pegs embedded in concrete. The aluminum

*The cantilevered counter and the sitting area. (© 1985 Julius Shulman)*



*The transition from cave to sky. (© 1985 Julius Shulman)*



T-sections were actually high-alloy wing spars from a Lockheed bomber found at a war surplus depot. With only bicycles for transportation, Soleri and Mills carried the spars by hand on to the city bus in order to get them to Allison Steel, where there was a break to bend the sections into shape. Mills recalled, "The bus drivers weren't too happy about these things coming on the bus; it was *really hairy!*" The two halves of the dome were to be rotated manually until such time as a gear mechanism that could move them automatically in relation to the sun became available. Soleri's dome parallels work by Buckminster Fuller between 1949 and 1952, when in the Skybreak Dwellings he developed the habitation potentials of his geodesic domes, while the technology of automation was explored by Norman Foster and Fuller in 1982 in the Autonomous Dwelling, which was to have a double-skin dome, half glazed and half opaque, with inner and outer skins rotating independently.

Other devices to which the design of the Dome lent itself were a water spray on the concrete slab roof to augment the effect of heat absorption by the desert concrete walls and a circular copper water tube to cool the air with a curtain spray around the base of the dome. Both these devices could be automated; an automated version of the latter, called "mist cool," was the rage in Palm Springs five years ago and more recently in Phoenix. Then at the top of the stair is a reflecting pool which has a psychological function and is also the source of water that flows down grooves in the surface of a concrete ramp beneath the stair treads, creating additional evaporative surface. The ramp connects the two concrete floors, the pouring of which Soleri remembers as "a carnival." As the segments were poured Soleri, using a spoon, carved a spontaneous, flowing pattern, vaguely resembling the flamboyant desert flower, ocotillo. The pattern was then filled with black, red and white integral concrete color and ground to a ter-

*The double-shell dome, each shell on its own track. (© 1985 Julius Shulman)*

razo-like finish. It begins at the upper level, flows underneath the stair treads, all over the lower level, and out the front door.

The Dome was completed in the summer of 1950. Shortly before that, Paolo and Colly were married and left for Italy. Mills finished the last details of construction and later settled in Carmel. Soon the Dome was receiving international recognition through publications like *The Architectural Forum* (June 1951). Mrs Woods lived in it until the summer of 1984, after which it sat vacant for almost a year. Shortly before the following summer, I met Mrs Woods and came to know the magic of a glass dome in a still pristine desert. Because of the loss of rotation due to the deterioration of the ball bearing track system, which was too refined technically for the raw nature of the construction, the movable dome was altered sometime after completion. The existing dome, which utilizes the original aluminum T-sections, is fixed, affording a 360-degree view with uninterrupted glass. The upper third of the dome is metal-clad, with an evaporative cooler providing comfort in the summer heat. The remainder of the seasons are allowed to pass into the space through three opening panes of glass. Most of Mrs Woods' collector's artifacts still adorn the glass shelves built into the desert concrete walls. The stars are viewed through the glass dome that hovers above the bed, allowing each morning to be experienced the way the pioneers of the desert experienced it, from the floor of the desert without interruption.

The spatial flow is a symphony of movement through contrasted volumes. One space, in the historical tradition of desert building, provides a volume that moderates temperature swings, with very few windows. The other space, in the modern tradition, allows an escape from the cave of the past; flexible, it lets the outside in while ensuring an intimate and visually exciting relation with nature. Soleri and Mills created not just a glass house in the desert, but a compatible marriage of past and future.



*In the kitchen. (By courtesy of Paolo Soleri)*