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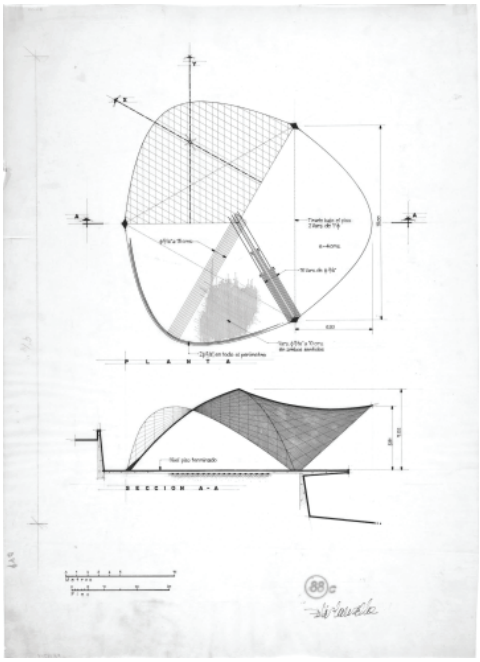
The Curving Concrete Poetry of a Daring Experimental Architect

In Mexico, the architecture of Félix Candela punctuates landscapes like giant flowers, folded umbrellas, and cresting waves.

Félix Candela's Los Manantiales Restaurant at Xochimilco, Mexico City in 1958 (all photos courtesy Gallery 400 unless otherwise noted)

CHICAGO — Its name suggests it could have been the headquarters of Sun Ra and his Arkestra. But the building known as the Pavilion of Cosmic Rays served, instead, as a research center for scientists at Universidad Nacional Autónoma de México (UNAM), who were working to measure high-energy radiation from space. The 40-by-35 foot shelter has a curved covering made of thin concrete — just 5/8 of an inch at its thickest point — representing one of the thinnest concrete shells ever constructed at the time. Built in 1951 by the Spanish-born architect Félix Candela, it was the perfect laboratory for the scientists: it protected their measurement devices while allowing rays to pass through the solid concrete. It still stands; today the university's chess club meets there.

The Pavilion of Cosmic Rays was the first building that Candela realized with what became his signature forms of curving concrete. While Brutalist structures, hard-edged and austere, began to rise in other parts of the world, Candela spent the 1950s experimenting with the rough material to shape it into graceful yet daring hyperbolic paraboloid surfaces. (The hyperbolic paraboloid, or hypar, curves in the manner of a saddle or a Pringle potato chip.) These structures often appeared to float above open spaces, creating cavernous interiors ideal for group gatherings.



Félix Candela's 1957 plan for La Jacaranda Cabaret, Presidente Acapulco Hotel in Acapulco, Guerrero

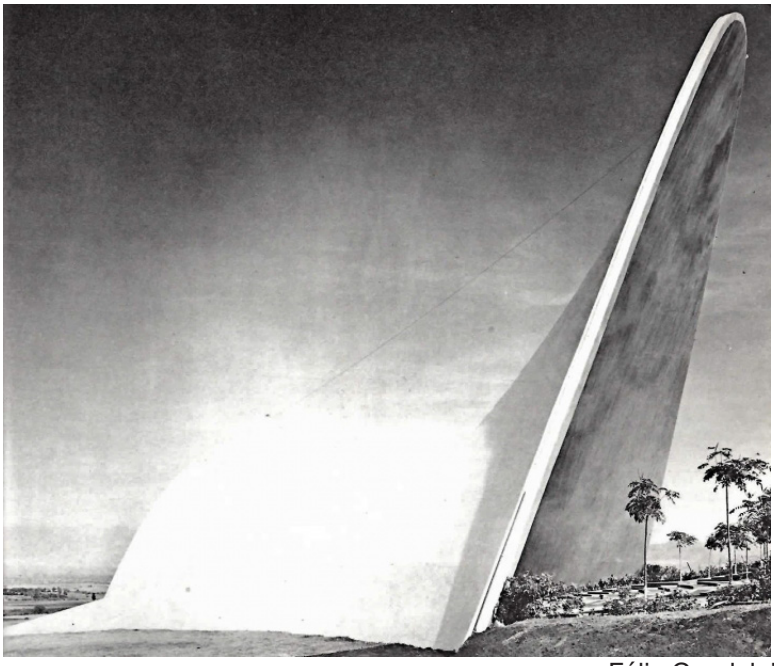
C Between 1950 and 1976, Candela designed about 1,500 projects, over half of which were realized. At Gallery 400, an exhibition examines 14 of his most iconic concrete shell works through photographs, architectural models, and plans. Among these are the UNAM pavilion, a dramatic chapel in Cuernavaca, and Candela's complex for the 1968 Olympic Games in Mexico City. Curator Alexander Eisenschmidt, working with the show's lead researcher Juan Ignacio del Cueto, has paired these with documents and other archival material that highlight Candela's time as a professor at the School of Architecture at the University of Illinois (now known as the University of Illinois at Chicago), where he worked from 1971 to 1978.

Candela's experience as not only an architect but also a contractor and engineer prepared him to build these massive, gravity-defying shells. Born in Madrid in 1910, he attended the city's architectural school, where he studied early shell structures until 1935. The following year saw the start of the Spanish Civil War. Joining the Republican cause as Captain of Engineers, Candela helped restore old buildings for military use. In 1939, when the Republicans surrendered, ending the conflict, Candela was held at a French war camp before he was sent to Mexico as an exile.

Model for the Pavilion of Cosmic Rays (photo by the author for Hyperallergic)

In Mexico, Candela focused on building his architectural career. He started experimenting with full-scale, reinforced concrete shells before setting up a company in 1949 with his siblings and Mexican architects Fernando and Raúl Fernandez Range. He called it Cubiertas Ala, or Wing Roofs.

While Candela's first commission, for the UNAM's scientists, features two subtle hyperbolic paraboloids, he gradually introduced more drama in later buildings. In 1958, he built Los Manantiales Restaurant near the canals of Xochimilco, a neighborhood in Mexican City. Comprised of eight parabolic folds that meet at a central point, the structure, which still stands, can shelter 1,000 patrons. From afar, it resembles a concrete lotus on the water. The same year, Candela began work on the Capilla de Palmira, or Palmira Chapel, near Cuernavaca. The striking, thin-shelled shelter swoops like a partial sine wave, with its highest point reaching 60 feet. Candela was bent on pushing concrete to its limit with this project; the structure actually collapsed during his team's first attempt.



Félix Candela's Capilla de Palmira in 1959

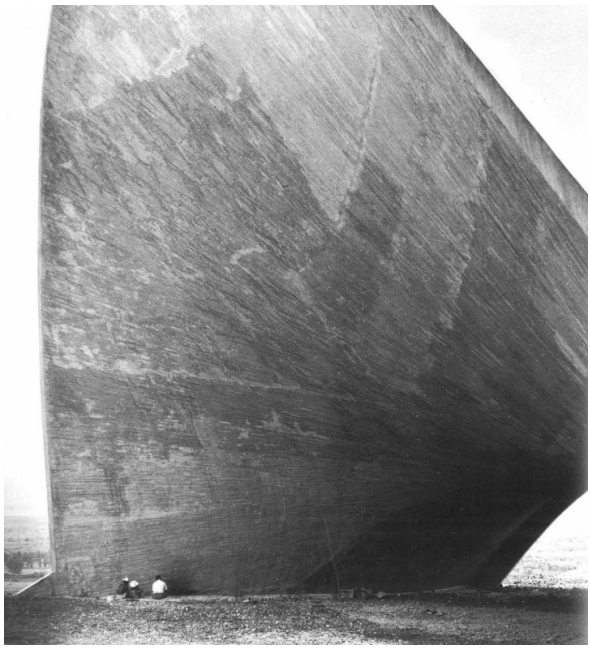
The exhibition includes photographs of these buildings, some of which were taken by his brother, Antonio Candela. Their corresponding models — simple skeletons of their exteriors — allow visitors to observe their basic construction from all angles. (These are not Candela's own prototypes but were created more recently at the Faculty of Architecture of UNAM.)

Despite the grandeur of the finished buildings, Candela relied on relatively simple construction techniques. In an exhibition handout, Ignacio del Cueto and Eisenschmidt explain the typical process that large teams of laborers carried out:

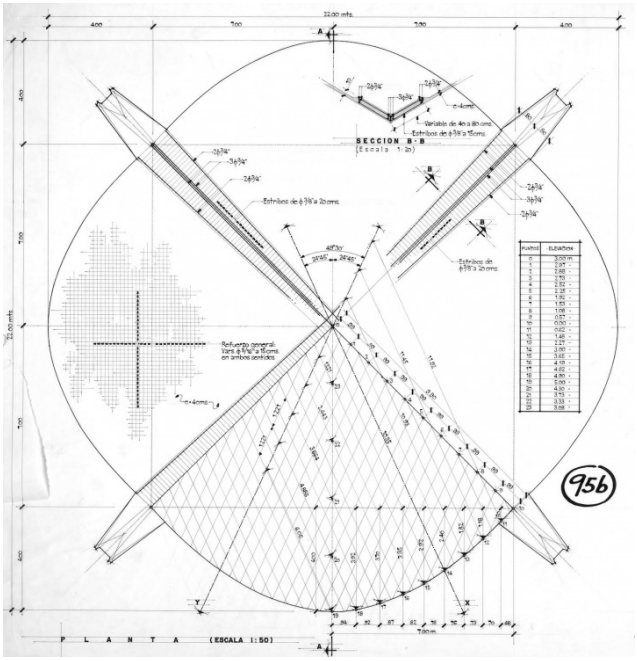
The formwork for each double-curved shell was entirely created through straight pieces of timber boards, before the rebar was placed and concrete was poured by hand. In the end, the three-dimensional scaffolding that held the formwork in place was slowly removed after the concrete cured, revealing a vaulted space.

Workers constructing the concrete shell at Restaurante Los Manantiales in Xochimilco, Mexico City in 1958

These techniques granted Candela versatility in his designs, which clearly appealed to a wide range of clients. In just one decade of work in Mexico, Candela built his concrete shells to shelter not only scientists, churchgoers, and diners, but also factory workers at the Bacardi Bottling Plant and revelers at the oceanside La Jacaranda Nightclub. When he immigrated to the United States in 1971, Candela devoted himself to teaching, although he did collaborate on a number of large-scale projects built in other cities. But it is in Mexico where his legacy as an experimental architect is truly seen, where concrete poetry punctuates landscapes like giant flowers, folded umbrellas, and cresting waves.



Félix Candela's 1960 plan and section drawings of Caseta de ventas Verde Valle (Verde Valle Sales Stand) in Guadalajara, Jalisco



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Installation view of 'Félix Candela's Concrete Shells' at Gallery 400

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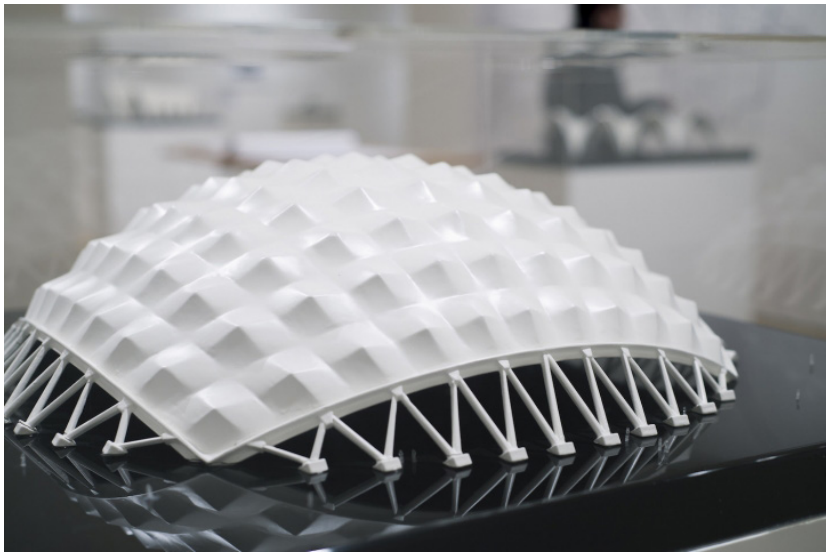

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— Claire Voom

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