

COVER FEATURE | HOUSE OF TOMORROW

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WHAT THE  
HOUSE OF  
TOMORROW  
CAN TEACH US TODAY

*By Jean Thilmany*





WHAT WERE THEY THINKING? WHEN HOME DESIGNERS OF YESTERYEAR PREDICTED THE FUTURE, THEY TOLD US MOSTLY ABOUT THE TIMES IN WHICH THEY LIVED. AND SO IT GOES TODAY.

#### ONE WORD: PLASTIC.

OK, a couple more: affordable, mass-produced.

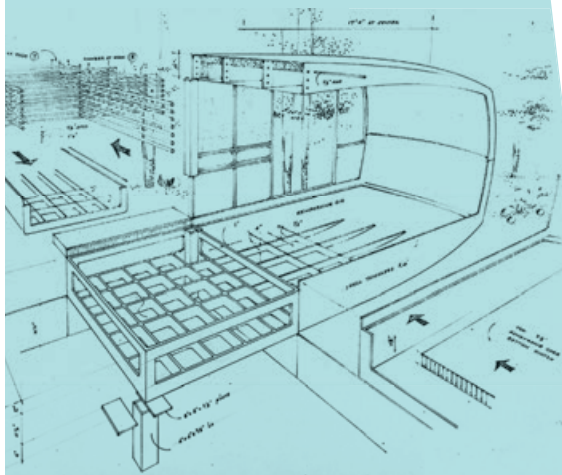
Those were the adjectives that were expected to define late-20th century housing. By the middle 1980s Americans and Western Europeans were supposed to be living in white plastic Swiss crosses with windows lining the arms. Like pies on display, the houses were to be constructed on pedestals.

The team that designed the Monsanto House of the Future, a Disneyland attraction from 1957 to 1967, originally set out to create their vision for an affordable home for the families flocking into the housing market following World War II. Designed and engineered by Monsanto, Marvin Goody and Richard Hamilton of MIT, and





*The Monsanto House of the Future was built from plastic wings that were trucked to the site and fused to a concrete base. The idea was that this sort of house could be set up anywhere—and quickly.*



Walt Disney Imagineering, the house was envisioned as something that could be quickly and inexpensively constructed on nearly any terrain and could withstand most any force of nature, said Gary Van Zante, architecture curator at the Massachusetts Institute of Technology Museum. That's not the home they finished with, and only in small part because they were working with the most popular material of their day—namely plastic—and with building techniques that hadn't yet caught up with that material, he said.

In 2010, Van Zante gave a presentation on the Monsanto House of the Future.

When it was completed, Disneyland visitors could tour the house of the future set in the far-off year 1986, complete with an imaginary family and futuristic household appliances such as microwave ovens.

We may snicker at the retro-future, but it's something we can't escape. Projections of the future have to represent what's actually happening in the days in which they're imagined. Many of their bells and features might not be functional in a future we can't predict, said David Forster Parker of Parker and Associates, a real-estate development and marketing consultant firm in Jacksonville, Fla. He's been building homes for 50 years and has also worked as a community planner and developer.

A look back at what designers predicted for the future of housing gives us insight into the society and the times in which they were working, and shows how they expected design, technology, and lifestyle to progress, Parker said. For instance, the end of World War II, the rise of the suburbs, the back-to-the-earth movement, and the rise of mass production have all been reflected in houses of the future.

Designers might have some foundational ideas that may go on to be developed; other great ideas unfortunately fall by the wayside on the way to the future, Parker said.

The vast majority of developers aren't looking to design the house of the future, which is why studying those who were offers unusual insights.

"Builders and developers often rely upon historical trends rather than working out innovations," Parker said. "They put small innovations in, but they don't want to change it too much for fear of losing their clientele, and we see improvements come in baby steps over years."

A case in point is the material of the Monsanto House of the Future.

"What designers were working with at the time was shaped by their idea of the future," Van Zante said. "Plastic was seen as the utopian material at that time though it wasn't exactly new then."

But the material was innovative for the designers of the time, who imagined the popularity of such a pliable substance would only grow, Van Zante said.

## THE FACTORY LINE

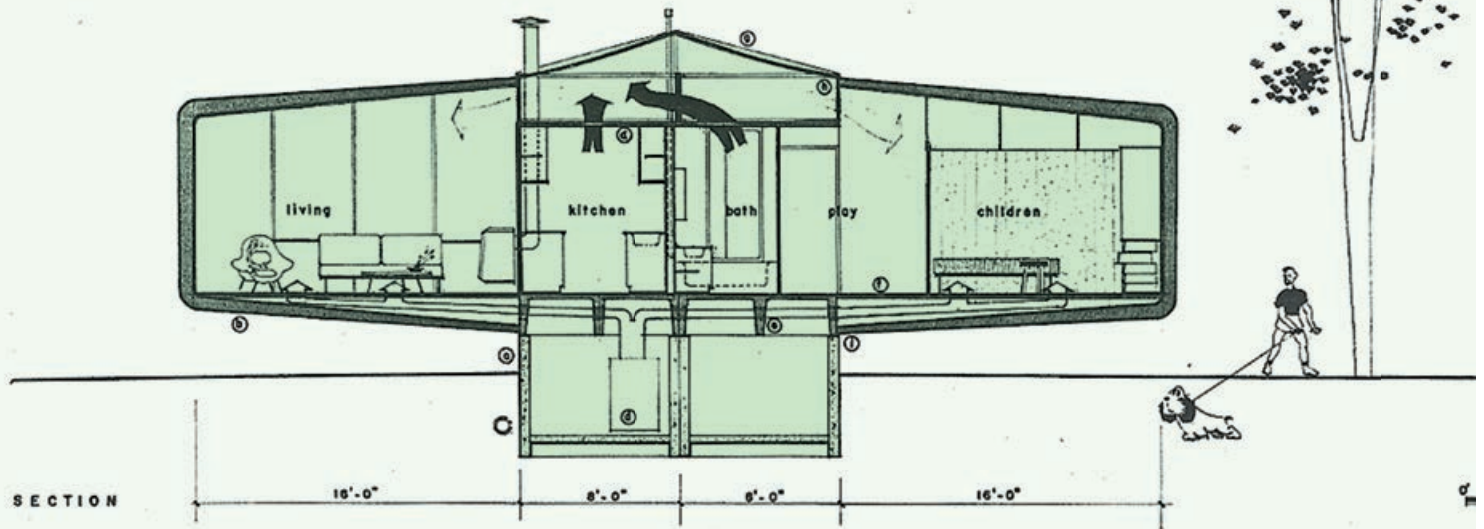
Before the housing boom of the early 1950s, before the rise of suburbia, the Chicago World's Fair of 1933 and 1934 (formally named A Century of Progress International Exposition) sought to build on the mass production capabilities that Henry Ford had helped pioneer with his automobiles. The fair committee sought to demonstrate that housing, too, could be produced on the factory line.

The Century of Progress fair committee produced a book outlining the requirements for its Homes of Tomorrow Exhibition. The exhibition showcased 12 model homes that featured contemporary designs. They were to include new materials and demonstrate techniques for prefabrication.

A major requirement of the 1933 fair committee was that homes' components be mass produced and affordable for the average American family, said historical architect Judy Collins, who keeps a copy of the Century of Progress book in her office.

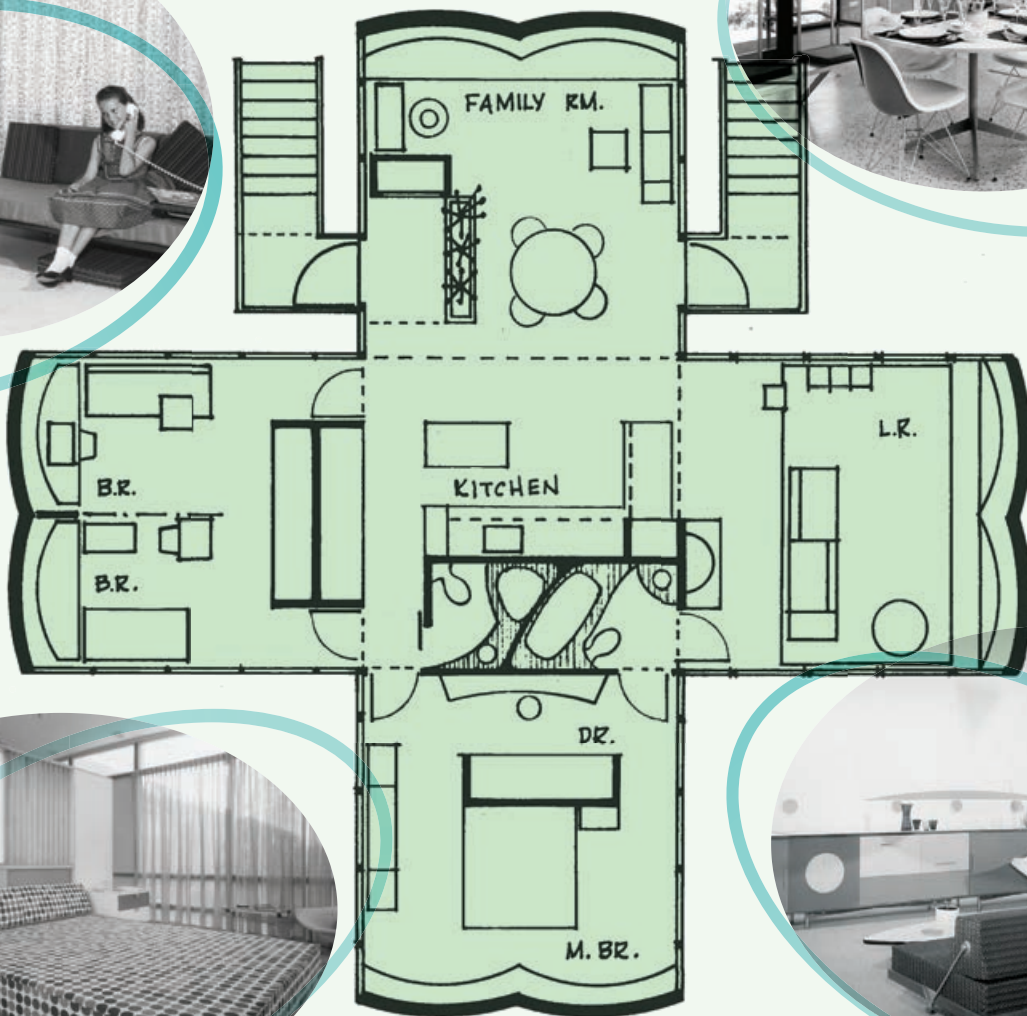
"This was still in the Depression, but the Exposition was highly influenced by the automobile industry," Collins said. "They really wanted the construction industry to become more industrial, more of a manufacturing process like for the automobile, which was coming into its own at that time. People were looking to the production line as way to produce construction materials. And things were being manufactured on a factory line, so why not houses to bring down their costs?"

After the exposition ended in 1934, Robert Bartlett purchased five of the homes—the Wieboldt-Rostone House, the House of Tomorrow, the Florida Tropical House, the Cypress Log Cabin, and the Armco-Ferro House—load-



The House of the Future was designed around a central core that housed the plumbing, heating, and ventilation systems. From the kitchen, living space radiated outward in 250-square-foot pods. The interior was furnished to reflect the ultramodern tastes of a family living in 1986.

Images on these pages courtesy: Goody Clancy





## THE 1933 HOUSE OF TOMORROW ORIGINALLY INCLUDED ITS OWN AIRPLANE HANGAR



*The Florida Tropical House (top) was flamingo pink and originally designed to withstand hurricanes. The Wieboldt-Rostone House (bottom) had to be re-clad after its experimental exterior rotted away.*

*Images courtesy: Indiana Dunes National Lakeshore*

ed them on barges, and floated them across Lake Michigan to Beverly Shores, Ind.

That's where Collins comes in: she's a historical architect with the National Park Service in Chesterton, Ind., and she's working to help restore the five homes through a partnership of the NPS, a non-profit organization called Indiana Landmarks, and private individuals.

The houses failed to meet the affordability goal, however, because designers equipped the homes with more and more flourishes and bells and wishes. Of the five homes at the Beverly Shores site, only one was affordable for its time, the Armco-Ferro House, an enamel frameless steel house sponsored by the Ferro Enamel Corp. and the American Rolling Mill Co.

Many of the Century of Progress houses were made from a steel frame, a common material that hadn't often before been used for home construction, Collins said. But the Armco-Ferro House was designed very particularly to be mass-produced from steel, she said. Based a traditional four-square home, the house itself is composed of corrugated steel panels bolted together: the walls, the floors, the roof, all are corrugated steel.

The Wieboldt-Rostone House was framed in steel and clad with Rostone, an artificial experimental stone made from shale limestone alkali that never really caught on. Though other Rostone-clad homes weathered the years "just fine," Collins said, the original house was too close to steel mills and oil refineries. By 1950 it had deteriorated under too much acid rain "and has been sheathed over with another material," Collins said.

The House of Tomorrow, also now at Beverly Shores, was prohibitively expensive. But theoretically it could have been mass-produced: the home's columns were made from steel and the joints of steel and lightweight concrete. The house originally included its own airplane hangar and glass walls that offered views from every angle, a feature that so taxed the experimental air conditioning system that it soon failed.

"But the House of Tomorrow and the Armco-Ferro House are two of the best examples of how quickly homes made of pre-manufactured pieces could go up," Collins said.

The Florida Tropical House, also in Beverly Shores, has a wood frame covered with stucco, though original designs called for it to be constructed with poured concrete walls to withstand hurricanes.

"So that was really forward-thinking," Collins said.

### WHEN PLASTIC WAS FANTASTIC

Prefabrication is not unusual today, Parker, the home builder and developer, said. Many companies make prefab, manufactured houses that can be cheaply and speedily built and even customized, within limits, to client specifications.

The Monsanto House of the Future had itself been intended as a quick-build, low-cost prefabricated structure for the surge of returning World War II veterans starting families and moving into single-family homes. A plastic house would nicely serve their needs; as a bonus, the house could be sited on any frontier the housing boom would open.

"After the war there was this enormous population and economic boom, and this housing boom that led to the need to deploy housing very quickly," Van Zante of MIT said. "So this house was prefabricated, compact modular, and entire subdivisions of them could be put up very quickly, unlike hammer and nail wooden or brick housing that would take weeks or months to build.

"The idea was that the base could be placed anywhere even on a hilly or rocky terrain and then the house attached to it," he said. "It was all about prefabrication; it could be shipped anywhere; it was also modular so it could be shipped on the back of an 18-wheeler."

"These plastic houses could be put up in an afternoon after the concrete core had been poured and dried," he added.

The house was crafted from eight wings of plastic fused "very imperfectly" to a base, Van Zante said. Imperfectly because the designers didn't know how to best fuse plastic to concrete, their material of choice for the home's base. The designers were working with both a new material—plastic—and a very traditional concrete, which they chose as the best method to secure the house to the ground.

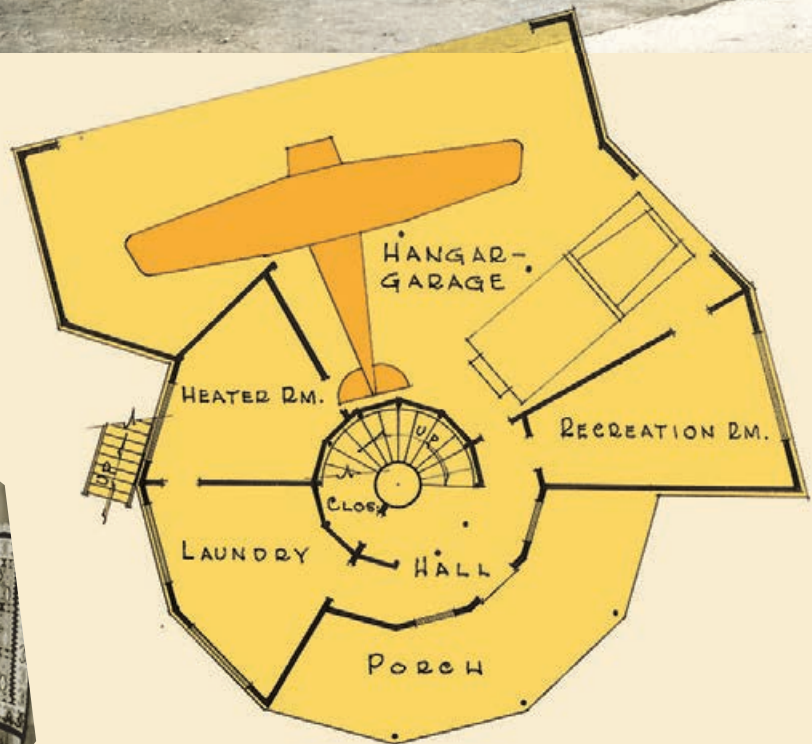
"No one had ever built a plastic house before," Van Zante said. "They'd decided they needed a concrete foundation because they didn't know any other way to secure the house to the ground. They knew plastic wouldn't be dense enough to provide that kind of stability and that concrete could handle the moisture of the ground.

One reason designers chose to create a plastic house had everything to do with its sponsor. "Monsanto had geared up over the years of the war to produce plastic for the war effort,"

Images courtesy: Century of Progress Records, 1927-1952, University of Illinois at Chicago Library



The House of Tomorrow at the Chicago Century of Progress Exhibition hinted at a future where airplanes would be common. The circular plan led to some odd-shape rooms, however, and the floor-to-ceiling windows led to overheating.



FIRST-FLOOR-PLAN



# HOUSE OF TOMORROW



## HOUSE OF TOMORROW



Images courtesy: Indiana Dunes National Lakeshore

*The Armco-Ferro House featured corrugated steel panels that were bolted together. The kitchen, though, was conventional.*

Van Zante said. “It was an essential material during the war, but when the war ended they had an unfulfilled production market; so they wanted to create a domestic market.”

The plastic used for the house closely resembled fiberglass, so its designers turned to boat-building techniques to create the structure.

“The builders were working with what they knew, as always,” Van Zante said. “Boats were the largest objects built out of plastic at that time. If this had been mass produced, the whole concept would have been developed over time and would have been innovated along with other concepts. But it just kind of stopped dead.”

Though the house was “imperfectly fused” to its base, Van Zante is confident that had its design and material caught on, the fusing technique would have advanced with time.

“Because the house didn’t go further, the idea of fusing it didn’t either,” he said. “Fusing plastic to concrete wasn’t an ideal solution. They’d have had to develop it further.”

Though plastic houses hadn’t become the norm by 1986, the design of the Monsanto House of the Future was actually quite forward-thinking, Van Zante said. The concrete base, for example, acted as the home’s central core through which all utility lines were run without the need to be threaded throughout each room.

The kitchen acted as the cultural hub of the home.

“The housewife of the future could command the house from the kitchen through electronic controls,” Van Zante said. “The window shades could move and doors could open and be locked with these controls.”

The command center anticipated today’s mobile applications and household electronics that allow for much the same kind of control. The Internet of Things promises to link household appliances and much more to the Internet, giving them the capability to be programmed and controlled at the touch of a button.

As the Monsanto house was designed to include every innovation possible, it became expensive, well over the estimated budget. Too costly to be a viable mass-produced product, the idea of the house as a prototype was eventually abandoned, Van Zante said. The house functioned strictly as a Disney exhibition home.

# THE WRECKING BALL BOUNCED OFF THE PLASTIC WALLS.

## HOUSES OF OUR FUTURE

The Monsanto House of the Future closed in 1967 when Disneyland sought newer exhibits. According to the Walt Disney Company, the wrecking ball bounced off the plastic walls. The house had to be dismantled.

Its demise came well before the advent of the historical preservation movement. "I've had some of my students ask me if they recycled the pieces of the house," Van Zante said. "At the time, there weren't any environmental or conservation concerns."

Ironic, because today's housing buzzword is green: low-energy, sustainable, and tiny.

"Everyone wants green everything, but what is green? I challenge anyone to define it," Parker said. "There's no standardization over green. People started jumping on it, but it's expensive to do, and the consumer still wants a cheap house."

For his part, Parker expects the house of the future—meaning the houses built in 50 or so years—to pretty much resemble the homes of today. Externally, that is.

"We'll continue to see advances in housing, but like cars the changes will be mostly under the hood. The envelope will change much more slowly," he said, citing American's avoidance of radical styles of homes.

"You'll notice in new subdivisions that replication of very old styles like the Victorian and the Tudor are still very popular, and the current craze is for Tuscan architecture," he said. "A lot of builders are moving with that because it's safe to do."

Under the hood—or in this case, the roof—he expects to see continued advances in home electronics, so that the furnace and air conditioning really can be controlled by a touch of a button. He expects to see refrigerators that track the food inside and electronically alert the homeowner of soon-to-spoil produce or a lack of butter and milk.

Due to its expense, he doesn't expect solar energy to become popular "until we stop using coal" and public utilities fall from favor. But he does expect to see a movement to bury electrical wires that now run down streets and through backyards.

"Those are terrific changes but they'll happen so slowly you don't notice them," Parker said.

Green and solar and wireless. Those are the real key elements to the home of the future. But how far in the future is an open question, Parker said. **ME**

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**JEAN THILMANY** is an associate editor of *Mechanical Engineering* magazine.



Images courtesy: Steve Fisher

## Livin' the Dome Home Life

There's no home design more futuristic than the geodesic dome popularized by Buckminster Fuller. He hoped the domes—which could be constructed on site and placed on many types of terrain—could aid the postwar housing crisis.

The homes did see a wave of popularity, especially within the back-to-the-earth movement and were popularized by Lloyd Kahn, former shelter editor with the *Whole Earth Catalog*. In the late 1980s the homes were sold in kit form, ready to be erected by homeowners.

But the domes never caught on, for a number of reasons—many experienced by Steve Fisher, a marketing consultant in Los Angeles who recently purchased a 30-year-old geodesic dome home built from a kit in the Big Smoky Valley of Nevada. (See photos above and right.) When his wife suggested a dome as their retirement home he took to the Internet and found it.

He knew about the unique problems he'd face as a dome homeowner and they've pretty well all come to pass, Fisher said. First, the bank wouldn't give him a loan for the home because its resale value is practically nil. Few people want to live in a dome, it seems, and most don't want to live near one.

Same with buying homeowner's insurance. Fisher is now insured with Lloyd's of London.

Every house has its nitpicky problems, but a dome's are unique, Fisher said.

"If you're talking about a house that's supposed to be cheap and efficient, this doesn't fit," he said. "People and hardware think rectangularly, all the venting out there is for right angles."

It goes without saying there are few right angles in a dome. "That's not the way the future was supposed to go," Fisher said.

Venting is an important consideration because his house is also prone to condensation buildup due to its high ceiling. The temperature upstairs can be 20 or so degrees warmer than downstairs.

Heating is another factor. Fisher heats with propane, which, due to the inclusion of water, raises humidity levels. The couple needs to keep the windows open, even in winter, or moisture condenses on the walls.

And then there's the roof. It can leak, which then ruins the acoustic tiles underneath. Fisher hopes to find roofers who can lay shingles on the many acoustic tiles that make up the dome's sides.

"But it can withstand 90 mile-per-hour winds," Fisher said.

"It was designed to be built in the middle of nowhere by hippies. Those new terms like 'green' and 'sustainable'—isn't that what the hippies were all about?"

Despite those issues—and all homes have issues, Fisher said—he thinks the dome home is poised for a comeback.

"Nowadays the buzz is all 'tiny house' but a dome home is that same thing, being in tune with nature," he said.

