

PENNSYLVANIA ROCKSHELTER EARNS LANDMARK STATUS

In 1955, a man investigating a groundhog hole in southwest Pennsylvania came across what was to become one of the most important archeological sites in North America. The Meadowcroft Rockshelter, recently designated a national historic landmark by the Secretary of the Interior, has long been a lightning rod in the debate over the peopling of the continent.

The age of the site—and the vagaries of radiocarbon dating—is at the center of the argument. Located in the side of a steep, rocky slope that rises from a tributary of the Ohio River, the shelter is believed by some to have been occupied as early as 16,000 years ago.

Since the 1930s, the conventional theory has been that the oldest evidence of humans was at a site in Clovis, New Mexico, dated to about 11,200 years ago. It was believed that, with much of the world's water locked up in Ice Age glaciers, people made their way to the continent on foot via the Bering Strait.

THE SITE (AND A HANDFUL OF OTHERS LIKE IT) CAUSED A SCHISM IN AMERICAN ARCHEOLOGY. CRITICS CLAIMED THE RADIOCARBON SAMPLES WERE CONTAMINATED BY COAL PARTICULATE PERCOLATING DOWN THROUGH THE SOIL, SKEWING THE TESTS TO A MUCH OLDER DATE.

While some embrace the “Clovis first” theory, more recent discoveries suggest that Alaska was not the only point of entry, and that some may have arrived long before Clovis. Meadowcroft is probably the most sensational case for this rewriting of prehistory.

Archeologist James Adovasio of Mercyhurst College has been excavating the site since 1973. “At the beginning none of us thought it would be remarkably old or deep,” he says. His team went down to 16 feet, discovering a lengthy catalogue of activity. There were thousands of stone tools, over 300 fire pits, and almost a million animal remains. It is the largest collection of plant and animal remains at a single site in North America.

Archeologists discovered the earliest corn in the region, and some of the oldest evidence of squash and ceramics. The evidence stretched over thousands of years. Native Americans were likely still using the shelter as late as the Revolution, when it was abandoned.

It was at the lowest strata that the most surprising and controversial discoveries were made. Radiocarbon-dated material showed an age of 13,000 to 19,000 years. Stone tools and fragments from tool-making indicate humans were in the shelter at that time.

The site (and a handful of others like it) caused a schism in American archeology. Critics claimed the radio carbon samples were contaminated by coal particulate percolating down through the soil, skewing the tests to a much older date. Others contended that some of the alleged remains were of animals that weren't around in the Ice Age, when the first humans were thought to be hunkering down in the shelter. Since the mid-'70s, scholarly journals have been filled with articles on recognizing coal contaminants and the radiocarbon chronology from the Meadowcroft excavations. But four different labs found no evidence of coal contamination, Adovasio says, and a study “effectively terminated” the discussion, with the NHL nomination citing the care of the excavation.

There is agreement that the site is one of the oldest in the New World. With other discoveries there has been a shift away from Clovis-first. Findings at Virginia's Cactus Hill, Florida's Little Salt Spring, and South

Carolina's Topper site reportedly pre-date Clovis too.

Now, thanks to the landmark designation, the rockshelter enjoys the highest distinction bestowed on a place for its importance to the past. A \$250,000 grant from the National Park Service-administered Save America's Treasures program will fund a protective structure.

The site is owned by the nonprofit Historical Society of Western Pennsylvania, which offers guided tours of the excavation, where tools and the remains of campfires from thousands of years ago can still be seen.

For more information, contact James Adovasio, (814) 824-2581, adovasio@mercyhurst.edu, or Meadowcroft Rockshelter and Museum of Rural Life, 401 Meadowcroft Road, Avella, PA 15312, (724) 587-3412, www.meadowcroftmuseum.org.

Right: The view from outside the shelter.



THE FUTURE AS RELIC

HOUSTON'S SPACE AGE ICON IN AN UNCERTAIN ORBIT

The Houston Astrodome sits in forlorn isolation these days. Baseball and football have moved on to new stadiums, leaving what was once the epitome of the modern sports arena to host the occasional rodeo or monster truck show. Yet, in its day, the Astrodome was history in the making. Completed in 1964, it was called the Eighth Wonder of the World, the first totally enclosed, air-conditioned stadium, the first to host football and baseball, and the first to attempt such a gravity-defying roof span—at 641 feet, 8 inches. Douglas Pegues Harvey, writing in *Texas Architect*, said, "Its location at the edge of the limitless prairie, in a nearly infinite parking lot, heightens the air of surrealism while its name appropriates the aura of outer space."

BELOW LEFT AND CENTER KATYA HORNER



WITH THE FATE OF THIS REMARKABLE FEAT OF ENGINEERING in flux, the Historic American Engineering Record worked with the American Society of Civil Engineers to document the site, photographed last summer by HAER lensman Jet Lowe.

Harris County, which owns the stadium, put out a request for proposals in 2003, looking for parties to renovate for a new use. The front-runner is the Astrodome Redevelopment Corporation, which recently obtained \$450 million in financing to turn the dome into a 1,200-room convention hotel with an indoor waterway similar to San Antonio's River Walk. The county has yet to approve the plan.

The fate of the place is a difficult subject for Houstonians. Many have a sentimental attachment; for some it is still a source of pride. Though 40 years old, it stands for Texas-size ambition and a sky's-

Above: Refugees from Hurricane Katrina take shelter in the dome. **Right:** The Texas-size drama of the stadium's interior space.

the-limit attitude. No politician wants to be known as the person who demolished the Astrodome.

FOR PURPOSES OF THE DOCUMENTATION, IT WAS THE STRUCTURAL ENGINEERING THAT GOT THE attention. The construction challenges were enormous. Much had never been done

THE AGE GAVE THE DOME ITS NAME. IN THE MID-'60S, THE SPACE PROGRAM WAS IN FULL SWING, WITH HOUSTON'S NEW NASA FACILITY AT ITS CENTER. THE FUTURE WAS THE RAGE; PEOPLE WERE TALKING ABOUT PUTTING A MAN ON THE MOON. HOFHEINZ DECIDED TO CALL IT THE ASTRODOME.

before, at least on such a scale. A New York company, hired to oversee the structural work, supervised a St. Louis structural design firm, which in turn brought in a specialist from London. As a 1965 issue of *Civil Engineering* put it, the arrangement was "a case of consultants who had consultants who had consultants."

The very things that made Houston an inhospitable place to watch a ballgame could wreak havoc on a structure like the dome. Designers had to account for strong winds and the thermal expansion and contraction of summer heat. A combination of stiffness and flexibility was achieved, in part, with steel columns free to move on pins at the top



ALL PHOTOS JET LOWENPSHAER EXCEPT AS NOTED



NEAR RIGHT AND CENTER FOOTBALL HALL OF FAME



Left, above right: The Astrodome inside and out. Above left: The first football game. Above center: Granger Hoyle breaks a tackle on December 7, 1968.



IT COST \$31.6 MILLION TO BUILD. THE PARKING LOT WAS THE WORLD'S LARGEST, HOLDING 30,000 CARS. MOTORS RECONFIGURED THE STANDS, ONE WAY FOR FOOTBALL, ANOTHER FOR BASEBALL. FANS SAT IN STYLE AND COMFORT, IN ORANGE AND RED CUSHIONED SEATS, WHILE WATCHING A \$2 MILLION ELECTRONIC SCOREBOARD—THE FIRST OF ITS KIND—SIMULATE EXPLOSIONS AND CATTLE STAMPEDES.

and rollers at the bottom. A network of interconnected diamond-shaped trusses gave the roof both support and rigidity. Lightweight concrete was used for all the parts above ground.

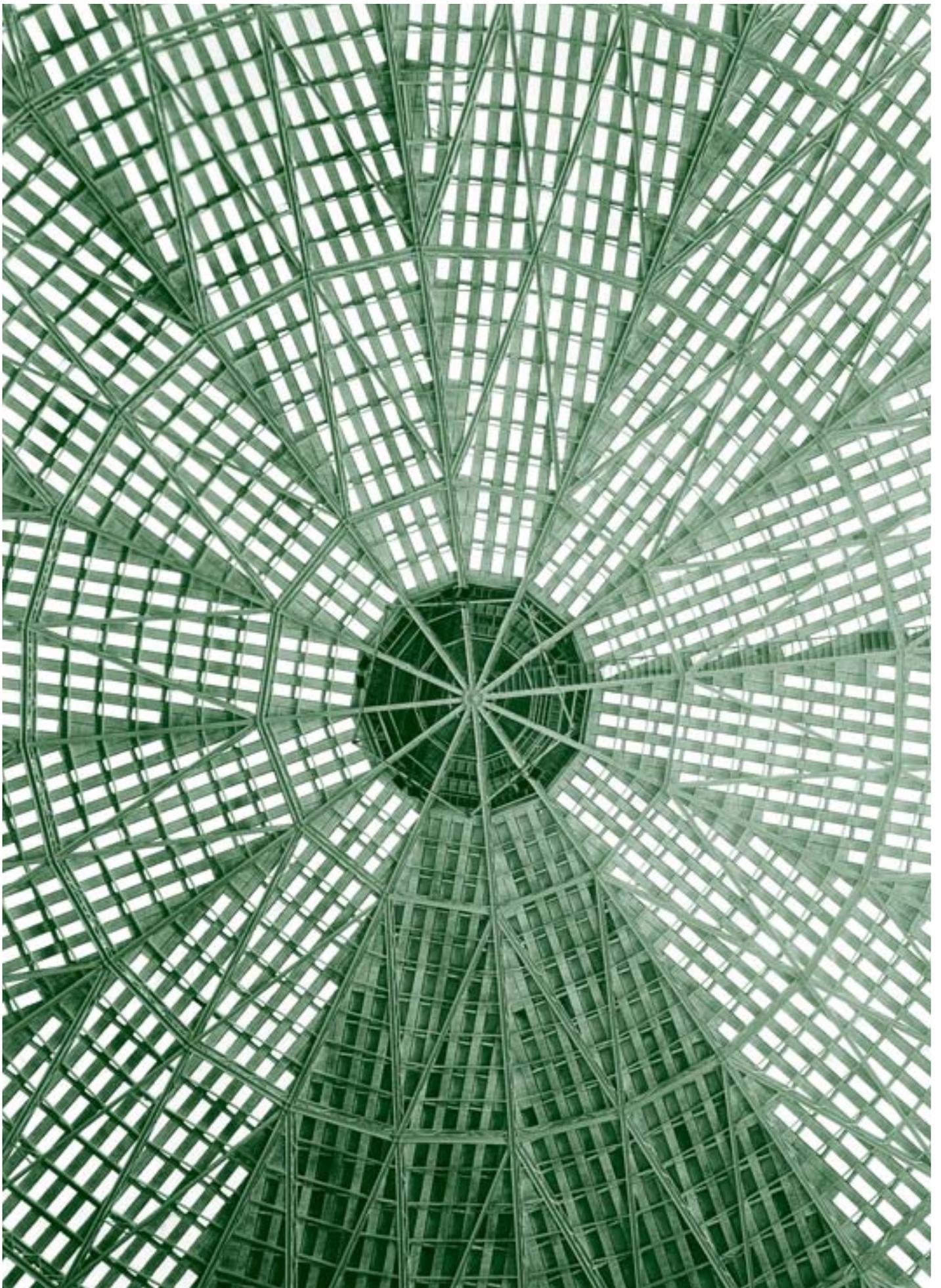
Merindra Gosain of Walter B. Moore and Associates, which did the structural engineering, says that designing without computer models was a feat in itself. “There was a lot of manual calculation,” he says. “To be able to predict very accurately what the deflection of the dome was going to be once the shoring and temporary supports were removed was [a major achievement].”

The field was 22 feet below ground, and ingenuity stepped in again with the shoring up of the concrete walls to hold the earth back. Steel cables—attached to the outside of the walls—connected to huge concrete anchors, or “deadmen,” buried some distance outside the stadium. A cathodic system protected against rust in the wet soil, a technique borrowed from the offshore oil industry.

THE ASTRODOME WAS THE IDEA OF LOCAL POLITICIAN AND ENTREPRENEUR ROY HOFHEINZ.

In the early 1960s, baseball was getting ready to expand, and he and his partners formed the Houston Sports Association to bring a team to the city. But the climate and mosquitoes made an open air stadium problematic. Hofheinz, who liked Buckminster Fuller’s geodesic domes, was reportedly inspired by a contraption the Romans unfurled over the Coliseum in inclement weather.

A public bond was necessary to build the place, proposed in 1961. Needing the vote of the county’s large African American population, Hofheinz enlisted the aid of Quentin R. Mease, an African American WWII vet and a respected member of the community. The bond got the vote on the condition that when the stadium opened, it would be integrated—just as the city’s lunch counters had been the year before.



NEAR RIGHT AND CENTER TOPPS

Opposite: Fly balls tended to disappear into the dome's pale background. Below left: Jim Wynn lofts one skyward. Below center: Baseball legend Joe Morgan broke in with Houston. Below right: Fans of the new stadium next door stroll past the old dome.

As construction proceeded, the dome got the attention of the engineering world. *Air Engineering* weighed in on cooling and heating 41 million cubic feet of space. *Welding Engineer* devoted a lengthy article to the truss-work. *Illuminating Engineering* enthused over the lighting system (“Natureproof Astrodome Gets Controlled Lighting”).

When work was done in 1964, people paid to take a tour; it was the nation’s third most-visited manmade attraction after Mount Rushmore and the Golden Gate Bridge.

The age gave the dome its name. In the mid-’60s, the space program was in full swing, with Houston’s new NASA facility at its center. The future was the rage; people were talking about putting a man on the moon.

Temperature at game time was always a pleasant 74 degrees. The opening pitch—or kickoff—was delivered under the light of 4,500 lucite panels, soon painted because fly balls tended to disappear against the pale background. A hearty variety of grass was chosen, but could not survive indoors, ushering in the era of Astro Turf, another Astrodome first.

THE STADIUM INSPIRED IMITATORS ALL OVER THE COUNTRY AS TRADITIONAL STADIUMS WERE abandoned in favor of the futuristic. Then came the backlash, with retro ballparks recalling the days of old. Suddenly, places like the Astrodome were considered “monument[s] to bad taste and synthetic sport,” as one critic put it. The Oilers left town in 1996. The Astros moved to a new park three years later.

When calls for adapting the stadium went out—to Disney, Six Flags, and Universal Studios, among others—Lee Hockstader wrote in the *Washington Post*, “The vastness of the Astrodome still impresses, but little else does. The plumbing is unreliable; the Astro Turf carpet is coming apart at the seams; the seats are rusting on their moorings. The air conditioning still works but only because it doesn’t need to most of the time.”



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Hofheinz decided to call it the Astrodome. The National League Astros played their first season in 1965; the football Oilers debuted three years later.

It cost \$31.6 million to build. The parking lot was the world’s largest, holding 30,000 cars. Motors reconfigured the stands, one way for football, another for baseball. Fans sat in style and comfort, in orange and red cushioned seats, while watching a \$2 million electronic scoreboard—the first of its kind—simulate explosions and cattle stampedes. The well-to-do were ensconced in “skyboxes,” a harbinger of the economic changes that would transform professional sports.

Last summer, when thousands lost their homes to Hurricane Katrina, the dome was offered as shelter. But it remains a financial drain. To keep it open for a few annual events costs about \$1.5 million. Even shut down, it costs the county \$500,000 annually for upkeep.

Whatever becomes of the Astrodome, it is a chapter in the story of American innovation, one that was dubbed the “Can-Do Cathedral.” Writes Douglas Pegues Harvey, “To posterity, the most important test of a building is not in the continuing influence of its various innovations but in how it engages and alters the mythic landscape. By this standard, the Dome is a landmark of the first order.”

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