# DYMAXION MAN

## THE VISIONS OF BUCKMINISTER FULLER

by Elizabeth Kolbet

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ONE OF BUCKMINSTER FULLER'S EARLIEST INVENTIONS WAS A CAR SHAPED like a blimp. The car had three wheels—two up front, one in the back—and a periscope instead of a rear window. Owing to its unusual design, it could be maneuvered into a parking space nose first and could execute a hundred-and-eighty-degree turn so tightly that it would end up practically where it had started, facing the opposite direction. In Bridgeport, Connecticut, where the car was introduced in the summer of 1933, it caused such a sensation that gridlock followed, and anxious drivers implored Fuller to keep it off the streets at rush hour.

Fuller called his invention the Dymaxion Vehicle. He believed that it would not just revolutionize automaking but help bring about a wholesale reordering of modern life. Soon, Fuller thought, people would be living in standardized, prefabricated dwellings, and this, in turn, would allow them to occupy regions previously considered uninhabitable—the Arctic, the Sahara, the tops of mountains. The Dymaxion Vehicle would carry them to their new homes; it would be capable of travelling on the roughest roads and—once the technology for the requisite engines had been worked out—it would also (somehow) be able to fly. Fuller envisioned the Dymaxion taking off almost vertically, like a duck.

Fuller's schemes often had the hallucinatory quality associated with science fiction (or mental hospitals). It concerned him not in the least that things had always been done a certain way in the past. In addition, to flying cars, he imagined mass-produced bathrooms that could be installed like refrigerators; underwater settlements that would be restocked by submarine; and floating communities that, along with all their inhabitants, would hover among the clouds. Most famously, he dreamed up the geodesic dome. "If you are in a shipwreck and all the boats are gone, a piano top…that comes along makes a fortuitous life preserver," Fuller once wrote. "But this is not to say that the best way to design a life preserver is in the form of a piano top. I think that we are clinging to a great many piano tops in accepting yesterday's fortuitous contrivings." Fuller may have spent his life inventing things, but he claimed that he was not particularly interested in inventions. He called himself a "comprehensive, anticipatory design scientist"—a "comprehensivist," for short—and believed that his task was to innovate in such a way as to benefit the greatest number of people using the least amount of resources. "My objective was humanity's comprehensive success in the universe" is how he once put it. "I could have ended up with a pair of flying slippers."

Fuller's career is the subject of a new exhibition, "Buckminster Fuller: Starting with the Universe," which opens later this month at the Whitney Museum of American Art. The exhibition traces the long, loopy arc of his career from early doodlings to plans he drew up shortly before his death, twenty-five years ago this summer. It will feature studies for several of his geodesic domes and the only surviving Dymaxion Vehicle. By staging the

SEGMENT : GEODESIC DOME

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retrospective, the Whitney raises—or, really, one should say, re-raises—the question of Fuller's relevance. Was he an important cultural figure because he produced inventions of practical value or because he didn't?

Richard Buckminster Fuller, Jr.—Bucky, to his friends—was born on July 12, 1895, into one of New England's most venerable and, at the same time, most freethinking families. His great-great-grandfather, the Reverend Timothy Fuller, a Massachusetts delegate to the Federal Constitutional Assembly, was so outraged by the Constitution's sanctioning of slavery that he came out against ratification. His great-aunt Margaret Fuller, a friend of Emerson and Thoreau, edited the transcendentalist journal The Dial and later became America's first female foreign correspondent.

Growing up in Milton, Massachusetts, Bucky was a boisterous but hopelessly nearsighted child; until he was fitted with glasses, he refused to believe that the world was not blurry. Like all Fuller men, he was sent off to Harvard. Halfway through his freshman year, he withdrew his tuition money from the bank to entertain some chorus girls in Manhattan. He was expelled. The following fall, he was reinstated, only to be thrown out again. Fuller never did graduate from Harvard, or any other school. He took a job with a meatpacking firm, then joined the Navy, where he invented a winchlike device for rescuing pilots of the service's primitive airplanes. (The pilots often ended up head down, under water.)

During the First World War, Fuller married Anne Hewlett, the daughter of a prominent architect, and when the war was over he started a business with his father-in-law, manufacturing bricks out of wood shavings. Despite the general prosperity of the period, the company struggled and, in 1927, nearly bankrupt, it was bought out. At just about the same time, Anne gave birth to a daughter. With no job and a new baby to support, Fuller became depressed. One day, he was walking by Lake Michigan, thinking about, in his words, "Buckminster Fuller—life or death," when he found himself suspended several feet above the ground, surrounded by sparkling light. Time seemed to stand still, and a voice spoke to him. "You do not have the right to eliminate yourself," it said. "You do not belong to you. You belong to Universe." (In Fuller's idiosyncratic English, "universe"—capitalized—is never preceded by the definite article.) It was at this point, according to Fuller, that he decided to embark on his "lifelong experiment." The experiment's aim was nothing less than determining "what, if anything," an individual could do "on behalf of all humanity." For this study, Fuller would serve both as the researcher and as the object of inquiry. (He referred to himself as Guinea Pig B, the "B" apparently being for Bucky.) Fuller moved his wife and daughter into a tiny studio in a Chicago slum and, instead of finding a job, took to spending his days in the library, reading Gandhi and Leonardo. He began to record his own ideas, which soon filled two thousand pages. In 1928, he edited the manuscript down to fifty pages, and had it published in a booklet called "4D Time Lock," which he sent out to, among others, Vincent Astor, Bertrand Russell, and Henry Ford.

Like most of Fuller's writings, "4D Time Lock" is nearly impossible to read; its sentences, Slinky-like, stretch on and on and on. (One of his biographers observed of "4D Time Lock" that "worse prose is barely conceivable.") At its heart is a critique of the construction industry. Imagine, Fuller says, what would happen if a person, seeking to purchase an automobile, had to hire a designer, then send the plans out for bid, then show them to the bank, and then have them approved by the town council, all before work on the vehicle could begin. "Few would have the temerity to go through with it," he notes, and those who did would have to pay something like fifty thousand dollars—half a million in today's money—per car. Such a system, so obviously absurd for autos, persisted for houses, Fuller argued, because of retrograde thinking. (His own failure at peddling wood-composite bricks he cited as evidence of the construction industry's recalcitrance.) What was needed was a "New Era Home," which would be "erectable in one day, complete in every detail," and, on top of that, "drudgery-proof," with "every living appliance known to mankind, built-in."

Not coincidentally, Fuller was working to design just such a home. One plan, which never made it beyond the sketching stage, called for ultra-lightweight towers to be assembled at a central location, then transported to any spot in the world, via zeppelin. (Fuller envisioned the zeppelin crew excavating the site by dropping a small bomb.) A second, only slightly less fabulous proposal was for what Fuller came to call the Dymaxion House. The hexagonal-shaped, single-family home was tobe stamped out of metal and suspended from a central mast that would contain all its wiring and plumbing. When a family moved, the Dymaxion House could be disassembled and taken along, like a bed or a table. Fuller constructed a scale model of the house, which was exhibited in 1929 at Marshall Field's as part of a display of modern furniture. But no full-size version could be produced, because many of the components, including what Fuller called a "radio-television receiver," did not yet exist. Fuller estimated that it would take a billion dollars to develop the necessary technologies. Not surprisingly, the money wasn't forthcoming.

Fuller was fond of neologisms. He coined the word "livingry," as the opposite of "weaponry"—which he called "killingry"—and popularized the term "spaceship earth." (He claimed to have invented "debunk," but probably did not.) Another one of his coinages was "ephemeralization," which meant, roughly speaking, "dematerialization." Fuller was a strong believer in the notion that "less is more," and not just in the aestheticized, Miesian sense of the phrase. He imagined that buildings would eventually be "ephemeralized" to such an extent that construction materials would be dispensed with altogether, and builders would instead rely on "electrical field and other utterly invisible environment controls."

Fuller's favorite neologism, "dymaxion," was concocted purely for public relations. When Marshall Field's displayed his model house, it wanted a catchy label, so it hired a consultant, who fashioned "dymaxion" out of bits of "dynamic," "maximum," and "ion." Fuller was so taken with the word, which had no known meaning, that he adopted it as a sort of brand name. The Dymaxion House led to the Dymaxion Vehicle, which led, in turn, to the Dymaxion Bathroom and the Dymaxion Deployment Unit, essentially a grain bin with windows. As a child, Fuller had assembled scrapbooks of letters and newspaper articles on subjects that interested him; when, later, he decided to keep a more systematic record of his life, including everything from his correspondence to his dry-cleaning bills, it became the Dymaxion Chronofile.

All the Dymaxion projects generated a great deal of hype, and that was clearly Fuller's desire. All of them also flopped. The first prototype of the Dymaxion Vehicle had been on the road for just three months when it crashed, near the entrance to the Chicago World's Fair; the driver was killed, and one of the passengers—a British aviation expert—was seriously injured. Eventually, it was revealed that another car was responsible for the accident, but only two more Dymaxion Vehicles were produced before production was halted, in 1934. Only thirteen models of the Dymaxion Bathroom—a single unit that came with a built-in tub, toilet, and sink—were constructed before the manufacturer pulled the plug on that project, in 1936. The Dymaxion Deployment Unit, which Fuller imagined being used as a mobile shelter, failed because after the United States entered the Second World War he could no longer obtain any steel. In 1945, Fuller attempted to mass-produce the Dymaxion House, entering into a joint effort with Beech Aircraft, which was based in Wichita.

DYMAXION CAR

FULLER'S GLASSES

Two examples of the house were built before that project, too, collapsed. (The only surviving prototype, known as the Wichita House, looks like a cross between an onion dome and a flying saucer; it is now on display at the Henry Ford Museum, in Dearborn, Michigan.)

Following this string of disappointments, Fuller might have decided that his "experiment" had run its course. Instead, he kept right on going. Turning his attention to mathematics, he concluded that the Cartesian coördinate system had got things all wrong and invented his own system, which he called Synergetic Geometry. Synergetic Geometry was based on sixty-degree (rather than ninety-degree) angles, took the tetrahedron to be the basic building block of the universe, and avoided the use of pi, a number that Fuller found deeply distasteful. By 1948, Fuller's geometric investigations had led him to the idea of the geodesic dome—essentially, a series of struts that could support a covering skin. That summer, he was invited to teach at Black Mountain College, in North Carolina, where some of the other instructors included Josef Albers, Willem and Elaine de Kooning, John Cage, and Merce Cunningham. ("I remember thinking it's Bucky Fuller and his magic show," Cunningham would later recall of Fuller's arrival.) Toward the end of his stay, Fuller and a team of students assembled a trial dome out of Venetian-blind slats. Immediately upon being completed, the dome sagged and fell in on itself. (Some of the observers referred to it as a "flopahedron.") Fuller insisted that this outcome had been intentional—he was, he said, trying to determine the critical point at which the dome would collapse—but no one seems to have believed this. The following year, Anne Fuller sold thirty thousand dollars' worth of I.B.M. stock to finance Bucky's continuing research, and in 1950 he succeeded in erecting a dome fifty feet in diameter.

The geodesic dome is a prime example of "ephemeralization"; it can enclose more space with less material than virtually any other structure. The first commercial use of Fuller's design came in 1953, when the Ford Motor Company decided to cover the central courtyard of its Rotunda building, in Dearborn. The walls of the building, which had been erected for a temporary exhibit, were not strong enough to support a conventional dome. Fuller designed a geodesic dome of aluminum struts fitted with fibreglass panes. The structure spanned ninety-three feet, yet weighed just eight and a half tons. It received a tremendous amount of press, almost all of it positive, with the result that geodesic domes soon became popular for all sorts of purposes. They seemed to spring up "like toadstools after a rain," as one commentator put it.

The geodesic dome transformed Fuller from an eccentric outsider into an eccentric insider. He was hired by the Pentagon to design protective housing for radar equipment along the Distant Early Warning, or DEW, line; the structure became known as a radome. He also developed a system for erecting temporary domes at trade fairs all around the world. (Nikita Khrushchev supposedly became so enamored of one such dome, built for a fair in Moscow, that he insisted that "Buckingham Fuller" come to Russia "and teach our engineers.") Fuller was offered an appointment at Southern Illinois University, in Carbondale, and he had a dome-home built near campus for himself and Anne. In 1965, he was commissioned by the United States Information Agency to design the U.S. Pavilion for the Montreal Expo. Though the exhibit inside was criticized as uninspiring, Fuller's dome, which looked as if it were about to float free of the earth, was a hit.

As the fame of the dome—and domes themselves—spread, Fuller was in near-constant demand as a speaker. "I travel between Southern and Northern hemispheres and around the world so frequently that I no longer have any so-called normal winter and summer, nor normal night and day," he wrote in "Operating Manual for Spaceship Earth." "I wear three watches to tell me what time it is." Castro-like, Fuller could lecture for ten hours at a stretch. (A friend of mine who took an architecture course from Fuller at Yale recalls that classes lasted from nine o'clock in the morning until five in the evening, and that Fuller talked basically the entire time.) Audiences were enraptured and also, it seems, mystified. "It was great! What did he say?" became the standard joke. The first "Whole Earth Catalog," which was dedicated to Fuller, noted that his language "makes demands on your head like suddenly discovering an extra engine in your car."

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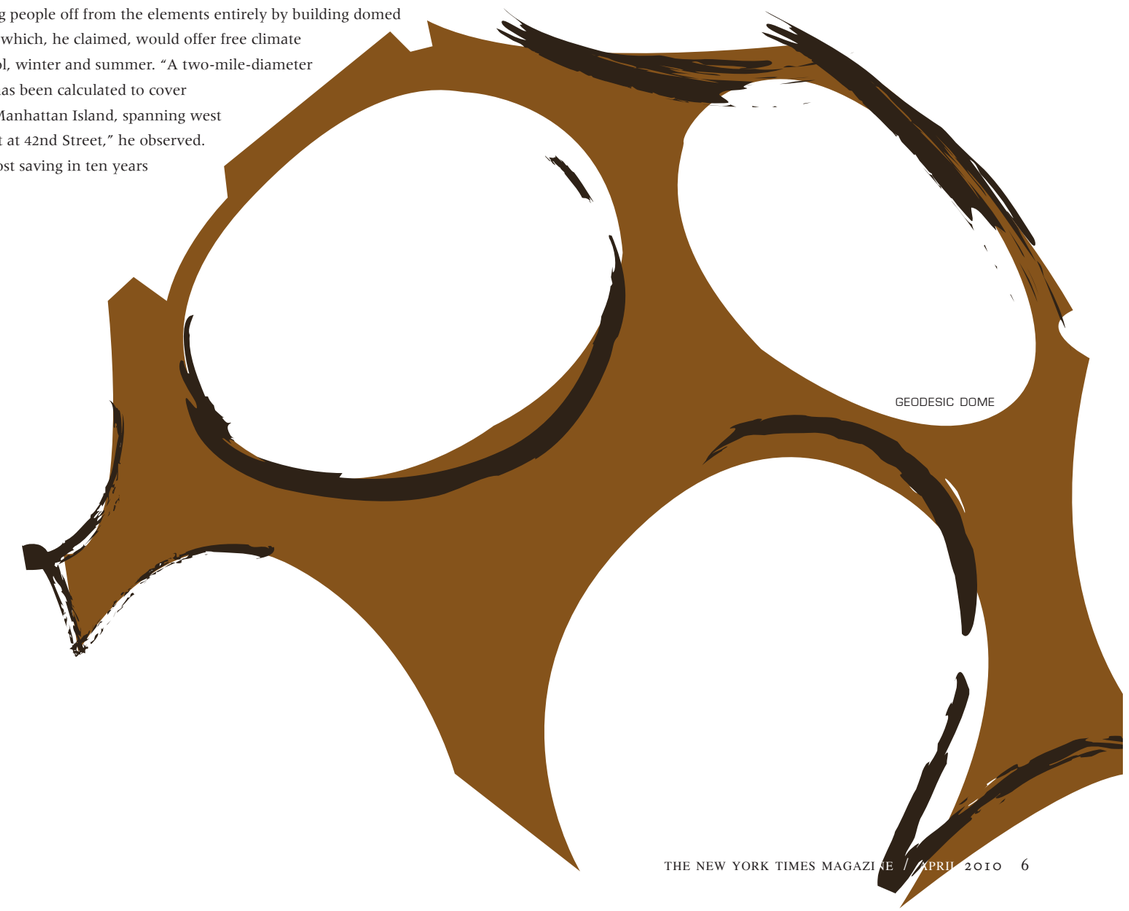
In "Bucky," a biography-cum-meditation, published in 1973, the critic Hugh Kenner observed, "One of the ways I could arrange this book would make Fuller's talk seem systematic. I could also make it look like a string of platitudes, or like a set of notions never entertained before, or like a delirium." On the one hand, Fuller insisted that all the world's problems—from hunger and illiteracy to war—could be solved by technology. "You may… want to ask me how we are going to resolve the ever-accelerating dangerous impasse of world-opposed politicians and ideological dogmas," he observed at one point. "I answer, it will be resolved by the computer." On the other hand, he rejected fundamental tenets of modern science, most notably evolution. "We arrived from elsewhere in Universe as complete human beings," he maintained. He further insisted that humans had spread not from Africa but from Polynesia, and that dolphins were descended from these early, seafaring earthlings.

Although he looked to nature as the exemplar of efficient design, he was not terribly interested in the natural world, and mocked those who warned about problems like resource depletion and overpopulation. "When world realization of its unlimited wealth has been established there as yet will be room for the whole of humanity to stand indoors in greater New York City, with more room for each human than at an average cocktail party," he wrote. He envisioned cutting people off from the elements entirely by building domed cities, which, he claimed, would offer free climate control, winter and summer. "A two-mile-diameter ome has been calculated to cover Mid-Manhattan Island, spanning west to east at 42nd Street," he observed. "The cost saving in ten years would pay for the dome. Domed cities are going to be essential to the occupation of the Arctic and the Antarctic." As an alternative, he developed a plan for a tetrahedral city, which was intended to house a million people and float in Tokyo Bay.

He also envisioned what he called Cloud Nines, communities that would dwell in extremely lightweight spheres, covered in a polyethylene skin. As the sun warmed the air inside, Fuller claimed, the sphere and all the buildings within it would rise into the air, like a balloon. "Many thousands of passengers could be housed aboard one-mile-diameter and larger cloud structures," he wrote. In the late seventies, Fuller took up with Werner Erhard, the controversial founder of the equally controversial est movement, and the pair set off on a speaking tour across America. Fuller championed, and for many years adhered to, a dietary regimen that consisted exclusively of prunes, tea, steak, and Jell-O.



GEODESIC DOME

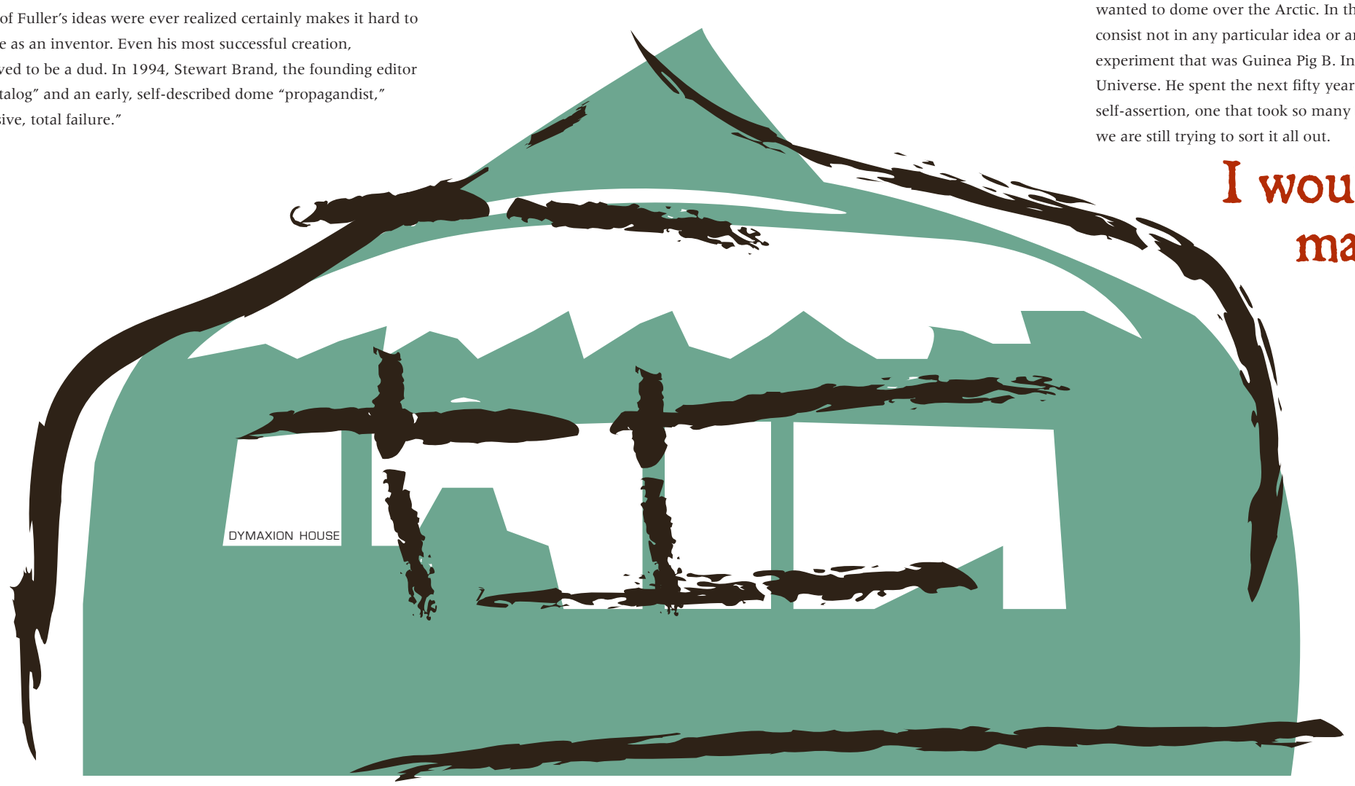
The Dymaxion Vehicle, the Dymaxion House, "comprehensive, anticipatory design," Synergetic Geometry, floating cities, Jell-O—what does it all add up to? In conjunction with the Whitney retrospective, the exhibition's two curators, K. Michael Hays and Dana Miller, have put together a book of essays, articles, and photographs—"Buckminster Fuller: Starting with the Universe." Several of the authors in the volume gamely, if inconclusively, grapple with Fuller's legacy. Antoine Picon, a professor of architecture at Harvard, notes that the detail with which Fuller's life was recorded—the Dymaxion Chronofile eventually grew to more than two hundred thousand pages—has had the paradoxical effect of obscuring its significance. Elizabeth A. T. Smith, the chief curator at the Museum of Contemporary Art in Chicago, writes that Fuller's influence on "creative practice" has been "more wide-ranging than previously thought," but goes on to acknowledge that this influence is "difficult to pinpoint or define with certainty." In their introduction, Hays and Miller maintain that Fuller helped "us see the perils and possibilities" of the twentieth century. They stress his "continuing relevance as an aid to history," though exactly what they mean by this seems purposefully unclear.

The fact that so few of Fuller's ideas were ever realized certainly makes it hard to argue for his importance as an inventor. Even his most successful creation, the geodesic dome, proved to be a dud. In 1994, Stewart Brand, the founding editor of the "Whole Earth Catalog" and an early, self-described dome "propagandist," called geodesics a "massive, total failure."

Domes leaked, always. The angles between the facets could never be sealed successfully. If you gave up and tried to shingle the whole damn thing—dangerous process, ugly result—the nearly horizontal shingles on top still took in water. The inside was basically one big room, impossible to subdivide, with too much space wasted up high. The shape made it a whispering gallery that broadcast private sounds to everyone.

Among the domes that leaked were Fuller's own home, in Carbondale, and the structure atop the Ford Rotunda. (When workmen were sent to try to reseal the Rotunda's dome, they ended up burning down the entire building.)

Fuller's impact as a social theorist is equally ambiguous. He insisted that the future could be radically different from the past, that humanity was capable of finding solutions to the most intractable-seeming problems, and that the only thing standing in the way was the tendency to cling to old "piano tops."




But Fuller was also deeply pessimistic about people's capacity for change, which was why, he said, he had become an inventor in the first place. "I made up my mind… that I would never try to reform man—that's much too difficult," he told an interviewer for this magazine in 1966. "What I would do was to try to modify the environment in such a way as to get man moving in preferred directions." Fuller's writings and speeches are filled with this sort of tension, or, if you prefer, contradiction. He was a material determinist who believed in radical autonomy, an individualist who extolled mass production, and an environmentalist who wanted to dome over the Arctic. In the end, Fuller's greatest accomplishment may consist not in any particular idea or artifact but in the whole unlikely experiment that was Guinea Pig B. Instead of destroying himself, Fuller listened to Universe. He spent the next fifty years in a headlong, ceaseless act of self-assertion, one that took so many forms that, twenty-five years after his death, we are still trying to sort it all out.

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