Current Comments

A Tribute to R. Buckminster Fuller— Inventor, Philosopher

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I first met Buckminster Fuller at my apartment about three years ago. He and his wife then lived in the same building I do. An ISI® colleague, Beta Starchild, told me that Fuller needed a new office. The University of Pennsylvania could no longer provide space for his staff. Since we were planning our new building at the time, Beta suggested that Bucky could use space on the fourth floor of our building. A meeting was arranged to discuss this and to get better acquainted. We had previously been introduced at a press conference announcing the new building. I remember my first impression of Bucky. He seemed like an elf: small, quiet, and frequently smiling. A few of us later dined at a local French restaurant. Bucky remained quiet unless specifically questioned.

After a brief negotiation, he and his staff moved into our building. It is a pleasure for me to tell visitors that such a distinguished scholar has his professional residence here. I only wish that he stayed around more often. He travels more than I do and, alas, recently moved his home to California.

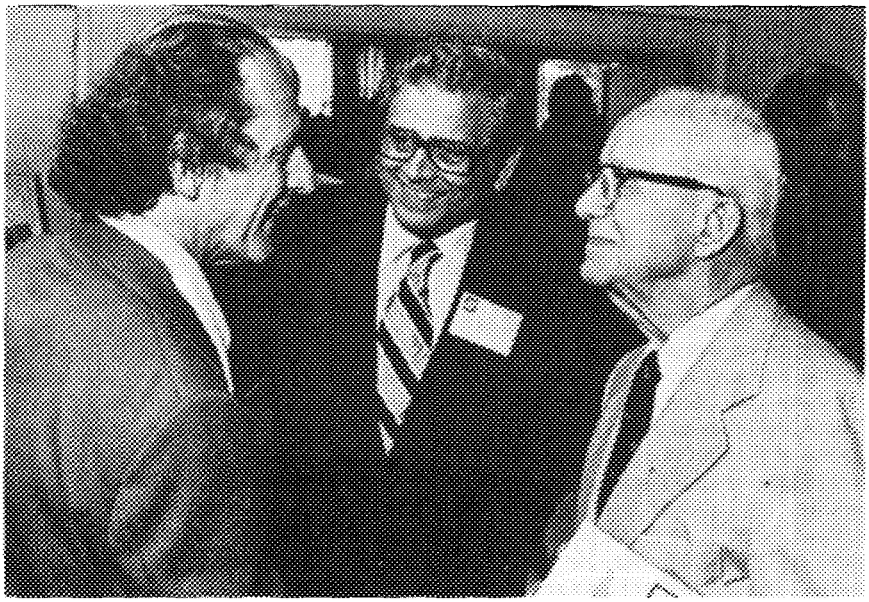
Richard Buckminster Fuller, or Bucky, as he prefers to be called, has long been known as the inventor of the geodesic dome, the Dymaxion map, and the concept of "spaceship earth." Since 1972, he has held the position of World Fellow in Residence at the University City Science Center. The position is now largely honorary, but Bucky continues to keep his office at ISI, which is located in the University City Science Center.

Fuller was born in Milton, Massachusetts, on July 12, 1895, the second of four children. His mother was Caroline Wolcott Fuller, and his father Richard Buckminster Fuller, Sr. The Fuller family is known for strong wills and resoluteness. Among Bucky's ancestors were many ministers, lawyers, and military leaders. His father was a Boston merchant importer. He was the first Fuller in several generations who did not enter law or the ministry.

One of Bucky's more notable relatives was his great-aunt Margaret Fuller, a literary critic, editor, and feminist. She was a friend of Ralph Waldo Emerson, and first encouraged him to publish his work. She is also credited with discovering Thoreau.[1]

When I first met Fuller he told me that he was born hyperopic, or farsighted, but his eyes were not corrected with glasses until he was four years old. Until then, he says, he had never seen the details of objects—only their outlines and general shapes. He contends that this early view of life is responsible for his still unusual outlook on the world. Throughout his life, he has retained a penchant for concentrating on the large shapes around him rather than the details. But I'm sure that Bucky knows that hyperopia is not a universal prescription for such a unique *weltanschauung*.

Fuller's life has been every bit as unusual as his outlook on it. Although



My meeting with Buckminster Fuller, during the press conference announcing the new ISI building in the University City Science Center, July 19, 1978. Also shown is Randall M. Whaley, president of the Science Center.

he attended Harvard twice, and has 47 honorary degrees, he never graduated from college. He has held a number of diverse jobs, from an apprentice machine-fitter in a cotton mill to a cashier. During World War I, he served in the Navy as commander of a crash boat flotilla. With his father-in-law, James Monroe Hewlett, Bucky founded the Stockade Building System in 1922. Their company manufactured a special kind of building block. It was later sold to the Celotex Company.[1] From 1930 to 1932 he edited and published *Shelter* magazine,[2] an architectural periodical. Since the age of 33, however, he has not worked in the conventional sense at all. He is continually inventing things, and currently has 22 patents (and three more applications) to his credit. He is the author of 20 books and more than 60 articles. He has been called both a genius and a crackpot.[3] He also experienced numerous financial failures.

Depending upon one's outlook, Fuller has been considered an artist, architect, inventor, mathematician, poet, writer, builder, philosopher, and scientist. He has done a wide variety of things to earn such titles—invented, designed, and built new types of buildings (considered by at least one author as artwork[4]), maps, cars, and chairs; created his own system of geometry (with models that biological structures were later discovered to follow); coined numerous terms; written poems; developed water recycling systems; and inspired untold numbers of people with lofty, long-range visions.

Bucky says that the real Buckminster Fuller came into being in 1927, about ten years after his marriage to Anne Hewlett on July 12, 1917. When their first daughter, Alexandra, died in 1922, Bucky entered a major crisis period in his life. Five years later, Bucky's father-in-law sold the building business they had founded, due to financial failures. Bucky had never had much success as a businessman, and the new owners fired him from his position in the company.

The crisis culminated for Bucky with the birth of his second daughter, Allegra, the same year.[1]

Convinced that he was a failure, Bucky briefly considered suicide. He decided, however, that his life's experience was not his to destroy and that he was only a failure as long as he kept trying to earn a living according to society's rules. It was time to be honest with himself and work according to his own rules. And the rules he set for himself were simple: he would dedicate himself to improving the human condition in any way he could. He was then 32 years old. Today, 54 years later, Fuller continues to pursue this goal.[1]

One of the first things Bucky did after making his crucial decision was to stop talking for almost two years. He wanted, he says, to break himself of the habit of talking by rote. He intended, instead, to be sure that he meant exactly every word he said. In a recent interview, writer John Love described how Fuller was affected by these two years: "He emerged from this period of monkish silence a changed man. He set about to discover nothing less than the operating principles of the universe, and then to apply them to designs for new kinds of shelter and other life-enhancing inventions. 'I decided to invest my life this way,' Bucky says."[5]

This process of discovering the grand scheme of things has led Bucky along numerous paths. He decided at age four that the triangle was the basis of much in the universe, and many of his designs have evolved from that principle. One of the first was his "4D" or "Dymaxion" house—a complete family dwelling hung around a central pole. Mass-producible, it could be dropped in place by a dirigible, and moved at whim. The house was completely automated: refrigerators and cupboards opened at the interruption of a light beam; clothes were washed, pressed, and stored automatically; and the house was kept dust-free by its air circulation system. Water was recycled. And this, I should point out, was designed in 1927! Had the materials needed to build it been feasible then, the house could have retailed for about $1,500—not bad even for those days. The term Dymaxion, which Bucky has adopted as his personal trademark, was originally coined expressly for this house when it was displayed at the Marshall Field department store in Chicago. The term, a combination of "dynamism," "maximum," and "ions," is now defined by Bucky as "the most-advantage-from-the-least technology."[6]

Unfortunately, the Dymaxion house, like many of Bucky's inventions, was ahead of its time. The idea of a house hung from a pole was quite unlike anything else designed at the time, and the materials needed to build it were undreamed of in 1927. In *The Dymaxion World of Buckminster Fuller*, a work he wrote with Robert Marks, he explains that the American Institute of Architects so disliked his house that they passed a resolution concerning it: "Be it resolved that the American Institute of Architects establish itself on record as inherently opposed to any peas-in-a-pod reproducible designs."[1] The Dymaxion house, due to its advanced ideas, was the first of many inventions that earned Bucky the name "crackpot."

The Dymaxion house, shown in Figure 1, was never built except as a table model. But Bucky continued to invent. In 1930 he produced the Dymaxion bathroom—an offshoot of his Dymaxion house. The Dymaxion bathroom was composed of four pieces of sheet metal stamped out in a factory. When fitted together (a process which only took a few minutes), they made a complete single surface form that contained a shower/tub, a toilet, and a sink. The toilet used a special chemical system rather than water, and the atomizer shower ran for ten minutes on a quart of water. Bucky's idea was to create a bathroom that could be easily moved and installed—just like a refrigerator or a stove. Although about a dozen of the bathrooms were built and installed, the manufacturer, Phelps-Dodge Corporation, soon stopped production. One of

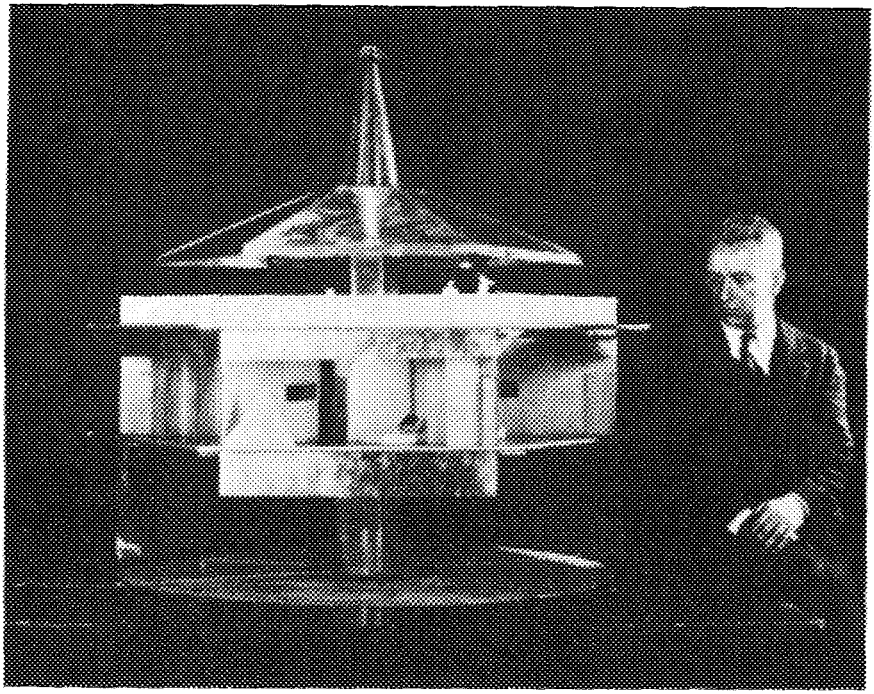


Figure 1: Table model of the 4-D, or Dymaxion house, with Fuller.

Phelps-Dodge's largest customers, the Standard Sanitary Company, apparently was afraid that plumbers' unions would react unfavorably to the Dymaxion bathroom. Such a reaction would have had a serious effect on both companies' business.[1]

In addition to his house and bathroom, Bucky designed a Dymaxion car that could seat ten people. Built in the shape of a teardrop, the car could reach a speed of 120 miles an hour, and was highly maneuverable. It could, for example, rotate in a circle around its front wheels. The car is shown in Figures 2 and 3. Three Dymaxion cars were actually built and received favorable attention from the public. Unfortunately, when the second of the cars was involved in a fatal accident (the Dymaxion car was rammed by another car) the publicity which it attracted proved equally fatal. The offending car, which was owned by a minor government official, was removed from the accident scene before the press arrived. The accident was consequently blamed on Bucky's car.[1]

Another well-known Fuller invention at this time was the Dymaxion map, a flat projection that shows the entire world on one surface with negligible distortions. The map has enjoyed popularity, although, according to Bucky's staff, it has not been an enormous financial success. Various versions of the map can be ordered from Dymaxion Artifacts, 3501 Market Street, University City Science Center, Philadelphia, Pennsylvania 19104. Prices range from $1.00 to $15.00.

Working with the Butler Manufacturing Company, Bucky also designed the "Dymaxion deployment unit" in the early-1940s, which was actually a converted grain bin. Easily moved and assembled, these units made excellent temporary housing for the military during World War II. A gradual shortage of

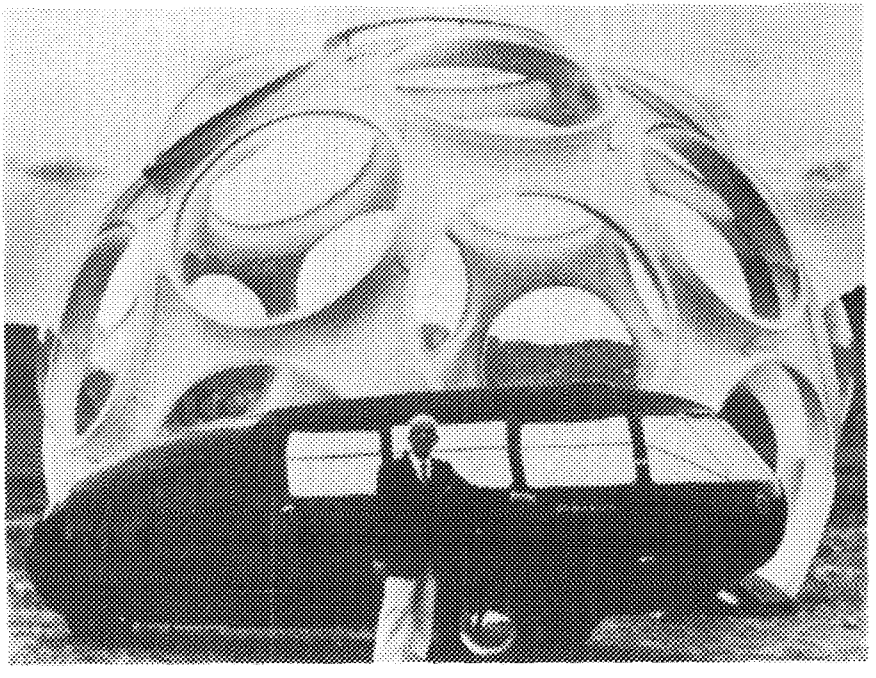


Figure 2: Fuller and his Dymaxion car, shown together with one of his most recent artifacts, the fly's eye dome.

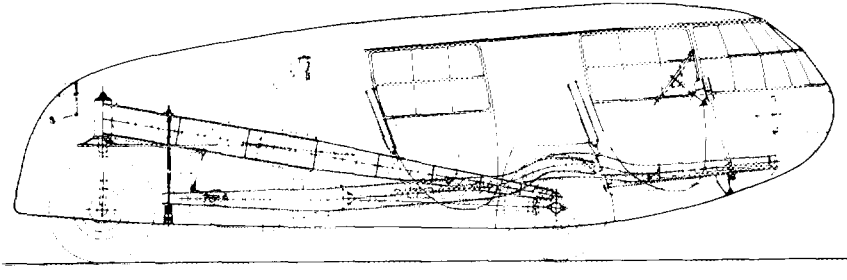


Figure 3: Scale drawing of the Dymaxion car, showing its interior design. The car was steered by its rear wheel.

metal during the war, however, brought about the end of the deployment unit.[1] Bucky also designed "multi-deck" apartment houses, which, like his Dymaxion house, were hung from a central pole! Unfortunately, as with his Dymaxion house, these ideas were premature, since not enough people could appreciate them. This only added to his share of bad luck. But all this began to change with the introduction of the geodesic dome.

Like most of Bucky's projects, the geodesic dome was a sort of accidental invention—an offshoot of his attempt to understand the nature of the universe. Hugh Kenner, a professor of English at Johns Hopkins University and a good friend of Fuller, notes that Bucky says he "didn't set out to invent the geodesic

dome." In fact, Bucky points out, "I might have come up with a pair of flying slippers."[6]

Although I'm no student of mathematics, I am going to attempt an explanation of how the geodesic dome evolved. While enormously simplified, I hope my version will at least give an indication of the incredible thought processes that brought about Fuller's dome. The geodesic dome actually began with Bucky's attempt to organize the energy patterns of the universe into a logical system. He was hoping to create a geometry of energy. His attempts at creating this geometry brought him to, among other things, the phenomenon that he called "closest-packing of spheres." Bucky discovered that one sphere completely surrounded by other spheres of identical size always formed a 14-sided polyhedron. A polyhedron is defined as a "solid form created by plane faces."[7] A cube, for example, is a polyhedron. Fuller called this 14-sided polyhedron the "vector equilibrium" because "all the sides of this figure are of equal length, and this length is the same as the distance from any of its vertexes to the center of the figure."[1] In other words, the figure represents an equilibrium of forces.

Fuller further discovered that if he removed the central sphere and compressed the polyhedron, the resulting figure was an icosahedron, or a 20-sided solid figure. Continuing to contract symmetrically, Fuller produced from the icosahedron an octahedron (eight sides) and finally a tetrahedron (four sides, or a pyramid). These three forms, Bucky found, are the only all-triangular, symmetric systems. These systems represent an integrated system of forces, and are quite stable. They will not collapse or expand of their own accord. He believes, as a result, that they provide the most economical, stable structural system.[1]

The geodesic dome itself is a result of the projection of these triangular systems outward onto a spherical surface. The result is a spherical representation of these forms, or basically, a spherical system of triangles. According to Bucky, this generates "a structured system of maximum economy."[1]

In this final form, the dome system of spherical triangles is formed by a series of intercrossing circles on the sphere. Fuller thus chose the name "geodesic" for his domes, as in modern geometry the arc of a great circle is called a geodesic. (A great circle is a "circle formed on the surface of a sphere by the intersection of a plane that passes through the center of the sphere."[7] As an example, the equator is a great circle on the earth. An arc is a portion of the curved line that constitutes the circle.[7])

Fuller's geodesic domes have a number of remarkable qualities. They can be built of many materials, such as paper, wood, or plastic. They can cover a much larger area of space than conventional buildings, without needing internal support. They are also much lighter and less expensive to build than conventional buildings of comparable size.[1] Figure 4 shows one of his geodesic domes.

With the introduction of the geodesic dome in 1948, Bucky's fortunes finally began to change. People all over the world were thrilled with the dome, and wherever it was exhibited, it was an immediate hit. A demand for domes grew steadily. When Bucky received the patent (US patent #2,682,235) for the dome on June 29, 1954, which gave him sole control of the geodesic dome, his fortune was finally made. He was then just three weeks short of his sixtieth birthday. The patent has since expired, and although Bucky is usually credited as the dome's inventor, he no longer makes any money from it.

To date, hundreds of thousands of geodesic domes have been built around the world. One of the largest was built in Baton Rouge, Louisiana, in October 1958. Constructed by the Union Tank Car Company, it was built to house trains being repaired. The dome rises

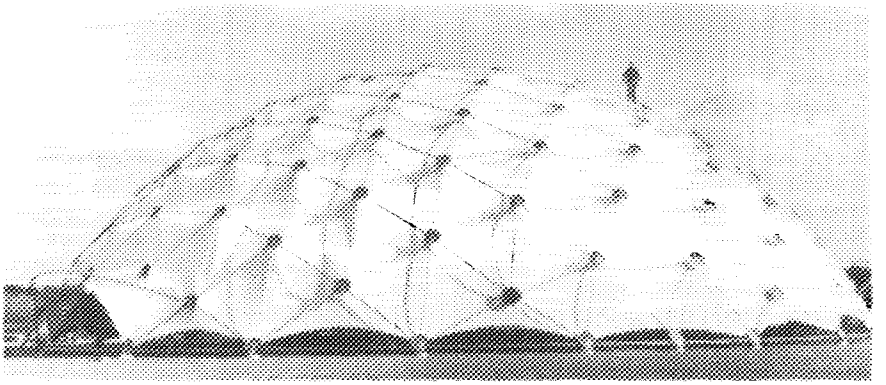


Figure 4: Fuller's geodesic dome.

128 feet at its center, and covers a floor area of 115,558 square feet, yet its total weight is only 1,200 tons.

Geodesic domes are relatively simple to build. Workmen in Afghanistan erected one in two days for the International Trade Fair in 1956 simply by fitting together parts that had been color-coded in blue and red. It's almost, in a sense, a giant erector set! In fact, you could easily build one with an erector set. Nobody, however, has ever specifically designed a geodesic dome building kit as a toy. Another dome, built in Hawaii in the late-1950s, was completed in one day. It housed a symphony orchestra and an audience of 1,822 that night. From 1959 to 1972, while he was research professor of design science at Southern Illinois University, Bucky and Anne lived in a geodesic dome.

Undoubtedly, the geodesic dome is the principal reason for Fuller's international fame. As the dome increased in popularity, so did Bucky. Perhaps the most remarkable of his many resulting awards are his many medals from the American Institute of Architects. They seem to have completely reversed their earlier feelings about Bucky, and in 1960 they made him an honorary member. In 1970, Bucky received his fourth award from this organization, a gold medal, for, among other things, "the design of the strongest, lightest and most efficient means of enclosing space yet devised by man." Bucky has also won the Franklin Institute's Frank P. Brown medal, awarded "in recognition of discoveries involving meritorious improvement in building and allied industries," and the American Institute of Steel Construction Award for Excellence. He has been made an honorary citizen of many communities, and a member and honorary member of numerous organizations. These range from Mensa International to the American Association for the Advancement of Science. He has been honored by several "Buckminster Fuller days" and many other awards far too numerous to mention here. His biography lists 93 different awards. Figure 5 gives a sampling of them.

Another product of Bucky's geometry is the concept of tensegrity. The term comes from a combination of the words "tensional integrity."[1] In a tensegrity system, parts are held together through a "discontinuous-compression, continuous-tension" relationship. It is as if, according to Bucky, "there would be a spherical building of bricks, in which the bricks would be interlaced with rubber bands; each brick would be in effect restrained from escaping from the pattern only by the rubber bands for no brick would be in direct contact with

Figure 5: A select listing of awards presented to R. Buckminster Fuller.

1952	Award of Merit, American Institute of Architects
1954	Gran Premio, Triennale de Milan, Italy
1960	Gold Medal, American Institute of Architects
1967	Centennial Award, Boston Society of Architects
1968	First Architectural Design Award, American Institute of Architects
1969	Citation of Merit, US Department of Housing and Urban Development
1969	Humanist of the Year, American Association of Humanists
1971	Hero for the Nuclear Age Citation, Center for Teaching about Peace and War, Wayne State University
1972	Outstanding Lecturer and Author, Anchorage, Alaska
1973	Citation of Honorary Citizenship, City of Philadelphia
1974	Appreciation Medal, Harvard Business School Club of New York
1975	Planetary Citizens Award, United Nations
1975	Reward for Peace, World Unification Movement
1977	Eleanor Roosevelt Humanitarian Award, New York League for the Hard of Hearing
1977	Engineering and Science Award, Drexel University Federation of Engineering and Scientific Societies
1977	R. Buckminster Fuller Day, Boston, Massachusetts (February 11, 1977)
1978	R. Buckminster Fuller Days, State of Minnesota (April 28-30, 1978)

any other brick." A tensegrity system is shown in Figure 6. Bucky has built all sorts of tensegrity systems—including towers that appear to stand without support. Like geodesic domes, tensegrity domes have no size limitations, and in fact, the larger they are, the stronger they are. Among Bucky's dreams are plans to cover a two-mile diameter section of Manhattan with a tensegrity dome.[1]

Although Fuller has received a good deal of attention for his inventions, a quick perusal of Figure 5 will make it obvious that his recognition has not been solely the result of the dome. The dome may have gotten people to finally take Bucky seriously, but it is actually only a small portion of his work. As I explained before, Bucky's life goal has been to understand the patterns of the universe. That understanding, he has hoped, will allow mankind to live in the most efficient, yet luxurious, way possible. The inventions have been both by-products and a part of this overall goal. And while developing his inventions, Bucky has also been trying to tell us about the other, larger things he has learned over the years. His early book, *Operating Manual for Spaceship Earth*, first introduced the concept of the Earth as a spaceship. In it, he asserts that the Earth is simply a mechanical vehicle, and like any such vehicle, it needs maintenance to continue operating well. But, he goes on, "there is one outstandingly important fact regarding Spaceship Earth, and that is that no instruction book came with it."[8] It is up to us, he maintains, to learn how to operate our spaceship. We were given our intellect for precisely that reason. We must forget, he said, the idea that we are a world composed of many nations, and think of ourselves instead as one people traveling together. And our immediate goal is to unite in our effort to learn how to best use our environment—or spaceship—without destroying it.

The book's message was one of optimism, however. Bucky argued (and does still) that technology is the answer. Managed properly, he said, the Earth could easily support us all in a high standard of life. The trick to the whole thing, he said, is to learn to "do more with less."[8]

His latest book, *Critical Path*, takes up the theme again. We have not yet followed the ideas expressed in *Operating Manual for Spaceship Earth*, he says, and the problem is now getting serious. In fact, Fuller states that unless we follow the course of action outlined in the book—or the critical path—we have no more than about five years left to us on this planet.[9] Is he a prophet of doom? I think he is overdramatizing to make a point. Indeed, Bucky still claims that we have everything here we need to live well and happily indefinitely if we take action now. We must, for example, begin to

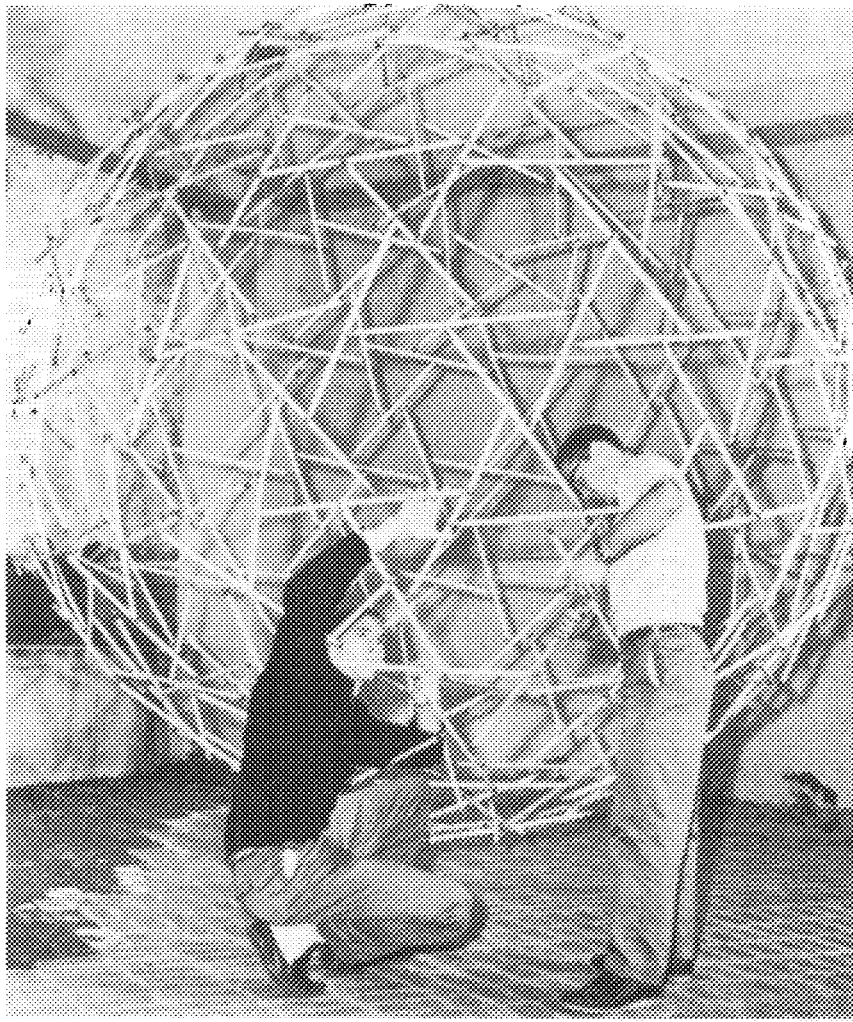


Figure 6: A tensegrity sphere.

draw on our energy "income"—sunlight, water power, wind power, and geothermal energy—and stop drawing from our energy "savings account"—fossil fuels.

Yet even with the dire warnings, Bucky's outlook remains optimistic. He is certain that man can save himself. He summed up this feeling when he spoke recently on a Philadelphia talk show. "God," Bucky said with a large smile, "is trying very hard to make us a success."[9]

In spite of all he has done, however, Bucky has not received as much attention as might be expected. I suspect that he is a "man ahead of his time" and his citation record seems to confirm that idea. A check of our citation indexes shows that he has received "only" 200 or so citations. The majority are to his book *Operating Manual for Spaceship Earth.*

In an attempt to gain a better understanding of Bucky's citation record, we

decided to do a brief citation analysis. Using the 1961-1980 *Science Citation Index®* (*SCI®*), the 1966-1980 *Social Sciences Citation Index®* (*SSCI®*), and the 1976-1980 *Arts & Humanities Citation Index™* (*A&HCI™*), we ran a check on what journals cited Bucky, and why. Over 200 articles cited Fuller in the years noted. Approximately 29 disciplines were represented: 11 in the sciences, 12 in the social sciences, and six in the arts and humanities. Journals ranged in subject matter from accounting and art to medicine and meteorology. In addition, education, religion, psychology, computer science, business, aeronautics, political science, physics, law, biology, economics, housing, and philosophy journals were all represented. The works most-cited—all books—are listed in Figure 7. Most of these works deal, in one form or another, with the same premises outlined in *Operating Manual for Spaceship Earth*. It is natural to wonder why journals from so many different disciplines turned up.

The answer, we discovered, was relatively simple. Fuller's works fall generally into the category of "futurism." And writers dealing with the future—whether in mathematics or education—often found him a support for their ideas. In addition, his concepts of "doing more with less" and looking at the overall structure of things are widely applicable. Some people, of course, were critical or even uncomplimentary. One writer, for example, said, "Fuller's *Spaceship Earth* seems oversimplified in the way it subsumes the biological and political realms under the laws of mechanics."[10]

Most, however, have either agreed with or praised Fuller's ideas. Typical of these citations:

> "A superb contribution toward understanding how experience, properly evaluated, can help in avoiding waste has been given by R. Buckminster Fuller."[11]

> "If you read the book *Synergetics*, you will realize that all systems interface with other systems, have subsystems and form a part of larger systems."[12]

> "The recently recognized need to shift away from a concentration on land and water boundaries that must be jealously maintained and defended at all costs toward a concern for the earth's atmosphere that must be protected [*Utopia or Oblivion*] has created a situation in which it is very desirable—and indeed, very urgent—to invent new, more appropriate forms."[13]

> "At the present time, development of capacity on earth for all to live in more direct relationship with energy than with matter emerges as the new universal imperative. [*Operating Manual for Spaceship Earth, Intuition, And It Came to Pass—Not to Stay*]"[14]

> "The philosophy that children have unusual creative vitality has been mentioned by many people ranging from Herbert Read to Buckminster Fuller."[15]

> "...Nothing seemed more persuasive than the 'dymaxion' social philosophy that R. Buckminster

Figure 7: R. Buckminster Fuller; a selected bibliography of his most-cited works.

Fuller R B. *And it came to pass—not to stay.* New York: Macmillan, 1976. 157 p.
----------. *Earth, Inc.* Garden City, NY: Anchor, 1973. 180 p.
----------. *I seem to be a verb.* New York: Bantam, 1970. 192 p.
----------. *Intuition.* Garden City, NY: Anchor, 1972. 190 p.
----------. *Nine chains to the moon.* Garden City, NY: Anchor, 1963. 375 p.
----------. *Operating manual for spaceship earth.* New York: Dutton, 1963. 143 p.
----------. *Synergetics: explorations in the geometry of thinking.* New York: Macmillan, 1975. 876 p.
----------. *Synergetics, volume II.* New York: Macmillan, 1979. 592 p.
----------. *Untitled epic poem on the history of industrialization.* New York: Simon and Schuster, 1962. 227 p.
----------. *Utopia or oblivion.* New York: Bantam, 1969. 365 p.

Fuller had been articulating since the twenties...but not until the post-Marxist sixties, indicatively, did Fuller become widely hailed as the social visionary he had always been."[16]

"The emerging future 'super-industrial society' desperately calls for a mentality that operates holistically, anticipates rapid change and novelty, acknowledges the reciprocal interaction of the components of general dynamic systems, recognizes that whole systems exhibit behavior unpredictable on the basis of their components taken separately (Fuller's synergy)...."[17]

"While high-energy and environmentally dangerous *technologies* will continue, a major revolution is occurring in the field of *microprocessors* with immense potential for the saving of material (doing more with less in Buckminster Fuller's sense)...."[18]

" 'Structure' is an abstract notion, which we assign at will and which allows us to map familiar pieces and relations into a broader context and to search for other pieces and relations this context implies. This is R. Buckminster Fuller's strategy of the posited whole in order to ferret out and map its dimensions which as such may not be readily observable...."[19]

"Fuller, whose professed field is that of 'comprehensive anticipatory design science,' has revolutionized the approach to architecture and design through the application of ecological and biological principles. His concepts of 'ephemeralization' and 'doing more with less' have become accepted ideals within the ever-widening body of environmental literature."[20]

Despite his age—he recently turned 86—Fuller is still going strong. His staff keeps quite busy handling a full schedule of trips, speeches, artifact development, and publication. Few people call him a crackpot anymore, although some admit that they find him difficult to understand. Bucky can often be somewhat long-winded, and his thinking does often seem to be on a wavelength somehow different from everyone else's. But it is certainly possible to understand Bucky. He has done much toward ensuring us a comfortable future on this planet by encouraging and insisting that we plan for the future, and by his insistence that we unite as a planet of people. His dome has done much toward that end—enchanting people all over the world with its simple and beautiful design. In his own way, Bucky has spent his lifetime as an ambassador of peace.

Bucky was nominated for the Nobel peace prize in 1969. Since all documents dealing with the prize are confidential, I don't know why he didn't win the prize that year, but it seems to me that he was an excellent candidate. Nominations for the Nobel peace prize, which must be in before February 1 of the prize year, may be submitted by seven groups. According to the Nobel committee, they are: "1. active and former members of the Nobel Committee of the Norwegian Storting and the advisers appointed by the Norwegian Nobel Institute; 2. members of the national assemblies and governments of the different states and members of the Inter-parliamentary Union; 3. members of the International Court of Arbitration at The Hague; 4. members of the Commission of the Permanent International Peace Bureau; 5. members and associate members of the Institute de Droit International; 6. university professors of political science and jurisprudence, history and philosophy; 7. persons who have been awarded the Nobel Peace Prize."[21]

The Nobel committee then has histories prepared for all candidates, which are considered and evaluated later in the year. If the committee feels one of those nominees is qualified, they award the prize. Although I am not a member of any of those bodies, I hope that anyone who is will accept this reminder that Bucky is an eminently worthy candidate.

Bucky's gold medal award from the American Institute of Architects best

sums up, I believe, the essence of this remarkable man. The citation reads:

> The American Institute of Architects presents the 1970 Gold Medal, the highest honor it can bestow, to Richard Buckminster Fuller, engineer, inventor, mathematician, educator, cartographer, philosopher, poet, author, cosmogonist, industrial designer and architect, whose ideas, once considered visionary, have now received national and international acceptance. A man responsible for the design of the strongest, lightest and most efficient means of enclosing space yet devised by man. A man who has used himself as a laboratory of human response, who has at all times concerned himself with the social implications of his discoveries, who has understood that real wealth is energy, and a man whose objective was humanity's success in the universe.

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My thanks to Susan Fell Evans and Edward M. Sweeney for their help in the preparation of this essay.

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