

Richard Buckminster Fuller, or Bucky as he was affectionately known, arrived on Spaceship Earth July 12, 1895 as we all do: naked, helpless and dependent. He was born so far-sighted as to be almost blind. Before he got his glasses, at age four and a half, he learned to make sense of the large patterns going on around him, to trust what his other senses told him about his environment and to appreciate the big picture before attending to the details. In kindergarten when the teacher gave Bucky and the other students dried peas and toothpicks for an exercise in "structure", Bucky had no visual reference to consider. Without glasses, Bucky was challenged to find a structure that didn't collapse in his young hands. The teachers were surprised to see that he was making tetrahedrons when the rest of his classmates were making cubes. And so began his proclivity for "out of the box" thinking.

Dynamic systems working together in nature would be fundamental to his perception for the rest of his life, as would the habit of examining the large patterns first. He could return his world of patterns and colors any time he wanted to by simply removing his glasses. No one then could have guessed that this young boy would turn out to be one of the greatest thinkers of the 20th Century; the Leonardo di Vinci of our time.

In 1912, young Bucky became the fifth generation of Fullers to be accepted to Harvard. He became bored with school and was eventually dismissed. His mother sent him off to work in a cotton mill in Sherbrooke, Quebec, Canada in an effort to teach him some responsibility; it was a punishment that he found stimulating and fulfilling. He later returned to Harvard but was again dismissed. He was doing well in his classes; but he didn't think that memorizing things was an effective use of his capabilities.

After his Harvard experience Bucky went to work for the Armour & Company meat packing operation in New York, City. At the onset of World War I Bucky joined the U.S. Naval Reserve. On July 12, 1917, his 22nd birthday, he married Anne Hewlett at Rock Hall, the Hewlett family homestead on Long Island in Lawrence, N.Y. Shortly thereafter Bucky was assigned to the U.S. Naval Academy. The Navy trained its officers in comprehensive thinking; to think about the whole ship and the well being of all its inhabitants, to consider the efficient use of the finite resources on board, and to anticipate the myriad dynamic forces that might

affect the balance. He had a distinguished Military career during which rose to the rank of Lieutenant and had a wide range of unique experiences including taking part in some of the first two-way transatlantic radio telephone communications.

On occasion he would observe the rich foam of bubbles that formed in the wake of a ship and would contemplate how nature made those bubbles. He was taught in school that to create a model of a sphere one had to use the number pi. But Bucky knew pi to be a "transcendental irrational" as it went on to infinity without resolution. It struck him that nature could not be using pi in the formation of bubbles; unless she was fudging the math somehow. He passed time contemplating the principles that nature was using to make a bubble if she wasn't using pi.

On December 12, 1918, shortly after the World War I Armistice, the Fullers had their first child, Alexandra Willets Fuller. Within her first year Alexandra contracts infantile paralysis and spinal meningitis. Bucky resigns from the Navy and takes a job with Armour & Company in an effort to be closer to his wife and ailing daughter. While employed at Armour he began to contemplate the complexities of food production and distribution and also about human consumption. In 1921 he resigns from Armour & Company to serve as the National Account Sales Manager for the Kelley-Springfield Truck Company. One year later he leaves Kelley-Springfield to assist his father-in-law, J.M. Hewlett, with the development of the Stockade Building Company. On November 14, 1922 Alexandra dies just before her fourth birthday. Bucky and Anne are devastated. Within a short time span Anne's mother and brother also die. It is a sad time in the Fuller home.

Bucky continued to manufacture buildings made from the Stockade building blocks invented by his father-in-law. The business expanded to include five factories from New Jersey to Joliet, Illinois where Bucky would eventually set up his headquarters. Eventually, 240 homes and buildings would be built using the Stockade Building System. The Stockade Midwest Corporation, of which Bucky was President, began to falter financially and in 1926 it was sold to Celotex Company. Bucky had lost all of his investor's money and was feeling like a failure.

Bucky and Anne were living in an apartment in Chicago when their second daughter, Allegra, was born on August 28, 1927. Bucky was 32 years old, unemployed and had a wife and a child looking to him for support and leadership. The responsibility of providing for his family along with the failures and disappointments of the recent past were weighing heavily on his mind. He wondered if his family would be better off without him. He spent many hours walking the streets of Chicago pondering his precarious situation.

On one cold autumn evening he found himself at the shore of Lake Michigan contemplating whether or not he should jump into the icy water and swim until he was overcome with exhaustion and died in the lake. He spent many hours there by the lake engaged in an internal dialogue, which resulted in an epiphany. He postulated that he did not belong to himself and therefore had no right to eliminate himself; that he was a part of Universe and its grand design, much of which he knew he would never be able to comprehend; and that he should trust his intuition and serve towards the betterment for the whole of humanity (for it is only through striving for the peaceful betterment for the whole of humanity that one could reasonably be assured of the viability of one's offspring and of their opportunity to enjoy a life richer than one's own).

From that day forward Bucky would never be the same. He had purposefully altered his relationship with the world, as he knew it and as it knew him: he shifted his paradigm. The shift in the model with which he used to interact with his environment caused him to re-think all he had learned up to that point. The world appeared different to him and he needed some time to think about the generalized principles at work in Universe, what it was he was trying to do and the words he was using to communicate his purpose to others. He resolved to do his own thinking and see what an individual with a wife and a child, starting out without money or credit, could produce on behalf of his fellow men.

Bucky, Anne, and Allegra move to a smaller apartment at 739 Belmont Avenue in Chicago and Bucky took some time to contemplate the shift in perception that he had recently experienced. The joy of his new daughter energizes his spirit and helps to focus his thoughts; he dedicates his life to the young life and the need for improved housing. His shift

in perception offered him the opportunity to observe his new daughter in a different light; one that had confidence and faith that developing minds can flourish with safe, healthy and nurturing home. He begins to spend a great deal of time at the library reading books by other independent thinkers in history, examining the history of the human species and reviewing the history of the housing industry. He was looking for indications of generalized principles that operated throughout Universe. One intriguing concept that he discovers in the field of Physics is that of precession or "the effect of one body in motion on that of another body in motion." The term is used to describe some of the gravity-defying effects of gyroscopes and the apparent 90° reaction to inputs. He takes copious notes and makes numerous sketches in an attempt to share his ideas with others.

1928 was a formative year for Fuller. He spends a great deal of time distilling the ideas that formed during his months of quiet contemplation. He begins work on the Air/Ocean World Town Plan and develops drawings of his 4-D House; a lightweight, cost-effective home built on a central mast. His ideas develop into his first published work, 4D Timelock, which he presents to a small group of American Institute of Architecture (AIA) members. The work receives mixed reviews from the AIA but catches the attention of some innovative thinkers that recognize some validity and importance in Fuller's ideas. The 4D ideas receive some additional publicity with a number of articles including a major illustrated piece in the Chicago Evening Post and a write up in the magazine Architecture. Some financial support follows and Fuller forms the 4D Company to build models of the ideas expressed in his recently published work.

The publicity caught the attention of Waldo Warren, the Public Relations Manager for the Marshall Fields Company in Chicago, who was looking for a PR tool to promote a new line of "modern" furniture. It was this connection that led to the creation of the name that would become the trademark for all things developed by Fuller: Dymaxion. Mr. Warren hired a wordsmith to develop a catchy slogan for Bucky's 4D house. The process began by extracting key words from Bucky's description of his 4D structure. The three that struck the greatest chord were: Dynamic, Maximum and Tension. Parts of each were strung together to form the word Dy-max-ion. For two weeks in April of 1929, Fuller's Dymaxion House served

as a sidebar exhibit to the new line of "modern" furniture displayed at the company's downtown Chicago store. The exhibit was quite successful and afterwards the Marshall Fields Company had the word copyrighted for Fuller. The positive public recognition of his ideas validates Fuller's decision to "do his own thinking." Soon, he is being invited to speak to groups all over the city of Chicago including the City Club of Chicago and the Chicago Homeowners Exhibition. He was becoming a minor celebrity about the city.

Bucky was feeling revived after a few tumultuous years. With his spirit renewed he decided to move his family to Woodmere, New York. Once back on the east coast Bucky would continue the promotion of his recently published 4D Timelock ideas concerning the modern housing industry and the social dynamics that controlled its development. He soon found himself with an agenda filled with speaking engagements at prominent architecture and technology schools on the east coast. He began to frequent the gathering places of artists and intellectuals in the Greenwich Village section of New York. At Romany Marie's, a restaurant he ate at regularly, he would hold frequent impromptu lectures that became the highlight of the day for the avant-garde crowd. Bucky was refining and honing his ideas with the help of his intellectual peers and others willing to listen.

The crash of the Stock Market in October of 1929 changed the lives of all Americans including the Fuller family. The Crash must have been especially painful for Fuller to experience. His writings in 4D Timelock demonstrate his understanding of the precariousness of the economic model in operation at that time. It must have been similar to witnessing a car accident that could have been avoided if only the driver could hear the plea of advice coming from someone with a more advantageous perspective (a shifted paradigm). It was perhaps that feeling of "had only I done more, this could have been avoided..." that formed the sense of urgency that resonates through Fuller's message.

Prior to the Stock Market crash of 1929 Bucky had written in 4D Timelock that, "...the new home is the only salvation of economic chaos." The Crash of '29 seems only to have strengthened his resolve to "do more with less" and find solutions to the present economic

crisis through the evolution of the modern housing industry. He continued throughout 1930 to entertain his ideas with anyone that would listen.

In 1930, Bucky began developing a concept for a technologically advanced bathroom as a member of the John B. Pierce Foundation in association with the American Standard Company. Later that year he cashes in his life insurance policy to purchase a Philadelphia-based magazine which he renames Shelter. Fuller utilizes the magazine to promote technological advances in the shelter industry, including his own ideas. The magazine ceases publication at the end of 1932. But not before publishing a wide range of conceptual solutions to modern problems including that of the Streamlined car.

In 1933, with \$5000 from stockbroker Philip Pearson, Bucky set out to build a prototype of a streamlined automobile that he had presented in the pages of Shelter. So began Bucky's next major project: the Dymaxion Car. The Dymaxion Corporation is formed and a workshop is rented in Bridgeport, Connecticut. Bucky, Anne and Allegra move to Darien, Conn. Starling Burgess, well-known yacht builder, and a group of former Rolls-Royce mechanics are hired to build the prototype. The design utilizes three wheels, front-drive and rear steering. It is aerodynamically designed in the shape of a water droplet. The Dymaxion car uses lightweight aircraft design principles and materials. Henry Ford was so impressed with the innovative design that he made available off-the-shelf parts at discounted prices to assist the company in developing the car for mass production. With a Ford flat-head V-8 engine the Dymaxion car achieved upwards of 30 miles to the gallon of gasoline and could travel at speeds up to 120 miles per hour. For comparison Ford was selling Model A's during 1933 and 1934. The first prototype was ready for its inaugural drive in July of 1933.

Amelia Earhart commissioned the use of the Dymaxion car to chauffeur her to the National Geographic Society in Washington D.C. where she was presented with their Gold Medal. The car also made it to the White House where Miss Earhart was an invited guest of Mrs. Eleanor Roosevelt. The first prototype was eventually sold to Gulf Oil Company as a show car to promote its aviation fuel products at air shows.

A group of investors came from England to experience the car prior to purchasing the second prototype. Gulf Oil offered their car for inspection by the potential investors. On the last day of the investor's stay, while in the Dymaxion car on the way to the fairgrounds to meet the Graf Zeppelin for their return trip, they were pursued by another vehicle whose driver was enthralled by the sight of the Dymaxion to the point that he didn't watch where he was going and clipped the tail of the car sending it into a spin and eventually rolling over several times. The driver of the car was killed and one of the passengers was critically wounded. The headlines read, "Three Wheeled Car Kills Driver." The papers made no mention of the fact that the Dymaxion was hit by another car; driven by an influential South Chicago Park Commissioner. By the time the media frenzy had died down, the Dymaxion car was blamed for the accident even though the coroner's inquest had shown that the collision with the other vehicle and not the design of the Dymaxion had caused the accident.

Two more Dymaxion prototypes were built. But the accident in 1933 had all but sealed the cars fate. It just seemed to be too revolutionary for the public and the Automotive Industry to accept. The machinery at the Bridgeport, Conn. Dymaxion factory was sold at a sheriff's auction shortly after completion of the third car. Had the car been embraced at the time of its conception it would have revolutionized the automotive industry in ways that could not be predicted but suffice it to say, we would be driving wholly different cars today.

1935, Bucky and family move to East 87th Street in New York City. Bucky takes some time off and has another brief period of silent introspection in which to evaluate all that he has learned over the past few years. By the summer of 1936 he has completed his first major book, which he later titles, *Nine Chains to the Moon*. The publisher, Lippincott, was proceeding as normal until their editor read the three chapters of the book that dealt with Albert Einstein's theories. At that time there were rumored to only be a handful of people in the world that could decipher Einstein's Theory of Relativity and Bucky had written three whole chapters on the subject. The publisher balked at Bucky's suggestion that he could understand Einstein's theories. Bucky responded by asking the publisher to seek Einstein's comment on the three chapters in question. Shortly after Bucky's request, he received a call from Dr. Morris Fishbein who informed Bucky that Dr. Einstein had read his writings and

wanted very much to meet the young Fuller to discuss the three chapters. At their meeting, Einstein told Fuller that he very much approved of the chapters and that he was amazed that anyone could have come up with practical applications for his abstract theories. The book would not be published until 1938 but it would include all of the chapters originally proposed.

Also in 1936, Bucky was a frequent guest on experimental television broadcasts made by CBS. Director Gilbert Seldes invited Bucky to be part of the broadcasts from Grand Central Station to approximately 100 experimental television sets developed for CBS Executives. Allegra Fuller was also a guest on these early experimental broadcasts.

In the fall of 1936, Bucky takes work as assistant to the Director of Research of the Phelps Dodge Corporation, a leading producer of copper. His work at Phelps Dodge intensifies his study of world resources as he examines the trends in the production, use and reuse of copper. He helps to develop a new design of automobile braking system and puts more time into making a working prototype of his one-piece Dymaxion bathroom unit. Thirteen prototypes of the one-piece bathroom unit are built. One of which goes on display at the Museum of Modern Art in New York. Bucky spends a great deal of his time at Phelps Dodge studying the statistical reports on the history and flow of copper from production to industrial use to recycling. This sets the tone for his continuing statistical evaluation of the World Resources Inventory. One of his reports to the Board of Directors of Phelps Dodge is deemed unreadable and he edits the report into short phrases in compact stanzas. His boss considers it readable but also labels it as poetry and refuses to present it to the Board. Bucky's foray into the world of poetry begins as he looks for ways to make his complex ideas more accessible to the average reader. He begins the manuscript for Untitled Epic Poem of Industrialization. He will continue to write in poetic form for the rest of his life.

In 1938 *Nine Chains to the Moon* is published but not well received by the critical world or the general public. With the release of his recently published book Fuller leaves Phelps Dodge and accepts an offer to work as the Science and Technology Consultant with *Fortune* magazine. Bucky worked on a series of articles titled *The New U.S. Frontier* concerning technology and U.S. industrialization. During his time at *Fortune* the first attempts at

developing his Dymaxion Map (a map with minimal distortion of the land masses) are formed. The World Energy Map is published in the February 1940 issue of Fortune magazine. He also became an advisor to Life magazine during this time.

Fuller leaves Fortune in 1940 to work on the development of the Dymaxion Deployment Unit. The Dymaxion Company was formed as a unit of the Butler Manufacturing Company of Kansas City, Missouri, which focused on the creation of dwelling and storage units for the U.S. Army. The round Butler Building that Bucky saw serving the farms across America as grain bins reminded him of his own Dymaxion House. The Dymaxion Deployment Unit (DDU) was created to provide quickly deployable dwelling units to our troops during World War II. Plans were going well and a number of orders for DDU's were filled. When the war in the Pacific escalated the U.S. Government diverted all of the nations steel production towards the creation of armaments, which left the company without the raw materials needed for its construction. Unlike earlier abrupt halts in major projects this endeavor did not end in financial failure. This small business venture ended in the black and Bucky could move on to his next project without shame or the unpleasant burden of financial loss.

In 1942 Fuller joins the U.S. Board of Economic Warfare in Washington D.C. as Chief Mechanical Engineer. The Fuller family moves to 2222 Decatur Place N.W. Washington D.C. He spends his time studying the economic trends of various countries and their natural resources. He gives twice-weekly lectures on geography and world energy statistics and trends. He works out the details of the Dymaxion Map first using great circles to define the edges of a cubo-octehedron for transforming the spherical earth to a planar configuration. Fuller continued to search for the best pattern for dividing up the spherical surface into equal sections. He will eventually (1954) find that the icosahedron, a regular polyhedron comprised of 20 equilateral triangles, 30 equal length edges and 12 equally spaced vertices, to be the most advantageous form for modeling the spherical planet. This map configuration allows for a minimum of landmass distortion as each triangular face has a small but equal amount of convex transformation to planar dimensions. The Dymaxion Projection Sky-Ocean World Map is published in the March 1, 1943 issue of Life magazine, sets a record for most issues sold to date. The discovery of the icosahedron as tool for modeling spherical objects would mark the

beginning of Bucky's research into Synergetic-Energetic Geometry. His quest into how nature might be making bubbles was beginning to take shape. By 1944 Bucky is the Special Assistant to the Deputy Director of the U.S. Foreign Economic Administration. During his time in the government Bucky meets many prominent scientists and shares ideas concerning the direction of technological advancement in the U.S.

At the end of World War II, Bucky found himself once again addressing the need for efficient, affordable, and easily producible housing for the returning war veterans. In addition to this problem was that of excess production capacity that was no longer needed for the war effort. Bucky proposed using aircraft technology to build small but affordable dwelling units based roughly on his earlier 4D Dymaxion House concept. An effort was begun under the joint cooperation of the AFL-CIO Labor Union, the War Production Board, the War Manpower Commission, Aircraft Industry Production Board and the Beech Aircraft Executive Administration with Buckminster Fuller as Chief Design Engineer. Bucky moved to Wichita, Kansas while Anne and Allegra moved from Washington D.C. to an apartment at 6 Burns Street in Forest Hills, New York City.

Bucky becomes the Chief Designer and Engineer of the Dymaxion Dwelling Machine Corporation (later named Fuller Houses) in Wichita, Kansas. The Dymaxion Dwelling Machine (DDM) is based on the same central mast theme of the original 4D House but in this iteration it uses round rims with spokes to form the floor and ceiling structures along with an aerodynamically shaped rooftop ventilator for creating a natural flow-through ventilation system. An abandoned hanger on the Beech Aircraft property is transformed into a research facility for creating the first prototype. Bucky is adamant that this not just an exercise to build pre-fabricated houses but the creation of whole new concept in housing. Bucky is insistent as to what materials (lightweight aluminum and Plexiglas) and production techniques (aircraft standards) can and will be used. When word of the Fuller House started to reach the general public, 37,000 unsolicited orders, many with deposit checks, came flooding in. Many involved in the project see it just as a business opportunity to build pre-fabricated houses and want to hurry into production before the first run of three prototypes is

completed. After completion of the first prototype there was pressure to move into production but Fuller was not ready and insisted on another prototype.

The financial people involved were becoming increasingly frustrated with the slow development from prototype to production and began to push Bucky towards releasing control and allowing production to begin. Each time they pushed Bucky resisted with greater force even though moving into production would have generated a windfall profit for Fuller based on the going price of shares in the company. Bucky was looking at the big picture and the development of a whole new industry that included not just the production but also the on-site assembly and maintenance of the unit once sold. There were the issues of unions, dealerships and transportation to consider. The other investors imagined that these issues would "work themselves out" on their own while Bucky felt that they needed to be designed as part of the whole industry system in order for it to operate at peak efficiency. In the end Fuller prevailed but the modern housing industry movement did not. Many of the investors sold their shares and withdrew their support for Fuller. Two prototypes survived and were purchased by William Graham, one of the investors, after development ceased and Fuller left Wichita. He used the pieces of the two prototypes to build one two-story version of the house on property he owned near Wichita. In 1991 members of the Graham family donated the pieces to the Henry Ford Museum where it is been restored and is now on display.

In 1946 prior to the collapse of Fuller Houses, Inc. he receives a patent for his Dymaxion Air-Ocean World Map, the first cartographic projection patent ever granted by the U.S. Patent Office, and forms the Fuller Research Foundation. After the Wichita experience Fuller returned to New York to be with his family.

He spends the next year developing the Synergetic-Energetic geometry concepts that have been forming in his thoughts during the past few years. Much of his time was spent researching spherical geometry and making laborious calculations in an effort to discover some generalized principles in the patterns he began to recognize in the great circle geometry with which he was experimenting. He recognizes the tetrahedron as the smallest possible subdivision of Universe. He starts to create models of every conceivable shape and

size that might offer some insight into the principles of spherical geometry. It was during this time that Fuller develops his first drawings of what will later be named geodesic geometry. In the summer of 1947 Bucky accepted an invitation to lecture at the somewhat eccentric Black Mountain College in Asheville, North Carolina. He found the educational atmosphere and cooperative spirit to his liking and the hungry and open minds of the students were just the medicine he needed to help him recover from the past couple of years spent with seemingly intelligent adults that were focused solely on earning a profit. 1947 is the year that Fuller discovers the properties of the geodesic dome while studying spherical trigonometry.

Bucky's work at the Fuller Research Foundation leads to many exciting possibilities that need further research and experimentation. In early 1948 he discovers the dynamic properties of the isotropic vector-equilibrium and gives it the moniker "jitterbug" for the dance it does when in motion. The "jitterbug" models the relationship of the four axes in Fuller's Synergetic geometry. The model can rotate through four polyhedral shapes utilizing triangulated geometry including the cubo-octahedron, the icosahedron (20 sided), the octahedron (eight sided) and the tetrahedron (four sided). The model also displays volumetric relational properties.

He returns to Black Mountain College in 1948 for the summer session and attempts to create the first large-scale geodesic dome. The math was correct but the materials used were insufficient; the dome never stood on its own. Most everyone involved in the experiment was disappointed, except Fuller who saw this "failure" as an opportunity to learn. He excitedly collected data and made adjustments to his calculations. One student that summer, Kenneth Snelson, was particularly electrified by Fuller's lectures and exciting futurist ideas. After the summer session had ended he returned to Oregon and worked on a series of art studies that included some concepts he had gleaned from Fuller's lectures the summer before.

In the fall of 1948 Fuller returns to Chicago to give lectures at the Institute of Design. He also teaches at the University of Illinois at Champaign and gives lectures at Illinois Institute of Technology. When he returned as the Director of the Black Mountain College Summer

Institute in 1949, he and his students were successful at erecting a sturdy, self-supporting geodesic dome. In addition, young Ken Snelson had returned with a small sturdy model with compression members floating in a sea of tension wires. Fuller coins the term tensegrity to describe the sculpture's "tensional integrity. Ken Snelson goes on to make many more models that further refine the concept of tensegrity. It was an exciting summer for Fuller as the geodesic dome theory is proven successful and one of his students makes an important advancement in his burgeoning theories.

Throughout the next few years Fuller continues to lecture at numerous prestigious academic institutions including: Massachusetts Institute of Technology, Bennington College, University of Michigan, Harvard University and University of Toronto. He enjoys the rare opportunity to meet and converse with some of the great minds in American academia. He starts to receive invitations from corporations and other non-academic institutions to give lectures and workshops. The concept of energetic geometry continues to evolve with the creation of hundreds of drawings and models and uncounted hours of laborious calculations.

In 1950, Bucky's daughter Allegra marries Mr. Robert Snyder, and the first full size geodesic dome is built in Montreal, Canada. The structure was built in Canada because the aluminum that Fuller wanted to use for its construction was being rationed in the U.S. Work on the patent application for the geodesic dome begins. The moniker Spaceship Earth starts to be heard in Bucky's lexicon around 1951. In his lectures he begins describing the planet Earth as a spaceship with finite resources and 2.5 billion "crewmembers" moving through space at the speed of 66,000 miles an hour as it orbits the Sun. In 1951, the Museum of Modern Art exhibits a geodesic dome and the patent for the geodesic dome is filed in December.

The first geoscope, an almost spherical geodesic dome that has a map of the earth drawn on it, is created at Cornell University during 1952. Fuller meets Shoji Sadao in the process and the two begin a lifelong collaboration.

Fuller receives the contract to build a dome over the Ford Motor Company Headquarters Rotunda building in River Rouge, Michigan, in 1953. Work on the Ford Rotunda takes only 4

months from contract to completion in June and employs aircraft manufacturing techniques. Also in 1953, Bucky and Anne's first grandchild is born, Alexandra Fuller Snyder, a 50-foot diameter tensegrity structure is created at Princeton University and a geodesic dome is built to house a restaurant in Massachusetts.

The patent for the geodesic dome (patent # 2,682,235) was granted to Fuller on June 29, 1954. Fuller forms Synergetics, Inc. to utilize the recent patent granted for the geodesic dome. That same year the U.S. Marines Corps build and test the portability of the dome structure and find it meets or exceeds their requirements for a new temporary enclosure. Bucky makes adjustments to his Dymaxion Map to utilize the more spherical icosahedron, instead of the cubo-octahedron as the model for flattening the Earth's surface. He also receives the first of 47 honorary Doctorate awards from North Carolina State University. He begins to use the word livingry (essentially the opposite of weaponry, using production to create products that support life rather than the destruction of life), in his rapidly developing paradigmatic language. Work begins on the creation of a dome that doesn't use metal for use at radar sites for the U.S. military. Major press is given to the speculation that Fuller might design a dome to cover the Brooklyn Dodgers Stadium. Receiving prizes and honors are a regular occurrence throughout 1954. As a visiting professor at the University of Michigan he lectures on Synergetic Geometry.

The Fuller's second grandchild is born on April 28 1955, Jamie Lawrence Snyder. Synergetics Inc. is formed to organize and develop the utilization of the geodesic dome patent. Geodesic radomes are built and installed along the Defense Early Warning (DEW) Line at height of cold war to watch for missiles coming from the Soviet Union. The U.S. International Trade Fairs adopted the geodesic dome as its traveling pavilion space. The first pavilion is erected in Kabul, Afghanistan in 1956. The Kabul Trade Fair dome was 100' in diameter, fit in one DC-4 and was erected in 48 hours by Afghans with the help of only one engineer. 1956 was the first year that Bucky received an appointment as visiting lecturer at Southern Illinois University in Carbondale.

1957 broke historical ground as the largest clear span structure in the history of humanity is erected in Baton Rouge, Louisiana. The Union Tank Car Company commissioned a 384' diameter geodesic dome to enclose its tank car operations in Louisiana and another 354' diameter dome for its operations in Wood River, Illinois. The Brooklyn Dodgers move to Los Angeles and the plans to build a large stadium dome in New York City are cancelled. In Hawaii, Kaiser Aluminum erects a dome of pre-fabricated panels in less than 22 hours. Within 24 hours of the panels arriving in Hawaii, the Hawaii Symphony plays to a capacity crowd inside the Kaiser Dome. This demonstration showed the significance of the geodesic dome design; it can provide stable clear-span enclosure quickly with minimal construction costs. Playdomes start to appear on playgrounds across America. Fuller's vision of a Spaceship Earth with 3 billion crewmembers working cooperatively to provide a better standard of living for all people is starting to be heard in his lectures.

Bucky begins his first "world tour" in 1958 as he circumnavigates the globe giving lectures in: South Africa, Japan, India, England and the United States. He is awarded the Gold Medal from the National Architectural Society. Domes are being constructed all over the planet including the Arctic and Antarctic. Prominent nuclear physicists note the significance of Fuller's Synergetic geometry in explaining the structure of the atomic nucleus. Don Moore of Whirlpool Corporation invites Fuller to consult for Whirlpool and consider the "livingry equipment of the future" (i.e. the shelter and the internal mechanisms for living). Fuller returns to Southern Illinois University as visiting lecturer, suggests SIU consult with Don Moore on the design of a modern educational institution and the future of their Edwardsville, IL campus. Don and Bucky form a lifelong friendship and working relationship.

The U.S. State Department appoints Fuller as U.S. Representative for Engineering for visit to Soviet Union and chooses a 200' geodesic dome to serve as the U.S. Pavilion for the 1959 International Exposition in Moscow. At a dinner in his honor the Soviets tell Bucky that they have been interested in his work for the past 29 years. Inside the dome at the Whirlpool Kitchen of the Future exhibit, Nixon and Khrushchev have their "Kitchen Debate." After the Exposition, the Soviets purchase the dome which is still a prominent display at Sokolniki Park in Moscow. Molecular biologists and virus researchers note the icosahedron geodesic structure

found in the viral shell. During the Spring Semester of 1959, Fuller is appointed as the first Research Professor at Southern Illinois University at Carbondale within the Design Department. Tensegrity mast and octet-truss are displayed at Museum of Modern Art. Al Miller of Pease Woodwork Company designs a small wooden geodesic dome as a home for human habitation.

In early 1960, Bucky and Anne purchased from Tom and Anna Gray of West Frankfort, Illinois, a small corner lot on the northeast corner of Forest Avenue and Cherry Street in the predominantly residential southwest side of Carbondale, IL. Legend has it that a small pink mobile home had been on the lot for a number of years before the Fullers purchased the property. Bucky hired Ira Parrish of the Parrish Construction Company to construct a home, a geodesic dome home, from a kit supplied by the Pease Woodwork Company of Hamilton, Ohio. Ira saw the potential for building domes throughout Southern Illinois and gladly accepted the challenge. The neighbors weren't sure what to expect when they saw the trucks pull up on the morning of April 20, 1960. The five workers started to assemble the parts to the 39' 6" diameter dome shortly before 10 a.m. and by 5:30 p.m. the shell of the house was completed. The kit supplied by Pease Woodwork Company was made up of lettered panels that fit together like a puzzle. The joints where the plywood roof panels met were covered in Celastic tape soaked in methyl-ethyl-ketone that dried to form a permanent hardened seal. The kit for the 1,400 square foot home included all of the exterior panels, windows, doors and some kitchen and bathroom fixtures and cost around \$3,700. The price of the foundation, construction labor and finishing brought the cost of the dome home to about \$8,000. The dome was designed with large sliding glass doors which limited privacy so a fence of Fuller's own design was constructed to offer some privacy and to meet local ordinances for the small pond that was built in the yard. The Fuller Dome Home was the first Pease dome to be used as a private residence. The reaction of the neighbors to the unusual home design was mixed; some thought it was ugly and just a passing fad that would fall apart in a few years and others thought it was the shape of things to come. Ira Parrish had already received another contract to build a second dome in Carbondale. When the dome is completed in November of 1960, Anne and Bucky move their belongings from Forest Hills, New York and officially "move in."

The dome in Carbondale is the first home that the Fullers have ever owned. Heretofore they have rented. Bucky calls the dome his "private motel" as his busy schedule will keep him away for most of nine months out of the year. Anne is the dome home's primary resident. From the start there were problems with water leaks at the joints. As it would turn out the hardened Celastic tape was not able to expand and contract with the rest of the home as the sun's heat passed from east to west over the dome's southern exposure. Bucky was not discouraged as he knew that this home was essentially a prototype and that he should expect to learn a few things by living in a prototype. Anne, on the other hand, was not at all pleased with the leaking roof. Bucky first attempt at sealing the roof was to use a plasticized paint to "seal" the exterior surface of the dome. This worked for a while but as the paint hardened over time the same problem of the rate expansion and contraction of different materials caused the paint to crack and once again water was leaking into the dome. After two attempts to seal the surface Fuller resorted to the proven technology of the time, good old-fashioned tar shingles. Fuller noted at that time that the material he was looking for to seal the dome's exterior surface had not yet been invented but that someday a material would be produced that properly sealed the dome's surface.

Also in 1960, the 175' diameter Climatron Dome at the Missouri Botanical Gardens is constructed, *The Dymaxion World of Buckminster Fuller* by Robert Marks is published, Fuller is awarded the Frank P. Brown Medal of Philadelphia's Franklin Institute, the Philadelphia Chapter of the American Institute of Architecture's awards him their Gold Medal and a fully erected 114' diameter dome that covers 10,000 square feet of floor space is delivered by helicopter to the Ford Motor Company. Numerous academic institutions award him Honorary Doctorates.

At the International Union of Architects Fifth World Congress in 1961, Fuller proposes to the 2000 members in attendance Phase I of the World Design Science Decade. This first phase should put the world on notice that creating a world that works for 100% of humanity is an invention and design initiative and not the responsibility of political machinations. He challenges the architects to start a "design revolution" and to design more efficient structures

that do more with less. In 1961 the U.S. Patent Office grants Fuller's patent for the octet truss space frame.

Bucky returns to Harvard in 1962 as the Charles Eliot Norton visiting professor of Poetry. The irony of his twice being rejected from Harvard was not lost on Fuller. The Inventory of World Resources, Human Trends and Needs is initiated at Southern Illinois University with John McHale as the Executive Director. Fuller continues to promote the need for a World Design Science Decade where the inventive and productive resources are focused on livingry rather than weaponry. A patent for Tensegrity is issued.

At the 1963 World Congress of Virologists the discovery of the protein shell of the virus is announced. Public acknowledgement of Fuller's anticipation of the shell's icosahedron geodesic structure is written up on the front page of the New York Herald-Tribune. Fuller is appointed to NASA's Advanced Structures Research Team. SIU receives a grant to do computerized mathematical research on all forms of geodesic structures. Joe Clinton is the student that is offered and accepts the project. Joe has gone on to be the world's foremost expert in geodesic geometry. Fuller is awarded the American Institute of Architects Allied Professions Gold Medal and the Plomado de Oro award of the Mexican Society of Architects. The University of Colorado commemorates R. Buckminster Fuller Recognition Day.

Bucky has a number of books published in 1963 including: Operating Manual for Spaceship Earth, No More Secondhand God, Ideas and Integrities, and Education Automation. No More Secondhand God includes a comprehensive treatise on modern housing design and construction titled Universal Requirements of a Dwelling Advantage and an essay titled Omnidirectional Halo in which he explains his concept of Synergy as "behavior of integral aggregate systems unpredicted by behaviors of any of their components or sub-assemblies of their components."

Synergy becomes a word that Fuller will use quite frequently to demonstrate that "hope springs eternal" and that one cannot predict what amazing thing can happen just by looking at the parts of any given system or situation. One simple example of the powerful concept of

synergy is to consider a jar of oxygen and a jar of hydrogen. By looking at the invisible gases in each of the jars could you ever predict that by mixing the invisible gaseous contents together that you could produce a third substance that would be a liquid named water with all of its amazing properties? The inability to predict the whole by looking at the parts is what Fuller termed synergy.

January 8, 1964: Buckminster Fuller graces the cover of Time magazine. Bucky is commissioned as architect for the U.S. Pavilion at the Montreal World Exposition in 1967. The architectural firm of Fuller & Sadao is formed. Bucky is part of prestigious panel of intellectuals assembled by the U.S.S.R.'s Academy of Sciences to discuss all known points of contention between the Cold War Superpowers. The Southern Illinois University Press publishes the four-volume set of Bucky's Design Science Decade: World Resources Inventory, Human Trends and Needs. Fuller writes a series of articles for the Saturday Review titled Prospects of Humanity.

In 1965, Fuller is awarded the patent for the Monohex or "Fly's Eye" dome; the next iteration of the geodesic dome design. Bucky conceives of World Game as a converse to War Games; a game in which the resources of the world are shared to offer a higher standard of living to all people rather than the conquering of resources to enrich the lives of a few people. He receives the Creative Achievement Award from Brandeis University.

The design for the U.S. Pavilion at the 1967 Montreal Expo is completed in 1966. The design calls for a 250' geodesic sphere. World Game is inaugurated at Southern Illinois University in 1966. Fuller gives a speech to NASA scientists at Cape Kennedy explaining the possibility for technology transfer from the space program into the domestic economy could bring about the first scientifically designed house which could lead to the long term success for all humans. Fuller receives the First Award of Excellence from the Industrial Designers of America.

On April 1, 1967 Bucky appears on the cover of Saturday Review. Later that year the Expo '67 Dome in Montreal opens to enormous crowds: 50 million visitors in the first 6 months. On July 12, Bucky and Anne celebrate their 50th wedding anniversary. The American Institute of

Architects gives Fuller their first Architectural Design Award. Phi Beta Kappa of Harvard University inducts Buckminster Fuller as an Honorary Member on the occasion of the Class of 1917's 50th Reunion. At age 72, Bucky gives 90 public lectures this year circumnavigating the globe in the process.

Bucky is appointed, in 1968, to Distinguished University Professor, one of only three in the 99-year history of Southern Illinois University. He is elected to the World Academy of Arts and Sciences and the National Academy of Design. Fuller & Sadao receive First Architectural Design Award from the American Institute of Architects for their work on the Expo '67 Dome. Bucky receives the British Royal Gold Medal for Architecture from Her Majesty the Queen of England. He receives numerous honorary Doctorate degrees in 1968. The Dymaxion car (#2 of 3) is displayed at the Museum of Modern Art.

Ed Schlossberg and Medard Gable developed Bucky's World Game concept into a working model that debuted at the New York Studio School of Painting and Sculpture during 1969. Bucky was invited to give testimony concerning World Game before the Senate Subcommittee on Intergovernmental Relations. And he spoke about "Planetary Planning" at the Jawaharlal Nehru Memorial Lecture in New Delhi, India. He released two books, including: Operating Manual for Spaceship Earth and Utopia or Oblivion: The Prospects for Humanity. Construction for the new Religious Center at Southern Illinois includes a Geoscope placed along the meridian at 90° longitude. Fuller was nominated for the Nobel Peace Prize.

Unrest at Southern Illinois University in May 1970 caused the closing of the university and a palpable change in the general atmosphere in Carbondale. Fuller shifted his work to the SIU Edwardsville Campus. He continued to give numerous lectures and to receive a variety of awards including another handful of Honorary Doctorate degrees. One such award was the Gold Medal for Lifetime Achievement from the American Institute of Architects. I seem to be a verb is released. Bucky's Student, Joe Clinton, presents to NASA his research report: Advanced Structural Design Concepts for Future Space Missions

The Religious Center with Geoscope is dedicated at SIU Edwardsville in 1971. In the same year, Bucky presents the Old Man River City concept to the citizens of East St. Louis. Life, The Christian Science Monitor and Rolling Stone had major articles about Bucky. The Cold War was at a steady boil and Bucky had practical solutions to bring the Earth's complex problems to a workable simmer through the use of technology applied such that it would increase the standard of living for each human on the planet, thereby reducing the individual's desire to wage war. His philosophy was that if people had a reasonable standard of living they would not feel the desire to go to war to get more. He anticipated that with a high standard of living that people would rather spend time with their families or performing productively than taking up arms against their neighbors to forcibly take resources that do not belong to them. But the steady growth of the multi-national-corporate system was working against him. People were indebted to the system and could not afford to support ideas that cut across the grain of the mainstream society being developed in America at that time. Domes were springing up everywhere but their mainstream acceptance was thwarted when mortgage and insurance companies failed to offer products to serve the growing dome home market. Unions disliked buildings that went up in one or two days; it was better for the workers when it took 6 weeks to put up a house. A whole host of consumer products were designed to fit into a square house. Even though the dome is a much more efficient design compared to the average rectilinear dwelling, the corporations were not interested in changing the design of their products to embrace the shape of things to come. Fuller continues to carry an intense lecture agenda as he reaches into his upper 70's.

Bucky moved his headquarters from Edwardsville, Illinois to Philadelphia, Pennsylvania in 1972 when he joined a consortium of educational institutions as World Fellow in Residence. The 40th Anniversary issue of Architectural Forum is dedicated to Bucky and his work. He is interviewed by Playboy magazine. A geodesic dome is built over the South Pole to protect researchers and their equipment. Intuition and Buckminster Fuller to the Children of Earth are published in 1972. Bucky gives over 120 lectures most of which are to standing room only crowds. The Fuller Dome Home in Carbondale, IL is sold to Michael Mitchell of West Frankfort, IL.

Bucky and Anne move to Society Hill Towers at 200 Locust Street in Philadelphia. Bucky's circumnavigation of the globe continues in 1973 when he gave over 120 lectures. He is granted patents for the floating breakwater and the tensegrity dome. The Architectural firm of Fuller and Sadao complete two major airport design projects. Japan builds two geodesic domes for weather observation on top of Mount Fuji and issues a memorial stamp titled "Pearl in the Crown of Fuji San". The Museum of Science and Industry in Chicago creates a major traveling exhibit of Fuller's work, which is displayed all over North America during 1973 and 1974. Fuller continues to receive honorary doctorate degrees from prestigious Universities.

In 1974, at the age of 79, Fuller gives a record 150 lectures around the planet. He gives the commencement address and receives an Honorary Doctorate from the University of Notre Dame. Bucky challenges the "Club of Rome's" report on The Limits to Growth stating that this type of Malthusian thinking is no longer true if technology is included in the calculations. Ed Applewhite is working diligently with Bucky to complete the manuscript for the forthcoming book Synergetics. Bucky is granted his first ever license to practice architecture from the State of New York.

In January of 1975 Bucky gives a two-week lecture titled Everything I know, which is videotaped resulting in a 43 hour long recording. Fuller is recognized as Professor Emeritus at Southern Illinois University. His magnum opus Synergetics: The Geometry of Thinking is finally published. In it Fuller, in collaboration with Ed Applewhite, explains in painstaking detail the concepts behind the four-dimensional dynamic geometry that he discovered in nature. Birthday party held at John Denver's ranch in Colorado to celebrate Bucky's 80th revolution around the Sun while traveling aboard Spaceship Earth. He testifies before the U.S. Senate Committee on Foreign Relations and receives the United Nations Planetary Citizens Award. The American Institute of Architects invests Fuller as a Distinguished Fellow. He speaks to the Department of States Senior Seminar in Foreign Policy. He continues to give numerous lectures and receives his 39th honorary doctorate in 1975 at the age of 80.

Bucky was interviewed by CBS in 1976 for their Bi-Centennial Television Special. Bucky's 15th book *And it Came to Pass not to Stay* is published. *Tetrascroll*, a tetrahedrally shaped book for children, is conceived of and published in collaboration with Tayana Grossman. Fuller receives the Development of Consciousness Award from the International Meditation Society. He testifies before the House of Representatives concerning "The Recovery of the City". Bucky speaks at the United Nations Conference on Human Settlements. He is the first Distinguished Lecturer at the College of Engineering at Villanova University, Pennsylvania. Southern Illinois University gives Fuller an award for 16 years of service.

In 1977 Fuller gives over 100 lectures to audiences all around the world. He receives a multitude of awards including the First Annual Henry Townley Heald Award from the Illinois Institute of Technology. He further develops his monohex dome design with two prototypes: the "pinecone" and the "fly's eye" domes. Work on *Synergetics 2* begins. February 11th proclaimed as Buckminster Fuller Day by Governor of Massachusetts. The city of Park Forest, Illinois named him an Honorary Citizen on May 7, 1977. The U.S. State Department and the U.S. Information Agency sponsor a trip to the Far East for Bucky to give a lecture series.

Fuller testifies before a U.S. Senate Committee, in 1978, concerning the potential use of satellites to measure world resources. He gives a lecture at the World Congress of the New Age in Florence, Italy describing his model of Einstein's $E=mc^2$ equation. He returned to Carbondale, IL on May 3, 1978 to speak at the Sun Day Celebration. The Honda car company produced an ad that pictured Bucky with a geodesic dome and the new Honda Civic. His ideas are practical and many people around the world embrace his philosophies as an alternative to the accepted paradigm that is being applied by the present day command and control systems. Fuller was not interested in "changing Humans." But he was concerned with improving the environment in which those humans grew and thrived. He believed that by improving the environment in which a human lived there would be a positively synergetic effect on the human that could propel them forward on their pursuit of happiness. He continued to travel the world and speak to large crowds throughout 1978.

Bucky took a month long tour of China in May and Early June of 1979. His Design Science Revolution concept is well received in the People's Republic of China. Only 25 years later, China has the world's largest industrial production capabilities. Synergetics 2 is published as a companion piece to the original work. He receives an Honorary Doctorate of Humane Letters from Southern Illinois University at Edwardsville on June 8, 1979. Fuller is the Chairman of the Board of Fuller, Sadao and Zung Architects in Ohio. He is promoted to senior partner at Buckminster Fuller Associates in London, England. World Game Collaborator Medard Gabel writes Ho-Ping: Food for Everyone. At Harvard University, Harold Loeb teaches geometry to design students based on Bucky's Synergetics.

1980 is highlighted by the work on the final details of Critical Path, Bucky's most comprehensive work to date. Bucky and Anne move to Pacific Palisades, CA. Buckminster Fuller: An Autobiographical Monologue/Scenario by Robert Snyder is published. Los Angeles chooses a 50 foot Fly's Eye Dome as their theme building for the city's bi-centennial. He gives over 90 lectures in 1980 at the age of 85. Among other awards he received an Honorary Doctorate of Humane Letters from Roosevelt University in Chicago, IL.

Fuller's schedule continues to be rigorous throughout 1981. Critical Path is published and Bucky makes an extensive book signing tour which includes dates in Japan. Texas Wesleyan College awards Bucky his 47th honorary doctorate degree. The Fuller Dome Home in Carbondale, IL is being used as a rental property; students flow in and out throughout the years.

Grunch of Giants is published in 1982. His speaking schedule includes 70 engagements with stops in France, Canada, Japan, Thailand and Taiwan and many cities in the U.S. Bucky is inducted into the Engineering and Science Hall of Fame. Inventions is published. Temcor constructs a 415' diameter geodesic dome, the world's largest clear span structure, in Long Beach, CA to house the world's largest plane, Howard Hughes' Spruce Goose. Walt Disney World in Orlando, FL builds the Epcot Center which is based on Fuller's geodesic dome design.

On February 23, 1983 Fuller was awarded the U.S. Medal of Freedom by President Ronald Reagan. At age 87, his schedule is filled with speaking engagements. Fuller commemorates "Integrity Day" with his final lecture series. On July 1, 1983, while visiting his wife Anne in the hospital, Fuller suffers a heart attack at her bedside and dies a few hours later. Anne passed 36 hours after Bucky on July 3. The Fullers were married for 66 years.

He began an experiment in 1927 with himself as the subject; and so began the project of guinea pig "B." During his lifetime, Bucky was awarded 25 U.S Patents, authored 28 books, received 47 honorary doctorate degrees. He kept a chronologically organized collection of his life's activities, which he called Chronofile: the nucleus that eventually became the Fuller Archive. At present the Fuller Archive is housed at Stanford University in Palo Alto, CA.

At one point Bucky predicted that science would one day discover a molecule, most probably carbon, which would be in the form of a geodesic structure. In 1987, four years after Fuller's death, Harold Kroto and Richard Smalley discovered a soccer-ball shaped molecule of carbon that they named buckminsterfullene or Bucky Balls for short.

On July 12, 2004, the United States Post Office released a Buckminster Fuller Commemorative stamp. Groups across the country including RBF Dome NFP held special events to celebrate the stamps release.

The Fuller Dome Home in Carbondale, IL remained a rental property for almost 28 years after Bucky sold it to Mike Mitchell. In 1999, after numerous stalled attempts, friend and colleague of Fuller, Bill Perk made an agreement with Mr. Mitchell to purchase the Fuller Dome Home. Mr. Perk's purchase was intended as a move to protect the dome from further degradation due to misuse at the hands of careless renters. He began to look for a suitable and willing organization to which he could donate the dome but in the end could not find one. To protect the dome from further degradation due to the weather, Mr. Perk had a protective dome constructed on top of the Fuller Dome Home while he continued to look for a proper steward for the dome. In 2002, a small group of local volunteers formed RBF Dome NFP; a 501(c)3 not for profit organization whose mission includes preserving the dome and creating a museum inside the dome to chronicle the Fuller's time spent in Carbondale, IL.

Since the formation of RBF Dome NFP, the group has added the R. Buckminster and Anne Hewlett Fuller Dome Home to the Carbondale Historic Register, passed a text amendment to the R1 Zoning Ordinance to allow home museums, and was granted a permit to act as a home museum. In 2004 the Fuller Dome Home was recognized by the Landmarks Preservation Council of Illinois as one of The Ten Most Endangered Historic Properties in Illinois. This recognition helped RBF Dome NFP raise the funds to contract with White & Borgognoni to complete this Historic Structures Report and Preservation Plan.