Minerva (2007) 45:417–434
DOI 10.1007/s11024-007-9066-7

PEDER ANKER

BUCKMINSTER FULLER AS CAPTAIN OF SPACESHIP EARTH

ABSTRACT. Buckminster Fuller's experiences in the Navy became a model for his ecological design projects and suggestions for the global management of 'Spaceship Earth'. Inspired by technocratic ideas of the 1930s, Fuller envisaged, in the 1970s, an elitist world without politics, in which designers were at the helm, steering the planet out of its environmental crises.

INTRODUCTION

'We'll be remembered as those who lived in the age of Buckminster Fuller', the American poet and composer John Cage noted in his 'Diary: How to Improve the World (You Will Only Make Matters Worse)' of 1971.[1] There is some truth to Cage's observation, as Fuller's technological designs for a better environment did capture the counter-culture in the 1970s. But did his answers to the question of 'how to improve the world?', 'only make matters worse'?

Architects, designers, and historians have argued that Fuller did indeed improve the world. In the literature, he is portrayed as providing designers and environmentalists alike with tools to better life. His dome is widely recognized as a masterpiece of *avant-garde* design. A recent study argues that his 'Dymaxion' maps, and his 'World Game', 'conveyed a strong message about the value of democratic participation', and that his famous domes 'expressed community, gathering and sharing' as a metaphor for spiritual ecological 'earth-consciousness'.[2] Fuller's 'World Game' may also deserve a place within the history of environmental programming.[3]

[1] John Cage, 'Diary: How to Improve the World (You Will Only Make Matters Worse)', *New Literary History*, III (1), (1971), 201–214, at 210.

[2] Christine Macy and Sarah Bonnemaison, *Architecture and Nature* (New York: Routledge, 2003), 317–318.

[3] Paul Edwards, 'The World in a Machine', in Agatha and Thomas Hughes (eds.), *Systems, Experts, and Computers* (Cambridge, MA: MIT Press, 2000), 201–253; *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996); Fernando Elichirigoity, *Planet Management: Limits to Growth, Computer Simulation and the Emergence of Global Spaces* (Evanston: Northwestern University Press, 1999).

This essay examines Fuller's approaches for saving the Earth from ecological disaster. During the First World War, he developed an early admiration for the US Navy's style of leadership. This was reinforced by his interests in scientific and technocratic social management. During the Second World War and thereafter, Fuller emerged as a designer of military technology and know-how, an enterprise, which came to incorporate an elitist and managerial outlook. In the 1960s, he came to fashion himself in the naval image of a 'captain', designing energy-saving buildings and conducting military war games to save the world from destruction. His 'high-modernist schemes', to borrow James Scott's terminology, came to inspire the idea of an eco-utopia, without politics, with designers and ecologists at the helm.[4]

Serving the Navy and the Human Family

Except for a limited period of basic training at the US Naval Academy in Annapolis, Maryland, during the summer of 1918, Fuller was almost completely self-taught. Yet it is worth reviewing his short military record, as he often praised his navy education for giving a generalist knowledge that could be used anywhere. 'We [in the Navy] are the only ones who can live and travel on land, on the water, and in the air', he would tell his friends.[5] Most important, his navy experience of collective service for 'the human family' would re-emerge throughout his life in his ideas about ecological management.

Fuller tried to join the US Navy in 1914, but failed with poor eyesight. He had just been expelled from Harvard University – owing, it was said, to irresponsible conduct and a lack of interest in his studies – and was eager to find something else to do. The Navy needed craft to patrol the Atlantic seaboard, and he offered the family pleasure boat on condition that he be its commander. In July 1916, Fuller found himself in an ensign's uniform, restoring his boat so that it could be included in the fleet of Navy Scout Patrol craft assigned to the coast of Maine. On this 'battleship,' he later told environmentalists, he learned the military survival art of doing 'more with less'.[6] The Navy paid a small salary, life looked good,

[4] James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 103–146.

[5] Quoted in Athena Lord, *Pilot for Spaceship Earth* (New York: Macmillan, 1978), 33.

[6] Robert Snyder, *The World of Buckminster Fuller* (New York: Mystic Fire Video, 1971), film.

and he proposed to Anne Hewlett. They married in 1917 in a traditional military wedding, in which the couple passed under an arch of swords. The wedding photo shows Fuller dressed in a stylish white Navy uniform.

Fuller's dream was to attend the US Navy Academy, but only unmarried, clear-sighted men of flawless conduct were enrolled in their four-year programme. Instead, Fuller was commissioned in the 4th Reserve Officer's Class, and sent to a temporary school designed to provide urgently needed junior grade officers. For ten weeks from June until September 1918, this crash course used the Academy's campground as its duty station. After training, Fuller was enrolled as a Lieutenant Junior Grade and assigned to convoy communication under the command of Admiral Albert Gleaves. He served until the end of the war, and was discharged in August 1919.

The 'Dymaxion' of Nature's Household

The Navy experience taught Fuller that, 'with all ethical bars 'down', survival techniques and creative powers thrived, people became 'jazzed up' for a common good, and 'science became dominantly more ''practical'''.[7] Fuller came to argue that society should look to the military for inspiration. In the immediate post-war years, he found the wartime sense of belonging to one 'Human Family' was ruined by economic profiteering. As an antidote, Fuller thought that people should be 'in the service' of the public good, just as 'the sailor' labours for a common cause.[8] But Fuller saw in the Navy more than the spirit of self-sacrifice. He also admired its principles of order and leadership. Putting society in order meant empowering a master builder.

During the 1920s, Fuller was unable to find a way to serve society. He became a vagabond odd-job man, drifting first to a managerial position in an armour company, then to a truck manufacturing company, and to a private airplane maintenance job for a millionaire, before he was finally hired by his father-in-law's architectural firm in Chicago. From this, however, he was laid off in 1927, and in a state of deep crisis, he cut off his friends and went silent for a year. After the war, Fuller had acquired practical

[7] Richard Bukminister Fuller, 'Putting the House in Order', *Shelter*, November 1932, 2–9, 3.
[8] *Ibid.* 4.

knowledge in engineering and architecture, even while his dreams drifted towards that white uniform he once wore. He used his year of silence to study the problems of American society, and to learn what he could contribute to solving them.

In this Cartesian interlude, Fuller traversed current debates on human population growth and housing.[9] One popular view, held by followers of Thomas Malthus, argued that as populations grow faster than food is produced, human society was doomed to tragedy. Fuller could not agree. Following Schumpeterian theory, he believed that mankind could engineer itself out of its problems. The Malthusians, he thought, put too much emphasis on economics, and not enough on engineering. Fuller turned to the vision of the Progressive Era, as embodied in the thinking of Henry Ford and Frederick W. Taylor. He adapted their shared idea that the rationality of the scientific and managerial elite could liberate humanity from its sufferings with machine technology.

Through his '4D Company' (founded in 1927 with himself, the only employee), Fuller generated a series of innovative designs aimed at meeting the needs of a growing population. The chief problem for designers was, as he saw it, to mass-produce a new type of 'industrial house', using military know-how.[10] The '4D tower house' was designed to prove his point. Built of aluminium, it was supposed to be cheaper, lighter, and better – and to be delivered by zeppelin to far-off locations. With military reasoning, Fuller even suggested that, to save construction time, massive bombs should be used to blast out the basins into which the towers were to be lowered.

These somewhat fantastic designs were not taken seriously, at least if one may judge from the 'incredible smile' his drawings generated when put on display at the Harvard Society for Contemporary Art in 1929.[11] Yet the fact that he was included in the exhibition is evidence of his growing recognition among *avant-garde* architects. It was the design for his 'Dymaxion' house (for 'dynamic,' 'maximum,' and 'ion') of 1927 that sparked interest in his work. This structure could be mass produced and assembled in

[9] Peder Anker, *Imperial Ecology: Environmental Order in the British Empire, 1895–1945* (Cambridge, MA: Harvard University Press, 2001), 196–236. On the population debate at the time, see Alexander Morris Carr-Saunders, *The Population Problem: A Study in Human Evolution* (Oxford: Oxford University Press, 1922).

[10] Richard Buckminster Fuller, *4D Time Lock* (Albuquerque: Biotechnic, 1928), 1–2.

[11] Anonymous, 'The Dymaxion House', *The Harvard Crimson*, 22 May, 1929, 24.

twenty-four hours, thanks to efficient use of materials and construction practices. His 'admirer and friend' Frank Lloyd Wright argued that, as a machine to live in, this house would surely increase human happiness just as the automobile and airplane did.[12] Others were more sceptical: 'it is a man's world still', wrote a woman who thought Fuller's house had 'a feminist problem', with techno-solutions modelled on military industry.[13]

'Putting the House in Order'

Although it is true that auto-industrial mass production was a major inspiration for the 'Dymaxion', it would be misleading to suggest that this alone fired Fuller's imagination. Written in 1932, his article on 'Putting the House in Order' summarized his chief aims. He began by stating that architecture should be in the service of 'Ecology – the study of human relations, particularly as pertains to the home' – a statement reflecting the definition of human ecology used by sociologists at the University of Chicago.[14] Fuller argued that it was a matter of evolutionary survival for humankind to turn away from destructive *laisser-faire* capitalism.

By the 1930s, Fuller was busy inventing a series of technologies that sought to streamline design according to nature's dynamics. The principles of fluidity, energy, and aerodynamics caught his fascination and he produced the 'Dymaxion Dwelling Machine', 'Dymaxion Car', 'Dymaxion Trailer', 'Dymaxion A-Frame Carrier', and even the 'Dymaxion Bathroom'. These represented an optimistic view of the capacities of design to meet the challenges of growth.

The theoretical underpinnings of these inventions are set out in Fuller's *Nine Chains of the Moon,* published in 1938. His point of departure is, again, 'ecology', which Fuller defines as '*the body of knowledge developed out of* the HOUSE. We stress not *housing* but

[12] Frank Lloyd Wright, 'Ideas for the Future', *The Saturday Review*, LCXII (17 September 1938), 14–15. Felicity D. Scott, ''On Architecture under Capitalism', *Grey Room*, VI (1), (2002), 44–65.

[13] Inez Cunningham, 'Fuller's Dymaxion House on Display', *The Chicago Evening Post*, 13 May 1930.

[14] Fuller, *op. cit*. note 7, 2. Robert Park and Ernst Burgess, *Introduction to the Science of Sociology* (Chicago: University of Chicago Press, 1921); Gregg Mitman, *State of Nature: Ecology, Community, and American Social Thought, 1900–1950* (Chicago: University of Chicago Press, 1992); and Paul Crook, *Darwinism, War and History* (Cambridge: Cambridge University Press, 1994).

the essentiality of *comprehensive research and design*'.[15] Ecology thus conceived embraced research on everything from psychology, biology, and economics to material structures and design. Fuller's main idea was that energy flowed through the machinery of life. Such mechanistic views penetrated every aspect of his thinking. But machinery needs an operator. Borrowing from his naval vocabulary, the art of designing a house became like that of building a 'ship' for society. In command, was a 'Phantom Captain', a captain architect of the body politic.[16] The possibility of human extinction was not out of the question, Fuller argued. Research and design alone were the means of salvation.

However, most of Fuller's 'Dymaxion' technologies were commercial failures and it was not until the development of his Dymaxion Deployment Unit that he fulfilled his dream of seeing houses roll off the assembly line. With Europe relapsing into another war, the United States of America soon became a provider of materials for the Allied forces, and these Units filled a pressing need for easy-to-assemble shelters. Its most ingenious aspect was its natural air-conditioning; Fuller used the solar energy to create air pressure, which, in effect, cooled the building. Hundreds of these homes were mass produced and used for military purposes.

Fuller as Military Designer

The 'Dymaxion' inventions were examples of technological solutions to ecological problems, as Fuller saw them. They drew upon his naval ethos of sacrifice and service, and represented an optimistic view of the capacity of technology to solve problems by design and mass production. American entry into the Second World War fired Fuller's zeal to be of service, which by now was also profitable. He continued to develop new designs, one of which was a polyhedron cuboctahedron map of the world. Many innovative world maps were produced at the time, reflecting a shift toward 'Air-Age Globalism'; and it is in this context, as Susan Schulten has argued, that Fuller's work should be understood. The issue of *Life* magazine in which Fuller's map appeared as a cut-out-and-glue exercise

[15] Richard Buckminster Fuller, *Nine Chains to the Moon* (Garden City: Anchor, 1938), 14.
[16] *Ibid.*, 18–29, 41.

for readers became the best-selling issue of the magazine to that date.[17] Maps are representations of power, and Fuller helped the reader jiggle with the pieces so that either the 'North Pole layout', 'Mercator's World' (around the equator), the 'British Empire', 'Hitler's Heartland Concept', or the 'Japanese Empire' would emerge. The version that Fuller later copyrighted and sold in five million copies put the USA, Canada, and the Soviet Union together as one group at the centre, and called it, 'The Dymaxion Air–Ocean World Map'. The effect represented a global sense of the war seen from different political perspectives, an idea that would re-emerge in Fuller's global environmental analysis in the 1970s.

The map was a creative application of spherical trigonometry that Fuller developed following research into what he called the 'geometry of energy'. The outcome of these calculations appeared in the summer of 1949, when students at the Chicago Institute of Design constructed his first dome. The Institute, it is worth recalling, was based on the teachings of its founder, the late Bauhaus designer László Moholy-Nagy, who, in his *Vision in Motion*, taught students 'to add to the politico-social a *biological* "*bill of rights*"', so that people could live in harmony with nature's household.[18] The dome was in line with the syllabus. Fuller followed the first principle of ecological synergy: the energetic strength of the entire construction is greater than the sum of its parts.

The virtues of Fuller's dome technology were several: lightweight, structurally strong, easy to build, and amenable to the needs of different clients. Fuller soon found himself designing domes for the US Air Force and the Distant Early Warning (DEW) line of radar installations in northern Canada and Alaska, whose computer surveillance systems would later re-emerge in his computer games. Another major patron was the US Navy. Domes could be assembled on an aircraft carrier and lifted ashore by helicopter (see Figure 1).

---

[17] Anonymous, 'R. Buckminster Fuller's Dymaxian World', *Life*, 1 March 1943, 40–55; Richard E. Harrison, *Look at the World: The Fortune Atlas for World Strategy* (New York: Alfred A. Knopf, 1944); Susan Schulten, *The Geographical Imagination In America, 1880–1950* (Chicago: University of Chicago Press, 2001), 204–238; Alan K. Henrikson, 'The Map and an "Idea": The Role of Cartographic Imagery during the Second World War', *The American Cartographer*, II (1), (1975), 19–53; Denis Wood, *The Power of Maps* (New York: Guilford Press, 1992).

[18] László Moholy-Nagy, *Vision in Motion* (Chicago: Theobald, 1947), 5; Peder Anker, "The Bauhaus of Nature', *Modernism/Modernity*, XII (2), (2005), 229–251.

Figure 1. A Dome for Helicopters on the USS Leyte in 1957.

Source: Richard Buckminster Fuller, *Ideas and Integrities*, ed. by Robert Marks (Englewood Cliffs: Prentice-Hall, 1963), 96.

Fuller's work in support of military technology makes him, as Alex Soojung-Kim Pang has argued, a superb example of a Cold War designer.[19] The dome itself became part of 'the standard of living package' that Fuller developed with students at the Institute of Design in Chicago, for the use of civilians fleeing cities to 'decentralized communities' in the event of a nuclear war.[20] The Department of Commerce also asked Fuller to make a dome for the US pavilion at the 1956 International Trade Fair in Kabul. While the Soviet Union and China worked on their pavilions for weeks, they were shocked by the sudden construction of the US exhibit in forty-eight hours. The pavilion arrived in one plane, and took only one engineer and untrained locals to complete. The Fuller dome was the most popular pavilion in Kabul, and came to represent American efficiency, military might, technological know-how, commercial supremacy, and popular appeal.

In the following years, Fuller constructed a number of domes for fairs and expos around the world, including one for the World Expo of 1967 in Montreal. His fame (along with his royalties) grew with each order, and by the early 1970s, he was one of America's most celebrated designers. More than 300,000 domes were built before his death in 1983.

[19] Alex Soojung-Kim Pang, 'Dome Days: Buckminster Fuller in the Cold War', in Francis Spufford *et al*. (eds.), *Cultural Babbage*, (Boston: Faber, 1997), 167–192.
[20] Richard Buckminster Fuller, 'New Directions', *Perspecta*, I (Summer 1952), 29–37, at 33.

On the Road – Doom and Domes

In the early 1960s, to mobilize dome research and construction, and to warn the world about its coming ecological crisis, Fuller began a lecture tour that would last a decade.[21] His fifty-one-page *curriculum vitae*, which he made into a booklet in 1975, is evidence of his visits to institutions, universities, and design schools around the world.[22] His list of thirty-eight honorary doctorates, twenty-seven awards (including the Gold Medal of the Royal Institute of British Architects), twenty-six patents, publications and lectures, and more than 30.000 citations, would make any aspiring designer blush.

His travels gave Fuller a sense of the Earth as a whole, an experience that is evident in his writings. The future of humankind, as he saw it, was threatened by population pressure and the waste of energy, followed by social discontent. This observation serves as the key opening of his lectures, public appearances, and books. The world has serious problems to be solved, and the architect–engineer has some of the solutions. 'One third of the human family is now', he wrote in 1963, 'doomed to premature death due to causes arising directly from inadequate solution to the housing problem', pointing to dramatic curves showing increases in population and energy consumption.[23] A bleak scenario of collapse would come, he predicted, around 1972, if policies were not changed.

At the time, there was a widespread fear of nuclear war, and Fuller's language fed on this gloomy reasoning. Yet, what separated him from the atomic doomsayers was that he gave his audience apolitical hands-on solutions. His engineering solutions were radical but not leftist, and thus were viewed as an ideologically acceptable response to the threats of the Cold War.

Ideally, Fuller argued, the future would see scientists, in collaboration with engineers and architects, at the helm of a new 'Energy-Borne Commonwealth of Humanity', which would steer humankind through the population problem by managing the use of energy. This could also lead to a 'Pan-American Plan on

[21] Columbia University (New York), Avery Library, Chermayeff Archive, Buckminster Fuller to Don Metz, 2 October 1964. He demanded lecture fees of $1,500 plus travel and accommodation.

[22] Richard Buckminster Fuller, *Basic Biography* (Philadelphia: Fuller Publications, 1975).

[23] Richard Buckminster Fuller, *Ideas and Integrities*, ed. by Robert Marks (Englewood Cliffs: Prentice-Hall, 1963), 187.

Intercontinental Cooperation', which would work for international peace.[24]

These views came to the fore in what was perhaps Fuller's most famous lecture, on 'Spaceship Earth', which he delivered in different versions beginning in 1964. The National Aeronautics and Space Administration (NASA) had just completed its Mercury programme, and was gearing up to launch the Gemini spacecraft (a forerunner of the Apollo programme). Space travel was in the news. Fuller appealed to public sentiment by pointing out that we are all space travellers on a common voyage: 'I've often heard people say, 'I wonder what it would feel like to be on board a spaceship,' and the answer is very simple. What *does* it *feel* like? That's all we have ever experienced. We are all astronauts.'[25] Being a space traveller had obvious appeal.

Fuller was not alone in construing the Earth as a spaceship. Since the early 1960s, ecologists had been involved in research aimed at constructing cabin systems for spaceships. In this literature, space colonies came to represent a rational, orderly, and wisely managed contrast to the irrational, disorderly, and ill-managed state of affairs on Earth. Following the advice of these 'space cabin ecologists', influential economists and politicians such as Kenneth Boulding, Barbara Ward, and Adlai Stevenson came to argue that environmental and moral space should be reordered according to the ideals of the astronaut. Fuller thus accompanied a wider trend, and became particularly influential among architects such as Ian L. McHarg, John Todd, and the 'New Alchemists', Alexander Pike and John Frazer, and Brenda and Robert Vale who designed autonomous buildings modeled on ecological space travel.[26]

A Computerised Command Centre for Spaceship Earth

Keeping 'Spaceship Earth' on a steady course was the focus of Fuller's lectures, and the title of the lecture-booklet, *Operating Manual for Spaceship Earth*, summarized his engineering outlook. Fuller

[24] *Ibid.*, 93, 113.

[25] Richard Buckminster Fuller, *Operating Manual for Spaceship Earth* (Edwardsville: Southern Illinois University Press; Denis Cosgrove, 'Contested Global Visions: One-World, Whole-Earth, and the Apollo Space Photographs', *Annals of the Association of American Geographers*, LXXXIV (2), (1994), 270–294.

[26] Peder Anker, 'The Ecological Colonization of Space', *Environmental History*, X (2), (2005), 239–268; Anker, 'The Closed World of Ecological Architecture', *The Journal of Architecture*, X (5), (2005), 527–552

mobilized the managerial views of the Progressive Era in a plea for ecological stewardship, building a grand computer to monitor the state of the Earth. His model was the pilothouse of a naval vessel, whose navigational instruments would steer Spaceship Earth away from metaphorical rocks. His computer was to be so powerful that it would ultimately replace human capacity. 'Man is going to be displaced altogether as a specialist by the computer', he wrote, since it would contain complete knowledge. And with such a computer, designers could act wisely. 'So, planners, architects, and engineers take the initiative. Go to work', and build the computer and take responsibility, he urged.[27] They were the only true naval officers of Spaceship Earth with the competence to guide the 'human family'.

These ideas were not utopian fantasies, but realizable projects taken seriously, at least at Southern Illinois University, where Fuller held one of his more lasting positions as a research professor – a position that enabled him to work outside the usual faculties and to develop interdisciplinary projects, such as his programme for managing the earth. What students needed to learn was, he believed, the art of 'World Planning', and he initiated a series of interdisciplinary courses covering the economic, technological, and scientific aspects of world planning. In his curriculum, Fuller emphasized that 'The design scientist would not be concerned exclusively with the seat of a tractor but [with] the whole concept of production and distribution of food'.[28]

The problem with this generalist, interdisciplinary approach was that it risked spreading the curriculum too thinly, and thus losing the focus of design. Therefore, Fuller suggested that the organizing principle should be 'a two-hundred foot diameter Miniature Earth', fabricated of a light metal trussing, its surfaces symmetrically dotted with ten million small variable intensity light bulbs, all connected to a computer.[29] The blinking lights on the 'Geoscope' (as he sometimes called it) were to represent statistical knowledge in a managerial fashion, thus educating the public, and making world planning possible. In a similar proposal for a Geoscope at the United Nations building in New York, Fuller proposed to plot population in red, and its dramatic growth, displayed in computer simulations as expanding or retracting colour blobs. 'You would

[27] Fuller, *op. cit.* note 25, 44, 133.
[28] Richard Buckminster Fuller, *Utopia or Oblivion* (New York: Overlook, 1969), 293.
[29] Fuller, *op. cit.* note 23, 257.

see the glowing red mass spreading north-westward around the globe like a fire', he told his audience.[30] This creative use of colour and number was to impress Americans, who saw the communist colour red as eventually covering the entire planet.

Although the Mini-Earth was never built in New York, the project acquired momentum at other locations, particularly at Southern Illinois University where, in 1969, Fuller launched a grandiose US$22 million plan for a World Resources Simulations Center, fully equipped with a four-hundred foot diameter dome (with a 5/8 sphere) covered with light bulbs driven by state-of-the-art computers. When finished, it would 'in effect [be] a World Brain', he told the president of the University, which promised to free the 'mind from occupations of brain slavery'.[31] The built result was in the end somewhat scaled down to a Simulation Center, designed as a planetarium, in which students could see all the continents of the world painted on the dome, giving them the managerial overview necessary for world planners. It was to be a microcosm of the world. The Center's director wrote enthusiastic reports about of a building that looked like a control room for Spaceship Earth, similar to those 'large scale displays, such as those of N.A.S.A in Houston, and those of [the North American Aerospace Defense Command] NORAD'.[32]

These computer simulations caught the attention of John McHale, a keen follower of Fuller, and Director of the Center for Integrative Studies at the State University of New York, and principal organizer of Future Studies. McHale eagerly defended the need for a grand computerized command centre in which ecologists could steer Spaceship Earth towards a better future. The building was a headquarters for environmental stewardship.

Playing the World Game

British and American military 'war games seeking the most effective means for controlling the world' were at the core of the Simulation

[30] Fuller, *op. cit.* note 28, 117.

[31] Columbia University (New York), Avery Library, MS AA 737, F96, F9633, 5. Richard Buckminster Fuller, 'Planned Implementation of the World Resources Simulation Center', 18 June 1969; Herbert G. Wells, *World Brain* (London: Methuen, 1938).

[32] Columbia University (New York), Avery Library, MS AA 737, F96, F9633, 4. Thomas B. Turner, 'World Game State-of-the-Art Report', December 1969.

Figure 2. Playing the World Game at New York Studio School of Painting and Sculpture in 1969.

Source: Richard Buckminster Fuller, Edwin Schlossberg and Daniel Gildesgame, *World Game Report* (New York: New York Studio School, 1969), 11

Center's activities.[33] In these games, students learned to use computer scenarios. Fuller told his university superiors that he had been trained to carry out such war games at the Naval Academy.[34] Through such games, one could compare different scenarios and find the most cost-effective approach to a given situation. Following economic game-theories as well as 'world war games', Fuller testified to the US Senate about the virtues of simulating nature's economy in the format of a grand World Game.[35] Some will 'push buttons of Armageddon', he reasoned, but he was 'betting that the earthians will *wake up and win*' after playing the World Game.[36] See Figure 2.

That Fuller's followers 'woke up' when playing the World Game is evident in reports by students and volunteers. A geoscope, such as the one at Southern Illinois University was a helpful, but not a necessary condition for playing the game. Players lacking the Mini-Earth could first build 'a game room' (by analogy with a war room), with 'Dymaxion Air-Ocean Maps' on its walls. Fuller would then give a day or so of lectures, before his local followers (such as the resident professor or graduate student) organized the players

[33] Richard Buckminster Fuller, 'World Game: How It Came About', in *50 Years of the Design Science Revolution and the World Game* (Carbondale: Southern Illinois University, 1969), 111–118, at114.
[34] *Ibid.* v.
[35] Richard Buckminster Fuller in *Hearings on S. Res. 68* (4 March 1969), 2–15.
[36] Fuller, *op. cit.* note 28, 206.

(usually students) into groups. While Fuller went to the next campus, students would enjoy the ultimate power trip of seeing themselves the 'captains' of a troubled 'spaceship'. They would investigate the past, current, and future needs of a particular natural resource. They would compile a history of, say, oil or solar energy, and extrapolate different scenarios depending upon different inventions and the use (or more often the abuse) of the resource. After some weeks, the groups would gather and present their results with markers on the maps.

With the results of these different groups, the World Game would then begin. This process was analytical, but it could also take the format of spiritual 'travel through the minds of others in the room'.[37] Mystical exercises and meditations were practised to evoke the sense of being an astronaut, seeing the world as a whole. No means were left untried to obtaining the captain's overview of 'the human family'. One player recalls the excitement: 'I've learned lately that news has a sort of a sex life. Hegel said the same. If you take two items of antagonistic bad news and point them at each other, or *let* them at each other, you may get some surprising good news.'[38] The lesson was that a labour crisis could be prevented if the jobless could invent new technologies for saving energy, and thus prevent an energy crisis. Fuller himself would usually appear in person at these concluding sessions, carefully taking notes and material for future publications.

Creativity, exploration, inventions and play were the main ingredients of Fuller's view of history. In his repeated critique of Malthusian theory – at the time, advocated by Paul Ehrlich in his *Population Bomb* – Fuller would point to human inventive powers, and claim that the World Game 'demonstrated beyond question that the Malthusian doctrine is fallacious'.[39] The game came to inspire many environmentalists in predicting the Earth's behaviour, including the Club of Rome's report on *The Limits to Growth* in 1972.[40]

[37] Edwin Schlossberg quoted in Richard Buckminster Fuller *et al.*, *World Game Report* (New York: New York Studio School, 1969), 2.

[38] Medard Gabel, *Energy, Earth and Everyone: A Global Energy Strategy for Spaceship Earth* (San Francisco: Straight Arrow, 1975), 155.

[39] Fuller, quoted in Fuller *et al.*, *op. cit.* note 37, 1; Paul Ehrlich, *The Population Bomb* (New York: Ballantine, 1968).

[40] Donella H. Meadows *et al.*, *The Limits to Growth* (New York: Signet, 1972).

The 'Dymaxion Messiah' of the Counterculture

For all his futuristic and technocratic visions, Fuller was also highly popular among counter-culture enthusiasts and environmentalists. At first glance, there seems to be little resemblance between his navy-inspired technocracy, and the anti-war and pro-environment agenda. How could he find such a huge audience?

The answer lay in his vision of 'the human family', albeit guarded by elite scientists and intellectuals. These insights were the chief source of inspiration for the *Whole Earth Catalog*, begun in 1967. This was dedicated to Fuller, and has since become one of the chief practical handbooks for alternative lifestyles and soft-tech solutions – complete with detailed instructions on how to build an ecological home as a dome. Fuller's construction techniques were used in such counterculture buildings as the ultra-hippie 'Drop City' in Colorado. The military survival technique of how 'to do more with less' found, thanks to Fuller, its counterpart in energy-saving buildings that were 'to be the easiest, most efficient, with least cost'.[41] Extracts from his books and lectures were compiled and videos made to boost interest among spiritualists, eco-worshipers, and other 'children-of-the-earth'.[42] Further evidence of support came with the biographies that emerged in the 1970s. His naval past, the patronage by the military-industrial complex, these were toned down to a minimum. Instead, he was in all sincerity described as a 'Dymaxion Messiah', providing mystical prophesies.[43]

Such idolatry predictably met with resistance at a time marked by a rich diversity of political, spiritual, and scientific worldviews. More politically oriented leftist activists, for example, thought the design revolution and ecological reasoning had a 'paralyzing' effect on the revolutionary potential of the counterculture.[44] However, Fuller was cheered among hippies preoccupied with spiritual thinking, environmentalism, and alternative ways of organizing society.

---

[41] Bill Voyd, 'Funk Architecture', in Paul Oliver (ed.), *Shelter and Society* (New York: Praeger, 1969), 156–164, at 156; Stewart Brand *et al*. (eds.), *Whole Earth Catalog* (Menlo Park: Portola, 1969); Andrew Kirk, 'Appropriating Technology: *The Whole Earth Catalog* and Counterculture Environmental Politics', *Environmental History*, VI (3), (2001), 374–394.

[42] Richard Buckminster Fuller, *Buckminster Fuller to Children of Earth* (Garden City: Doubleday, 1972).

[43] Hugh Kenner, *Bucky: A Guided Tour of Buckminster Fuller* (New York: Morrow, 1973), 163–199.

[44] James Ridgeway, *The Politics of Ecology* (New York: Dutton, 1970), 14.

Among environmentalists, there was a fundamental tension between those who believed in new technology, and those who wanted a new moral and political approach towards the natural world. Acute debates often boiled down to whether or not one agreed with Malthus. Garrett Hardin was one of the key debaters. He, too, understood the Earth as a 'spaceship', but, as a Malthusian, argued that the 'ship' had limited 'carrying capacity', and that human conduct was ruled by the reality of 'lifeboat' ethics.[45] A new ecology-driven politics, ethics and lifestyle were urgent, Hardin argued, while new inventions were a secondary issue. Whether one agreed with Fuller or Hardin, these questions pointed to the need for a captain at the helm.

To his followers, Fuller was such a captain. The fact that his military rhetoric found an audience among environmentalists is evidence of a movement lending its ears to technocratic language. Architects and designers would one day 'take over and successfully operate SPACESHIP EARTH',[46] and his many readers were not unsympathetic. In reality, however, few put time and effort into organizing a governing body to run the world according to Fuller's manuals. The reason was simple: Fuller was so radical as to believe that politics would soon be a thing of the past. He and his followers were promoting an informational, not political programme. Consequently, they put their hopes in the idea that 'popular pressure' from players of the World Game would 'gradually force world politics to yield to the computer-indicated, mutually-beneficial world programs'.[47]

'If humanity succeeds', said Fuller, 'its success will have been initiated by inventions and not by the debilitating, often lethal biases of politics.'[48] To architectural students, he pointed out that 'politics will become obsolete' by the year 2000, if only designers could be in charge.[49] For readers of *Playboy*, he fancied new utopian cities on the moon, chemically free of politics. 'Take away all the inventions from humanity and, within six months, half of us would die of starvation and disease', he argued. 'Take away all the politicians and all political ideologies and leave all the inventions, and more would eat and prosper than do now [in 1968].'[50] Fuller was all for submitting politics to 'secondary housekeeping tasks',[51] while giving

[45] Garrett Hardin, 'Living in a Lifeboat', *BioScience*, XX (10), (1974), 561–568.
[46] Richard Buckminster Fuller, *Earth, Inc.* (Garden City: Anchor, 1973), 142.
[47] Fuller, *op. cit.* note 33, 116.
[48] Richard Buckminster Fuller, 'City of the Future', *Playboy* XV (1), 1968, 166–168, at 167.
[49] Richard Buckminster Fuller, 'The Year 2000', *Architectural Design*, XXVIII (2), (1967), 92–95.
[50] Fuller, *op. cit.* note 48, 166–168.
[51] Fuller, *op. cit.* note 28, 155–156.

leadership to designers whose task was to invent technologies and architectures that kept the world on track. In Fuller's vision, the political realm would fade away and be replaced by an enlightened regime of technocrats.

The idea that political bureaucracy could wither away carried an obvious appeal to Americans of all persuasions, although there were disagreements about the dialectics of history, politics, and the role of revolutions. Contrary to Marx, Fuller argued that history was driven by inventions, and that important revolutions were driven by design. '[We need a] design-science revolution', he told students at Southern Illinois University. 'This revolution is trying to articulate itself everywhere. It gets bogged down by political exploiters of all varieties.' Irritated by students who became engaged in politics, he saw them wasting time on a system that was incapable of offering a fair distribution of resources. He had a similar message to those trying to stop the war in Vietnam: 'They [the peace activists] will have to shift their effort from mere political agitation to participation in the design revolution.'[52] He was, in effect, offering a programme that threatened to sideline not only the Civil Rights anti-war movements, but political activity altogether.

Some enthusiasts tried to make a revolution of a different kind. In his *Synergetics* of 1975, Fuller laid the foundations for an ecological design revolution based on geometrical and energetic principles.[53] A series of technical dome studies, as well as practical 'how-to' manuals for dome building, written by his followers, prepared the ground for the future. A notable design revolutionary was Victor Papanek who, in *Design for the Real World*, argued that 'design can and must become a way in which young people can participate in changing society'.[54] Architecture and design were to be the means of changing human relations. Where politics divides, design unites. Design can revolutionize the world.

Despite all his efforts, an ageing Fuller in 1981 believed the Earth was 'moving ever deeper into crisis', and that the optimistic hopes of 1975 of getting the 'ship' on course by 1985 would not be achieved.[55] His later writings are filled with gloom. The cause of this sad state of affairs was an invisible global economic conglomeratic monster

[52] Richard Buckminster Fuller, 'Education for Comprehensivity', in Richard Buckminster Fuller *et al*. (eds.), *Approaching the Benign Environment* (London: Collier, 1970), 15–111, at 110.
[53] Richard Buckminster Fuller, *Synergetics* (New York: Macmillan, 1975).
[54] Victor Papanek, *Design for the Real World* (New York: Pantheon, 1971), xxvi.
[55] Richard Buckminster Fuller, *Critical Path* (New York: St. Martin's Press, 1981), xvii.

called GRUNCH (for 'Gross Universe Cash Heist').[56] Such conspiracy theories, published posthumously, are best understood against the ever-growing demand for his ideas. Since his death in 1983, a steady stream of unpublished manuscripts, reprints, collections, coffee-table books, art-catalogues, and biographies have reached the market. What is remarkable about most of this material is its uncritical treatment of Fuller. There is no hint of mutiny among the 'officers', who still loyally obey the teachings of their late 'captain'. Perhaps one should not be surprised. There is hardly a long tradition of self-criticism in military culture, and since it is within the political realm that debate takes place, one should not expect a culture of critical discourse to have emerged among his followers.

However, Fuller's legacy reaches beyond his immediate acolytes, and a narrow group of dome builders and design revolutionaries. More important is the growing use of simulation games and virtual programmes for planet management, which owe a great deal to Fuller's insight and enthusiasm. With the help of the Society for Computer Simulation, the Earth Systems Resource Institute, the Big Picture Small World, the Earthscope Project, the Global Simulation Workshop, and the Geographic Information System, anyone with a computer may today go online and simulate the Earth's resources, and think about its future. Time will tell how Fuller's vision – or any other – will save the planet and keep Earth on course.

About the Author

Peder Anker received his Ph.D. in the history of science from Harvard University in 1999. His works are accessible at *www.pederanker.net*, They include *Imperial Ecology: Environmental Order in the British Empire, 1895–1945* (Harvard, 2001).

Forum for University History
Department of History
University of Oslo
PO Box 1008 Blindern
Oslo 0315
Norway
E-mail: anker@ffu.uio.no

[56] Richard Buckminster Fuller, *Grunch of Giants* (New York: St. Martin's Press, 1983), 1–2.