

## **The Earth as a Giant Enclosed Space Cabin**

Peder Anker

The outer space has for centuries been a place in which heavenly utopias and religious figures were thought to exist. The ideals evoked by appealing to things existing in outer space have had a profound impact on ethical standards for people living on Earth. The philosopher Immanuel Kant (1724–1804), for example, saw a parallel between ‘the starry heavens above me and the moral law within me’. The heavenly ideals (for example in Christian religious thinking) had a particular impact in setting moral standards for social behaviour on Earth.

The outer space continued to be a place in which to fix moral standards with the space explorations of the 1960s. The Soviet-made Sputnik was the first satellite to enter outer space. Launched on 4 October 1957 it aroused great pride among the people of the Soviet Union and their socialist allies who saw it as evidence of their moral and technological superiority. It awakened an equally intense sense of being socially behind on the other side of the Cold War divide. In the rest of the world people also reacted with hope or fear to the satellite’s signals – a modest ‘pip, pip, pip’. In 1961 the Russian cosmonaut Yuri Gagarin became the first person to orbit around the Earth in outer space, and he immediately turned into a transnational hero whose courage all socialist comrades were encouraged to follow. The reaction was different among people in the West, as his achievements became an opportunity to question their own nations’ technological and social abilities. In May 1961 President Kennedy of the United States responded to these shocks by announcing that his nation should commit itself to sending a spaceship to the moon and to return it safely back to the Earth. In the following years a significant amount of money was used on both sides of the Iron Curtain to achieve this goal. A series of artefacts were built in the 1960s which aimed at

colonizing outer space. These included rockets carrying objects, plants, animals, and people into a foreign realm for human activities. Their methods for doing this were, and still are, extremely complicated technologically, and successful missions to outer space thus became an object of national pride. For both superpowers, the race to the moon was a way in which to prove the values of their respective social and political systems, and to strengthen their respective people's moral faith in their governments.

The language of this US-led program was partly inspired by the founder of the British Interplanetary Society, Arthur C. Clarke, who wrote a significant volume of fiction and non-fiction about the exploration of the outer space. In books such as *Interplanetary Flight* (1960), *Prelude to Mars* (1965), and *2001: A Space Odyssey* (1968), he came to fashion space exploration in the language of the British imperial tradition of 'colonizing' and 'conquering' new frontiers. Successful space colonization, Clarke argued, was a matter of human biological survival in view of environmental problems and dramatic population growth on Earth.

Many leading ecologists were involved in trying to make outer space habitable for human beings. They tried to design closed ecological systems within the astronauts' cabins and made plans for a larger moon station. To ecologists, building space cabins was a question of copying a piece of the earthly ecosystem and placing it behind walls in outer space. This 'cabin ecology' was construed to have a 'carrying capacity' of a given number of astronauts, which was the technical name signifying a spaceship's ability to maintain itself while supporting its crew members. Close management of the population dynamics of species on board would be of paramount importance for the ship's survival, and astronauts would therefore have to live in harmony with the spaceship in order to survive. A host of highly advanced technologies were developed to achieve this end. This was very much transnational research as ecologists from all over the world were involved. In South Africa, for example,

the famous anti-apartheid activist and ecologist Edward Roux worked on the problem of carrying plant life to new planets and studied whether humans could support themselves by growing food there. As the programme for voyaging to the moon advanced during the 1960s, the public and scientific debates were dominated by increasingly bold suggestions for ways in which to inhabit outer space, including plans for space colonies on the moon, Mars, and beyond.

In July 1969 the US astronaut Neil Armstrong became the first human being on the moon. The success of this mission was a great boost to the self-confidence and pride in the American democratic way of life. Among the Soviets and their allies, on the other hand, the news caused self-examination and a sense of having lost the race. On the diplomatic front, especially in United Nations circles, tensions soon emerged with respect to what sort of activities and ownership should be allowed in outer space. A number of agreements and treaties were as a consequence signed in the 1970s, of which the Moon Treaty of 1979 was the most important. It declared the moon as a demilitarized zone and its resources as the common heritage of all peoples. Through these legal and political agreements the United Nations was able to post itself as a relevant institution in a period marked by the bipolar Cold War. Barbara Ward, an international economist at Columbia University, was one of those who thought that the United Nations should play a key role in outer space governance. She was no space enthusiast and believed money would be better spent solving environmental problems on Earth, and she used ideas about spaceship management and research into the carrying capacity of space cabins to generate ideas about transnational steering of *Spaceship Earth* (1966). This reasoning inspired Adlai Stevenson, the US Ambassador to the United Nations, to note that ‘We travel together [as] passengers on a little spaceship.’ ‘Spaceship Earth’ soon became a key term in United Nations vocabulary, especially after secretary-general U Thant used it in connection with Earth Day in 1970.

Around the same time the designer Richard Buckminster Fuller started using cabin ecology in his lectures as a model for understanding life on Earth. 'We are all astronauts,' he explained in his *Operating Manual for Spaceship Earth* (1969), a book which basically postulates using cabin ecological engineering manuals for living in outer space to solve environmental problems on Earth. To live in harmony with the Earth's ecosystem became in the 1970s a question of adopting technologies, analytical tools, and ways of living in outer space. Key environmentalist terminology such as 'carrying capacity', 'steady state economy' and 'life support system' were based on the astronauts' life support systems in a spaceship. The Gaia thesis of James Lovelock, for example, basically postulated Earth as a giant space cabin, complete with a self-regulating system that maintained climate and chemical compositions comfortable for living organisms. The emergence of a transnational ecological ethic was based on the imagined lifestyle of the astronaut in outer space. Understanding the Earth in terms of a spaceship implied a new set of technological, ethical and social tools to guide humans towards the astronaut's way of life. Numerous designs for such technologies can be found in the *Whole Earth Catalog*, edited by Stewart Brand, and published in various incarnations since 1968. This ethic postulates that humans on Earth, just like astronauts, would have to adjust their lives to a host of computer-driven cybernetic monitoring, control and device systems in order to steer Spaceship Earth into ecological harmony. Humans of the future would have to let technologies for renewable energy, solar cells, recycling of air and water, waste processing, sewage management, material reuse, and other health-related technologies developed for space stations be part of their daily lives.

Viewing the Earth as a giant space cabin in outer space required a panoramic perspective which came when the Apollo spaceship sent images of the Earth from the moon late in 1968. The view inspired ecologists around the world who also used the imagined communities of future space colonies on the moon and on Mars to analyse the Earth. In *Environment, Power*

*and Society* (1971) the ecologist Howard Odum made a book length case for understanding the earthly environment and human activity in terms of astronauts' life in outer space. In the 1970s 'Spaceship Earth' was often used to address transnational ecological issues and the urgent need for global leadership.

On the other hand, the ecological colonization of outer space was a technically and economically viable idea according to the physics professor at Princeton University, Gerard K. O'Neill. His visions for space colonization caught the imagination of much of the outer space debate of the 1970s. He suggested building a colony in space free of military purpose, in ecological harmony, without atomic pollution or other suspicious industrial activities. It should include citizens from all over the world and contribute to the well-being of the Earth as a whole. The idea was to use material resources on the moon to fabricate a grand space station located at one of the points of gravitational equilibrium between the moon and the Earth. The station was to be complete with mountains, lakes, and small-town communities. Moving heavy manufacturing to the moon could relieve the Earth of polluting industries, and a grand space station could ease the population pressure. Such a space station, O'Neill argued, was 'likely to encourage self-sufficiency, small-scale governmental units, cultural diversity and high degree of independence'. It was to be an Arcadian ecological community in outer space, he argued in his widely read book *The High Frontier* (1976). A space station could solve most of the Earth's environmental ills, he believed. It could be built as a 'steady state' economy in harmony with the station's ecologically engineered system, and clean energy could be sent back to Earth from solar power satellites in outer space. Not only could space stations benefit Earth 'by relieving Earth of industry and of its burden of population', but its ecosystem with species of animals, birds and fish in danger on Earth could have a chance of survival in outer space. The space station was thus to be understood as a Noah's Ark taking an intact ecosystem into space from polluting industrialism on Earth. More

recently, the Biosphere 2 buildings in Arizona were completed in 1991 in preparation for the colonization of outer space. It was the most expensive ecological experiment to that date, and the scientific rationale was to figure out the 'carrying capacity' of a closed ecosystem with respect to how large a crew of astronauts an artificial biosphere could support. Its proponents argued that successfully running a new biosphere inside a sealed building could show people what it would take to successfully manage Biosphere 1 (the Earth).

The colonization of outer space has been of key importance for ecological debate, methodology, and practice. Technologies for surviving in outer space, such as computer simulation programs, sewage systems, air-rinsing methodologies, energy-saving devices, and solar cell panels, have become regular ecological tools for biological survival on Earth. The rationalist and managerial ideals for measuring a spaceship's 'carrying capacity' of astronauts have become a standard for organizing human practical as well as moral life on board Spaceship Earth.