Figuring Survival: Cultural Plots of the Ship*

Sabine Höhler, German Historical Institute, Washington, DC / Deutsches Museum München

"Figuren des Wissens / Figurations of Knowledge"
European Conference of the Society for Literature, Science, and the Arts (SLSA),
Zentrum für Literatur- und Kulturforschung / Center for Literary and Cultural Research Berlin (ZfL),
Berlin, June 3-7, 2008.
Stream 8: "Vitality – Contours and Boundaries between Life and Death" (Christine Blättler, Ulrike Vedder)

Abstract

From the voyages of discovery to space flight the ship has served as a reservoir of collective memory and imagination. Symbolizing spatial expansion and exploration as much as fragility, transition, and transience, the ship is at the heart of powerful narratives of containment and exclusion, of crisis and advancement prevailing in (western) cultural history. Michel Foucault considered the ship the "heterotopia par excellence," denoting an exceptional site of life and death where survival is at stake.

This paper explores the figure of the ship in cultural, literary, and scientific narratives with a focus on their biopolitical and bioeconomical plots. The first trajectory follows the cultural history of the ship as a vehicle of hope and rescue, flight and fate. In the stories of Noah's ark, of slave and deportation ships, of migrants to new lands of promise, and of contemporary dramas of refugees facing "Fortress Europe", the ship represents displacement, survival, or obliteration in struggles about borders, limits, and capacities. In the life sciences the ship illustrated limited living space on planet earth since the environmental era of the 1960s and 1970s. The second trajectory follows the role of the ship in a "New Ethics for Survival", a neo-Darwinian theory of distinguishing valuable human life from disposable "surplus". Population ecology developed practices of figuring out capacities and overloads by means of the ship, the lifeboat, and the spaceship. Both trajectories study how the promises of modern arks were accompanied by practices of selection.

Taking different texts and images, pictures and stories, figures, formulas, and graphs into account and analyzing how they turned narratives of the ship into meaningful plots working in different cultural settings, the paper aims at presenting an example of how to combine perspectives from historical science studies and cultural studies to enable a transdisciplinary reading and understanding of cultural topoi.

---

* This paper is an abridged version of an article published in May 2008 under the title "'Spaceship Earth': Envisioning Human Habitats in the Environmental Age", *Bulletin of the German Historical Institute* No. 42, Spring 2008, pp. 65-85. The online-edition, which also contains the references, is available at http://www.ghi-dc.org/publications/ghipubs/bu/042/bulletin42.html.

Prologue: A Conservationist Mission

The opening sequence of a science-fiction film released in 1972 begins with close-up views of an Edenic garden of plants—plentiful, precious, pure, and peaceful. It soon becomes clear, however, that the richness on display is as unique as the biblical paradise. As the camera draws back, we see that this botanical abundance is quite limited, contained within a large glass dome. Pulling back still further, the camera discloses that the encapsulated environment is actually situated in deep space; the dome is part of the "Valley Forge," a huge *American Airlines* space freighter (Fig. 1).

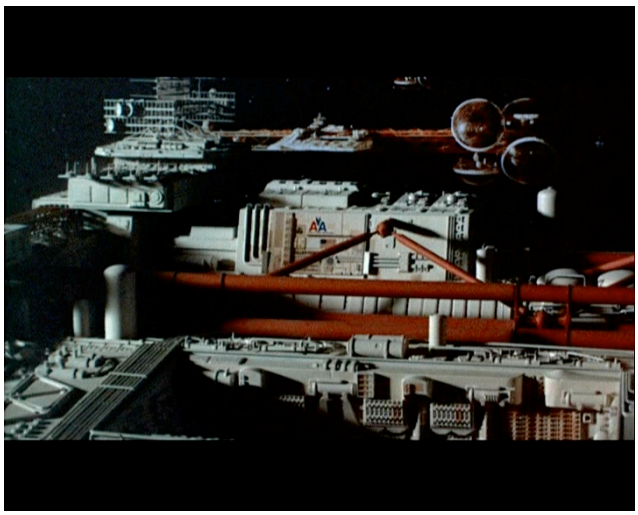

Fig. 1: *Silent Running*, directed by Douglas Trumbull, starring Bruce Dern. USA, Universal 1972.

Accompanied by majestic music, the first sequence of the movie culminates in the revelation of the awe-inspiring extent and importance of this US mission. A solemn voice reads out a declaration written at the beginning of the twenty-first century, in which the last surviving forests on Earth are dedicated to a conservationist journey through outer space that, as the story begins, has been in progress for eight years. Astronaut and botanist Freeman Lowell, one of four spacemen aboard, tends the precious cargo that will one day be returned safely to its earthly home. "Freeman" is a true disciple of the environmental movement of the 1960s and early 1970s. He still remembers when vegetables had taste, smell, and color, when the air was fresh and the skies were blue. Through Freeman we learn that, despite the warnings of environmental activists, the earth of the future has become a bleak and monotonous place with a uniform temperature of 75 degrees. The planet is so densely populated that it has

grown into one massive, completely defoliated city; trees and plants are no longer essential for (human) life, as nutrients are now laboratory-manufactured.

The Spaceship, a Modern Container of Life

The startling contrast between the richness of life and the fragility of its artificial environment, as well as the consequences of changed attitudes toward nature, are the issues on which the 1972 movie *Silent Running* focuses. The film was produced amid heated debates on resource scarcity, environmental pollution, and overpopulation. It reflects the popular images of impending ecological catastrophe and the questionable survival of humankind. It is certainly no coincidence that the film is set entirely on a spaceship, which had become a major symbol of both the fears and the hopes associated with Earth's transformation into an endangered planet. "Whole Earth" was first pictured and repeatedly represented through photographs taken on the Apollo missions during the 1960s (Fig. 2). At this time the "Blue Planet" became an icon of Earth's singularity, one that would endure throughout the second half of the twentieth century. The dynamic green and blue colors in this image of Earth are attributed to three billion years of converting sunlight into processes of life. It is not without irony that it was this distant vision of the earth that focused attention on life's fundamental conditions, believed to be unique within the universe.

Fig. 2: "Full Earth" (NASA). View of the Earth as seen by the Apollo 17 crew traveling toward the Moon in 1972. URL: http://dayton.hq.nasa.gov/IMAGES/SMALL/GPN-2000-001138.jpg.

The figure of the spaceship merged notions about the fragility of life with the triumphs of science and technology. Inside this discursive frame, it took only a small step to imagine the newly discovered "Planet Earth" as a spaceship. The predicaments of the late twentieth

century seemed to find a perfect expression in the phrase "Spaceship Earth." This paper explores the cultural horizons that were opened—and closed—by the image of Spaceship Earth in the so-called "Environmental Age," the decade ranging from the mid-1960s to the mid-1970s. I begin by examining the meaning of the ship in Western culture. I see the figure of the ship as linked to narratives of fragility and transience on the one hand and exploration and expansion on the other; these themes continue in narratives of the spaceship. Imagining Earth as a spaceship made it possible to combine concerns about the planet with visions of global control in order to address the question of mankind's "survival." At a time when the earth seemed like a paradise in jeopardy, the spaceship, like the ark, held out the hope of preserving life in all its diversity. Moreover, I contend that the mythically resonant metaphor of the ship marked Earth as a temporary environment and introduced the idea of human survival elsewhere, based on rational scientific management.

Containment: A "Swimming Endosphere"

From the early modern voyages of discovery to the Apollo missions the ship has served as a reservoir of collective memory and imagination. Symbolizing spatial expansion and exploration of the unknown as well as fragility, transition, and transience, the image of the ship has been at the heart of Western culture's most powerful narratives. Michel Foucault considered the ship to be the "heterotopia par excellence." Heterotopia is his term for an exceptional site that exists within the world and, at the same time, lies far remote from or beyond it. Heterotopias, according to Foucault, are in relation with all other places and spaces and yet in opposition to them. The ship he describes as a "floating piece of space, a place without a place, that exists by itself, that is closed in on itself and at the same time is given over to the infinity of the sea." Roland Barthes likewise saw the ship as a symbol of seclusion and refuge from life's raging storms. Barthes refers to the fictional narratives of Jules Verne, in which the ship replicates and preserves the world on a small scale. In a very confined space it keeps at the traveler's disposal the utmost number of valued objects, a singular universe floating amid the violent tempests of time. In the novel *20,000 Leagues under the Sea* from 1870 Verne describes the inventory of Captain Nemo's submarine *Nautilus* in great detail, including a library of 12,000 treasured volumes, a valuable collection of art and music, and a magnificent museum displaying the varieties, rarities, and curiosities of nature. Barthes depicts Verne's ships as vehicles of the encyclopedic project of the nineteenth century,

designed to encompass and conserve *en miniature* all elements of a finite but rapidly proliferating world.

Appropriating space by compiling, registering, and neatly arranging the elements within it is a strategy not limited to the modern era of scientific collecting, archiving, and interpreting of the world. The procedure recalls the primal ship representing the inventory of the world, the biblical ark. This vessel from the Old Testament (Genesis 1:6–9), furnished with specimens of life on earth, differs in a significant way from Verne's crammed but comfortable floating interiors: Noah's ark is the paradigmatic heterotopia, a storm-tossed place of survival and salvation in the face of catastrophe. In the second volume of his work titled *Sphären*, Peter Sloterdijk analyzes the ark as the perfect example of an "ontology of enclosed space." *Ark*, from the Latin *arca*, is the word for "case" or "compartment." To Sloterdijk, the ark denotes an artificial interior space, a "swimming endosphere," that under certain conditions provides the *only possible* environment for its inhabitants.

Like Sloterdijk's "swimming endosphere," the spaceship constitutes an insular habitat for a small group of living beings facing a hostile outside world. In the twentieth century, when the "World Frontier" closed and the formerly distant "lost horizon" of the seas and the unknown continents became familiar territory, it was outer space that seemed to hold new possibilities for exploration and expansion. The spaceship—scientifically and technologically propelled and sustained—promised the opportunities and the rewards of a utopian society flourishing in a re-created Eden. The spaceship informed and organized the rhetoric of the Environmental Age. "Spaceship Earth" took the ancient motif of the ship as the "greatest reserve of the imagination" and united it with the modern image of human technological supremacy in space. Moreover, "Spaceship Earth" simultaneously represented "crisis" and "progress," the era's two prevailing attitudes toward environmental issues. Both supporters of *sufficiency* and advocates of *efficiency* could argue their radically different positions on and in the same terms.

Control: "Life Support"

The true engineers of "Spaceship Earth" used the ship not so much as a metaphor of vulnerability and community but to describe an innovative technological *model* of a natural environment yet to come. The economist Kenneth E. Boulding in his programmatic lecture "The Economics of the Coming Spaceship Earth" delivered in 1966 chose the spaceship to

prefigure the "closed earth of the future." He advocated replacing the wasteful "cowboy economy" of the past with a frugal "spaceman economy," a cyclical ecological system capable of continuous reproduction of material form and sustained entirely by solar energy. The global environment was conceptualized as functioning by means of technology-driven control systems, similar to the control systems integrated into space capsules (Fig. 3). Life on Earth was increasingly reduced to its essential conditions and functions, similar to those in a space capsule: *life support* became the term proper.

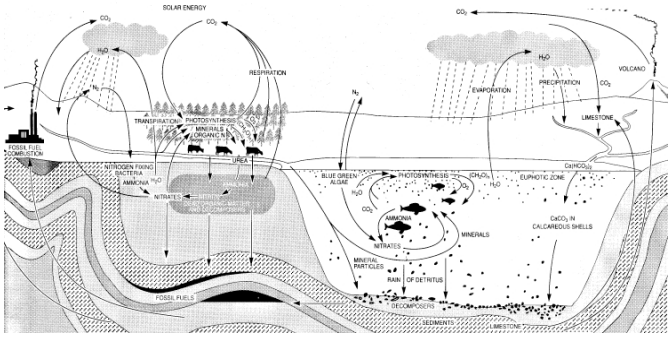

Fig. 3: "Major Cycles of the Biosphere". Hutchinson, G. Evelyn, "The Biosphere," in: *The Biosphere: A Scientific American Book*, San Francisco, W. H. Freeman and Company 1970, pp. 3-11, image pp. 8-9.

The architect and designer Richard Buckminster Fuller published his *Operating Manual for Spaceship Earth* in 1969, summoning the engineering elite to take control of an environment in bad repair. "We are all astronauts," he argued. "We have not been seeing our Spaceship Earth as an integrally-designed machine which to be persistently successful must be comprehended and serviced in total." But because "no instruction book came with it," humankind was confronted with the challenge of learning on its own how to operate "Spaceship Earth and its complex life-supporting and regenerating systems."

These statements do not indicate who exactly would be the global captain steering the ship through space; rather, the cybernetic concept of governance was based on a problematic analogy of technological and political authority. *Kybernetes* refers back to Plato's ideal state as a ship on high seas steered with a firm hand and subjected to a strictly hierarchical organization. The metaphor of the "ship of state" and its helmsman provided a basis for claiming "command of the competent", linking scientific expertise to a set of rules inscribed into the servomechanisms feeding the control loops. These discursive shifts may seem small, yet they demonstrate how the powerful metaphor of Spaceship Earth reorganized the traditional inclusive image of the "good ship Earth" on the verge of sinking. Speaking about

Earth in terms of a planetary complex of "life-support and maintenance systems" did not include all of life; "Spaceship Earth" would sustain instead the *optimum* combination of collaborating organisms.

Capacity: "Lifeboat Ethics"

This applied also to population policies that proliferated during the 1960s, when and ideas of "overpopulation" and "population control" moved to the vanguard of state politics. "Few issues in the world have undergone such a rapid shift in public attitudes and government policies over the last decade as the problems of population growth and fertility control," George H. W. Bush, then U.S. Representative to the United Nations, proclaimed in 1973. Development programs began to include population as a field for international technical aid, especially in the so-called underdeveloped nations. The 1972 UN conference on the "Human Environment" in Stockholm popularized the "One Boat" concept, the thought that all of humanity shared a common fate within absolute limits. 1974 was declared "World Population Year."

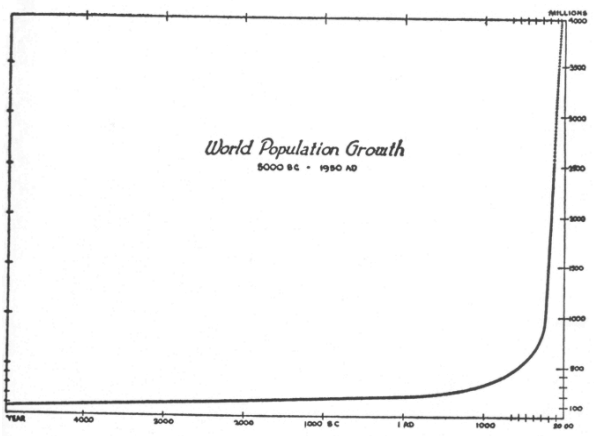

Fig. 4: "World Population Growth". Sax, Karl, *Standing Room Only: The World's Exploding Population*, Boston, Beacon Press 1960 [1955], p. 35.

Global population-growth curves plotted empirical population figures and extrapolated back into ancient times and up to the year 2000 (Fig. 4). These curves marked the contemporary situation as unique in history, not because the absolute number of people in the world had reached roughly three billion but because of the "exponential nature" of growth. Within less than a century world population had doubled, and it was increasing at a rate that indicated

another doubling within just one generation. Population growth threatened to surpass the ongoing economic expansion of the postwar period—"DNA was greater than GNP," as David Brower, managing director of the Sierra Club, put it. According to the Neo-Malthusian "laws of population growth", the size of any population over time, be it animal, plant, or human, could be described by a symmetrical S-shaped curve, sometimes known as the "logistic curve" (Fig. 5). The constraining factor in the growth pattern, biologists explained, consisted in the restriction of most populations to a limited area. Framed by such boundaries, population development was thought to grow exponentially up to a point of inflection, when environmental feedback would cut in and, subsequently, progressive deceleration and regression would occur. The asymptote of the logistic growth curve of world population became known as the earth's ultimate ecological "carrying capacity." In line with models of ecological balance, "carrying capacity" equaled the maximum number of lives that could be sustained within the finite limits of the planet.

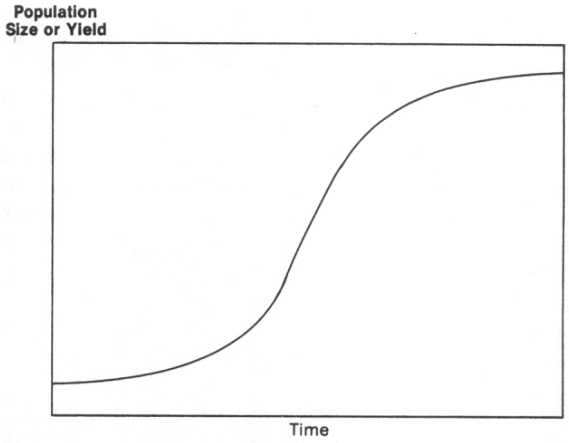

Fig. 5: "The S-Shaped Biological Growth Curve".
Brown, Lester R., *The Twenty-Ninth Day: Accommodating Human Needs and Numbers to the Earth's Resources* (A Worldwatch Institute Book), New York, W. W. Norton 1978, p. 69.

Natural and life scientists tried to answer the question "How Many People Can the World Support?" by numerical means. Human ecologists like Paul Ehrlich brought this question to a point by asking, "What is the *optimum number* of human beings that the earth can support?" All of these scientists framed the world's population problem as a matter of efficiently allocating "human elements" within a limited cargo area or storage space. In these calculations, colonial history, global power relations, and disparities of wealth were rarely

taken into account. Biologist Garrett Hardin, professor of human ecology at the University of California at Santa Barbara, demanded in 1968 a "fundamental extension in morality," in the Old Testament formula *Thou shalt not*: "Thou shalt not exceed the carrying capacity" became Hardin's quasi-biblical commandment of ecological correctness in the 1970s. He took on a godlike authority when demanding that society should "close the commons" in breeding and oppose the "present policy of *laissez-faire* in reproduction."

Hardin's claim articulates the notion that the ultimate carrying capacity of "Spaceship Earth" involved not only a zero-sum economy but also, a moral economy for deciding who was to live and who was to die on a global scale. Hardin altered the image of the earth as "One Boat" or "sinking ship" to a "lifeboat," stressing not unity and cooperation but limited capacity. He based his "Lifeboat Ethics" on the claim that assuring survival in a lifeboat depended on the efficient allocation of provisions and the disposal of dead weight. In his "Case Against Helping the Poor" Hardin argued against the "fundamental error of the ethics of sharing" in international-aid programs, urging wealthy nations to close their doors to acts of charity like immigration and food aid. In his opinion, the optimum world population would have to be reached via a Darwinian process of selection that reflected a nation's "fitness." He defined *fitness* according to classical liberal logic of achieved economic prosperity. Socially and historically developed problems he defined as biological in origin and individual in character.

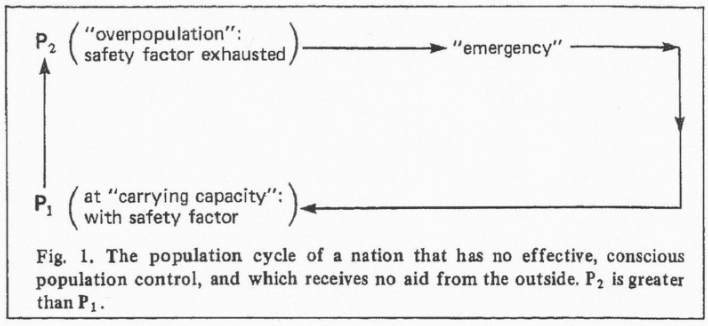

Fig. 1. The population cycle of a nation that has no effective, conscious population control, and which receives no aid from the outside. P_2 is greater than P_1.

Fig. 6: "Normal Population Cycle".
Hardin, Garrett, "Living on a Lifeboat," *BioScience* 24 (1974) 10, pp. 561-568, image p. 564.

"The demoralizing effect of charity on the recipient has long been known," Hardin claimed. An international food bank, he argued, would be simply "a disguised one-way transfer device for moving wealth from rich countries to poor" (Fig. 6). Without conscious population control, a nation's population would endlessly repeat the cycle of overpopulation followed by a drop back to "the 'normal' level—the 'carrying capacity' of the environment—or even

below." If such countries were able to draw on world food-bank resources in times of emergency, the normal cycle would be replaced by the "population *escalator*" (Fig. 7): The input from a world food bank would act as "the pawl of a ratchet," pushing the population upward. The "ratchet effect" would end only with the total collapse of the entire system.

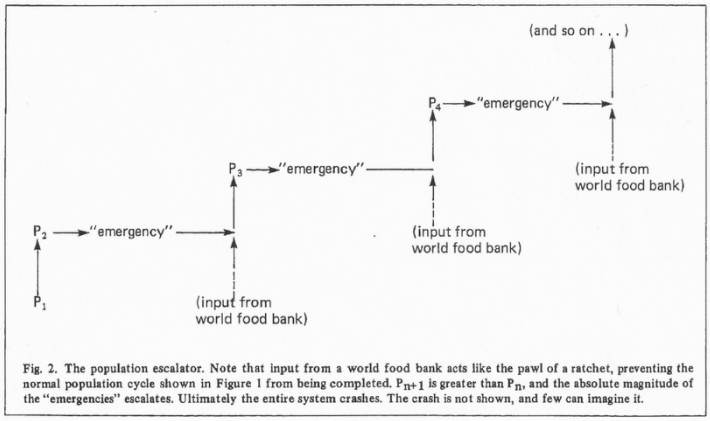

Fig. 2. The population escalator. Note that input from a world food bank acts like the pawl of a ratchet, preventing the normal population cycle shown in Figure 1 from being completed. P_{n+1} is greater than P_n, and the absolute magnitude of the "emergencies" escalates. Ultimately the entire system crashes. The crash is not shown, and few can imagine it.

Fig. 7: "Population Escalator".
Hardin, Garrett, "Living on a Lifeboat," *BioScience* 24 (1974) 10, pp. 561-568, image p. 564.

Departure: The "Glass Ark"

From today's point of view, ecological schemes for deciding who would remain on the planetary ship and who would have to be rejected as "surplus" may seem at best irrelevant and at worst aberrant. When considered as part of a theory of the Earth's maximum "carrying capacity," however, they are plausible and rational—and this is what makes them so disturbing. Lifeboat and spaceship economies not only created new metaphors for understanding the fragility of the planet but also inspired a rigid classification and selection of life and nature in order to establish a rational scientific basis for determining what would be useful and what was redundant, what was to be conserved and what discarded.

Sloterdijk points to the selectivity that characterizes all ark narratives, in which the choice of the few is declared a holy necessity and salvation is found only by those who have acquired one of the few boarding passes to the exclusive vehicle. The selective mechanisms employed on "Spaceship Earth" become visible in the Biosphere 2 project in the Arizona desert during the 1980s (Fig. 8). The "Second Biosphere" was designed as an "experiment" to study Earth's biosphere in an artificial system on the small scale of about three acres (Fig. 9). It created a new type of ecological laboratory, in which ecosystems functions and interactions could be

studied and in which the impact of humans and their technologies on the overall biospheric system could be researched. Anticipating that in the long run, Earthlife would have to expand to other planets, the experimenters hoped to develop "a prototype for a space colony." The architect of the project summarized its aims in the provocative question "Why not build a spaceship like the one we've been traveling on—along with all its inhabitants?"

Fig. 8: Biosphere 2, Aerial View.
Gentry, Linnea, Liptak, Karen, *The Glass Ark: The Story of Biosphere 2*, New York, Puffin Books 1991, p. 24.

While Hardin's "lifeboat" continued to be fraught with terrestrial problems and solutions, "Spaceship Earth" projected the planet as a *temporary* environment, opening up the prospect of leaving the planet altogether. "Men in a spaceship are not locked in one place, but become perpetual travelers," William Kuhns remarked in 1971. Sloterdijk reminds us that the ark mythology includes the radical idea of completely removing the "endosphere" from nature. The Biosphere 2 project represents just such an artificial construct of a nature. Eight human biospherians, four men and four women, were sealed inside the glass dome.

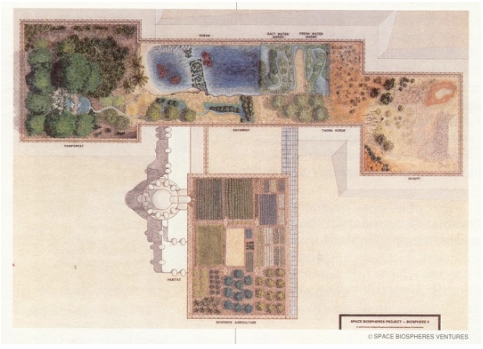

Fig. 9: Biosphere 2, Floorplan.
Allen, John, *Biosphere 2: The Human Experiment*, New York, Penguin Books 1991, p. 36.

The “Glass Ark,” as it was called, emphasized not completeness but systemic integrity, following an economy of modular combination and substitution of single components. To select the 3,800 species to be taken on board, not natural affluence but systemic “diversity” was modeled, based on biological agents selected according to criteria of efficiency, practicality, and replaceability. And, indeed, neither acid rain nor “overpopulation” nor “pollution” posed a problem within this artificial environment. Rather, a drastic decline in pollinating insects and subsequent losses of other species had to be taken into account, and the decline of oxygen called for an oxygen injection one and a half years into the experiment. Like so many ships, the Second Biosphere ran aground. The endosphere turned out to be an *exosphere*, where the only environment in which it was possible to survive was *outside*.