

# BIOSP

## ON MARCH 8, 2001,

Steven Ausbury and Anthony Burr premiered their electronic opera/experimental performance *Biospheria* at the University of California, San Diego (UCSD). *Biospheria* was based on the experiences of the first crew of Biosphere 2, a self-contained, three-acre "terrarium" built in Arizona as a prototypical Martian colony for earthlings. A utopian experiment in holistic environmentalism, Biosphere 2 was also a gigantic zoo-cum-tourist-site with a well-stocked gift shop. Visitors to Biosphere 2 could wave at the inhabitants and marvel at the rainforests for the price of a \$9.50 ticket. A mix of science fiction and science, in the popular press the experiment was labeled as "hokum"—"a grand enterprise dressed up as serious science,"<sup>1</sup> and the inhabitants were described as "a clique of recycled theater performers that evolved out of an authoritarian—and decidedly non-scientific—personality cult."<sup>2</sup> More recently Biosphere 2 has garnered more respect among the scientific community, largely due to a change in management that stresses science over science fiction. However, in its present incarnation, Biosphere 2 is no longer terribly compelling for the popular imagination.

It was the original Biosphere 2, cult-like and non-scientific, that fascinated Ausbury

and Burr. The fate and legacy of this utopian project, which blurs the boundaries between science and art, experiment and performance, farsighted vision and kookiness, suggests much about the role of popular science in our culture. For example, why is art seen as diametrically opposed to science? And how is it that the label "recycled theater performers"—a charge that was actually exaggerated—served to undermine the credibility of the men and women involved in the original Biosphere 2? Given this history, it seems apt that a theatrical performance has become a vehicle to relegitimize the initial efforts of the much-maligned crew.

AT SUNRISE ON SEPTEMBER 26, 1991 TO THE accompaniment of Native American chants, eight red-suited "bionauts"—four men and four women—were sealed into the self-contained, hermetically sealed environment known as Biosphere 2, where they would live for two years. Two of the crew members, Linda Leigh and Abigail Ailing, had scientific degrees in botany and marine biology. Roy Walford was a physician. Mark Nelson had a background in ecological management, and the other four, in spite of their non-scientific backgrounds, were

able technicians. Located in the Arizona desert at the northern foot of Mount Lemmon, the biosphere was funded by billionaire Ed Bass, who hoped to recoup his investment by marketing it as a tourist attraction. Biosphere 2 (planet Earth is Biosphere 1) was and is a remarkable structure. Designed to be entirely self-sufficient and regenerating, Biosphere 2 is Earth in microcosm—a Noah's Ark for the twenty-first century. Covered with a glass dome and hermetically sealed, it contains a patch of tropical forest, a mini savanna, an ocean complete with a coral reef, a marsh, and a desert. It also contains a human environment: compact living quarters that include eight 360-square-foot "apartments," one for each of the Biospherians, and a farm so that they could grow their own food. Below this manmade paradise of deserts and oceans lie the real workings of Biosphere 2: the maze of pipes, electrical wiring, fans, ducts, and computers that permit the atmosphere above to be self-sustaining. Periodically placed through the wilderness of the above-ground habitat are sets of stairs leading 25 feet down to this industrial territory, the "other" to Biosphere 2's construction of a natural Paradise.<sup>3</sup>



# HERIA

by Jennie Klein

Almost from the beginning, Biosphere 2 as originally occupied was beset with problems. Along with the inevitable tensions that occur when eight people are forced to live in close proximity for a long time, the bionauts faced very real physical and physiological deprivations that threatened the conceptual purity of the project. Most significantly, the oxygen levels inside the sphere began dropping precipitously after a few months, with a corresponding rise in carbon dioxide levels. By January of 1993, the oxygen levels had dropped to 14 percent, the equivalent of breathing air at 4,360 feet above sea level. Rather than abort the mission, the project managers of Biosphere 2 decided to pump in oxygen. The mystery of the disappearing oxygen was finally solved when scientists realized that the carbon dioxide molecule was reacting with the calcium in the concrete used to construct Biosphere 2's dome. The concrete was absorbing the carbon dioxide that should have been present in higher concentrates given the paucity of oxygen, thus throwing off the meter readings monitoring the air quality. In addition to this, the ultra-rich compost soil, with its oxygen-eating bacteria, was also responsible for the disappearing oxygen. Finally, the ultra-violet shield in the

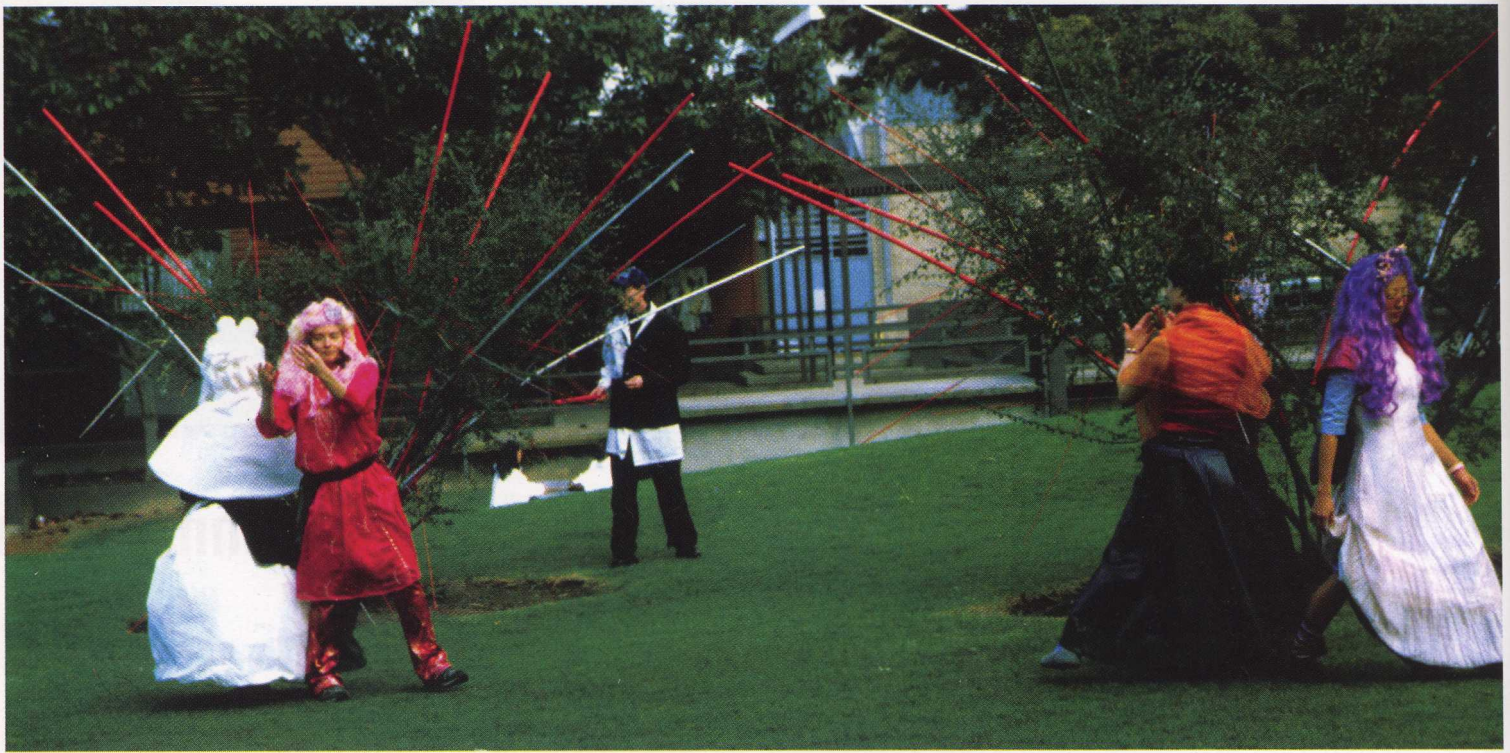
glass inhibited photosynthesis, which also accounted for the missing oxygen.<sup>4</sup> Pumping in extra oxygen was a problem, particularly since Biosphere 2 had been hyped as a completely sealed environment. Exacerbating the problem was the fact that the oxygen had been introduced furtively by the parent company, Space Biospheres Ventures. Even worse, when crew member Jane Poynter received an injury requiring surgery that took her out of the environment, she allegedly returned with a duffel bag of extra goodies that included plastic bags, two reference books, maps, color film, hydrochloric acid, and spare computer parts. The duffel bag also allegedly included steel pipe-fittings and tamper indicators, the latter meant to permit crew members to come and go from the biosphere as they pleased without detection.

Biosphere 2 had been an attempt on the part of scientists to recreate the natural environment of Earth, to construct, rather than destroy, its vast and complex ecosystem. With only three acres at their disposal, scientists had to make selective choices about what—and who—would and would not go into the site. It was inevitable that the fabricated ecological balance would not function as well as that of Biosphere 1.

Most of the plants, with the exception of the morning-glory that grew over everything, did poorly. The birds, animals, and butterflies quickly became extinct. Although the bionauts had gone into the biosphere with a three-month supply of dried food (as well as food for the galagos, a small marsupial that lives in the rainforest), they quickly ran out of extra food. Unable to produce enough for sustenance, many of them lost a great deal of weight. Meanwhile insects, particularly cockroaches and ants, not only survived, but multiplied with alarming frequency, quickly overrunning Biosphere 2. In order to combat the roaches, the biospherians made traps baited with KY jelly, which the roaches apparently liked to eat as much as the usual roach bait, boric acid.

In September 1993, when the beleaguered Biospherians finally emerged, breathless and famished, from their aquarium paradise, they were greeted not as conquering heroes but as charlatans and quacks, pseudo-scientists who had presumed to dabble in a world in which they had no business. From the outset, it had been no secret that Space Biospheres Ventures and Biosphere 2 were the brainchild of John Allen, an engineer, ecologist,





and poet-playwright who initially went by the name Johnny Dolphin. In the 1960s, Allen had founded a commune/cult known as the Synergist movement. Based in Santa Fe at Synergia Ranch, the Synergists espoused a holistic approach to science and the environment. This approach has much in common with the Gaia hypothesis, which dictates that the ecosystems of the earth are interrelated and inseparable, with the health of one affecting the health of all.

Billionaire Ed Bass, who funded Biosphere 2, subscribed to the Synergist movement. Like Bass, most of the Synergists were scientific autodidacts with college degrees in liberal arts and humanities. In order to legitimize their enterprises, the Synergists founded a non-accredited institution of higher learning, The Institute of Ecotechnics (IE). Still in existence, IE has various enterprises worldwide, including sites in France and Nepal. As part of its unconventional approach to scientific research, an enterprise operating under the auspice of IE and calling itself the Theatre of All Possibilities produces and performs theatrical works for the public as a means of creating group unity and accomplishing social outreach. When it was discovered that the people associated with Biosphere 2 were in fact a theater group in addition to being scientists, the proverbial shit hit

the fan. Apparently embarrassed by the charges of cult-like activities, Bass peremptorily fired the management of Space Biosphere Ventures and leased Biosphere 2 to Columbia University, which continues to use it as a research lab, but without the human specimens.

In addition to being New Age, Gaia-loving scientists and space-age cowboys, the Biospherians were also artists in a duration performance piece that spanned the two years of their interment. Initiated by Barbara Smith and titled *The Twenty-first Century Odyssey*, the performance took place simultaneously at sites around the world and in the Biosphere itself.<sup>5</sup> Smith, a well-known Los Angeles-based performance artist whose work deals with feminist spirituality and the female body, had become romantically involved with Dr. Roy Walford in the late '80s. Walford had always had aspirations to be an artist as well as a doctor; his involvement with Smith, whom he met when he came to her home for an evening of performances, clinched that desire. Walford, professor of pathology and gerontology at the University of California, Los Angeles, School of Medicine, had initially brought the Institute of Ecotechnics to the campus to perform. He subsequently performed with the group himself in a Fort Worth production of the *Oresteia*.

ABOVE:

STEVEN AUSBURY AND ANTHONY BURR

*Biospheria, Scene 2: Masque of Evolution, 2001. Performance on University of California, San Diego campus.*

OPPOSITE:

STEVEN AUSBURY AND ANTHONY BURR

*Biospheria, 2001, Scene 1: Initiation, 2001.*



## THEY WERE GREETED AS CHARLATANS AND QUACKS, PSEUDO-SCIENTISTS WHO HAD PRESUMED TO DABBLE IN A WORLD IN WHICH THEY HAD NO BUSINESS.

By the time of his involvement with Smith, he had become critical of the lack of sophistication that characterized the theatrical productions of the IE, which he felt did not use avant-garde forms adequately. He saw Biosphere 2 as an opportunity to align the group with art that was truly avant-garde. For the two-year duration of *The Twenty-first Century Odyssey*, Smith played Odysseus to Walford's Penelope, traveling all over the world while Walford remained confined to his fixed, sealed location in the biosphere. Smith periodically hooked up with Walford via a video phone link (provided by Electronic Café, International), and performed for the Biospherians. The Biospherians, particularly Leigh, Poynter, Taber McCallum, and sometimes Nelson, responded with performances of their own. Smith stayed, for the most part, at various research sites that were run by the IE, from which she staged events that were transmitted live to Biosphere 2. In one memorable performance that took place in the Vajra hotel located in Kath-mandu, Nepal and operated by the IE, Smith danced to traditional raga music for over an hour, shocking the Nepalese who had never seen an "old" woman move so fluidly and for so long. Sadly, in spite of the performance/videophone connection, the relationship between Smith and Walford did not survive after Walford's stay in Biosphere 2.

EIGHT YEARS AFTER THE FIRST PIONEERING bionauts walked out of Biosphere 2 in disgrace, Ausbury and Burr, then graduate students at UCSD, decided to create "a situational opera" as a tribute to the original

Biosphere 2 and its colonizers. Intrigued by the notion that Biosphere 2 was a "living art form" as well as a prototype for a Mars colony and a vehicle for investigating holistic theories of ecology, Ausbury and Burr attempted to create a time-based performance that honored all of those aspects of the structure. They also wanted to foreground the factors that had gotten the project and its participants into trouble, such as its appeal to popular rather than "hard" science, and its cult-like, utopian implications. Ausbury and Burr mobilized an impressive team of writers, performers, dancers, and designers to realize this ambitious project. Rather than staging the resulting piece *Biospheria* in a theatrical performance space, Ausbury and Burr decided to use the entire UCSD

campus as a backdrop for their environmental opera, because of its metaphorical similarity to Biosphere 2. In effect, the campus has turned into the biosphere. "We decided from the outset," Ausbury writes, "that to make a site-based or situational opera, we'd have to directly address Southern California, San Diego, and even more locally, the landscape we work in, UCSD. It wasn't hard to view the university as a utopian community with its sci-fi, late Modernist architecture, dress-alike student body, and crimeless corridors and vast open spaces."<sup>6</sup> UCSD, like Biosphere 2, represents a closed social system of the upper-class, educated elite, a system to which very few "others" have access. Nevertheless, UCSD is a utopia of sorts—a campus set in the canyons and eucalyptus















ABOVE:  
**STEVEN AUSBURY AND ANTHONY BURR**  
*Biospheria, Scene 4: Life on the Commune, Part 2, 2001.*

PREVIOUS PAGE:  
**STEVEN AUSBURY AND ANTHONY BURR**  
*Biospheria, Scene 3: Life on the Commune, Part 1, 2001.*

groves of La Jolla, California where the weather is almost always sunny and mild. The campus is in a sense what Biosphere 2 wanted to be, and thus seemed the perfect setting for an opera about the failed experiment.

*Biospheria* was initially performed over a two-week period in March 2001. Participants/viewers were assembled in an enclosed, cavernous space and asked to take a seat within a grid of water bottles and cushions. Two "flight attendants," members of the Opera vs. Overdevelopment Group (a theatrical group based in San Diego that included Jennifer Wang, Kerry Drake, Lennox Miller, Kumiko Nayama, Miriam Padolsky, Howard Buckstein, John Mark Harris, Fiona Chatwin, and Andrew West), quickly explained what to do and organized the latter-day bionauts into

groups of eight, the number of original Biosphere 2 inhabitants. Each attendee was required to don a plastic poncho and audio headsets, which were then hooked up to one compact-disk player carried by the designated leader of each group that played a score of nature sounds composed by Burr.

High on the Biospherian reading list was the writing of W. S. Bion. (The Institute of Ecotechnics would require their participants to read certain significant passages from authors influenced by the theories of the spiritual teacher G.I. Gurdjieff in order to act out the meaning of the passages.?) Bion's experiments with work groups of former British prisoners of war in the 1950s prompted him to write the book *Experiences in Groups*. According to Bion, an ideal group would contain eight people, each of whom would naturally assume a

different role such as fight-flight, pairing off, and isolating. In addition to being both science and art (or neither), Biosphere 2 was a social experiment, albeit one in which the inhabitants decided not to reproduce. Ausbury, as the director of *Biospheria*, sought to replicate that arbitrary social division. He later observed that many of the roles described by Bion were in fact acted out by the participants. I can attest that in my own group, I paired up with an acquaintance of mine, another couple paired up as well, and our field captain chose flight instead of fight and ultimately wandered away from the group once the earphones were no longer necessary.

Suited up with water bottles in hand and earphones plugged into the group leader's backpack, the participants of *Biospheria* ventured out onto the UCSD campus.



Burr's haunting, computer-generated score of sounds such as birds singing and water flowing gave the entire campus a surreal, otherworldly feeling. For me at least, this experience was heightened by a feeling of isolation. Although placed into groups of eight, participants were isolated in cocoons of sound and plastic ponchos. Adding to the feeling of aloneness was the emptiness of the relatively deserted campus. At times, it seemed as though the only people there on that Saturday afternoon were audience participants, performers, or dancers. Along the journey, we encountered tableaux, or, as they were called in the program, "scenes." The first was *Masque of Evolution*, a techno-punk minuet of fluorescent-clothed and be-wigged dancers goose-stepping in a bizarre landscape of small trees and colored plastic rods. *Life on the Commune, Part I* consisted of a group of white-clad dancers and performers farming a plot of land outside of the dormitories. For part two of this section, we divested ourselves of our earphones and sat around four large tables pushed into a square for a communal supper of ideas rather than food. Journeying further through the campus, past a young woman doing yoga-inspired sun salutations, we arrived at an open field filled with plywood-framed, plastic-encased boxes. These structures, part post-Minimal sculpture and part science project, functioned as greenhouses, trash regenerators, and air and water recyclers. The final tableaux *Mars* was reached only after the participants had squeezed through a number of makeshift offices of student-run organizations, returned the headsets, and doffed the plastic ponchos. Emerging from the warren of offices into the open quad before the science building, participants were invited to sit in rows of seats. There, to the strains of Dean Martin's *You Belong to Me* (re-worked by Burr), we watched and then joined a waltzing elderly couple. Meanwhile, the performers silently lined up on a walkway upstairs in the science building, and peered down at the dancing revelers.

*Biospheria's* libretto was written by six people who communicated primarily by email in the form of diary entries by fictional

biospherians named Adelaide, Gil, KD, Samantha, Will, and Dixie. These characters were narrated by Adriene Jenik, Shahrokh Yadegari, Ayse P. Saygin, Stephen Cope, Al Rubottom, and Loie Michael.<sup>8</sup> The libretto begins with a joyful acceptance of new companions in a manmade world and ends with the ironic and disillusioned realization that the invincible leader is soiling himself in his bed, suggesting the claustrophobia, disappointment, and flakiness of Biosphere 2. "I/liked lying in the grass with you today/staring at the chemical sky," Adelaide writes in her diary. "It was so nice; I could almost/hear the/subway roaring under my back. I have to say/that I/am very happy here." Only a short while later, Dixie narrates a very different experience. "So much work. It never ends. I'm numb with/exhaustion. No interior life, no space for/creative. And I miss music." Adelaide, meanwhile, has taken to wearing other people's underclothes, while trying to obtain two pairs of "red sparkle string bikini underwear," while Samantha laments the inability of the colony's sickly birds to eat the breadcrumb trails that they had made. At one point, one of the men observes that he had been practicing so much yoga that he could "suck his own cock."

Currently, there are plans to restage *Biospheria* in Los Angeles, New York City, and Austin, Texas. As they did with the San Diego location, Ausbury and Burr will have to make significant modifications to the opera based on the site and environment in which it is performed. It remains to be seen what form the biosphere might take, when based in a climate with less cooperative weather.

"Popular science," Constance Penley writes, "is a collectively elaborated story that weaves together science and science fiction to help write, think, and launch us into space. . . . Popular science is ordinary people's extraordinary will to engage with the world of science and technology. Popular science wants us to go into space but keep our feet on the ground."<sup>9</sup> Biosphere 2 was a popular science project run by populist scientists. It was utopian, visionary, deranged, and claustrophobic. It was Mars on Earth, or a Martian microcosm

of Earth in the desert. The crime of Biosphere 2, if there was one, was that it did not meet the requirements of being hard science. *Biospheria*, an environmental performance, reinvests Biosphere 2 with its deserved mystery and aura of otherworldly difference. To experience *Biospheria* is to descend safely into the visionary insanity of the utopian community/cult, albeit for just one pleasant afternoon rather than an exhausting two years. ♦

*Jennie Klein has more appreciation for Biosphere 2 now than she did when it was actually happening.*

#### Footnotes:

<sup>1</sup> A. Toufexis and A. Dorfman, "The Wizards of Hokum," *Time*, September 30, 1991, 66.

<sup>2</sup> Marc Cooper, "Take this Terrarium and Shove It," *Village Voice*, April 4, 1991, quoted in Scott Veggeberg, "Biosphere's image: rise, fall, and rehabilitation," in *21st Century Metanews*, an internet publication. See also Cooper's article for the *Village Voice* in 1993 titled "When the Bubble Bursts."

<sup>3</sup> Much of my information on Biosphere 2 comes from the following sources: Scott LaFee, "UCSD grad students' to premiere environmental opera *Biospheria*," *San Diego Union Tribune*, March 7, 2001; "Biosphere 2: An Experiment in an Enclosed Environ (sic)," [www.totse.com/en/technology/science\\_technology/biospher.html](http://www.totse.com/en/technology/science_technology/biospher.html), accessed on February 12, 2002; an interview I conducted with Barbara Smith on February 3, 2002; and Constance Penley's reading of the meaning of Biosphere 2 as part of the panel discussion "Cultivating Utopia," held March 10, 2001 at the University of California, San Diego.

<sup>4</sup> Joseph Alper, "Biosphere 2: Out of Oxygen," [www.chemistry.org](http://www.chemistry.org), accessed on February 12, 2002. Dr. Roy Walford, one of the original eight Biospherians, has subsequently been diagnosed with Lou Gehrig's disease (ALS), which he attributes to the oxygen deprivation that he suffered while inside Biosphere 2.

<sup>5</sup> My information about this performance comes from Ames Hall, "The 21st Century Odyssey: Barbara T. Smith, Dr. Roy Walford, and Biosphere 2," *Pform* 32, Summer 1994, 4-8.

<sup>6</sup> Steve Ausbury, email to the author dated April 9, 2001.

<sup>7</sup> The Biospherians also read *The Dramatic Universe* by J.G. Bennet and *The Territorial Imperative* by Robert Ardrey, as well as Buckminster Fuller's *Spaceship Earth*.

<sup>8</sup> The authors of the libretto are Coco McPherson, Billy Lux, Cynthia Farar, Nancy Reilly-Mevittie, Constance Penley, and Gil Bios.

<sup>9</sup> Constance Penley, *Nasa/Trek: Popular Science and Sex in America* (London: Verso, 1997), 9-10.