

## **Image and Imagination: The Formation of Global Environmental Consciousness**

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As the mood of the West turned retrospective and millennial in the final years of the 20th century, it became clear that the images by which western societies were defining the meaning of this stretch of history had shifted their form and emphasis — from pictures of division and conflict for the first three-quarters of the century to those of interconnectedness at its end. War and destruction dominate the frames through which we look at the most of the past hundred years: the disjointed march of troops from nowhere to nowhere on the battlefields of the Great War, the emaciated bodies and charred cities of the second and wider World War, the eruptions of American firepower in the fields and villages of Vietnam, and the mass evacuations that presaged the killing fields of Cambodia. These images have not faded from our collective consciousness. Rather, they have gained secondary and tertiary currency through the commemorative efforts of contemporary historians, novelists, filmmakers, and museologists, all intent, it seems, on finding at this emotionally charged calendrical moment the appropriate visual languages to memorialize the century's vast conflicts.<sup>1</sup> One need think only of the controversies surrounding the US. Vietnam memorial and their resolution through Maya Lin's inspired and reflective roll-call of names, the attack against perceived revisionism in the *Enola Gay* exhibit at the U.S. National Air and Space Museum (Harwit 1996), Stephen Spielberg's embrace of black-and-white cinematography in his 1993 opus *Schindler's List*, and the lengthy, emotional debates about how best to commemorate the Holocaust in Berlin, the once and future capital of reunified Germany.

Sometime during the last three decades of the century, however, images of connection, of dissolving boundaries, began to supplement, and at times crowd out, division in our visual and imaginative space. President Richard Nixon's controversial visit to China in 1972 was perhaps a starting point, providing compelling television footage of one of the world's most committed cold warriors visiting the shrines and monuments of the very nation he had fought so doggedly to isolate from communication with the West. The watershed year of 1989 brought additional stirring images, with the fall of the Berlin wall on November 9 signaling the official end of bipolar tensions and, to some, even "the end of history" (Fukuyama 1992). And on January 1, 1999, months before war-torn Kosovo gripped the television screens, the pictures of a new common currency, the Euro — as yet available only in virtual form — made concrete the extraordinary, voluntary ceding of sovereignty through which eleven European nations sought to erase the scars and trenches of the two world wars that had split their continent.<sup>2</sup>

One image perhaps more than any other has come to symbolize the western world's heightened perceptions of connectedness at the end of the millennium: that of the earth suspended in a void, captured by the cameras of the U.S. space program beginning with the Lunar Orbiter in 1966 and culminating with *Apollo 17*, the last mission to land men on the moon.<sup>3</sup> The image confronts Americans today at every turn, from the revolving globe used as a background for so many televised, and now networked, news programs to the logo that wordlessly asserts the global reach of credit cards, airlines, automobile manufacturers, telephone companies, bookstores, academic programs, and virtually every other product or service that travels. It is also an image that catches the spirit of contemporary environmentalism, one of late modernity's signature social movements. The picture of the earth hanging in space not only renders visible and immediate the object of environmentalists' concern, but it resonates with the themes of finiteness and fragility, and of human dependence on the biosphere, that have provided the

chief impetus for environmental mobilization since the 1960s. It is as well a deeply political image, subordinating as it does the notional boundaries of sovereign power in favor of swirling clouds that do not respect the lines configured by human conquest or legislation. It is in this respect a fitting emblem of western environmentalism's transnational ambitions.

While many have pointed to the image of Earth from space as an artifact that fundamentally altered human consciousness, there has been no systematic attempt to explore how, when or to what extent such a transformation occurred, let alone how this potent visual resource interacted with other, more commonly recognized political forces (for example, scientific knowledge, economic interests or hegemonic power) in the formation of shared environmental awareness. There are several reasons why it is important to fill this gap. To begin with, the televised distribution of standardized visual symbols, and visual language more generally, is creating a global communicative resource whose political implications demand closer exploration. Images may transcend cultural lines in ways that words cannot, thereby helping to create communities of meaning and shared responses or demands that cut across ordinary linguistic and governmental divides. More generally, there is growing interest in the social sciences in the power of visual representation to sway both belief and action (Scott 1998). Sight moreover, like any sense, is now seen as something that has to be manipulated and disciplined in order for people in the aggregate to see things in the same ways.<sup>4</sup> The politics involved in constructing common vision has accordingly begun to draw attention.

This chapter, then, is a study of the reception of the image of planet earth in American and, through U.S. mediation, international environmental politics. At a theoretical level, this project can be seen as contributing to the interpretive turn in international relations theory by attempting to understand better the role of ideas in promoting transnational cooperation and conflict (Keohane 1988; Haggard

and Simmons 1987; Haas 1990; Litfin 1994). More specifically, it extends earlier work on epistemic communities by probing, within visual culture, one possible source of shared beliefs about the environment.<sup>5</sup> At the same time, the project also fits comfortably into the core research agenda of science and technology studies: it explores the creation of new knowledge about nature and its diffusion to varied audiences through technologically mediated visual representations.<sup>6</sup> The chapter's organization reflects these paired objectives. I begin by reviewing major strands in international relations theory and science and technology studies that deal with image-making and its power to foster shared social and political awareness. I then successively discuss the emergence of earth-consciousness in postwar politics, the early history of responses to the image of planet Earth, and its later thematization and uptake in the discourses of risk, politics, economics, and ethics. The chapter ends with reflections on the merits of the planetary image as a resource for global action to protect the environment.

### **Common Vision, Concerted Action**

What makes people from different societies and cultures believe that they should act to further common goals, even if these goals require them to sacrifice or postpone perceived economic and social interests? In a world in which political will has classically been exercised through national institutions, how can we account for the rise of transnational coalitions, such as the contemporary environmental movement, that seem to articulate their objectives in defiance of the positions of nation states? How, more generally, do people form commitments to collective action on a global scale, and from where do they derive notions of an international common good that are strong enough to override the intense but parochial pull of national self-interest?

A promising place from which to begin addressing these questions is Benedict Anderson's seminal work, *Imagined Communities* (1983), which sought to explain how nationality became modernity's most compelling social identifier. Why, Anderson asked, has nationality proved to be such a peculiarly robust form of ideology, resisting for instance Marxism's brave attempts to reclassify world politics in terms of shared class allegiances? Why are people willing to go to war, courting death in defense of nationhood, and why do they agree to do this even when, as in the case of Indonesia, the entity that commands their loyalty is a loosely connected string of islands with no reasonable claims to linguistic or cultural unity? Rejecting geographical determinism as inadequate, Anderson defined the nation as "an imagined political community — and imagined as both inherently limited and sovereign" (1983, 2d ed., 6). The move from physical to imagined demarcations proved to be intensely liberating to theoreticians of the state. Anderson and his many followers were able to probe the mechanisms by which people come to think that they belong to something so invisibly put together as a nation, and which, in short, endow the concept of nationhood with meaning. The turn to "imagined communities" made it possible to encompass within a single theoretical frame such disparate manifestations of nationhood as Austria-Hungary, Indonesia, and the ultimately failed construct of post-partition Pakistan, its brackets not firmly enough welded through a shared Islamic faith to withstand the fissiparous force of intervening Hindu India.

Print capitalism plays a central role in Anderson's story of nationalism. Newspapers, he argued, exerted a profound pull on social imagination, making it possible for people in far-flung places to read about and react to the same events at the same time. The printed page became the instrument through which people who previously had no connection with each other could now *imagine* that they were part of a single community, experiencing and participating in a single national drama. Readers were bound

together by the newspaper's inbuilt clock, which inexorably marked off the days (and, through morning and evening papers, even times of days), juxtaposed happenings from around the world in a collage of adventitiously related events, and rendered them obsolete the very next day with another collection of stories, equally random though united by the same seemingly inevitable logic.

Anderson originally ascribed to the controllers of the printed page an almost unlimited capacity to mobilize nationalism, but in the book's second edition he added a chapter, more Foucauldian in inspiration, on three other institutions of power — the census, the map, and the museum — through which modern states have tried to discipline their citizens' nationalistic imaginations. Through these institutions, enterprising states could manufacture or erase boundaries and histories, connections and divisions. A telling exercise in image-making occurred at the fifteenth anniversary celebration of Cambodia's independence in November 1968, in honor of which

Norodom Sihanouk had a large wood and papier-maché replica of the great Bayon temple of Angkor displayed in the national sports stadium in Phnom Penh. The replica was exceptionally coarse and crude, but it served its purpose — instant recognizability via a history of colonial-era logoization. 'Ah, our Bayon' — but with the memory of French colonial restorers wholly banished. French-reconstructed Angkor Wat, again in 'jigsaw' form, became...the central symbol of the successive flags of Sihanouk's royalist, Lon Nol's militarist, and Pol Pot's Jacobin regimes (Anderson 1983, 2d ed., 183).

Nationalism as "logoization," imagination overwritten by image-making — all possible, so Anderson argued, through a means of production that permitted images to be removed from context, made infinitely reproducible, and so implanted in people's minds as seedlings of national fellow-feeling.

This account of political community-building strikingly resonates with recent work in science and technology studies that attempts to explain how scientific representations of the natural world acquire a hold on people's beliefs. No one perhaps has done more to illuminate this process than Bruno Latour, the French ethnographer and philosopher of science, for whom the investigation of scientific knowledge

in the making has long been coterminous with trying to understand what gives scientific images and inscriptions their special persuasive power (Latour and Woolgar 1979). In one of his best known expositions of the subject, Latour argues that the difference between “savage,” or prescientific, and “civilized,” or scientific, knowledge lies not so much in how people perceive reality but in the ability of modern science to *circulate* its perceptions by rendering them “mobile, flat, reproducible, still, and of varying scales” (Latour 1990, 45). Latour called the resulting inscriptions “immutable mobiles” because — unlike the *objects* that science observes (countries, planets, microbes) — *representations* of them (maps, photographic plates, Petri dishes) can move around in fixed forms created by the exertions of scientists.

To this point, there is a startling family resemblance between Anderson’s logoized nations and Latour’s immobilized inscriptions: both move, both can be mobilized, both are torn away from the specific circumstances of their production, gaining greater power through this erasure of history and context. Yet, the two writers are profoundly at odds in their understanding of the forces that create mobility. For Anderson, capital is the prime mover. Without its support, states could not control the printing presses that produce the maps and images that impress themselves, in turn, on the awaiting minds of proto-nationalist citizens. Latour turns this argument on its head, insisting that it is the mundane craftsmanship of visualization that moves things and people, and so gives rise to power. In passages that read almost as if they were written to counter Anderson, or equally Foucault, Latour says that we continually misunderstand the relationship between science and power

because we take for granted that there exist, somewhere in society, macroactors that naturally dominate the scene: Corporation, State, Productive Forces, Cultures, Imperialism, “Mentalités,” etc..... Far from being the key to the understanding of science and technology, these entities are the very things a new understanding of science and technology should explain. The large-scale actors to which sociologists of science are keen to attach “interests” are immaterial in practice so long as precise mechanisms to explain their origin or extraction and their changes of scale have not been proposed (1990, 56-57).

“Capitalism,” for Latour then becomes a special case of accumulation — that of money:

Thus capitalism is not to be used to explain the evolution of science and technology. It seems to me that it should be quite the contrary. Once science and technology are rephrased in terms of immutable mobiles it might be possible to explain economic capitalism as another process of mobilization and conscription (1990, 59).

Latour’s commitment therefore is to elaborating the details of scientific practice (not, characteristically, of science funding), the workaday routines of sampling and observation, recording and classification through which an entire Amazonian forest, for example, can be transformed into a tractable, movable catalogue of soil types and plant varieties, and ultimately even a theory of causation to explain whether the forest is advancing or retreating (Latour 1995).

Does the aggregated power of money control the technologies of representation, which then function as levers of ideology? Or does mastery of the craftwork of representation cumulatively give rise to power, lodged in “centers of calculation” (another catchy Latourian phrase; Latour 1990, 59) that in effect *make* the world by circulating particular interpretations of it? Or is the relationship between image and imagination altogether more complex, requiring visual stimuli to resonate with cultures of interpretation that help define their ultimate meanings in time and place? Let us turn to an actual case. In this chapter we will investigate more exactly how a single image, that of planet Earth, became an inhabitant of western consciousness and an icon, more particularly, of U.S. environmentalism. In doing so, we will not (following a typically Latourian program) seek to retrace the networks of rocket and satellite production, nor the labyrinths of the military-industrial establishment, that importantly enabled the making of the original image. Rather, we will focus principally on a later story, that of the image’s transmission, uptake, and interpretation within disparate communities of discourse and action.<sup>7</sup> Unlike Anderson and Latour, both of whom link their studies of power primarily to image-making and circulation, I aim to

look more closely at the imagination of the viewers – and the self-conscious consumers – of this potent symbol of human and natural interconnectedness.

### **Viewing Planet Earth**

American commentators have frequently written of the transforming impact of the picture of Earth suspended in space, as captured on film by successive *Apollo* mission astronauts. The late astronomer Carl Sagan, whose televised program *Cosmos* won him something akin to cult status in the 1980s, was one of those who helped to popularize this theme:

While almost everyone is taught that the Earth is a sphere with all of us somehow glued to it by gravity, the reality of our circumstance did not really begin to sink in until the famous frame-filling *Apollo* photograph of the whole Earth – the one taken by the *Apollo 17* astronauts on the last journey of humans to the Moon (Sagan 1994, 5).

Sagan selected a particular image as his icon, the one that shows earth in the round, with no clouds concealing the (to a mapping culture) readily imaginable outlines of states in Arabia and the horn of Africa.<sup>8</sup>

Environmentalists as a rule are inclined to agree with Sagan’s judgment about the importance of that image. Writing in 1990, the ecologist Daniel Botkin said:

It is more than 20 years since the phrase “spaceship Earth” was coined and made popular and 20 years since the Apollo astronauts took this famous photograph of the Earth from space — a blue globe, enveloped by swirling white clouds, against a black background — creating an image of a small island of life floating in an ocean of empty space (Botkin 1990, 5).

A remarkably similar point was made some years earlier by the World Commission on Environment and Development (WCED) in its influential report, *Our Common Future*:

In the middle of the 20th century, we saw our planet from space for the first time. Historians may eventually find that this vision had a greater impact on thought than did the Copernican revolution of the 16th century, which upset humans’ self-image by revealing that the Earth is not the centre of the universe. From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity’s inability

to fit its activities into that pattern is changing planetary systems fundamentally (World Commission on Environment and Development 1987, 308).

The idea of a “scientific revolution” held particular appeal for others who commented on the *Apollo* picture. Laurence Tribe, a one-time critic of technology’s instrumental rationality and later a constitutional scholar at Harvard Law School, remarked that this image — “the earth as a dramatically finite and surprisingly delicate blue-green globe” (Tribe 1973, 620) — had ushered us toward “the fourth discontinuity.” This was a moment that displaced the human ego by making it conscious of the physical limitations of the place it inhabits. This decentering effect, Tribe and others have said, was on a par with three great intellectual discontinuities of the past: the Copernican revolution, which displaced the earth from the center of the universe; the Darwinian revolution, which displaced human beings from the pinnacle of the tree of creation; and the Freudian revolution, which exposed the workings of the unconscious mind and made humankind aware that we are not, after all, masters in our own house.

Continuing the theme of scientific revolutions, some suggested that the picture of our lonely planet brought about nothing less than a paradigm shift in ways of thinking about how the world works. Lynton Caldwell, a leading figure in the new environmentalism of the 1970s, explicitly took this position:

[T]he change from the belief that the sun, moon, and stars revolved around the earth to the Copernican view of the earth’s place in the solar system was a paradigm shift. The change marked by [the aftermath of *Apollo*] is from the view of an earth unlimited in abundance and created for man’s exclusive use to a concept of the earth as a domain of life or biosphere for which mankind is a temporary resident custodian...The newer view sees it as an ultimately unified system...that may supply man’s needs as long as he observes the system’s rules (Caldwell 1990, 21).

Elsewhere, Caldwell linked the image to the internationalization of environmental policy:

The first landing on the moon on 20 July 1969 and pictures of the Earth from outer space brought to many people a realization that their environment had many of the characteristics of a closed system. “Spaceship Earth” became a metaphor, and “Only One earth” was the motto of the 1972 United Nations Conference on the Human Environment (Caldwell 1992, 67).

Another author, Joseph Campbell, suggested that the making and broadcasting of the *Apollo 17* trip had “transformed, deepened, and extended human consciousness to a degree and in a manner that amount to the opening of a new spiritual era.” (Campbell 1972).

All these observations credit the earth image with inducing a sudden, radical, and far-ranging shift in political consciousness, as human beings redefined their understanding of what it means to live together on the earth. But the widespread acceptance of this reading by environmentalists runs counter to much of what we know about cultural responses to imagery. Whether in the history of science or in the history of art, it seems that images become persuasive only when ways of looking at them have been carefully prepared in advance, through the creation of a stylized visual idiom or an interpretive tradition that knows how to respond to particular types of images (see for example Jones and Galison 1998; Alpers 1983). The meaning of pictures is inseparable from the context that supplies the idioms of interpretation. What, then, were the historical, political, and cultural circumstances in which the vision of Planet Earth acquired its now-canonical readings? Did the image give rise to demonstrably new forms of understanding about the environment and associated concepts of governance, or did it simply reinforce older habits and patterns of political association?

### **Narrative Traditions**

Many of the themes invoked in connection with the *Apollo* image predated the photographs that gave them unforgettable embodiment. In particular, themes of the earth’s finiteness, its fragility, its limited resources, the interconnectedness of its physical and biological systems, and the flimsiness of its geopolitical boundaries were all current in Western thought and writing well before the astronauts of *Apollo 17* brought back the most famous picture of the floating planet. Thus, the maverick American engineer and

inventor, R. Buckminster Fuller (1969), who prided himself on viewing the earth before there were astronauts, coined the term *Spaceship Earth* to describe humanity's flight on a superbly designed, self-contained vehicle lacking only an intelligible operating manual.<sup>9</sup> The metaphor quickly became popular in enlightened political circles. The influential British economist and environmentalist Barbara Ward (1966; see also Ward and Dubos 1972) borrowed Fuller's term, finding it a congenial hook on which to hang her own ideas about sustainable development and the need for global redistribution of wealth. Ward's friend and philosophical ally, the noted liberal Democrat Adlai Stevenson, then U.S. Ambassador to the United Nations, observed in a speech before the UN Economic and Social Council in July 1965, "We travel together, passengers on a little spaceship, dependent on its vulnerable resources of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work and, I will say, the love we give our fragile craft."

Although Fuller and others spoke of earth as a spaceship, it was the University of Michigan economist Kenneth Boulding who explicitly connected the planet's roundness with a global imagination of the environmental predicament (1966, 3-14). Air travel, Boulding observed, had begun to accustom people since World War II with "the notion of the spherical earth and a closed sphere of human activity" (1966, 3).<sup>10</sup> The sense of the planet as an enclosed system had gradually replaced the image of the frontier, with its wide open spaces and promise of endless resources. The new era, Boulding argued, would require a new kind of economic discipline: a "spaceman economy," in which "man must find his place in a cyclical ecological system," replacing the earlier "cowboy economy," which countenanced "reckless, exploitative, romantic, and violent behavior," especially with respect to resource consumption (1966, 9).

Others, too, had begun to note that the triad of population, consumption, and pollution might place irreversible stresses on the planet's health. Among the earliest and most influential voices in the United States was that of Rachel Carson, whose 1962 book *Silent Spring* offered a part-scientific, part-elegiac exposition of how the indiscriminate use of chemical pesticides was silencing bird populations throughout North America and gravely threatening all earthly life (Carson 1962). The Club of Rome, a prestigious association of scientists and intellectuals, went further. Using newly developed techniques of computer modeling, its controversial report, *The Limits to Growth*, predicted a sudden and drastic collapse of the earth's economic, social, and environmental systems (Meadows et al., 1972). Despite many methodological criticisms, the report's catastrophist vision persisted as one of the enduring themes of modern environmentalism (Cotgrove 1982; Ashley 1983; Bloomfield 1986).

Perceptions of the earth as a closed system inspired less calamitous scientific stories as well. Most widely discussed perhaps is the so-called Gaia hypothesis, originated in the early 1970s by James Lovelock, a physicist working for the National Aeronautics and Space Administration (NASA), and further developed with Lynn Margulis, a microbiologist known for her theory of the origins of eukaryotic cells. Versions of the hypothesis range from a weak (and uncontroversial) form that merely posits complex linkages between biological and non-biological activity at the earth's surface to stronger claims that the earth's atmosphere maintains a steady state for the express purpose of sustaining life, and that biological organisms actively manipulate their environment to this end (Lovelock 1979; Margulis and Lovelock 1976; Schneider 1991). It is not the truth or theoretical coherence of Lovelock's and Margulis' scientific ideas that is significant for our purposes, but rather their integrative, planetary vision. An outgrowth of NASA's interest in the possible existence of life on Mars, the Gaia hypothesis illustrates how the technology of space exploration fostered a global science of biogeochemical interactions. Even

before the space age allowed humanity actually to look earth in the face, scientific imaginations were constructing narratives on a global scale about what was happening at the earth-atmosphere interface.

If the conquest of flight ushered in an age of environmental claustrophobia, it also made geopolitical divisions seem more vulnerable. By the late 1940s, the world's major powers were already arrayed into the sharp dualities of the Cold War. The earth as globe dominated the visual renditions of this new political dispensation. The standard view adopted by the superpowers looked down on the world from the North Pole. From this standpoint, image-makers were free to decide only how much of the southern hemisphere they would include in their field of vision. A 1947 report sponsored by the Council on Foreign Relations, for example, displayed the polar perspective as adapted from an official chart used by the U.S. Air Force. The map was cut off at the 30th parallel, showing the top of north Africa and fringes of Iran and India, but nothing at all of Latin America. "Strategists," the report observed, "term the area between the 30th and 65th parallels the key zone since all modern wars have started there" (Baldwin 1947). The same projection appears as a logo to this day on publications of Harvard University's Belfer Center for Science and International Affairs, an institution whose identity was molded during the Cold War. Image and imagination, still powerfully fused, deny the emergence of a more complex, less bipolar political order.

Yet, the implications of the global perspective have always been deeply ambiguous. The view from the pole could be read, on one hand, as an invitation to strengthen state sovereignty. A 1948 report by the President's Air Policy Commission took just this tack, using the polar projection to underscore the threat of aerial war. Surveying the world from a position near Point Barrow, Alaska, and looking 7000 miles along the earth's surface in all directions, the Commission graphically illustrated the emergence of "a new element through which this country may be attacked — the air." The report called

for a stronger air force as “the best conceivable defense” against air attack (President’s Air Policy Commission 1948). But the polar gaze equally supported messages of peaceful coexistence in the postwar world, as evidenced by the United Nations logo adopted in the same period. Although the North Pole again occupied the image’s center, no nation, however far from the central viewing point, was excluded from the UN’s encompassing vision. Even Australia appears outlined in full at the outer margins of the UN world.

Finally, no account of the interpretive conventions that have grown up around the earth image would be complete without the voices of the astronauts who saw as eyewitnesses what the rest of humanity experienced only through pictures and television. Unwitting seers, confronting a vision for which little in life had prepared them, these observers tell what it was like to see the earth before anyone else had appropriated the images. Some were stirred to uncharacteristic eloquence. William Anders, a member of the December 1968 *Apollo 8* mission which for the first time saw the earth whole, helped to set the tone for many later interpreters. Imagining the Earth as a “little Christmas-tree ornament against an infinite black backdrop of space,” Anders commented on its “fragility and finiteness”:

I find it somewhat ironic that we went up there for the moon, but probably it was the Earth and the perspective of it that most impressed hard-bitten test pilots like us — and I guess the rest of the world — the most. Because the pictures of the first Earthrise and the first full Earth floating in space, I think, have been a major contribution in helping people get a better feeling for the Earth’s place in our lives and in the universe. You realize that Earth is about as physically significant as one grain of sand on a beach. But it’s our only home (Folger et al. 1994).

One recognizes in Anders’ groping phrases some of the familiar strains of contemporary environmentalist discourse: fragility, finiteness, insignificance, the unavoidable dependence of human life on this planet (“our only home”). Yet, barely three-and-a-half years later, when NASA was winding up the first phase of lunar exploration, the “hard-bitten” edge was back, and some members of the *Apollo 17*

crew seemed able to take the spectacular earthscape for granted. Eugene Cernan records the following conversation with his fellow-traveler Harrison “Jack” Schmitt:

C: “Oh, man — Hey, Jack, just stop. You owe yourself 30 seconds to look up over the South Massif and look at the Earth.”

S: “What? The Earth?!”

C: “Just look up there.”

S: “Aaah! You’ve seen one Earth, you’ve seen them all” (Chaikin 1994).

If even astronauts on the moon could become so quickly inured to one of the 20th century’s grandest displays, then it hardly seems probable that the rest of humanity, preoccupied with innumerable local cares and conflicts, was drawn by the image to an all-new, enduring global eco-consciousness. Did its mere dissemination — as capitalist logo or scientific “immutable mobile” — compel people to re-imagine their political affiliations on a worldwide scale? Not so. As we shall see below, connections between the global image and an imagined global community evolved along more intricate pathways, as human actors and institutions strove in disparate ways to assimilate, or exploit, the photographic evidence of their common destiny. Associated shifts from local or national to global environmental thinking — although they *can* be documented — have been neither seamless nor smooth, but rather subtle, sporadic, partial, and unevenly distributed among the world’s political communities.

### **Varieties of Global Experience**

Global environmental consciousness, I am suggesting, did not coalesce all at once in response to a striking visual stimulus, but took shape gradually in diverse domains of social and political practice during the final decades of the 20th century. Strands of increasing global awareness can be traced in the discourses of risk, politics, commerce, and ethics. In each context, we observe a selective uptake of

themes prevalent in older narratives of earthwatching, but reinforced and given new persuasive power through association with the *Apollo* photographs.

### *Framing Risks Globally*

Most observers of American environmental politics agree that something happened to alter its character in the decade roughly marked by the publication of *Silent Spring* in 1962 and the celebration of the first Earth Day, a nationwide event involving some 300,000 citizens, on April 21, 1970. Often termed the “new environmentalism,” the movement born in this period of ferment diverged from earlier forms of environmental activism in its focus on people and their habitats rather than on the preservation of nature for its own sake. It was founded, according to one analyst, on “a broader conception of the place of man in the biosphere, a more sophisticated understanding of that relationship, and a note of crisis that was greater and broader than it had been in the earlier conservation movement” (McCormick 1989, 48).

Its targets, however, were initially local. They concerned first and foremost the effects of pollution on common people’s homes and lives. Rachel Carson’s ground-breaking vision, as noted earlier, took as its central theme the harms caused by pervasive use of chemical pesticides. Although she imagined a whole world deprived of birdsong (her book began with a fable of poisoned landscapes and dying animals and vegetation), some of her most telling vignettes involved ordinary citizens reporting on changes in their immediate surroundings: the disappearance of robins in one town, the decimation of swallows in another. These local insults added up to a problem of concededly national proportions. In 1970, President Nixon ordered the creation of the Environmental Protection Agency largely on the ground that a new organization was needed to coordinate a nationwide fight against pollution. But local

issues continued to predominate in environmental politics. In 1978, for example, toxic chemicals found in the basements of homes in the Love Canal area of Niagara Falls, New York precipitated an intense flurry of pollution-centered legislative and regulatory activity (see for example Levine 1982). This and similar episodes fueled the era's most powerful form of environmental mobilization, the NIMBY, a social movement whose tightly bounded, *local* imagination was synonymous with the slogan "not in my back yard." Chemical pollution of communities remained a guiding theme of U.S. environmentalism well into the 1980s.

It was not until the later 1980s that a wider conception of environmental protection began seeping into western consciousness. Almost imperceptibly, the causes and extent of environmental degradation (for example, deforestation, desertification, ozone depletion) began to be defined across political domains far larger than individual communities and even larger sometimes than nation states. Attention began to shift from end-of-pipe controls on specific polluting facilities to questions of prevention and lifestyle change. A new term — *sustainability* — came into common use, bridging what had previously seemed an irreconcilable contradiction between environmental protection and human development. Appropriately enough, the book that heralded this new era was not the work of a single author with a distinctively personal vision, but of an international committee, the World Commission on Environment and Development, chaired by Norway's prime minister Gro Harlem Brundtland. Both in its title and by explicit reference (as quoted above), *Our Common Future* conveyed, and helped crystallize, a sense of the human condition framed by the planetary image and global in its prescriptive scope. No longer would it be possible for environmental activism to direct its energies exclusively toward the invasion of individual backyards by chemical pollution.

*Global Environmental Politics*

From NIMBY to a global politics of the environment, however, was no easy step. The transition arguably began with the age of space exploration, but its progress is not as yet complete. That the earth image impels many observers to “think globally” has been apparent ever since the early commentaries of astronauts like William Anders. It is “as physically significant as one grain of sand,” Anders said, and yet “it is our only home.” In a perhaps self-conscious echo, the distinguished environmentalists Barbara Ward and Rene Dubos (1972) published a book with the title *Only One Earth*, which also became the official theme of the Stockholm conference on the environment held in the same year. Carl Sagan, in a later interpretation, reiterated the theme of insignificance while also giving the image an explicitly political spin:

We are too small and *our statecraft too feeble* to be seen by a spacecraft between the Earth and the Moon. From this vantage point, our obsession with nationalism is nowhere in evidence. The Apollo pictures of the whole Earth conveyed to multitudes something well known to astronomers: On the scale of worlds — to say nothing of stars or galaxies — humans are inconsequential, a thin film of life on an obscure and solitary lump of rock and metal (Sagan 1994, 5-6, emphasis added).

The World Commission on Environment and Development similarly juxtaposed the transitory geopolitical construction of the globe against an enduring ecological view: “From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils” (World Commission on Environment and Development 1987, 308).

While astronauts, astronomers, and international expert committees identified the earth image with coexistence and political interdependence, the use and enjoyment of environmental resources remained for many other actors tightly bound to national interests. A case in point was President Ronald Reagan’s emphatic and astonishing rejection of the draft Law of the Sea (LOS) convention following his

election in 1980. Here was an accord governing the oceans that had enjoyed bipartisan support in the Nixon, Ford, and Carter administrations and had seemed virtually ready for adoption by the late 1970s. It presented U.S. negotiators with an apparently uncomplicated trade-off: increased navigational freedom, simplifying and counteracting a patchwork of jurisdictional claims by coastal states, in return for a decrease in the right to mine seabed resources, including manganese nodules, which developing countries saw as “the common heritage of mankind” (Sebenius 1984). For those committed to the negotiation, the two issues were inextricably linked. Concession on seabed mining was deemed a necessary price for avoiding the expanding territorial ambitions of coastal states. Yet, as the negotiations went on for decades, fissures appeared in the U.S. position corresponding to changing perceptions of costs and benefits among some of the parties to the negotiation. American mining interests, in particular, came to believe that the draft treaty was penalizing them more than was warranted by corresponding gains on the side of navigation. As support crumbled for a comprehensive solution, combining navigation and mining, a new Republican administration began to think the unthinkable and pulled the U.S. out of the almost completed negotiations.

The fate of the LOS conference in the 1980s can be seen in retrospect as a triumph of persistent nationalist claims to global environmental resources over a nascent internationalist one. This point was well understood by Richard Darman, vice chairman of the U.S. delegation to the 1977 session of the third LOS conference and a perceptive participant-observer of the treaty process. In an article in *Foreign Affairs*, Darman argued that the conference was being driven, to the detriment of U.S. interests, both pragmatic and ideological, by a community of

internationalist lawyer-codifiers. The internationalists’ tendency to favor collective over individual action is combined with the codifiers’ tendency to wish to see the world in neat static terms. Above and beyond practical considerations, there is an aesthetic antipathy toward the “disas-

ter” of non-uniformity, and a general distrust of the possible benignness of self-regulating, dynamic processes (Darman 1978).

Darman conceded that foiling the internationalist vision of a single regime for navigational and seabed governance carried a risk. The oceans occupying two-thirds of the earth’s surface might be “carved up” along geopolitical lines in ways that would benefit developed countries over developing ones. This, in turn, would create a problem of equity that might affect U.S. strategic interests. But this issue, Darman urged, could be addressed on its own terms through mechanisms such as loan guarantees and technology transfer. International equity did not require the U.S. to recognize the oceans as the common property of humankind or to countenance the development of new international institutions whose mandates would inevitably erode national sovereignty. Equity problems, in other words, could be redressed without having to accept the case for global ownership or control of the oceans.

When the Clinton administration signed a revised LOS convention in July 1994, the official explanation declared a victory for free-market principles over objectionable centralized planning and for sovereignty over loss of national control. A government fact sheet on LOS posted on the World Wide Web notes that the United States has won a guaranteed seat on key committees, increased power to block adverse decisions, and credit for exploration already undertaken by American companies (U.S. Department of State, 1996). Clearly, framing the seas as an economic resource proved antithetical in this case to the emergence of transnational management institutions and a truly global politics of resource allocation.

A similar resurgence of national sovereignty can be observed under the Convention on Biological Diversity (CBD), even though this treaty, too, was initially conceived as an instrument for effectuating allegedly global environmental interests. By the late 1980s, alarm about rapid, worldwide extinctions of

species and associated activism by leading biologists had created a demand for international action to protect the earth's scarce biological resources (Takacs 1996). In response, the United Nations Environment Program (UNEP) initiated in 1988 a series of expert and intergovernmental deliberations with the aim of preparing a legal instrument for the conservation and sustainable use of biodiversity. Consistent with these goals, the convention sought to address economic and social concerns along with scientific ones. The experts convened by UNEP were asked to take into account "the need to share costs and benefits between developed and developing countries" as well as "ways and means to support innovation by local people."

The text of the CBD was adopted in Nairobi in May 1992 and opened for signature in June of the same year at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). It entered into force in December 1993, ninety days after the 30th ratification. From the beginning, however, international efforts to balance conservation against development, equity against economics, and global management against national sovereignty proved to be highly contentious. A test of the convention's attempted global framing of biodiversity arose in 1999 at a meeting in Cartagena, Colombia to approve an international biosafety protocol governing genetically modified organisms. Acrimony between developing countries and major grain exporters caused the meeting to break down without any agreement being reached. Once again, as in the case of LOS, environmentalism's global face succumbed to the pressure of nationally defined economic interests.

One of the few environmental regimes in which the political ideal of "one earth" arguably has come closer to fruition is that governing climate change (popularly better known as "global warming"). Here, there has been a convergence between the *scientific* construction of a problem that transcends national boundaries (see Miller, this volume) and a *normative* construction that recognizes the rights of

developing as well as developed countries to be protected against the worst consequences of greenhouse gas accumulation in the atmosphere. Even on the scientific side, considerable work was needed to define climate change as something other than the sum of local weather patterns, in other words, as a problem of “whole-earth” dimensions. Prerequisites included the formation of the Intergovernmental Panel on Climate Change and its hard-fought acquisition of credibility as a body capable of representing the best scientific judgment with respect to climate change. This evolutionary story stands markedly at odds with the conventionalized account of the earth image as herald and harbinger of a paradigm shift in environmental consciousness. The emergence of climate change as a global phenomenon, moreover, coincided, as we shall see below, with the appearance of an ethical discourse that had no precise analogue in the politics of either LOS or biodiversity.

#### *Commerce’s Global Ambition*

U.S. environmentalists were not alone in sizing up the symbolic potential of the earth image. The picture of the globe became almost an instant classic in the visual repertoire of advertising, at first retaining its connections to themes of environmental stewardship, but gradually shedding these in favor of something more like “universalism” or simply “global reach.” Commerce, environment, and the globe were first linked together in 1968 in the *Whole Earth Catalogue*, a entrepreneurial venture that both echoed and capitalized on the values of the new environmental movement. To this end, the *Catalogue’s* offerings emphasized environmental restoration, community building, simplicity, authenticity, and medical self-help. The cover picture showed the North American land mass almost entirely obstructed by a large white cloud; below appeared the caption “THE UNIVERSE: from planet Earth on a sunny day.” Supplements published over the next five years all carried the same picture on the cover, accompanied by

the same message. A new version planned for the millennium continues several themes of the late 1960s. Consumers are still offered “tools for producing knowledge, reporting and broadcasting the news as you see it, and creating communities according to your own values and ideals” (Rheingold, 1994).

Contemporary advertisers of services and products seldom link globality so explicitly to messages about environment-friendly lifestyles. Instead, the planetary symbol tends to stress the deployer’s capacity to move people and products (and, in the case of television, images) effortlessly around the globe. Not surprisingly, the picture has become a primary logo for CNN, the cable news service that built its empire by bringing viewers face-to-face with events happening in the furthest reaches of the earth — an immediacy that is equally prized in the White House and in the headquarters of some of the U.S.’s most intransigent enemies. Not only for CNN but for many other advertisers, it is the shrinking of time and distance between the consumer and the object of consumption that has become the image’s most significant message.

Advertising texts also underscore the infinite interpretive flexibility of an image that has achieved iconic status throughout western culture. Just as the Mona Lisa, the world’s most famous painting, has been adapted, interpreted, and sometimes subverted, to suit every taste,<sup>11</sup> so too the planet’s portrait has been manipulated in varied ways to create a universally accessible visual counterpoint to messages of persuasion and seduction. One commonplace strategy is to focus on that part of the globe upon which the advertiser’s commercial activities are specifically targeted. Another is to superimpose the image on something else — for example, a burning, spherical candle or a pair of clasped hands — thereby hybridizing the instantly comprehensible sign of global interconnection with other, less compelling messages (energy crisis, regional business partnerships, company logos, and the like).

Pictures like these do not claim the power of direct representation, the seemingly literal transcription of a new reality celebrated by environmental writers and scientists. Consider, once again, Sagan's evocative reading of the *Apollo 17* image, in which he first zoomed in on its dense, geopolitical meanings before pulling back (as noted above) to a more abstracted, apolitical gaze:

There's Antarctica at what Americans and Europeans so readily regard as the bottom, and then all of Africa stretching up above it: You can see Ethiopia, Tanzania, and Kenya, where the earliest humans lived. At top right are Saudi Arabia and what Europeans call the Near East. Just barely peeking out at the top is the Mediterranean Sea, around which so much of our global civilization emerged. You can make out the blue of the ocean, the yellow-red of the Sahara and the Arabian desert, the brown-green of forest and grassland (Sagan 1994, 5).

In commercial discourse, by contrast, Earth has no such fixed, human-made coordinates. It is, as often as not, a dream image, as in an advertisement for Thai Airways, which shows an incredibly remote planet held by a pair of silvery tongs against a background of deep purple, the advertiser's signature color. Through their very ubiquity, however, these modified pictures reinforce the value of the underlying "original" image as a common cultural resource; they appear and disappear as figments of our common imagination, even as they cater to our culturally conditioned desires.

### *A Planetary Ethics*

Modern environmentalism includes at its core a widely acknowledged, if only imperfectly realized, ethical imperative to renegotiate human beings' relationship with nature in the light of new scientific understandings. More than a generation ago, Boulding observed in his article on Spaceship Earth that we were as yet "very far from having made the moral, political, and psychological adjustments which are implied in [the] transition from the illimitable plane to the closed sphere" (Boulding 1966, 4). Now, more than two decades after the first landing on the moon and the first photographic portrayals of the earth from space, it is possible to identify at least three strains of ethical discourse that appear specifi-

cally to derive their force from a global, as opposed to a national or local, framing of humanity's environmental predicament.

The first is a gradual extension of the precautionary principle into transnational environmental policy. This legal precept originated in German law as one of five fundamental principles governing environmental decisions. Briefly stated, the precautionary principle asks for restraint on human activities that could harm the environment when there is insufficient evidence to determine for sure whether such harm will occur. American environmental law has opted on the whole for a seemingly more pragmatic, risk-based approach that allows development to proceed when the benefits are calculated to exceed the costs.<sup>12</sup>

With respect to environmental hazards of global scope, however, the utilitarian calculus of risks and benefits is harder to sustain than in the context of localized pollution problems from a waste dump or chemical factory. Uncertainties loom larger, and, within the contested frameworks of global politics, practices of analysis and reassurance cannot be as readily stabilized through well-worn channels of expert deliberation. The result has been to introduce what some international theorists have termed a "bias shift" away from problem-solving toward a set of actions geared more toward prevention (Ruggie 1986). For example, as Karen Litfin has argued, the Montreal accord on the control of ozone-depleting substances would not have adopted nearly so stringent a set of targets had it not been for the discovery of the Antarctic ozone hole, which atmospheric science had not predicted and which had no obvious non-anthropogenic explanation (Litfin 1994).

The second strand of an emergent global ethical discourse centers on the idea of sustainability and more specifically on concepts of stewardship for future generations. The World Commission on Environment and Development built the norm of stewardship into its very definition of sustainability in

*Our Common Future*, endorsing only those patterns of development that would leave future generations no worse off than their forebears in the present. Lynton Caldwell, for one, explicitly ties this shift to the *Apollo* image, which in his telling induced a move “from the view of an earth unlimited in abundance and created for man’s exclusive use to a concept of the earth as a domain of life or biosphere for which mankind is a temporary resident custodian” (Caldwell 1990, 21). The elaboration of intergenerational ethics as a legal principle likewise rests on a recognition of “the planet” as the appropriate locus for sustainable environmental action. Edith Brown Weiss’ important treatise on the legal foundations of intergenerational ethics begins on a note familiar to all earthwatchers: “The human species inhabits a small, relatively new, and so far as we know, unique planet — Earth. It is also a fragile planet” (Weiss 1989).

The third ethical strand has to do with the obligations of the developed North to the developing South in matters of environmental policy. The recognition of such an obligation is not in itself new, as is evident from our earlier discussion of the Law of the Sea negotiations. Thus, even while espousing a position of unilateralism and national self-interest, Darman rejected the prospect of a highly inequitable regime for exploiting global seabed resources. Embedded within the discourse of rational choice, however, ethics became simply one more element to tote up along with other national interests, no more important in principle than the needs of the mining industry or of commercial shipping. Efforts to treat equity as a higher-order variable within LOS proved unsuccessful. Indeed, in his analysis of the U.S. withdrawal from LOS, the negotiation theorist James Sebenius has argued that developing nations’ attempt to promote a supervening, *transnational* ethical discourse — that of the New International Economic Order (NIEO) — was a prime cause for the formation of a “blocking coalition” and the eventual breakdown of the conference (Sebenius 1991).

Claims about equity have received a more sympathetic hearing under regimes that have (unlike LOS and CBD) successfully constructed environmental problems on a supranational level, most notably ozone and climate change. Thus, an Indian environmental group, the Centre for Science and Environment, successfully deconstructed the tacit normative assumptions incorporated within early efforts to create objective measures of the “global warming potential” of greenhouse gases (Agarwal and Narain 1991). Perhaps more important, the very kinds of equity arguments that were rejected by Northern nations when put forward by the South under the label “NIEO” now seem to carry greater moral as well as political weight. Terms like “vulnerability” and “equity” have entered the language of global environmental accords. Both the ozone and climate change regimes explicitly recognize the special economic and ethical claims of developing nations through legal provisions ensuring delayed implementation, funding, and technology transfer. It is tempting to conclude that framing pieces of the natural world in global terms — such as the “ozone hole” and the “climate” — has facilitated an ethical discourse that also operates at the global level, without needing to be channeled through the older calculus of national interests.

### **Seeing Things Together**

The power of words to compel action has been a subject for philosophical and political analysis from Plato down to modern times. The power of images may be no less profound, especially in our era of mass visual communication, but it has yet to receive the same sustained scrutiny. My object in this essay has been to trace the complex pathways by which one image — that of planet Earth — has come to inhabit our political consciousness as an icon of global environmentalism.

A closer look at the image's reception suggests that its connections with environmental thought and action have been anything but straightforward. The picture, to begin with, picked up and reinforced themes of the earth's fragility and finiteness that had begun to percolate through policy discourses decades before the space age began. In this way, it may have subtly helped to shift the perception of environmental risk from issues of purely local scope to longer-term concerns for human survival. Yet, although it was appropriated early on to support arguments for global environmental governance (witness the "Only One Earth" theme of the 1972 Stockholm conference), such thinking failed to move entrenched national interests in resource management regimes ranging from seabed mining to the protection of biodiversity. The image's widespread exploitation by commercial enterprises has underscored its iconic properties but arguably blunted its moral and political message. Possibly the most important consequence to flow from the planetary image is the visual anchor it has provided for emerging, globally articulated ethical concepts, such as the precautionary principle, sustainability, and intergenerational equity.

Global stewardship remains nonetheless a deeply contested concept. Battles over the Law of the Sea and biodiversity throw into sharp relief some of the dangers that people around the world — from the South as well as the North — perceive in allowing environmental risks, and their control, to be globalized. The idea of international governance, especially in matters of natural resource management, carries for many the threatening specters of bureaucratic inflexibility, loss of sovereignty, and even new forms of colonial domination drawing their legitimacy from science. The planetary image, moreover, conveys a serene (some might say contemptuous) disregard for the day-to-day environmental insults suffered by billions of the world's poorest citizens: dirty air, polluted water, inadequate sanitation, infectious diseases, damaged crops, loss of green spaces, and the decay of built environments. Indeed, peo-

ple themselves are erased from this image of environmentalism, as in some of the darker fantasies of eco-fascism. As a dazzling offshoot of the 20th century's most destructive technological impulses, the photograph that preeminently symbolizes planetary togetherness ironically undermines its own authority in the eyes of skeptics. It promises an imagined community as encompassing as the earth itself, but is this a community in which those without the power to patrol the heavens, to map and perhaps to devastate the earth, can ever meaningfully participate?

I would like nevertheless to end this essay on a note of mild optimism. Seldom in the course of writing an academic paper have I encountered so much spontaneous interest among my conversation partners as in discussing the topic of this piece. Almost everyone I spoke with, it seemed, had his or her own favorite associations with the earth image; many admitted to possessing a variant of it on some prized but mundane object, such as a tee-shirt, a tote bag or a poster. If general circulation models and integrated assessments belong to the "high" scientific language of global environmentalism, then for most Americans the picture of planet Earth clearly belongs to its vernacular. It is not, if it ever was, an arcane "immutable mobile" which simply extends the dominance of instrumentally rational ways of perceiving the environment. Nor is it a decontextualized, impersonal logo through which an unscrupulous, hegemonic power can assert its reach across the globe. Thoroughly domesticated and sustaining multiple meanings, the image may, after all, rekindle an associationism through which America's too self-centered political culture can embrace in imagination those billions of others who also regard the earth as their only home.

## NOTES

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<sup>1</sup> For the appearance of memory as a major theme in historiography, see Nora 1987. On war and memory, see Fussell 1975 and Winter 1995. Representations of the two world wars multiplied in both high and popular culture in the last decades of the century, as exemplified by Michael Ondaatje's *The English Patient* (in both novel and film versions), Pat Barker's *Regeneration* trilogy, and Stephen Spielberg's *Schindler's List* and *Saving Private Ryan*. For a comparative account of attempts to memorialize World War II in Germany and Japan, see Buruma 1995.

<sup>2</sup> As of January 1999, only four (Britain, Denmark, Greece, Sweden) of fifteen members of the European Union had not joined the European Monetary Union.

<sup>3</sup> There are, in fact, a large number of pictures of the earth from space, as documented and archived by NASA's Johnson Space Program; these may be viewed at NASA's web site. The most famous (as discussed below) is the *Apollo 17* picture of the whole planet, showing the horn of Africa and Saudi Arabia. Its popularity can be attributed to several factors, including the size and fullness of the planet, the absence of clouds, and the clarity and color of the visible land masses. Like all of NASA's pictures, this one is not covered by copyright and can be downloaded from the web.

<sup>4</sup> For instance, in a courtroom, the jury's ability to see things is framed by the judge and discursively constituted by expert witnesses. See, in this regard, Goodwin 1994 (writing about the videotape in the Rodney King trial) and Jasanoff 1998.

<sup>5</sup> See, for example, Haas 1989, 1990. See also my own argument that political analysis needs to take more seriously the ways in which shared epistemes are created and achieve standing in the political realm, in Jasanoff 1996, 173-197.

<sup>6</sup> Representation has long been a topic of major interest in science and technology studies and there is a vast literature dealing with scientific representations in particular. For an introduction, see Lynch and Woolgar 1990.

<sup>7</sup> By focusing on *regimes* of interpretation, I do not mean to suggest that individual perceptions are unimportant. There is clearly interesting research to be done on ways in which people in varying national or social surroundings have made sense of the image of the earth. This type of ethnographic work, however, lies outside the scope of this paper.

<sup>8</sup> One can only speculate on the reasons for this particular choice. It is, as noted, one of the relatively few earth images that shows the full globe relatively unencumbered by clouds. It therefore conforms well to the ways in which cultures familiar for some five centuries with the artifacts of mapping, both spherical and two-dimensional, *expect* to see the earth.

<sup>9</sup> Fuller noted that few people actually sense themselves to be in a spaceship because most have seen only small portions of the earth's surface; even veteran pilots, he observed, had not viewed more than about one-hundredth of the earth. In a bow to Fuller, "Spaceship Earth" is the name given to the giant geosphere (a full rather than a half-sphere or geodesic dome) that marks the entrance to the Future World exhibit at Walt Disney World's Epcot Center in Florida.

<sup>10</sup> Boulding specifically contrasted the new visual perception of earth as a sphere with the earlier imaging of earth as "an illimitable cylinder, essentially a plane wrapped around a globe."

<sup>11</sup> "She has also been used to advertise cheese, oranges, gramophone needles, cigars and ladies' shoes in Italy, Spain, Holland and England. Her name is an unfailing password everywhere. The German post office has issued the painting on a stamp. At the same time, she has given rise to many iconoclastic manifestations on postcards or cartoons, but they were friendly jokes and could also be taken for tokens of admiration" (Ottino della Chiesa 1985, 105).

<sup>12</sup> To be sure, the precautionary principle also requires a balancing of caution against other desired policy objectives. Nonetheless, the principle's very framing places a greater emphasis on prevention than the discourse of risk analysis. For critiques of risk-based environmental regulation, see Winner 1986, 138-154, and Jasanoff 1999, forthcoming.

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