According to some powerful voices in American environmental politics, we live in the era of post-environmentalism. Michael Shellenberger and Ted Nordhaus’s *The Death of Environmentalism: Global Warming Politics in a Post-environmental World* (Shellenberger and Nordhaus, 2004), for example, has had a similar impact among American environmentalists to William Cronon’s 1995 essay, “The trouble with wilderness.” While Cronon introduced to American environmentalists the idea that their sacred ‘wilderness’, and indeed ‘nature’ itself, were socially constructed, Shellenberger and Nordhaus, together with former Sierra Club president and environmental activist Adam Werbach (2004), have extended Cronon’s provocation to include the ontological foundations of American environmental politics.

The ‘post-environmentalist’ argument was ably summarized by Werbach in a polemical 2004 speech “Is environmentalism dead?” delivered at the influential public affairs forum: the San Francisco Commonwealth Club. He claimed that the foundational categories with which the environmental movement has worked have inhibited its ability to consider opportunities outside narrowly conceived and bounded binaries. These environmentalist categories, he argued, are characteristically “Modern”: “a set of hierarchies: humans over nature, men over women, healthy over sick, reason over emotion, spirit over body, human over animal, and so on.” In his opinion, environmentalism did not so much subvert these modernist categories as invert them, or at best flatten them. By contrast, 21st-century thought seeks to transcend binary thinking and the categories associated with it. In summary, his argument is that environmentalism, as a language, an ideology, a set of practices, and network of institutions, can not deal with the most pressing ecological challenges facing the planet because it is so tightly bound to a rationality that reduces our worlds into these kinds of dyads. The moment we free ourselves from this modern way of thinking by creating a new language, a new set of strategic initiatives, a new

Images and imagination in 20th-century environmentalism:
from the Sierras to the Poles

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Abstract. Recent claims that the environmentalist thinking and politics that dominated the last years of the past century were based on outmoded, ‘Modernist’ categories jibe with academic criticism of dualistic thinking about ‘culture’ and ‘nature’, and with attempts to acknowledge the roles of nonhuman agency in the coconstruction of social worlds. While acknowledging the salience of these arguments, the author claims that examination of pictorial images that have shaped and promoted modern environmentalism complicate them. Pictorial images are less prone to dualistic interpretation than scientific and theoretical argument, and the affective responses they generate are complex. An examination of iconic images of key 20th-century environmental crises—wilderness preservation, soil erosion, urban sprawl, nuclear testing, and global environmental change—reveals both continuities in image making and presentation, and the evolving roles of physical nature itself in shaping their composition and meanings. Globalization of environmental concerns and images has shifted nature’s icons from landscape towards living species, and from a temperate to a tropical and polar geography.

According to some powerful voices in American environmental politics, we live in the era of post-environmentalism. Michael Shellenberger and Ted Nordhaus’s *The Death of Environmentalism: Global Warming Politics in a Post-environmental World* (Shellenberger and Nordhaus, 2004), for example, has had a similar impact among American environmentalists to William Cronon’s 1995 essay, “The trouble with wilderness.” While Cronon introduced to American environmentalists the idea that their sacred ‘wilderness’, and indeed ‘nature’ itself, were socially constructed, Shellenberger and Nordhaus, together with former Sierra Club president and environmental activist Adam Werbach (2004), have extended Cronon’s provocation to include the ontological foundations of American environmental politics.

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set of institutions, and a new metric for evaluating our success, we cease to be
‘environmentalists’ in any meaningful sense of the term and open ourselves up to
the possibility of becoming progressive Americans’ (Werbach, 2004).

Werbach’s polemic does not specify the routes whereby we may so ‘free ourselves’, nor
the alternative rationality that might underpin this new language, and he does not
spell out the political implications beyond recognizing that care for nature cannot be
separated from care for social justice. But his ideas clearly connect to a broader
philosophical movement that is similarly critical of ‘modernist’ thinking, and also
seeks nondualistic conceptual frameworks to meet the challenge of what the geog-
rapher Sarah Whatmore (2006) has called the “more-than-human world”. While
recognizing that all knowledge is culturally constructed, she asks us to embrace the
“livingness of the world [that] shifts the register of materiality from the indifferent stuff
of a world ‘out there’, articulated through notions of ‘land’, ‘nature’ or ‘environment’, to
the intimate fabric of corporeality that includes and redistributes the ‘in here’ of human
being.” Natural/nonhuman phenomena (organisms, materials, forces, etc) are active
agents in fabricating social events, while sensing human bodies engage with nature in
ways that are always more than purely cognitive. This insight, prompted in no small
measure by advances in microbiology, neurology, information technology, and nano-
technologies undermines the very notion of an ‘environment’ that can be set apart
in some way from the environed subject, and it brings the claims of Shellenberger,
Nordhaus, and Werbach into line with philosophers and scholars seeking to theorize
how humans and nonhumans cofabricate the world. Both groups thus seek to
conceptualize and engage across Modernism’s supposed ontological, epistemological,
and political divides. Twenty-first-century thinking seeks to replace stable taxonomies,
fixed boundaries, and essential identities with more flexible, hybrid, and permeable
categories actively generated through performance and practice (Szerszynski et al,
2003).

This paper does not directly engage the political aspects of the post-environmentalist
debate. I am more concerned to show how the shifts to which those politics are respond-
ing, and specifically the ‘decentering’ of the human subject, are not entirely absent from
the modern period itself; they do not spring unbidden either from theoretical reflection
or from the political failure of a Modernist, liberal project. Both theorists and activists
seem to me to pay insufficient attention to the role that imagination has always
played in connecting environmental theory and science to environmental politics, and
especially to the significance of pictorial images in popular environmentalism. Images
are not bounded by the conceptual binaries of which Modernist environmentalism
stands accused. I explore the role played by iconic environmental images in the 20th
century, the era of mass communication, when photojournalism, cinema, and television
consecutively propelled the pictorial image to the core of popular culture. I suggest that
the images I examine reveal historical and geographical shifts from a framed and
static—although not passive—rendering of external nature, dominated by forms
and landscape morphologies produced by deep time, to a more labile and active
nature, dominated by active life processes, in which organisms rather than landscapes
play the iconic roles. The acceleration of social and technological processes so often
associated with modernity is reflected in the way that nature itself is framed and
represented.

I open with some general observations about the nature and effects of pictorial
images, especially ‘environmental images’, before examining specific pictures of key
20th-century environmental issues. I end by reflecting on the implications of these shifts
in modes of representation for a changing environmentalist discourse.
Pictorial images

Like historians, scientists tend to elevate words and texts, figures and statistics over other modes of communication, paying less attention to the power and authority of pictorial images. (But see Stafford, 1991; 1994.) This is especially true of environmental work that takes legitimacy above all from ecological science. Pictorial images, often regarded within scientific discourse as secondary and illustrative rather than a primary source of knowledge, are nonlexical. While words can be attached to them, as in a strip cartoon or a map, or through a caption, and while it is possible to treat images as ‘texts’, pictorial images work differently from verbal, mathematical, or textual communication—and even poetry, although I do not discount the rhetorical power of these communicative media (Mitchell, 1995). The pictorial image veers towards the affective and sensuous rather than syllogistic and analytic, and in more than merely its aesthetic aspects. Further, the eye engages a picture as a whole, working across its surface in nonlinear (thus nonhistorical) fashion. And while pictorial conventions are learned and culturally specific, pictorial combinations of line, form, composition, color, and tone generate immediate sensual and aesthetic responses.

The affective role of vision is not uncomplicated. Pictorial conventions of framing and perspective rationalize space and distance the viewer from the object of vision (thereby reflecting and promoting a Cartesian distinction of subject and object) (Cosgrove, 1985; Rose, 1993). But in seeking to achieve the realist effect of ‘presence’ they also indicate a coproduction of the image that takes place at its surface, an actual engagement with the viewed object. Environmental images (for example, landscape paintings and photographs, maps and digital images, nature films and videos) can exemplify how the inanimate material object is an active agent in cofabricating the social world. They claim direct reference to the objects they represent and ask to be judged on their conformity with those objects. They cannot be separated into a purely semiotic realm.

Pictures and picture theory play a significant historical role in a Western environmentalism whose roots lie deep in the soil of European Romanticism (Bate, 1991; Buell, 1995; Harrison, 2006). Environmentalism’s affective ur-languages of the Beautiful, the Sublime, and the Picturesque were developed by 18th-century thinkers to explore the cofabrication of the world by natural and human agents in the arts of landscape: as critics such as Alexander Pope, Edmund Burke, and John Ruskin recognized. These thinkers recognized that landscape engaged the whole body moving through space, and that images of landscape simulated this engagement; they were more than merely objects of contemplation (Hunt, 1992). I refer to this tradition because the pictorial images that I shall be examining, each of which has had a significant impact on 20th-century popular environmentalism, owe their compositional and iconographic conventions of the landscape tradition, even when actively seeking to counter them. In landscape design—from William Kent in the early 18th century to Ian McHarg in the late 20th—such binary categories as human/natural, mind/matter, object/subject are combined and merged, and the making, circulation, and consumption of pictorial images cannot be divorced from an embodied engagement with the world.

I do not discount those features of 20th-century environmental images that were characteristically new: photography, film, flight, and mass circulation, for example, which reworked the Romantic landscape tradition. Photography was a 19th-century invention but it came of age as a vehicle for mass public education in the 20th century through the cheap snapshot camera and the moving film. Over the course of the 20th century the union of powered flight and photography produced distinctive ways of seeing and experiencing the earth in both plan and perspective, initially
through reproduction of the aerial view in photojournalism and panoramic sketches based on air photos, and later through the aerial movie, mass passenger air travel, and satellite and remote sensed images from space (Cosgrove and Fox, forthcoming).

To substantiate the argument, I have selected five significant moments in 20th-century American—and to some extent global—environmental concern and politics. I examine each of these through sets of widely reproduced images that were effective in shaping the way these moments were seen and understood. The events depicted are: early-20th-century nature preservation and the creation of national parks, the 1930s Dust Bowl and soil conservation, postwar suburbanization and fears over urban sprawl, 1950s atomic testing and framing the desert as wasteland, and the late-20th-century globalization of environmental changes and their effects on habitat. I have drawn significantly for some of the substantive materials on Finis Dunway’s (2005) study of 20th-century environmental photography.

Nature preservation and national parks

‘Nature protection’ characterizes the goals of early-20th-century environmentalism: national in scale, politically organized, and connected to other fin-du-siècle, modernizing reform movements such as universal suffrage and trades unionism. Whether protesting the plumage trade, protecting colonial hunting zones, or preserving Californian redwoods, nature protection reflected its historical context in combining nationalism and colonialism in a complex response to perceived ‘modern’ ills of industrialization, urbanization, and demographic change—often framed explicitly in relation to class and race (Cosgrove, 1995; Doughty, 1975; Neumann, 1998). In Great Britain, for example, nature protection drew upon nostalgia for village community, and a disappearing ‘rural England’ with its racially tinged ‘yeoman’ virtues, all viewed through the watery prism of John Constable’s landscapes (Daniels, 1993). German Naturpflege was tied to the idea of Heimatschutz, and by many to racial ideology (Brüggemeier et al, 2005). American nature protection combined post-Civil-War nationalism with Western territorial imperialism in the idea of sublime wilderness, largely imagined and promoted through landscape paintings and photographs made in the Rockies and California Sierras by artists such as Thomas Moran, Albert Bierstadt, and Eadweard Muybridge, and marketed commercially in the eastern cities (Scott, 2006). Each of these movements drew upon interpretations of Darwinism and, in conceptualizing nature, on the idea of deep time, contrasting the infinitely slow pace of evolution in nature with Modernity disturbing acceleration of social time (Kern, 2003).

The issue was most dramatically played out in California’s Sierra Nevada where resource exploitation’s weapons of capital and modern technology faced off against the timeless sublimity of the grandest natural scenery (Walker, 2001). The Yosemite Valley’s emergence as the poster landscape for nature protection was highly orchestrated. Within a decade of its ‘discovery’ by American troops in 1851 engaged in forcible concentration of native people into reservations, artists were promoting its wild and ‘natural’ beauty. In the mid-1860s Albert Bierstadt produced a series of dramatic landscape paintings, presenting Yosemite as a new Eden for a nation brutalized by civil war (figure 1). His huge oil paintings exhibited in eastern cities and their print reproductions, along with the works of many lesser artists who flocked to the valley, had by the mid-1870s already turned Yosemite into an intensely familiar national icon of wilderness America.

Bierstadt’s images focused either on the sublime effects of scale in individual elements such as the Merced River Falls, the Half Dome or El Capitan, or more commonly on panoramic sweeps of the glaciated valley. These adopted the scenic conventions of picturesque landscape inherited from European landscape art, framing
nature as a static stage set seen through lateral wings, with alternating bands of light and shadow leading the eye into the depth of the image, past landform markers to a hazy vanishing point. By the late 1860s the painters shared Yosemite with photographers, notably Eadweard Muybridge and Carleton Watkins, whose prints vied with the cheap engravings by Courier & Ives to disseminate the image of Yosemite into the homes of ordinary Americans. By the time John Muir began herding sheep in the valley, and guiding such eminent visitors as Ralph Waldo Emerson and Teddy Roosevelt through its scenic wonders, Yosemite was familiar to thousands from actual visits and millions through pictorial images in their parlors.

The idea of ‘protecting’ Yosemite as the paradigm American wilderness from the destructive demands of modernity was concurrent with its celebration as a natural and national icon. The valley lay at the heart of the Sierra’s gold-mining and forest-cutting region, and by 1900 its meadows were heavily grazed by shepherders, and its waters subject to the urban demands of San Francisco. John Muir’s battles against ranchers and engineers’ plans to flood Hetch Hetchy led to national park status in 1906 and became the reference point for struggles over wilderness protection throughout the 20th century. The most favored images of Yosemite today continue to embody both the pictorial conventions established over a century ago and the idea of timeless nature (Klett et al, 2005). These are the photographs by Ansel Adams, acolyte of John Muir and photographer for the Sierra Club that Muir founded. Adams’s images were commissioned for the Club’s Bulletin, beginning in the early 1930s. In the 1940s he made a series of panoramic shots of the valley, dramatizing the classic picturesque perspective in stark monochrome (figure 2). These were later explicitly selected by the Sierra Club Director and environmental activist David Brower for a series of high-quality coffee-table books produced between 1960 and 1970, by which time over one million visitors entered the park annually. Adams himself claimed at a 1961 Wilderness Conference that photographers had a special role to play in environmental reform,
and Brower’s Sierra Club books and related exhibitions were enormously influential in shaping 1960s American environmental attitudes (Dunway, 2005, pages 117–121).

The appeal of Adams’s photographs, like that of his predecessors’ work in Yosemite, is overwhelmingly poetic rather than rationalist or historical. Deep time and sublime nature are felt rather than hypothesized. But Yosemite, the paradigmatic if not the first national park, and the one that established the geographic, biotic, and scenic criteria for the great swaths of wilderness designated for the nation in the first decade of the 20th century, is neither a static work of nature nor a pure construction of nationalist ideology; it is a coproduction of nature, social action, and imagination. Glaciation determined the valley forms that so corresponded to picturesque scenic conventions: its flat bottom and striking verticality of rock and pine forests, while Native American land-management practices produced the grass meadows of its middle ground. But it took eyes trained in those conventions and hands skilled in the techniques for reproducing them to create Yosemite as a place, even if those human contributions are normally erased in the images itself. The iconic image of American wilderness that shaped American environmental ideas of nature protection during the 20th century was a coproduction in which both nature and humans acted as reciprocal agents, a fact increasingly acknowledged from the late 1960s when Brower’s Sierra Club coffee-table books began to attract criticism from a new generation of environmental activists for erasing process and history in favor of a timeless aesthetic of wilderness, for promoting preservation instead of an ecologically informed environmentalism, for focusing exclusively on aesthetically appealing landscapes, and for excluding rather than incorporating human agency in shaping environments.

The 1930s Dust Bowl and soil conservation

Three decades before these criticisms emerged, an alternative American environmentalism to wilderness preservation was evident in response to the crisis that unfolded on the Great Plains in the 1930s. This generated a different, but equally iconic, set

Figure 2. Yosemite Valley, Winter, Yosemite National Park (c1940). Photograph by Ansel Adams. Collection Center for Creative Photography, University of Arizona. © The Ansel Adams Publishing Rights Trust.
of environmental images, in which the joint, if conflicting agencies of natural and social processes were actively represented. By the mid-1930s at the peak of economic depression, with dust storms devastating the Great Plains and spreading a blanket of dirt as far east as Manhattan, photojournalism and the movies had replaced paintings, engravings, and prints as the principal channels of American visual culture. Both of these media produced apocalyptic images of dust clouds blackening the sun, dunes of blown topsoil overwhelming flimsy farm structures and rusting machinery, erosion gullies leaching out farmland, and the human misery, migration, and exploitation that accompanied the destruction of farmlands (figure 3).

The most sustained and widely disseminated visual presentation was Pare Lorentz’s short documentary film: *The Plow That Broke the Plains* (1936), a movie funded by the federal government and the subject of intense debate that reflected broader questions of the respective roles of nature and society in the disaster (Cunfer, 2008; Dunway, 2005, pages 33–59). The Dust Bowl was figured primarily as a social and agricultural crisis, although the film’s imagery was as strongly environmental. The history of agriculture on the Plains has been understood through either a “progressive narrative of Euro-American triumph over indigenous peoples and a harsh environment in the creation of a new (albeit somewhat dry) American Eden” or a “declensionist account of capitalist avarice, human hubris, or just plain old stupidity leading to ecological despoliation and the transformation of a pristine wilderness into the Dust Bowl of despair and destitution” (Wynn, 2007). But Lorentz drew strongly on Clementsian ecological theory to give natural processes—or rather their interruption—a central role in the narrative. The movie opened with a vision of the unplowed Plains before human settlement as a climax ecosystem, destroyed in less than a century by greed and ignorance. The environment was now exacting an inevitable revenge. The film is an eco-historical drama in which nature plays the role of avenger to human moral failure.

**Figure 3.** [In color online.] George E Marsh: *Dust Storm, Stratford, Texas (18 April 1935).* National Oceanic and Atmospheric Administration (NOAA). Coast and Geodetic Survey Historical Image Collection, NOAA Central Library.
Although himself no political radical, Lorenz adopted Soviet cinematic techniques to capture the grand spaces of the Great Plains. The region’s landscape aesthetics are very different from those of the mountain West: long and low horizontal lines, extended orthogonals, and undifferentiated spatial masses dominate. Both photographers and filmmakers found that wide-angle lenses and panoramic perspectives, often shot from low angles, emphasized the vastness of space and the insignificant scale of human enterprise in the continental interior. They dramatized the destructive capacity both of nature itself in the form of great dust clouds looming over tiny farmsteads, and of human activity in the form of deep ruts and gullies eating into deep grassland soils. Pare Lorentz was a close friend of both Dorothea Lange whose iconic photograph of a migrant mother in a California labor camp and similar portraits of the Dust Bowl’s victims became the human face of the Plains disaster, and John Steinbeck whose *The Grapes of Wrath* (1939) narrated its social consequences. Although different from the wilderness aesthetic in its strong social commitments, the Dust Bowl critique was conveyed most forcibly through pictorial images that do not themselves make clear boundaries between humans and nature.

The ecological interpretation of the Dust Bowl apparent in the cinematic narrative did not wholly escape a dualistic interpretation of nature and human action. It was more attentive to social action and consequences than the wilderness aesthetic and its natural historiography was very different: the Plains were a landscape formed over historical rather than deep time and the processes of change were correspondingly accelerated. Photography and film sought to capture a moment in history rather than represent nature’s immutable eternity, although they did construct a counterpastoral lament for a human fall from grace in ignoring natural imperatives and rhythms, or subordinating local adaptation to a ruthless, nonlocal capitalism. The poet Archibald MacLeish, commenting on Lorentz’s *The Plow That Broke the Plains*, placed its message within the dominant American frontier historiography while suggesting an unrecognized codependency of society and nature:

“Back of the whole history of the dust storms is the story of grass. For more than three centuries men have moved across this continent from east to west. For some years now ... dust has blown back across the land from west to east. The movement of men, long understood, is taken for granted. The blowing of dust little understood has filled the newspapers and rolled across the newsreel screens. And yet the two are linked together.... The two are chapters from the same book. The book is a book that has never been written” (quoted in Dunway, 2005, page 42).

MacLeish reflects the pictorial representation of the Dust Bowl in emphasizing the coproduction of human and natural worlds rather than their binary character. MacLeish’s interpretation of spatial images would play an important role in framing later 20th-century environmental discourse.

**Urban sprawl**

While ‘soil erosion’ remained a significant environmental concern in the USA and beyond well into the 1960s, social developments in postwar America produced a new subject of environmental concern. The belief that (sub)urban sprawl eats up agriculturally productive, ecologically precious, and recreationally important land, and that the highways that generated sprawl ruined the aesthetics of American landscape, emerged in the 1950s and remains strong today (Bruegmann, 2005; Hayden, 2004; Ingersoll, 2006). Mass suburbanization began in the late 1940s as a response to the accommodation needs of returning servicemen and their baby-boom families, and rapidly became a principal engine of American economic growth. Critique of its environmental
impacts has always been conflated with concerns for the consequences of accelerating social change (Harvey, 1989; Jonas and Wilson, 1999).

The concept and terminology of sprawl are highly cartographic in the sense that spatial extent rather than specific forms of environmental transformation or destruction defines it. Identification and representation of sprawl have depended heavily on graphic images, especially on aerial photographs and maps. Ironically the earliest and most widely reproduced images of American suburban sprawl were initially produced to celebrate the success of wartime industrial building techniques in providing for the postwar housing demands. In 1950 the aerial photographer and artist William Garnett accepted a commission to document the new community of Lakewood being developed to service the Douglas aircraft plant just north of Long Beach in the Los Angeles basin. His photographs first appeared in *Business Week* and their titles: “Grading Lakewood”, “Trenching Lakewood”, “Foundations and Slabs”, “Plaster and Roofing”, reflect their purpose of illustrating the stages of Fordist industrial housing production on a newly leveled site (Dunway, 2005, pages 137 – 138). The pictures show rows of suburban homes being constructed on a graded site; they are photographed in monochrome with raking light and sharp shadows emphasizing the geometry of the surface in a distinctly modernist aesthetic (figure 4). Within a very short time these celebratory images had become reconceived and widely reproduced emblems of the horrors that suburban development was imposing on both pristine nature and the social lives of American families.

Garnett’s six Lakewood photographs owe their status as iconic environmental images to their reproduction in a Sierra Club publication of 1960. *This is the American Earth*, was a photographic coffee-table book produced and edited by the ecologist David Brower: Sierra Club President and disciple of John Muir (Dunway, 2005, pages 117 – 123 passim). It was authored by Ansel Adams and critic Nancy Newhall (1960), and based on a photographic exhibition they had mounted at Yosemite National Park in 1955. Adams’s own wilderness photographs dominated the collection of environmental images, whose purpose according to Brower’s foreword was to promote a “love for the earth,” and stir the “suspicion that what man is capable of doing to the earth is not always what he ought to do, [and] a renewed hope for the wide spacious freedom
that can remain in the midst of the American earth” (Brower, 1960). With hindsight we may regard the project, in which Brower made an explicit connection between the threat to Jeffersonian liberty and the loss of wilderness, in the context of the Cold War, emphasizing America’s embrace of the intangible, spiritual values of natural beauty as opposed to Soviet secular rationalism.

Garnett’s Lakewood photographs were used in the exhibition and book as a foil to Adams’s images of Yosemite, contrasting “waves of smog and the desolate mazes of tract housing” to the pristine purity and the drama of untouched American nature. The book demonstrated Newhall’s belief in the power of the “additive caption” to work alongside the picture itself in creating meaning in the image. She and Adams altered Garnett’s functionalist captions in favor of a single line inscribed under the group of six Lakewood images reading “Hell we are creating here on earth”, making clear their belief that suburban development not only destroyed wilderness and the freedoms that supposedly go with it, but simultaneously undermined the individualism of Americans by rendering them atomized consumers of suburban uniformity (Dunway, 2005, pages 126–130). In fact, in the Lakewood images, Garnett, who was one of the earliest American artists to take aerial photography as a serious medium, had used the high oblique aerial perspective favored by New Deal advocates of comprehensive survey and regional planning. Drawing on cartographic traditions of regional representation that can be traced to Patrick Geddes’s regional survey methods, New Deal photographers used aerial survey to promote balanced development of natural resources, a perspective grounded in the same ecological principles that had underpinned Lorenz’s representation of the Great Plains. And Lakewood itself had been envisioned as an exercise in civic community building, so that schools, parks, and a recreational center were part of its planning, although they did not appear in Garnett’s images, which were intended to demonstrate industrial techniques of house construction. But the captioning in This is the American Earth gave his aerial vision of rational planning a wholly different meaning, as a picture of environmental degradation and social alienation, an intellectual protest against the assumed anomie and conformity of suburban life as well as against the destruction of the natural world by rapid urban development. Brower apparently regretted the production error that had excluded the insertion below Garnett’s images of a quotation from Isaiah: “Woe unto them that build house to house and lay field to field, till there be no place that they may be placed alone in the midst of the earth” (quoted in Dunway, 2005, page 137).

Brower’s reproduction of Garnett’s Lakewood photographs established a powerful pictorial convention in the American critique of urban sprawl. It relied on the scale effects achieved by the high-angled aerial perspective: a panoramic view with elevated horizon line and long distances while cropping the image to dramatize the uniformity of human impacts at the expense of diversified nature. While the aerial view can reveal at the regional scale the relations between natural form and human activity, it also distances people and their individual activities, reducing humans to the appearance of either mass actors wholly dominant over natural forces, or passive consumers, subject to them. Viewers of the aerial image could not rely on learned conventions of the picturesque, nor was it the abstract impressionist artwork that its surface lines and masses appeared to reference; in a formal sense the images are neutral. Determination of the environmental relationships they depict relies on the captioning, as Newhall recognized, and as continues to be the case for images of sprawl today (Hayden, 2004). If the argument about modernist binaries dominating environmental discourse in the 20th century applies in the case of images it is to these aerial photographs, but only through the written captions accompanying them.
Atomic testing

More conventional aesthetic criteria applied a parallel set of mid-century photographic images in which American nature played a central role, and which later became closely associated with concerns over environmental destruction. These were the photographs of atmospheric nuclear testing that lasted from 1946 until 1962, when it was forced underground by the limited Test Ban Treaty signed that year. Nuclear test images were widely publicized in photographic magazines such as Life and Newsweek and through cinema newsreels and television. They deployed the language of the sublime in contrasting the blinding fire and billowing black clouds with the silent locations chosen for the demonstrations, in the focus on the explosion itself, and in their scale contrasts of human bodies against the elemental power of the atomic energy released.

The moment of detonation itself could not be photographed for the obvious reason that the light energy released would destroy the lens, or at best flood the plate, so that the images concentrated on its immediate aftermath when the blinding waves of light energy had passed and the mushroom cloud rose high into the atmosphere, its heart eerily illuminated with the fires produced at ground zero (Light, 2005). Photographers adopted one of two standard compositions, taking the shot either from a low ground perspective, often framed by foreground figures of military observers or of the flimsily built structures intended to test the impacts of the explosions, or from the air, high over the test site, emphasizing the scale of the event against the earth’s surface and in the height of the cloud of released gases (figure 5). The camera’s necessary distance from the destructive event meant that the former perspective was used in the case of desert sites, the latter for oceanic detonations.

Test sites were located in the deserts of the American West or on Pacific atolls, far removed from cities and densely settled areas and easily secured from espionage. Practical as these considerations might have been, the choice of location gave the natural world a powerful agency in shaping the interpretation of nuclear test images.

Figure 5. [In color online.] Michael Light: GRABLE, 15 Kilotons, Nevada, 1953. Image used with permission from 100 SUNS by Michael Light, © 2003.
so that the environmental context played an important role in the graphic and imaginative framing of nuclear tests. Both hot deserts and equatorial Pacific islands had long been figured in modern and Western discourse as marginal—indeed ‘waste’—spaces, of limited practical value, far removed from civilization, where the powerfully erosive forces of nature in wind and sea had produced landscapes characterized by the physically and spiritually testing aesthetics of the sublime. Using such marginal and ‘testing’ natural environments as the appropriate location for scientific experimentation is a characteristic feature of modern science, as evidenced in the case of locating astronomical observatories atop high mountains (Lane, in press). In the context of such attitudes, the desert and open ocean spaces chosen for atmospheric atomic testing, nature could be altered or destroyed without significant consequences for human life, or indeed for any other organism deemed important. Such elemental landscapes of bare earth and water complemented perfectly the destructive action of thermonuclear experimentation, which was commonly represented as the human manipulation of nature’s most elemental particles and forces. If the wilderness aesthetic had been framed by the Western Sierras, and the Dust Bowl by the Great Plains, the apocalyptic drama of nuclear explosions took place in ‘empty’ wastelands.

The ideological and political discourses that connected nuclear testing to the most advanced scientific experimentation in the years before biology replaced physics as the paradigm of progressive science tended to obscure distinctions between social and natural processes. Social ‘progress’ entailed ever-greater human understanding and manipulation of the ‘forces of nature’. Thus nuclear test images were rarely read from a critical environmental perspective before the late 1950s, but regarded as celebrations of American power and technology in harnessing elemental nature, while they also played on Cold War anxieties of nuclear destruction and competition with Soviet communism. In this respect the nuclear test photographs can lend support to the argument that mid-20th-century environmental discourse was dualistic and hierarchical, but the relationship portrayed is not unambiguous. Certainly, Edward Teller’s promotion of Operation Plowshare, the twelve-year program to develop atmospheric nuclear explosions for the purposes of civil engineering, was highly dependent on dramatic landscape images and a stereotypically ‘modernist’ rhetoric of progress, the ‘conquest’ of nature and the transformation of natural environments (Kirsch, 2005). By the same token, it was emphasized that nuclear power was a force inherent within nature itself whose agency humans had come to understand and thus direct to new ends. To manipulate nature, humans had to appreciate and work with its own agency.

Moving to the poles: Whole Earth images
If nuclear testing was the most aggressive expression of Cold War competition between the United States and the Soviet Union, the space race was its most graphic, certainly after atmospheric testing ended in 1962. The two programs were of course closely connected in both technology and culture. Each depended on the application of physics to engineering, and each extended the scale and experience of what counted as ‘nature’ from the conventional Romantic and Picturesque scale and forms of landscape to subatomic and extraterrestrial scales and spaces. But the last three decades of the 20th century saw physics displaced by the life sciences as the most intellectually adventurous and productive field of natural science, and the growing significance of biology and ecology in the popular imagination. The nuclear arms race came increasingy to be associated with images of indiscriminate destruction, not only of human, but of all terrestrial life, as concepts such as nuclear winter were popularized by the astrophysicist Carl Sagan (1985). The idea that a nuclear war could alter the climate of the whole planet and lead to the extinction of life was the first of a series of putative
environmental catastrophes of global proportion, derived from increasingly sophisticated computer-generated models. These have consistently located the source of crises in human actions: nuclear warfare, the use of chlorofluorocarbons in aerosols and refrigerators, forest clearance, burning fossil fuels, and greenhouse gas release. The effects of these anthropogenic changes, including tropical rainforest destruction that became the focus of attention in the 1990s, are most immediately apparent at the poles, creating a global geography of apocalypse.

The graphic reference for global environmentalism came, ironically, from the Cold War space race. The Apollo lunar project provided the only opportunity in history for individual humans physically to witness the whole round earth. At no other time have individuals ventured far enough from the globe to see it in its entirety (although there have been many more opportunities to picture it mechanically). As I have discussed elsewhere, it was the *Earthrise* and *Whole Earth* images of 1968 and 1972, respectively, that became the emblems of planetary environmentalism (Cosgrove, 1994).

The latter image is among the most widely reproduced photographs of all time: its appearance on the cover of the countercultural and environmentalist *Whole Earth Catalog*, regarded by many as a precursor to the Internet, and its incorporation into the ‘Earth Day’ flag confirmed its status as an environmental icon. The photograph shows an unshadowed hemisphere of the Earth, with Africa and Antarctica, part of Western Australia and South America, the Mediterranean Sea, Indian Ocean, and South Atlantic all visible. It challenges conventional Western cartography of the Earth in many ways: its focus on the southern hemisphere and the salience given to Africa and Antarctica at the expense of the settled temperate zones. Bands of color denote vegetation zones, while the general circulation of the atmosphere can be traced in swirls and bands of clouds in the southern temperate cyclones and the equatorial zone.

Reading the Apollo photographs of the Earth as environmental symbols denoting the planet as a vulnerable living organism—‘Spaceship Earth’—did not arise ‘naturally’ or spontaneously from the images themselves; it was consciously constructed, indeed overdetermined. During their flight, the Apollo astronauts themselves, conscious of their own vulnerability and distance from home and loved ones, referred to the Earth as ‘home’, and, drawing on their Christian culture and the scheduling of both Apollo 11 and 17 missions at Christmas time, they read from Genesis and described the tiny blue planet as a precious ‘Christmas tree bauble’, while their responses drew on a stock of responses to ‘seeing the Earth’ that can be traced back to Plato (Cosgrove, 2001). As significant as the astronauts’ own words were those of Archibald MacLeish (who had commented on Lorentz’s dustbowl images in 1930s), whose op-ed comments on the *Earthrise* image in the *New York Times* of 25 December 1968 were widely reproduced. MacLeish claimed that “for the first time in all of time men have actually seen the Earth: seen it not as continents or oceans from the little distance of a hundred miles or two or three, but seen it from the depths of space; seen it as whole and round and beautiful and small.... To see the Earth as it truly is, small and blue and beautiful in that eternal silence in which it floats, is to see ourselves as riders on the earth together” (quoted in Cosgrove, 2001, page 258). The idea of ‘Spaceship Earth’ with human inhabitants as “riders on an isolated, self-sustaining organism fitted with the then current scientific popularity of cybernetics and systems theory” (von Bertalanffy, 1968).

While MacLeish had been promoting the ‘airman’s vision’ as a benign element within the globalizing mission of American democracy for a quarter century prior to the Apollo photographs of Earth, by 1968 his words harmonized with a broader disquiet in the USA and beyond about the environmental impacts of human progress. Critical voices were pointing to the externalities of manufacturing industry, rapid growth in the world’s population, the dangers of nuclear technology (military and civilian),
and they latched onto the space photographs of Earth, especially AS 17-22727, as visible proof of the home planet’s isolation and interconnected unity and thus its environmental sensitivity, of human insignificance against the scale of the Earth and of space, and the consequent need for planetary awareness. In the final decades of the 20th century the mere appearance of the Whole Earth image became sufficient to indicate the environmentalist sensibilities of whatever item it was attached to.

A principal graphic effect of space photography of the Earth and of the many forms of remote sensed geographical imagery that have succeeded it was to complete the transformation in environmental images from a picturesque landscape aesthetics whose perspective draws the viewer into the depth of the image, and even from the high-angled oblique perspective of the aerial photo, towards a flattened cartographic vision of geographic space. And even the conventional cartographic image is transformed in the space images, by the disappearance of latitude and longitude lines, conventional cartographic notation, numerical coordinates, and directional symbols which have no place on satellite photographs, and which become optional overlays on GIS images. The semblance of photographic realism allows us today to circumnavigate the globe virtually at any selected scale on a home computer program, even apparently manipulating perspective by tilting or rotating the image. Digital maps and computer-generated images based on statistical models and drawing on the iconography of space photography and remote-sensed earth images have become critical in making visible environmental changes that otherwise could only be known through complex mathematical notation and modeling or that operate at too large a geographical scale to be meaningful in daily life. Dramatic images of local events are increasingly available from space: for example, the patterns of rainforest clearance in the Amazon basin that were widely reproduced in the 1990s, the devastation of Hurricane Katrina along the US Gulf Coast in 2005, or the multiple fires that destroyed significant areas of the Peloponnese in Greece in 2007 (figure 6).

Figure 6. [In color online.] NASA image of Peloponnese fires, August 2007. NASA—public access.
Indeed, a recent NASA project provides astronauts on the Space Shuttle or the International Space Station with very sophisticated cameras for picturing geophysical phenomena such as eruptions, floods, or violent storms, and the effects of environmental disasters. Such images from space allow for a subliminal connection to be made with cartographic images of global environmental crises such as global warming even when no direct connection may exist. But, unlike environmental events such as a flood or tornado, a Chernobyl-type nuclear accident or a chemical release, slow-acting global environmental crises in themselves remain difficult to relate to daily life.

The challenge is to find images of predicted global environmental crises that have the emotional impact of a dust storm rising over an isolated farmstead or of Yosemite emerging as a Claudian dream of arcadia in early morning light. Remote-sensed maps or those based on computer models, like conventional maps, allow the cartographer a range of artistic choices in the choice of overlays, of design and (false) color. They are highly manipulated images that rely for their scientific authority on the realism attributed both to the map and to the photograph. Phenomena such as the ozone hole over the Antarctic mapped in the 1980s and the El Niño oceanic effects imaged in the 1990s were dramatized by the use of powerful color contrasts overlain on outlines of the continents (figure 7).

But the scale of these cartographic images greatly increases the distance between the viewer and the world over conventional landscape representation or even oblique aerial photography. It is instructive to compare figures 6 and 3. Both show large-scale pollution events from dense atmospheric particulates (dust and smoke, respectively), but while the Dust Bowl positions the viewer within a landscape that is both natural and human, demanding a subjective response that is more than aesthetic, the satellite image of Greece is highly distanciated and objective. Satellite images do not represent...
an ‘environment’ in the conventional sense of something in which life is embedded and through which it is supported, but rather ‘environment’ in the looser sense of ‘vulnerable nature’, a conceptual category with which we feel less emotionally engaged than with the landscapes of conventional modernist framing. This is exacerbated by the fact that, for all the reference to the Whole Earth, the geography of global environmental imagery is highly uneven. The main producers of greenhouse gases may be located in the temperate zones of the northern hemisphere but these are not the regions that appear most regularly in the pictorial representation of global environmental crisis. It is the tropics, and in recent years the polar regions, that have achieved prominence in representing these issues graphically.

The move to the poles raises a number of interesting issues. Like the tropics, polar regions have conventionally been represented as the ‘ends of earth’ in every sense: of space, of time, of civilization. These are ‘eschatological’ landscapes, where ‘normal’ social as well as physical geographic processes break down and apocalypse can easily be imagined (Cosgrove and della Dora, in press). Maps and satellite images of Antarctica, Greenland, or northern Siberia showing ozone holes, accelerated rates of ice degradation or the release of methane from melting permafrost, draw implicitly on a long heritage of dramatic and exotic representation of high latitudes. But there remains the problem of connecting the abstraction of choropleth maps of temperature variation illustrating warming trends in such regions to direct human experience, to find an affective image for places directly familiar to only a tiny number of observers. Where this has been most effectively achieved it has been through representing the impacts on nonhuman life within the landscape, especially on megafauna. In the tropical regions, threatened species such as tigers, crocodiles, and gorillas have dominated; gorillas attracting particular attention because of their anthropomorphic qualities.

Figure 8. [In color online.] Polar bear 2006 (Photo Credit: Christopher Szorc/courtesy of National Ice Service/NOAA) University of Chicago Science Daily 19 June 2006. http://www.sciencedaily.com/releases/2007/09/070907224237.htm
Anthropomorphism applies also to the polar bear that has become the icon of climate change in the Arctic regions (Lawson-Peebles, 1988). A web image search for ‘threatened polar bears’ reveals a limited set of compositions showing bears in family groups on the ice, with their young prominent, or positioned on the edge of open water, clinging to a floating ice edge or even apparently stranded an isolated iceberg, suggesting the rapid melting of their habitat (figure 8). Although compositionally similar to conventional landscape images, the focus is on nonhuman life, with topography and landscape acting as a backdrop, no longer a stable space of deep time and infinitely slow evolution, but of accelerating change and catastrophic extinction. At the same time, neither physical nature (landscape) nor biological nature (fauna) is represented as an active participant in the processes of environmental change (although they may have become actants in the semiological sense of playing a role in the construction of a specific narrative by the fact of being represented in the image itself). They are intended to be read as passive victims of anthropogenic processes underway in far distant locations—those of the viewer. In some respects, therefore, recent popular environmental images suggest greater distanciation and sharper binaries than those of the 20th-century modern period.

Conclusion
Pictorial images played a powerful and continuous role in shaping 20th-century environmental thought and discourse, although the nature and penetration of the media through which they were diffused evolved over the course of the century. They have become more widely accessible and demotic, and progressively individual in their reception, as the age of mass consumption has given way to highly customized and privatized modes of receiving and consuming images. The power of pictorial images rests as much in their emotional appeal as in the rational arguments they are used to support. The post-environmentalist claim that rationalism triumphed over affect in 20th-century environmental discourse is questionable in the case of pictorial images. Both the significance and reality effects of environmental images intensified over the course the 20th century, in some respects increasing rather than diminishing the distance between the human viewing subject and embodied, sensuous experience of nature. Rather than a generalized critique of ‘Modernist binaries’ we might examine the pictorial techniques favored by late-20th-century environmentalists themselves in explaining the counterposition of human subject and external nature that commentators such as Werbach denounce. The examples of both satellite and polar bear images reproduced here suggest that the distanciation of the human subject and the natural world has in some ways intensified rather than diminished: 1930s Modernist planning and even the nuclear test images were more sensitive to the coproduction of landscapes by human and natural agents.

Werbach’s urge to create “a new language, a new set of strategic initiatives, a new set of institutions, and a new metric for evaluating... success”, and his demand that environmental politics should not be divorced from questions of social justice are welcome, but they need to be framed in the context of a wholly different cultural milieu from those of the various 20th-century environmental politics. New languages are already being pioneered, and they are overwhelmingly graphic. The dominant post-environmental media are web based, digital, and interactive. Google Earth, for example, is effectively a popular GIS, allowing personal interactions with a virtual world with seamless scale change from satellite images to aerial photos to topographic and statistical cartography, giving a powerful illusion of real presence that simultaneously distances us from the animate world and brings the locality of anywhere on earth into our immediate personal space.
But its affective qualities are not thereby enhanced, even though the recent addition of local ground photography offers the viewer the option of a landscape perspective. If post-environmentalism seeks to overcome binaries that supposedly divide the sensing human body from active physical and biological processes that coproduce the ‘natural’, it should attend more carefully to the roles of image and imagination, both historically and with ever-increasing significance today, in shaping taken-for-granted environmental assumptions and experiences.

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