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Landscape as Data

From the Classical to the Consumer-Mathematical

I. COLD CARE

According to garbologists William Rathje and Cullen Murphy, the cliché "Out of sight, out of mind" rings true when it comes to garbage. Its inverse, however, is not.[1] Even when spotlighted, garbage somehow manages to escape notice, let alone anyone taking responsibility for it. Perhaps this is because waste is normally concealed from the everyday lives of privileged, "First World" citizens, whether under the kitchen sink, outside a city's limits, or on a barge on its way to international waters. On occasions when garbage and consumer waste is seen—on the news, the internet, or occasionally, in an art gallery—it elicits destabilizing responses ranging from discomfort to fleeting terror or, in the case of Burtynsky's art photography, a chilling beautification. But the environment is in crisis and these realities, no matter how disturbing, can no longer remain out of mind.

What better way to analyze these beatified "art world" images of unfathomable crisis then through the polarized forces of shock-and-awe intrinsic to the sublime? At least this has been the trend in recent years, from my analysis in the previous chapter to recent scholarship from Jill Gatlin, Catherine Zuromskis, Finis Dunaway, and Jennifer Peeples, all of whom explore the distraught relationship between visual beauty and its role in photographs of disturbing toxicity and waste. The crux of this debate was addressed in the previous chapter. Yet another problem arises when artists turn to big data and numerical visualizations of global waste. This chapter examines this dilemma through a genealogical argument about the evolution of landscape imaging in art photography. The middle sections discuss the work of German photographer Andreas Gursky, whose cool images of industrial

landscapes echo the anonymity of postindustrial global capital. The last part of the chapter turns to photographs and computer-generated images from Al Gore and Seattle-based eco-artist Chris Jordan (1963–) to discuss the way in which they convey complex forms of failure and breakdown. Building on chapter 6's analysis of the aesthetic sublime, this chapter discusses the twin concept of the mathematical sublime. I argue that adopting numbers and statistics to depict environmental waste engenders a twofold structure of failure related to (a) the literal depiction of trash and waste and (b) a failure in visual communications. Because the latter is only brought to light after an exegesis of the history of landscape photography, the chapter first provides this history, from the late nineteenth century to the beginning of the twenty-first. In charting a shift from classical "Nature" aesthetics to industrial and, eventually, postindustrial, mathematical techniques of data visualization, I establish an aesthetic archaeology of "waste landscapes," on the basis of which Jordan's and Gore's works can then be discussed.

II. TWO SUBLIMES

The above noted scholars are loosely affiliated with what Jennifer Peeples calls the "toxic sublime," a genre of contemporary fine art photography depicting waste and ruin, often as a result of the high-tech industries.[2] Some images in this genre highlight beauty (as in Burtynsky's work), while others prioritize political and activist issues (e.g.: Chris Jordan's and Al Gore's works). The divide has prompted a number of critics to question the efficacy of either one: do slick and expensive, large-scale "art house" photographs of toxic waste divert attention from environmental concerns or, to the contrary, does beauty allow us to accept otherwise horrifying realities? Concurring with the former, Gatlin argues that sublime images of waste present an "improbable catalyst" for political mobilization.[3] Unlike chapter 6, this chapter concurs with Gatlin insofar as sublime images of toxicity and environmental breakdown nullify political action when treated *mathematically*. As abstract statistics, I argue here, they engender yet another crisis in human perception and corresponding failure-qua-fascination with the transcendent capacities of the human mind.

The theoretical and epistemological failures at stake in this chapter are akin to the critical failure of the romantic sublime that precedes it. To briefly rehash from chapter 6, in the aesthetic sublime, an individual is exposed to an awe-inspiring scene or object, like a massive mountain range or a powerful thunderstorm that generates a series of complex negotiations between the imagination and the faculties of reason and understanding. This begins with a failure to grasp this breadth and a sense of fear and diminishment that this has occurred at all, followed by a questioning of identity. It concludes with a final recuperation by the faculty of

reason. But given that we are discussing images of toxic waste, not pristine mountain ranges, this final state of recuperation is again precarious. And indeed, this is what I argued in chapter 6. The toxic sublime, and what I theorized as the "X-ray sublime" in the previous chapter, unlike the classical aesthetic sublime, only finds an irresolvable standstill in the perpetual oscillation between two ambivalent forces. After acknowledging one's lack of control and inability to provide a quick fix or remedy, a subject is void of resolution and in this way, fails again.[4]

When these toxic images are pictured through mathematics and numerical abstraction, this too leads to another kind of failure, qualified by an entirely distinct set of conditions. Where both the aesthetic and mathematical sublimes, according to Kant, involve measuring size and related feelings of superiority in relation to "something great,"[5] it is only the mathematical sublime that requires a basic apprehension of numerical quanta in such a way that, strangely, relieves the subject of the need to resolve the sublime experience as something fully comprehended or even understood.[6] In the mathematical sublime, greater and greater numbers increasingly challenge the faculty of understanding. As the size of an object or phenomenon continues to grow, the faculty of reason demonstrates its capacity to reach by stretching to apprehend what is being shown or represented, and yet, Kant argues, because there is no limit in the "mathematical estimation of magnitude," all that is needed is a mere acknowledgment of quantity.[7]

The word "apprehension" derives from the Latin *prehendere,* meaning "to seize," denoting only a surface awareness of something. One "seizes" or recognizes a state of the world but does not, and cannot, judge or assess if it is true or false, ethical or unethical, and so forth. Apprehension, Kant writes, is "prior to any concept."[8] Consider Kant's own distinction between apprehension and comprehension: in judging a person's height, he explains, an assessment is made relative to the average magnitude of other people known to us.[9] This estimation of size is something we do every day, intuitively, and without much need to calculate it. This is comprehension, a basic ingredient for aesthetic experience. In contrast, in the mathematical sublime, one can attribute a precise numerical quantity to an object without "comprehending" it at all. Here, a person's height is not simply an eyeball guess or intuitive concept, but rather, quantitatively determined "by means of [external] numerical concepts."[10] In short, in the mathematical sublime, failure on the level of integrated understanding is not only acceptable, it is prescribed.[11]

In this way, the mathematical sublime becomes a suitable lens for analyzing our relationship to large quantities of computational data that surpass human understanding. In science and engineering, massive sets of numbers are manipulated by computers. In visual art and media, however, we are discussing images made *for* humans, *by* humans, which is to say, integrated understanding and hermeneutic breadth are the benchmarks of success. After the next section's archaeology of landscape photography, I return to this polemic in my analysis of Chris Jordan's and Al Gore's use of mathematical abstraction to depict the toxic sublime.

III. LANDSCAPES: FROM THE CLASSICAL TO THE INDUSTRIAL

It is not by accident that the landscape genre evolved alongside Western capitalism, from agrarian industries to mechanized production and electronic information technologies. Some of the strongest evidence of this trajectory is provided in the American and, to some degree, German landscape traditions.[12] We must first consider these non-mathematical precursors before turning to more recent, mathematically inspired landscapes.

Classical Landscape Photography

Prior to the industrial era, the landscape tradition tended largely to romanticism. Classically lush paintings of the pristine American wilderness and European hinterlands emerged on the heels of Burke's and Kant's doctrines. And even though photography (introduced in 1839) only became commonplace by the second half of the nineteenth century, in the landscape genre, it did so at first as an instrumental device—not quite the "fine art" photography that it has since been construed as.[13] At the same time, it did not take long for the first generation of photographic practitioners to test the poetic limits in the medium. Such pioneers included Eadweard Muybridge, Darius Kinsey, Carleton Watkins, Timothy O'Sullivan, and William Henry Jackson, initially hired to document the American West and its unexplored "wilderness" for government surveys. In these pursuits, they simultaneously found creative new ways to photograph the landscape.

This first generation of landscape photographers is also renowned for aiding pioneers as they trailblazed new routes across the then-wild frontiers of the United States. Carleton Watkins's massive plate work in Yosemite National Park, California (1861–65), for example, began as a set of commissions documenting a quicksilver mine for courtroom evidence,[14] while Timothy O'Sullivan's landscape images (1890–1940) were later used by the U.S. Senate in establishing the National Park Service.[15] Darius Kinsey's photographs were instrumental in documenting the logging industry's environmental effects on the Pacific Northwest from the turn of the century to the 1940s. Almost all of these photographers also had vested interests in supporting one political issue or another, albeit often inadvertently, and as a result, this body of work foreshadows both activist strategies and landscape aesthetics.

Despite the persistent encroachment of industry and Western-moving settlements, photographers and environmentalists like Ansel Adams, Minor White, August Sander, and Edward Weston perpetuated iconic images of a pristine, untouched "wild" West well into the middle of the twentieth century. Adams produced striking black-and-white landscapes showing very little evidence of human presence.[16] Even as this once-wild terrain began to disappear into the "well-traversed frontier of cultural development" that much of it has now become, such romantic images maintained a hold on the imagination of many Americans.[17]

Industrial Sublime

As the century progressed, however, clinging to mythologies of utopian purity became increasingly challenging. A second generation of landscape photographers had had enough of the deluded myths of an untainted wilderness and turned instead to industry and man-made accomplishments. August Sander, Berenice Abbott, Charles Sheeler, and Margaret Bourke-White, among others, helped to transform the naivety of the American psyche through their industrial-based landscape aesthetic. Some worked independently, while others were commissioned to document the triumphant new world of man-made concrete, iron, glass, and steel. Their work resonated with the simplicity of pure shape and form, characteristic of purist painting, related minimalist techniques, and architecture's International Style.

In 1927, Sheeler was commissioned by N. W. Ayer & Son to photograph the Ford Motor Company's new River Rouge plant in Dearborn, Michigan. He produced a series of clean, modernist images of the plant's natural architecture, emphasizing the beauty of its hard lines and geometrical "bisections" and the way they formalized a pattern of repeating lines.[18] Bourke-White's influential work featured equally bold industrial shapes and forms, most notably her *Plow Blades, Oliver Chilled Plow Company* (1930); her upward-looking views of the Chrysler Building (1930); and her remarkable images of a DC-4 flying over Manhattan in 1939, presumably shot from the upper stories of the Empire State Building. Bourke-White's *Diversion Tunnels, Fort Peck Dam* (1936) are also spectacular in their stark depiction of gargantuan steel structures used to manage water in the Fort Peck dam. In the foreground one sees enormous sections of the pipes waiting to be installed in the Missouri River.[19] In some images from the series, people stand in the foreground, their relative size dwarfed by the gigantic pipe sections they face. In other images from the series, the metal edifices are featured in the foreground with an overcast sky and a small range of hills barely detectable in the background. The contrast, again, retroactively intensifies the magnificence and dominating presence of the man-made structures.[20] The land that once impressed classical landscape artists here becomes the mere backdrop for a new generation of nature-defying machines.

Sheeler's and Bourke-White's work reinforce David Nye's concept of the "Technological Sublime." According to Nye, the concept of the sublime transformed from the "natural sublime" to a "technological" one with the advent of industrialization and mechanical reproduction. The massive changes to culture and society resulted in such "incomprehension" and "astonishment," industrial culture readily supplanted their earlier fascinations with nature for the grandeurs of man-made achievements.[21] Examples abound, from New York City's Times Square spectacle to early skyscrapers or, Peeples suggests, to watching Neil Armstrong walk on the moon.[22] A century of such achievements has replaced the God of Nature with

symbols of humanity's omnipotence. Hence Nietzsche's dictum that "God is dead" because he has been replaced by modern science and industry. Nye's notion of a technological sublime also invokes a Promethean pride in humanity's endeavors. But recall from chapter 1 that Prometheus *stole* fire from the gods to make amends for his brother's error. Furthermore, according to this origin myth, technology is not only a prosthetic, supplementing what we do not have and cannot accomplish without it but also, a mark of eternal dependence. This side of the myth is of course largely absent in the work of this generation of landscape photographers. Industrial materials like metals and ores may not be stolen from the gods, but they are mined from the earth in ways that are often reckless and without care. I return to this in my concluding discussion of Jordan's work. Here, such environmental concerns are still a distant reality, if at all.

IV. POSTINDUSTRIAL HABITATS

The "New Topographic" Landscape

As noted in chapter 4, one 1975 exhibition is accredited for single-handedly pioneering a shift in contemporary aesthetics.[23] *New Topographics: Photographs of a Man-Altered Landscape*, shown at the George Eastman House, included work by Robert Adams, Lewis Baltz, Bernd and Hilla Becher, Joe Deal, Frank Gohlke, Stephen Shore, and Henry Wessel Jr., all of whom depicted flat and vernacular landscapes, in stark contrast to the Promethean visions noted above. The artists in the show chose generic, man-made landscapes like tract houses, suburbia, strip malls, industrial parks, trailer parks, roadside hotels, and generic cars and apartment buildings, and photographed them in a deadpan, prosaic fashion.[24] Writing for the *New York Times,* Vicki Goldberg claims this turn to the vernacular christened culture's second nature, one more authentic than the God-given first one.[25] The exhibition's curator, William Jenkins, called it "anthropological rather than critical, scientific rather than artistic,"[26] marking a growing pessimism towards so-called triumphant machines and their implicit links to social and cultural progress. This generation of artists worked in the postwar boom of the 1960s, which is to say, during a time when most people sought and found comfort in the stable and familiar. But the *New Topographics* artists (in conjunction with the German School, as discussed in chapter 4) rejected this, turning the mundane into a too-cool aesthetic, which, for better or worse, went largely unnoticed.[27] Their key move, Catherine Zuromskis argues, was to consider the landscape as a "cultural formation" versus "simply what is out there." The landscape was taken as a complex system where politics, ideology, mythology, and economics all played vital roles constructing who we are and how we experience the world.[28] These photographers moved away from naturalism and the modernist mythology of unfettered progress to embrace instead a prosaic intimacy with everyday material life, ironically

in touch with the culture's broader tendency to prioritize economic advancement over collective, social, or environmental good.

Artists like Lee Friedlander, Robert Adams, David Hanson, David Maisel, Alan Berger, Peter Goin, Emmet Gowin, and German photographer Andreas Gursky continued to work in this vein for the next few decades. Friedlander's work, for example, while not included in the 1975 exhibition, accurately reflects a nascent consciousness of postwar consumerism. He made his name by renting a car and driving around the country, using black-and-white photography to document the highways, motels, and strip malls of Cold War America. From this, he produced his best-known series, *America by Car* (1995–2009), depicting the new Fordist landscape of automation and convenience from the inside and out. On the surface, Friedlander's images speak to the cliché postwar American psyche, with its expectations of comfort and convenience. On a deeper level, his images confront a subtle play between cultural nostalgia and destitution more familiar to the present. Likewise, Robert Adams's *Santa Ana Wash, Next to Norton Air Force Base, San Bernardino County, California* (1978) depicts a desert landscape with shrubs and trees. Barely detectable in the distance is an airplane. Its bareness illustrates how the image is blatantly unconcerned with glamorizing nature or paying tribute to industry's greatness. In fact, it actively eschews such precursors, apropos of the new school of landscape cool, favoring the flat and banal, the "here and now," as Britt Salvesen puts it. In sum, what we see here, and in other images from this landscape genre are the "mundane qualia" saturating the contours of postwar life.[29]

Andreas Gursky's Consumer Landscapes

On the other side of the Atlantic, German photographer Andreas Gursky blazed a similar trail towards man-made landscapes. Before discussing Gursky's work, it should be noted that while some of the concerns of the American photographers noted above may be shared with the German School, they also have acute distinctions and should not be treated analogously.[30]

Gursky's primary connection to the New Topographics was through the exhibition, which included the work of his teachers Bernd and Hilla Becher (see chapter 4).[31] My inclusion of figures from the Becher-led Düsseldorf school in an analysis otherwise focused on American landscape photography further elucidates historical and aesthetic connections between the two countries and the ways in which they have both operated as industrial power houses.[32]

Gursky is known for an elegant series of "eye-zapping" images that, according to Chris Jordan, depict our commodity-patterned world.[33] Synthetic and industrial colors are normalized as vernacular facets of our second nature, characterized by post-Fordist office spaces and global communication networks. Like others in his generation, Gursky's work is shot in color, but his hues, like Stephen Shore's, evoke neither the bright, hypersaturated colors of William Eggleston nor the supernatural hues of Eliot Porter.[34] Rather, his palette is washed out and dulled, corresponding

FIGURE 39. Andreas Gursky, *Tokyo Stock Exchange* (1990). Gursky photographed crowd scenes in the 1990s and 2000s, illustrating a key shift in the distribution of objects and bodies in space. © Andreas Gursky / SOCAN (2019).

with the energy level of the workers he depicts who spend thousands of hours toiling under electronic lights and screens. For example, Gursky's *Düsseldorf, Airport, Sunday Walkers* (1985) depicts a small group of people who have "either walked or biked to the airport." The image is composed from behind, Michael Fried points out, suggesting that what is to be seen is…nothing! That is, we see the same banal reality that the people in the image see. No magnificent airplane is taking off nor is there an awe-inspiring landscape in the background. Rather, the image documents banal sightseeing on a boring "overcast" Sunday afternoon.[35]

In the 1990s, Gursky began digitally manipulating his images, producing what are now considered his capstone works: *Tokyo Stock Exchange* (1990), *Paris, Montparnasse* (1993), *Prada I* (1996), *Atlanta* (1996), *Untitled V* (1997), *Chicago Board of Trade* (1997), *Times Square* (1997), and *Rhine II* (1999). Taken together, Fried suggests, they evoke an ontological and spiritual void. *Singapore Stock Exchange* (1997) and *Hong Kong Stock Exchange* (1994) portray extremely geometric images of a large number of Asian workers assembled around their computer stations.[36] As both Peter Galassi and Fried argue, the photographs depict many people, but no individuals per se; they are portraits without subjectivity. For one,

FIGURE 40. Andreas Gursky, *99 Cent* (2001). Spectral colors pop and compete for a viewer's attention. None of nature's subtle charms remain. © Andreas Gursky / SOCAN (2019).

the images are not composed from a particular viewer's perspective, suggesting instead a new landscape of rational and homogenized indifference.[37] *Tokyo Stock Exchange* (1990) is somewhat less rigid in its geometric organization, but comparable in its absence of any single focus, perspective, or horizon line. The image depicts stock market traders' "somewhat fervent absorption in their transactions," Fried writes, conveying a collective human-economic system, while still lacking specificity or personal expression.[38] This machine-like "all-overness," captures a slice of the pervasive postindustrial landscape, sadly void of a graspable whole.[39]

Lastly, more recent but related work by Gursky includes *Dortmund* (2009), an image of a massive crowd wearing yellow at a soccer match, and *99 Cent* (2001), a view of the aisles in a grocery store with various synthetically colored candy wrappers and processed food items, deploying seriality and repetition to create a playful and purely graphical visual interest. Like the human workers depicted in the preceding images, the candy bars are equally void of individual identity or presence. Both humans and machines are treated as anonymous nodes in much larger systems of command and control. Such is the paradox of global infrastructures: the more sophisticated they become, the less we can see or relate to them.[40] In sum, Gursky's work offers a preliminary set of strategies for visualizing how excessive technology in an age of global capital operates in relation to human experience. His images take a slice of the rapid movement of people and data and freezes them; making them static in movement and momentum, but already beyond any one single, human vantage point. There is no longer room for individual experience, let alone social ideals. Specific tasks, personalities, or unique psychologies become

obsolete in this ominous landscape of network flows and invisible, but seemingly omniscient, imaging mechanisms.

V. CHRIS JORDAN'S MATHEMATICAL LANDSCAPES

Ecology in every way has to do with "love, loss, despair, and compassion," ecologist Timothy Morton argues, suggesting ecological images necessarily integrate physical and metaphysical registers, especially those displaying breakdown and ruin. And yet, how can any single image of ecological waste convey anything else, with 260,000 gallons of gasoline burned in motor vehicles in the United States every minute, not to speak of fifteen million sheets of office paper used up in five minutes, and 426,000 cell phones retired every day?[41] Moreover, when asked to "think green" in all of our activities and affairs, where and how does one seemingly insignificant person begin? Consider too, the preceding statistics are almost two decades old, taken from studies in 2000. In 2015, the *New York Times* alluded to the "1980 consultants for AT&T [who] projected that 900,000 cellphones might be sold by 2000. In fact, there were 109 million sold by then."[42] By the end of 2018, GSMA Intelligence reports, "5.1 billion people around the world subscribed to mobile services," with 700 million more projected to subscribe by 2025.[43] Yes, the numbers are big, and the difference significant, but in terms of grasping just how much and why, do we not fall short every time? Do recent trends in computational analysis and numerical abstraction help us to get a better grasp on these stark realities? Or, given our inability to absorb such large numbers (as outlined in the above discussion of Kant's mathematical sublime), do they not instead perpetuate blind and hysterical responses to what has become the fastest-growing and most toxic portion of waste in American society: e-waste?

Alongside a number of media activists, San Francisco-born photographer Chris Jordan has been seeking solutions to these questions by turning to computer simulation and big data. Such strategies seem to provide an appropriate response to the massive overhauls in global, infrastructural, and aesthetic registers, but in less obvious ways, they fail. This section analyzes Jordan's mathematically inspired strategies for illustrating mass consumption and corresponding forms of e-waste and garbage accumulating across the globe, presented as a provocative and not unproblematic turn in twenty-first century landscape imaging.

Jordan's giant images (some 6 to 12 ft tall and up to 5 ft wide) are not unlike Edward Burtynsky's phantasmatic large-scale images of toxic and industrial waste.[44] Many of Jordan's images are also printed in limited editions, for exclusive display in galleries or museums. Unlike Burtynsky, however, Jordan draws on and prioritizes mathematics—statistics and big data gleaned from internet research—to visually convey difficult and challenging "truths" about the global landscape's rapid environmental breakdown.[45]

Before turning to photography, Jordan was an attorney engaged in corporate litigation but eventually found the work "soul-draining."[46] In 2003, he tore up his law degree and turned to photography full-time. He has since made a number of portraits and series depicting global waste, high-tech trash, ecological breakdown, and the effects of mass consumption that, in his words, examine American culture "through the austere lens of statistics,"[47] resulting in a series of contentious images contrasting visual beauty with the ecological horror show of the consumer practices in which we are all complicit. His early work depicts numerically derived images of global landscapes in critical condition. More recently, he has turned from troubled landscapes to equally harrowing issues such as elephant poaching in Africa and the aftermath of disasters like Hurricane Katrina.[48] Below, I consider images from Jordan's series *Intolerable Beauty: Portraits of American Mass Consumption* (2005) and *Running the Numbers: An American Self-Portrait* (2007) to assess their efficacy in conveying environmental failure as a result of the high-tech industries.

Running the Numbers

Running the Numbers consists of a series of "intricately detailed prints assembled from thousands of smaller photographs," each one illustrating specific quantities of various products consumed in the United States during given periods.[49] *Plastic Bags* (2007), depicts 60,000 plastic bags, the number used every five seconds, while *Car Keys* (2011) presents an image of 260,000 car keys, equal to the number of gallons of gasoline burned in motor vehicles every minute. Similarly, *Cell Phones* (2007) illustrates 426,000 cell phones, the number retired every day circa 2000;[50] and *Plastic Cups* (2008) depicts a million plastic cups, the number used on airline flights every six hours.[51]

Running the Numbers began in 2005 as an "experiment with Jeep Liberty" (an SUV produced by Jeep from 2002 to 2012).[52] The artist's goal for the series was to repeat a set of images until they embodied his chosen statistic to reflect this facet of American culture. How, he asks, could he produce a "different effect than the raw numbers" did, and as we also encounter daily in books, magazines, and the news; "statistics [that] can feel abstract and anesthetizing."[53] The *Running the Numbers* images joined statistics with images to produce an alternative aesthetic that aimed to transform everyday manufactured objects into existential questions.[54] Images in the series also allude to iconic examples of landscape art, which, unlike his work, are intrinsically linked to norms of classical beauty. *Impressionism (Cans Seurat,* 2007), for example, is based on the well-known painting by Georges Seurat, *A Sunday Afternoon on the Island of La Grande Jatte* (1884). Seurat's image consists of dots or points of color in what has since become known as pointillism, and Jordan's image is similarly constructed out of 106,000 variously colored aluminum cans, the number used in the United States every thirty seconds.[55] When viewed on the artist's website or as documented during his appearance on *The Colbert Report*,

FIGURE 41. Chris Jordan, *Cell Phones* (2007). Jordan "stood on a ladder, gazing down at 3,000 or so used cellphones in a pile on the warehouse floor. His 8×10 view camera was perched even higher, on a tripod 12 feet above them" (Gefter, "Great Big Beautiful Pile of Junk"). Courtesy of Chris Jordan.

FIGURE 42. Chris Jordan, *Cans Seurat,* on *The Colbert Report,* October 11, 2007. Composite image of 106,000 soda cans—the number used in the United States every thirty seconds. The audience gasped when the camera zoomed in on the image to reveal cans with corporate logos used as the building blocks for the image.

the two-fold dynamic is illustrated as the camera zooms in to view the details of each soda can used as a "point" to make up the larger image.[56]

The juxtaposition between a more distant "whole" and close-up "parts" is one solution to the challenge of dealing with large quantities. But, again, the aim is not visual beauty as traditionally defined but the capacity to convey the breadth of such gargantuan numerical data. Put differently, Jordan's perceptual field is not constituted through light and color, but by quanta. The repetition of simple shapes and forms are used to draw a viewer into a social and environmental "territory they might otherwise be reluctant to enter," the artist explains, "inviting the viewer in close, to stay a while."[57] Granted the realities he points to are urgent and demand attention, one cannot help but wonder if the way he portrays them is effective. Substituting metal cans for colored dots or, for pixels in the world of computer graphics, is in essence a simulation. That is, it is further removed and abstracted, not only from landscape, but also from concrete experience. This is not a value judgment but an observation on the capacity of a digital image to speak to us. By depicting quantities of e-waste and high-tech trash resembling what very few people have ever seen or experienced firsthand—a reality not even seen in the image itself, but only pointed to through the caption—simulated image-worlds become a discursive exercise that attempts to relate to everyone about no-actual-thing in particular.[58]

Plastic Bottles (2006–7) raises the same issue. Jordan began this piece by taking a photograph of a few hundred plastic bottles assembled in his driveway. He then rearranged the bottles numerous times, photographing each new arrangement.[59] The images were then imported into Photoshop and reassembled into a single image, representative of the two million bottles opened in the United States every five minutes. The results were printed onto large-scale limited edition papers, 60″ × 120″ prints, using an Epson UltraChrome process. The method is efficient, given the large numbers with which Jordan is dealing, but ultimately, he was visually simulating a non-existent physical space.

Philip Gefter's 2005 *New York Times* article on Jordan's work discusses the artist's strategies for representing quantity. In one instance, Gefter reports, Jordan "stood on a ladder, gazing down at 3,000 or so used cellphones in a pile on the warehouse floor. His 8×10 view camera was perched even higher, on a tripod 12 feet above them." Jordan was photographing discarded cell phones at CollectiveGood in the suburbs of Atlanta, one of the few U.S.-based electronics recycling sites. He wanted to portray 130 million cell phones in one image, to represent the number of cell phones discarded annually. However, in order to do this, CollectiveGood informed him, he would have to "reproduce the picture he was now getting ready to take about 43,000 times, creating a panorama that would stretch 61 miles if the photos were laid side by side."[60] This presented an obvious logistical problem, especially given Jordan's goal to "give a concrete sense of our consumption" practices. In this way, his digitally simulated collages seem to be a viable solution.

Jordan's *Paper Bags* (60″ × 80″), *Cell Phones* (60″ × 100″), and *Denali Denial* (60″ × 75″) all use this technique to represent vast quantities of objects, standing in for equally gross patterns of consumption.

Recall that in the mathematical sublime, numerical abstraction only requires a basic "apprehension," which is always already "beyond understanding."[61] Perhaps then we do not require any further explanation for these data-driven simulations? In this way, Jordan's work employs the basic precondition of the mathematical sublime: to deploy numbers and abstraction (caption and simulated visual re-presentation) to evoke a lack of comprehension or failure to fully grasp on the level of understanding.[62] Jordan's images then simultaneously undermine the integrity of the "landscape" genre as a realistic or contingent rendering of the world as it actually is, introducing a new form of digitally simulated landscapes by expanding the terrain of conventional data visualization. The role of the caption in relation to the image arguably resolves this tension. Their integration in *Running the Numbers,* Jordan explains, produces a "translation, from the deadening language of statistics into a more *universal visual language* that might allow for more feeling."[63] In this way, his digital collages are antithetical to the landscape genre, offering instead a proto-form of data visualization that, I submit, has begun the hard climb of moving a visual image away from the attributes of sense perception. If this is true, then can this work be included in the landscape lineage at all? The lineage I have charted in this chapter allows us to see how Jordan's work can indeed be positioned at the end of this legacy, a move that, in turn, reveals the limits of the now-older visual episteme. This lineage also sheds light on a progressive aesthetic tendency towards anonymous and numeric-based abstraction, lacking indexical relation to lived experience.

Recall too that Jordan is less concerned with the surface aesthetic than with an image's implied meaning. He has even gone so far as to note a dissatisfaction with viewers who associate his images with notions of beauty. Subsequently, he has attempted to eviscerate any possibility of "beautiful" interpretations of his work. His eccentric focus on activism over aesthetics (at least within the world of large-scale art photography) also explains his tendency to discuss his work in terms of the ecological facts driving the images, rather than the images themselves. Furthermore, rather than throw the baby out with the bathwater by reframing Jordan's use of abstract numbers within the legacy of landscape photography, we might reconsider the role of the mathematical sublime in contemporary landscapes, especially ones addressing global relations and, by extrapolation, the increasingly prominent role of big data in them.

The mathematical sublime is a transcendent realm beyond the need of comprehension; it needs only a basic, immediate apprehension, which makes it an obvious choice for analyzing realities and phenomena that have already moved too far beyond human grasp or magnitude (computation being the primary candidate here). Put differently, and as noted in the chapter's introduction, the mathematical

sublime presents a condition of "absolute greatness *not* inhibited with ideas of limitation";[64] it does not require comprehension, which is fine for indicating truth, but insufficient as a hermeneutic or for any humanities-based interpretation, which, arguably, the arts serve. In reaching the limits of the two-dimensional visual image in the globally connected infrastructures of the twenty-first century, the use of numerical abstraction in data visualization seems a promising solution, ostensibly without limit, as Kant proposed, but in terms of meaning, a whole host of other problems emerge.[65]

VI. BIG DATA'S FAILURES

Like Jordan's visualizations, David Guggenheim's documentary film *An Inconvenient Truth* (2006) employs numbers and computational data to represent environmental breakdown and global warming. The film focusses on former U.S. vice president Al Gore's efforts to educate people about global warming and it has been affiliated with great successes, including an Academy Award, being a co-recipient on the Climate Change panel of the 2007 Nobel Peace Prize, and underpinning Gore's "phoenix-like rebirth" as a global warming "rock star."[66] After viewing the film, critics noted "just how entertaining and enthralling" they found it. One critic noted his surprise when he assumed he was going to be watching a film on "the most boring of all subjects. . . . But I promise, you will be captivated and then riveted and then scared out of your wits." Another critic noted the film to be "full of surprises," offering viewers an "emotionally rich [and] visually entertaining story."[67] Unlike the vast majority of environmental media campaigns, Finis Dunaway writes, Gore's film challenged media conventions by articulating the "accretive crisis of climate change," global warming, and toxic waste over time, establishing a "bond" between historical, scientific, and emotional registers.[68]

At the same time, as the film employs statistics and cutting-edge computer simulation techniques to render future scenarios of dystopia and apocalypse, a concerning pathos takes hold. Scenes of environmental breakdown and global warming resembling Hollywood spectacle are a far cry from level-headed solutions or actual activist reform. For example, the film overwhelms audiences with data on environmental breakdown and global warming. Gore and Guggenheim make a "surprisingly captivating" use of a graph, Dunaway explains, with a "jagged red line" moving in an upward direction from the bottom left corner to the upper right of the image, representing the change in the amount of carbon dioxide in earth's atmosphere over the past 650,000 years on earth. A pale blue line indicating temperature runs along the horizontal *X*-axis (indicating time), just under the red line. When the blue line spikes, the red line does too. The *X*-axis is steady until the last section of the graph, indicating the present and immediate future, when the red line skyrockets to immeasurable levels. The message is clear: as the amount of CO_2 in the atmosphere rises, global temperature will dramatically rise in tandem.[69]

Unsurprisingly, the film's staggering statistics evoke intense emotional responses from the audience. "I can't think of another movie in which the display of a graph elicited a gasp of horror," *New York Times*'s A. O. Scott writes. "when the red lines showing the increasing rates of carbon dioxide emissions and the corresponding rise and temperatures come on screen, the effect is jolting and chilling."[70] The scene incites a heightened, horror movie-like pathos— but to what end? To my mind, this kind of shock effect through mass abstraction and extrapolation creates paralysis and an incapacity to respond. I do not seek to detract from the ethical or political importance of Jordan's or Gore's work, but it is nonetheless crucial to remain critical about the precarious ways in which the global landscape's changing conditions are represented through the visual arts and mass media. In short, Guggenheim and Gore's film, like Jordan's imagery, zero in on apocalyptic doomsday scenarios by leveraging inverted modern mythologies of human grandeur.

Asides from shocking privileged viewers in locations often far from the most critical sites of climate change, the film also marginalizes those who actually endure these environmental catastrophes. To unpack this claim, let's consider the film from a slightly different perspective: cuteness. Dunaway offers the example of Guggenheim's animated polar bear, which viewers watch "repeatedly but unsuccessfully" in its attempt to "climb on to chunks of melting ice."[71] The iconic polar bear's cuteness trumps reality. Another cute bear adorned the April 2006 cover of *Time Magazine*, Dunaway continues, a "lone polar bear" is seen "perched on floating ice, gazing uncertainly at the surrounding sea. The byline reads: "Be worried. Be very worried."[72] But the bear seems aloof. At the very least, Dunaway argues, the images made the polar bear a national icon of sensationalized environmental issues.

Around a year later, in the spring of 2007, the famed portrait photographer Annie Leibovitz photographed "Hollywood heartthrob" Leonardo DiCaprio for the next annual green issue of *Vanity Fair.* This would be the magazine's third such issue; the first one in 2005 featured Julia Roberts, and the second, Madonna in 2008. In Leibovitz's portrait of him, DiCaprio is perched on a glacier beside a "digitally added image of Knut, a popular polar bear cub from the Berlin zoo."[73] Such Hollywood mash-ups may help incite emotional responses to the long-term effects of global warming, but they do so through seduction and distorted visualization.

These kind of sensationalizing images can also be seen in the more recent collaboration between V Magazine and Oliver Peoples. In their short music video, *Heatwave* (2019), directed by Grant Greenberg and produced by Derby for V Magazine, the directors attempt to make "recycling fashionable." The video was shot at the Sims Municipal Recycling Center in Brooklyn and features dancers and fashionably-clad models prancing around stacks of plastic primed for recycling.[74] While the video may in fact increase the trendiness of recycling, it simultaneously perpetuates the production of waste by esteeming plastic and synthetic textiles in the form of wearable fashions (viscose, polyesters, and the various other

plastic-based makeup and dyes that the dancers are wearing). Such materials not only produce more toxins and waste during their "off-shore" production but also, additional waste through "fast fashion" cycles of planned obsolescence. (This is discussed at length in the book's postscript.)

There is of course nothing wrong with invoking our intrinsic human need for affection, or our tendency to seduce through glamor and cuteness in order to connect, but the way in which this appeal is made in these magazines, videos, and animations either placates or exacerbates anxiety. The titillating sex appeal of movie stars and hip new fashions pander to aesthetic modes often divorced from the underlying issues. For example, as Dunaway explains of *An Inconvenient Truth*, it foregrounds a cute bear but "completely ignores the plight of Arctic indigenous peoples whose cultures and landscapes are facing profound changes produced by melting polar ice."[75]

Is manipulation through cuteness, fashion, or sex appeal any worse than manipulation through numbers? For one, cuteness and sex appeal can operate in a similar way to numerical abstraction, distancing a viewer from the complexities of a viewed subject, which, in turn, effectively soothes potentially panicked responses.[76] Aesthetic cuteness, as Sianne Ngai argues, is a political category rooted in dominant and submissive power relations.[77] The aesthetic category of "cuteness" seldom receives serious academic consideration, she notes, and, since Kant, has been marginalized—along with color—from the upper echelons of aesthetic judgment and truth.[78] Ngai's goal is to redeem this aesthetic category as worthy of serious consideration. For her, the surface-cuteness seen in a bear or animated character holds a much deeper significance, connected to an implicit and often unconscious violence or aggression on the part of the spectator. Participating in the cultural practices of cuteness, she suggests, implies one is also, perhaps unknowingly, enacting deeper fantasies of control and domination.[79] In "apprehending" something cute, a beholder or viewer does not have to cognize or make meaning, in essence, a watered-down equivalent to the low-level engagement intrinsic to Kant's mathematical sublime. That is, a failed attempt to gain control fit for an age where we all have less and less of it. The inability to grasp the magnitude of numbers in the mathematical sublime of Gore and Jordan, now ubiquitous in so many depictions of global waste, breakdown, and crises, is quickly replaced, not by an acknowledgment of difficulty or challenge, but instead by the quick and cheap apprehension of affect, whether as cuteness, fear, or both.[80]

In sum, any single image from Gore or Jordan, or others using data visualization strategies, removes reality from its "holistic lifeworld," as the phenomenologists referred to it. Abstraction by definition denies the nuances and subtleties of context. And yet, by abstracting signals into numerical representations, they become a kind of free-floating noise, up for grabs for any interest or re-signification, ripe for re-territorialized "capture" as Deleuze and Guattari put it.[81] But what other option is there? If information-intensive landscapes and data visualization

have become the primary lens through which we access the world, then further consideration of the ways in which numbers fail to communicate is required. First, we must consider how data-simulated images fail worldly contexts, followed by their impressive but impenetrable capacity to exceed human comprehension. The task is not simple. As Paul Edwards notes, we may never know more about global warming trends because our constantly shifting standards have lost a consistent baseline to calculate deviations from.[82] Herein lies the perversity of bearing witness to our own destruction while erasing the very means necessary to track it.

This chapter has used landscape photography to map the historical trajectory behind this predicament, from its origins through the advent of consumer culture, drawing on the works of Ansel Adams, Andreas Gursky, Chris Jordan, and Al Gore as benchmarks in the process. In conjunction with the previous chapter, it charted the difficulties, failures, and successes in depicting waste and trash. Where Burtynsky's work introduced us to an environmental magnitude comparable to Kant's aesthetic sublime, and Gursky's to one apropos of the consumer environment, in Jordan's we face the limits of these strategies, but, in turn, a new set of imaging techniques that speak to the more immediate failures of communication in a global landscape.